

# FENDT

**WERKSTATTHANDBUCH  
WORKSHOPMANUAL  
MANUEL D'ATELIER  
MANUAL DE TALLER  
MANUALE PER L'OFFICINA**

## ***FAVORIT 900***

**916** chassis no. 23/3001 and up

**920** chassis no. 23/3001 and up

**924** chassis no. 23/3001 and up

**926** chassis no. 23/3001 and up

**Note:**

**If not noted otherwise, is the document valid for the North-America version also (chassis no. 9xx/24/xxxx)**

Ausgabe 12/2001 Edition

# 1

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Assembly overview</b>	<b>A</b>
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<b>0000</b>	<b>Tractor / General system</b>
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<b>1000</b>	<b>Transmission</b>
1005	Transmission control unit
1010	Differential
1015	Axle drive
1030	Handbrake
1050	Housing
1070	Brake system
1080	Vario transmission unit
1090	Emergency control
1100	Clutch actuation system
1150	Cardan brake
1170	ML range control
1200	Front PTO
1220	Live PTO
1320	Front-wheel drive
1430	Hydrodamp
1432	Hydraulic pump
1470	Transmission lubrication system
1490	Pump drive
1530	ML variable-displacement system
1600	Enhanced actuation system valves
1620	Enhanced actuation system pipes

<b>2000</b>	<b>Engine</b>
2010	Cylinder head
2020	Speed adjustment
2050	Cooling system
2060	Fuel system
2170	Exhaust brake
2180	Cold-start system
2190	Intercooler
2210	Crankcase
2250	Engine preheater
2312	Lubrication
2710	Injection pump
2712	Injectors
2714	Governor

Date	Version	Page	<b>Assembly overview</b>	Capitel	Index	Docu-No.
04/2000	<b>b</b>	1/4		<b>0000</b>	<b>A</b>	<b>000009</b>



<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Assembly overview</b>	<b>A</b>
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<b>3000</b>	<b>Front axle</b>
3010	Front axle support
3020	Axle housing
3050	Suspension
3060	Suspension valve fitting
3070	Suspension pipe
3100	Track rod
3120	Steering cylinder
3170	Frame
3180	Cardan shaft
3190	Diff. lock actuation system

<b>4000</b>	<b>Steering</b>
4070	Steering wheel
4090	Hydr. steering assembly

<b>5000</b>	<b>Vehicle body</b>
5010	Body
5030	Driver's seat
5050	Hitch
5161	Hitch trailer coupling
5200	Cab mount, suspension

<b>5500</b>	<b>Air conditioning</b>
5520	Compressor drive
5530	Coolant lines
5550	Evaporator
5560	Condenser
5570	Electric cables

<b>8100</b>	<b>Cab</b>
8113	Heater
8114	Ventilation
8117	Windscreen wiper
8121	Cable loom

<b>8600</b>	<b>Power lift</b>
8610	Electrohydraulic control EPC
8618	Electrohydraulic remote control
8631	Power lift

<b>8700</b>	<b>Three-point hitch</b>
8730	Lift arms
8740	Support

Date	Version	Page	<b>Assembly overview</b>	Capitel	Index	Docu-No.
04/2000	<b>b</b>	2/4		<b>0000</b>	<b>A</b>	<b>000009</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Assembly overview</b>	<b>A</b>
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<b>8800</b>	<b>Air compressor</b>
8810	Compressor
8820	Brake fittings
8830	Lines
8850	Electrical actuation system
8890	Air tank

<b>8900</b>	<b>Front loader</b>
8910	Mounting frame
8915	Hydr. implement actuation system
8955	3rd hydr. circuit
8958	Multi-coupling
8970	Pipes
8990	Lift cylinder

<b>9000</b>	<b>Electrics</b>
9010	Generator
9015	Starter inhibitor
9040	Fuses
9050	Battery system
9060	Starter motor system

<b>9200</b>	<b>Front power lift</b>
9210	Power lift
9211	Electrohydraulic remote control
9220	Cylinder
9230	Pipes
9260	Enhanced-control power lift
9280	Frame

<b>9400</b>	<b>Hydr. pump assembly</b>
9410	LS pump
9420	Transmission pump
9430	Steering pump

<b>9500</b>	<b>Hydraulic pipes</b>
9510	Basic circuit
9516	Power lift
9525	with oil cooler
9530	Hydr. trailer brake
9531	Steering
9534	Reversing system

Date	Version	Page	<b>Assembly overview</b>	Capitel	Index	Docu-No.
04/2000	<b>b</b>	3/4		<b>0000</b>	<b>A</b>	<b>000009</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Assembly overview</b>	<b>A</b>
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<b>9600</b>	<b>Hydr. equipment</b>
9605	Hydr. connections
9610	Central control block (ZSB)
9620	Valve fitting
9666	External hydraulic supply
9690	Valve supplement

<b>9700</b>	<b>Electronics</b>
9710	Instrument panel
9715	Vario terminal
9717	LBS - agricultural bus system
9720	Transducer
9730	Radar sensor
9740	E-box
9750	Transmission actuator unit
9760	Joystick
9770	Control unit
9780	Engine EDC
9790	ECU, power lift

<b>9900</b>	<b>Service</b>
9920	Special tools
9970	FENDIAS

Date	Version	Page	<b>Assembly overview</b>	Capitel	Index	Docu-No.
04/2000	<b>b</b>	4/4		<b>0000</b>	<b>A</b>	<b>000009</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Documentation structure</b>	<b>A</b>
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The fundamental feature of this documentation is that the different tractor types are divided into main assemblies which correspond, with a few exceptions for technical reasons, to the FENDOS structure. These main assemblies are, for example, "0000 - Tractor/General system" ; "1000 - Transmission"; "2000 - Engine" etc.

The main assemblies are sub-divided into subassemblies, e.g. "1005 - Transmission control unit"; "1220 - Live PTO" etc.

Please see document 0000 A 000009 for an overview of the assemblies.

Each assembly is subdivided into various registers which are labelled with a register letter.

**These are as follows.**

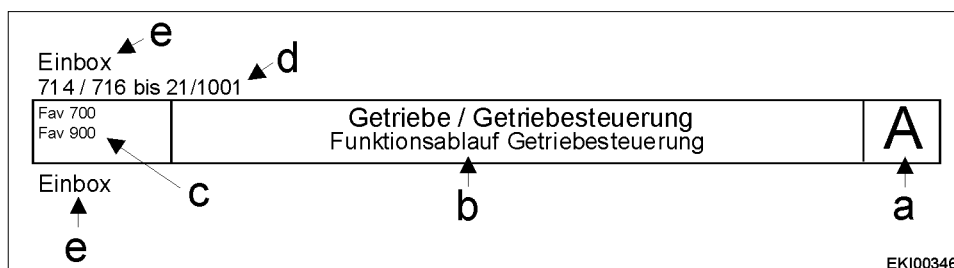
A - General	E - Testing
B - Faults	F - Setting and Calibration
C - Documents and Diagrams	G - Repair
D - Component Location	H - Service - Info

This documentation comprises a large number of self-contained individual documents (=worksheets). These documents can be used for various applications and are available in different languages.

Each document is given a unique document code (8), which is made up of the chapter no. (1) (=assembly / subassembly), the register letter (2) and the docu-no. (3) and is printed at the right of the footer.

A document can, therefore, be clearly assigned to a main assembly/subassembly and the register.

**Explanation of the header and footer:**



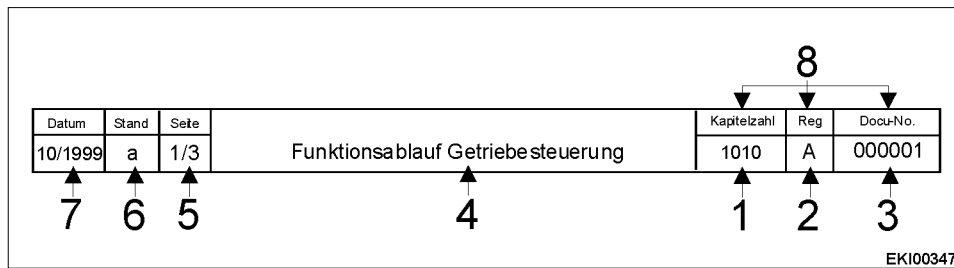
a	Register letter	d	Validity: chassis no.
b	Chapter / section	e	Other validity notes
c	Type validity		

Date	Version	Page	Capitel	Index	Docu-No.
12.4.2000	<b>b</b>	1/2	<b>0000</b>	<b>A</b>	<b>000011</b>

**Farmer 400  
Fav 700  
Fav 900**

**Documentation structure**

**A**



- 1 Main assembly / subassembly
- 2 Register
- 3 Docu-no.
- 4 Section
- 5 No. of pages in document
- 6 Revision status
- 7 Date created
- 8 Document code

All assemblies are paginated sequentially, starting at page 1.

The document code does not have to be sequential, i.e. gaps may occur.

The docu-no. is not the page number in the documentation. The page number is listed on the right in the contents.

Date	Version	Page	Documentation structure	Capitel	Index	Docu-No.
12.4.2000	<b>b</b>	2/2		<b>0000</b>	<b>A</b>	<b>000011</b>

	Tractor / General system <b>Notes on documentation</b>	<b>A</b>
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### Please note

This Workshop Manual gives the trained expert type-related information for the repair of our tractors. It is assumed that standard tools and general instruments which are part of the usual equipment in a workshop will be available. Special tools are kept to the absolute minimum and are shown both at the point where they are used and in a summary at the end of the manual.

If parts have to be replaced, **only** genuine spare parts may be used! When placing orders for parts please always quote the chassis number in accordance with the relevant valid spares documentation. The division of the assemblies in the Workshop Manual mirrors that of FENDOS.

Maintenance documentation and technical specifications must also be taken into account by workshops. On completion of a repair, the person responsible must carry out a test drive to ensure that the tractor is in perfect condition and its roadworthiness can be guaranteed.

We reserve the right to make design changes in the interests of technical progress.

### Notes on register G - Repairs

The disassembly and reassembly instructions shown represent the design status at the time that the Workshop Manual was written.

Technical refinement of the product and expansions in terms of different models may require different work procedures which can be carried out without major difficulty by qualified experts.

These disassembly and reassembly instructions are superseded on publication of the next edition.

### Important notes on safety at work

It is a fundamental principle that those carrying out repairs are responsible for ensuring their own safety while working.

**Compliance with all applicable safety regulations and statutory provisions is a prerequisite for avoiding personal injury and product damage during maintenance and repair work. Repair staff must familiarise themselves with such regulations and provisions before starting work.**

The proper repair of Fendt products presupposes that the work will be carried out by appropriately trained expert staff.

The obligation to provide such training lies with the repair workshop.

### The following are used in this manual to draw attention to safety issues



This pictogram warns of situations where a lack of care can lead to personal injury or product damage.

Read the relevant instructions thoroughly before starting any tests or repair work.

Photos, drawings and components do not always represent the original. They are an illustration of the work procedure required.

Photos, drawings components are not to scale. No conclusions may be drawn regarding size and weight (even within a single illustration).

Date	Version	Page	Capitel	Index	Docu-No.
26.03.2001	a	1/1	0000	A	000021

<p><i>Farmer 400</i> <i>Fav 700</i> <i>Fav 900</i></p>	<p>Working and steering hydraulics / General system <b>Safety instructions and measures</b></p>	<p><b>A</b></p>
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**Reason:**

- The pressure pipes of the front suspension between the central control block ZSB and the suspension cylinders,
- the accumulators ASP1 and ASP2 on the central control block and
- the piped accumulator ZSP

are subject to a pressure of 200 bar even with the engine switched off and the suspension lowered (=locked)!

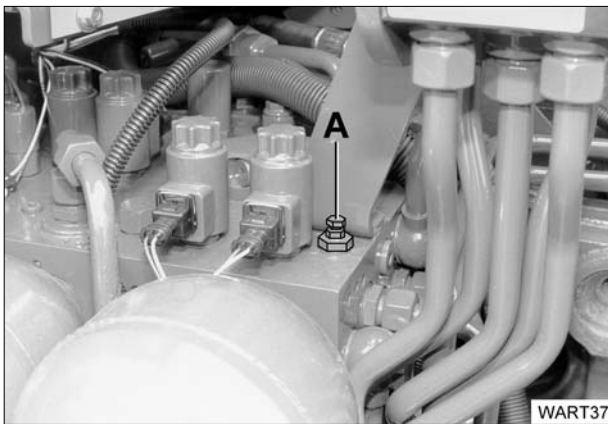
**Action:**

The pressure has to be relieved manually before any repair is carried out or anything is released or opened in this area.

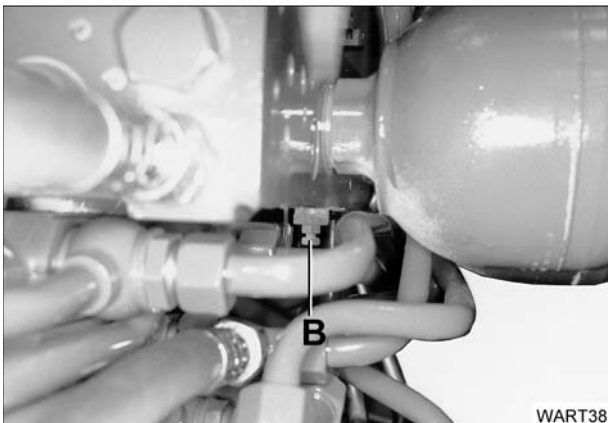
**Note:**

The "Lock suspension / lower suspension" command has no effect!

**Steps:**



1. Loosen stopcock item A (stopcock is labelled AV2 in further documents and circuit diagrams) on top of central control block by approx. 1 turn anti-clockwise.



2. Loosen stopcock item B (stopcock is labelled AV1 in further documents and circuit diagrams) on bottom of central control block by approx. 1 turn anti-clockwise.

**Check:**

Emptying of accumulator sounds like flowing liquid as oil temperature increases (scarcely audible in winter).

**Note and comparison:**

For tractors without a central control block (e.g. Fav 500) it is still necessary to relieve pressure using the "External power supply" method.

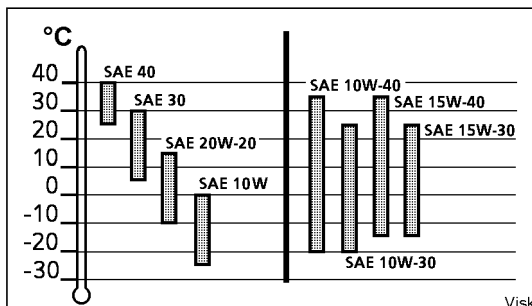
Date	Version	Page	Safety instructions and measures	Capitel	Index	Docu-No.
12/1999	a	1/1		0000	A	000012

<b>Fav 900</b>	<b>Tractor / General system Fuels and lubricants</b>	<b>A</b>
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Filling points	Filling quantity approx. litres	Type 4)	Frequency of change 2)
Engine "Max" with filter change	24	All-year SHPD engine oil 3) to ACEA E3-96	After 50, 500, 1000 op. hrs. then every 500 op. hrs. though at least once a year if sulphur content is up to 0.5% 5)
Transmission and differential (refill)	65	STOU SAE 10 W-40 or 15 W-40	then every 2 years or every 2000 operating hours.
Power lift shaft lubrication	0.2		Power lift shaft lubrication (top-up- only) after 50 operating hours and in event of leaks
Axle drives per side	13	Special hypoid transmission oil SAE 85 W-90 or SAE 80 W-90 or SAE 90 as per API GL-5	Every 500 operating hours then every 2 years or every 2000 op. hrs.
Front axle differential	9.5	No STOU or other universal oil	Front axle differential and hub drives After 50 then 1000 op. hrs, then every 2 years or 2000 op. hrs.
Hub drives per side	2.7		
Front PTO	4.2		After 500 op. hrs, then every 2 years or 2000 op. hrs.
Rear axle stub shaft (optional) axle drivers per side	13	Special hypoid transmission oil 85 W-140 to API GL-5	After 500 op. hrs, then every 2 years or 2000 op. hrs.
Hydraulics		STOU SAE 10W-30, 10W-40, 15W-30	After 1000 op. hrs.
Quantity for max. filling	70	Also permissible: HD-SAE 20 W-20 to API-CD	then every 2 years or every 1000 op. hrs.
Fuel tank	530	Diesel 5)	Fill up after use
Cooling system	26	Water with 35 - 50% vol/vol anti-freeze and anti-corrosion agent	Change antifreeze every 2 years
Brake and clutch system	0.8	Pentosin CHF 11S (X 902.011.622)	Every 2 years
Air compressor	0.5	Ethyl alcohol antifreeze (X 902.015.003)	Fill up only below + 5°C
Lubrication points		Lithium-saponified grease, NLGI class 2	See Lubrication Chart
see Lubrication Chart		(worked penetration coefficient 265-295)	-regularly oil all other joints and bearing surfaces

### 3) VISCOSITY OF OILS IN ENGINE

Monograde oils Multigrade oils



- 1) As indicated on dipstick, by overflow from filling point etc.
- 2) Whichever is the sooner.
- 4) For permitted tradenames, if specified, see current fuels and lubricants list which all Fendt dealers receive as a service circular.
- 5) If diesel fuel contains more than 0.5 - 1% sulphur, oil-change intervals must be halved. A sulphur content of less than 0.05% is recommended, though the fuel supplier must confirm that an adequate lubricant effect is guaranteed (e.g. by means of additives). Only use alternative fuels, e.g. RME, once discussed with the Service Workshop .



<b>Fav 900</b>	<b>Tractor / General system Fuels and lubricants</b>	<b>A</b>
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**Lubricants, sealants and bonding agents**

High-pressure grease for long-term lubrication, e.g. for splined shaft profiles	X 902.002.472 long-life grease
Grease for lubricating sealing lips of shaft seals	Multi-purpose grease 1) and 2)
Sealant (fully curing) for shaft seals with steel cage	Serdon X 903.051.711
Shaft seals with rubberised outer ring Coat outer rings with	Spirit/water mixture 1:1
Sealant (not fully curing) for surfaces of gearbox housing	Loctite X 903.050.074
Sealant e.g. for Hall-effect sensors with rotational direction sensor (non-curing)	F 119.200.210.930
Synthetic bonding agent	Normal Loctite bolt-sealant X 903.050.084 3)
Synthetic bonding agent	Loctite high-strength X 903.050.091 3)
High-speed cleaner for use against grease and oil, 520 ml spray can	X 907.505.000

- 1) = Lithium-saponified, dripping point approx. 185°C, worked penetration coefficient 265 to 295 (soft)
- 2) = Alvania 2 or Renolit MP
- 3) = Components which are to be bonded must be free of paint, oil and grease. Apply synthetic bonding agent to the dry joint surfaces of both components; after mating them, leave them for the specified curing time without exposing them to the air.

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12.11.2001	<b>a</b>	2/2	<b>Fuels and lubricants</b>	<b>0000</b>	<b>A</b>
			<b>0000</b>	<b>A</b>	<b>000029</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Tightening torques for screws/bolts in Nm (kpm)</b>	<b>A</b>
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Coefficient of friction:  $\mu$  tot. 0.14 for nuts and bolts without aftertreatment and for phosphated nuts.  
Tighten by hand.

Tightening torques, unless otherwise specified, can be taken from the following table.

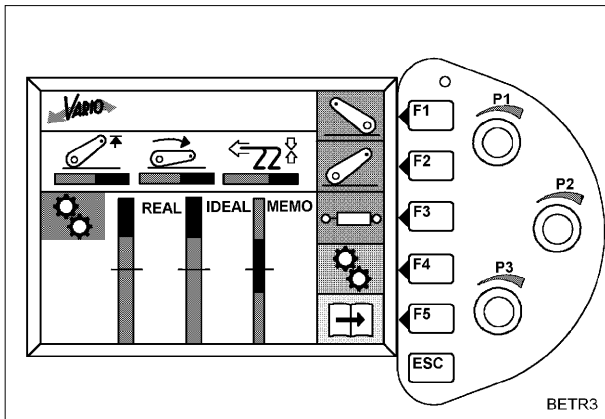
<b>Metrisches Gewinde</b>								
Abmessung	6,9		8,8		10,9		12,9	
	Nm	(kpm)	Nm	(kpm)	Nm	(kpm)	Nm	(kpm)
M 6	8,4	(0,85)	9,8	(1,0)	13,7	(1,4)	16,7	(1,7)
M 8	20,6	(2,1)	24,5	(2,5)	34,3	(3,5)	40,2	(4,1)
M 10	40,2	(4,1)	48,1	(4,9)	67,7	(6,9)	81,4	(8,3)
M 12	70,6	(7,2)	84,4	(8,6)	117,7	(12,0)	142,2	(14,5)
M 14	112,8	(11,5)	132,4	(13,5)	186,4	(19,0)	225,6	(23,0)
M 16	176,6	(18,0)	206,0	(21,0)	289,4	(29,5)	348,2	(35,5)
M 18	240,3	(24,5)	284,5	(29,0)	392,4	(40,0)	475,8	(48,5)
M 20	338,4	(34,5)	402,2	(41,0)	569,0	(58,0)	676,9	(69,0)
M 22	456,2	(46,5)	539,5	(55,0)	765,2	(78,0)	912,3	(93,0)
M 24	588,6	(60,0)	696,5	(71,0)	981,0	(100,0)	1177,2	(120,0)
M 27	873,1	(89,0)	1030,0	(105,0)	1471,5	(150,0)	1765,8	(180,0)
M 30	1177,2	(120,0)	1422,4	(145,0)	1962,0	(200,0)	2354,4	(240,0)

<b>Metrisches Feingewinde</b>								
Abmessung	6,9		8,8		10,9		12,9	
	Nm	(kpm)	Nm	(kpm)	Nm	(kpm)	Nm	(kpm)
M 8 x 1	22,6	(2,3)	26,5	(2,7)	37,3	(3,8)	44,1	(4,5)
M 10 x 1,25	42,2	(4,4)	51,0	(5,2)	71,6	(7,3)	86,3	(8,8)
M 12 x 1,25	78,5	(8,0)	93,2	(9,5)	132,4	(13,5)	157,0	(16,0)
M 12 x 1,5	74,5	(7,6)	88,3	(9,0)	122,6	(12,5)	147,1	(15,0)
M 14 x 1,5	122,6	(12,5)	147,1	(15,0)	206,0	(21,0)	245,2	(25,0)
M 16 x 1,5	186,4	(19,0)	220,7	(22,5)	309,0	(31,5)	372,8	(38,0)
M 18 x 1,5	296,8	(27,5)	318,8	(32,5)	451,3	(46,0)	539,5	(55,0)
M 20 x 1,5	377,7	(38,5)	451,3	(46,0)	627,8	(64,0)	755,4	(77,0)
M 22 x 1,5	510,1	(52,0)	598,4	(61,0)	843,7	(86,0)	1030,0	(105,0)
M 24 x 2	637,6	(65,0)	765,2	(78,0)	1079,1	(110,0)	1275,3	(130,0)
M 27 x 2	951,6	(97,0)	1128,1	(115,0)	1569,6	(160,0)	1912,9	(195,0)
M 30 x 2	1324,4	(135,0)	1569,6	(160,0)	2207,2	(225,0)	2648,7	(270,0)

A00519

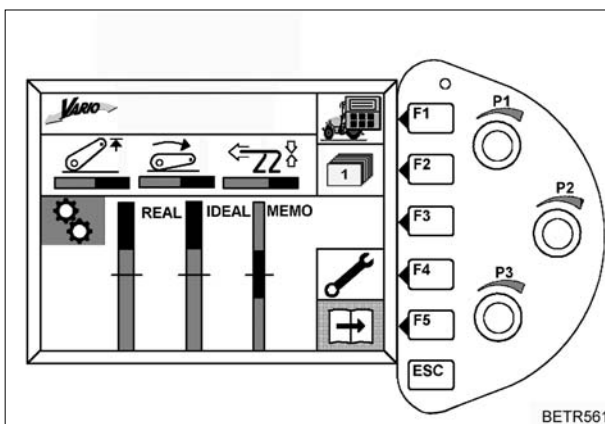
Date	Version	Page	Tightening torques for screws/bolts in Nm (kpm)	Capitel	Index	Docu-No.
03/2000	a	1/1		0000	A	000007

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Tractor / General system</p> <p><b>Tractor diagnostics with terminal A008</b></p>	<p><b>A</b></p>
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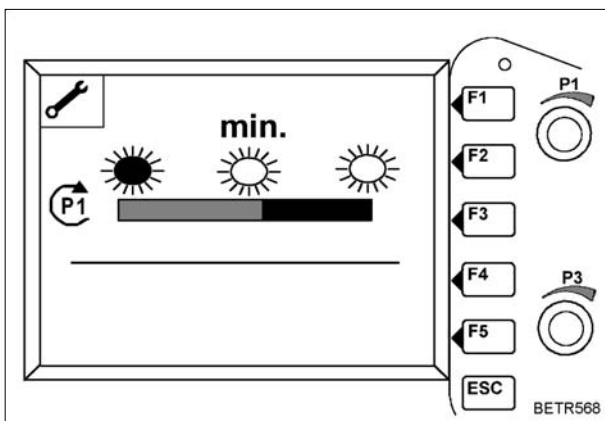
**Ignition ON**

Press **F5** to switch to second main menu level.



Second main menu level is displayed.

Press **F4** to open Screen Brightness menu.



Screen Brightness menu is displayed.

Press **F1** to open Diagnostics menu.

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Tractor / General system</p> <p><b>Tractor diagnostics with terminal A008</b></p>	<p><b>A</b></p>
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Diagnostics menu is displayed.

- High pressure - Transm ission - Sens or **B008** indicates oil pressure in transmission high-pressure circuit. ( bar )
- Setpoint speed accelerator potentiometer **B018** indicates setpoint engine speed. (rpm)
- Temp erature sensor discharge **B009** indicates discharge temperature of transmission high-pressure circuit. (digit = digital units)
- Trans mission - Act ion - Prio rity - E un ct ion indicates transmission's control status. (actuated, automatic maximum output control, cruise control, control via joystick, no control action)
- Press **ESC** to return to Screen Brightness menu.



Press **F5** to open Diagnostics Help menu.

This menu displays the conversion factors for the digital units (digit).

Press **ESC** to return to Diagnostics menu.

**Note:**

**The Diagnostics terminal is not a replacement for measuring pressure in the transmission circuit or electrical readings.**

**The Diagnostics terminal provides a reference value for the Vario transmission functions.**

**Possible applications:**

- Loss of power in tractor (question: transmission or engine? )
- Transmission is overheating (question: how high is the transmission discharge temperature for various tasks? )
- Checking setpoint engine speed

Date	Version	Page	Tractor diagnostics with terminal A008	Capitel	Index	Docu-No.
12.2.2001	a	2/2		0000	A	000015

<b>Fav 900</b>	<b>Tractor / General system Technical specifications</b>	<b>A</b>
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<b>Model</b>		<b>916</b>	<b>920</b>
<b>Engine</b>			
Type of engine		DO836LE504	DO836LE503
Turbocharger / intercooler		with / with	with / with
No. of cylinders / cooling		6 / water	6 / water
Bore / stroke	mm	108 / 125	108 / 125
Effective displacement	l	6870	6870
Idling speed	rpm	780 +/-30	780 +/-30
Rated speed	rpm	2150	2150
No-load engine speed	rpm	2260-2320	2280-2340
Fuel	l	530	530
Engine stop		electrical	electrical
Noise level at driver's ear	dB(A)	72	72
<b>Angle of engine</b>			
Tractor stability must be guaranteed			
Lengthways in travel direction front / rear	degree	25	25
Across travel direction left / right	degree	25	25
<b>Weights and dimensions</b>			
with following tyres and track width			
Tyres front		480/70R34	480/70R34
Tyres rear		580/70R42	580/70R42
Track width front	mm	2000	2000
Track width rear	mm	1970	1970
Overall length	mm	4940	4940
Overall width	mm	2550	2550
Overall height incl. cab	mm	3095	3095
Ground clearance	mm	605	605
Wheelbase	mm	2840	2840
Flange centre distance front	mm	1892	1892
Flange centre distance rear	mm	1890	1890
Min. turning circle radius without / with steering brake	mm	5.9/54	5.9/5.4
Kerb weight	kg	8750	8750
Max. permissible gross vehicle weight at 50km/h	kg	12000	12000
Max. permissible gross vehicle weight with mounted implements, depending on tyres	kg	14000	14000
Max. permissible axle load	kg	6500	6500
Max. permissible axle load rear	kg	7730	7730
Maximal vertical load on trailer coupling	kg	2000	2000
Maximal vertical load on trailer hitch	kg	3000	3000
<b>PTO 540/750/1000</b>			
PTO profile		1 3/4" 6-spline	1 3/4" 6-spline
PTO speed at rated engine speed and 540 setting	rpm	569	569
PTO speed at rated engine speed and 750 setting	rpm	726	726
PTO speed at rated engine speed and 1000 setting	rpm	1058	1058
Max. permissible torque at 540 setting	Nm	3500	3500
Max. permissible torque at 750 setting	Nm	2100	2100
Max. permissible torque at 1000 setting	Nm	1600	1600
<b>Front PTO 1000</b>			
PTO speed at rated engine speed and 1000 setting	rpm	1111	1111
Max. permissible torque for 1000	Nm	830	830

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<b>Fav 900</b>	<b>Tractor / General system Technical specifications</b>	<b>A</b>
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<b>Model</b>		<b>916</b>	<b>920</b>
<b>Hydraulics</b>			
Working pressure	bar	200	200
Hydraulic pump	l	112	112
Available hydr. oil at max. capacity	l	50	50
<b>Rear power lift</b>			
Three-point		Cat. 2/3	Cat. 2/3
Control		EPC	EPC
Max. lift capacity	kN	90	90
<b>Front power lift (optional)</b>			
Three-point		Cat. 2	Cat.2
Max. lift capacity	kN	50	50
Implement weight up to approx.	kg	3600	3600
<b>Transmission</b>			
Vario continuously variable transmission	km/h	50	50
Range I forwards	km/h	0.02 - 32	0.02 - 32
Range I reverse	km/h	0.02 - 20	0.02 - 20
Range II forwards	km/h	0.02 - 50	0.02 - 50
Range II reverse	km/h	0.02 - 38	0.02 - 38
<b>Electrics</b>			
Operating voltage	V	12	12
Battery	V/Ah	12/2 x 90	12/2 x 90
Alternator	W/V/A	2520/14/2x90	2520/14/2x90
Starter	kW	4.0	4.0
<b>Wheel tightening torques</b> (threads and locating faces lightly oiled)			
Front wheels	Nm	450	450
Rear wheels	Nm	620	620

**Note:**

The warranty becomes null and void if changes are made to the power output governor and max. speed setting or if the permissible loads and weights are exceeded.

**Note:**

With PTO operation:

If the maximum permissible torque can be exceeded because of the particular application, use cardan shafts with a safety coupling and freewheel, if appropriate.

Maximum protection against seizing at peak torques 4000 Nm.

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<b>Fav 900</b>	<b>Tractor / General system Technical specifications</b>	<b>A</b>
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<b>Model</b>		<b>924</b>	<b>926</b>
<b>Engine</b>			
Type of engine		DO836LE502	DO836LE501
Turbocharger / intercooler		with / with	with / with
No. of cylinders / cooling		6 / water	6 / water
Bore / stroke	mm	108 / 125	108 / 125
Effective displacement	l	6870	6870
Idling speed	rpm	780 +/-30	780 +/-30
Rated speed	rpm	2250	2250
No-load engine speed	rpm	2400-2460	2420-2480
Fuel	l	530	530
Engine stop		electrical	electrical
Noise level at driver's ear	dB(A)	72	72
<b>Angle of engine</b>			
Tractor stability must be guaranteed			
Lengthways in travel direction front / rear	degree	25	25
Across travel direction left / right	degree	25	25
<b>Weights and dimensions</b>			
with following tyres and track width			
Tyres front		540/65R34	600/65R34
Tyres rear		650/65R42	650/85R38
Track width front	mm	2000	2000
Track width rear	mm	1970	1970
Overall length	mm	4940	4940
Overall width	mm	2580	2640
Overall height incl. cab	mm	3110	3110
Ground clearance	mm	605	605
Wheelbase	mm	2840	2840
Flange centre distance front	mm	1892	1892
Flange centre distance rear	mm	1890	1890
Min. turning circle radius without / with steering brake	mm	5.9/5.4	5.9/5.4
Kerb weight	kg	8800	8800
Max. permissible gross vehicle weight at 50km/h	kg	12000	12000
Max. permissible gross vehicle weight with mounted implements, depending on tyres	kg	14000	14000
Max. permissible axle load front	kg	6500	6500
Max. permissible axle load rear	kg	7730	7730
Maximal vertical load on trailer coupling	kg	2000	2000
Maximal vertical load on trailer hitch	kg	3000	3000
<b>PTO 540/750/1000</b>			
PTO profile		1 3/4" 6-spline	1 3/4" 6-spline
PTO speed at rated engine speed and 540 setting	rpm	596	596
PTO speed at rated engine speed and 750 setting	rpm	760	760
PTO speed at rated engine speed and 1000 setting	rpm	1108	1108
Max. permissible torque at 540 setting	Nm	3500	3500
Max. permissible torque at 750 setting	Nm	2100	2100
Max. permissible torque at 1000 setting	Nm	1600	1600
<b>Front PTO 1000</b>			
PTO speed at nominal speed, 1000 version	rpm	1062	1062
Max. permissible torque at 1000 setting	Nm	830	830

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<b>Fav 900</b>	<b>Tractor / General system Technical specifications</b>	<b>A</b>
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<b>Model</b>		<b>924</b>	<b>926</b>
<b>Hydraulics</b>			
Working pressure	bar	200	200
Hydraulic pump	l	117	117
Available hydr. oil at max. capacity	l	50	50
<b>Rear power lift</b>			
Three-point Control		Cat. 2/3 EPC	Cat. 2/3 EPC
Max. lift capacity	kN	99.8	99.8
<b>Front power lift (optional)</b>			
Three-point		Cat. 2	Cat.2
Max. lift capacity	kN	50	50
Implement weight up to approx.	kg	3600	3600
<b>Transmission</b>			
Vario continuously variable transmission	km/h	50	50
Range I forwards	km/h	0.02 - 32	0.02 - 32
Range I reverse	km/h	0.02 - 20	0.02 - 20
Range II forwards	km/h	0.02 - 50	0.02 - 50
Range II reverse	km/h	0.02 - 38	0.02 - 38
<b>Electrics</b>			
Operating voltage	V	12	12
Battery	V/Ah	12/2 x 90	12/2 x 90
Alternator	W/V/A	2520/14/2x90	2520/14/2x90
Starter	kW	4.0	4.0
<b>Wheel tightening torques</b> (threads and locating faces lightly oiled)			
Front wheels	Nm	450	450
Rear wheels	Nm	620	620

**Note:**

The warranty becomes null and void if changes are made to the power output governor and max. speed setting or if the permissible loads and weights are exceeded.

**Note:**

With PTO operation:

If the maximum permissible torque can be exceeded because of the particular application, use cardan shafts with a safety coupling and freewheel, if appropriate.

Maximum protection against seizing at peak torques 4000 Nm.

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
0.0.11	A021; A022	ECU, EDC; ECU, EMR	EDC / EMR bus fault. Fault in ECU	Tractor can be driven using accelerator.		
			Programming errors in ECU.	Fault message, no restrictions.		EOL reprogramming necessary.
0.0.12	A008	Terminal	Bus Failure	no functions available, no display	Voltage supply CAN-Bus on fuse board A013; fuses F039, F046	
0.0.13	A004	Control console	Bus Failure	no functions available, no display	Voltage supply CAN-Bus on fuse board A013; fuses F040, F041	
0.0.14	A001; A002	Transmission control module	Bus Failure	no functions available, no display	Voltage supply CAN-Bus on fuse board A013; fuses F040, F041	
0.0.15	A001, A002	AWD; Differential - Lock activation	Bus Failure	no functions available, no display	Voltage supply CAN-Bus on fuse board A013; fuses F040, F041	
0.0.16	A001, A002	Rear PTO	Bus Failure	no functions available, no display	Voltage supply CAN-Bus on fuse board A013; fuses F040, F041	
0.0.17	A001, A002	Front PTO	Bus Failure	no functions available, no display	Voltage supply CAN-Bus on fuse board A013; fuses F040, F041	
0.0.18	A005	EPC Rear	Bus Failure	no functions available, no display	Voltage supply CAN-Bus on fuse board A013; fuses F040, F041	
0.0.19	A005	Front - Powerlift	Bus Failure	no functions available, no display	Voltage supply CAN-Bus on fuse board A013; fuses F040, F041	
0.0.1A	A005	Spool valves	Bus Failure	no functions available, no display	Voltage supply CAN-Bus on fuse board A013; fuses F040, F041	

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
0.0.20	A005	CAN-Bus-wiring	Bus Failure	no functions available, no display	Voltage supply CAN-Bus on fuse board A013; fuses F040, F041	
0.1.50	A007	Instrument panel	VDO instrument panel EEPROM not programmed	Malfunctions in instrument panel		EOL reprogramming necessary
0.1.51	B012	Engine oil pressure sensor	Sensor failure, wiring failure	no monitoring !	Electrical diagram "Dashpanel"	
0.1.54	B019	Pressure sensor compressed air tank	Sensor failure, wiring failure	no display	Electrical diagram "Dashpanel"	
0.1.55	S036	Level Sensor hydraulic oil	Sensor failure, wiring failure	no monitoring !	Electric diagram "Spool valves 1"	
0.1.56	B005	Engine temperature sensor	Sensor failure, wiring failure	no monitoring !	Electrical diagram "Dashpanel"	
0.1.57	B006	Sensor, intercooler temperature	Sensor fault, wiring fault	No monitoring !	Circuit diagram: "Instrument panel" (F400, F700); "EDC control module" (F900)	
0.1.59	B007	Fuel level sensor	Sensor failure, wiring failure	no monitoring !	Electrical diagram "Dashpanel"	
1.1.01, evtl. 4.2.81	B038	Position sensor accelerator pedal EDC ( yellow marker )	Signal out of range	Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.1.03	B029/- B038	Position sensor accelerator pedal EST ( Elektronik box comfort, red marker ) / Position sensor accelerator pedal EDC ( yellow marker )	values not corresponding B029 / B038	Restricted Operating Possibilities, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.1.7E	B035	Position sensor manual accelerator	Signal out of range.	Restricted Operating Possibilities, Chapter 2000 Reg.B (EDC-Failures)	Electric diagram "EDC Control "	

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
1.1.7F	A004	Control console	Electrical fault in hand throttle memory keys (EDC/EMR). No communication with control console.	Last speed setting is retained. Engine speed can be changed using hand throttle or accelerator.		
1.1.9E	A003	Memorization keys Engine speed	Signal out of range.	Restricted Operating Possibilities, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.1.9F	A002, A004	EST Comfort Control Module, Side Console	CAN communication failure EST Control Module (A002) - Side Console (A004)	Restricted Operating Possibilities, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control ", "Transmission BUS", "Comfort-BUS"	
1.1.A0	A021	EDC control module	EDC control module (A021) cannot be identified, EOL Programming error	According to failure importance, Engine torque will be reduced to Fav.916 torque . Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.1.A1	A002, A021	EST control module, EDC control module	CAN Communication failure EST control module (A002) - EDC control module (A021)	Chapter 2000 Reg.B (EDC-Failure)	Electric diagram Transmission -BUS (G-BUS)	
1.1.B0			CAN-bus communication restricted			EOL reprogramming necessary.
1.1.E0	B035	Position sensor manual accelerator	Checksum EEPROM is wrong	Restricted Operating Possibilities, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.13	G001, G003, G001, A021	Battery 1, Battery 2, Generator, EDC control module	Voltage supply failure EDC control module	No engine power Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "Voltage supply +Ub"	

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
1.2.17		Excessive Engine speed	Inadequate driving (e.g. Downhill ride)	Chapter 2000 Reg.B (EDC-Failure)		
1.2.18	A020	Electronic injection pump VP44	Start of injection - deviation of control	Restricted Power, Chapter 2000 Reg.B (EDC-Failure)		
1.2.1A	B026	Needle motion sensor NBF	Signal failure	Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.1F	A021	EDC control module	CAN Message: EDC control module connection failure	Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control ", Transmission - BUS	
1.2.21	A002	EST control module, Transmission - BUS	Fendt-EST not connected or CAN-Connection to Transmission Bus discontinued.	Chapter 2000 Reg.B (EDC-Failure)	Electric diagram Transmission - BUS , EDC Motorsteuerung	
1.2.23	A002	EST control module	CAN-Message failure from EST control module (A002) EDC control module	Chapter 2000 Reg.B (EDC-Failure)	Electric diagram Transmission - BUS , EDC Control Module	
1.2.25	K020	Relay Ub30 EDC	Contact does not open, Earth contact	Battery will run empty, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.2A	A002, A021	EST Control Module; EDC Control Module - BUS, Comfort-BUS	CAN Message failure from EST Module (A002) to EDC Control Module (A021) "Function Exhaust brake"	No function of Exhaust brake, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram Transmission - BUS , EDC Control Module; Transmission - BUS, Exhaust brake / Engine stop	
1.2.2B	A002, A021	EST Control Module; EDC Control Module - BUS, Transmission BUS ; Comfort-BUS	CAN Message failure from EST Module (A002) to EDC Control Module (A021) "Function Exhaust brake"	No function of Exhaust brake, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram Transmission BUS , "EDC Control Module ", Transmission - BUS, Exhaust brake / Engine stop	

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
1.2.2C	A002, A021	EST Control Module, EDC Control Module, Transmission - BUS, Komfort-BUS	CAN Message failure from EST Control Module (A002) to EDC Control Module (A021) "Function Exhaust brake"	No Function of exhaust brake, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control ", Transmission - BUS, Motorbremse/Motorabs-tellung	
1.2.2D	A002, A021	EST Control Module, EDC Control Module, Transmission - BUS	CAN Signal failure from EST Control Module (A002) to EDC Control Module (A021)	Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control ", Transmission - BUS,	
1.2.2E	A002, A021	Enhanced control module, EDC control module, transmission bus	CAN signal fault from enhanced control module (A002) to EDC control module (A021)		EDC control module, Transmission bus circuit diagrams	
1.2.38	A021	EDC Control Module	Function failure EDC Control Module "Engine - Stop"	restricted power, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control " Voltage supply +UB	
1.2.42	A020	Pump Control (Injection pump)	Injection Pump, Fuel temperature to high	Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.46	BUSS-system	Comfort-BUS, Transmission - BUS, EDC-BUS	CAN-BUS Message failure	Restricted Operating Possibilities, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control ", Transmission - BUS, Comfort-BUS	
1.2.81	B038	Position sensor accelerator pedal EDC ( yellow marker )	Signal failure Supply time	Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.82	A020	Pump Control (Injection pump)	Supply time High pressure solenoid valve not adequate	Engine stops, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.84	B025	Speed sensor EDC	Signal Failure	restricted Power, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	

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1.2.85	B028	Sensor Intake pressure LDF	Signal Failure	restricted Power, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.87	B027	Water temperature sensor (EDC control)	Signal Failure	restricted Power, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.89	A020	Pump Control (Injection pump)	electronic volume controller failure	Engine won't start, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.91	B025	Speed sensor EDC	Signal Failure	restricted power, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.92	A020 A021	EDC Control Module , Pump Control (Injection pump)	Failure Engine Stop via "Injected volume = 0" fehlerhaft, se Chapter 2710 Reg.A "Engine Stop"	Restricted power, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.96	A021	EDC Control Module Monitoring unit	Failure EDC Control Module Monitoring unit (A021)	Engine stops, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.99	A020 A021	EDC Control Module and Pump Control (Injection pump)	Engine Stop via Voltage monitoring within EDC Control Module, Chapter 2710 Reg.A "Engine Stop".	Reduced power, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.9B	A020/- A021	EDC Control Module, Pump Control (Injection pump)	Engine stop via engine stop solenoid valve, Chapter 2710 Index A Engine Stop	Reduced power, Chapter 2000 Index B (EDC-fault)	Electric diagram "EDC Control "	
1.2.A2	K021	Relay solenoid valve engine stop	Engine stop via relay K021, Chapter 2710 Index A Engine Stop	Reduced power, Chapter 2000 Index B (EDC-fault)	Electric diagram "EDC Control "	

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
1.2.A6	A021, A020	EDC Control Module, Pump Control (Injection pump)	Engine stop, fault in signal processing in EDC control module	Reduced power, Chapter 2000 Index B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.A8	A021	EDC Control Module	Fault in barometric pressure sensor	Chapter 2000 Index B (EDC-Failure)		
1.2.A9	A020	Pump Control (Injection pump)	Failure identified during auto diagnostic	restricted Power, Engine does not start, Chapter 2000 Reg.B (EDC-Failure)		
1.2.B1	A021, A020	EDC Control Module, Pump Control (Injection pump)	EDC-CAN Message failure: from EDC Control Module to Pump Control (Injection pump)	restricted Power, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.B2	A020	Pump Control (Injection pump)	Failure identified during auto diagnostic	restricted Power, Chapter 2000 Reg.B (EDC-Failure)		
1.2.B3	A020	Pump Control (Injection pump)	Supply failure Pumpe Control . Chapter 2710 Reg.A "Engine Stop".	Engine stops, Engine does not sart, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.B4	A020 A021	EDC Control Module, Pump Control (Injection pump)	CAN Message failure: from Pump Control to EDC Control Module	Engine runs idle, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.B5	A020	Pump Control (Injection pump)	Failure during auto diagnostic Pump Control (EEPROM-Checksum)	restricted Power, Chapter 2000 Reg.B (EDC-Failure)		
1.2.B6	A020	Pump Control (Injection pump)	Failure during auto diagnostic Pump Control (EEPROM-Status)	restricted Power, Chapter 2000 Reg.B (EDC-Failure)		
1.2.B7	A020, B025	Pump Control (Injection pump), Speed sensor EDC	Speed sensor Failure, --- Signal processing failure within injection pump	restricted Power, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	

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**B**

Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
1.2.B9	A020	Pump Control (Injection pump)	Failure during auto diagnostic of injection pump (RAM-Failure)	Motor stops. Chapter 2000 Reg.B (EDC-Failure)		
1.2.C1	A020	Pump Control (Injection pump)	Failure during auto diagnostic of injection pump (Solenoid valve final stage)	Chapter 2000 Reg.B (EDC-Failure)		
1.2.C3	A021, A020	EDC Control Module, Pump Control (Injection pump)	CAN Message Failure : EDC Control Module to injection pump during engine start.	Motor runs idle (720 Rpm), Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.C4	A020	Pump Control (Injectin pump)	CAN Message failure to Injection Pump	Engine runs idle (720 Rpm), Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.C5	A021, A020	EDC Control Module, Pump Control (Injection pump)	Failure durin Engine Stop via Solenoid valve, Chapter 2710 Reg.A Engine Stop	restricted Power, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.C7	A020	Pump Control (Injection pump)	Pump Speed sensor failure (IWZ-Signal)	Engine stops. Chapter 2000 Reg.B (EDC-Failure)		
1.2.C8	A021, B026, B028	EDC-CAN-BUS, EDC Control Module, Needle Motion Sensor, Intake Air pressure sensor	EDC Control Module: Injection volume is not precise	Engine stops, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.C9	A020	Pump Control (Injection pump)	Failure during Autodiagnostic of Injection pump (Solenoid Valve final stage)	Chapter 2000 Reg.B (EDC-Failure)		
1.2.CA	A020	Pump Control (Injection pump)	Injection controller out of range	restricted Power, Chapter 2000 Reg.B (EDC-Failure)		

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**B**

Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
1.2.CB	A021, A020	EDC Control Module, Pump Control (Injection pump)	CAN Message failure to Injection pump	Engine runs idle, Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control "	
1.2.CD	A021, A020	EDC Control Module, Pump Control (Injection pump)	Speed failure of CAN Message Between Injection Pump and EDC Control Module	restricted Power, Chapter 2000 Reg.B (EDC-Failure)		
1.2.DE	A002, A021	EDC Control Module , EST Comfort Module	Speed of CAN Message missing	restricted operation, Chapter 2000 Reg.B (EDC-Failure)		
1.2.E0	A021, A002	EDC Control Module , EST Comfort Module	Communication failure during CAN - Message between EDC Control Module and EST Control Module	Chapter 2000 Reg.B (EDC-Failure)	Electric diagram "EDC Control ", Transmission - BUS	
1.2.E1			Fault in speed signal (B014 - sensor, accumulator shaft, B015 - sensor - bevel pinion) or PTO is driving engine (running on)	Fault display, Chapter 2000 Index B (EDC fault)		
2.1.EE		LBS mounted implement	Fault in LBS ECU	Mounted implement can no longer be operated via joystick controls or terminal.		
2.1.EF		LBS mounted implement		Depending on implement manufacturer / restricted operation of mounted implement	For fault description, please see implement manufacturer's literature	
3.1.01	A004	Side Console	RAM, EEPROM - Failure	Functions switched off: - keypad, - digital / analogue input, - LED actuation	Fit new control console	

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3.1.02	A004	Side Console	RAM, EEPROM - Failure	Functions switched off: - keypad, - digital / analogue input, - LED actuation	Fit new control console	
3.1.03	A004	Side Console	RAM, EEPROM - Failure	Functions switched off: - keypad, - digital / analogue input, - LED actuation	Fit new control console	
3.1.04	A004	Side Console	RAM, EEPROM - Failure	Functions switched off: - keypad, - digital / analogue input, - LED actuation	Fit new control console	
3.1.05	A004	Side Console	Internal 8,5 Volt Failure, Keypad failure	Functions switched off: - keypad, - digital / analogue input, - LED actuation	Fit new control console	
3.1.06	A004	Side Console	8,5 Volt Failure	Functions switched off: - keypad, - digital / analogue input, - LED actuation	Fit new control console	
4.1.01	A003	Acceleration Ramp I...IV	Signal failure	Only Auxilliary Operation		TRANSMISSION
			Supply Failure 8,5 Volt		A013 Fuse 5	
4.1.04	B017	Position sensor clutch pedal	Signal failure	Comfort-/ Function - Restrictions in final speed control; Cruise Control not available	Electric diagram "Transmission Control"	TRANSMISSION
			Supply Failure 8,5 Volt		A013 Fuse 8	
4.1.06	B018	Position sensor accelerator pedal	Signal failure	Only Auxilliary opration	Electric diagram "Transmission Control"	Engine without EDC , TRANSMISSION
			Supply failure 8,5 Volt		A013 Fuse 4	

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4.1.06	B029	Accelerator ECU position sensor (red marker)	Signal fault	Restricted operation (no hand throttle, no memory keys)	'EDC control` circuit diagram	Engine Fav 900/23/24 EDC
			8.5 V supply fault		A013 fuse 17	
4.1.07	B008	High pressure sensor transmission	Signal failure	Operating Range switching from 1 to 2 not possible	Electric diagram "Transmisson Control"	TRANSMISSION
			Supply Failure 8,5 Volt		A013 Fuse 3	
4.1.08	B016	Position sensor operating range	Signal failure	Switching Operating ranges not available; Actual Range remains engaged	Electric diagram "Transmisson Control"	TRANSMISSION
			Supply Failure 8,5 Volt		A013 fuse 13	
4.1.21	S045	Position sensor "Reversed Operating Controls"	Signal failure			
4.1.23	A003	Joystick "Cruise Control Activate"	Signal failure	Only Auxilliary Operation	Electric diagram "Transmisson Control"	TRANSMISSION
4.1.24	S015	Position sensor parking brake	Signal failure	Parking Brake automatism not available	Electric diagram "Transmisson Control"	TRANSMISSION
4.1.25	A003	Joystick "Quick Reverse"	Signal failure	Only Auxilliary Operation	Electric diagram "Transmisson Control"	TRANSMISSION
4.1.28	A009	Transmission Control unit, Incremental sensor	Signal failure	Only Auxilliary Operation	Electric diagram "Transmisson Control"	TRANSMISSION
4.1.29	A003	Joystick "Central Position"	Signal failure	Only Auxilliary Operation	Electric diagram "Transmisson Control"	TRANSMISSION
4.1.2A	B015	Speed.sensor motor 1 bevel pinion	Signal failure	Only Auxilliary Operation	Electric diagram "Transmisson Control"	TRANSMISSION

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4.1.2B	A003	Button Switching Operating Range	Signal failure	Actual Operating Range remains engaged; no further switching possible	Electric diagram "Transmisson Control"	TRANSMISSION
4.1.2C	A003	Button "Neutral / Active Standstill	Signal failure	Only Auxilliary Operation	Electric diagram "Transmisson Control"	TRANSMISSION
4.1.2D	S014	Button "Quick Reverse " left of steerin wheel	Signal failure	Quick Reverse still possible via Joystick	Electric diagram "Transmisson Control"	TRANSMISSION
4.1.2E	A003	Joystick Ahead "v+ transmission control"	Signal failure	Only Auxilliary Operation	Electric diagram "Transmisson Control"	TRANSMISSION
4.1.2F	A003	Joystick Backward "v+ transmission control"	Signal failure	Only Auxilliary Operation	Electric diagram "Transmisson Control"	TRANSMISSION
4.1.30		Contact "Auxilliary Operation Hatch" Open / Closed	Signal failure	Only Auxilliary Operation		valid only for FAV900 with telescopic handle
4.1.31	B014	Speed. sensor collector shaft	Signal failure	Only Auxilliary Operation	Electric diagram "Transmisson Control"	TRANSMISSION
4.1.32	A003	Key within Joystick "Activating"	Signal failure	Only Auxilliary Operation	Electric diagram "Transmisson Control"	TRANSMISSION
4.1.33		Key "Load limit control"	Signal failure	Function not available		only for Twin EST Modules -FAV900
4.1.34		Key "Cruise Control"	Signal failure	Function not available		only for Twin EST Modules -FAV900
4.1.35		Key "Memorizing Reverse Transmission ratio"	Signal failure	Function not available		only for Twin EST Modules -FAV900
4.1.36		Key "Rear PTO Control Transfer"	Signal failure	Function not available		only for Twin EST Modules -FAV900
4.1.37		Key "Front - PTO Control Transfer"	Signal failure	Function not available		only for Twin EST Modules -FAV900

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4.1.38		Key "Memorizing Transmission Ratio Ahead"	Signal failure	Function not available		only for Twin EST Modules -FAV900
4.1.41	B011	Speed. sensor motor 2	Signal failure	Only Auxilliary Operation	Electric diagram "Transmisson Control"	TRANSMISSION
4.1.42	B014	Speed. sensor collector shaft	Signal failure	Only Auxilliary Operation	Electric diagram "Transmisson Control"	TRANSMISSION
4.1.44	B010	Speed.sensor motor 1	Signal failure	Only Auxilliary Operation	Electric diagram "Transmisson Control"	TRANSMISSION
4.1.45	B015	Speed.sensor bevel pinion	Signal failure	Only Auxilliary Operation	Electric diagram "Transmisson Control"	TRANSMISSION
4.1.50	S017	Contact "Transmission Oil Filter contaminated"	Filter contaminated	no further indication of contamination	Electrical diagram "Transmission Control"	Only Twin EST Module version. TRANSMISSION - TRANSMISSION OIL FILTER Contact only effective > 50°C.
4.1.53	B009	Temperature switch	"Transmission Oil temperature > 110°C"	Stop immediately , serious risk of transmission damage!	Electrical diagram "Transmission Control"	TRANSMISSION
4.1.56	S017	Contact "Transmission Oil Filter contaminated"	Signal failure	no further display !	Electrical diagram "Transmission Control"	TRANSMISSION - TRANSMISSION OIL FILTER on for Twin EST Module Version
4.1.58		Transmission -Slip - Monitoring	Transmission output speed deviates fore more than 30% from ideal value	Can occur under extremely cold ambient temperatures; Repeated occurence under normal circumstances leads to Oil overheating and serious transmisson damage.		TRANSMISSION - TRANSMISSION CONTROL (Comparison "ideal Ratio / actual Ratio)

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4.1.59		"Auxilliary Operation"	Auxilliary Operation activated without apparent reason			Failure Code will not be memorized
			Auxilliary Operation failure			
4.1.61	Y002	Solenoid valve operating range 1	Supply failure	Only Auxilliary Operation Mode	Electrical diagram "Transmission Control"	TRANSMISSION
4.1.62	Y003	Solenoid valve operating range 2	Supply failure	Only Auxilliary Operation Mode		TRANSMISSION
4.1.63	Y005	Solenoid valve speed limiter	Supply failure	Maximal speed 30 km/h	Electrical diagram "Transmission Control"	TRANSMISSION
4.1.64	Y004	Solenoid valve neutral/turboclutch	PWM-Supply failure		Electrical diagram "Transmission Control"	TRANSMISSION
4.1.65	Y006	Solenoid valve exhaust brake	Supply failure			TRANSMISSION only for FARMER 400
4.1.70	A004	Key "Cruise Control 1"	Key failure	Cruise Control cannot be activated	Electrical diagram "Transmission Control"	TRANSMISSION
			Bus failure from A004 to Transmission Control Module			
4.1.71	A004	Key "Cruise Control 2"	Key failure	Cruise Control cannot be activated	Electrical diagram "Transmission Control"	TRANSMISSION
			Bus failure from A004 to Transmission Control Module			
4.1.72	S017	Contact "Transmission Oil Filter contaminated"	Signal failure	no further display or monitoring, possibly Transmisssion damage	Electrical diagram "Transmission Control"	only for Single EST Module Version: TRANSMISSION TRANSMISSION OIL FILTER

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4.1.73	B033	Temperatur-Sensor "Temperature Feed oil"	Signal failure	no further display or monitoring, possibly Transmisssion damage	Electrical diagram "Transmission Control"	only for Single EST Module Version. TRANSMISSION
4.1.74	S015	Position sensor parking brake	Signal failure		Electrical diagram "Transmission Control"	only for Single EST Module Version. TRANSMISSION
4.1.75	S045	Position switch reverse operation	Signal failure		Electrical diagram "Transmission Control"	only for Single EST Module Version. TRANSMISSION
4.1.76	S047	Contamination switch	Signal failure		Electrical diagram "Transmission Control"	only for Single EST Module Version. TRANSMISSION
4.1.7E	B035	Position sensor manual accelerator	Signal failure		Electric diagram "EDC Control Module"	FAV900 , EDC Calibration Code "4011"
4.1.7F	A003	Memorizing key Selected engine speed	Signal failure		Electric diagram "EDC Control Module"	FAV900 with EDC
4.1.81	B010 B011	Speed.sensor motor 1 Speed. sensor motor 2	Plausibility failure (=Speed indications are not corresponding)	Only Auxilliary Operation Mode	Electrical diagram "Transmission Control"	TRANSMISSION
4.1.82	B014 B015	Speed. sensor collector shaft, Speed.sensor bevel pinion	Plausibility failure (=Speed indications are not in logical corresponding)	Only Auxilliary Operation Mode	Electrical diagram "Transmission Control"	TRANSMISSION
4.1.83	B014 B015	Speed. sensor collector shaft, Speed.sensor bevel pinion	Plausibility failure (=Speed indications are not in corresponding direction)	Only Auxilliary Operation Mode	Electrical diagram "Transmission Control"	TRANSMISSION
4.1.84		Joystick contacts (Quick Reverse, Cruise Control)	Plausibility failure (=Speed indications are not corresponding logically)	Only Auxilliary Operation Mode	Electrical diagram "Transmission Control"	TRANSMISSION

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
4.1.85			Engine speed sensor does not supply plausible speed curves. Output speed increase or decrease is outside limits.	Continuation in emergency mode possible	`Transmission control` circuit diagram	
4.1.90	A001 A004	Cruise Control 1 - data communication	Data Communication fault	Key not available		Only for FAV700/900 twin e-box version
4.1.91	A001 A004	Cruise Control 2 - data communication	Data communication fault	Key not available		Only for FAV700/900 twin e-box version
4.1.92	A001 A002	Brake pedal left / right , data communication	Data communication fault	Automatic cruise control not available		Only for FAV700/900 twin e-box version
4.1.93	A001 A002	Brake pedal left , data communication	Data communication fault	Automatic cruise control not available		Only for FAV700/900 twin e-box version
4.1.A0	A009	Transmission control unit	Actuation fault in transmission control module	Continuation in emergency mode possible		
4.1.A1	A009	Transmission control unit	Turn angle is not reached within 2 seconds.	Continuation in emergency mode possible		Mechanical verification: check ease of movement of adjustment device using emergency control system. TRANSMISSION, TRANSMISSION CONTROL
4.1.A2	A009 A001 or A002	Transmission control unit	CAN-bus actuation fault	Continuation in emergency mode possible		
4.1.A3	A009	Transmission control unit	Fault or logical error in incremental sensor signal (actual position signal)	Continuation in emergency mode possible		TRANSMISSION, TRANSMISSION CONTROL

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
4.1.A4	A009	Transmission control unit	Fault or logical error in ECU signal.	Continuation in emergency mode possible		TRANSMISSION, TRANSMISSION CONTROL
4.1.A5	A009	Transmission control unit	Initial -Reference (=Zero position) could not be reached during ignition "ON"	Continuation in emergency mode possible		TRANSMISSION, TRANSMISSION CONTROL
4.1.A6	A009	Transmission control unit	Reference point signal fault during operation	Continuation in emergency mode possible		TRANSMISSION, TRANSMISSION CONTROL
4.1.B0	all bus consumers		Initialisation error	Restricted CAN-bus data communication		
4.1.B1	Y001 Y002	Speed range control	Illogical speed range operation (=fatal error)	Continuation in emergency mode possible		
4.1.B2	A002	ECU, enhanced control	Fault in EPROM programming (range control I / II)	Range cannot be changed while driving.		EOL reprogramming necessary
4.1.B3	A002	ECU, enhanced control	Fault in EPROM programming (rapid reversing ramp parameters)	Rapid reversing possible with standard values.		EOL reprogramming necessary
4.1.B4	B010	Sensor, engine 1	Input parameter values for plausibility monitoring are incorrect.	Standard parameters are stored, plausibility monitoring system remains functional.		EOL reprogramming necessary
4.1.E0	Y004	Turboclutch characteristic	Wrong characteristic stored	Continuation in emergency mode possible		EOL reprogramming necessary
4.1.E9			Values for shift from range II to I outside tolerances	Shifting only possible when stationary		

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4.1.EA			Internal fault (RAM / EEPROM)	Continuation in emergency mode possible		
4.1.EB	B016	Speed range operation	No calibration or drifted values	Continuation in emergency mode possible		TRANSMISSION, calibration code "4003"
4.1.EC	B029 B038	Target engine speed position sensor ('accelerator')	No calibration or drifted values	Continuation in emergency mode possible		Fav 900 with EDC - TRANSMISSION calibration code "4005"
4.1.ED	B017	Clutch pedal angular resolver	No calibration or drifted values	Continuation in emergency mode possible		TRANSMISSION, Calibration Code "4001"
4.1.EE		Transmission characteristic	No calibration or drifted values	Continuation in emergency mode possible		TRANSMISSION, calibration code "4007"
4.1.EF		Turboclutch characteristic	No calibration or drifted values	Continuation in emergency mode possible		TRANSMISSION, TURBOCLUTCH FUNCTION, calibration code "4009"
4.1.FF	A001 A002	Transmission e-box	Internal fault (RAM / EEPROM)	Continuation in emergency mode possible		
5.1.31	A004	4WD 100% key	key / A004 signal fault	Other functions remain active	" 4 WD / Diff. Lock" circuit diagram	4WD ENHANCED CONTROL
			Bus fault A004 / A002			
5.1.32	A004	4WD automatic key	Key / A004 signal fault	Other functions remain active	" 4 WD / Diff. Lock" circuit diagram	4WD ENHANCED CONTROL
			Bus fault A004 / A002			
5.1.33	Y009	4WD clutch solenoid valve	Actuation fault	4WD engages	"4WD / Diff. Lock" circuit diagram	4WD ENHANCED CONTROL
5.1.34	B047	Proximity sensor - Steering angle sensor 1	Signal / switch fault	4WD diff. lock automatic system out of order	"4WD / Diff. Lock" circuit diagram	4WD ENHANCED CONTROL

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
5.1.35	B047	Proximity sensor - Steering angle sensor 2	Signal / switch fault	4WD diff. lock automatic system out of order	"4WD / Diff. Lock" circuit diagram	4WD ENHANCED CONTROL
5.1.51	A004	Diff. lock 100% key	Key / A004 signal fault	Other functions remain active	"4WD / Diff. Lock" circuit diagram	DIFFERENTIAL LOCK ENHANCED CONTROL
			Bus fault A004 / A002			
5.1.52	A004	Diff. lock automatic system key	Key / A004 signal fault	Other functions remain active	"4WD / Diff. Lock" circuit diagram	DIFFERENTIAL LOCK ENHANCED CONTROL
			Bus fault A004/A002			
5.1.53	Y010	Diff. lock solenoid valve	Actuation fault	Diff. lock disengages	"4WD / Diff. Lock" circuit diagram	DIFFERENTIAL LOCK ENHANCED CONTROL
5.1.54	S006	Left brake pedal solenoid switch	Signal fault	Automatic differential lock not available	"4WD / Diff. Lock" circuit diagram	DIFFERENTIAL LOCK ENHANCED CONTROL
5.1.55	S005	Right brake pedal solenoid switch	Signal fault	Automatic differential lock not available	"4WD / Diff. Lock" circuit diagram	DIFFERENTIAL LOCK ENHANCED CONTROL
5.1.61	B003	Suspension position sensor	Signal fault	No further functions available, suspension remains in last position. Continuation without suspension possible	" Suspension" circuit diagram	SUSPENSION ENHANCED DIAGNOSTIC SYSTEM
			8,5 supply fault		A013 Fuse	
5.1.62	Y014	"Raise" suspension solenoid valve	12V supply fault	No further functions available, suspension remains in last position. Continuation without suspension possible	" Suspension" circuit diagram	SUSPENSION ENHANCED DIAGNOSTIC SYSTEM
5.1.63	Y013	"Lower" suspension solenoid valve	12V supply fault	No further functions available, suspension remains in last position. Continuation without suspension possible	" Suspension" circuit diagram	SUSPENSION ENHANCED DIAGNOSTIC SYSTEM

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5.1.64	A004	"Suspension "ON" key	Fault in signal from key to A004	Suspension not operational. Continuation without suspension possible		SUSPENSION ENHANCED DIAGNOSTIC SYSTEM only with single e-box version
			Fault in bus signal from A004 to A002		"CAN/enhanced controls bus" circuit diagram	
5.1.65	A004	"Suspension OFF / Lock" key	Fault in signal from key to A004	Suspension not operational. Continuation without suspension possible		SUSPENSION ENHANCED DIAGNOSTIC SYSTEM only with single e-box version
			Fault in bus signal from A004 to A002		"CAN/enhanced controls bus" circuit diagram	
5.1.66	Y012	Valve, charge suspension	Actuatuion fault	Suspension moves to "Lock" status.		Only in Farmer 400
5.1.6E	B003	Suspension position sensor	Incorrect calibration	Suspension not operational		SUSPENSION ENHANCED DIAGNOSTIC SYSTEM calibration code "7666"
5.1.00	A002	ECU, enhanced control	EPROM checksum error			
5.1.91	A003	"Rear automatic ON / OFF" key in joystick	Signal fault			
5.1.93	A003	"Front automatic ON / OFF" key in joystick	Signal fault			
5.1.95	A003	"Automatic functions STOP" key in joystick	Signal fault			

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
5.1.98	S025	LS pump pressure-operated switch	<p>Minimum pressure cannot be reached, test Sequence : 0 / 2,4 V</p>	<p>Case A ) Valves locked : immediate fault code ; case B ) Valves in operation : 1. No fault code initially 2. Valve flow is automatically reduced. 3. If pressure-operated switch remains open for 2 more seconds, then fault code and locking of valves (= no supply to control pressure valve Y032 ), 4. If pressure-operated switch opens during flow restriction (see above) then flow will be restored after 3 more seconds and no fault code will be generated</p>	"Spool valves 1" circuit diagram	Fault code only after at least 1second > 1000 rpm
			<p>Pressure-operated switch does not open. Test sequence : 0 / 2.4V</p>	see above		

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
5.1.99	S026	Auxilliary pump flow monitor	Minimum flow cannot be reached, test sequence: 0 / 0 V	1. Control valve flow ist automatically reduced to 20 l/min. 2. Hydraulic oil preheater switched off (if active). 3. Fault code cannot be cleared (i.e. Key reset / restart necessary).	"Spool valves 1" circuit diagram	Fault code only after at least 1 second >1000 rpm
			Flow monitor does not open. Test sequence: 0 / 0 V	No monitoring		
5.1.99	S025 , S026	LS Pump pressure-operated switch, auxilliary pump flow monitor	Short-circuit to earth in signal line, test sequence: 0/0 V	No monitoring for either pump.		
5.1.9A	S026	Auxilliary pump flow monitor	Switch fault (does not close / is still open without oil flow), test sequence 2.4 / 5.1V	No monitoring ( from 09/2000 or from A002 Vario V090 software the fault will only be stored if the temperature sensor of control valve 1 for oil heater was over 5°C )	"Spool valves 1" circuit diagram	Fault code appears 8 second after "Ignition ON". Fault code can be cancelled, but appears again after 10 minutes.
			Signal line to flow monitor is interrupted, test sequence 2.4 / 5.1V	No monitoring ( from 09/2000 or from A002 Vario V090 software the fault will only be stored if the temperature sensor of control valve 1 for oil heater was over 5°C )		
5.1.9B	S025 , S026	LS Pump pressure-operated switch, auxilliary pump flow monitor	Interruption, while engine is running, between connector and e-box or connector and flow monitor, test sequence: 0 / 8 V	No monitoring	"Spool valves 1" circuit diagram	Fault code with engine running

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
5.1.9B	S025 , S026	LS Pump pressure-operated switch, auxilliary pump flow monitor	Interruption even before ignition is switched on between e-box and connector (same as when both components are disconnected), test sequence: constant 8 V	No monitoring	"Spool valves 1" circuit diagram	Fault code already present at "Ignition ON".
5.1.9E	S034	Engine coolant level switch	Coolant level too low	Major engine damage!	Circuit diagram "Dashpanel"	Only for FAV 700: Fault code can only be cleared temporarily; it is repeated every 2 minutes
5.1.9F	S034	Engine coolant level switch	Signal fault	No further monitoring	Circuit diagram "Dashpanel"	Only for FAV 700
5.1.B0	A002	ECU, enhanced control	CAN-bus communication restricted			EOL reprogramming necessary
5.1.FF	A002	ECU, enhanced control	Internal fault (RAM / EEPROM)			
6.1.01	A004	Rear PTO ON / OFF key in cab	Key A004 signal fault Bus fault A004 / A002	PTO disengages	Circuit diagram "PTO's"	COMFORT REAR PTO
6.1.02	S020	Left external Rear "PTO ON / OFF" pushbutton	Signal fault	PTO can be engaged by pressing emergency key in cab for 5 seconds.	Circuit diagram "PTO's"	COMFORT REAR PTO
6.1.03	S019	Right external "Rear PTO ON / OFF" pushbutton	Signal fault	PTO can be engaged by pressing emergency key in cab for 5 seconds.	Circuit diagram "PTO's"	COMFORT REAR PTO
6.1.04	Y008	Rear PTO clutch solenoid valve	Actuation fault	PTO disengages	Circuit diagram "PTO's"	COMFORT REAR PTO
6.1.05	B021	Hall-effect speed sensor at rear PTO clutch	Signal fault	PTO can be engaged by pressing emergency key in cab for 5 seconds.	Circuit diagram "PTO's"	COMFORT REAR PTO

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6.1.06	A004	Rear PTO speed selector key 1	Key / A004 signal fault			Fav900 twin e-box version. COMFORT REAR PTO
			Bus fault A004 / A002			
6.1.07	A004	Rear PTO speed selector key 2	Signal fault			Fav900 twin e-box version. COMFORT REAR PTO
			Bus fault A004 / A002			
6.1.08	Y026	Rear PTO speed 1 solenoid valve	Actuation fault			Fav900 twin e-box version. COMFORT REAR PTO
6.1.09	Y027	Rear PTO speed 2 solenoid valve	Actuation fault			Fav900 twin e-box version. COMFORT REAR PTO
6.1.10	B020	Hall-effect speed sensor on rear PTO stub shaft	Signal fault	PTO can be engaged by pressing emergency key in cab for 5 seconds.		COMFORT REAR PTO
6.1.11	A004	Rear PTO automatic mode key	Signal fault	PTO disengages, automatic mode OFF	Circuit diagram "PTO's"	Fav700 COMFORT REAR PTO
6.1.0A	A004	"Aktiv" key ( NA-Version)	Key / A004 signal fault	PTO cannot be engaged		Only for NA single e-box version. COMFORT REAR PTO
6.1.15	A004	NEUTRAL speed selection key	Key / A004 signal fault	PTO speed cannot be modified or selected	Circuit diagram "PTO's"	Only for single e-box version. COMFORT REAR PTO
6.1.16	A004	540 rpm speed selector key	Key / A004 signal fault	PTO speed cannot be modified or selected	Circuit diagram "PTO's"	Only for single e-box version. COMFORT REAR PTO
6.1.17	A004	750 rpm speed selector key	Key / A004 signal fault	PTO speed cannot be modified or selected	Circuit diagram "PTO's"	Only for single e-box version. COMFORT REAR PTO

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Faults



Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
6.1.18	A004	1000 rpm speed selector key	Key / A004 signal fault	PTO speed cannot be modified or selected	Circuit diagram "PTO's"	Only for single e-box version. COMFORT REAR PTO
6.1.1A	Y026	Rear PTO speed 540 solenoid valve	Actuation fault	PTO cannot be engaged	Circuit diagram "PTO's"	Only for single e-box version. COMFORT REAR PTO
6.1.1B	Y027	Rear PTO speed 750 solenoid valve	Actuation fault	PTO cannot be engaged	Circuit diagram "PTO's"	Only for single e-box version. <b>Not for Fav 900</b> . COMFORT REAR PTO
6.1.1B	Y026	Rear PTO speed 750 solenoid valve	Actuation fault	PTO cannot be engaged	Circuit diagram "PTO's"	<b>Only for Fav 900</b> . ENHANCED CONTROL REAR PTO
6.1.1C	Y028	Rear PTO speed 1000 solenoid valve	Actuation fault	PTO cannot be engaged	Circuit diagram "PTO's"	Only for single e-box version. <b>Not for Fav 900</b> COMFORT REAR PTO
6.1.1C	Y027	Rear PTO speed 1000 solenoid valve	Actuation fault	PTO cannot be engaged	Circuit diagram "PTO's"	<b>Only for Fav 900</b> . ENHANCED CONTROL REAR PTO
6.1.41	A004	Rear PTO ON / OFF key (in cab)	has been pressed for more than 30 seconds, mechanical or electric fault in key	Speed selection moves to neutral , no preselection possible	Circuit diagram "PTO's"	Only for single e-box version COMFORT REAR PTO
6.1.42	S020	Right external "Rear PTO ON / OFF" pushbutton	has been pressed for more than 30 seconds, mechanical or electric fault in key	No speed selection, PTO cannot be engaged	Circuit diagram "PTO's"	Only for single e-box version COMFORT REAR PTO
6.1.43	S019	Left external "Rear PTO ON / OFF" pushbutton	has been pressed for more than 30 seconds, mechanical or electric fault in key	No speed selection, PTO cannot be engaged	Circuit diagram "PTO's"	Only for single e-box version. COMFORT REAR PTO

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
6.1.45	B021	Hall-effect speed sensor at rear PTO clutch	Speed selection in neutral, clutch not engaged, B021 shows speed, clutch disc package does not separate, PTO brake non operational	Activating speeds remains possible, press "Engage PTO" key for more than 5 seconds (emergency mode).	Circuit diagram "PTO's"	Only for single e-box version COMFORT REAR PTO
			Speed is selected, clutch 100% engaged, clutch speed deviates by more than 20 % from engine speed. Clutch is slipping.	Activating speeds remains possible, press "Engage PTO" key for more than 5 seconds (emergency mode).	Circuit diagram "PTO's"	Only for single e-box version. COMFORT REAR PTO
			PTO clutch speed is lower than that of PTO stub shaft, fault in power supply to Hall-effect sensor B021	Activating speeds remains possible, press "Engage PTO" key for more than 5 seconds (emergency mode).	Circuit diagram "PTO's"	Only for single e-box version. COMFORT REAR PTO
6.1.4A	A004	"Active" key (only NA Version)	has been pressed for more than 30 seconds, mechanical or electrical fault in key	No PTO operation possible		Only for single e-box NA version. COMFORT REAR PTO

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
6.1.50	B020	Rear PTO stub shaft Hall-effect speed sensor	Speed at PTO stub shaft > 1300 rpm, signal fault in Hall-effect sensor (B020 or B021)	Activating speeds remains possible , press "Engage PTO" key for more than 5 seconds (emergency mode)	Circuit diagram "PTO's	Only for Fav700 single e-box version. COMFORT REAR PTO
			Selected speed is active, speed at stub is lower than clutch speed , power supply fault to Hall-effect sensor B020, speed selection solenoid valve (Y026, Y027, Y028) stuck in "OFF" position.	Electric speed selection remains possible, press "Engage PTO" key for more than 5 seconds (emergency mode). In case of a faulty solenoid valve, corresponding speed cannot be engaged.	Circuit diagram "PTO's	Only for Fav 700 single e-box version. COMFORT REAR PTO
6.1.55	A004	NEUTRAL speed selection key	has been pressed for more than 30 seconds, mechanical or electrical fault in key.	All speeds can be selected and engaged. Neutral cannot be selected.	Circuit diagram "PTO's	Only for single e-box version . COMFORT REAR PTO
6.1.56	A004	540 rpm speed selector key	has been pressed for more than 30 seconds, mechanical or electrical fault in key.	As long as "540" is selected, engagement can occur. "1000" and "750" can be selected, press "Engage PTO" key longer than 5 seconds. "540" cannot be selected.	Circuit diagram "PTO's	Only for single e-box version. COMFORT REAR PTO
6.1.57	A004	750 rpm speed selector key	has been pressed for more than 30 seconds, mechanical or electrical fault in key.	As long as "750" is selected, engagement can occur. "1000" and "540" can be selected, press "Engage PTO" key longer than 5 seconds. "750" cannot be selected.	Circuit diagram "PTO's	Only for single e-box version. COMFORT REAR PTO

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
6.1.58	A004	1000 rpm speed selector key	has been pressed for more than 30 seconds, mechanical or electrical fault in key.	As long as "1000" is selected, engagement can occur. "750" and "540" can be selected, press "Engage PTO" key longer than 5 seconds. "1000" cannot be selected.	Circuit diagram "PTO's	Only for single e-box version. COMFORT REAR PTO
6.1.60	B020 B021	PTO stub shaft Hall-effect speed sensor B020, Hall-effect speed sensor on PTO clutch B021	Actual speed of stub shaft differs by more than plus / minus 12% from setpoint speed of PTO clutch. Solenoid valve (Y026, Y027, Y028) wrongly wired or seized. Mechanical fault in speed selector. Signal fault at Hall-effect sensor (B020, B021)	Electric speed selection remains possible, press "Engage PTO" key for more than 5 seconds (emergency mode). In case of a faulty solenoid valve, corresponding speed cannot be engaged	Circuit diagram "PTO's	Only for single e-box version . COMFORT REAR PTO
6.1.A1	A004	Rear PTO "ON" key	Communication fault		Circuit diagram "PTO's	Only for single e-box version. COMFORT REAR PTO
6.1.AA	A004	"Active" key	Communication fault			Only for single e-box NA version. COMFORT REAR PTO
6.1.B0			CAN-bus communication restricted	Rear PTO non-operational		EOL reprogramming necessary
6.1.B5	A004	NEUTRAL speed selection key	Communication fault			Only for single e-box version. COMFORT REAR PTO
6.1.B6	A004	540 rpm speed selector key	Communication fault			Only for single e-box version. COMFORT REAR PTO

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
6.1.B7	A004	750 rpm speed selector key	Communication fault			Only for single e-box version. COMFORT REAR PTO
6.1.B8	A004	1000 rpm speed selector key	Communication fault			Only for single e-box version. COMFORT REAR PTO
6.1.C1			Activating speed for automatic operation of PTO/power lift not achieved.	Increase travel speed > 1 km/h		
7.1.01	A004	Front PTO ON / OFF key	Key / A004 signal fault		Circuit diagram "PTO's"	COMFORT FRONT PTO
			Bus fault A004 / A002			
7.1.02	S041	"Release front PTO brake" external pushbutton	Signal fault		Circuit diagram "PTO's"	Fav900: COMFORT FRONT PTO
7.1.03	Y034	"Release brake" front PTO solenoid valve	Actuation fault		Circuit diagram "PTO's"	
7.1.04	Y011	"PTO clutch" front PTO solenoid valve	Actuation fault			COMFORT FRONT PTO
7.1.05	B002	Front PTO Hall-effect speed sensor	Signal fault		Circuit diagram "PTO's"	COMFORT FRONT PTO
7.1.06	S042	Front PTO speed sensor 1 solenoid switch	Signal fault		Circuit diagram "PTO's"	Fav 900 twin e-box version. COMFORT FRONT PTO
7.1.07	S042	Front PTO speed sensor 2 solenoid switch	Signal fault		Circuit diagram "PTO's"	Fav 900 twin e-box version. COMFORT FRONT PTO
7.1.08	S042	Front PTO speed sensor 3 solenoid switch	Signal fault		Circuit diagram "PTO's"	Fav 900 twin e-box version. COMFORT FRONT PTO

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7.1.09	A004	Front PTO automatic mode key	Key / A004 signal fault		Circuit diagram "PTO's"	Fav 700: COMFORT FRONT PTO
			Bus fault A004 / A002			
7.1.0A	A004	"Active" key	Key / A004 signal fault			Only for NA single e-box version. COMFORT FRONT PTO
			Bus fault A004 / A002			
7.1.41	A004	Front PTO "ON" key	Plausibility error, key has been pressed for more than 30 seconds			Only for single e-box version. COMFORT FRONT PTO
7.1.42	S041	"Release brake" key	Plausibility error, key has been pressed for more than 30 seconds			Only for Fav 900 Single e-box version. COMFORT FRONT PTO
7.1.4A	A004	"Active" key	Plausibility error, key has been pressed for more than 30 seconds			Only for single e-box NA version. COMFORT FRONT PTO
7.1.A1	A004	Front PTO "ON" key	Communication fault			Only for single e-box version. COMFORT FRONT PTO
7.1.A2			Communication fault			Only for single e-box version. COMFORT FRONT PTO
7.1.AA	A004	"Active" key	Communication fault			Only for single e-box NA version. COMFORT FRONT PTO
7.1.C1			Activating speed for automatic operation of PTO/power lift not achieved.	Increase travel speed > 1 km/h		

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
8.3.11	A005; Y021	Rear EPC , "Raise" function	Fault in signal line to valve	Control locked	"Electrohydraulic power lift control" circuit diagram	REAR EPC SPOOL VALVES - OPERATING STATUS
			Solenoid valve fault			
			E-box fault			
8.3.12	Y021	Rear EPC , "Lower" function	Fault in signal line to valve	Control locked	"Electrohydraulic power lift control" circuit diagram	REAR EPC SPOOL VALVES - OPERATING STATUS
			Solenoid valve fault			
			E-box fault			
8.3.14	S029	"Raise" rear power lift external pushbotton, cab, left rear	Signal line fault, key fault	Control locked	"Electrohydraulic power lift control" circuit diagram	REAR EPC EXTERNAL PUSHBUTTONS
8.3.15	S030	"Lower" rear power lift external pushbotton, cab, left rear	Signal line fault	Control locked	"Electrohydraulic power lift control" circuit diagram	REAR EPC EXTERNAL PUSHBUTTONS
8.3.16	A005	Rear EPC control module	Stable voltage < 1 volt	Control locked	"Electrohydraulic power lift control" circuit diagram	REAR EPC EXTERNAL PUSHBUTTONS
8.3.17	A005	Rear EPC control module	Supply voltage >18 volt	Control locked	"Electrohydraulic power lift control" circuit diagram	Ub 30
8.3.18	S027	"Raise" rear power lift external pushbotton, cab, right rear	Signal line fault	Control locked	"Electrohydraulic power lift control" circuit diagram	REAR EPC EXTERNAL PUSHBUTTONS
			Key fault			
8.3.19	S028	"Lower" rear power lift external pushbotton, cab, right rear	Signal line fault	Control locked	"Electrohydraulic power lift control" circuit diagram	REAR EPC EXTERNAL PUSHBUTTONS
			Key fault			

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
8.3.21		Rotary control for "Position/traction hybrid control" for rear EPC	Signal fault			Only for FAV900 with twin control modules
8.3.22	B030	Rear EPC position sensor	Signal line fault	Control locked	"Electrohydraulic power lift control" circuit diagram	REAR EPC SETPOINT / POSITION SENSOR
			Fault in 9.5 V supply to A005			
			Sensor out of position			
			Sensor fault			
8.3.23	(A004)	Rear EPC "Depth control" setpoint setting	Signal line fault	Control locked		REAR EPC SETPOINT / POSITION SENSOR
8.3.24		Rear power lift "lift height limit" rotary control	Signal fault	Control locked		Only for FAV900 with twin control modules
8.3.26		External position sensor for rear power lift	Signal line fault	Control locked	"Electrohydraulic power lift control" circuit diagram	
			Sensor out of position			
			Sensor fault			
8.3.28	(A004)	Control console ECU	Fault in rear EPC rapid lift control	"Lift" and "Lower" only possible via external buttons.	"Electrohydraulic power lift control" circuit diagram	REAR EPC ACKNOWLEDGEMENTS / STATUS
8.3.31	B031	Rear EPC right draft-sensing pin	Signal line fault	Restricted control quality with traction control	"Electrohydraulic power lift control" circuit diagram	REAR EPC DRAFT-SENSING PIN
			9,5 V supply fault			
			Sensor fault			

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
8.3.32	B032	Rear EPC left draft-sensing pin	Signal line fault	Restricted control quality with traction control	"Electrohydraulic power lift control" circuit diagram	REAR EPC DRAFT-SENSING PIN
			Fault in 9,5 V supply to A005			
			Sensor fault			
8.3.33	G001; G002	Battery 1; battery 2	Battery voltage < 11 volts		"Power supply +Ub" circuit diagram	
8.3.34		Rear power lift "Lowering speed" rotary control	Signal fault	Cannot be changed	"Electrohydraulic power lift control" circuit diagram	Only for FAV900 with twin control modules
8.3.35		Rear power lift "Operating mode" rotary control	Signal fault	Cannot be changed	"Electrohydraulic power lift control" circuit diagram	Only for FAV900 with twin control modules
8.3.38		Rear power lift pressure sensor	Signal fault, pressure sensor fault	Control is continued	"Electrohydraulic power lift control" circuit diagram	Only for FAV900 with twin control modules
8.3.39		Rear power lift "Rapid lowering / Hitchlift" switch	Signal fault	Control is continued	"Electrohydraulic power lift control" circuit diagram	Only for FAV900 with twin control modules
8.3.40	(A004)	Rear power lift rapid lift control	Fault in switch / A004 contact	Lifting and lowering only via external controls	"Electrohydraulic power lift control" circuit diagram	REAR EPC ACKNOWLEDGEMENTS / STATUS
			CAN (K-Bus) fault A004 / A005			
8.3.41	(A004)	Rear power lift rapid lift control	Fault in switch / A004 contact	Rapid lowering system not functioning	"Electrohydraulic power lift control" circuit diagram	REAR EPC ACKNOWLEDGEMENTS / STATUS
			CAN (K-Bus) fault A004 / A005			

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
8.3.42	(A004)	Rear EPC, hitch function	Fault in switch / A004 contact	Hitch function not operational	"Electrohydraulic power lift control" circuit diagram	REAR EPC ACKNOWLEDGEMENTS / STATUS
			CAN (K-Bus) fault A004 / A005			
8.3.43	(A004)	Automatic function (switching from control console to joystick)	Fault in switch / A004	Switching not possible	"Electrohydraulic power lift control" circuit diagram	REAR EPC ACKNOWLEDGEMENTS / STATUS
			CAN (K-Bus) fault A004 / A005			
8.3.50	B031 draft-sensing pin	Rear EPC right draft-sensing pin	Draft-sensing pin is overloaded as a result of twisting lift in upper range (90-100% lift height) due to too tight setting	Fault code will not be stored	"Electrohydraulic power lift control" circuit diagram	Display is not shown for FAV900
8.3.51	B032 draft-sensing pin	Rear EPC left draft-sensing pin	Draft-sensing pin is overloaded as a result of twisting lift in upper range (90-100% lift height) due to too tight setting	Fault code will not be stored	"Electrohydraulic power lift control" circuit diagram	Display is not shown for FAV900
9.1.50		Spool valve fault	Valve cannot be identified by bus line	No valve operation available	Signal flow diagram A002 CAN II Pin 4 and 5	

Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
9.1.5F		Spool valve fault	Setpoint message missing	Valve moves into neutral position		FRONT POWER LIFT
			Configuration message missing			
			Setpoint message is not plausible			
			Configuration message is not plausible			
			Potentiometer or PWM fault			
9.1.51		Spool valve fault	EEPROM inconsistent	Valve moves into neutral position		FRONT POWER LIFT
9.1.52		Spool valve fault	Supply voltage < 8 volts	Valve moves into neutral position		FRONT POWER LIFT
9.1.53		Spool valve fault	Supply voltage > 18 volts	Valve moves into neutral position		FRONT POWER LIFT
9.1.54		Spool valve fault	Main Piston travel too short due to drop of control pressure below 22 bar	Valve moves into neutral position		FRONT POWER LIFT
			Hydraulic oil temperature too low			
9.1.5A		Spool valve fault	Main piston deflected too far	Valve moves into neutral position		FRONT POWER LIFT
9.1.5B		Spool valve fault	Floating position is not reached	Valve moves into neutral position		FRONT POWER LIFT
9.1.5C		Spool valve fault	Floating position has been set manually	No consequences		FRONT POWER LIFT
9.1.55		Spool valve fault	Overvoltage (> 45 volts)	Valve moves into neutral position		

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
9.1.56		Spool valve fault	Magnet output stage fault within spool valve	Valve moves into neutral position		FRONT POWER LIFT
9.1.57		Spool valve fault	Internal position sensor fault	Valve moves into neutral position		FRONT POWER LIFT
9.1.58		Spool valve fault	Main piston cannot return into neutral position because of oil contamination			FRONT POWER LIFT
9.1.59		Spool valve fault	Main piston cannot return into neutral position when switched on because of oil contamination			FRONT POWER LIFT
9.1.A0	A002	ECU, enhanced control	EEPROM fault while storing	Set values (enhanced controls) are not stored		
9.1.A1	A002	ECU, enhanced control	EEPROM fault while loading	Set values (enhanced controls) cannot be read		
9.1.B0	B040	Position sensor	Not calibrated	No position control available	"Spool valves 2" circuit diagram	FRONT POWER LIFT calibration code "9002"
9.1.B1	B040	Position sensor	Signal line fault	No position control available	Circuit diagram "Spool Valves 2"	FRONT POWER LIFT
			8.5 V supply Fault			
			Sensor out of position			
			Sensor fault			
9.1.B2	A004	Depth control setpoint potentiometer	Not calibrated	Setpoint cannot be set		FRONT POWER LIFT calibration code "9001"
9.1.B3	A004	Depth control setpoint potentiometer	Switch / A004 signal fault	Setpoint cannot be set		FRONT POWER LIFT
9.1.C0	A004	Control console	Not available or bus not connected			

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
9.1.C1	A004	Automatic (switching from control console to joystick)	Key fault			FRONT POWER LIFT
9.1.C2	A004	Valve locked	Key fault			FRONT POWER LIFT
9.1.C3	A004	Floating position	Key fault			FRONT POWER LIFT
9.1.C4	A004	"Lift" rapid lift control	Key fault			FRONT POWER LIFT
9.1.C5	A004	"Lower" rapid lift control	Key fault			FRONT POWER LIFT
9.1.C6	A004	Control Console	CAN-bus fault	Malfunctions which cannot be further specified		
9.1.C7						
9.1.C8						
9.1.C9						
9.1.CA						
9.1.D0	S021	"Lift" front power lift external pushbutton	Key fault	No function	Circuit diagram "Spool valves 2"	FRONT POWER LIFT
9.1.D1	S022	"Lower" front power lift external pushbutton	Key fault	No function	Circuit diagram "Spool valves 2"	FRONT POWER LIFT
A.1.10		Spool valve fault, valve 1	Valve cannot be recognised by valve bus	No valve operation available	Signal flow diagram A002 CAN II pin 4 and 5	
A.1.11		Spool valve fault, valve 1	EEPROM inconsistent	Valve moves into neutral position		
A.1.12		Spool valve fault, valve 1	Supply voltage < 8 volts	Valve moves into neutral position		
A.1.13		Spool valve fault, valve 1	Supply voltage > 18 volts	Valve moves into neutral position		
A.1.14		Spool valve fault, valve 1	Main piston travel too short due to drop of control pressure below 22 bar	Valve moves into neutral position		SPOOL VALVES 1 - 4
			Hydraulic oil temperature too low			

Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
A.1.15		Spool valve fault, valve 1	Overvoltage (<45 volts)	Valve moves into neutral position		
A.1.16		Spool valve fault, valve 1	Magnet output stage fault within spool valve	Valve moves into neutral position		SPOOL VALVES 1 - 4
A.1.17		Spool valve fault, valve 1	Internal position sensor fault	Valve moves into neutral position		SPOOL VALVES 1 - 4
A.1.18		Spool valve fault, valve 1	Main piston cannot return to neutral position because of oil contamination.	Undefined and uncontrolled functions can occur , DANGER!		SPOOL VALVES 1 - 4
A.1.19		Spool valve fault, valve 1	Main piston cannot return to neutral position when switched on because of oil contamination			SPOOL VALVES 1 - 4
A.1.1A		Spool valve fault	Main piston deflected too far	Valve moves into neutral position		SPOOL VALVES 1 - 4
A.1.1B		Spool valve fault, valve 1	Floating position is not reached	Valve moves into neutral position		SPOOL VALVES 1 - 4
A.1.1C		Spool valve fault, valve 1	Floating position has been set manually	No consequences		SPOOL VALVES 1 - 4
A.1.1F		Spool valve fault, valve 1	Setpoint message is missing or not plausible	Valve moves into neutral position		SPOOL VALVES 1 - 4 setpoint / actual value display
			Configuration message is missing or not plausible			
			Potentiometer or PWM fault			

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
A.1.20		Spool valve fault, valve 2	Valve cannot be recognised by valve bus	No valve operation available	Signal flow diagram A002 CAN II pin 4 and 5	
A.1.21		Spool valve fault, valve 2	EEPROM inconsistent	Valve moves into neutral position		
A.1.22		Spool valve fault, valve 2	Supply voltage < 8 volts	Valve moves into neutral position		
A.1.23		Spool valve fault, valve 2	Supply voltage > 18 volts	Valve moves into neutral position		
A.1.24		Spool valve fault, valve 2	Main piston travel too short due to drop of control pressure below 22 bar	Valve moves into neutral position		SPOOL VALVES 1 - 4
			Hydraulic oil temperature to low			
A.1.25		Spool valve fault, valve 2	Overvoltage (> 45 volts)	Valve moves into neutral position		
A.1.26		Spool valve fault, valve 2	Magnet output stage fault within spool valve	Valve moves into neutral position		SPOOL VALVES 1 - 4
A.1.27		Spool valve fault, valve 2	Internal position sensor fault	Valve moves into neutral position		SPOOL VALVES 1 - 4
A.1.28		Spool valve fault, valve 2	Main piston cannot return into neutral position because of oil contamination.	Undefined and uncontrolled functions can occur , DANGER!		SPOOL VALVES 1 - 4

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
A.1.29		Spool valve fault, valve 2	Main piston cannot return to neutral position when switched on because of oil contamination.			SPOOL VALVES 1 - 4
A.1.2A		Spool valve fault, valve 2	Main piston deflected too far	Valve moves into neutral position		SPOOL VALVES 1 - 4
A.1.2B		Spool valve fault, valve 2	Floating position is not reached	Valve moves into neutral position		SPOOL VALVES 1 - 4
A.1.2C		Spool valve fault, valve 2	Floating position has been set manually	No consequences		SPOOL VALVES 1 - 4
A.1.2F		Spool valve fault, valve 2	Setpoint message is missing or not plausible	Valve moves into neutral position		SPOOL VALVES 1 - 4 setpoint / actual value display
			Configuration message is missing or not plausible			
			Potentiometer or PWM fault			
A.1.30		Spool valve fault, valve 3	Valve cannot be recognised by valve bus	No valve operation available	Signal flow diagram A002 CAN II pin 4 and 5	
A.1.31		Spool valve fault, valve 3	EEPROM inconsistent	Valve moves into neutral position		
A.1.12		Spool valve fault, valve 3	Supply voltage < 8 volts	Valve moves into neutral position		
A.1.33		Spool valve fault, valve 3	Supply voltage > 18 volts	Valve moves into neutral position		

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12/1999	b	40/47		0000	B	000001



Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
A.1.34		Spool valve fault, valve 3	Main piston travel too short due to drop of control pPressure below 22 bar	Valve moves into neutral position		SPOOL VALVES 1 - 4
			Hydraulic oil temperature too low			
A.1.35		Spool valve fault, valve 3	Overvoltage (> 45 volts)	Valve moves into neutral position		
A.1.36		Spool valve fault, valve 3	Magnet output stage fault within spool valve	Valve moves into neutral position		SPOOL VALVES 1 - 4
A.1.37		Spool valve fault, valve 3	Internal position sensor fault	Valve moves into neutral position		SPOOL VALVES 1 - 4
A.1.38		Spool valve fault, valve 3	Main piston cannot return into neutral position because of oil contamination.	Undefined and uncontrolled functions can occur, DANGER!		SPOOL VALVES 1 - 4
A.1.39		Spool valve fault, valve 3	Main piston cannot return to neutral position when switched on because of oil contamination.			SPOOL VALVES 1 - 4
A.1.3A		Spool valve fault, valve 3	Main piston deflected too far	Valve moves into neutral position		SPOOL VALVES 1 - 4
A.1.3B		Spool valve fault, valve 3	Floating position is not reached	Valve moves into neutral position		SPOOL VALVES 1 - 4
A.1.3C		Spool valve fault, valve 3	Floating position has been set manually	No consequences		SPOOL VALVES 1 - 4

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
A.1.3F		Spool valve fault, valve 3	Setpoint message is missing or not plausible	Valve moves into neutral position		SPOOL VALVES 1 - 4 setpoint / actual value display
			Configuration message is missing or not plausible			
			Potentiometer or PWM fault			
A.1.40		Spool valve fault, valve 4	Valve cannot be recognised by valve bus	No valve operation available	Signal flow diagram A002 CAN II pin 4 and 5	
A.1.41		Spool valve fault, valve 4	EEPROM inconsistent	Valve moves into neutral position		
A.1.42		Spool valve fault, valve 4	Supply voltage < 8 volts	Valve moves into neutral position		
A.1.43		Spool valve fault, valve 4	Supply voltage > 18 volts	Valve moves into neutral position		
A.1.44		Spool valve fault, valve 4	Main piston travel too short due to drop of control pressure below 22 bar	Valve moves into neutral position		SPOOL VALVES 1 - 4
			Hydraulic oil temperature too low			
A.1.45		Spool valve fault, valve 4	Overvoltage (> 45 Volt)	Valve moves into neutral position		
A.1.46		Spool valve fault, valve 4	Magnet output stage fault within spool valve	Valve moves into neutral position		SPOOL VALVES 1 - 4
A.1.47		Spool valve fault, valve 4	Internal position sensor fault	Valve moves into neutral position		SPOOL VALVES 1 - 4
A.1.48		Spool valve fault, valve 4	Main piston cannot return to neutral position because of oil contamination.	Undefined and uncontrolled functions can occur, DANGER!		SPOOL VALVES 1 - 4

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Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
A.1.49		Spool valve fault, valve 4	Main piston cannot return to neutral position when switched on because of oil contamination.			SPOOL VALVES 1 - 4
A.1.4A		Spool valve fault, valve 4	Main piston deflected too far	Valve moves into neutral position		SPOOL VALVES 1 - 4
A.1.4B		Spool valve fault, valve 4	Floating position is not reached	Valve moves into neutral position		SPOOL VALVES 1 - 4
A.1.4C		Spool valve fault, valve 4	Floating position has been set manually	No consequences		SPOOL VALVES 1 - 4
A.1.4F		Spool valve fault, valve 4	Setpoint message is missing or not plausible	Valve moves into neutral position		SPOOL VALVES 1 - 4 setpoint / actual value display
			Configuration message is missing or not plausible			
			Potentiometer or PWM fault			
A.1.A0	A002	E-box	EEPROM fault while storing			-
A.1.A1	A002	E-box	EEPROM fault while loading			-
A.1.A2			More valves connected than registered via end-of-line programming. Program	Not all valves can be operated		-
A.1.B0	A003	Crossgate lever	Not calibrated	Valves cannot be operated		Calibration code "1001"

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Farmer 400  
Fav 700  
Fav 900

Tractor / General system  
Vario Tractors - Failure Codes

**B**

Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
A.1.B1	A003	Crossgate lever	X- axis signal fault	Valves cannot be operated	Circuit diagram "Spool valves 1"	SPOOL VALVES OPERATION
A.1.B2	A003	Crossgate lever	Y- axis signal fault	Valves cannot be operated	Circuit diagram "Spool valves 1"	SPOOL VALVES OPERATION
A.1.B3	A003	Crossgate lever	Interference with X- and Y-axis signals; crossgate lever missing	Valves cannot be operated	Circuit diagram "Spool valves 1"	SPOOL VALVES OPERATION
A.1.B4	A003	Crossgate lever	Zero position signals of X- and Y-axes are not identical to the "Rest position" signal (=plausibility check)	Valves cannot be operated	Circuit diagram "Spool valves 1"	SPOOL VALVES OPERATION
A.1.B5	A003	Crossgate lever	"Rest position" signal fault	Valves cannot be operated	Circuit diagram "Spool valves 1"	SPOOL VALVES OPERATION
A.1.C0	A004	Side console	Not available or bus not connected			-
A.1.C1	A004	Automatic (switching from control console to joystick)	Key fault			SPOOL VALVES OPERATION
A.1.C2	A004	Valve locked	Key fault			SPOOL VALVES OPERATION
A.1.C5	A004	Switching function	Key fault			SPOOL VALVES OPERATION

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Farmer 400  
Fav 700  
Fav 900

Tractor / General system  
Vario Tractors - Failure Codes

**B**

Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
A.1.C6 A.1.C7 A.1.C8 A.1.C9 A.1.CA	A004	Control console	CAN-bus fault	Malfunctions which cannot be further specified		-
A.1.D1	A003	Joystick button for spool valve 3 Lifting / Lowering	Key fault	No valve operation available		SPOOL VALVES OPERATION
A.1.D3	A003	Joystick button for spool valve 4 Lifting / Lowering	Key fault	No valve operation available		SPOOL VALVES OPERATION
A.1.D4	S023	Release for external operation / position of front power lift	Solenoid switch or signal fault	Impossible to switch mode from hydraulic connection to front power lift	Circuit diagram "Spool valves 1"	
A.1.D6	S021	External "Lift" pushbutton		No valve operation available	Circuit diagram "Spool valves 1"	STANDARD FRONT POWER LIFT or COMFORT FRONT POWER LIFT EPC
A.1.D7	S036	Hydraulic oil level sensor	Break in cable or sensor disconnected	No further monitoring	Circuit diagram "Spool valves 1"	Single e-box versions (cf. 0.1.55) ENHANCED CONTROL STEERING FLUID LEVELS
A.1.D9	S036	Hydraulic oil level sensor	Tank is empty	All valves are locked	Circuit diagram "Spool valves 1"	ENHANCED CONTROL STEERING FLUID LEVELS
A.1.DA	B022	Pressure-operated switch for kickout (NA)	Switch fault	"Kickout" function not available	Circuit diagram "Spool valves 1"	
A.1.DB			Hydraulic oil tank characteristic implausible	Incorrect tank display		EOL reprogramming necessary

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Farmer 400  
Fav 700  
Fav 900

Tractor / General system  
Vario Tractors - Failure Codes

**B**

Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
A.1.DC			Hydraulic oil priority volume greater than pump volume. Reduce hydraulic oil priority volume.			
A.1.E0			Not all conditions which are required for switching are met	Switching from EPC to DA and vice versa impossible		
A.1.E1			Switch fault	Switching from EPC to DA and vice versa impossible		
A.1.E2			Pilot valve fault	Switching from EPC to DA and vice versa impossible		
A.1.E3			Shutoff valve fault	Switching from EPC to DA and vice versa impossible		
A.1.E4			EPC is not available, not detected	Switching from EPC to DA and vice versa impossible		
A.1.E5			Mecanical problem within spool valve	Switching from EPC to DA and vice versa impossible		
A.1.F0	Y032	Control pressure solenoid valve	Fault in electric actuation system or solenoid valve.	Valves in neutral position	Circuit diagram "Spool valves 1"	

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**Farmer 400  
Fav 700  
Fav 900**

**Tractor / General system  
Vario Tractors - Failure Codes**

**B**

Fault code	Id code	Brief description	Description	Consequences	Link	FENDIAS / Note
A.1.F1	Y033 MVV	"Flush valve" solenoid	12V supply fault	No oil heating during start-up process for LS pump at low ambient temperature	Circuit diagram "Suspension"	<b>SPOOL VALVES OVERVIEW OF OPERATION</b>  VALVES 1 - 4
A.1.F1	A013	Fuseboard	Overall 8.5 V power supply failure (multiple fault codes)	Fault in suspension and other faults	Circuit diagram "Electronics power supply"	No FENDIAS diagnosis possible.

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Troubleshooting chart for front suspension</b>	<b>B</b>
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Message - symptom - fault													
A													Suspension does not rise
	B												Suspension does not lower / cannot be locked
		C											Suspension rises without valve actuation, i.e. without command
			D										Suspension lowers without valve actuation, i.e. without command
				E									Suspension is not stable, i.e. constant jerking movements
					F								Suspension does not spring up and down
						G							Commands are not carried out directly
							H						Suspension continues further than command
								J					Suspension cannot be calibrated
									K				Suspension is activated at slightest change, e.g. pulling away
										L			

X O	likely possible												Fault	Cause	Action, if necessary see ...
	A	B	C	D	E	F	G	H	J	K	L				
X													Front axle load too high		
X													Raise valve Y014	Fault in coil / cartridge	
	X												Lower valve Y013	Fault in coil / cartridge	
X													Raise nozzle BI 3	Blocked	Visual inspection, blow through, if nec.
	X												Lower nozzle BI 4	Blocked	Visual inspection, blow through, if nec.
X													Pressure duct open	Bleed point AV 1/2 open	Check Ma = 20 Nm
		X											Leak from B duct to P or A	Non-return valve RV2	Blow through / replace
		X										Raise valve SV2		Blow through / replace	
		X										Bleed point AV2		Closed? Ma = 20 Nm	
			X	O									Leak from A duct to T	Lower valve SV1	Blow through / replace
			X	O								Bleed point AV1		Closed? Ma = 20 Nm	
			X	O								Non-return valve DBV-HPS 250 bar		Blow through / replace	
				X									Leak in cylinder	Oil flowing between piston and rod sides	
							X						200 bar charge pressure not available	Fault in charge valve MVL/Y012	Generate 200 bar elsewhere, if nec. replace
								O						Shuttle valve WLS1 leaking / not available	This fault would affect entire hydraulic system!
					X								Accumulator capacity not available	Fault in diaphragm accumulator ASP1/2, ZSP	Replace



Farmer 400 Fav 700 Fav 900	Tractor / General system <b>Troubleshooting chart for front suspension</b>	B
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X O	likely possible											Fault	Cause	Action, if necessary see ...	
	A	B	C	D	E	F	G	H	J	K	L				
							X	X					Raise/lower valve correctly wired, though valve cartridges mixed up	Valves do not have identical function	Check: Raise=white-chromated Lo- wer=yellow-chroma- ted
X									X				Position sensor B003	Fault in mech. con- nection	
												X	Suspension (characteristic) incorrect	Faulty diaphragm in accumulator, i.e. reduction in nitrogen pre-tension pressure	Pre-tension pressure can only be measured with special instrument! If nec., compare by replacing accumulator. <b>Caution! Pressure in suspension must be relieved!</b>
												X		Wrong accumulator fitted	Check / replace <b>Caution! Pressure in suspension must be relieved!</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Troubleshooting chart for the steering</b>	<b>B</b>
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Message - symptom - fault													
A													Steering heavy / "lack of pressure"
	B												Vibrations
		C											Steering only initially heavy
			D										
				E									
					F								
						G							

X O	likely possible												Fault	Cause	Action, if necessary see ...	
	A	B	C	D	E	F	G	H	J	K	L					
X														Front axle load too high		
X														Lack of working pressure in all other consumers too		Refer to general faults
X														Lack of working pressure only when steering	Steering-side leak in shuttle valve WLS1	Blow through / replace
O															Steering pressure-relief valve DBV-L too low	
X														Priority valve PVL not operating	Piston not functioning	Blow through / replace
X													Non-return valve RV5 d=0.5 blocked		Blow through / replace	
X													Non-return valve RV6 d=1.2 blocked		Blow through / replace	
	X													Priority valve PVL regulating poorly	Piston not functioning smoothly	Blow through / replace
	X												Non-return valve RV5 blocked		Blow through / replace	
	X												Non-return valve RV6 blocked		Blow through / replace	
X		X												LS command is delayed or attenuated when forwarded	Dirt on diaphragm in LS duct of servostat	Blow through
	X													Air in circuit (in P to steering unit and steering cylinder)		Bleed

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Tractor / General system <b>General troubleshooting chart for the hydraulics</b>	<b>B</b>
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Message - symptom - fault													
A													Rise in oil temperature
	B												Required working pressure of 200 bar not reached with any consumer
		C											Commands are carried out with a delay
			D										Set figures, e.g. speeds, reduce
				E									Tractor engine speed is depressed
					F								Noise / hydraulic systems are loud

X O	likely possible												Fault	Cause	Action, if necessary see ...
	A	B	C	D	E	F	G	H	J	K	L				
					X								System-related; i.e. not a fault!	With dynamic constant load at high pressure level	
					O									When bio-oils are used, hydraulic systems may be louder in operation	
X													Lack of cooling	Contaminated radiator	Check
O														Insufficient residual oil volume in tank	Check
O														Visco fan does not kick in	Check
X														Engine speed too low	
X				X	O								Pressure overlap / overpressure effect at	Working pressure of 200 bar increased without authority	Symptom: engine speed depressed and Rise in oil temperature
O				X	O									Safety valve DBV-A	
X				O									LS pump constantly working at excessive pressure	Implement cannot reach setpoint	
X				X										Consumer running against stop too long, e.g. seized valve or time function of electrohydraulic control valve (EHS) too long	
X				X										Fault in charge valve; oil leaking from P line to LS; (=constant charge effect)	
X				X	O								Hydr. oil preheater (in tractors with EHS valves)	Does not switch off (required time at -20°C normally approx. 15 to 20 mins)	Note: noise during intended preheating of oil (=flushing) is not a fault
X					O									Auxiliary pump working against pressure	
O					O									Other throttle valves have free flow	
	O												Working pressure in LS pump too low	200 bar pressure relief adjusted	

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Tractor / General system <b>General troubleshooting chart for the hydraulics</b>	<b>B</b>
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X O	likely possible											Fault	Cause	Action, if necessary see ...		
	A	B	C	D	E	F	G	H	J	K	L					
X	X														LS pump leaking too much inside	
			X											Required oil volume is greater than possible pump output	Engine speed too low	
		X												Fault in LS command	Leak / pressure drop in shuttle valve WLS1	
		X													Air in LS duct	See also "Operating with ext. control blocks"
		X													Blockage e.g. dirt before a shuttle valve	
					X									LS pump entraining air	Tank empty	Check operation of level sensor FSG/S036 (not fitted to 400)
					X										Oil foaming (=air bubbles) because auxiliary pump is entraining air	
					X									Transmission of structure-borne noise	Another component touching hydraulic pipe or similar	
O					X									LS pump is worn		To measure oil leak volume (not possible in FAV 900) see .....
O					O									Auxiliary pump PL is worn		

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Troubleshooting chart: instrument control block at Pext and LSext</b>	<b>B</b>
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Message - symptom - fault													
A													Rise in oil temperature
	B												Commands not being carried out, i.e. "implement not working"
		C											Commands are carried out only with a delay
			D										Performance (pressure / volume) at implement too weak
				E									
					F								
						G							

X O	likely possible												Fault	Cause	Action, if necessary see ...
	A	B	C	D	E	F	G	H	J	K	L				
X													Lack of cooling	Contaminated radiator	Check
O												Insufficient residual oil volume in tank		Check	
O												Visco fan does not kick in		Check	
X												Engine speed too low			
X													LS pump working constantly against pressure	Implement cannot reach setpoint	Check
X												Consumer working against stop too long e.g. seized valve or time function of EHS valve too long		Check	
		X											Transmission of command in LS line corrupted	Air in LS line (especially at commissioning)	Bring valve to max. pressure capacity and then bleed LS line as close as poss. to LS pump
		X	X										Excessive pressure drop in P connecting line	In Fav 900: LS pressure increase ("Control pressure increase") not actuated	Check
		O												Connection cross-sections too small	
X	X												Control block not matched to LS, i.e. pressure supply system working as open system	"LS screw" not corrected	See relevant Operating Manual for implement

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Troubleshooting chart: implement control block at tractor valve</b>	<b>B</b>
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Message - symptom - fault													
A													Rise in oil temperature
	B												Commands not being carried out, i.e. "implement not working"
		C											
			D										
				E									
					F								
						G							

X O	likely possible												Fault	Cause	Action, if necessary see ...
	A	B	C	D	E	F	G	H	J	K	L				
X													Lack of cooling	Contaminated radiator	Check
O												Insufficient residual oil volume in tank		Check	
O												Visco fan does not kick in		Check	
X												Engine speed too low			
X													LS pump working constantly against pressure	Implement cannot reach setpoint	
X												Consumer working against stop too long e.g. seized valve or time function of EHS valve too long			
X													LS pump constantly working at excessive pressure	Set quantity at tractor valve is higher than consumers' setpoint quantity	
X	X												Control block not matched to open system	"LS screw" not corrected	See relevant Operating Manual for implement

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Component overview</b>	<b>D</b>
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**Note:**

The entries in the tractor range columns refer to the relevant circuit diagrams (sheet no.).

<b>DIN</b>	<b>Designation</b>	<b>Con- nec- tor</b>	<b>Farmer 400</b>	<b>Fav 700 twin e-box</b>	<b>Fav 700 single e-box</b>	<b>Fav 900</b>
A001	Transmission control unit e-box			3, 6, 19, 20, 25, 26		
A002	E-box (enhanced-control twin box version)	X031	3, 6, 19, 20, 25, 26, 27, 28, 29, 30	3, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29	3, 6, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30	3, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 33
A003	Joystick	X032		19, 24, 25	3, 19, 22, 24, 26	3, 20, 23, 25, 27, 33
A004	Control console	X033	3, 6, 19, 20, 21, 22, 23, 26, 28, 30	3, 19, 20, 22, 24	3, 6, 19, 20, 21, 22, 23, 24, 26, 28, 30	3, 6, 20, 21, 22, 23, 24, 25, 27, 29, 30, 31, 33
A005	EPC e-box	X034	3, 18, 19, 20, 22	18, 20, 22	3, 18, 19, 20, 22	3, 19, 20, 21, 23
A006	Keypad on front dashboard	X035	21	21	21	22
A007	Instrument panel	X100, X101, X102	3, 5, 7, 8, 18, 19, 20, 21, 22	5, 7, 8, 18, 20, 21, 22, 25	3, 5, 7, 8, 18, 19, 20, 21, 22, 24, 26	3, 5, 7, 9, 19, 20, 21, 22, 23, 27, 33
A008	Vario terminal	X036, X461	3, 19, 20, 31	19, 20, 24, 30	3, 19, 20, 31	3, 20, 21, 32
A009	Actuator unit	X037	25, 26	25	25, 26	26, 27
A010	Thermostat, electronic	X281	14	14	14	15
A011	Radar sensor	X039	22	22	22	5, 23
A012	Cold-start aid	X081	5	5	5	
A013	Fuse board ABC	X200, X201, X202	19, 20, 21, 25, 26, 28, 29, 30, 31	19, 20, 21, 23, 24, 25, 27, 28, 29, 30	19, 20, 21, 24, 25, 26, 28, 29, 30, 31	20, 21, 22, 25, 26, 27, 29, 30, 31, 32, 33
A015	Radio	X261, X262, X383, X384	13	13	13	14
A016	Heated mirror board	X263, X264	16	16	16	17
A017	LBS bus terminal board	X205	31	30	31	32
A018	Tank					
A020	VP44 (electronic fuel injection pump)	X046				33
A021	EDC e-box	X047, X048				5, 26, 33
A023	Front LBS bus terminal					23

<b>DIN</b>	<b>Designation</b>	<b>Con- nec- tor</b>	<b>Farmer 400</b>	<b>Fav 700 twin e-box</b>	<b>Fav 700 single e-box</b>	<b>Fav 900</b>
B001	Steering angle sensor 1	X403		29		31
B002	Front PTO Hall-effect speed sensor	X151	29	28	29	30

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Component overview</b>	<b>D</b>
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DIN	Designation	Con- nec- tor	Farmer 400	Fav 700 twin e-box	Fav 700 single e-box	Fav 900
B003	Suspension position sensor	X152	28	27	28	29
B004	Underpressure switch	X153	21	21	21	22
B005	Engine temperature sensor	X154	21	21	21	33
B006	Intercooler temperature sensor	X155	21	21	21	33
B007	Fuel level sensor	X156	21	21		
B008	High-pressure sensor	X157	26	25	26	27
B009	Discharge temperature sensor	X158	26	25	26	27
B010	Engine Hall-effect speed sensor 1	X159	26	25	26	27
B011	Engine Hall-effect speed sensor 2	X160	26	25	26	27
B012	Engine oil pressure sensor	X161	21	21	21	22
B013	Hydraulic oil temperature thermostat	X162	21	21	21	22
B014	Hydrostat accumulator shaft speed sensor	X163	26	25	26	27
B015	Bevel pinion speed sensor	X164	26	25	26	27
B016	Range sensor position sensor	X165	26	25	26	27
B017	Clutch pedal position sensor	X166	26	25	26	27
B018	Setpoint engine speed sensor	X167	26	25	26	
B019	Compressed-air volume pressure transducer	X168	21	21	21	22
B020	Rear PTO Hall-effect speed sensor	X169	29	28	29	30
B021	Rear PTO Hall-effect speed sensor after clutch	X170	29	28	29	30
B022	Kickout pressure-operated switch	X171		23	23 NA	24
B023	Cold-start aid temperature sensor					
B024	Steering angle sensor 2	X404		29		31
B025	EDC speed sensor	X172				33
B026	EDC needle motion sensor	X173				33
B027	Water temperature sensor	X174				33
B028	Intercooler pressure sensor	X175				33
B029	Accelerator position sensor	X176				33
B030	Signal position sensor	X178	22	22	22	23
B031	Right draft-sensing pin	X179	22	22	22	23
B032	Left draft-sensing pin	X180	22	22	22	23
B033	Discharge temperature sensor (AB sensor)					
B034	Fuel level sensor	X182			21	22
B035	Hand throttle position sensor	X183				33
B036	Tank sensor 1					
B037	Tank sensor 2					
B038	EDC accelerator position sensor	X189				33
B040	Front power lift position sensor	X188		24	24	25
B045	Temperature sensor (air-conditioning NTC2)	X195	14	14	14	15
B046	Temperature sensor (air-conditioning NTC1)	X196	14	14	14	15
B047	Steering angle switch (4WD diff. lock)	X401	30		30	
B050	Left loudspeaker	X311, X312	13	13	13	14
B051	Right loudspeaker	X289, X290	13	13	13	14

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Component overview</b>	<b>D</b>
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<b>DIN</b>	<b>Designation</b>	<b>Con- nec- tor</b>	<b>Farmer 400</b>	<b>Fav 700 twin e-box</b>	<b>Fav 700 single e-box</b>	<b>Fav 900</b>
E001	H4 headlamp right	X350	7	7	7	8
E002	H4 headlamp left	X351	7	7	7	8
E003	H4 auxiliary headlamp right	X352	7	7	7	7
E004	H4 auxiliary headlamp left	X353	7	7	7	7
E005	Sidelight front right	X372, X378, X380	7, 8	7, 8	7, 8	7, 9
E006	Sidelight front left	X373, X379, X381	7, 8	7, 8	7, 8	7, 9
E007	Tail light rear right	X121	7, 8, 9			8, 10
E008	Tail light rear left	X120	7, 8, 9	7, 8, 9	7, 8, 9	8, 9, 10
E009	Licence plate lighting right	X374, X375	7	7	7	7
E010	Licence plate lighting left	X376, X377	7	7	7	7
E011	Work light in roof rear left	X385, X386, X387	12	12	12	13
E012	Work light in roof rear left	X388, X389, X390	12	12	12	13
E013	Work light in roof front right	X291	11	11	11	12
E014	Work light in roof front left	X294	11	11	11	12
E015	Work light front on right direction indicator	X292, X293	11	11	11	12
E016	Work light front on left direction indicator	X295, X296	11	11	11	12
E017	Work light on tail light bracket right	X366	12	12	12	13
E018	Work light on tail light bracket left	X367	12	12	12	13
E019	UB cab lighting	X308, X309, X310	13	13	13	14
E020	EPC lighting	X282, X283	11	11	11	12
E021	Rotating beacon right	X346	10			11
E022	Rotating beacon left	X345	10			11
E023	Heated rear window	X259, X260	16	16	16	17
E024	Heated mirror connection right	X337, X338	16	10, 16	16	17
E025	Heated mirror connection left	X339, X340	16	10, 16	16	17
E026	Indicator right rear roof-mounted	X122	7	7		
E027	Indicator left rear roof-mounted					
E028	Indicator right USA front					
E029	Indicator left USA front					
E030	Corner light right	X358				12
E031	Corner light left	X359				12
E032	EDC diagnostic lamp					

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Component overview</b>	<b>D</b>
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DIN	Designation	Con- nec- tor	Farmer 400	Fav 700 twin e-box	Fav 700 single e-box	Fav 900
E033	Fuel heater	X141				5
E034	Licence plate lighting in tail light left					
E035	Extra-wide light (Italy)	X458 X459				8
E036	Extra-wide light (Italy)	X463 X464				8

DIN	Designation	Con- nec- tor	Farmer 400	Fav 700 twin e-box	Fav 700 single e-box	Fav 900
G001	Battery	X060, X066, X067	2, 3	2, 3	2, 3	2, 3
G002	Alternator	X062, X064	2, 5	2, 5	2, 5	2, 5
G003	Battery 2	X058, X059				2
G004	2. Alternator	X449, X450				2

DIN	Designation	Con- nec- tor	Farmer 400	Fav 700 twin e-box	Fav 700 single e-box	Fav 900
H005	Horn	X998, X999	7	7	7	8
H006	Beeper		21	21	21	22
H010	Telltale 2nd alternator	X210				5

DIN	Designation	Con- nec- tor	Farmer 400	Fav 700 twin e-box	Fav 700 single e-box	Fav 900
K001	+Ub 15 relay	X070	2	2	2	2
K002	+Ub 58 relay	X073	2, 7	2, 7	2, 7	2, 7
K003	+Ub 15E relay			2		
K004	56A relay	X077	7	7	7	7
K005	56B relay	X078	7	7	7	7
K006	Cold-start aid telltale relay					
K007	Brake relay	X079	9	7, 9	9	10
K008	Starter inhibitor relay	X075	4	4	4	4
K009	Windscreen wiper pulse generator	X093	10	10	10	11
K010	Direction indicator controller relay	X094	8	8	8	9
K011	EPC relay Ub			22, 23		
K013	Relay for 3rd hydraulic circuit	X097	24	24	24	25
K014	Exhaust brake relay	X084		6		6
K015	Emergency control relay	X098	27	26	27	28
K016	Suspension valves relay (charge/flush)	X074		27	28	29
K017	EPC/DA switchover remote-control relay					

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Component overview</b>	<b>D</b>
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DIN	Designation	Con- nec- tor	Farmer 400	Fav 700 twin e-box	Fav 700 single e-box	Fav 900
K018	Battery changeover relay	X054, X055, X056, X065, X068, X069				2, 4
K020	EDC UB 30 relay	X096				33
K021	Shutoff solenoid valve relay	X099				33
K022	+Ub 15 relay	X142				2, 33
K023	+Ub 58 relay	X143				2
K025	Left indicator relay USA					
K026	Right indicator relay USA					
K027	Indicator relay USA					
K028	Direction indicator controller USA					
K029	EPC-DA switchover solenoid switch					
K030	Direction indicator controller USA					
K031	Left indicator switch relay USA					
K032	Right indicator switch relay USA					
K033	Fuel preheater relay					5

DIN	Designation	Con- nec- tor	Farmer 400	Fav 700 - twin e-box	Fav 700 - single e-box	Fav 900
M001	Starter	X061, X063	2, 4	2, 4	2, 4	4
M002	Front wiper motor	X347	4,10	10	10	11
M003	Screen washer pump front	X301	10	10	10	11
M004	Windscreen wiper motor rear	X258	10	10	10	11
M005	Screen washer pump rear	X303	10	10	10	11
M007	Seat adjustment motor	X305	17	17	17	18
M008	Heater fan	X027	15	15	15	16
M009	Fan	X285, X286, X287, X288	14	14	14	15
M010	Fuel pump					
M011	24V starter	X061, X063				2

DIN	Designation	Con- nec- tor	Farmer 400	Fav 700 - twin e-box	Fav 700 - single e-box	Fav 900
R001	Heater plug	X090	5	5	5	5

DIN	Designation	Con- nec- tor	Farmer 400	Fav 700 - twin e-box	Fav 700 - single e-box	Fav 900
S001	Control stalk	X215, X245	7, 8, 10	7, 8, 10	7, 8, 10	9, 11

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Component overview</b>	<b>D</b>
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DIN	Designation	Con- nec- tor	Farmer 400	Fav 700 - twin e-box	Fav 700 - single e-box	Fav 900
S002	Ignition-starter switch	X072, X246	2, 4	2, 4	2, 4	2, 4
S003	Headlight pushbutton	X080	7	7	7	
S004	Hazard warning light pushbutton	X216	8	8	8	9
S005	Right brake solenoid switch	X217	9, 30	9, 29	9, 30	10, 31
S006	Left brake solenoid switch	X218	9, 30	9, 29	9, 30	10, 31
S007	Auxiliary lighting pushbutton	X219	7		7	
S008	Front work light switch	X275	11	11	11	12
S009	Rear work light switch	X274	12	12	12	13
S010	Rear wiper motor switch	X273	10	10	10	11
S011	Rotating beacon switch telltale connec- tion	X270, X271, X272	10	10	10	11
S012	Starter inhibitor switch	X082	4, 27	4, 26	4, 27	28
S013	Emergency mode pushbutton	X224	27	26	27	28
S014	Rapid reversing/steering wheel adjust- ment control	X225	26	25	26	27
S015	Handbrake switch	X226	26	25	26	27
S016	EPC/DA switchover switch			22		
S017	Clogged filter pressure-operated switch	X228	26	25	26	27
S018	Exhaust brake pushbutton			6		X
S019	PTO ON key, rear left	X229	29	28	29	30
S020	PTO ON key, rear right	X230	29	28	29	30
S021	Raise front power lift ext. pushbutton	X231		24	24	25
S022	Lower front power lift ext. pushbutton	X232		24	24	25
S023	Lock ext. pushbutton front power lift so- lensoid switch	X233		24	24	25
S024	Brake-fluid sensor			21	21	22
S025	Steering pressure-operated switch	X235	23	23	23	24
S026	Flow monitor	X236	23	23	23	24
S027	Raise ext. pushbutton right	X237	22	22	22	23
S028	Lower ext. pushbutton right	X238	22	22	22	23
S029	Raise ext. pushbutton left	X239	22	22	22	23
S030	Lower ext. pushbutton left	X240	22	22	22	23
S031	Door contact switch right	X279	13	13	13	14
S032	Door contact switch left	X299	13	13	13	14
S033	Heater control	X247	15	15	15	16
S034	Coolant level switch	X244	21	21	21	22
S035	Air-conditioning high/low pressure switch	X341	14	14	14	15
S036	Hydraulic oil level switch	X214		23	23	24
S037	Fan switch	X280	14	14	14	15
S038	Heated rear window telltale connection	X267, X268, X269	16	16	16	17
S039	Mirror heater toggle switch	X265, X266	16	16	16	17
S040	Flush valves thermostat			27		
S041	Release PTO brake pushbutton	X223				
S042	Front PTO speed sensor microswitch					

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Component overview</b>	<b>D</b>
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DIN	Designation	Con- nec- tor	Farmer 400	Fav 700 - twin e-box	Fav 700 - single e-box	Fav 900
S043	UB 15 pressure-operated switch					
S044	Air-conditioning switch	X220	14	14	14	15
S045	Reversing system solenoid switch	X213				27
S046	Crossgate lever neutral position switch					
S047	Exhaust brake plunger-operated switch	X140	6		6	6
S048	EPC/DA switchover solenoid switch				22	23
S051	Fuel preheater thermostat					5

DIN	Designation	Con- nec- tor	Farmer 400	Fav 700 - twin e-box	Fav 700 - single e-box	Fav 900
V003	Diode group	X089	27	6,26	27	28
V004	Diode group					
V005	Diode group	X136			28	29
V006	EPC/DA 3A diode					
V007	Diode group					

DIN	Designation	Con- nec- tor	Farmer 400	Fav 700 - twin e-box	Fav 700 - single e-box	Fav 900
X001 to X999	Cable couplers and connectors					

DIN	Designation	Con- nec- tor	Farmer 400	Fav 700 twin e-box	Fav 700 single e-box	Fav 900
Y001	Increased quantity solenoid valve			4		
Y002	Speed range 1 solenoid valve	X315	26	25	26	27
Y003	Speed range 2 solenoid valve	X316	26	25	26	27
Y004	Transmission neutral / turboclutch valve solenoid valve	X317	27	26	27	28
Y005	Speed governor solenoid valve	X318	26	25	26	27
Y006	Exhaust brake solenoid valve	X086	6	6	6	6
Y007	Engine OFF solenoid valve	X087	6	6	6	
Y008	Rear PTO solenoid valve	X319	29	28	29	30
Y009	4WD solenoid valve	X320	30	29	30	31
Y010	Diff. lock solenoid valve	X321	30	29	30	31
Y011	Front PTO solenoid valve	X322	29	28	28	30
Y012	Charge suspension solenoid valve	X323	28	27	27	29
Y013	Lower suspension solenoid valve	X324	28	27	27	29
Y014	Raise suspension solenoid valve	X325	28	27	27	29
Y015	Valve 1	X326		23	23	24, 26
Y016	Valve 2	X327		23	23	24, 26
Y017	Valve 3	X328		23	23	24, 26
Y018	Valve 4	X329		23	23	24, 26
Y019	Valve 5	X330		23	23	24, 26
Y021	Lift solenoid valve	X332	22	22	22	

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Fav 900	Tractor / General system Reserve cables (R)	D
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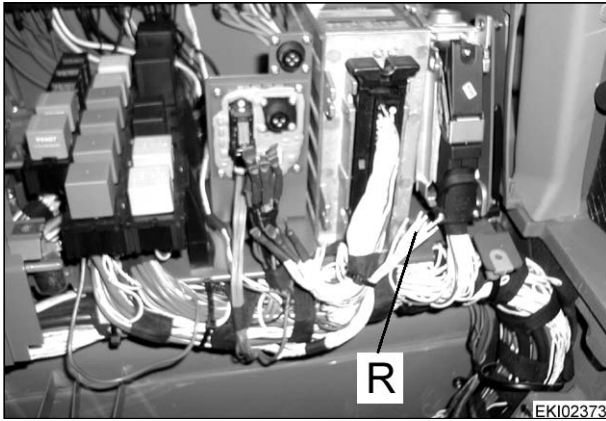
The cab cable loom incorporates several reserve cables (R).

**Possible uses for reserve cables (R)**

- In event of breaks in cables in cab cable loom
- Connecting auxiliary implements (note cross-sections of cables!)

**Note:**

Cable nos. are printed on cable sheaths

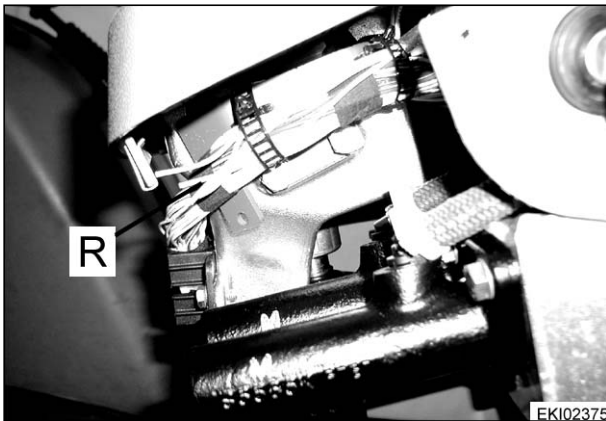


Cable no.: WF 3000 ; WF 3001 ; WF 3002 ;  
WF 3003 ; WF 3004 ; WF 3005 ; WF 3006 ;  
WF 3007 ; WF 3008 ; 3009

In cab on right mudguard



Remove panel

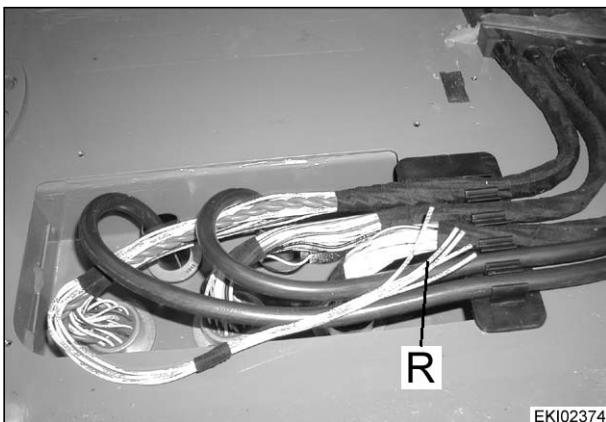


Cable no.: WF 3005 ; WF 3006 ; WF 3007 ;  
WF 3008 ; WF 3009

On right of steering column



Remove panel



Cable no.: WF 3000 ; WF 3001 ; WF 3002 ;  
WF 3003 ; WF 3004

In cab, at bottom left of footwell

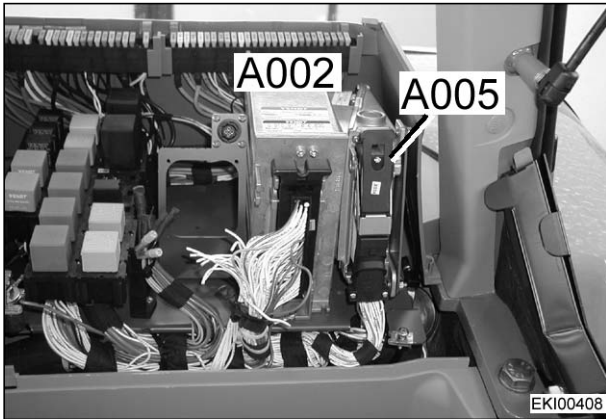


Raise floor mat, remove panel



Date	Version	Page	Reserve cables (R)	Capitel	Index	Docu-No.
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<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - A</b></p>	<p><b>D</b></p>
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**A002** = ECU, enhanced control  
**A005** = ECU, lift assembly  
 In cab on right mudguard



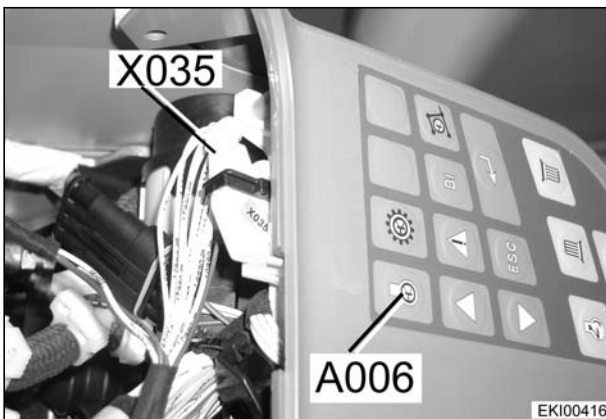
Remove panel



**A003** = Joystick  
 In cab on right armrest



**A004** = ECU, control console  
 On right in cab



**A006** = Keypad, dashboard  
 To right of steering wheel



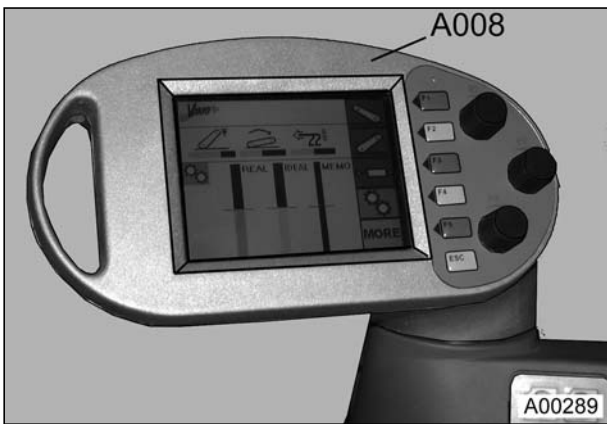
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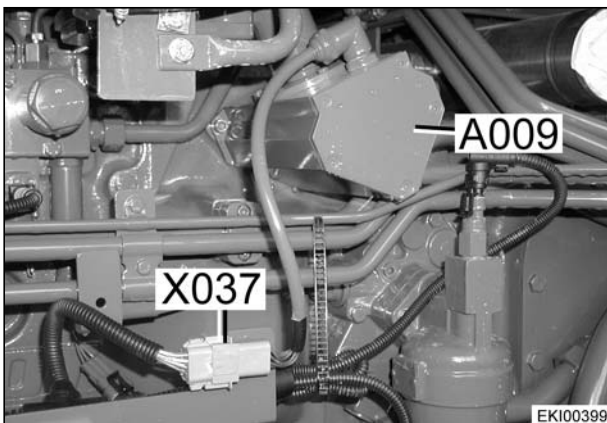
<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - A</b></p>	<p><b>D</b></p>
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**A007** = Display unit  
 At top of steering column



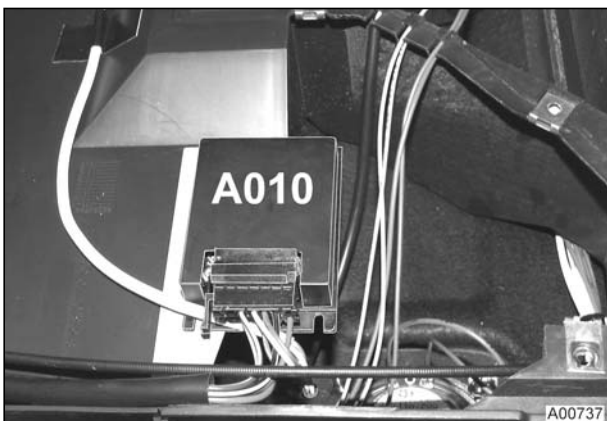
**A008** = Vario terminal  
 On right in cab on control console



**A009** = Actuator unit  
 On right below cab



Unscrew right rear wheel and panel



**A010** = ECU, air-conditioning  
 In front of right B-pillar



Remove cab roof

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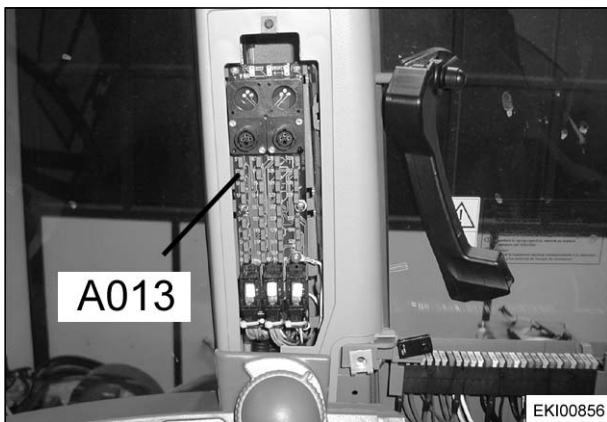
<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - A</b></p>	<p><b>D</b></p>
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**A011** = Sensor, radar  
 On right below cab



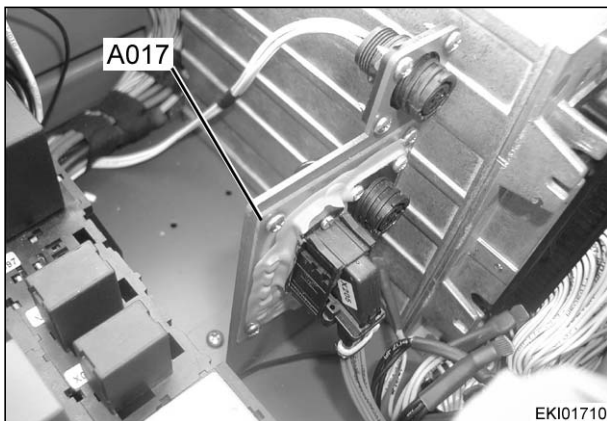
Remove rear wheel  
 Remove panels on right



**A013** = Board, fuse  
 In cab in right B-pillar



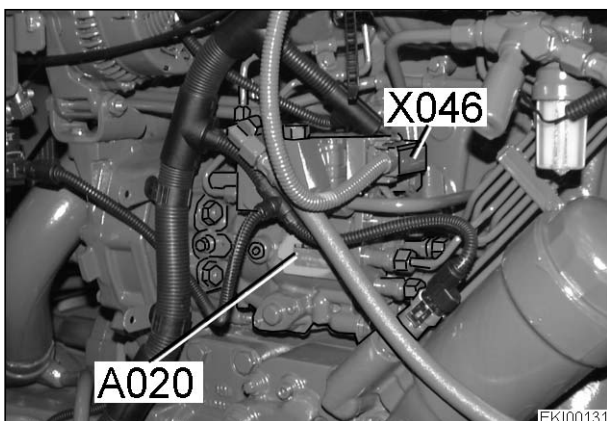
Remove hatch cover.



**A017** = Board, LBS  
 In cab on right mudguard



Remove panel



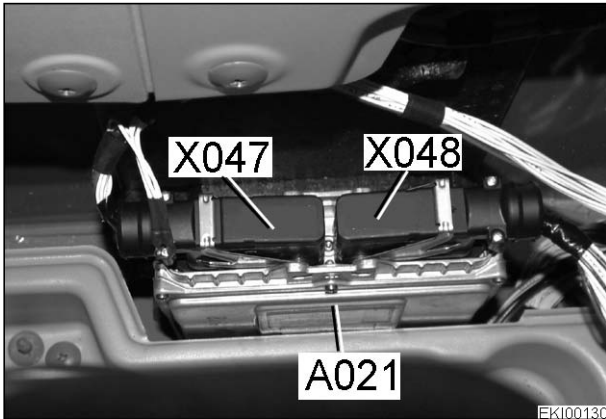
**A020** = ECU, VP44  
 Left side of engine



Open left side of bonnet

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<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - A</b>	<b>D</b>
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**A021** = ECU, EDC

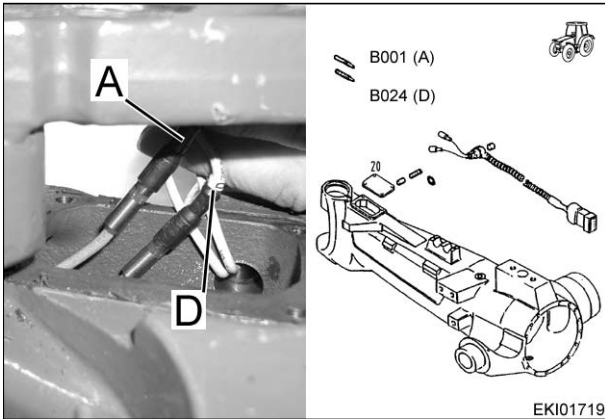
In cab under side panel of right mudguard



Remove side panel

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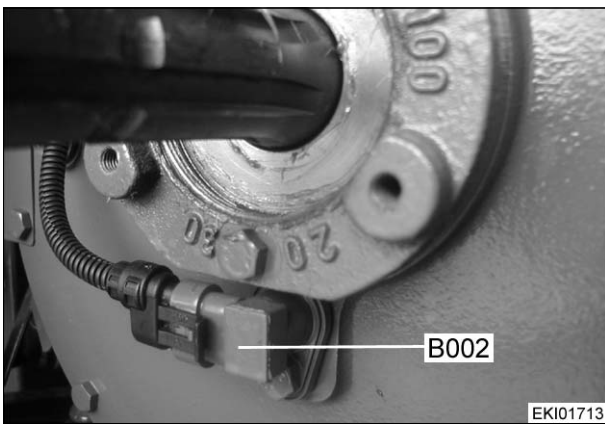
<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - B</b>	<b>D</b>
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**B001** = Sensor, steering angle 1  
**B024** = Sensor, steering angle 2  
 On steering knuckle of right front axle.



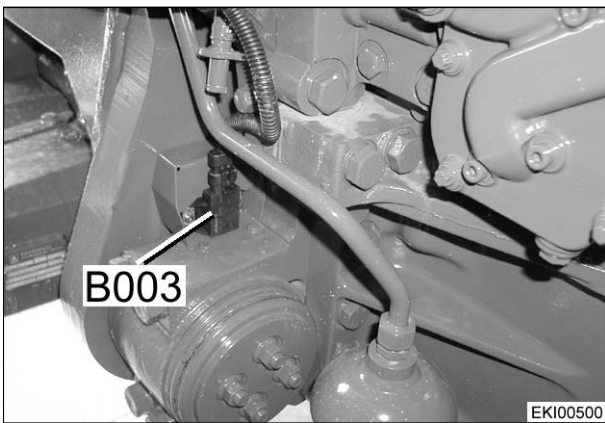
Remove cover (20).  
 B001 (top) and B024 (bottom) are labelled A and D.



**B002** = Sensor, front PTO  
 At front on PTO gearbox.



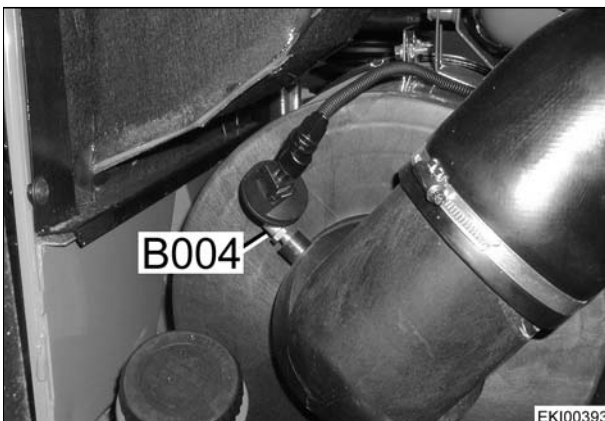
Remove protective cup.



**B003** = Sensor, suspension  
 On frame, left side next to cross-member joint



Remove panel from frame



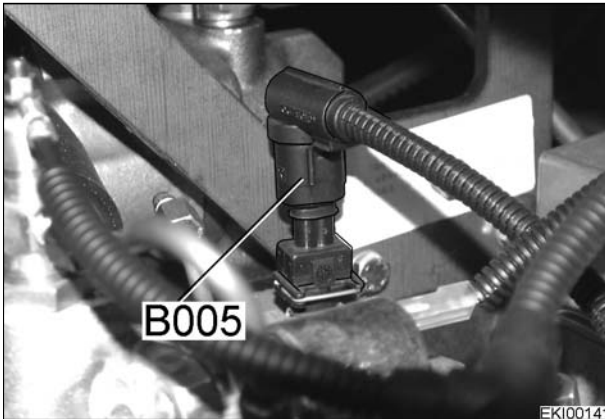
**B004** = Sensor, underpressure switch  
 On engine air filter



Open right side of bonnet

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01.08.2000	a	1/9		<b>0000</b>	<b>D</b>	<b>000029</b>

<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - B</b></p>	<p><b>D</b></p>
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**B005** = Sensor, engine temperature  
 Engine compartment on water pipe (fan side)



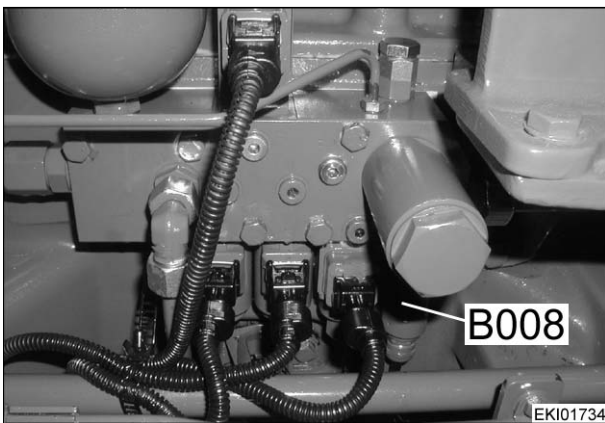
Open left side of bonnet



**B006** = Sensor, intercooler temperature  
 Engine compartment on intake pipe



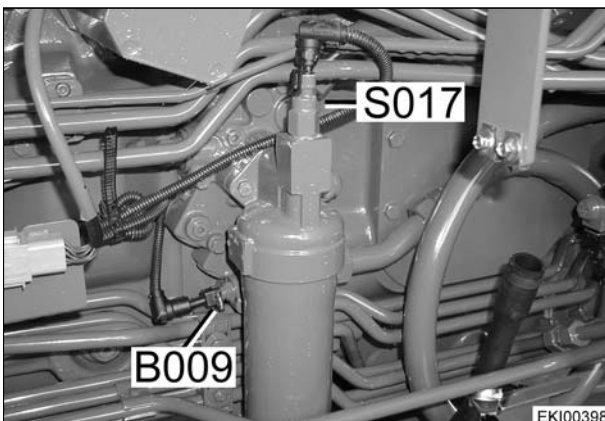
Open left side of bonnet



**B008** = Sensor, high pressure  
 Behind right rear wheel at bottom on valve unit



Unscrew right rear wheel and panel



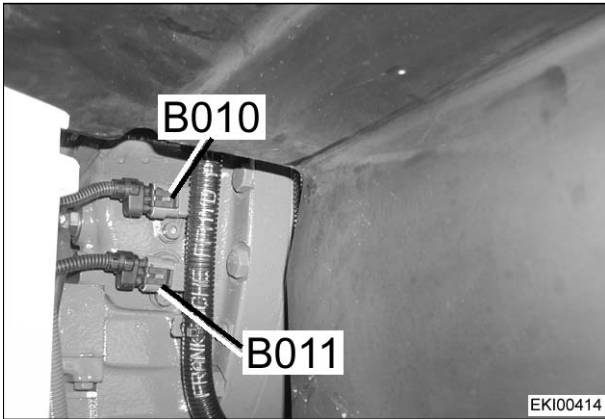
**B009** = Sensor, output temperature  
 Behind right rear wheel, behind pressure filter



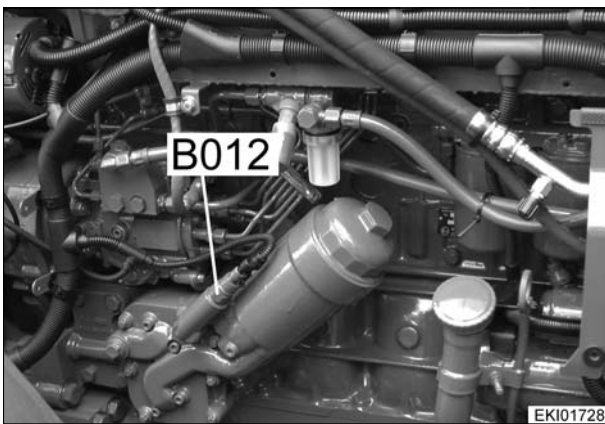
Unscrew right rear wheel and panel

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<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - B</b></p>	<p><b>D</b></p>
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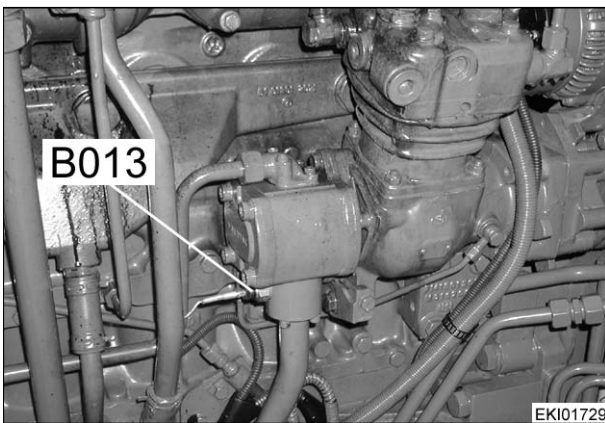
**B010** = Sensor, engine 1  
**B011** = Sensor, engine 2  
 Top left rear on engine



**B012** = Sensor, engine oil pressure  
 On left of engine, on oil filter housing



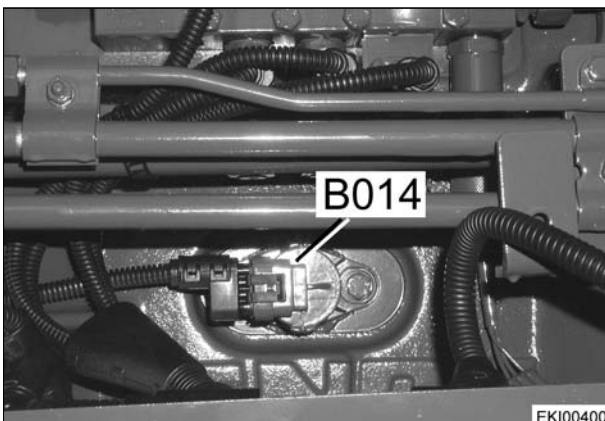
Remove left side of bonnet



**B013** = Sensor, hydraulic oil temperature  
 On right of engine near steering pump



Remove right side of bonnet



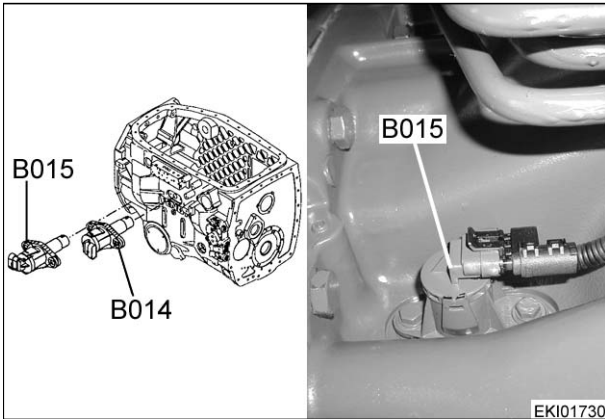
**B014** = Sensor, accumulator shaft  
 Centre right on transmission



Unscrew right rear wheel and panel

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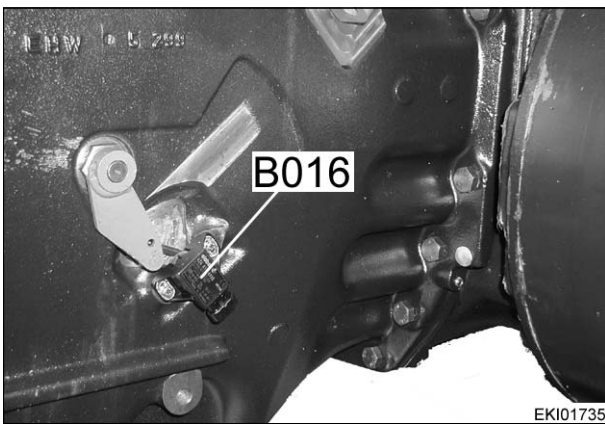
<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - B</b>	<b>D</b>
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**B015** = Sensor, bevel pinion  
At bottom right of transmission



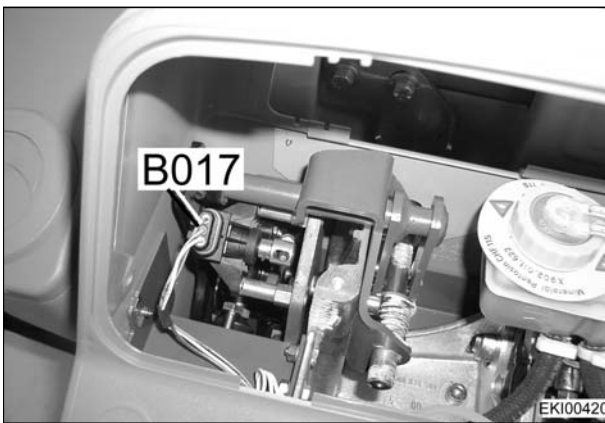
Unscrew right rear wheel and panel



**B016** = Sensor, range sensor  
On right, behind fuel tank



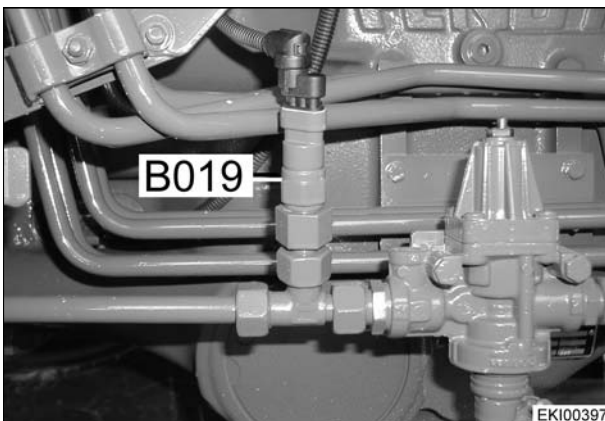
Remove fuel tank on left



**B017** = Sensor, clutch pedal  
At top of steering column



Remove hatch cover at top of steering column, then remove instrument panel



**B019** = Sensor, compressed-air volume  
On right of transmission on compressed-air reservoir at rear



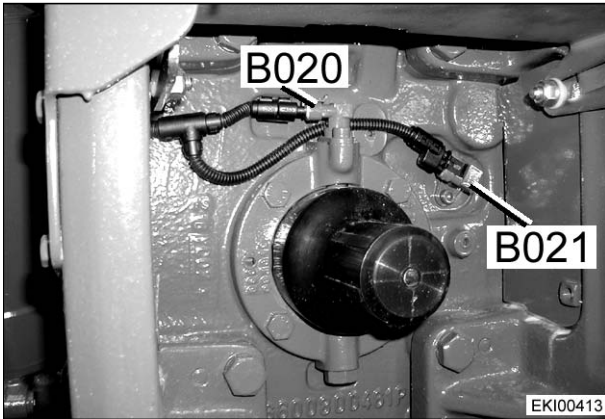
Unscrew right rear wheel and panel



Date	Version	Page	<b>Electrical / electronic components - B</b>	Capitel	Index	Docu-No.
01.08.2000	<b>a</b>	4/9		<b>0000</b>	<b>D</b>	<b>000029</b>



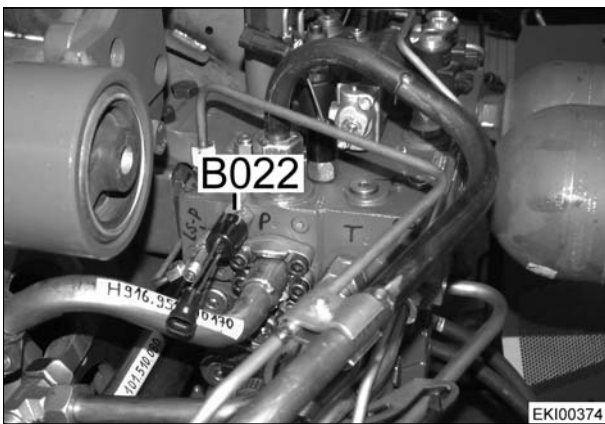
<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - B</b>	<b>D</b>
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**B020** = Sensor, PTO 1  
**B021** = Sensor, PTO 2  
 At rear above PTO stub shaft



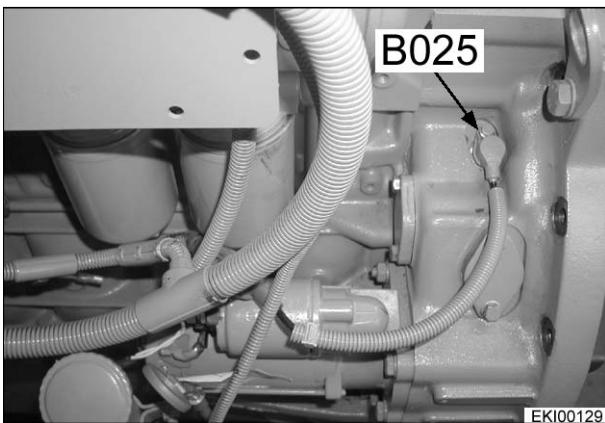
Remove cover panel



**B022** = Sensor, kickout  
 At right entrance step on left connection surface by SAE pump connection



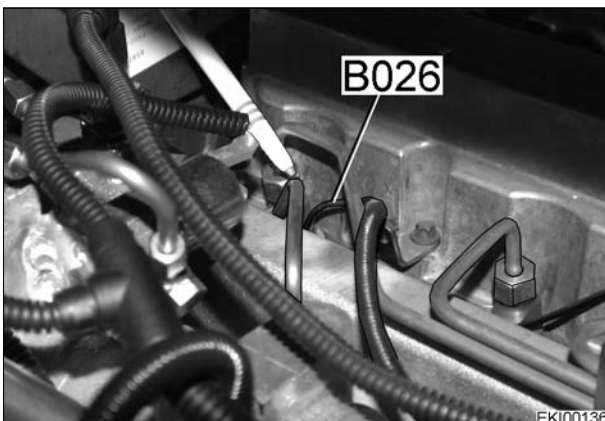
Remove panels



**B025** = Sensor, EDC speed  
 On left side of tractor on flywheel housing



Open left side of bonnet.



**B026** = Sensor, EDC needle motion sensor  
 Injector nozzle for cylinder 1 (fan side)

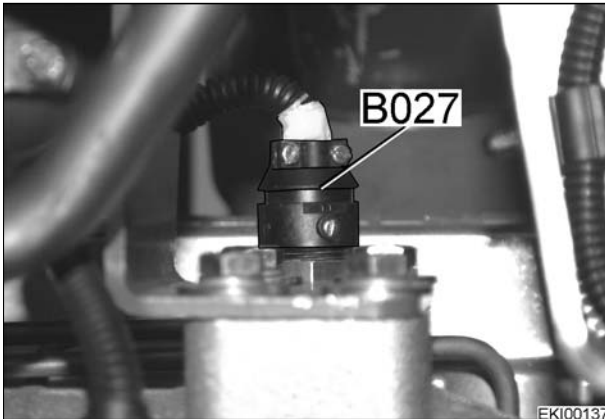


Open left side of bonnet.

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**B027** = Sensor, water temperature  
 Engine compartment on water pipe  
 (flywheel side)



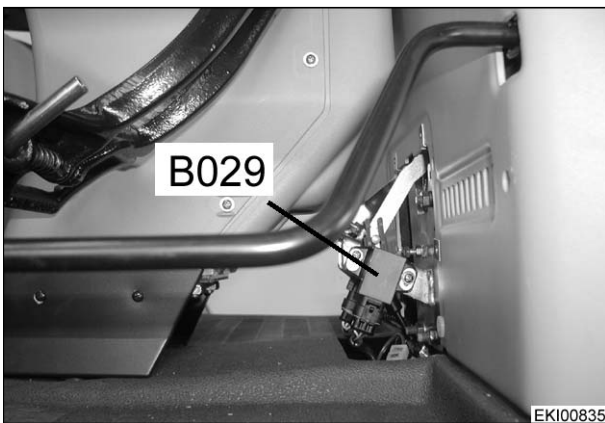
Open left side of bonnet



**B028** = Sensor, boost pressure  
 Engine compartment on intake pipe



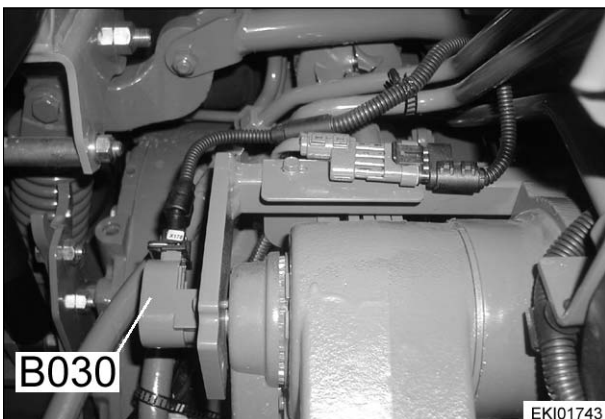
Open left side of bonnet



**B029** = Sensor, accelerator  
 Cab, under steering column



Remove steering column cover at bottom right



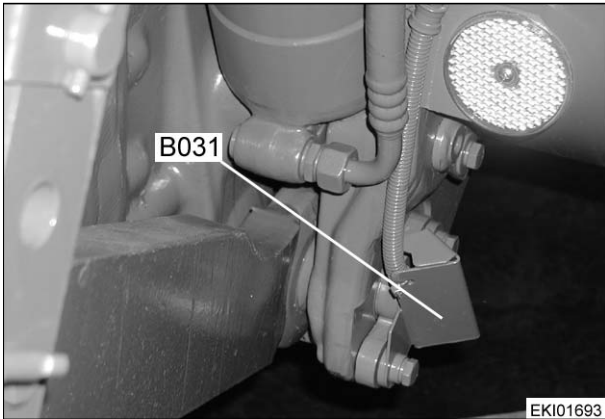
**B030** = Sensor, rear power lift position  
 On left lift arm



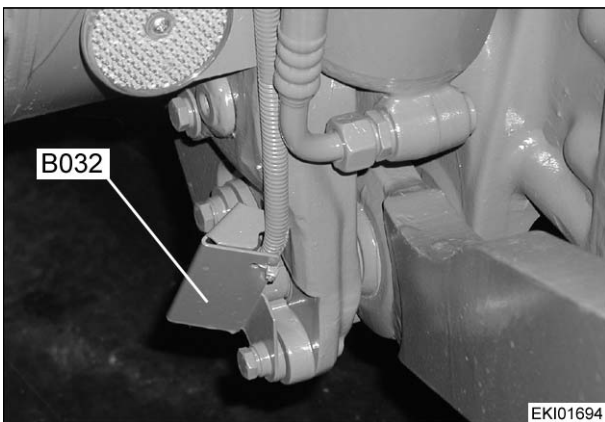
Unscrew cover panel

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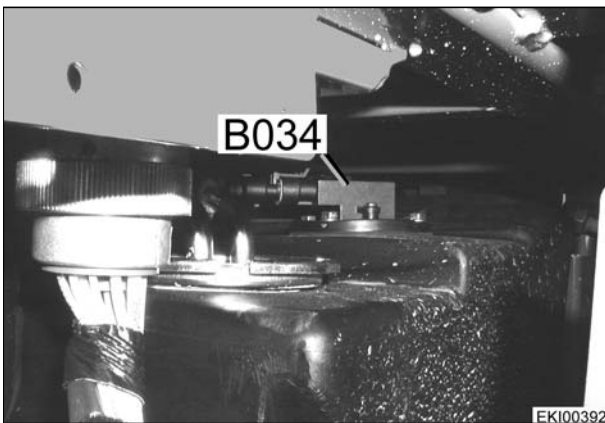
<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - B</b></p>	<p><b>D</b></p>
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**B031** = Sensor, draft-sensing pin right  
 Cross-beam bearing



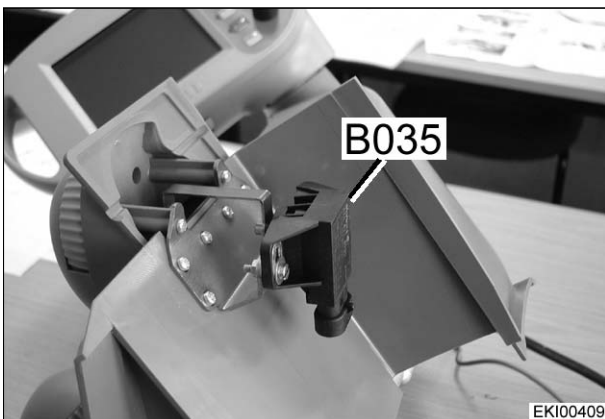
**B032** = Sensor, draft-sensing pin left  
 Cross-beam bearing



**B034** = Sensor, fuel  
 On left tank



Remove panel



**B035** = Sensor, hand throttle  
 In control console



Remove control console

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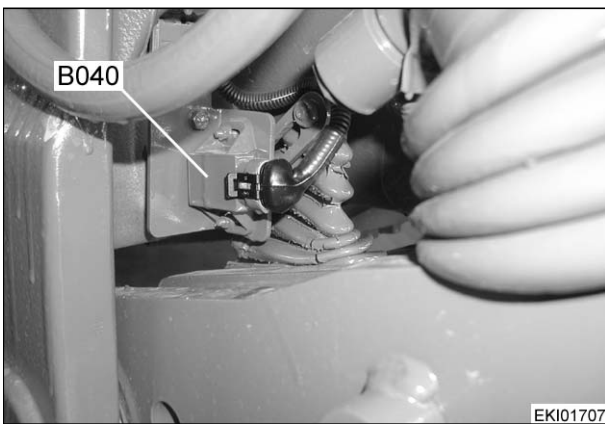
<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Electrical / electronic components - B</b></p>	<p><b>D</b></p>
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**B038** = Sensor, accelerator  
Cab, under steering column



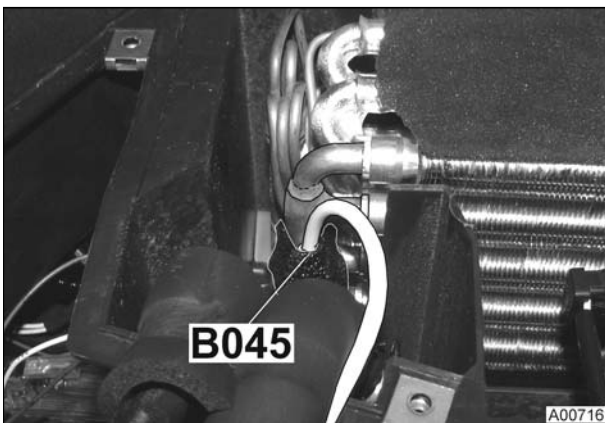
Remove steering column cover at bottom left



**B040** = Sensor, front power lift position  
On right bottom link in direction of travel



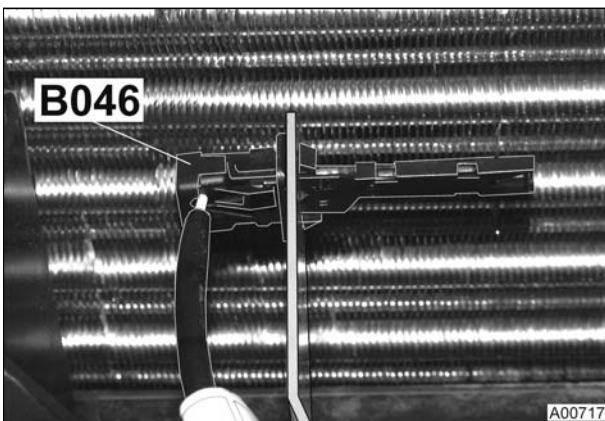
Remove guard



**B045** = Sensor, air-conditioning 2  
Top right between A- and B-pillars at air-conditioning expansion valve



Remove cab roof



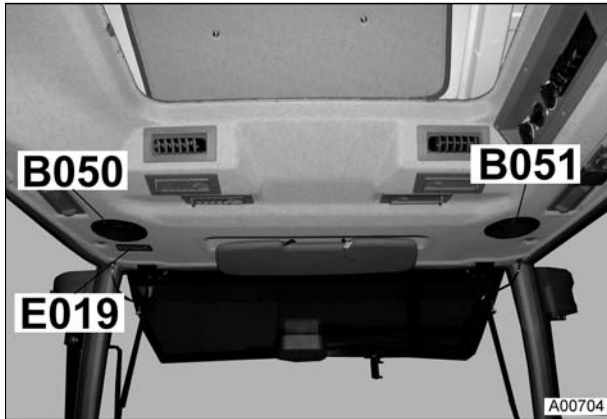
**B046** = Sensor, air-conditioning 1  
At top in roof



Remove roof from cab, then unscrew plastic cover

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<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - B</b>	<b>D</b>
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**B050** = Loudspeaker, left  
**B051** = Loudspeaker, right  
 At top in cab (roofliner)



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01.08.2000	<b>a</b>	9/9			<b>0000</b>	<b>D</b>

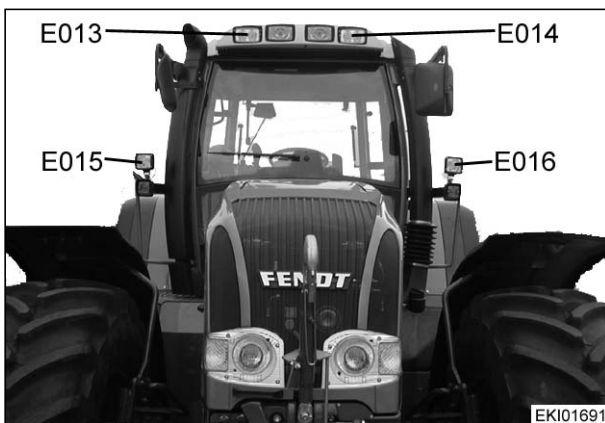
<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Electrical / electronic components - E</b></p>	<p><b>D</b></p>
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- E001** = H4 headlight right
  - E002** = H4 headlight left
  - E003** = H4 auxiliary headlight right
  - E004** = H4 auxiliary headlight left
  - E005** = Indicator / sidelight front right
  - E006** = Indicator / sidelight front left
- Tractor seen from front



- E007** = Tail light rear right
  - E008** = Tail light rear left
  - E009** = Licence plate light right
  - E010** = Licence plate light left
  - E011** = Work lamp in roof rear right
  - E012** = Work lamp in roof rear left
- Tractor seen from rear



- E013** = Work lamp in roof front right
  - E014** = Work lamp in roof front left
  - E015** = Work lamp front on right direction indicator
  - E016** = Work lamp front on left direction indicator
- Tractor seen from front

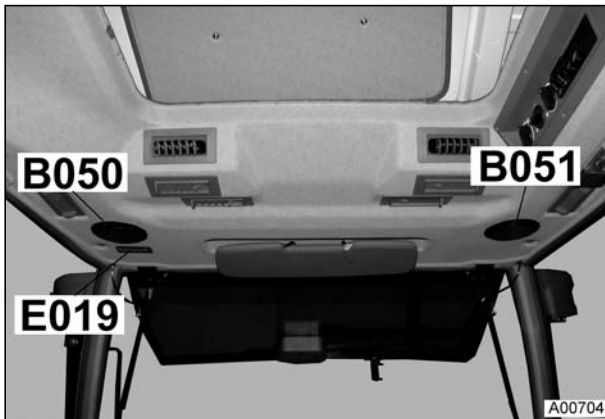


- E017** = Work light on tail light bracket right
  - E018** = Work light on tail light bracket left
- Tractor seen from rear



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21.09.2001	a	1/3	<b>0000</b>	<b>D</b>	<b>000039</b>

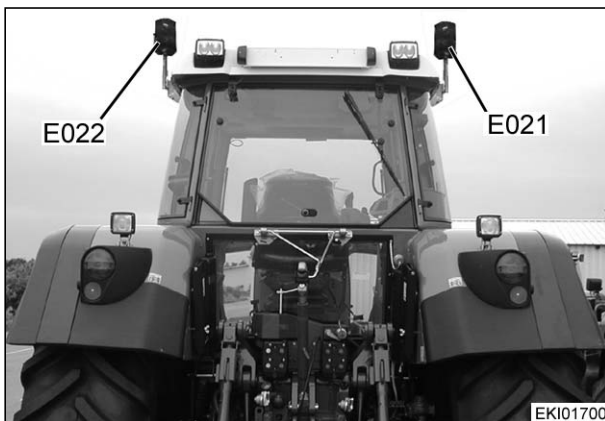
<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - E</b></p>	<p><b>D</b></p>
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**E019** = UB cab lighting  
 At top in cab (roofliner)



**E020** = EPC lighting  
 At top right in cab



**E021** = Rotating beacon right  
**E022** = Rotating beacon left  
 Tractor seen from rear

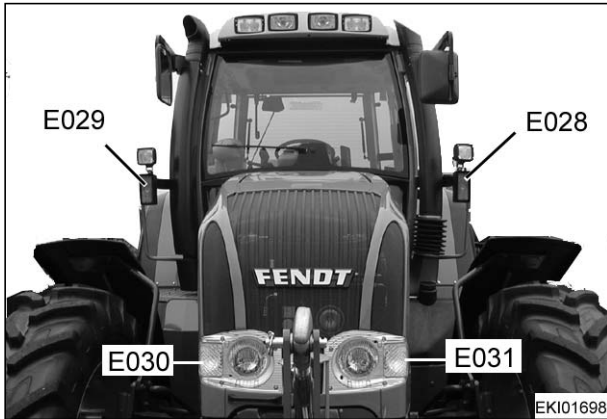


**E026** = Indicator high-mounted right rear  
**E027** = Indicator high-mounted left rear  
 Tractor seen from rear



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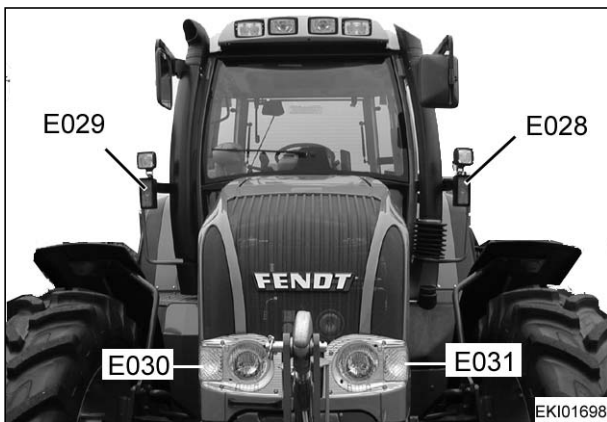
<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - E</b></p>	<p><b>D</b></p>
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**E028** = Indicator right USA front

**E029** = Indicator left USA front

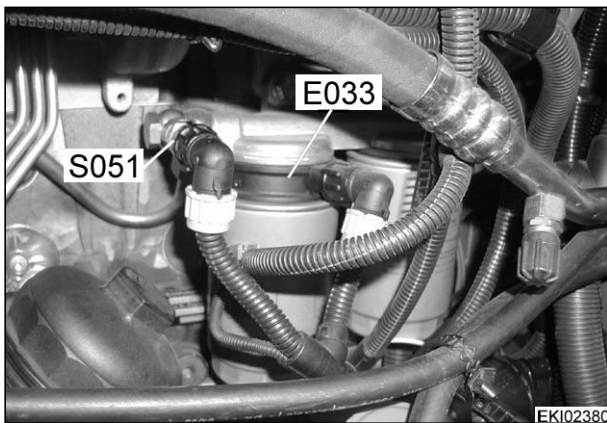
Tractor seen from front



**E030** = Corner light right

**E031** = Corner light left

Tractor seen from front



**E033** = Fuel heater

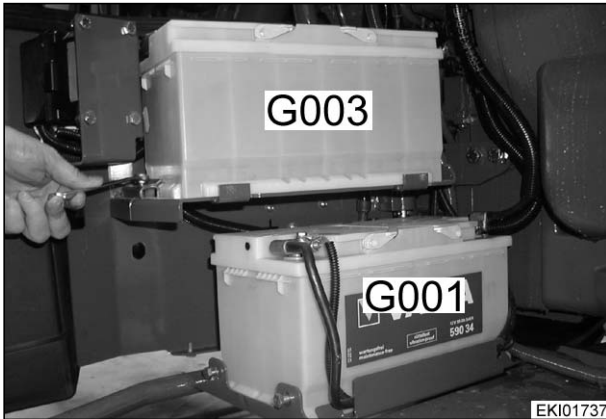
Left rear on engine



Open left side of bonnet

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<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - G</b>	<b>D</b>
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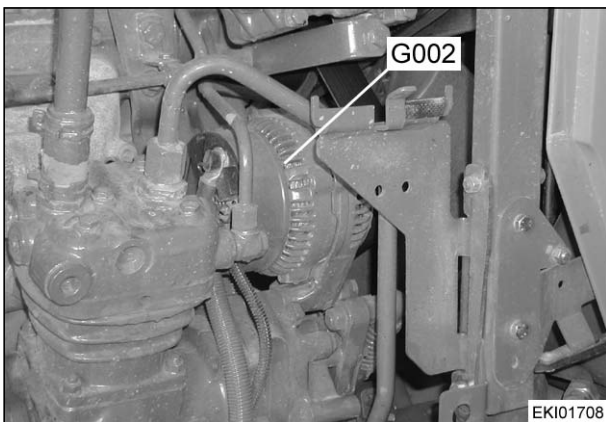


**G001** = Battery

In central part of tractor on left below fuel tank



Open battery cover

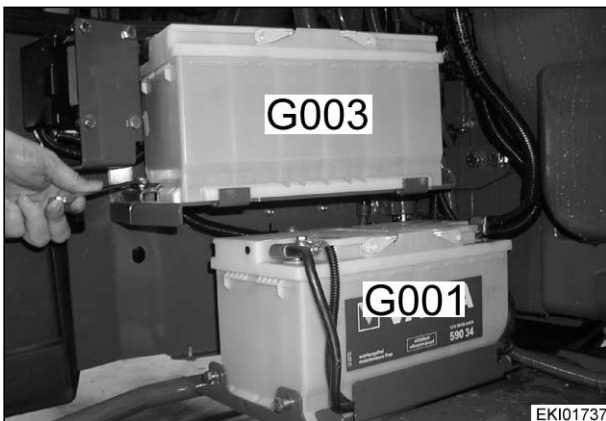


**G002** = Alternator

On right of engine



Open right side of bonnet

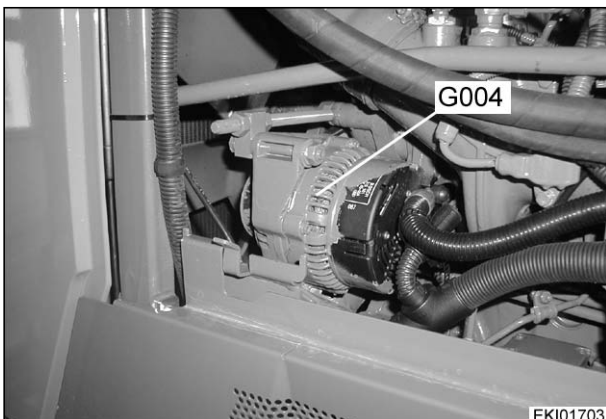


**G003** = Battery

In central part of tractor on left below fuel tank



Open battery cover



**G004** = Alternator

On left of engine



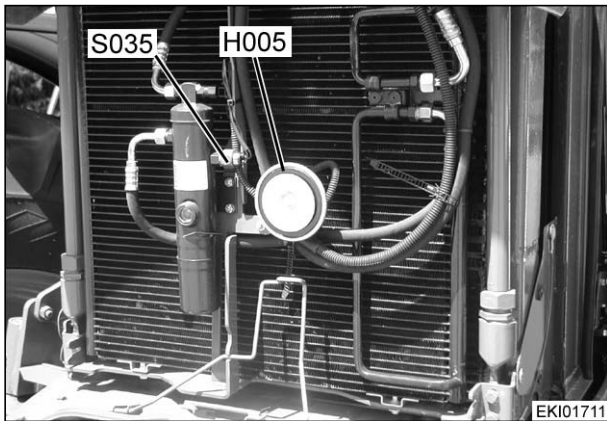
Open left side of bonnet



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18.07.2001	<b>a</b>	1/1		<b>0000</b>	<b>D</b>	<b>000037</b>



<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - H</b>	<b>D</b>
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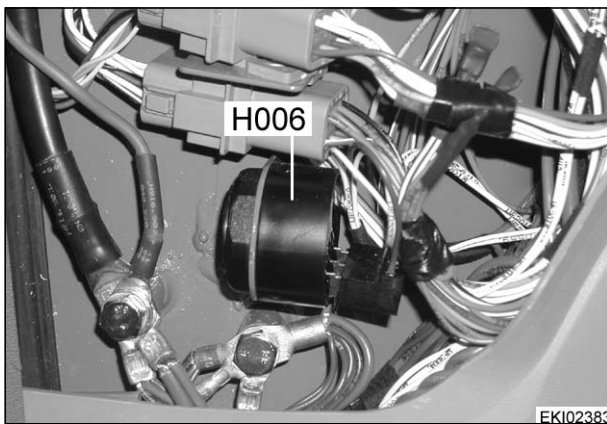


**H005** = Horn  
Bottom right in centre of tractor



Opening the front section

EKI01711



**H006** = Buzzer  
On right mudguard



Remove control console from right mudguard in cab

EKI02383



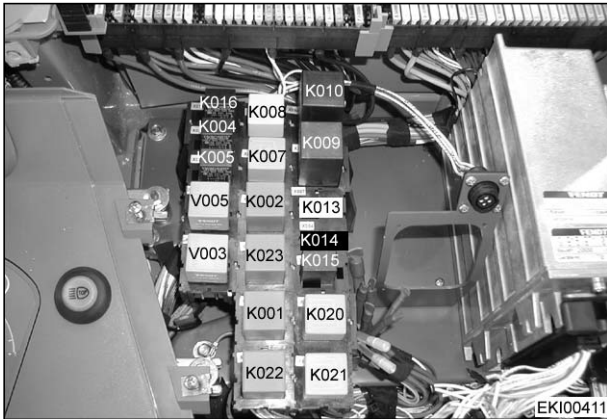
**H010** = Display, generator 2  
Middle of steering column



EKI02382

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24.09.2001	<b>a</b>	1/1		<b>0000</b>	<b>D</b>	<b>000041</b>

<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - K</b>	<b>D</b>
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- K001** = Relay, +Ub 15
- K002** = Relay, +Ub 58
- K004** = Relay, 56A
- K005** = Relay, 56B
- K007** = Relay, brake
- K008** = Relay, starter inhibitor
- K009** = Relay, windscreen wiper
- K010** = Relay, direction indicator controller
- K013** = Relay, 3rd hydraulic circuit
- K014** = Relay, exhaust brake
- K015** = Relay, emergency control
- K016** = Relay, valves, charge / flush suspension  
At right rear in cab



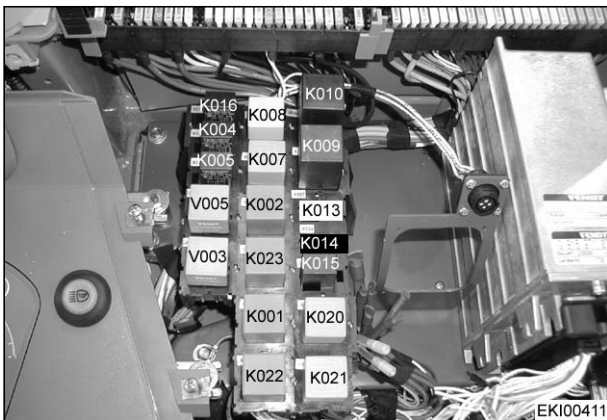
Remove cover



- K018** = Relay, battery switchover  
On left of battery frame



Pivot battery frame upwards



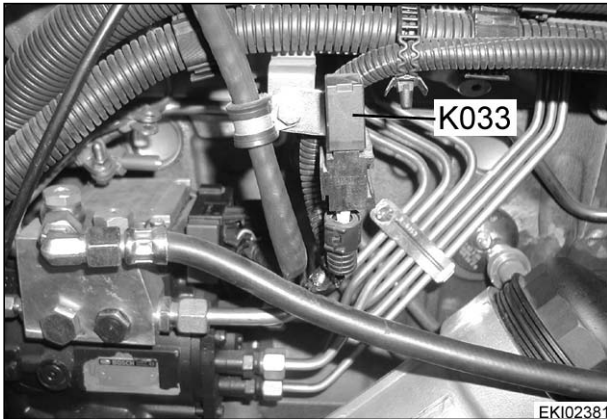
- K020** = Relay, EDC, UB 30
- K021** = Relay, engine stop solenoid valve
- K022** = Relay, +Ub 15
- K023** = Relay, +Ub 58  
At right rear in cab



Remove cover

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08/2000	<b>a</b>	1/2		<b>0000</b>	<b>D</b>	<b>000031</b>

<b>Fav 900</b>	Tractor / General system <b>Electrical / electronic components - K</b>	<b>D</b>
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**K033** = Relay, fuel preheater  
 Front left in engine compartment



Open left side of bonnet

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08/2000	<b>a</b>	2/2			<b>0000</b>	<b>D</b>

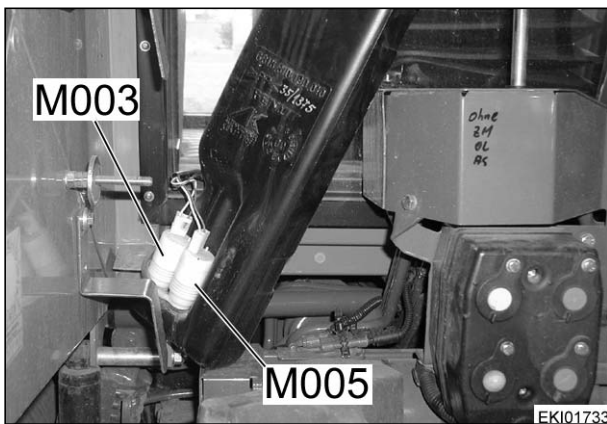
<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - M</b></p>	<p><b>D</b></p>
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**M002** = Wiper motor, front  
 In windscreen



Unscrew cover



**M003** = Wiper pump, front  
**M005** = Wiper pump, rear  
 In windscreen washer bottle



Remove windscreen washer bottle from left rear mudguard



**M004** = Wiper motor, rear  
 In rear window



Unscrew cover



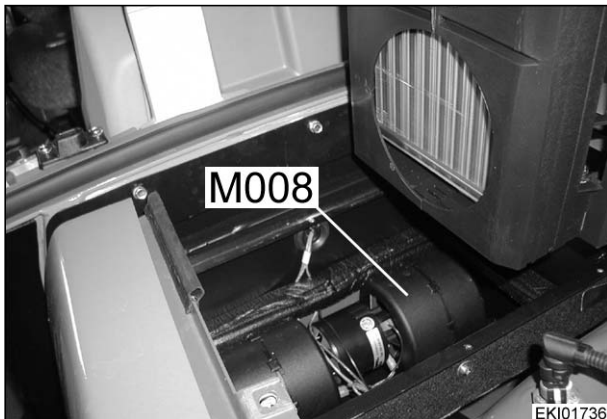
**M007** = Motor, seat adjustment  
 Under seat bracket



Remove rubber bellows from spring unit of driver's seat

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<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - M</b>	<b>D</b>
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**M008** = Motor, heater fan  
In front of cab



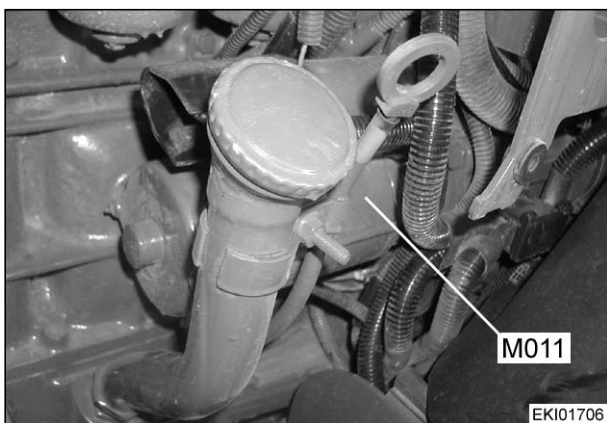
Remove cover from bonnet, filter and heater



**M009** = Motor, fan  
Top front in roof



Remove roof cover from cab, then unscrew plastic cover



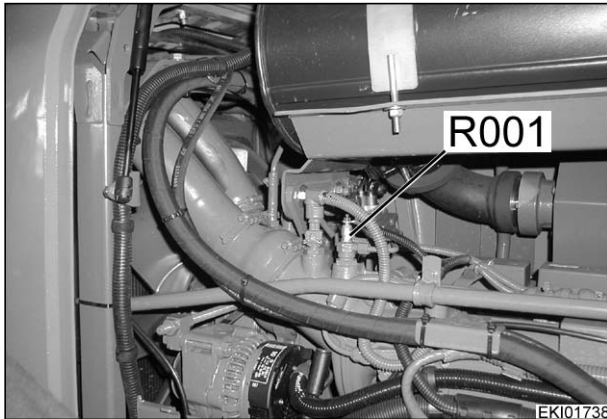
**M011** = Starter motor, 24V  
Left rear on engine



Remove left side of bonnet

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18/07/2001	<b>a</b>	2/2		<b>0000</b>	<b>D</b>	<b>000036</b>

<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - R</b>	<b>D</b>
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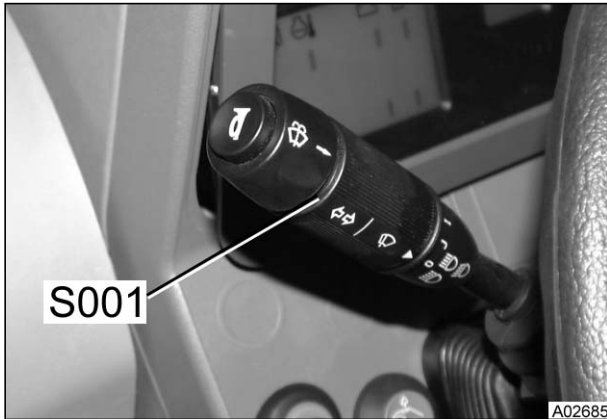
**R001** = Glow plug  
 At front on intake pipe



Open bonnet

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24.9.2001	<b>a</b>	1/1		<b>0000</b>	<b>D</b>	<b>000040</b>

Fav 900	Tractor / General system <b>Electrical / electronic components - S</b>	<b>D</b>
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**S001** = Switch, control stalk  
On left of steering wheel



**S002** = Switch, ignition  
On right of steering column



**S003** = Switch, headlights  
**S004** = Switch, hazard warning lights  
On left of instrument panel by steering wheel

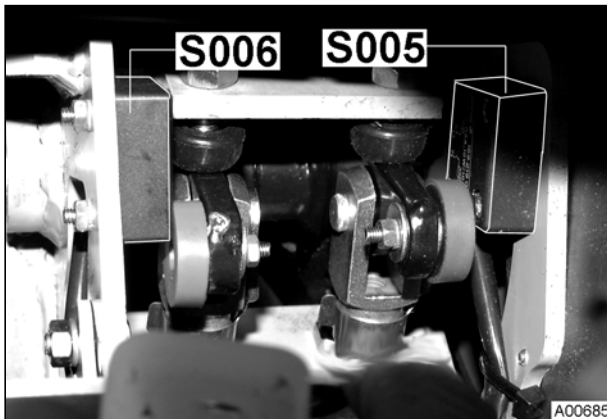


**S005** = Solenoid switch, right brake  
At top on brake pedals



Date	Version	Page	Electrical / electronic components - S	Capitel	Index	Docu-No.
08/2000	a	1/8			0000	D

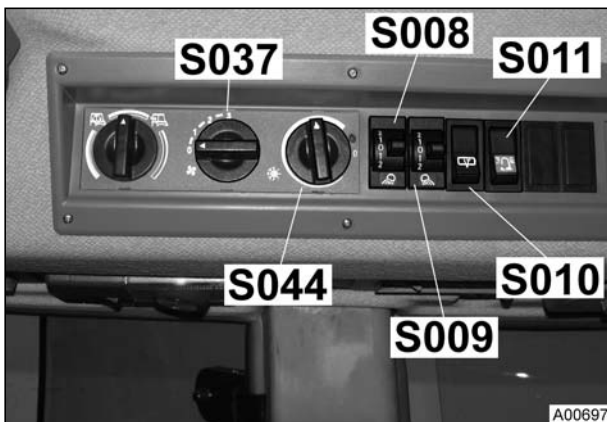
Fav 900	Tractor / General system Electrical / electronic components - S	D
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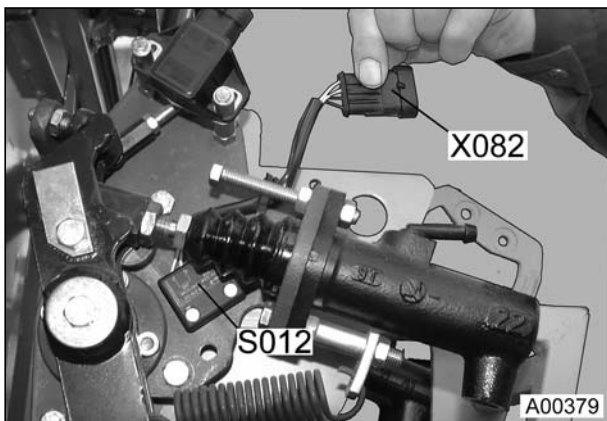
**S006** = Switch, left brake  
At top on brake pedals



Remove panel



**S008** = Switch, front working lights  
**S009** = Switch, rear working lights  
**S010** = Switch, rear wiper motor  
**S011** = Switch, rotating beacon  
**S037** = Switch, fan  
**S044** = Switch, air-conditioning  
Top right in roofliner of cab



**S012** = Switch, starter inhibitor  
At top by clutch pedal



Remove instrument panel



**S013** = Switch, Emergency mode  
To left of steering wheel



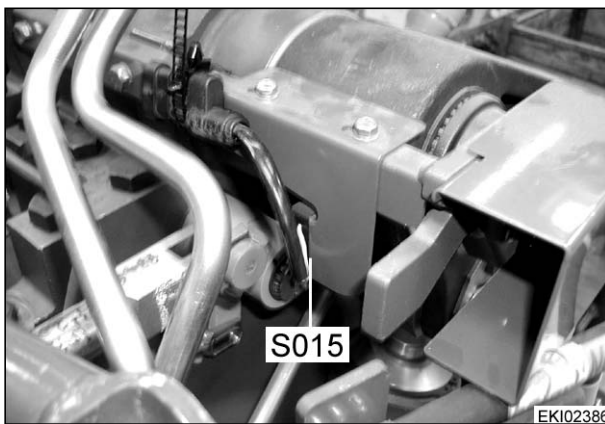
Date	Version	Page	Electrical / electronic components - S	Capitel	Index	Docu-No.
08/2000	a	2/8			0000	D



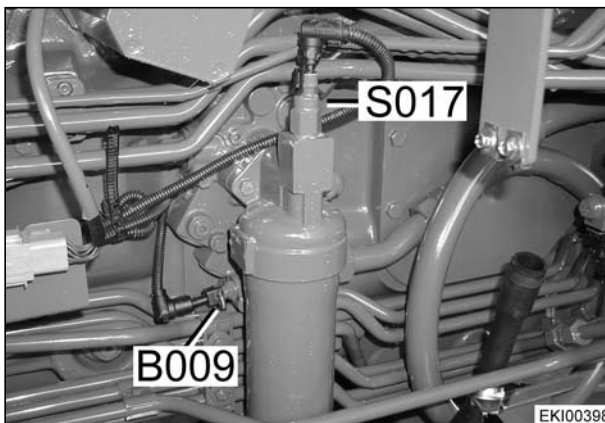
<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - S</b></p>	<p><b>D</b></p>
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**S014** = Switch, rapid reversing  
 To left of steering wheel



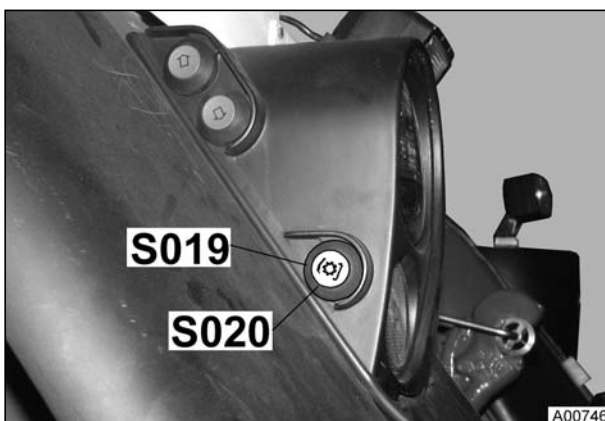
**S015** = Switch, handbrake  
 At rear on left brake cylinder



**S017** = Switch, filter clogging  
 Behind right rear wheel on pressure filter



Unscrew right rear wheel and panel

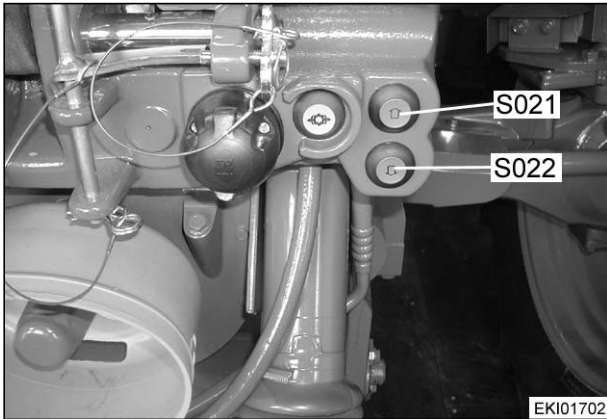


**S019** = Switch, rear PTO, left  
**S020** = Switch, rear PTO, right  
 On left and right mudguards at rear

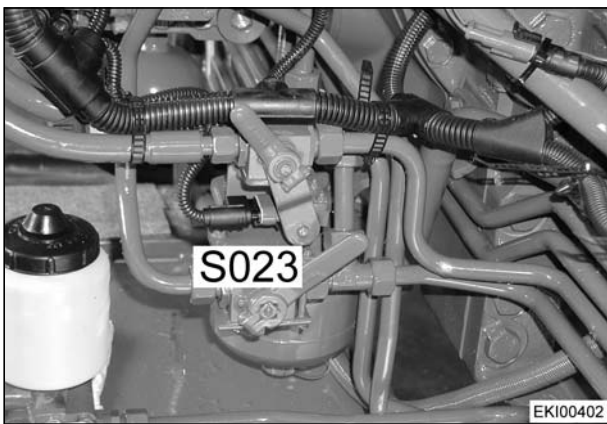


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<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - S</b></p>	<p><b>D</b></p>
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**S021** = Switch, raise front power lift  
**S022** = Switch, lower front power lift  
 Front left



**S023** = Switch, lock front power lift  
 On right entrance step by stopcock AVF



Remove cover panel



**S024** = Switch, brake fluid  
 At front in steering column

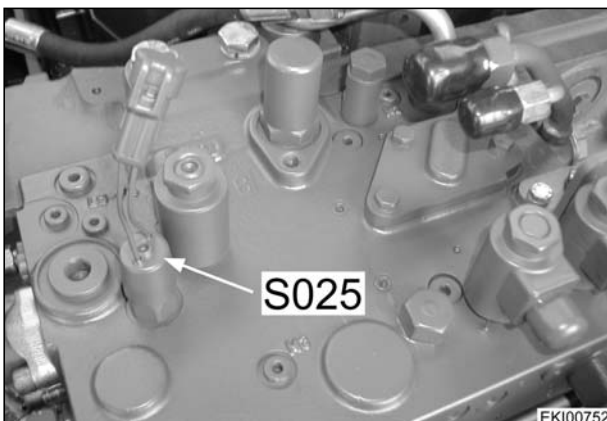


**Note:**

**Brake fluid must not be used! Only Pentosin CHF11S, order no. X 902.011.622, is permissible.**



Remove hatch cover at top front of steering column.



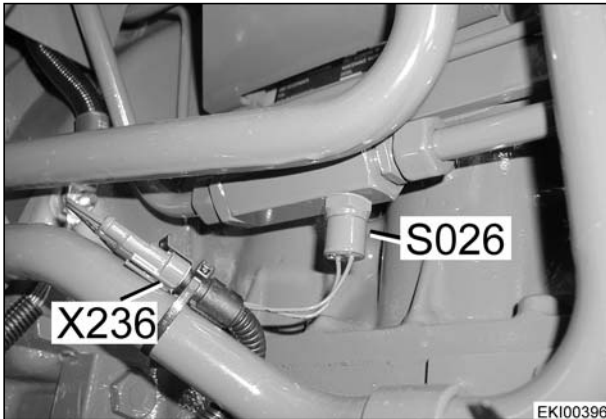
**S025** = Switch, steering  
 On right entrance step, top of central control block ZSB, bore no. 2007



Panel

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<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - S</b></p>	<p><b>D</b></p>
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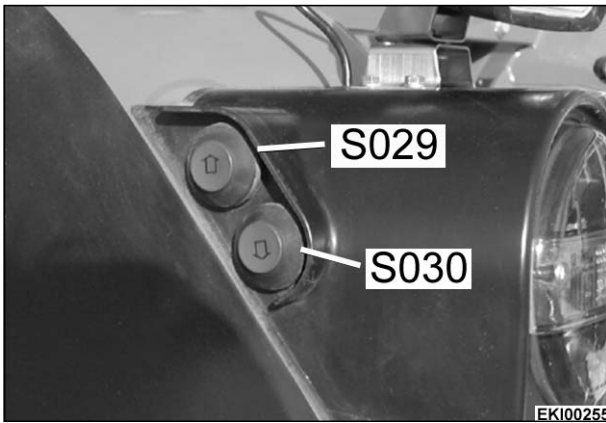
**S026** = Switch, flow monitor  
 By auxiliary pump in space between transmission and engine, in frame



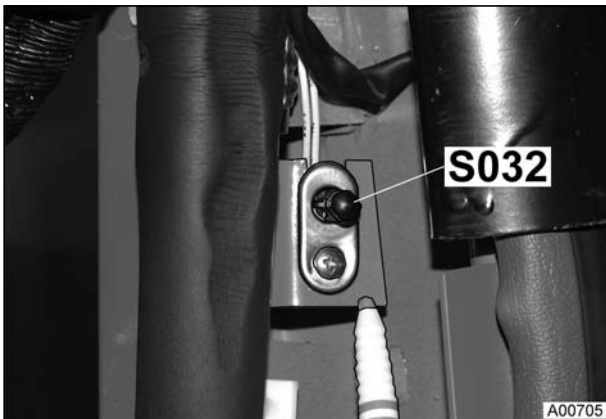
Remove right side of bonnet



**S027** = Switch, raise rear power lift, right  
**S028** = Switch, lower rear power lift, right



**S029** = Switch, raise rear power lift, left  
**S030** = Switch, lower rear power lift, left



**S031** = Switch, door contact switch, right  
**S032** = Switch, door contact switch, left

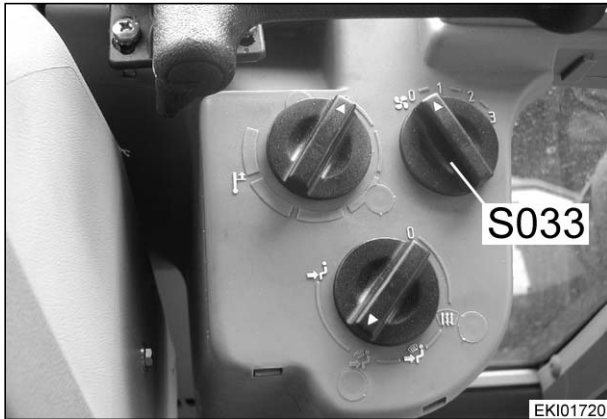
**Note:**  
 Photo shows left door contact switch; right switch analogous.



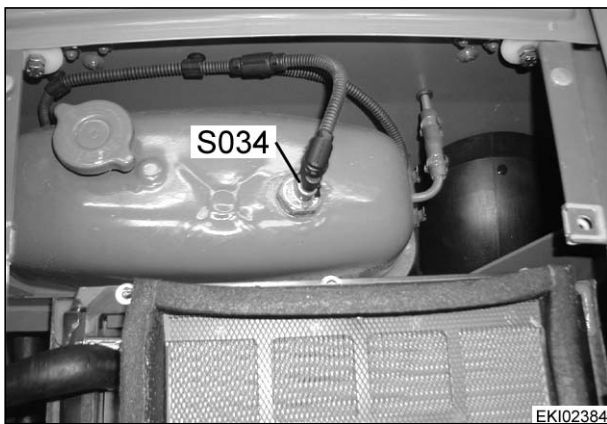
At top on door hinge on cab doors

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<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - S</b></p>	<p><b>D</b></p>
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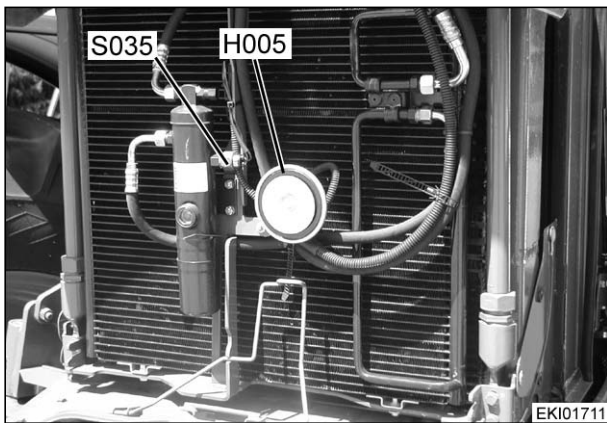
**S033** = Switch, heater control  
 On left of steering column



**S034** = Switch, coolant level  
 Expansion tank at rear of engine compartment



Remove bonnet cover



**S035** = Switch, air-conditioning high/low pressure  
 In front of radiators on fluid tank (drier)



Raise head section



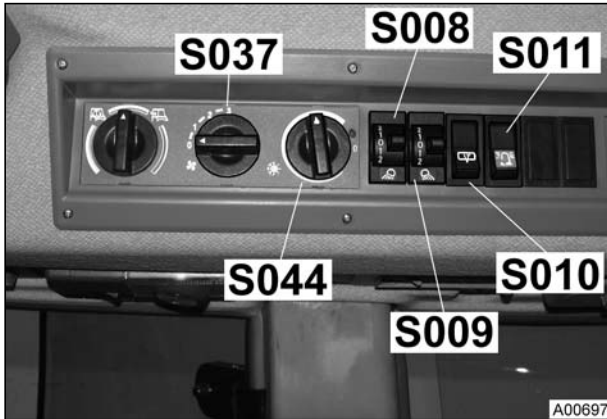
**S036** = Switch, hydraulic oil level  
 On top of clutch housing



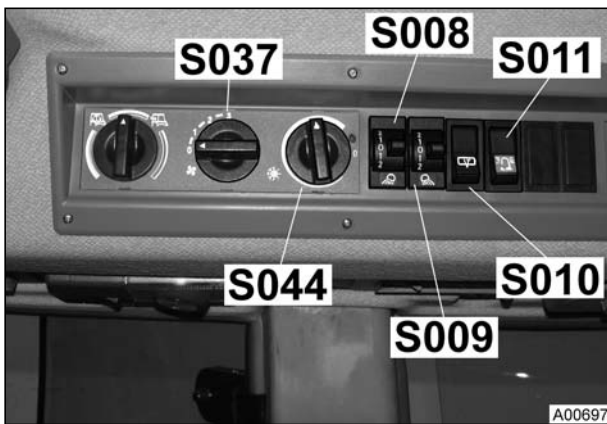
Raise cab at front

Date	Version	Page	Electrical / electronic components - S	Capitel	Index	Docu-No.
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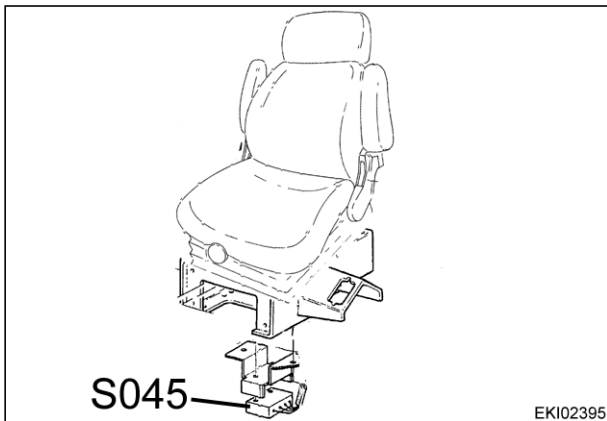
Fav 900	Tractor / General system Electrical / electronic components - S	D
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**S037** = Switch, fan  
Top right in cab



**S044** = Switch, air-conditioning  
In cab at top right on roofliner



**S045** = Switch, reversing system  
Under seat bracket



Remove driver's seat



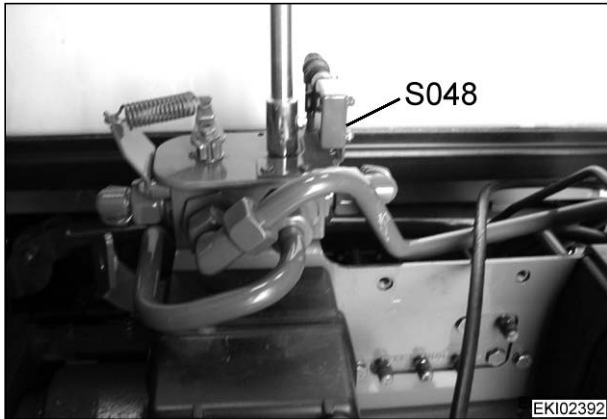
**S047** = Switch, exhaust brake  
Cab floor



Remove floor mat

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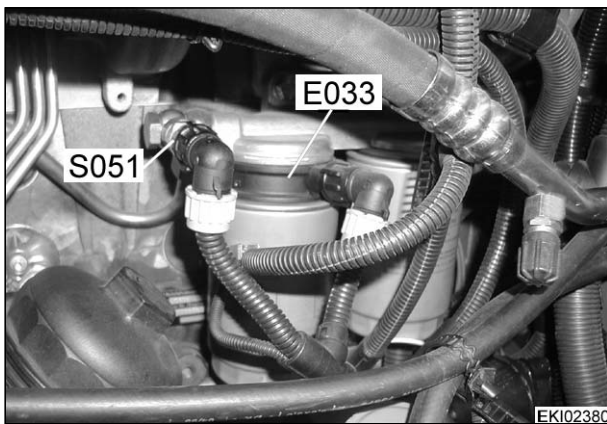
<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - S</b>	<b>D</b>
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**S048** = Switch, EPC / DA switchover  
Rear of tractor above rear connections



Remove cover panel



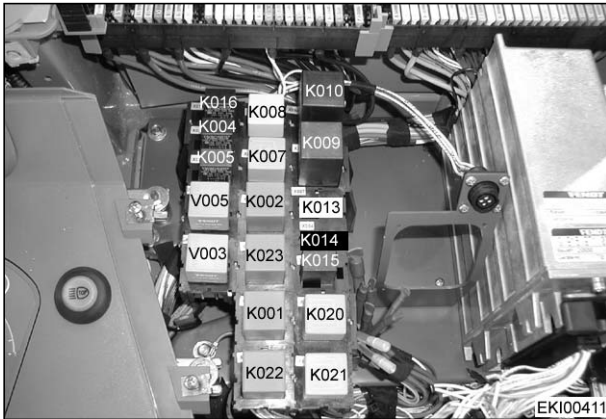
**S051** = Switch, fuel preheater  
Left rear on engine



Open left side of bonnet

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08/2000	a	8/8			0000	D

<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - V</b>	<b>D</b>
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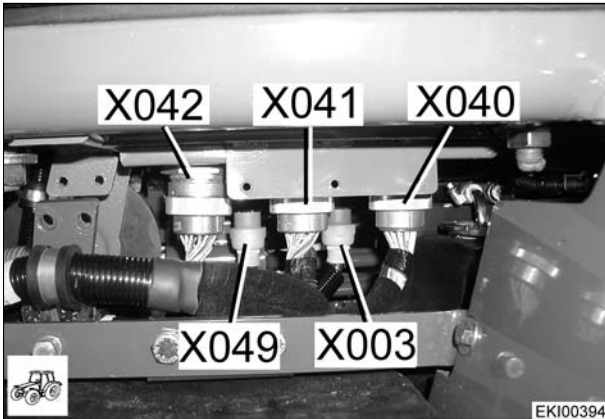
**V003** = Diode, group  
**V005** = Diode, group  
 At right rear in cab



Remove cover

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<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - X</b></p>	<p><b>D</b></p>
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**X003** = Load contact, chassis/cab base  
 Left side of tractor



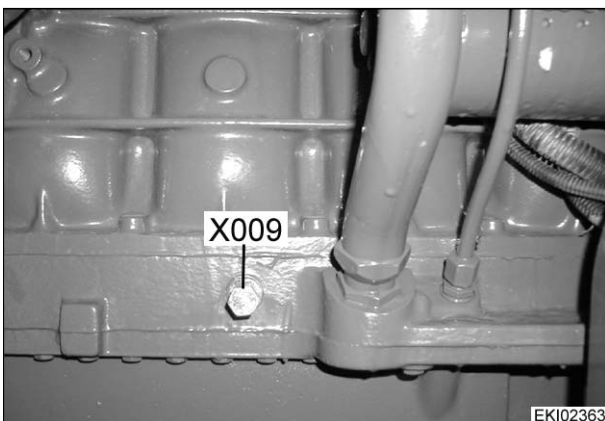
Remove panel



**X007** = Cable coupler, implement socket  
 At top right rear in cab



**X008** = Cable coupler, on-board computer counter input  
 At top right rear in cab



**X009** = External start terminal earth  
 On left of engine block

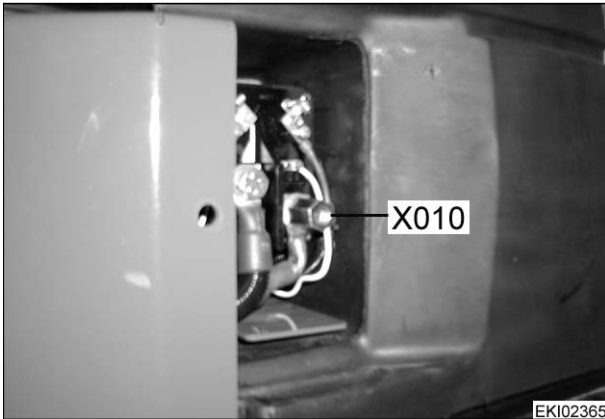


Open left side of bonnet

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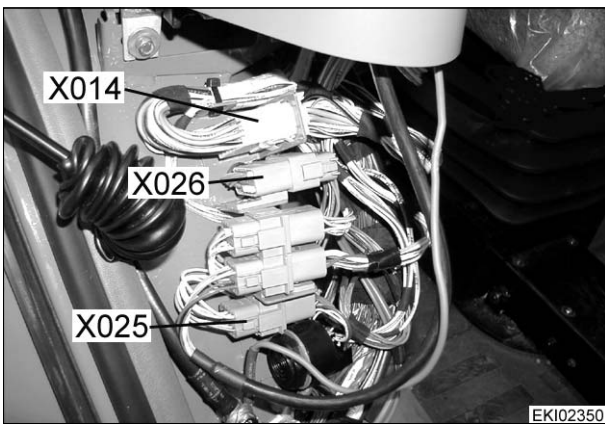
<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - X</b>	<b>D</b>
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**X010** = External start terminal plus  
On left of battery frame



Remove cover panel and protective cap from K018 - relay, battery switch



**X014** = Cable coupler, cab/cab base  
In cab on right mudguard at front



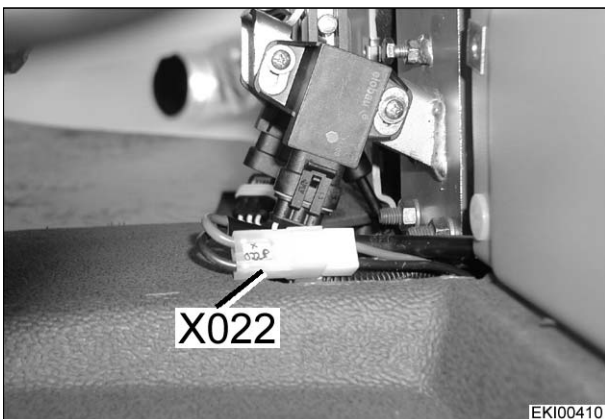
Remove hatch cover from control console at front



**X016** = Cable coupler, licence plate lighting/work light (round cable coupler)  
Right rear



Remove cab roof



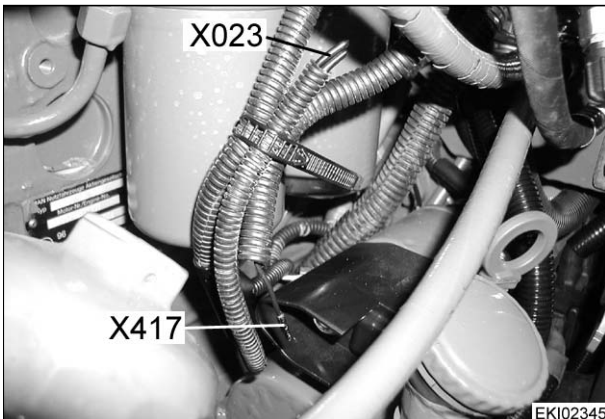
**X022** = Cable coupler, M008 - heater fan motor  
In steering column



Remove steering column cover at bottom left

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<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - X</b></p>	<p><b>D</b></p>
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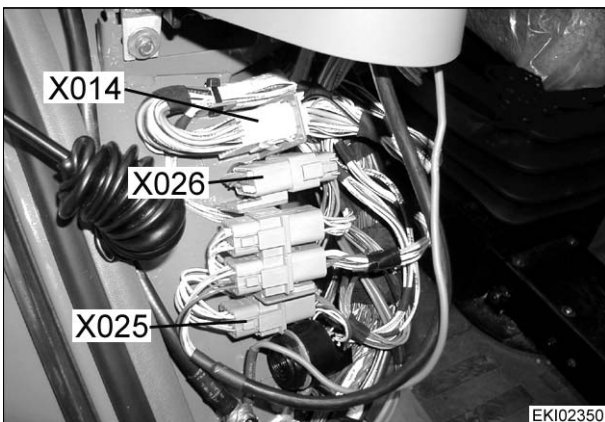
**X023** = Cable coupler, 3rd hydraulic circuit socket  
 Left side of tractor, in region of starter motor



Open left side of bonnet



EKI02345



**X025** = LBS prewiring

**X026** = Cable coupler, communication box  
 In cab on right mudguard at front



Remove hatch cover from control console at front



EKI02350



**X027** = Cable coupler, heater switch / M008 - motor, heater fan



At front of cab  
 Remove bonnet cover

Withdraw filter element, remove heater cooler, pull cable through rubber grommet



EKI02368



**X028** = Cable coupler, communication box  
 At top right rear in cab



EKI02378

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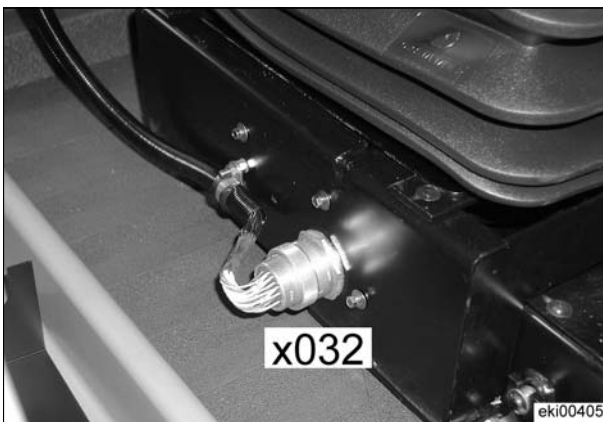
<p><b>Fav 900</b></p>	<p align="center"><b>Tractor / General system</b> <b>Electrical / electronic components - X</b></p>	<p align="center"><b>D</b></p>
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**X029** = Cable coupler, cab/cab base  
In cab on right mudguard at front



Remove hatch cover from control console at front



**X032** = Connector, A003 - joystick  
At bottom right on driver's seat bracket



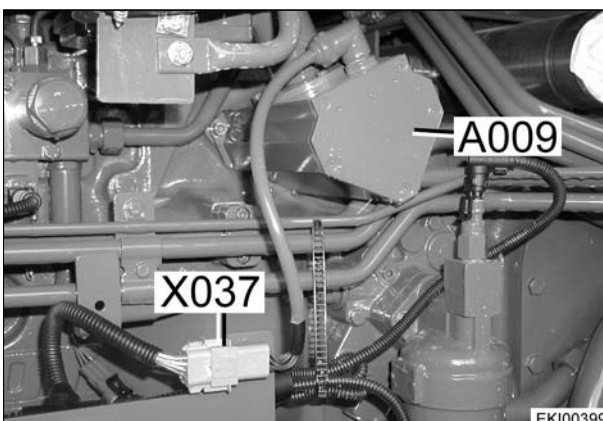
Remove panel



**X036** = Cable coupler, A008 - terminal  
In cab on right mudguard at front



Remove hatch cover from control console at front



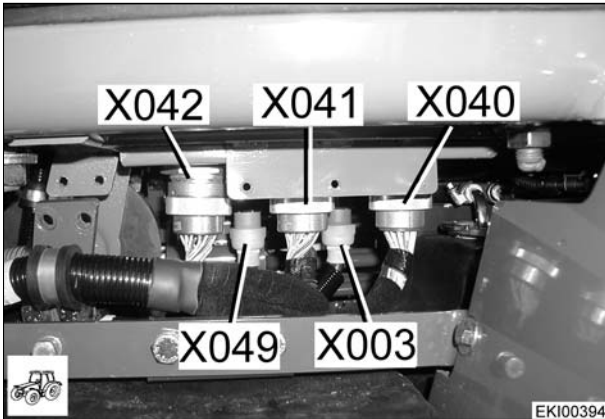
**X037** = Cable coupler, for A009 - actuator unit  
On right below cab



Unscrew right rear wheel and panel

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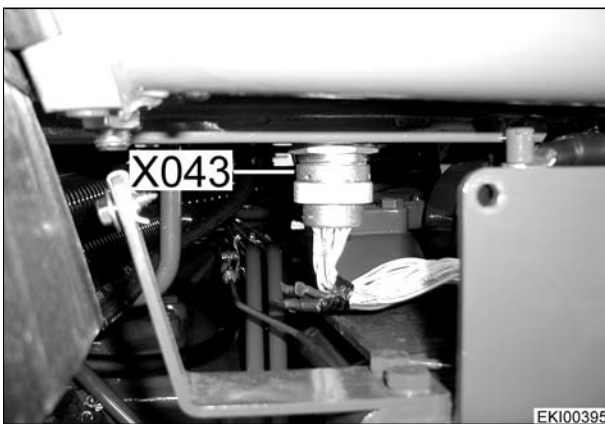
<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Electrical / electronic components - X</b></p>	<p><b>D</b></p>
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- X040** = Cable coupler, cab base / engine
- X041** = Cable coupler, cab base / engine
- X042** = Cable coupler, cab base / engine  
Left side of tractor



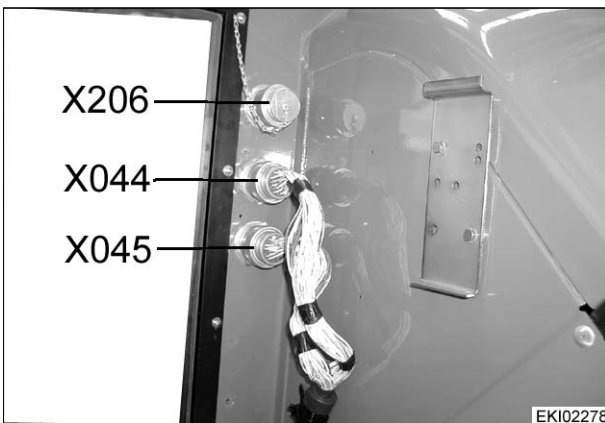
Remove panels



- X043** = Cable coupler cab base/engine  
(spool valves)  
Cab, right entrance step



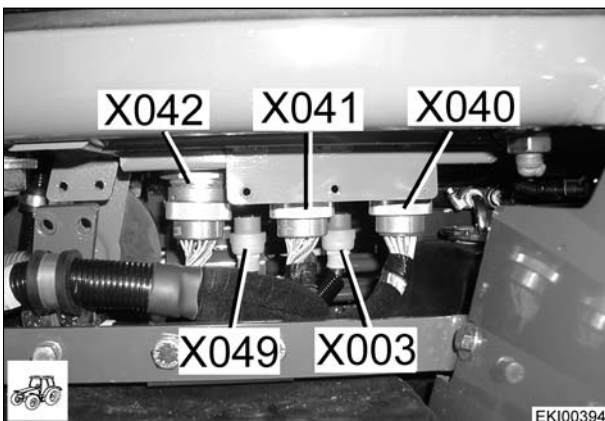
Remove footplate



- X044** = Connector, cab base / transmission
- X045** = Connector, cab base / transmission  
Rear of tractor, right side



Remove panel



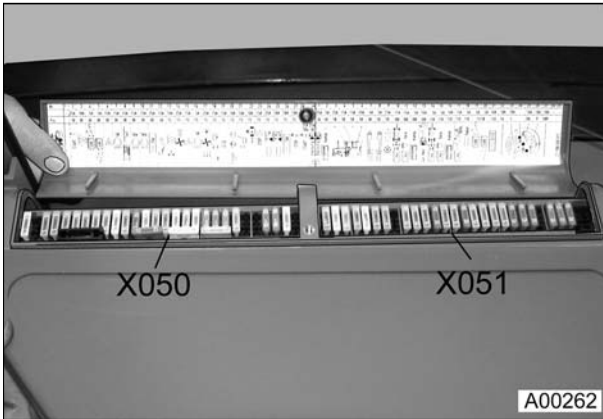
- X049** = Load contact, chassis/cab base  
Left side of tractor



Remove panel

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<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - X</b></p>	<p><b>D</b></p>
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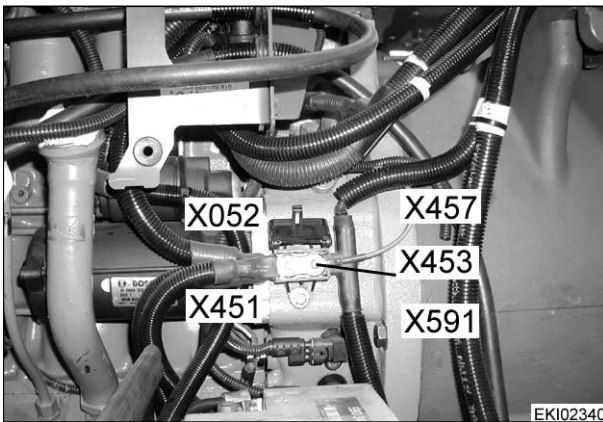
**X050** = Fuse holder 1 compl.

**X051** = Fuse holder 2 compl.

At right rear in cab



Remove cover



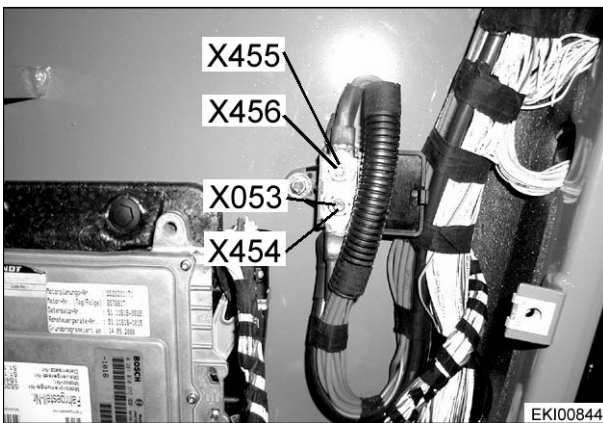
**X052** = Chassis plus terminal

On left side of tractor in flywheel housing



**Note:**

Shown with fuel tank removed for greater clarity.

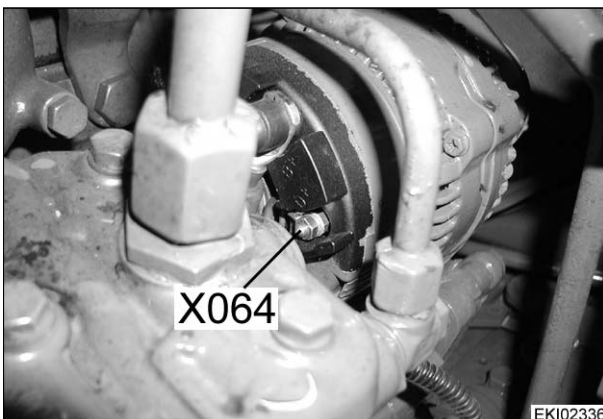


**X053** = Connector, + UB 30

Right mudguard



Remove panels



**X064** = Generator D+, G002 - generator

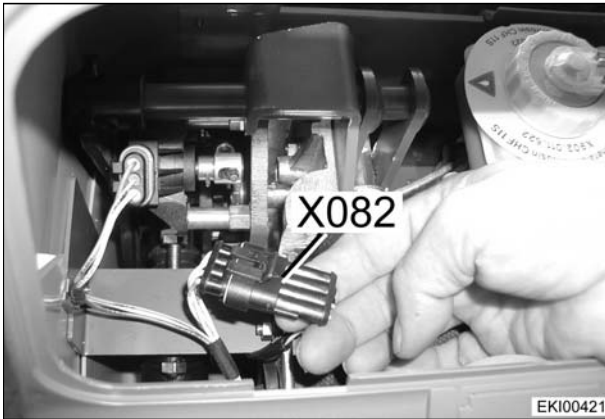
Right side of engine



Open right side of bonnet

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<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - X</b></p>	<p><b>D</b></p>
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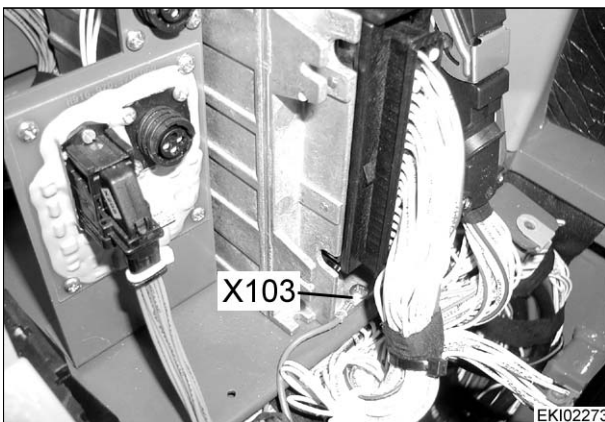


**X082** = Cable coupler, S012 - switch, starter inhibitor

At top of steering column



Remove instrument panel

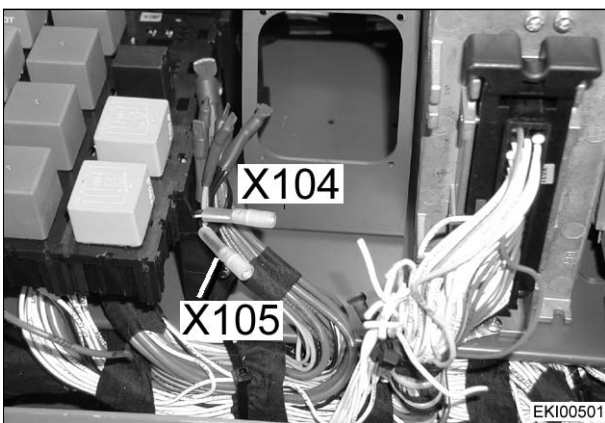


**X103** = Earthing point, A002 - ECU, enhanced control

In cab on right mudguard



Remove panel



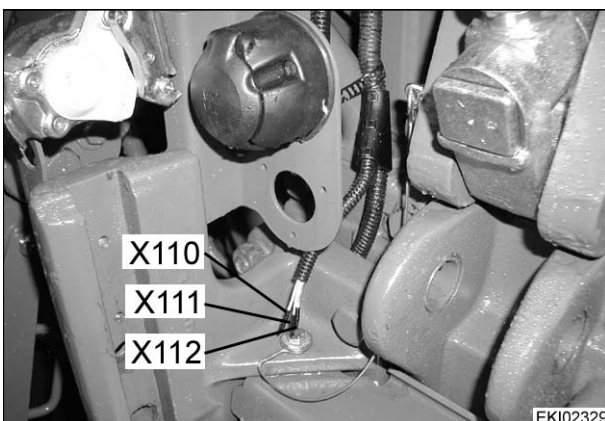
**X104** = Test socket, electronics, electric circuit 15E

**X105** = Test socket, electronics, earth

At right rear in cab



Remove panel



**X110** = To X015 - socket, electrohydraulic remote control

**X111** = To X015 - socket, electrohydraulic remote control

**X112** = To X015 - socket, electrohydraulic remote control

At rear of tractor



Open cable loom



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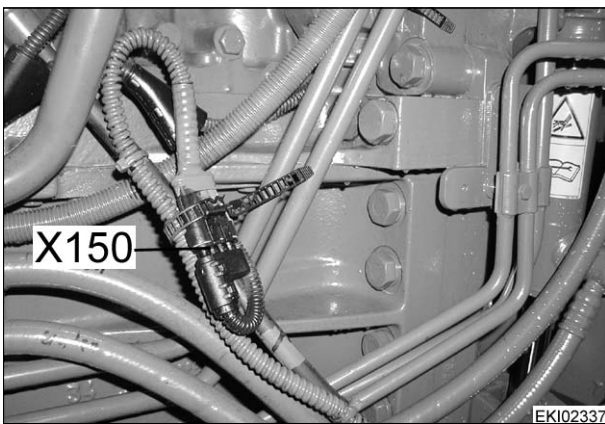
<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - X</b></p>	<p><b>D</b></p>
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**X118** = Earthing point, A004 - ECU, control console  
 In cab on right mudguard



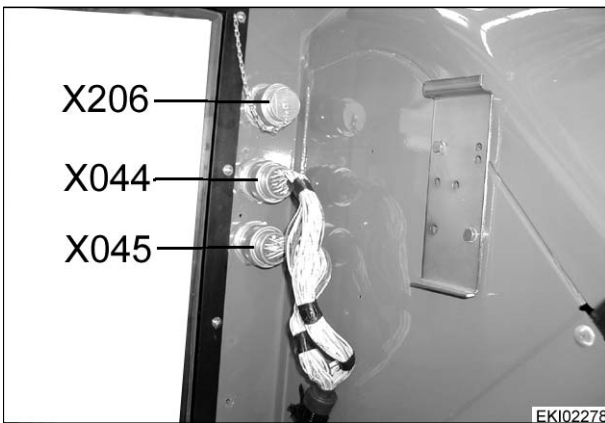
Remove panel



**X150** = Connector, B001/B024 - sensor, steering angle  
 Right side of engine



Open right side of bonnet



**X206** = LBS socket (implements)  
 Rear of tractor, right side



Remove panel



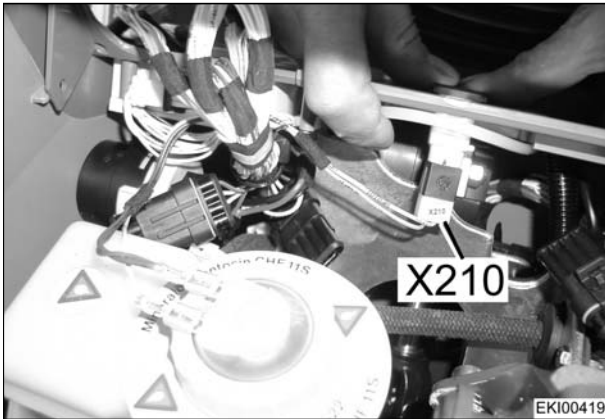
**X207** = Connector, supply TLE (LBS)  
 In cab in right B-pillar



Remove hatch cover

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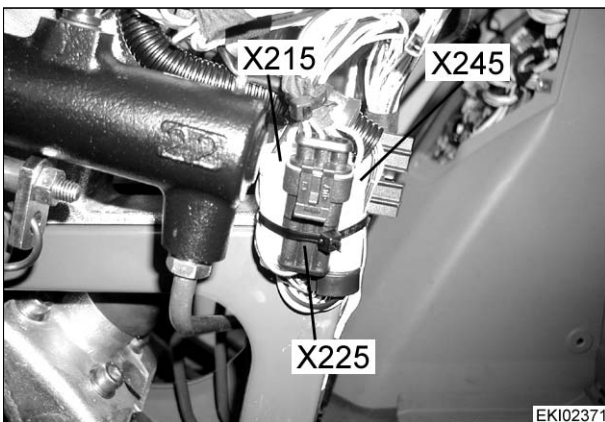
<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - X</b></p>	<p><b>D</b></p>
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**X210** = Indicator lamp 2/generator  
 At top of steering column



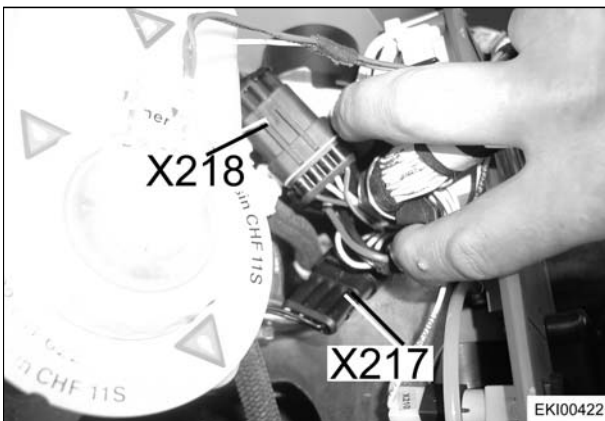
Remove hatch cover at top of steering column, then remove instrument panel



**X215** = Cable coupler, S001 - switch, control stalk  
 At rear of steering column on left



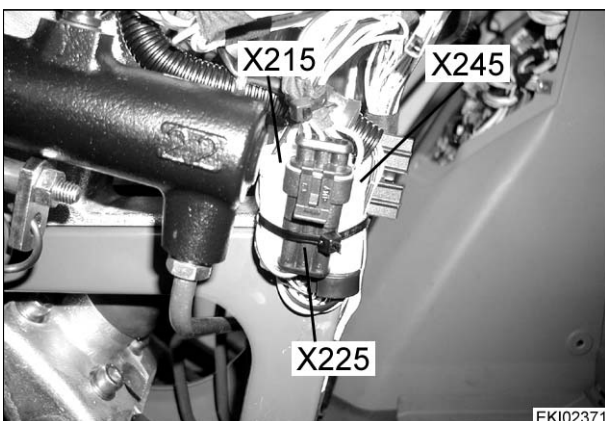
Remove panel



**X217** = Solenoid switch, S005 - switch, right brake  
**X218** = Solenoid switch, S006 - switch, left brake  
 At top of steering column



Remove hatch cover at top of steering column, then remove instrument panel



**X225** = Cable coupler, S014 - switch, rapid reversing  
 At rear of steering column

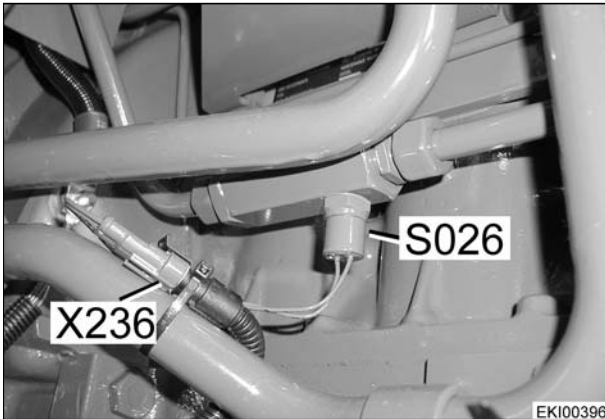


Remove panel

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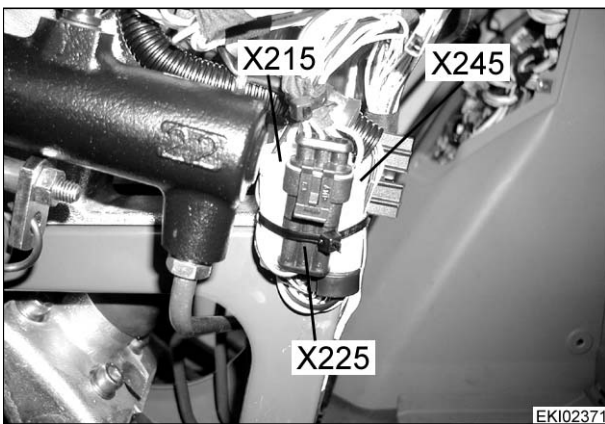
<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Electrical / electronic components - X</b></p>	<p><b>D</b></p>
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**X236** = Cable coupler, S026 - switch, flow monitor  
By auxiliary pump in space between transmission and engine, in frame



Open right side of bonnet



**X245** = Cable coupler, S001 - switch, control stalk  
At rear of steering column on left



Remove panel



**X254** = 10 A socket, connected to electric circuit 15, 10 amp fuse

**X255** = 25 A socket, connected to electric circuit 30, 25 amp fuse

At top right rear in cab



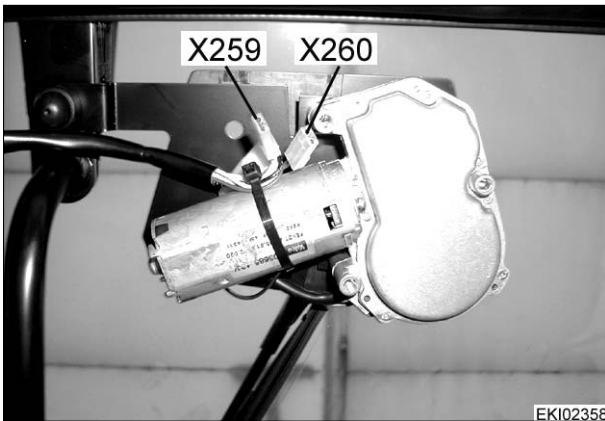
**X258** = Cable coupler, M004 - rear wiper motor  
At rear wiper motor



Remove panel

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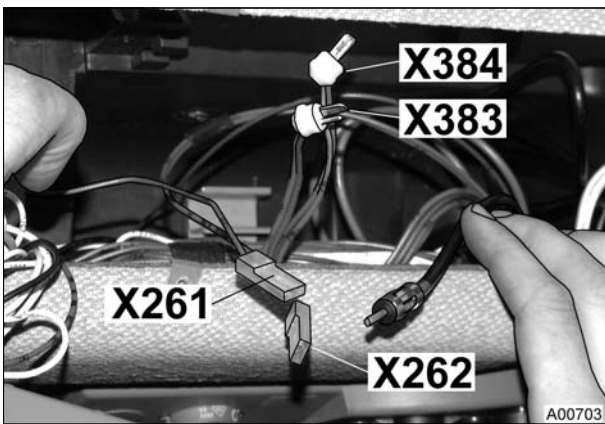
Fav 900	Tractor / General system Electrical / electronic components - X	D
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**X259** = Terminal, E023 - heated rear window  
**X260** = Terminal, E029 - heated rear window  
 At rear wiper motor



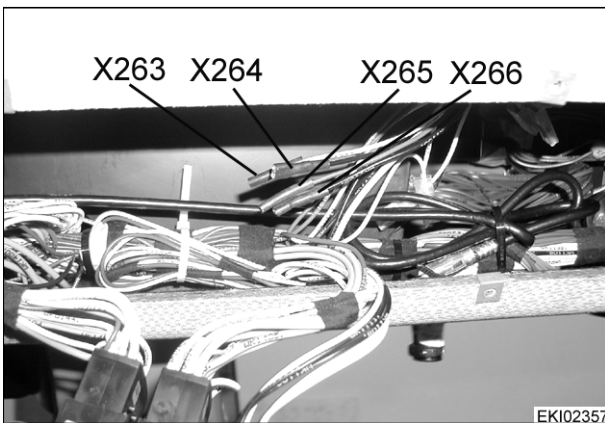
Remove panel



**X261** = Radio earth  
**X262** = +UB radio  
 Not assigned = Radio aerial  
 A015 = Radio not shown  
 At top right in cab



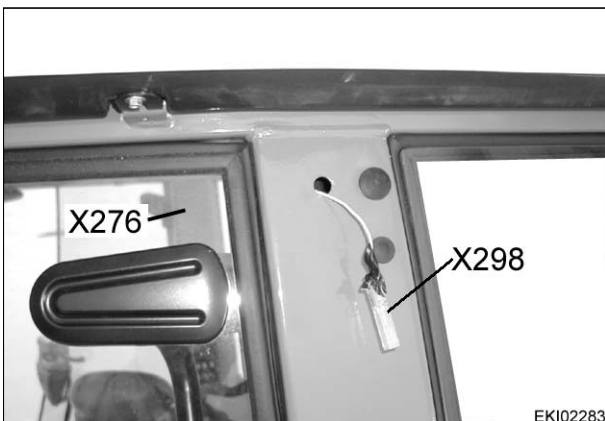
Remove radio housing blanking plate



**X263** = Terminal, UB, board for heated mirror  
**X264** = Terminal, earth, board for heated mirror  
**X265** = Terminal, mirror heater toggle switch  
**X266** = Terminal, mirror heater toggle switch  
 At top right in cab



Remove radio housing blanking plate



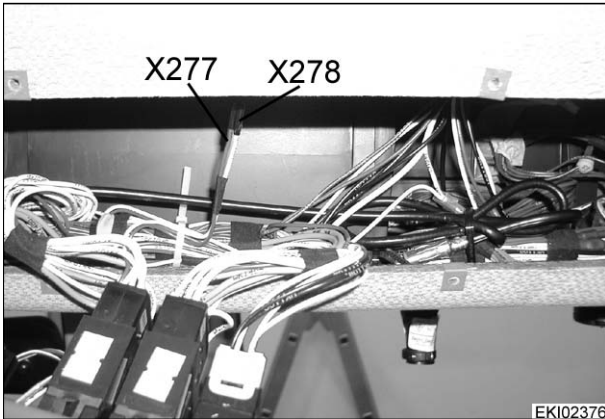
**X276** = Connector, E021 - right rotating beacon  
 Right side of tractor, in B-pillar



Remove blanking plug

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Fav 900	Tractor / General system <b>Electrical / electronic components - X</b>	<b>D</b>
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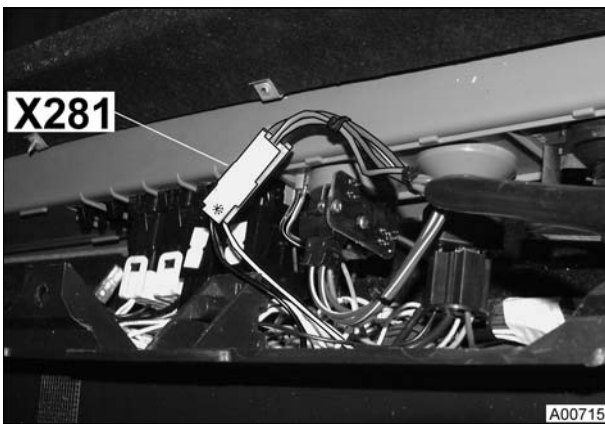


**X277** = Lighting, wide load, left (earth)

**X278** = Lighting, wide load, left (+UB)  
At top right in cab



Remove radio housing blanking plate



**X281** = Connector, air-conditioning

**Note:**  
Shown with cab roof removed for greater clarity.



At top right below roof

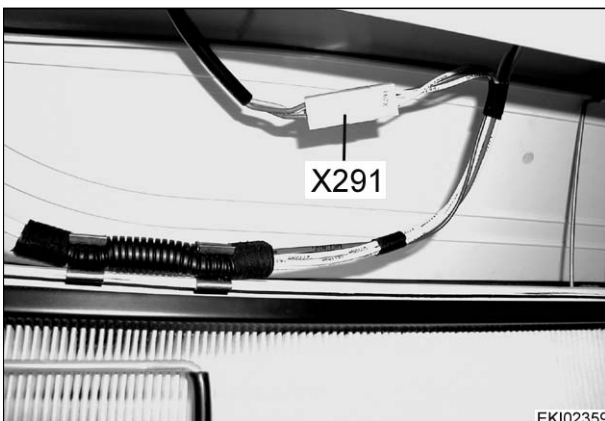


Remove panel



**X284** = Connector, M002 - front right wiper motor

Pull out of roofliner at front right



**X291** = E013 - work lights in roof, front right

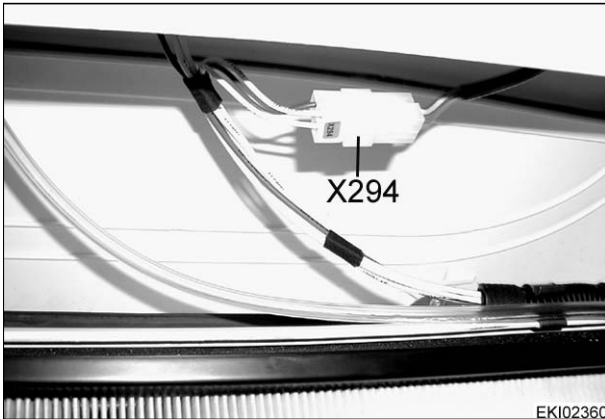
Top front in roof



Pivot bracket for work lights in roof upwards

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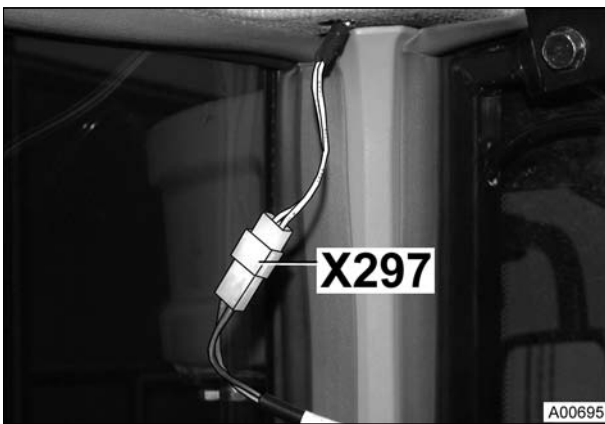
<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - X</b></p>	<p><b>D</b></p>
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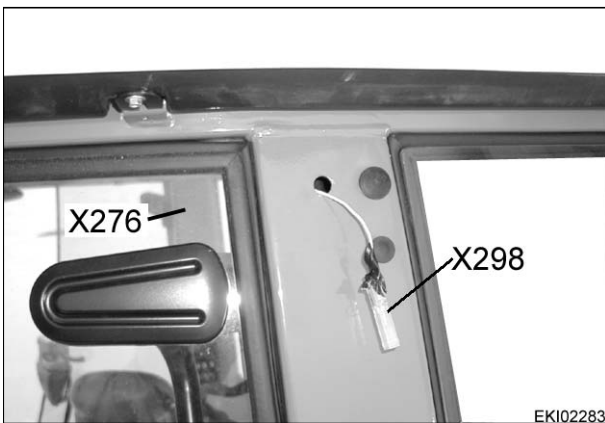
**X294** = E014 - work lights in roof, front left  
 Top front in roof



Pivot bracket for work lights in roof upwards



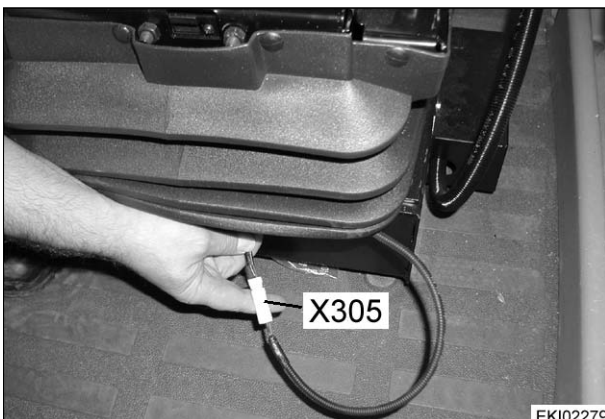
**X297** = Connector, M002 - front left wiper motor  
 Pull out of roofliner at front left



**X298** = Connector, E022 - left rotating beacon  
 Left side of tractor, in B-pillar



Remove blanking plug



**X305** = +UB, M007 - seat adjustment motor  
 Rear of driver's seat



Pull cable out of seat

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<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - X</b>	<b>D</b>
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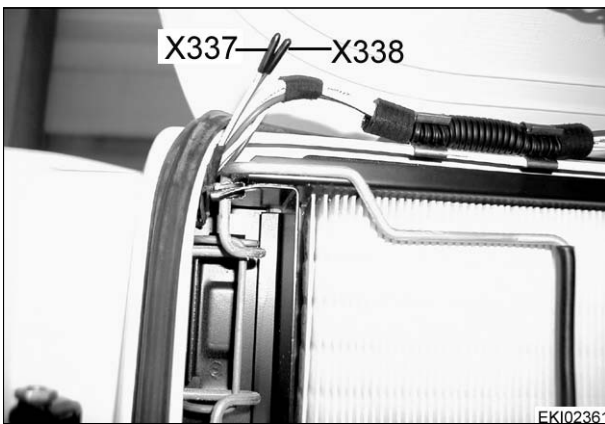


**X313** = Lighting, wide load, right, +UB

**X314** = Lighting, wide load, right, earth  
Front left in roof



Remove cab roof

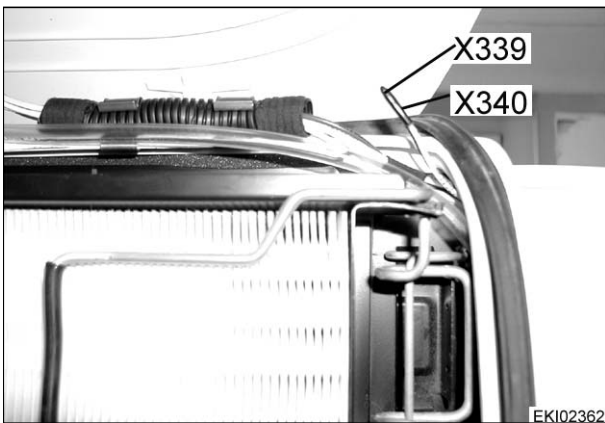


**X337** = Terminal, E024 - right heated mirror

**X338** = Terminal, E024 - right heated mirror  
Top front in roof



Pivot bracket for work lights in roof  
upwards

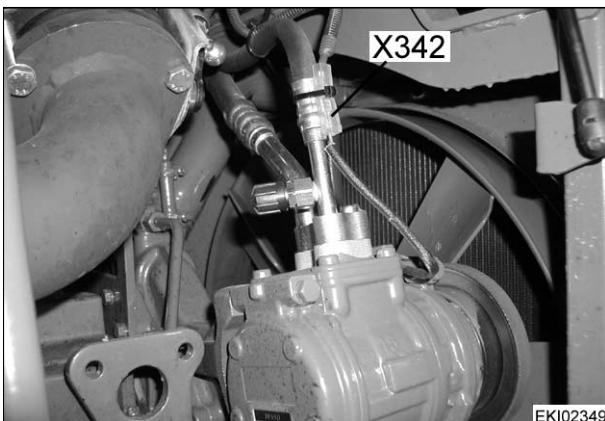


**X339** = Terminal, E025 - left heated mirror

**X340** = Terminal, E025 - left heated mirror  
Top front in roof



Pivot bracket for work lights in roof  
upwards



**X342** = Connector, Y024 - air-conditioning  
magnetic clutch

Front right on engine



Open right side of bonnet

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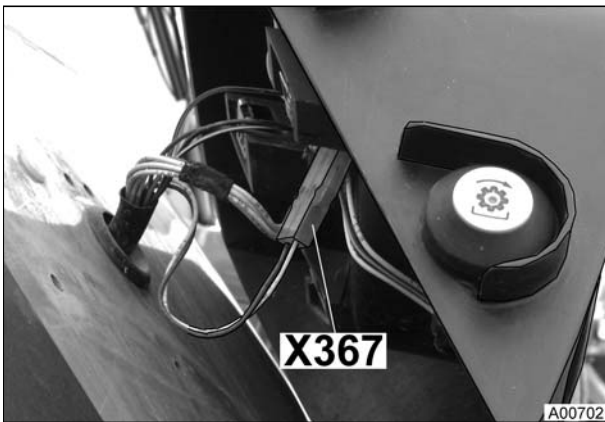
Fav 900	Tractor / General system <b>Electrical / electronic components - X</b>	<b>D</b>
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**X347** = Cable coupler, M002 - front wiper motor  
On front wiper motor



Remove panel



**X367** = Cable coupler, E018 - left work lights

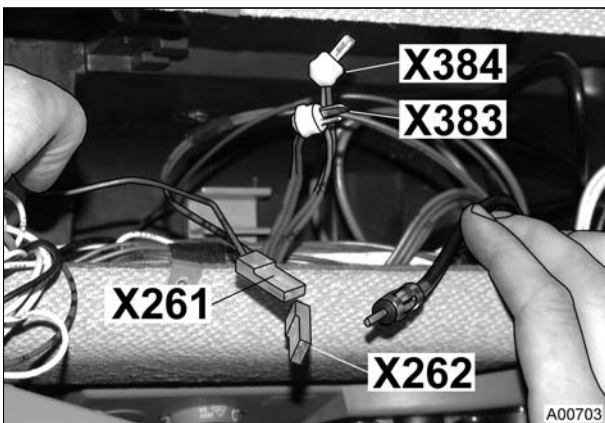
**Note:**

**Photo shows left connector**

**X366 = cable coupler E017 - right work lights is analogous**



Remove indicator/brake/tail light cluster



**X383** = Terminal, left loudspeaker

**X384** = Terminal, right loudspeaker

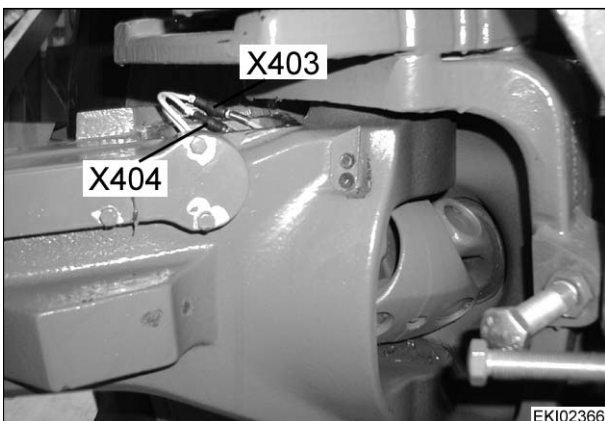
Not assigned = Radio aerial

A015 = Radio (not shown)

At top right in cab



Remove radio housing blanking plate



**X403** = Connector, B001 - sensor, steering angle 1

**X404** = Connector, B024 - sensor, steering angle 2

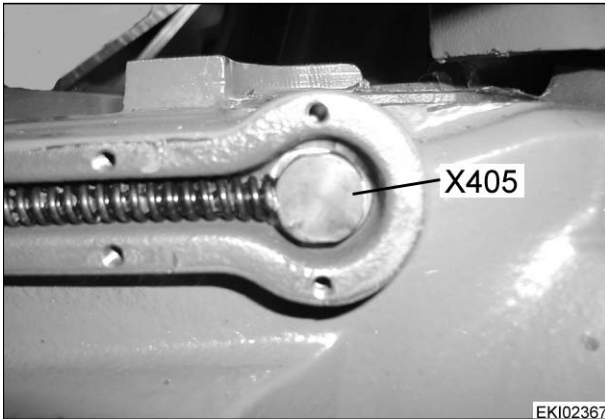
Right front axle



Unscrew cover from axle housing

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<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - X</b></p>	<p><b>D</b></p>
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**X405** = Connector, steering angle sensors  
 Right front axle



Unscrew cover from axle housing

EKI02367



**X406** = +UB, not currently assigned

Right side of tractor, B009 - sensor, output temperature



Unscrew right rear wheel and panel

EKI02333

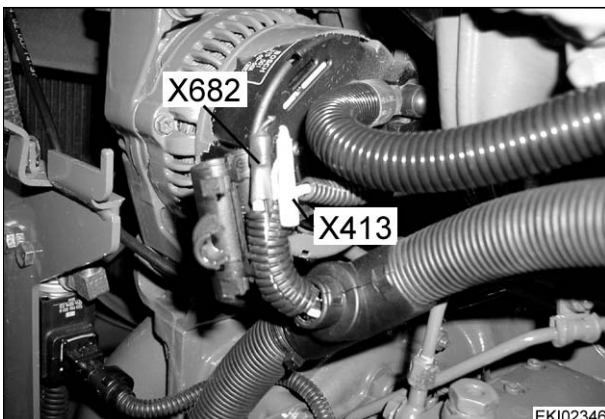


**X412** = EDC - diagnostics plug  
 In cab on right mudguard



Remove panel

EKI00502



**X413** = Cold start diagnostics  
 Front left on engine



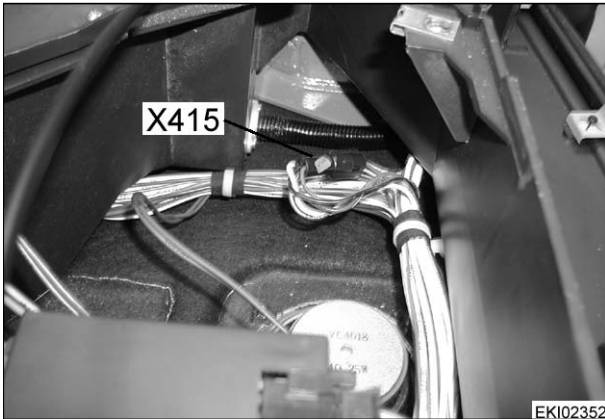
Open left side of bonnet, remove T-piece from cable loom

EKI02346

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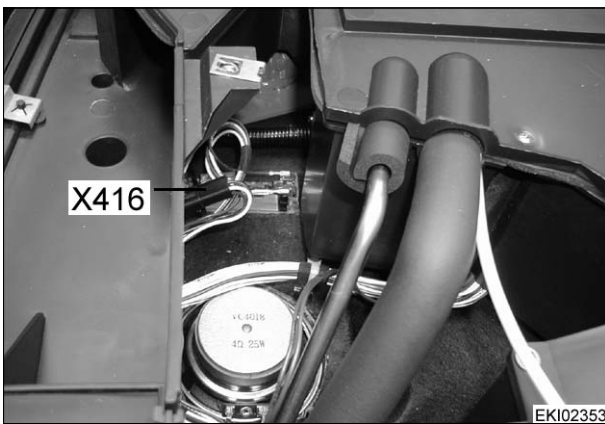
<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - X</b></p>	<p><b>D</b></p>
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**X415** = Connector, A-pillar  
 Front right in roof



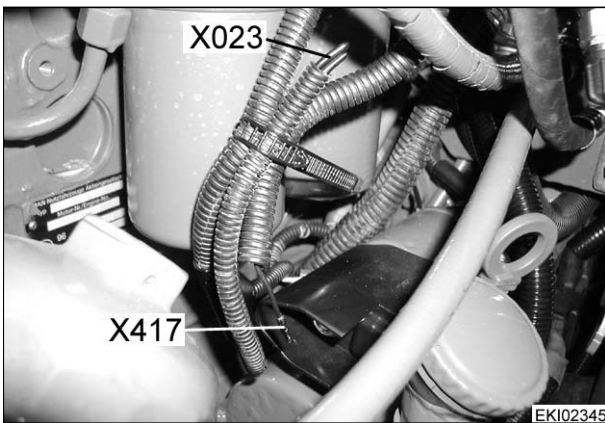
Remove cab roof



**X416** = Connector, A-pillar  
 Front left in roof



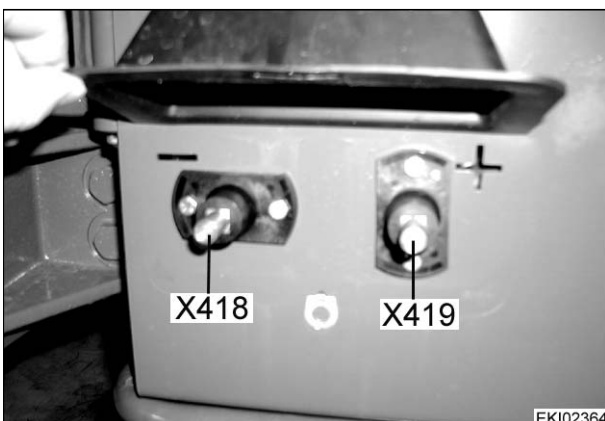
Remove cab roof



**X417** = Power supply, E033 - fuel preheater  
 Left side of tractor, in region of starter motor



Open left side of bonnet



**X418** = Cable coupler, external start terminal, earth

**X419** = Cable coupler, external start terminal, plus  
 On left of battery frame



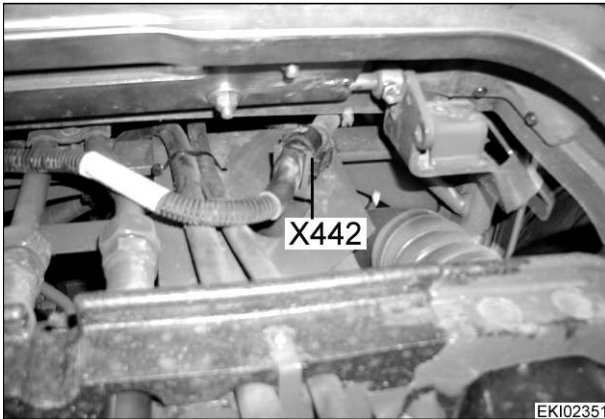
Raise cover



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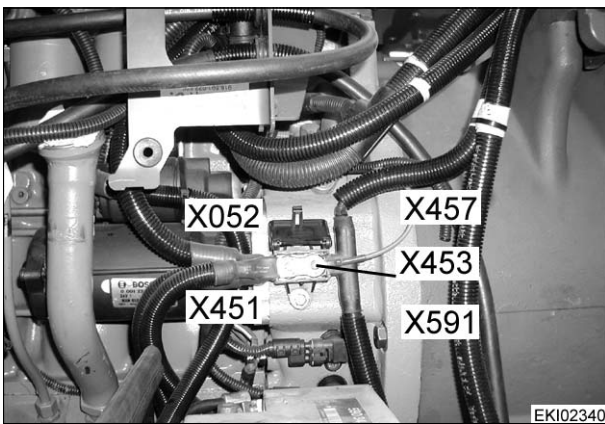
<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - X</b></p>	<p><b>D</b></p>
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**X442** = Connector, bonnet front  
 At top above radiator



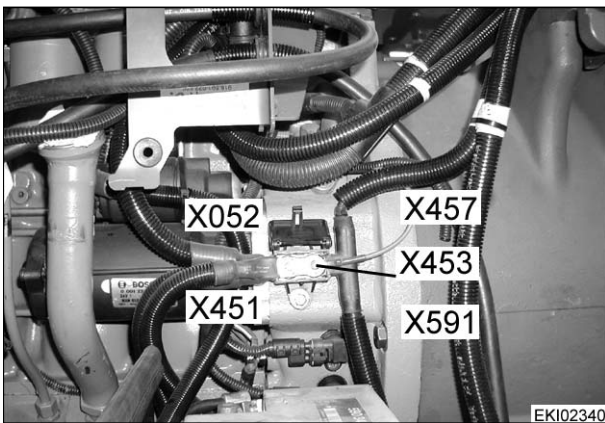
Opening the front section



**X451** = Cable lug, plus terminal, chassis  
 On left side of tractor in flywheel housing



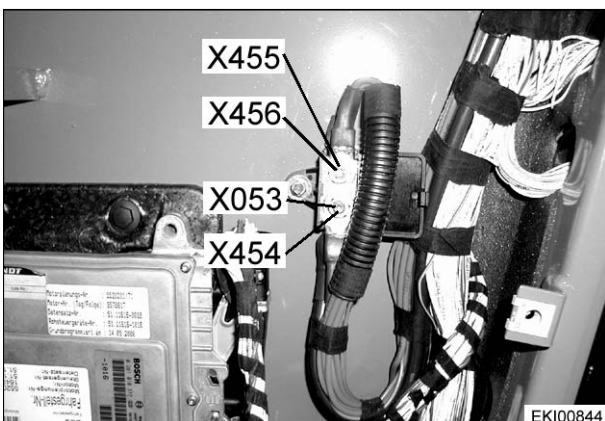
**Note:**  
 Shown with fuel tank removed for greater clarity.



**X453** = Cable lug, plus terminal, chassis  
 On left side of tractor on flywheel housing



**Note:**  
 Shown with fuel tank removed for greater clarity.



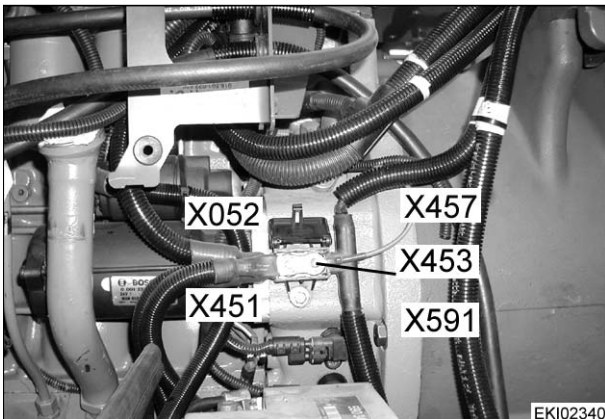
**X454** = Cable lug, plus terminal, cab base  
**X455** = Cable lug, plus terminal, cab base  
 Right mudguard



Remove panels

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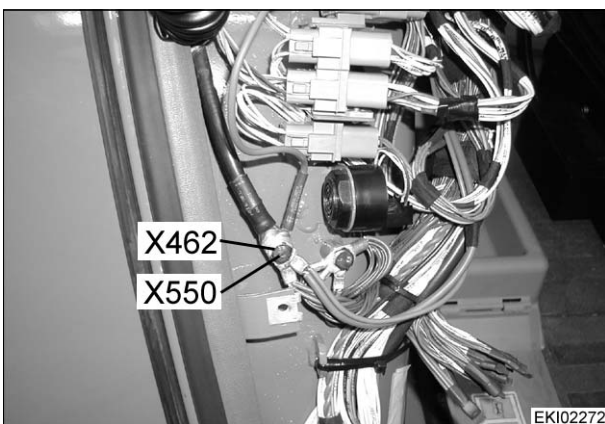
<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - X</b></p>	<p><b>D</b></p>
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**X457** = Cable lug, plus terminal, cab base  
 On left side of tractor in flywheel housing



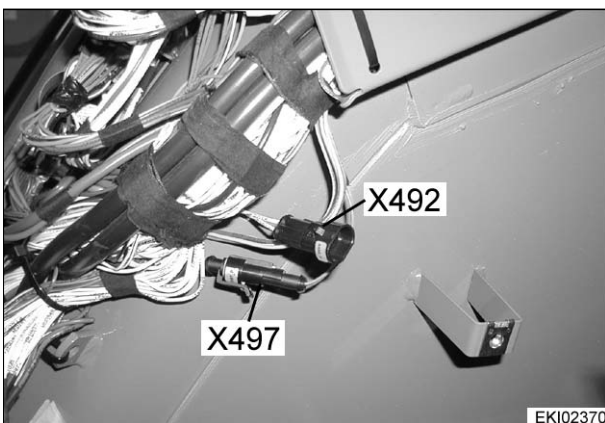
**Note:**  
 Shown with fuel tank removed for greater clarity.



**X462** = Earthing point, cab base  
 In cab at front right in front of control console



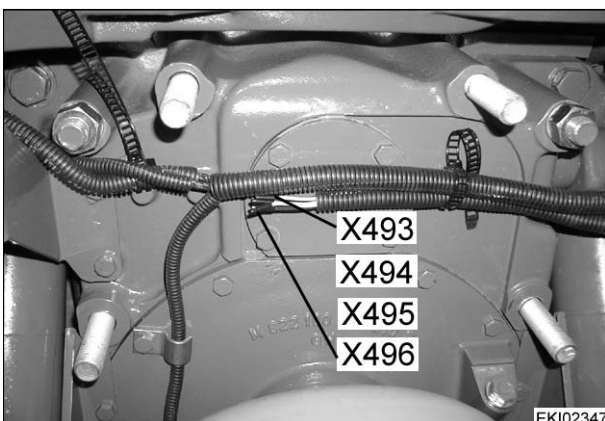
Unscrew hatch cover



**X492** = Connector, LBS prewiring (front)  
 In cab on right mudguard at front



Remove hatch cover on control console and mudguard panel at front



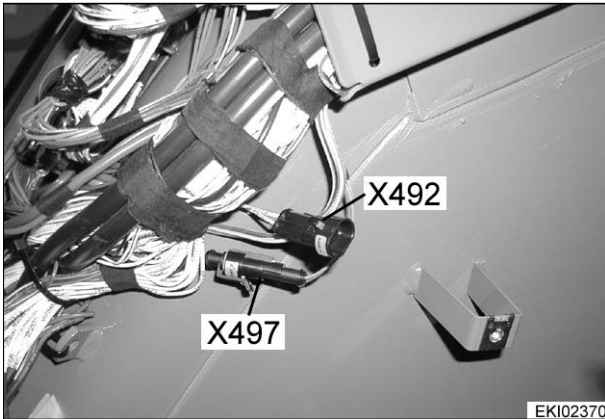
**X493** = LBS prewiring, front  
**X494** = LBS prewiring, front  
**X495** = LBS prewiring, front  
**X496** = LBS prewiring, front  
 Between front plate and front PTO



Remove front plate

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<p><b>Fav 900</b></p>	<p style="text-align: center;"><b>Tractor / General system</b> <b>Electrical / electronic components - X</b></p>	<p><b>D</b></p>
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**X497** = Connector, LBS prewiring (front)  
In cab on right mudguard at front



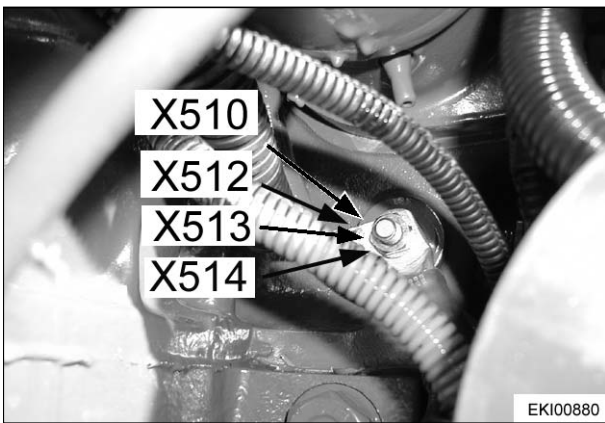
Remove hatch cover on control console and mudguard panel at front



**X499** = +UB30 LBS 40 amps  
Right mudguard



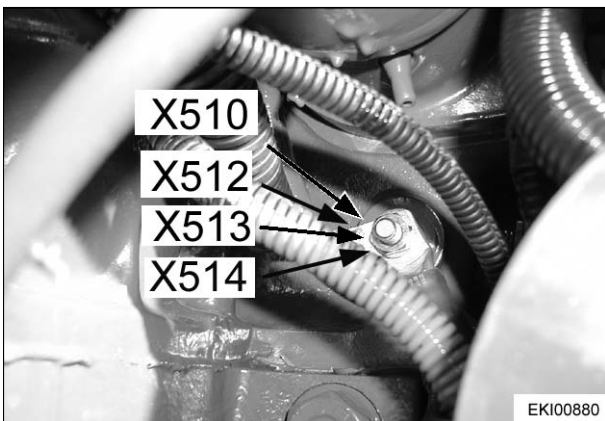
Remove panels



**X510** = Earthing point, engine, left  
On left side of tractor on flywheel housing



Open left side of bonnet



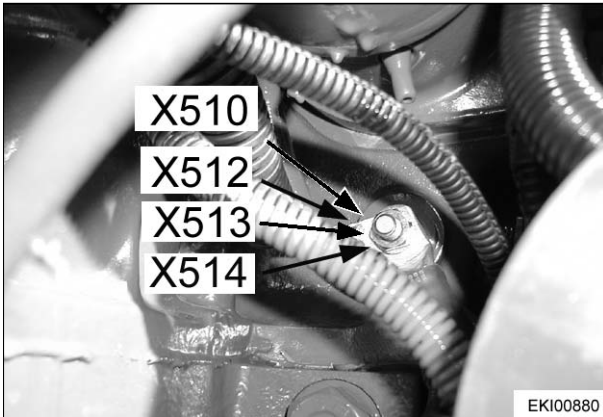
**X512** = Earthing point, engine, left  
**X513** = Earthing point, engine, left  
On left side of tractor on flywheel housing



Open left side of bonnet

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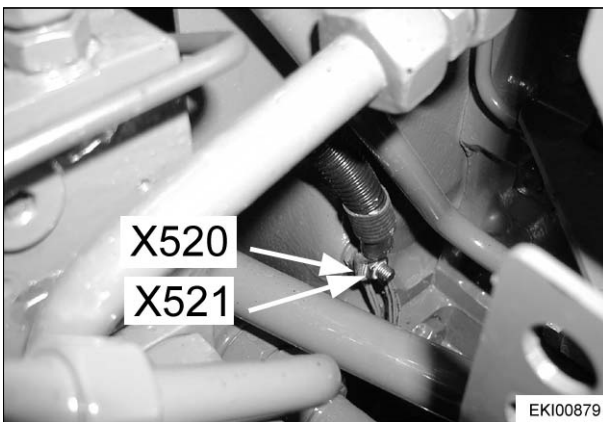
<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Electrical / electronic components - X</b></p>	<p><b>D</b></p>
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**X514** = Earthing point, engine, left  
On left side of tractor on flywheel housing



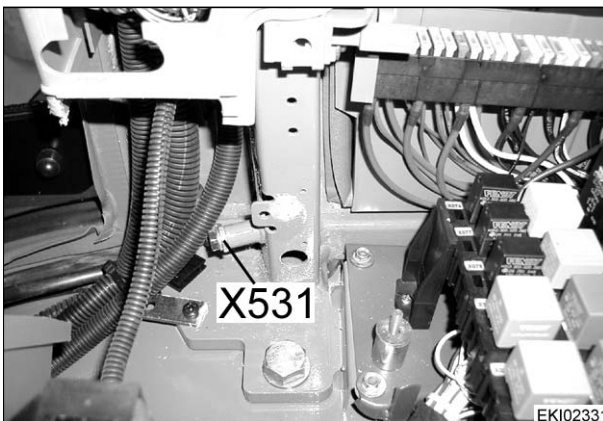
Open left side of bonnet



**X520** = Earthing point, engine, right  
**X521** = Earthing point, engine, right  
On right side of tractor on flywheel housing



Open right side of bonnet



**X531** = Earthing point, B-pillar  
In cab on right mudguard



Remove A004 - ECU, control console



**X532** = Earthing point, body/cab, right  
**X533** = Earthing point, body/cab, right  
**X534** = Earthing point, body/cab, right  
**X536** = Earthing point, body/cab, right  
At top right in cab

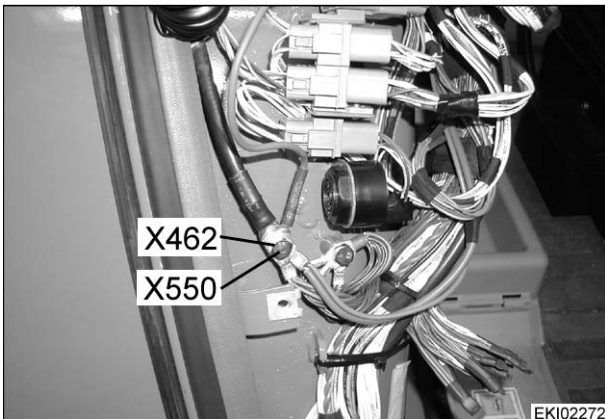


Remove radio housing blanking plate



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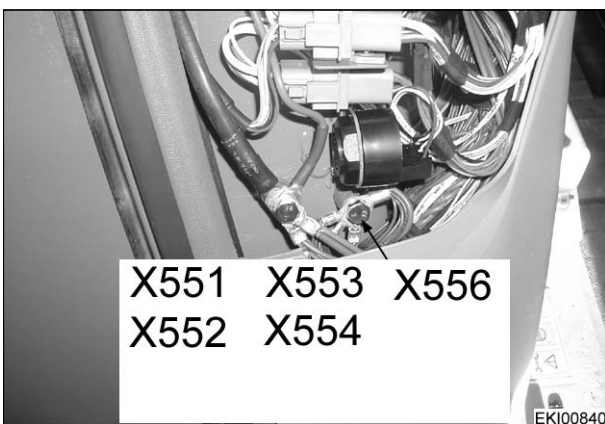
<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - X</b>	<b>D</b>
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**X550** = Earthing point, cab base  
In cab at front right in front of control console



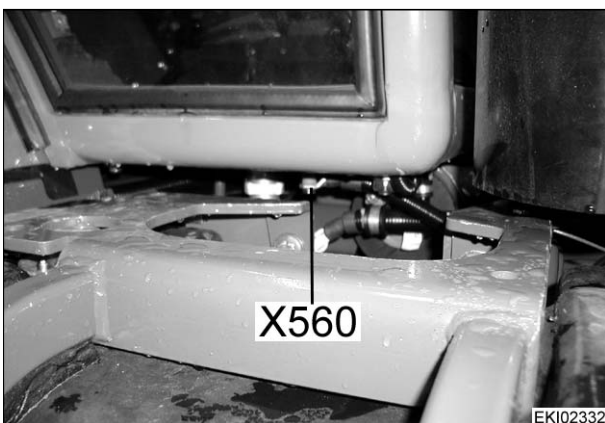
Unscrew hatch cover



**X551** = Earthing point, cab base  
**X552** = Earthing point, cab base  
**X553** = Earthing point, cab base  
**X554** = Earthing point, cab base  
**X556** = Earthing point, cab base  
At front right in cab



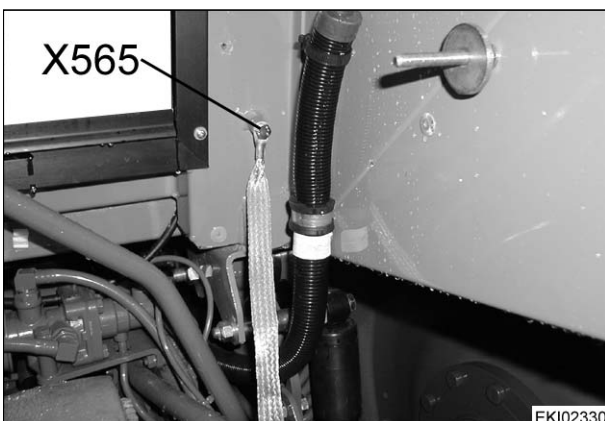
Remove hatch cover in front of control console



**X560** = Earthing point, cab base  
Cab, right entrance step



Remove footplate



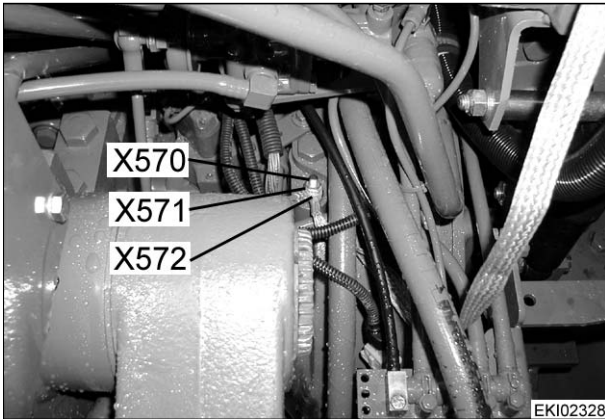
**X565** = Earthing point, cab base  
Rear of tractor, right side



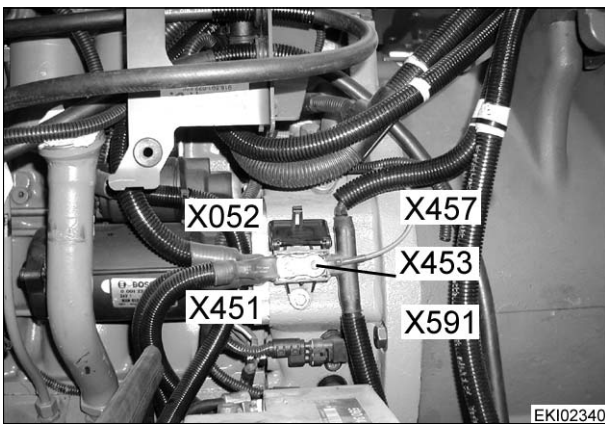
Remove panel

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<p><b>Fav 900</b></p>	<p align="center"><b>Tractor / General system</b> <b>Electrical / electronic components - X</b></p>	<p align="center"><b>D</b></p>
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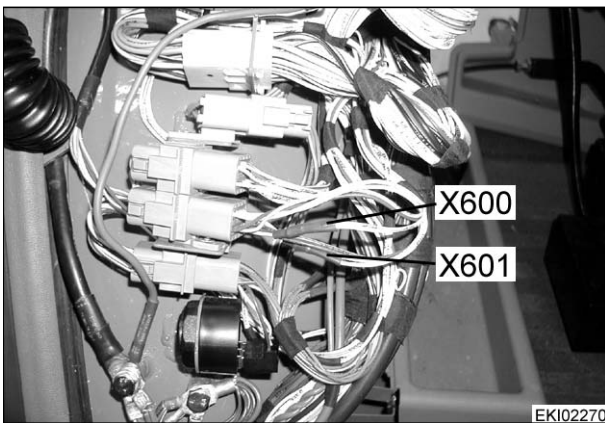
- X570** = Earthing point, transmission
- X571** = Earthing point, transmission
- X572** = Earthing point, transmission  
Rear of tractor, right axle tube



- X591** = Connector, +UB 30 LBS implement socket  
On left side of tractor in flywheel housing



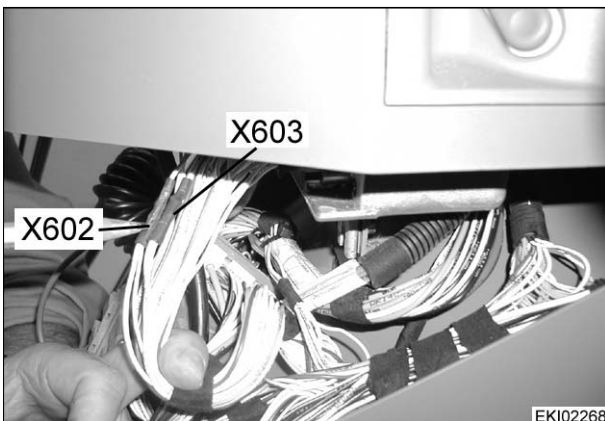
**Note:**  
Shown with fuel tank removed for greater clarity.



- X600** = Connector, CAN high upstream of A013 - board, fuse
- X601** = Connector, CAN low upstream of A013 - board, fuse  
In cab at front right in front of control console



Unscrew hatch cover



- X602** = Connector, CAN high upstream of A004 - ECU, control console
- X603** = Connector, CAN low upstream of A004 - ECU, control console  
In cab at front right in front of control console

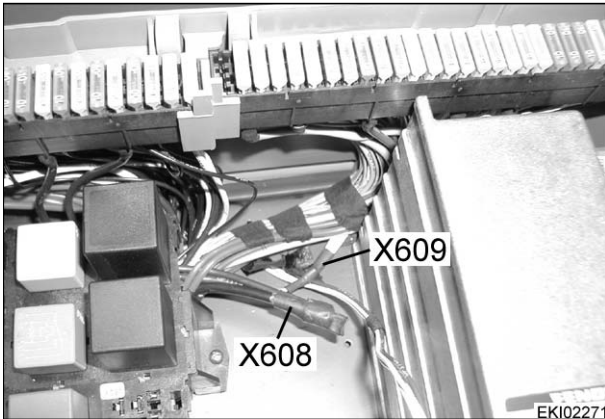


Unscrew hatch cover

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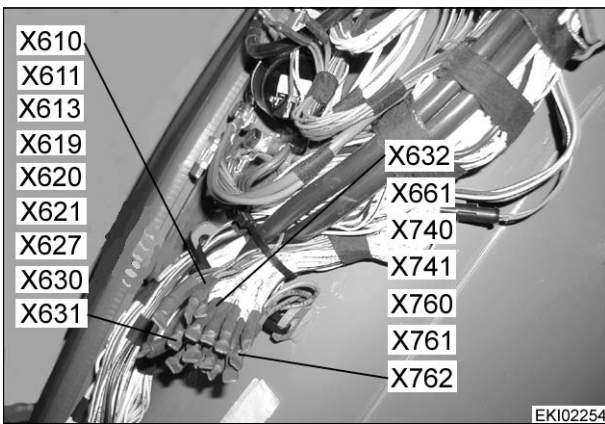
<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - X</b>	<b>D</b>
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- X608** = Connector, +UB15
- X609** = Connector, +UB58 lighting  
In cab on right mudguard



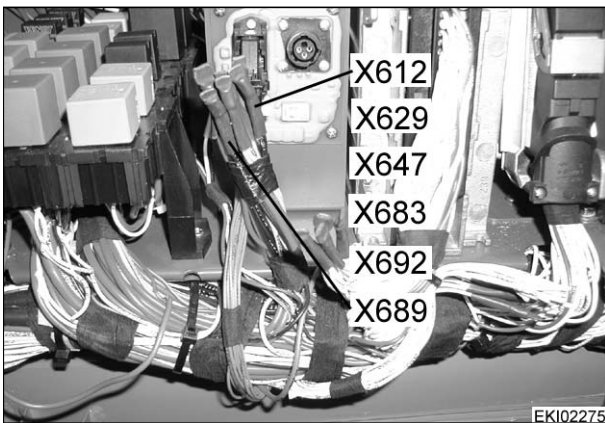
Remove panel



- X610** = Connector, E007 - right indicator
- X611** = Connector, E008 - left indicator  
In cab at front right in front of control console



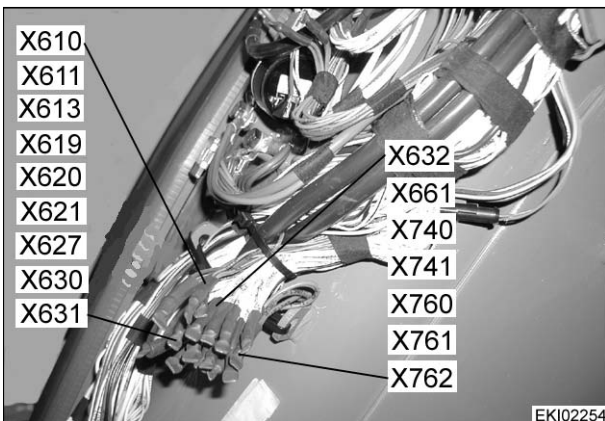
Unscrew hatch cover



- X612** = Connector, +UB15, M002/M004 - wiper motor, E021/E022 - rotating beacon  
In cab on right mudguard



Remove panel



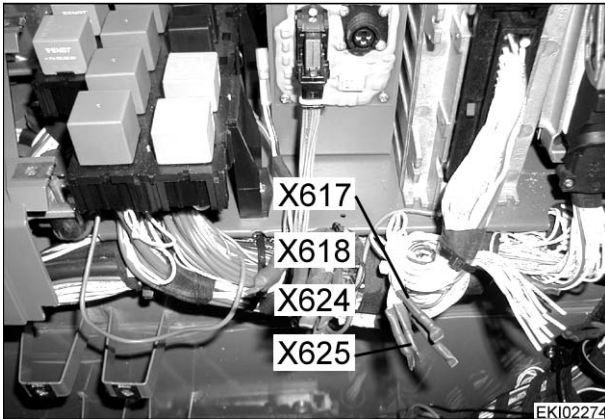
- X613** = Connector, earth, sensor system, A002 - ECU, enhanced control  
In cab at front right in front of control console



Unscrew hatch cover

Date	Version	Page	Electrical / electronic components - X	Capitel	Index	Docu-No.
08/2000	a	24/34			0000	D

<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - X</b>	<b>D</b>
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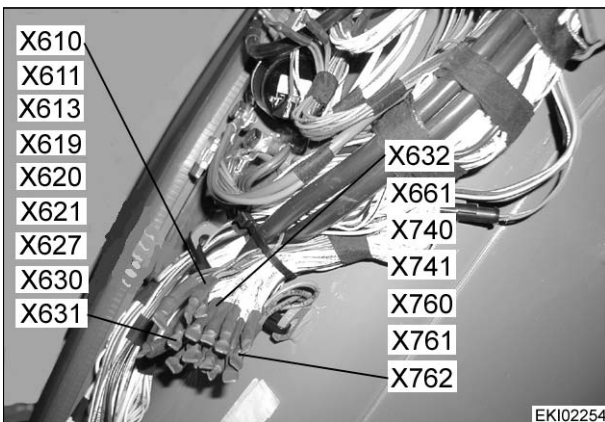


**X617** = Connector, G-bus, CAN low

**X618** = Connector, G-bus, CAN high  
In cab on right mudguard



Remove panel



**X619** = Connector, earth/electronics / 3

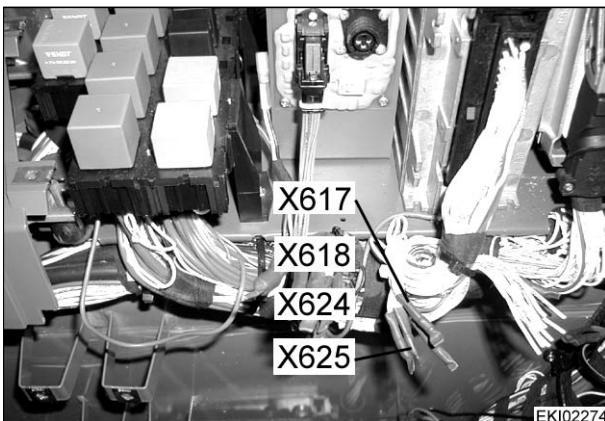
**X620** = Connector, earth/electronics / 2

**X621** = Connector, earth/electronics / 1

In cab at front right in front of control console



Unscrew hatch cover



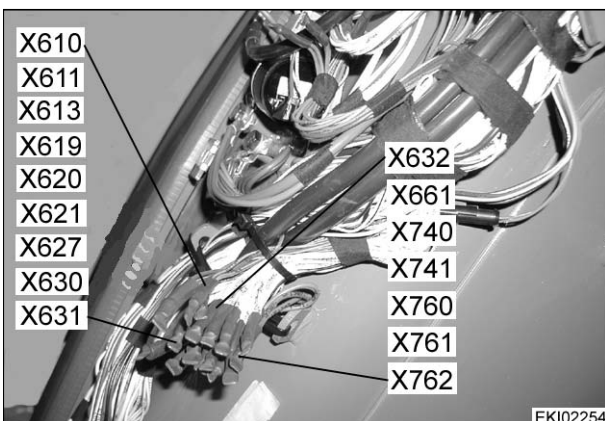
**X624** = Connector, K-bus, CAN high

**X625** = Connector, K-bus, CAN low

In cab on right mudguard



Remove panel



**X627** = Connector, earth

At front right in cab

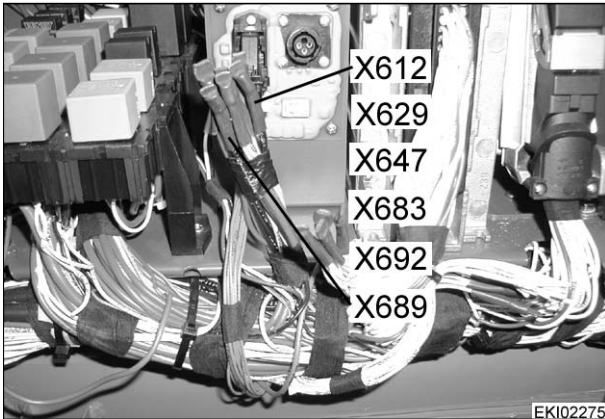


Remove hatch cover in front of control console

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08/2000	a	25/34			0000	D



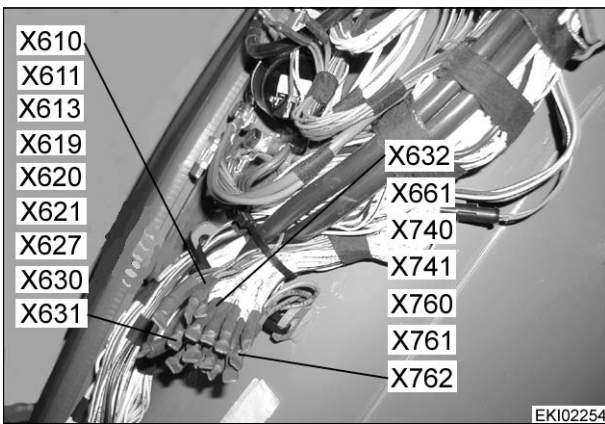
<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - X</b>	<b>D</b>
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**X629** = Connector, +UB30, A002 - ECU, enhanced control  
 In cab on right mudguard



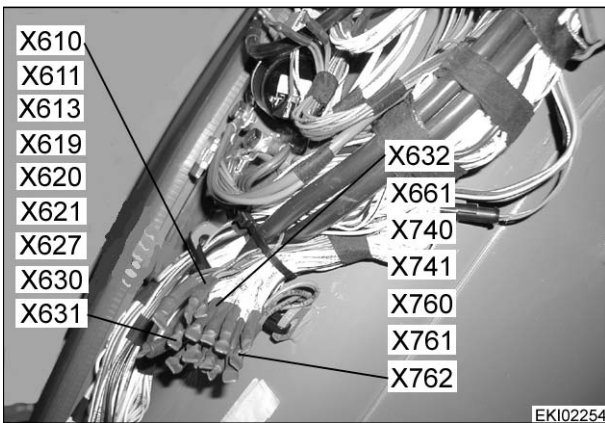
Remove panel



**X630** = Connector, brake light  
 In cab at front right in front of control console



Unscrew hatch cover

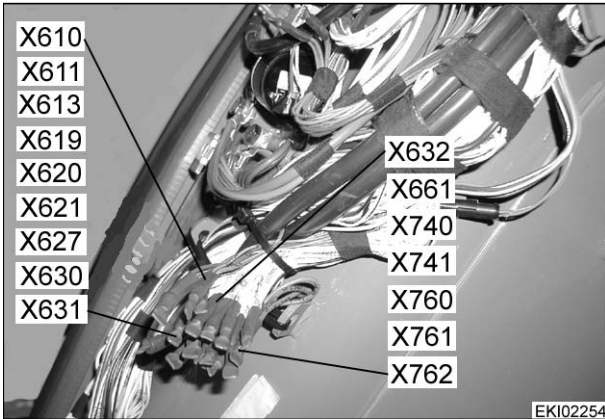


**X631** = Connector, "Rear PTO on" LED  
 In cab at front right in front of control console



Unscrew hatch cover

<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - X</b>	<b>D</b>
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- X632** = Connector, S027 - switch, raise rear power lift, right
- Connector, S028 - switch, lower rear power lift, right
- Connector, S029 - switch, raise rear power lift, left
- Connector, S030 - switch, lower rear power lift, left
- In cab at front right in front of control console



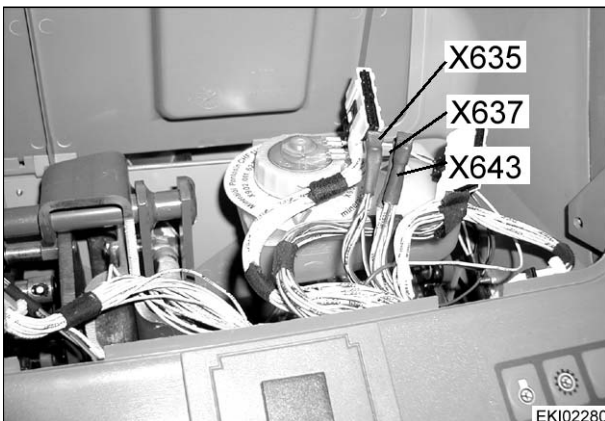
Unscrew hatch cover



- X633** = Connector, K-bus, CAN high
- X634** = Connector, K-bus, CAN low
- In cab on right mudguard



Remove panel



- X635** = Connector, analog earth, A007 - display unit
- At top of steering column

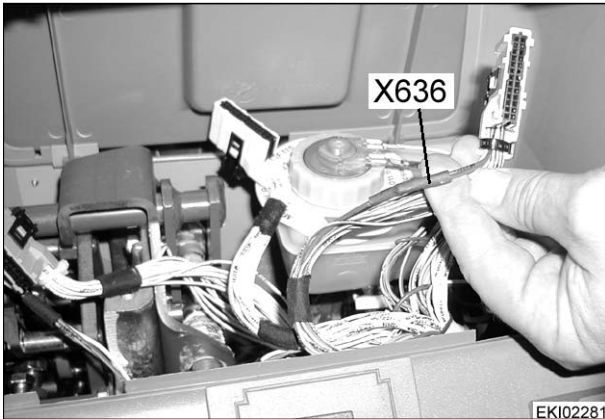


Remove instrument panel



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08/2000	a	27/34			0000	D

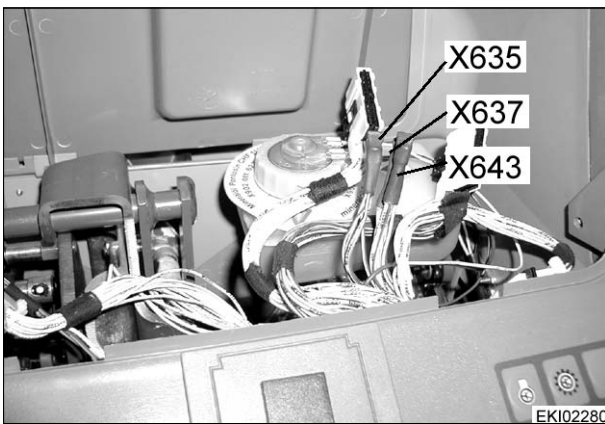
<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - X</b></p>	<p><b>D</b></p>
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**X636** = Connector, +UB30, A007 - display unit  
 Top front of steering column



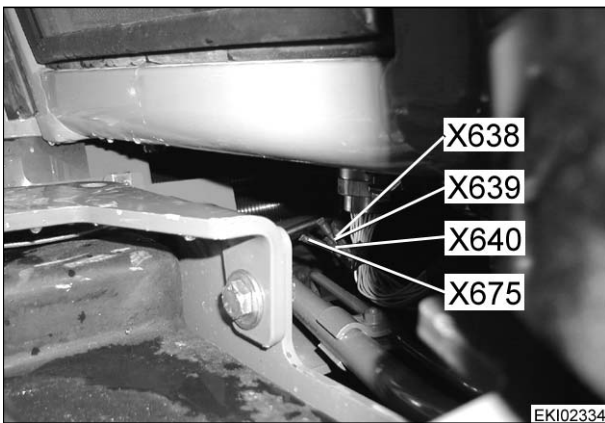
Remove A007 - display unit



**X637** = Connector, +UB 15, A007 - display unit  
 At top of steering column



Remove instrument panel



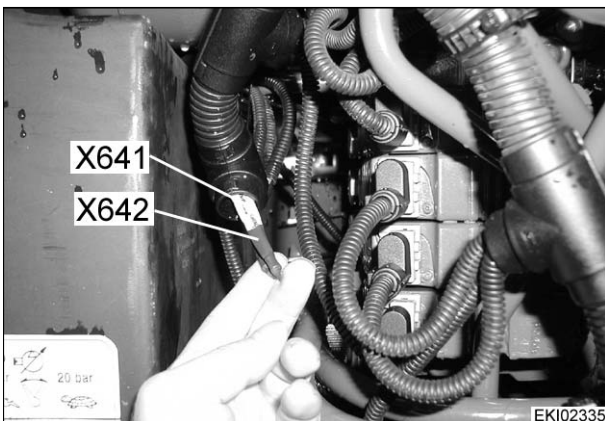
**X638** = Connector, earth, S025/S026 - switch (steering oil pressure)

**X639** = Connector, +UB, S025/S026 - switch (steering oil pressure)

**X640** = Connector, +UB, Y015-Y019 - valves  
 Cab, right entrance step



Remove footplate



**X641** = Connector, G-bus, CAN high (Y015-Y019 - valves)

**X642** = Connector, G-bus, CAN low (Y015-Y019 - valves)

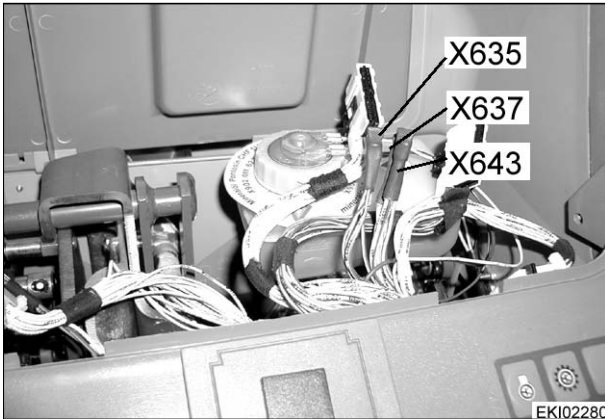
Right side of tractor, in region of ZSB - central control block



Remove flap

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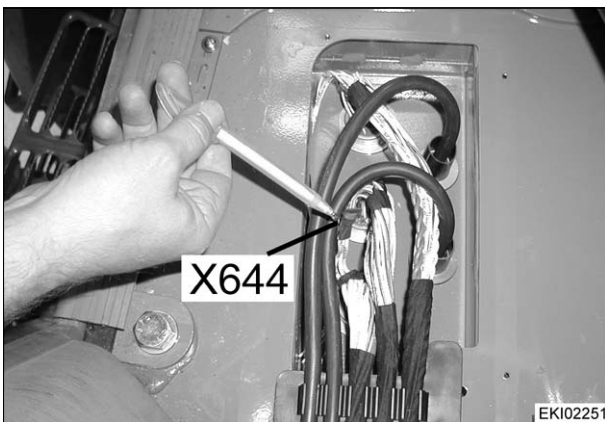
<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - X</b>	<b>D</b>
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**X643** = Connector, earth, A007 - display unit  
At top of steering column



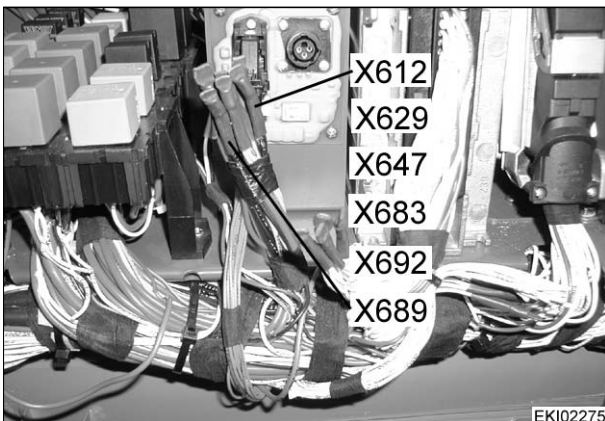
Remove instrument panel



**X644** = Connector, +UB 58 at front, S002 - switch, ignition  
Bottom left in footwell



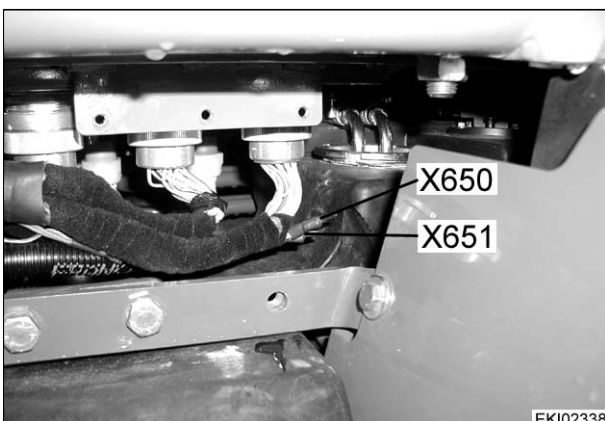
Raise floor mat and unscrew cover



**X647** = Connector, +UB15, EPC-DA switchover  
In cab on right mudguard



Remove panel



**X650** = Connector, E001/E002 - headlights  
(56b dipped headlights)

**X651** = Connector, E001/E002 - headlights  
(56a main beam)

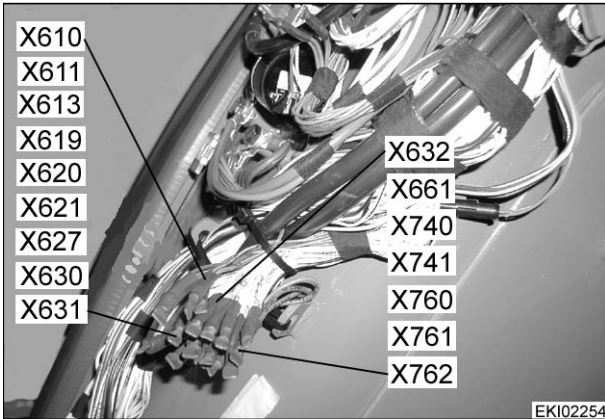


Cab, left step

Remove cover panel

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08/2000	a	29/34			0000	D

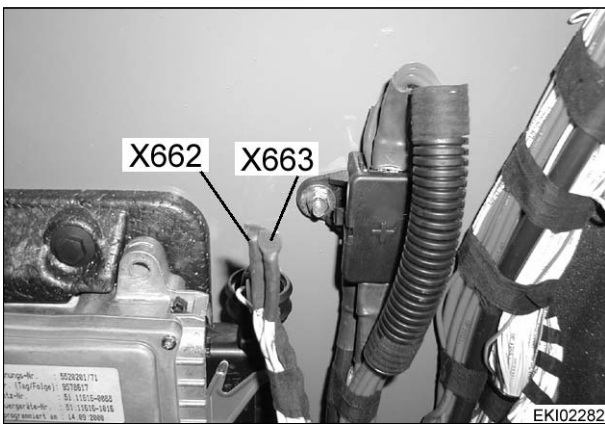
<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - X</b>	<b>D</b>
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**X661** = Connector, earth/electronics / 4  
In cab at front right in front of control console



Unscrew hatch cover

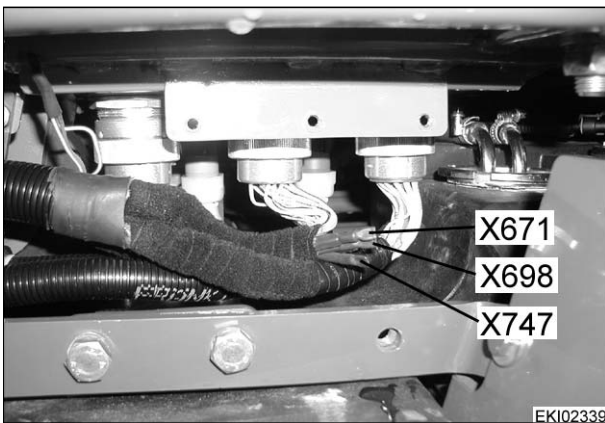


**X662** = Connector, G-bus, CAN low (A021 - ECU, EDC; Y015-Y016 - valves; A009 - actuator unit)

**X663** = Connector, G-bus, CAN high (A021 - ECU, EDC; Y015-Y016 - valves; A009 - actuator unit)  
Right mudguard



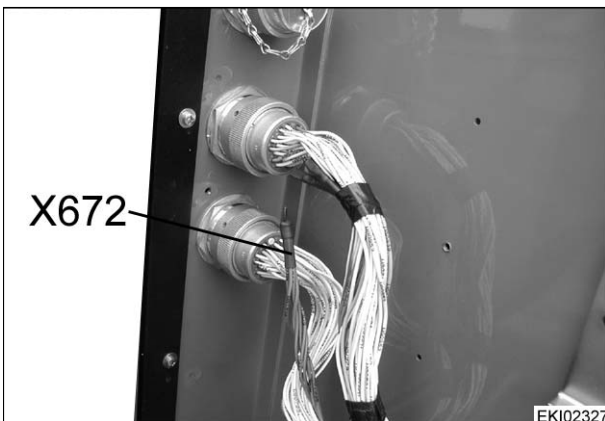
Remove panel



**X671** = Connector, earth, A002 - ECU, enhanced control  
Cab, left step



Remove cover panel



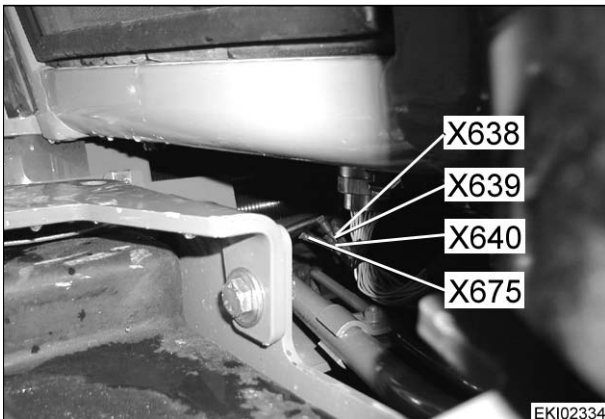
**X672** = Connector, earth, sensor system, A002 - ECU, enhanced control  
Rear of tractor, right side



Remove panel

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08/2000	a	30/34			0000	D

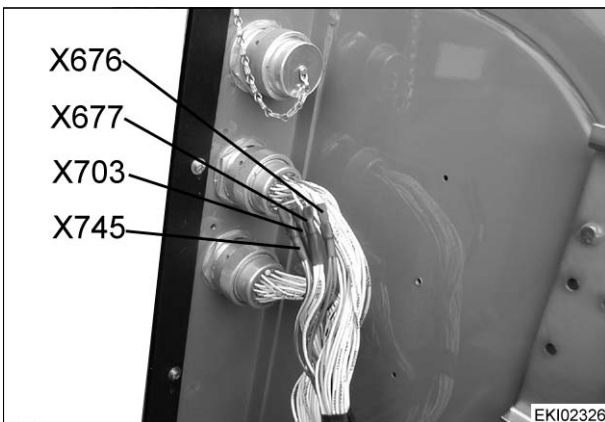
<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - X</b>	<b>D</b>
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**X675** = Connector, earth, Y021/Y022 - valve (raise/lower suspension)  
Cab, right entrance step



Remove footplate



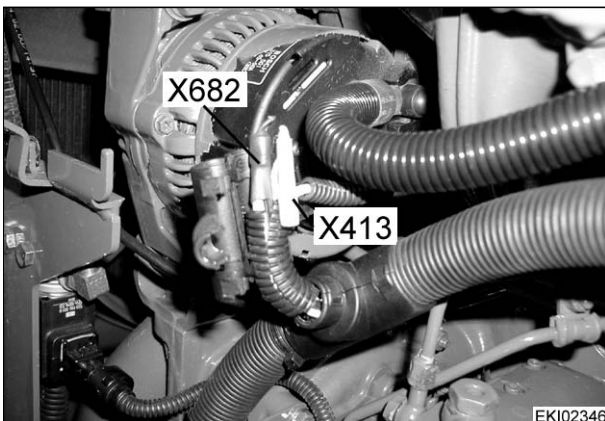
**X676** = Connector, earth, B031/B032 - sensor, draft-sensing pin

**X677** = Connector, +UB, B031/B032 - sensor, draft-sensing pin

Rear of tractor, right side



Remove panel

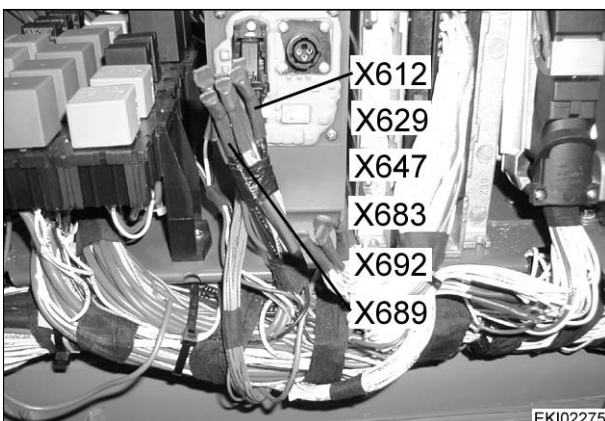


**X682** = Connector, R001 - heater plug

Front left on engine



Open side of bonnet, remove T-piece from cable loom



**X683** = UB 8.5 V for B012 - sensor, engine oil pressure and B019 - sensor, compressed-air volume

In cab on right mudguard

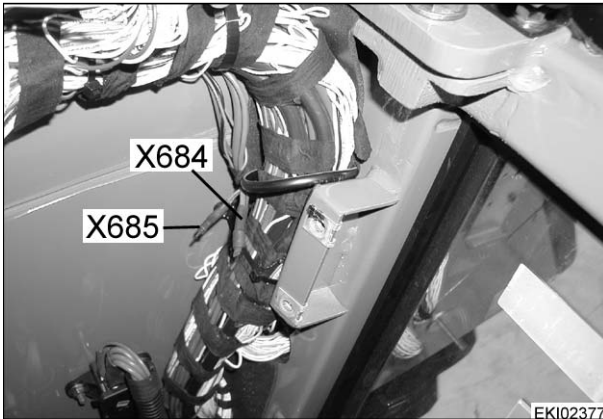


Remove panel

Date	Version	Page	Electrical / electronic components - X	Capitel	Index	Docu-No.
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<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - X</b>	<b>D</b>
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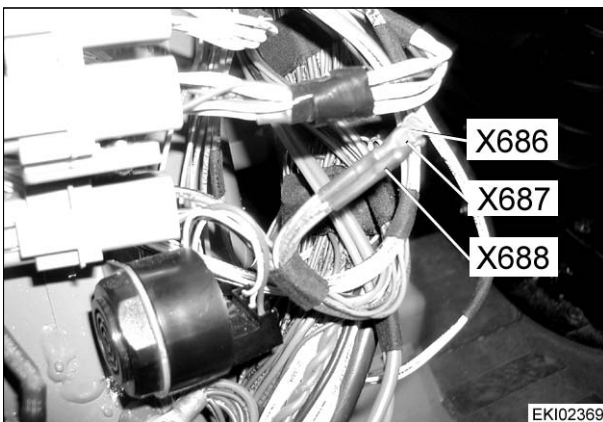
**X684** = Connector, LBS (earth)

**X685** = Connector, UB 30/251  
Right rear mudguard



Remove panels

EKI02377



**X686** = Connector, LBS, Can low

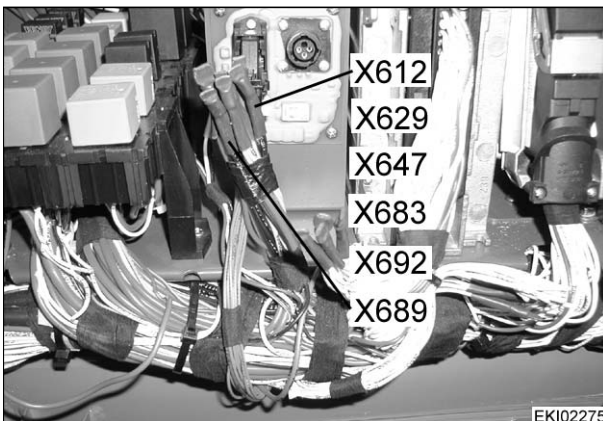
**X687** = Connector, LBS, Can high

**X688** = Connector, LBS, digital earth  
In cab on right mudguard at front



Remove hatch cover from control console  
at front

EKI02369



**X689** = Connector, +UB15, LBS - front

In cab on right mudguard



Remove panel

EKI02275



**X691** = Connector, analog earth, A007 - display  
unit

Left side of tractor

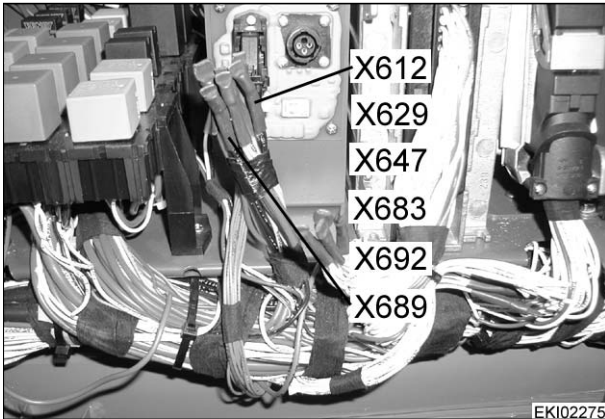


Remove panel

EKI02348

Date	Version	Page	Electrical / electronic components - X	Capitel	Index	Docu-No.
08/2000	a	32/34			0000	D

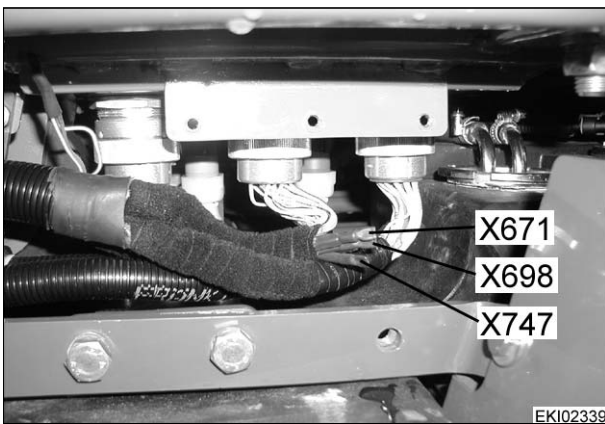
<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - X</b></p>	<p><b>D</b></p>
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**X692** = Connector, UB 30, EDC control unit  
 In cab on right mudguard



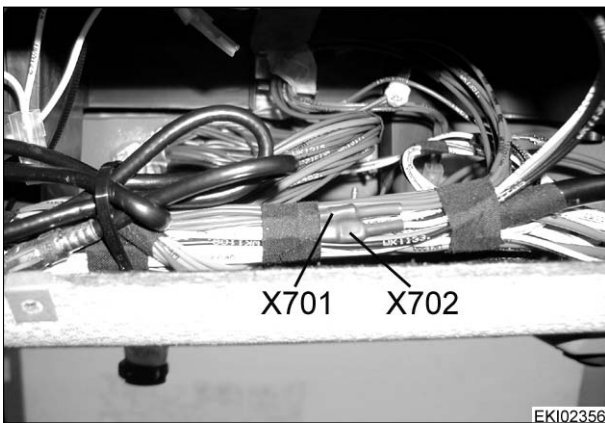
Remove panels



**X698** = Connector, earth, A007 - display unit  
 Cab, left step



Remove cover panel

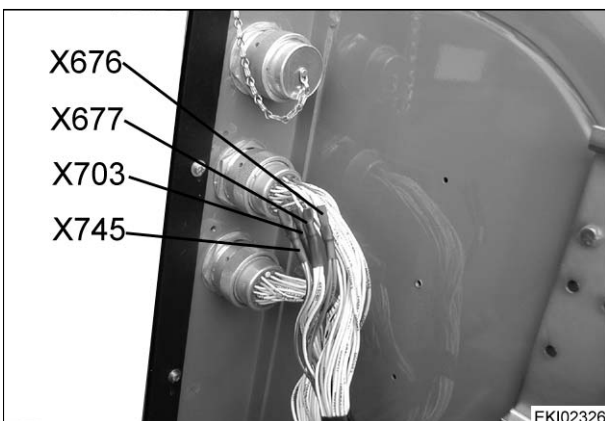


**X701** = Connector, +UB, heated mirror

**X702** = Connector, earth, heated mirror  
 At top right in cab



Remove radio housing blanking plate



**X703** = Connector; earth; B034 - sensor, fuel  
 Rear of tractor, right side



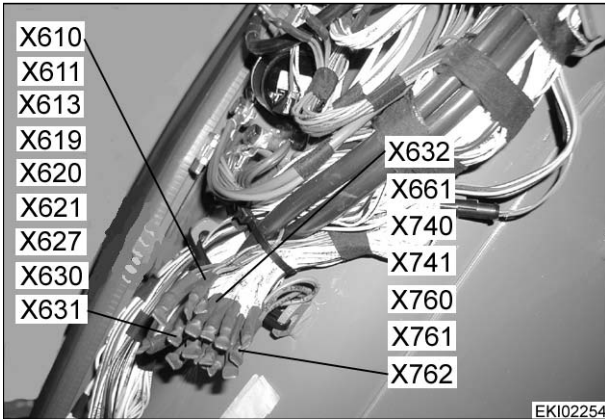
Remove panel



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<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - X</b>	<b>D</b>
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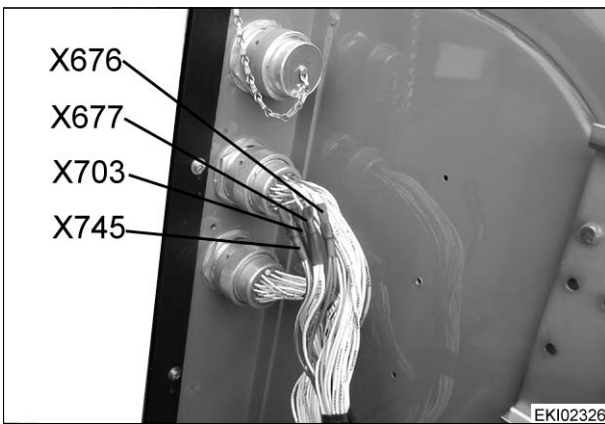


**X740** = Connector, earth, sensor system 1, A004 - ECU, control console

**X741** = Connector, earth, sensor system 2, A004 - ECU, control console  
In cab at front right in front of control console



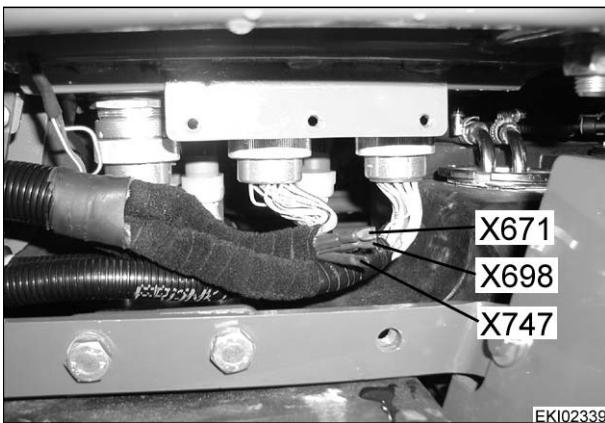
Unscrew hatch cover



**X745** = Connector, transmission, sensor system to A004 - ECU, control console (contact 1)  
Rear of tractor, right side



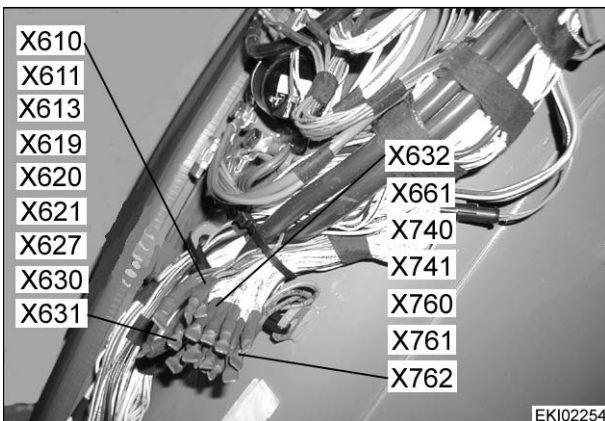
Remove panel



**X747** = Connector, engine, sensor system to A004 - ECU, control console  
Cab, left step



Remove cover panel



**X760** = Connector, Y014 - valve, raise suspension

**X761** = Connector, Y013 - valve, lower suspension

**X762** = Connector, Y012 - valve, charge suspension

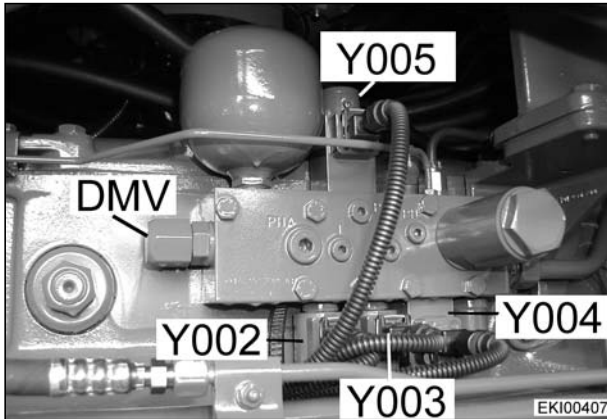
In cab at front right in front of control console



Unscrew hatch cover

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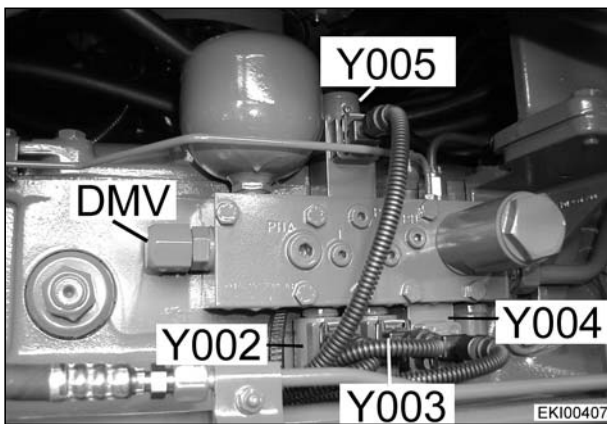
<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - Y</b></p>	<p><b>D</b></p>
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**Y002** = Valve, speed range 1  
**Y003** = Valve, speed range 2  
 Behind rear right wheel on valve unit



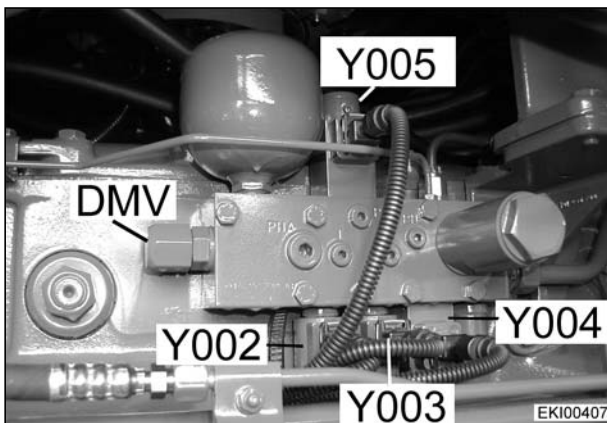
Unscrew rear right wheel and panel



**Y004** = Valve, transmission neutral / turboclutch valve  
 At right of transmission at bottom of valve unit



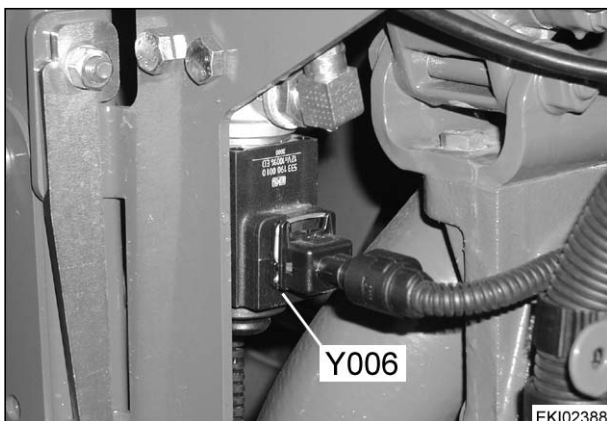
Unscrew rear right wheel and panel



**Y005** = Valve, speed governor  
 Behind rear right wheel on valve unit



Unscrew rear right wheel and panel



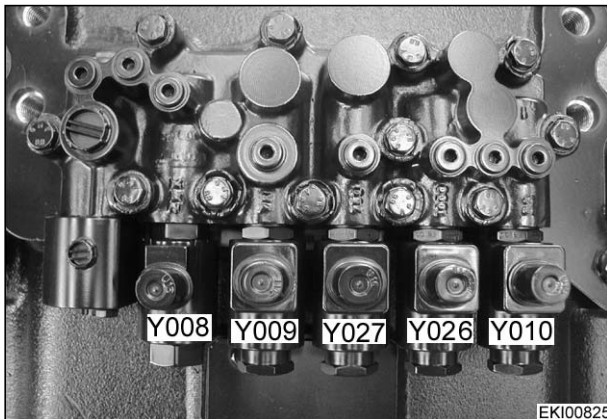
**Y006** = Valve, exhaust brake  
 At front left on radiator



Remove left side of bonnet

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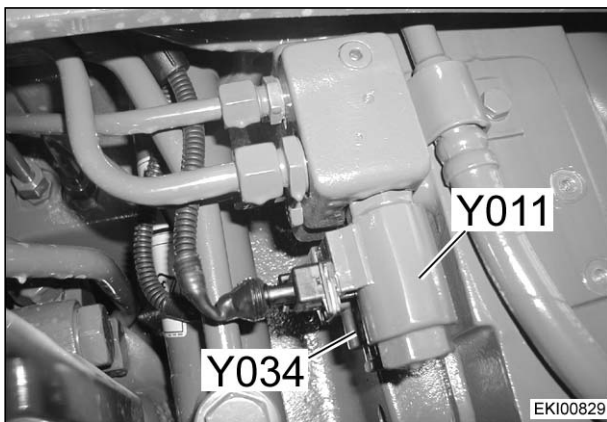
<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - Y</b></p>	<p><b>D</b></p>
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- Y008** = Valve, rear PTO
- Y009** = Valve, 4WD
- Y010** = Valve, diff. lock  
On rear-axle housing



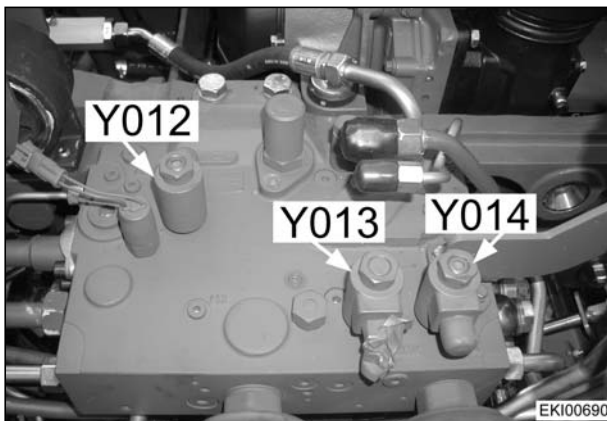
Raise cab at rear



- Y011** = Valve, front PTO  
On front PTO gearbox at left



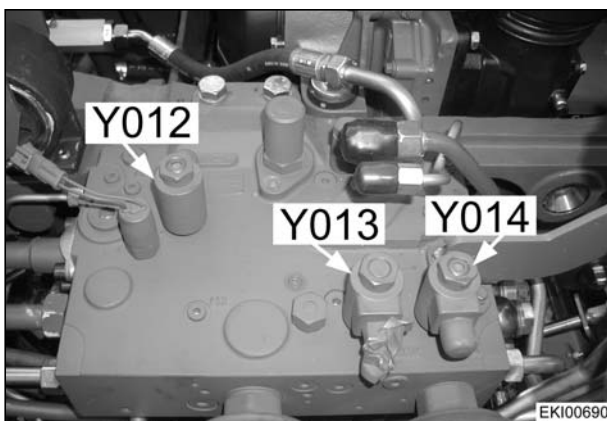
Unscrew cover panel



- Y012 / MVL** = Valve, charge suspension  
= "Charge valve" for suspension and oil preheater  
At right entrance step, on top of central control block in bore 2011



Remove footplate and cover



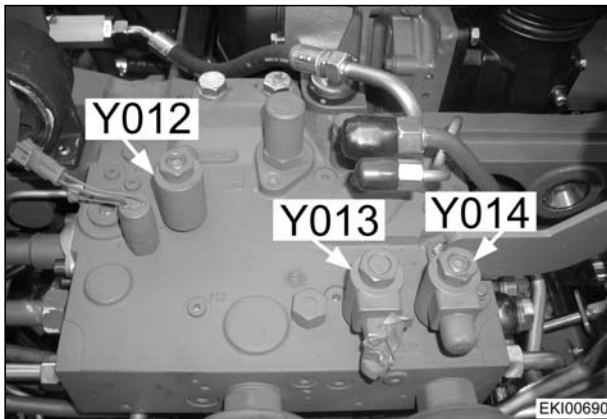
- Y013 / SV1** = Valve, lower suspension  
= Identifying feature of Y013: valve body yellow-chromated and without counterbore  
At right entrance step, on top of central control block in bore 2002



Remove footplate and cover

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<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - Y</b></p>	<p><b>D</b></p>
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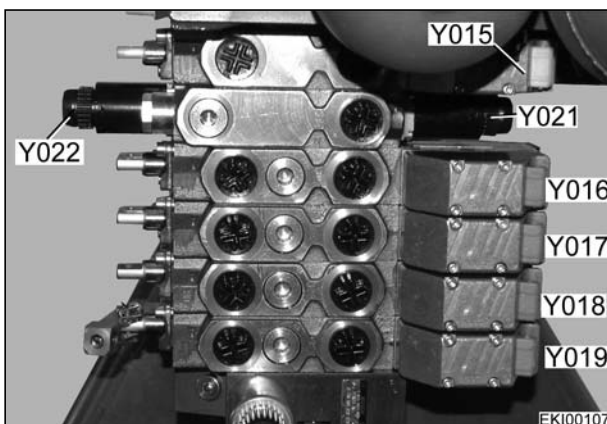


**Y014 / SV2** = Valve, "Raise suspension" solenoid valve

= Identifying feature of Y014: valve body white-chromated and with counterbore  
 At right entrance step, on top of central control block in bore 2001



Remove footplate and cover

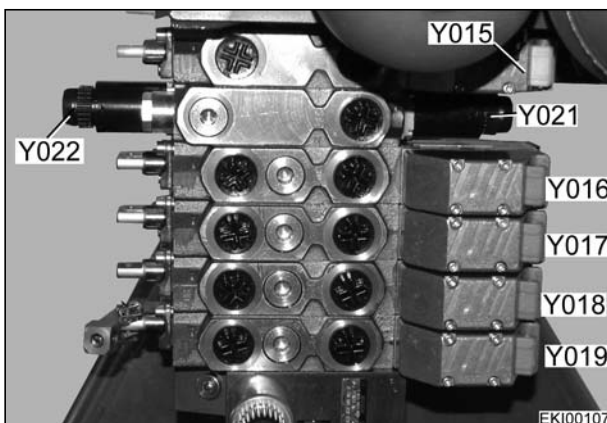


**Y015** = Valve 1

= Control valve SB 23 LS EHS  
 1st control valve on underside of central control block  
 Note: EPC control valve is located between Y015 and Y016.



Unscrew right step  
 Pull right auxiliary tank outwards

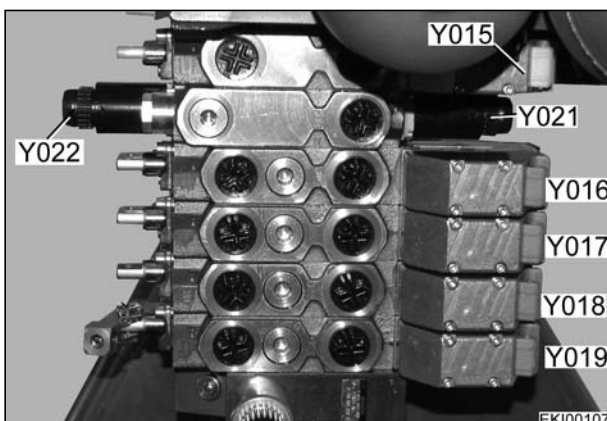


**Y016** = Valve 2

= Control valve SB 23 LS EHS  
 2nd control valve on underside of central control block  
 Note: EPC control valve is located between Y015 and Y016.



Unscrew right step  
 Pull right auxiliary tank outwards



**Y017 or Y018 or Y019** = Valve 3, valve 4, valve 5

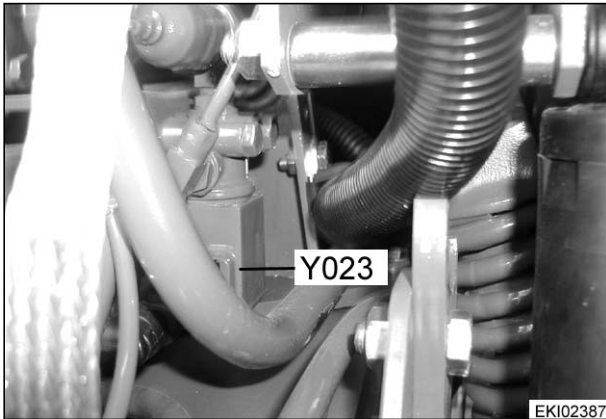
= Relevant control valve SB 23 LS EHR for front power lift or for connections, depending on tractor's equipment level  
 1st control valve on underside of central control block



Unscrew right step  
 Pull right auxiliary tank outwards

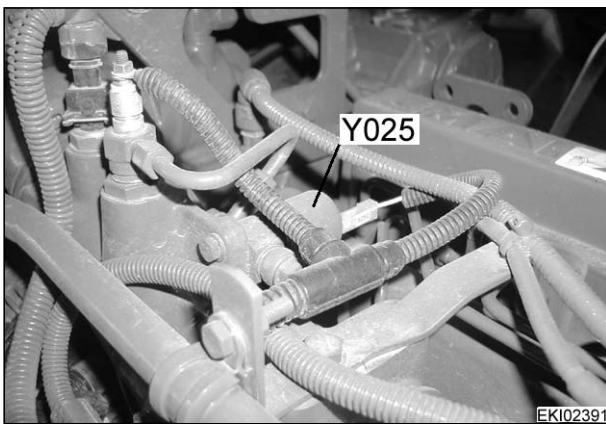
Date	Version	Page	Capitel	Index	Docu-No.
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<p><b>Fav 900</b></p>	<p>Tractor / General system  <b>Electrical / electronic components - Y</b></p>	<p><b>D</b></p>
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**Y023** = Valve, compressed-air advance control system

At rear right above axle drive

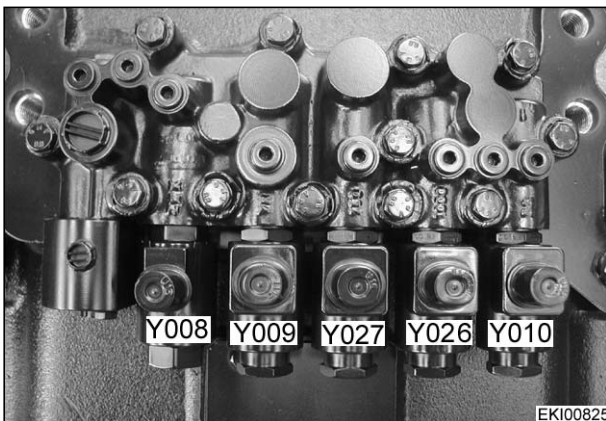


**Y025** = Valve, cold-start aid

At front on intake pipe



Open left side of bonnet



**Y026** = Valve, rear PTO speed 1

**Y027** = Valve, rear PTO speed 2

On rear-axle housing



Raise cab at rear



**Y032 / MVSt** = Valve, neutral (valves)

= Electrically activated pressure-relief valve for 22 bar control pressure; non-energised = no control pressure, EHS valves non-operational.

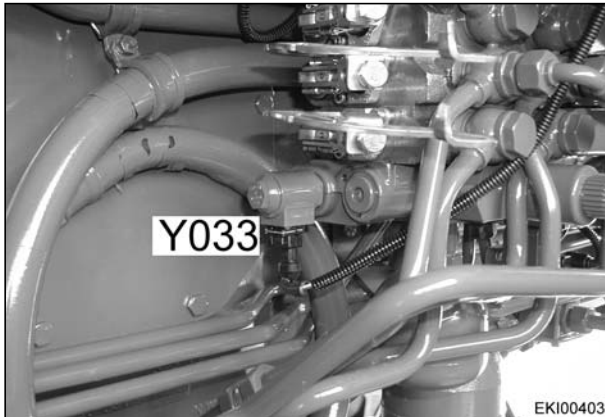
At right entrance step, in end plate EP of valve array under central control block ZSB.



Unscrew right step. Pull right auxiliary tank outwards

Date	Version	Page	Electrical / electronic components - Y	Capitel	Index	Docu-No.
21.9.2001	a	4/5			0000	D

<b>Fav 900</b>	<b>Tractor / General system</b> <b>Electrical / electronic components - Y</b>	<b>D</b>
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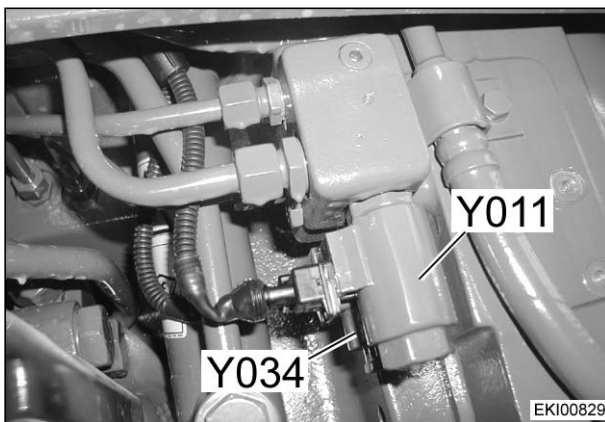
**Y033 MVV** = Valve, flush

= Opens flow from P via aperture 5 to tank.  
In end plate EP



Unscrew right step. Pull right auxiliary tank outwards

EKI00403



**Y034** = Valve, release brake

On front PTO gearbox at left

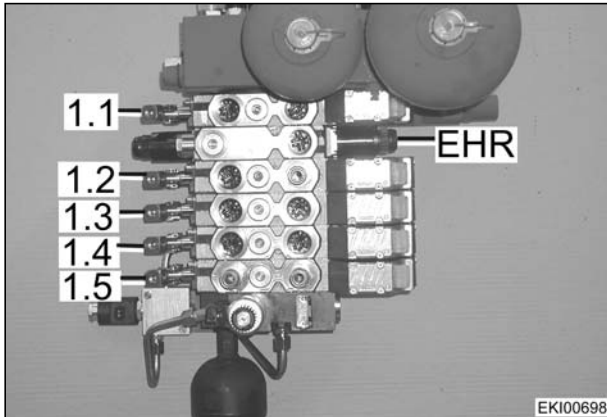


Unscrew cover panel

EKI00829

Date	Version	Page	Electrical / electronic components - Y	Capitel	Index	Docu-No.
21.9.2001	<b>a</b>	5/5		<b>0000</b>	<b>D</b>	<b>000038</b>

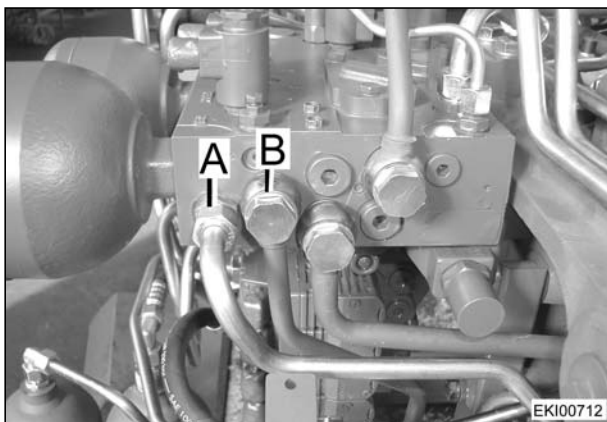
<b>Fav 900</b>	<b>Tractor / General system Hydraulic components</b>	<b>D</b>
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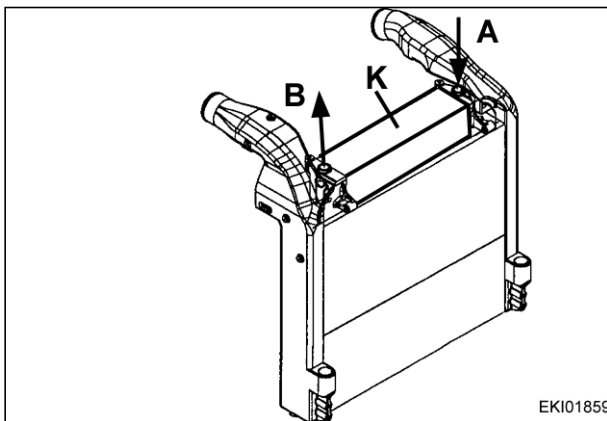
**1.1, 1.2, 1.3, 1.4, 1.5, = Control valves SB 23 EHS**  
 = Relevant control valve for front power lift or for connections, depending on tractor's equipment level

- 1.1 = 1. Valve
- 1.2 = 2. Valve
- 1.3 = 3. Valve
- 1.4 = 4. Control valve
- 1.5 = 5. Control valve

**Note:**  
**EPC control valve is between 1.1 and 1.2**



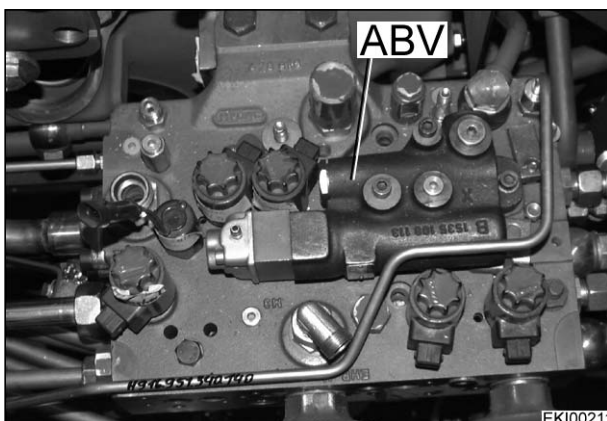
**Connection A = Raise suspension**  
 Right side of ZSB



**A on K = Hydraulic oil cooler inlet**  
 At front under bonnet



Raise bonnet front



**ABV = Hydraulic trailer brake valve**  
 = Optional

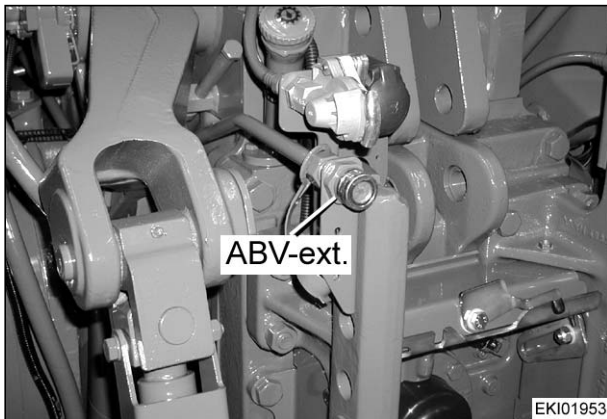


If appropriate, on top of central control block

Date	Version	Page	Hydraulic components	Capitel	Index	Docu-No.
8.12.2000	a	1/23		0000	D	00035



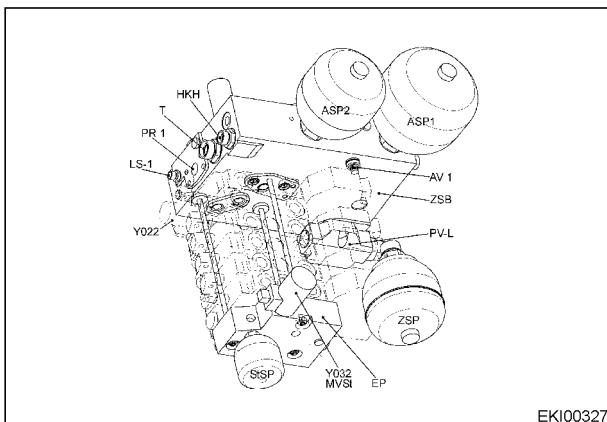
<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Hydraulic components</b></p>	<p><b>D</b></p>
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EKI01953

**ABV-ext.** = Connection for hydraulic trailer brake valve

Rear of tractor



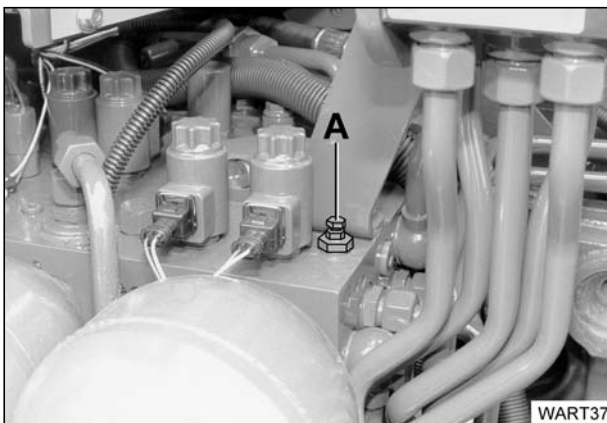
EKI00327

**ASP1** = Accumulator no. 1 with 1.4 l capacity / 50 bar

**ASP2** = Accumulator no. 2 with 0.75 l capacity / 50 bar

= Nitrogen diaphragm accumulator for front suspension, piston side

Fav 700, 900: ASP1 and ASP2 fitted  
Farmer 400: only ASP1 fitted

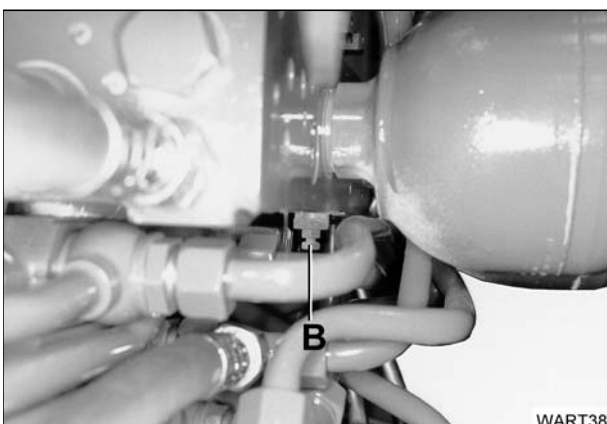


WART37

**AV1** = Shutoff

= Safety system for relieving pressure in front suspension

On top of ZSB



WART38

**AV2** = Shutoff

= Safety system for relieving pressure in front suspension

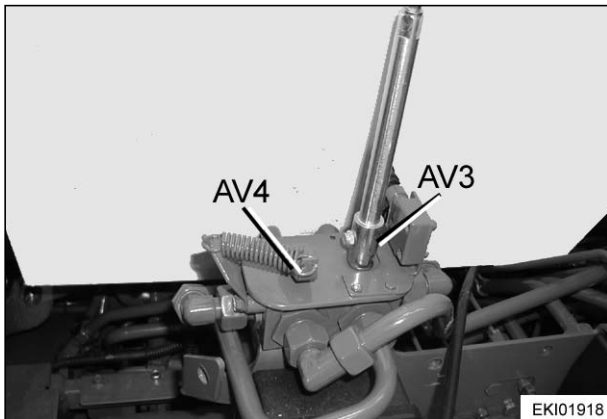
On bottom of ZSB



Date	Version	Page	Hydraulic components	Capitel	Index	Docu-No.
8.12.2000	a	2/23			0000	D



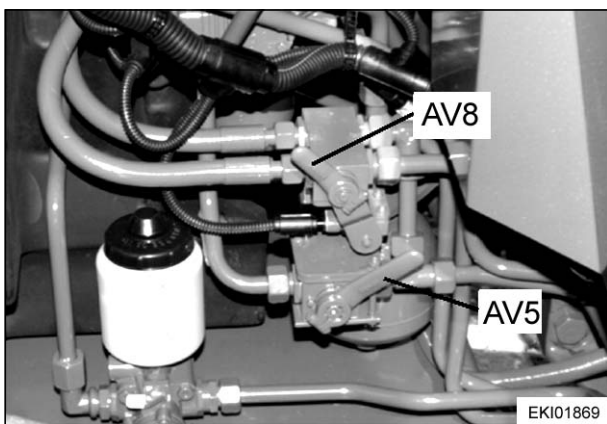
<b>Fav 900</b>	<b>Tractor / General system</b> <b>Hydraulic components</b>	<b>D</b>
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**AV3** = EPC-DA multiway valve  
**AV4** = EPC-DA multiway valve  
 Rear of tractor above rear connections



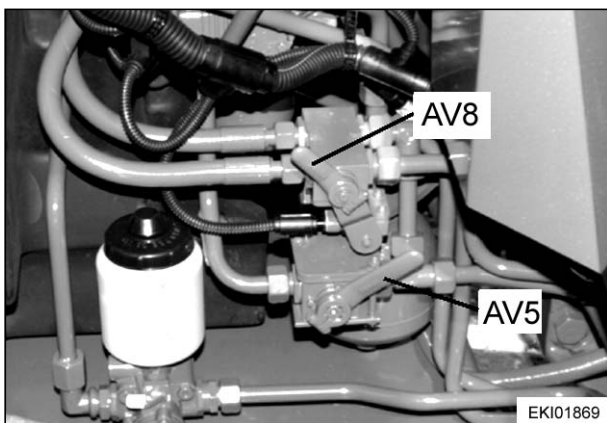
Remove cover panel.



**AV5** = Front power lift EPC-DA multiway valve  
 On right side of tractor - underneath central control block



Open cover panel at right entrance step.



**AV8** = Front power lift stopcock valve  
 On right side of tractor - underneath central control block



Open cover panel at right entrance step.



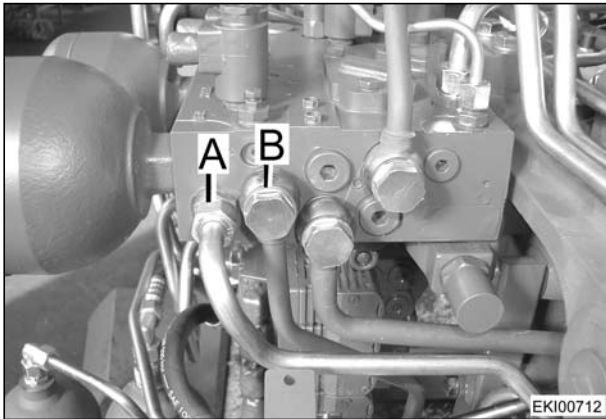
**AVLSt.** = Stopcock to increase control pressure  
 On central control block, right side.



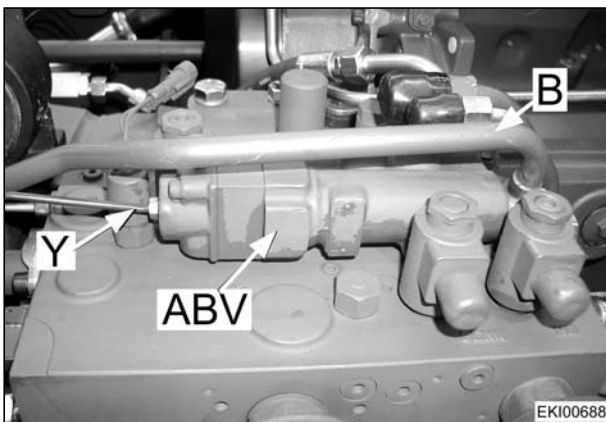
Open cover panel at right entrance step.

Date	Version	Page	Hydraulic components	Capitel	Index	Docu-No.
8.12.2000	a	3/23		0000	D	000035

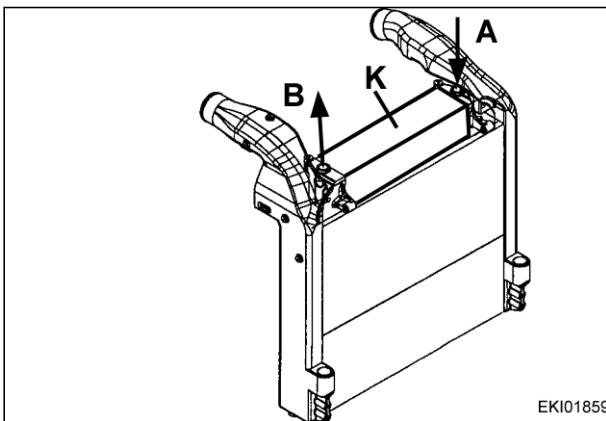
<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Hydraulic components</b></p>	<p><b>D</b></p>
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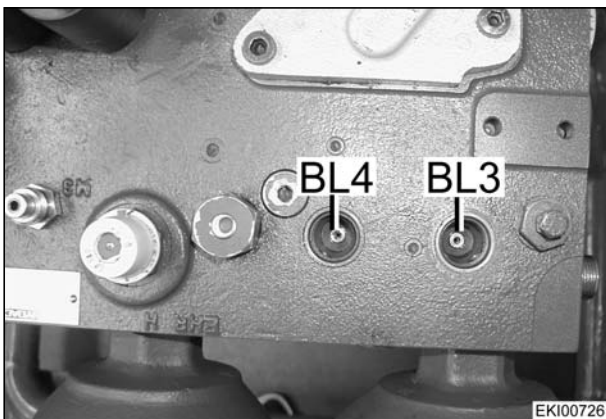
**Connection B** = Lower suspension  
Right side of ZSB



**B on ABV** = Hydr. pipe for hydraulic trailer brake rear connection  
On top of ZSB



**B on K** = Hydraulic oil cooler outlet  
Raise bonnet front



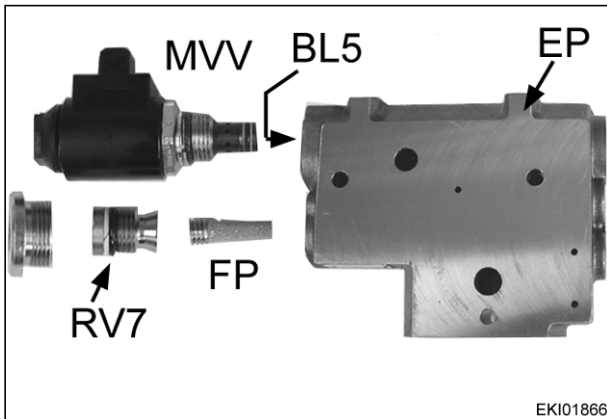
**BL3** = Aperture no. 3, d=1.6  
**BL4** = Aperture no. 4, d=1.6  
On top of ZSB



In bore of SV2, SV1

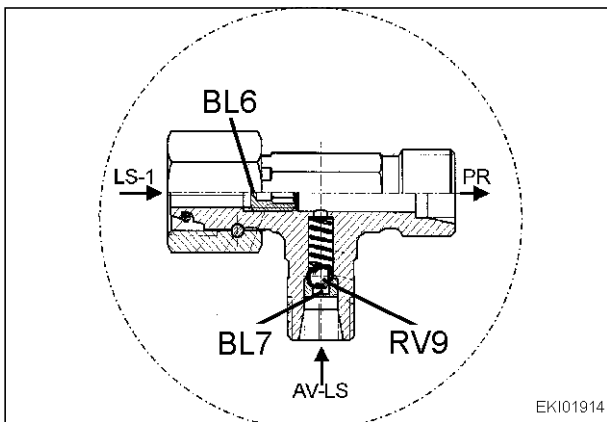
Date	Version	Page	Capitel	Index	Docu-No.
8.12.2000	a	4/23	<b>0000</b>	<b>D</b>	<b>000035</b>

<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Hydraulic components</b></p>	<p><b>D</b></p>
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EKI01866

**BL5** = Aperture no. 5, d=1.5mm - oil preheater  
In end plate

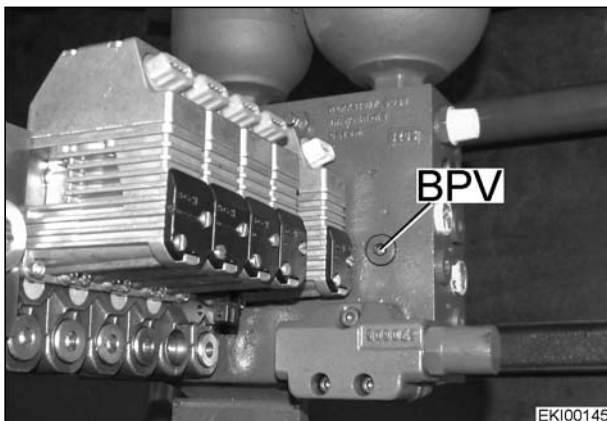


EKI01914

**BL6** = Aperture no. 6, d=0.9mm in LS system  
**BL7** = Aperture no. 7, d=0.8mm to increase control pressure

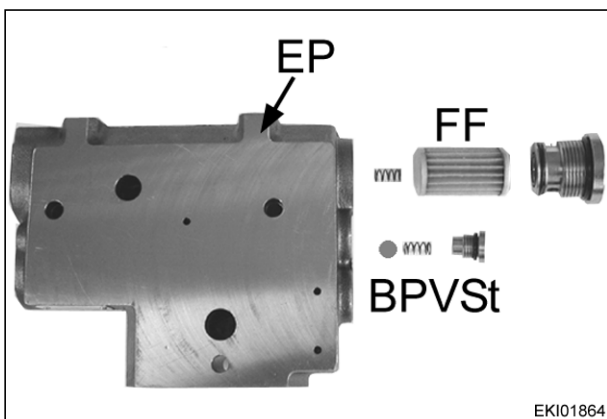
LS-1 connection on central control block (ZSB) - left side.

Pivot cover at right entrance step out of way.



EKI00145

**BPV** = Radiator bypass valve  
On bottom of ZSB

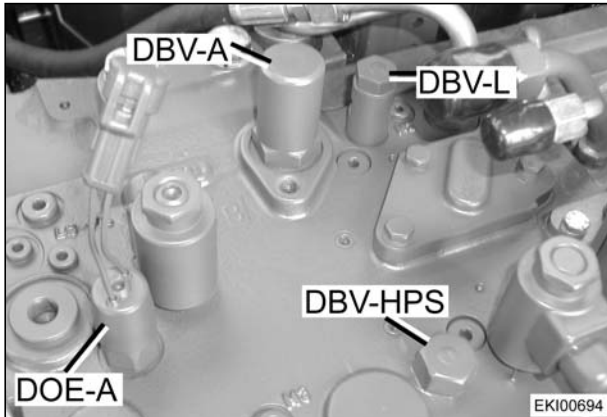


EKI01864

**BPVSt** = Bypass valve on microfilter  
In end plate

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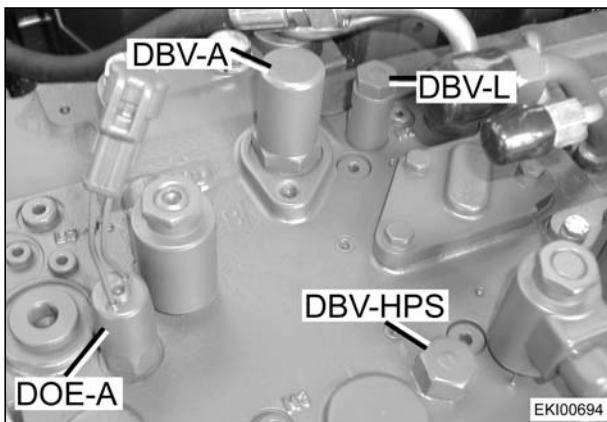
<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Hydraulic components</b></p>	<p><b>D</b></p>
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**DBV-A** = 230 bar pressure-relief valve  
= Safety valve for LS pump

**Note:**  
**Not used for setting working pressure**

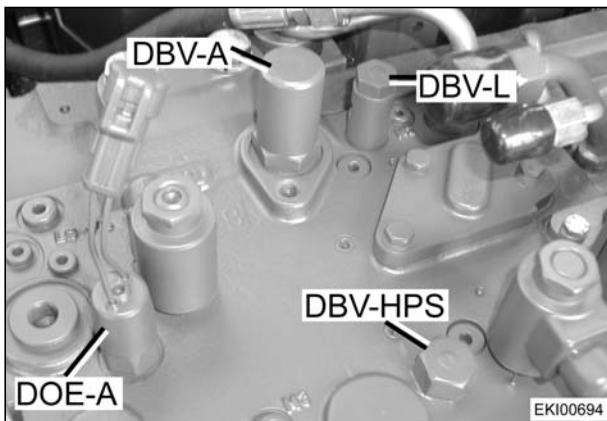
On top of ZSB



**DBV-HPS** = 250 bar pressure-relief valve  
= Safety and pressure-relief valve for suspension

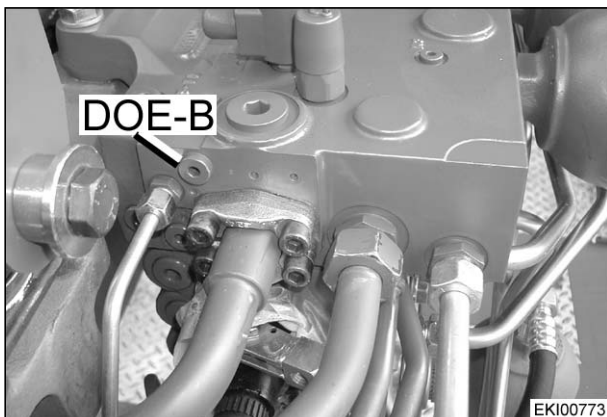
**DBV-L** = 180 bar pressure-relief valve  
= To relieve pressure on auxiliary pump

On top of ZSB



**DOE-A** = Pressure-operated switch 8 bar  
= LS pump monitor (earlier version was 25 bar)

At right entrance step, on top of central control block ZSB



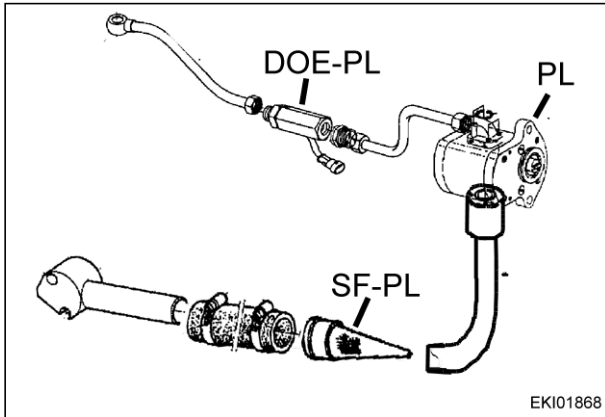
**DOE-B** = Connection bore for "Kickout" pressure-operated switch B022 (only in NA version)

On ZSB



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8.12.2000	<b>a</b>	6/23	<b>0000</b>	<b>D</b>	<b>000035</b>

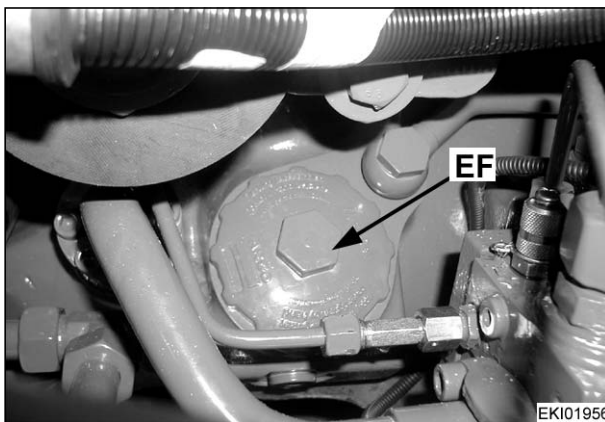
<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Hydraulic components</b></p>	<p><b>D</b></p>
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**DOE-PL** = Flow monitor (auxiliary pump monitor)  
Right side of engine on auxiliary pump



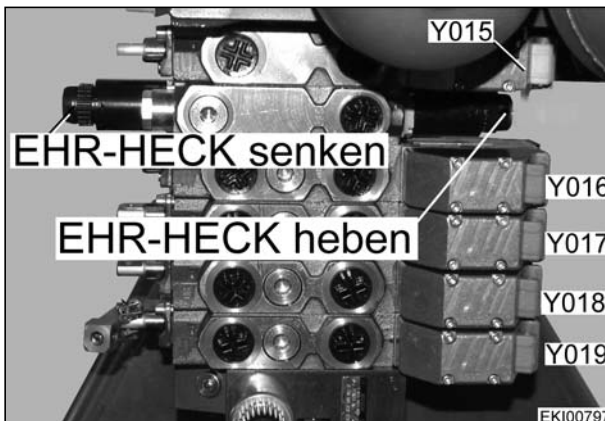
Raise side of bonnet



**EF** = Hyd. tank filler neck cover  
On right side of tractor - in front of cab.



Raise side of bonnet.

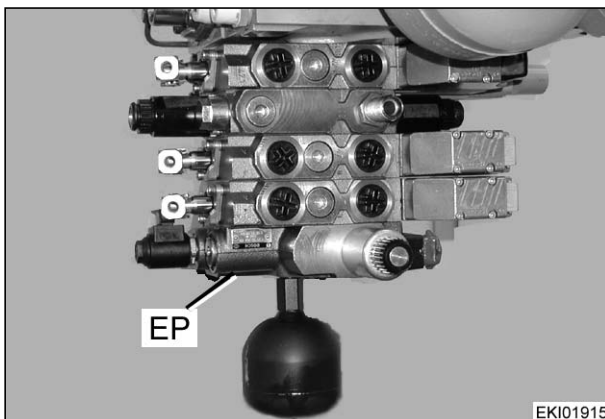


**Lift rear EPC** = "Lift" solenoid valve  
= Rear power lift  
**Lower rear EPC** = "Lower" solenoid valve  
= Rear power lift



At right entrance step, second valve in control valve unit from top after central control block, right or left

Panels



**EP** = End plate with pressure-reducing valve (MVSt.) for 22 bar control pressure.

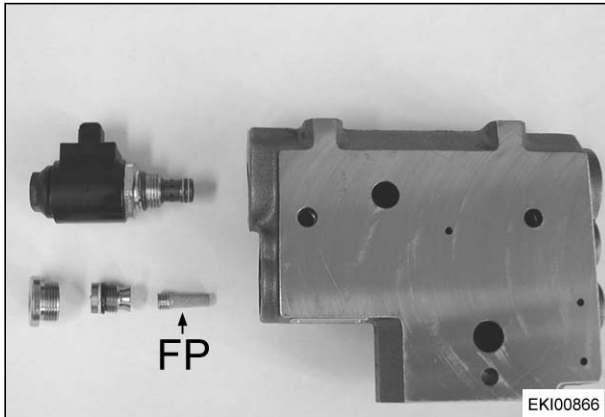


Lowest plate of control valve array

Open cover panel on right entrance step.

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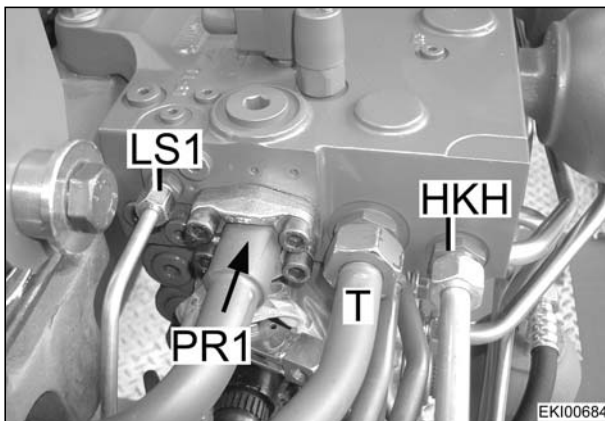
<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Hydraulic components</b></p>	<p><b>D</b></p>
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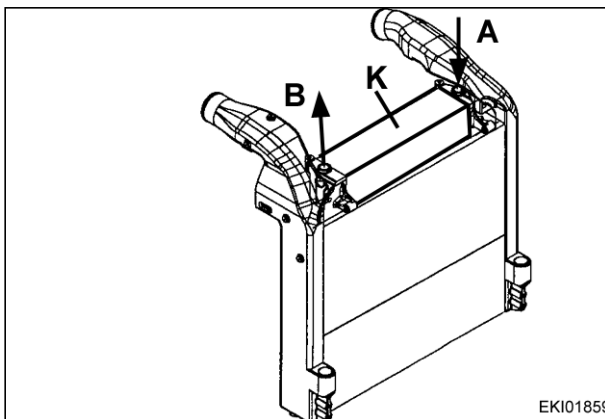
**FP** = Prefilter  
 = Sintered-metal filter in P duct upstream of control pressure valve Y032 (MVSt) in end plate EP  
 On right at entrance step, lowest end plate with integral valves and filters



**FSP** = Front power lift accumulator  
 On right side of tractor on engine oil pan.



**HKH** = Rear power lift tank connection  
 Left side of ZSB

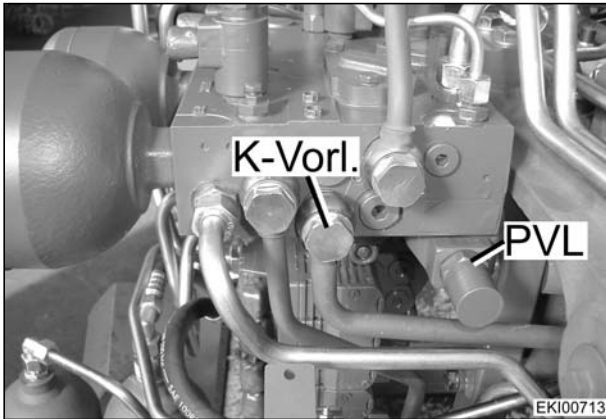


**K** = Hydraulic oil cooler  
 At front under bonnet



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<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Hydraulic components</b></p>	<p><b>D</b></p>
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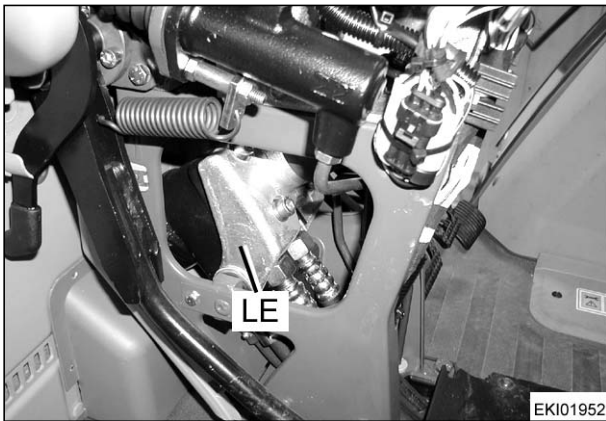
**K-Vorl.** = Auxiliary pump (PL) cooler (K) tank  
Right side of ZSB



**L on LE** = Steering unit for steering cylinder  
(steering to right).  
In steering column.



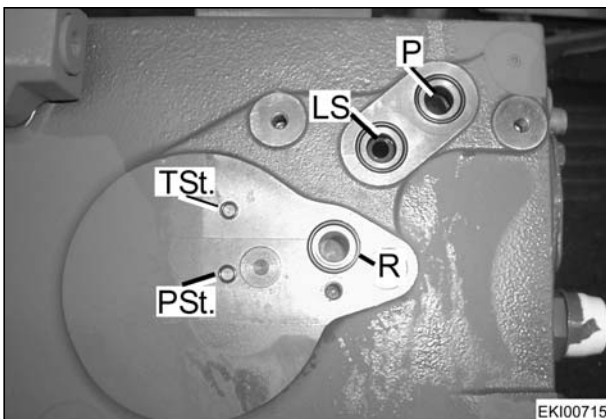
Remove steering column panel.



**LE** = Steering unit.  
In steering column.



Remove steering column panel.



**LS** = Load sensor output to control valves  
On bottom of ZSB



In bore of SV2, SV1

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<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Hydraulic components</b></p>	<p><b>D</b></p>
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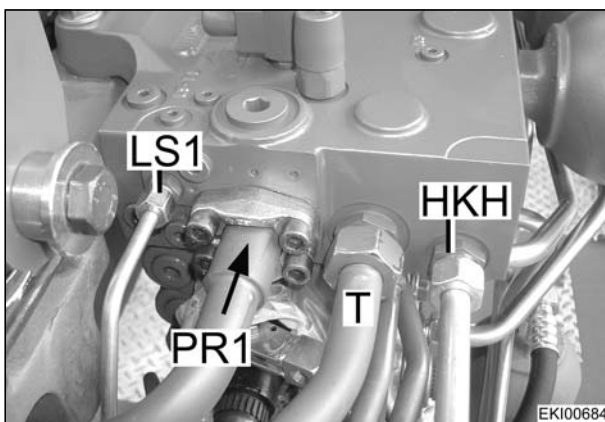


**LS on LE** = Control line (LS) from steering unit to central control block (ZSB).

In steering column.

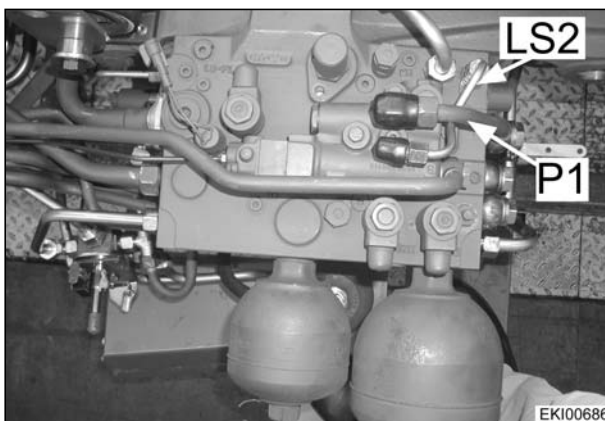


Remove steering column panel.



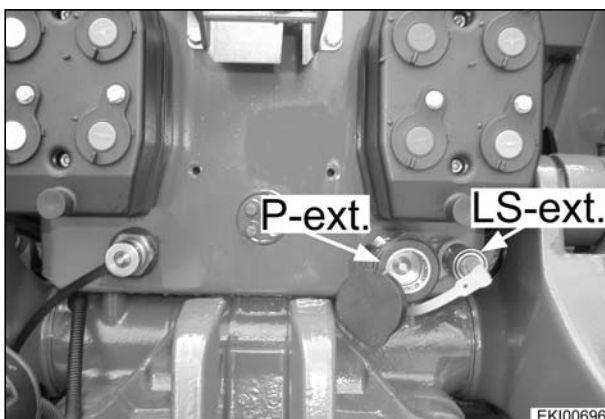
**LS1** = Load sensor to PR (LS pump)

Left side of ZSB



**LS2** = LS to steering unit (LE)

On top of ZSB



**LS-ext.** = Connection for external pressure supply to LS (load sensor)

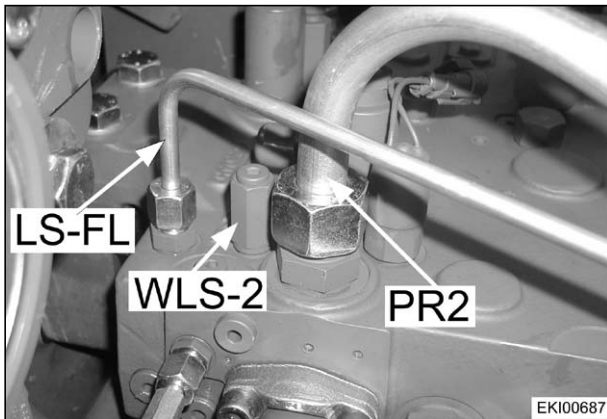
Rear panel



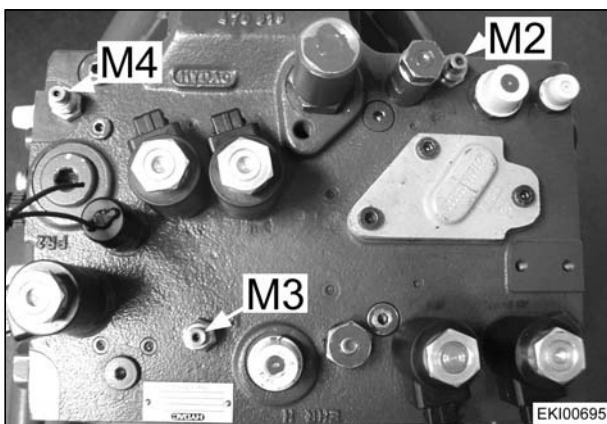
Date	Version	Page	Hydraulic components	Capitel	Index	Docu-No.
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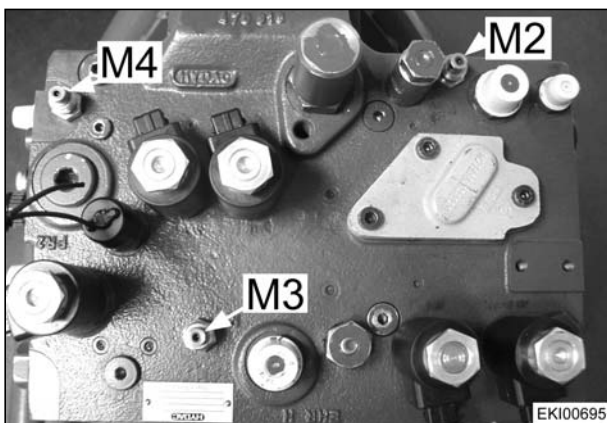
<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Hydraulic components</b></p>	<p><b>D</b></p>
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**LS-FL** = LS to external connection (LS-ext.)  
On top of ZSB

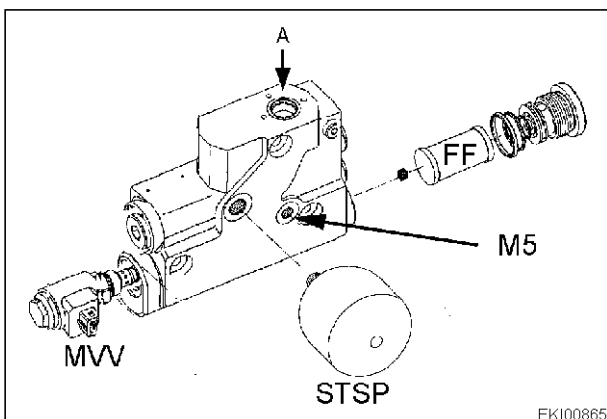


**M2** = Pressure measuring point no. 2  
= Auxiliary pump readings: circulating pressure (=normal scenario), pressure for steering in need scenario or for hydraulic trailer brake.  
At right entrance step, on top of central control block



**M3** = Pressure measuring point no. 3  
= LS pump readings: min. standby pressure, current working pressure and max. standby pressure  
**M4** = Pressure measuring point no. 4  
= LS (=load sensor) pressure upstream of LS pump

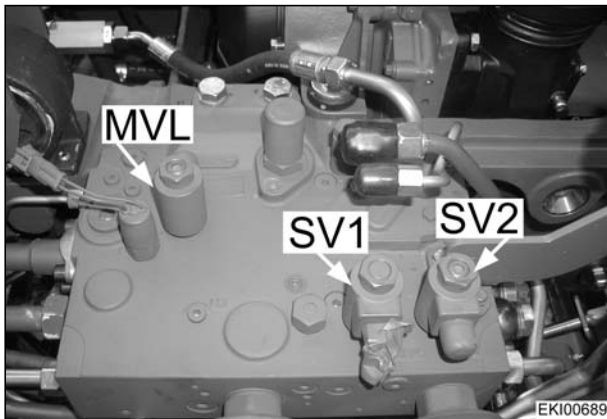
**Note:**  
**View with measurement adapter fitted**  
At right entrance step, on top of central control block



**M5** = Pressure measuring point no. 5  
= Control pressure for electrohydraulic control valves  
Only for Fav 700 and Fav 900  
At right entrance step, on underside of end plate EP (=connection plate of valve array)

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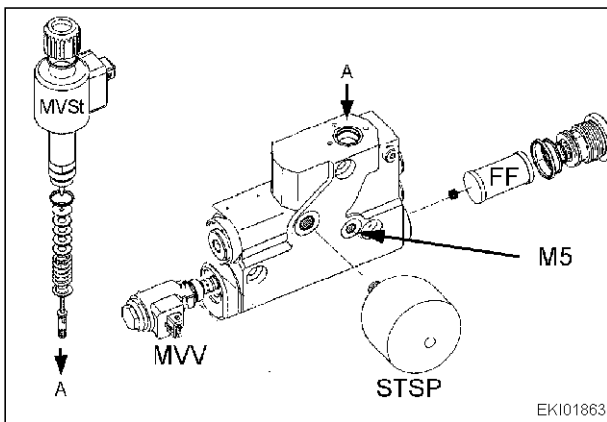
<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Hydraulic components</b></p>	<p><b>D</b></p>
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**MVL** = Solenoid valve  
= "Charge valve" for suspension and oil preheater (Fav 700 and Fav 900)



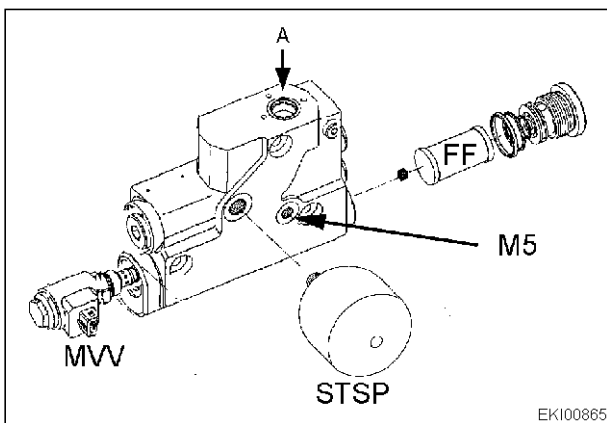
At right entrance step, top of central control block (ZSB) in bore 2011 of ZSB



**MVSt** = Solenoid valve, neutral (valves), control pressure 22 bar



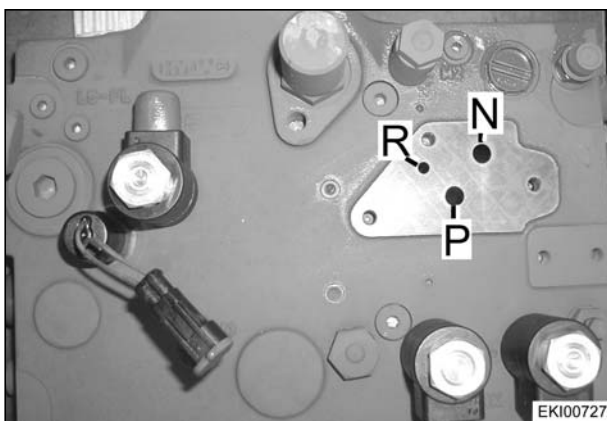
In end plate (EP) - valve array end plate, right side of tractor.



**MVV** = "Oil preheater" solenoid valve  
= Opens flow from P via aperture 5 to tank



In end plate EP



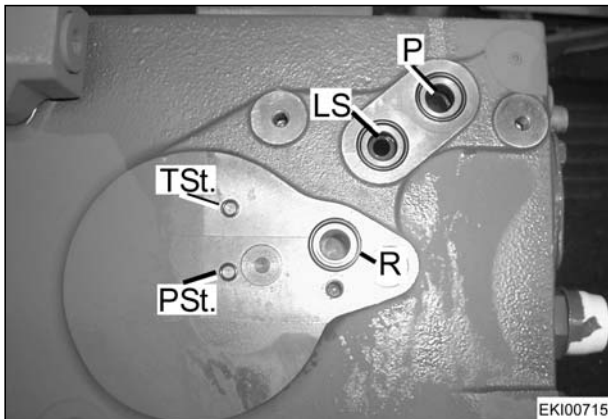
**N on ABV** = Return flow connection for hydraulic trailer brake (ABV)



On top of ZSB

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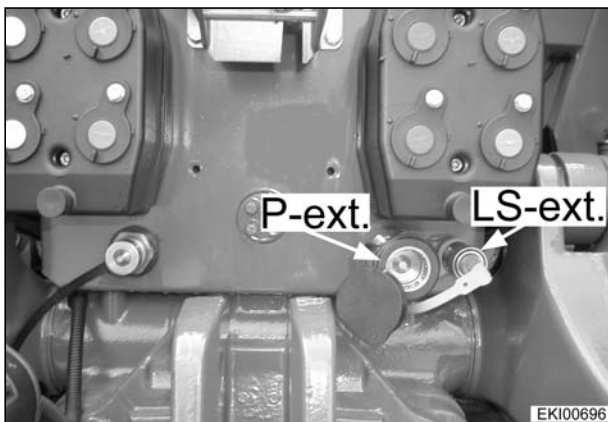
<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Hydraulic components</b></p>	<p><b>D</b></p>
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**P** = LS pump output to control valves  
On bottom of ZSB



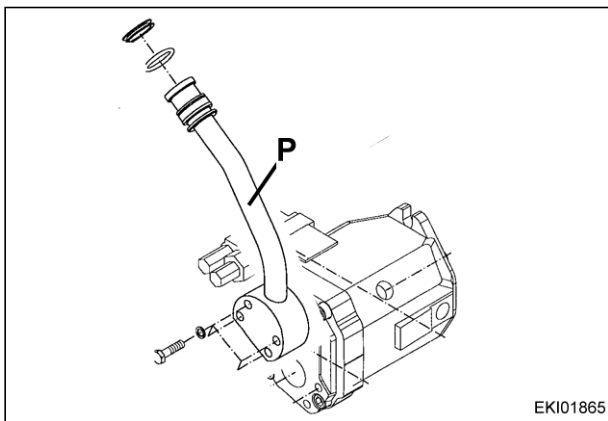
Control valves SB23 LS - EHS have been removed



**P-ext.** = External pressure supply connection directly from PR (LS pump)



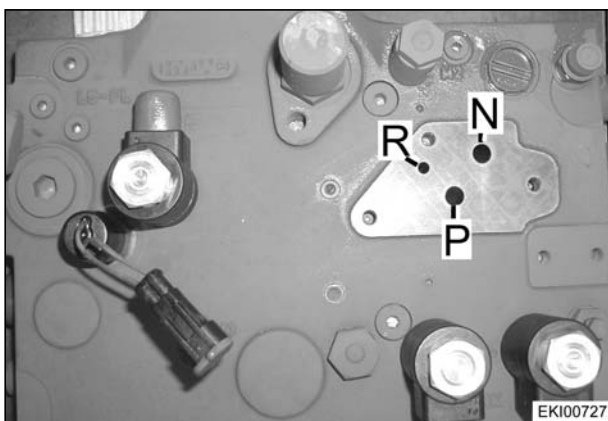
Rear panel



**P on PR** = Outlet from LS pump



Top of clutch housing, on right side of tractor.



**P on ABV** = Connection between auxiliary pump (PL) and trailer brake valve (ABV)



On top of ZSB

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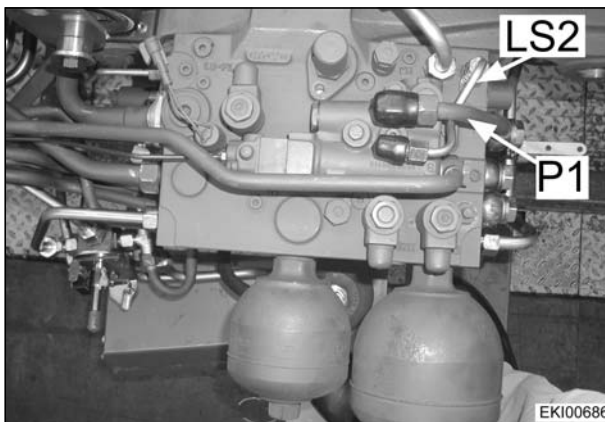
<b>Fav 900</b>	<b>Tractor / General system Hydraulic components</b>	<b>D</b>
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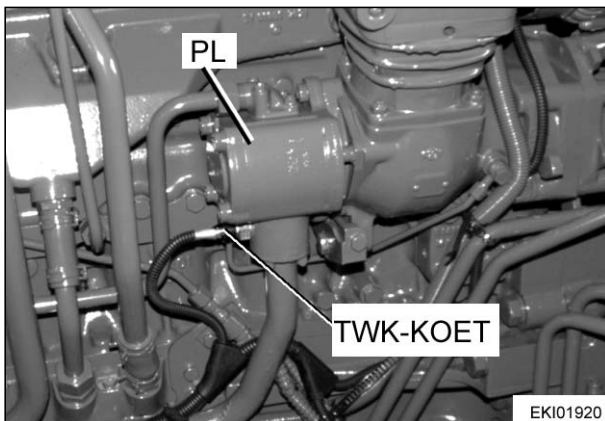
**P on LE** = Steering unit pressure pipe  
In steering column.



Remove steering column panel.



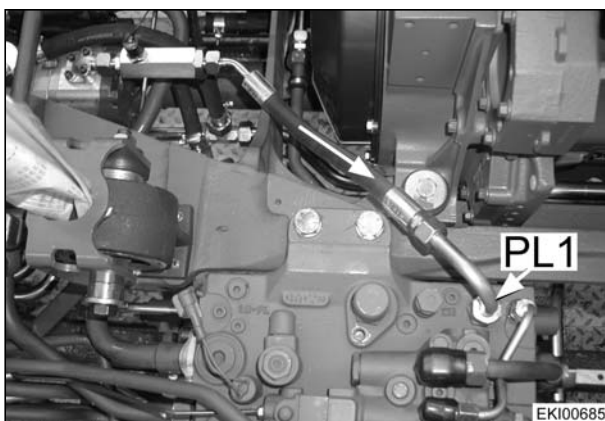
**P1** = LS pump (PR) to steering unit (LE)  
On top of ZSB



**PL** = Auxiliary pump (gear pump)  
Flange-mounted on right side of engine



Raise side of bonnet.

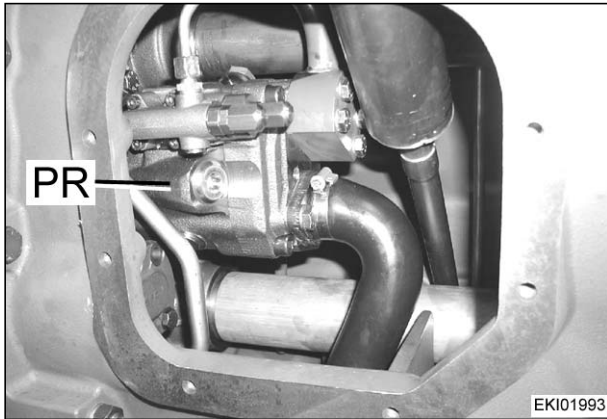


**PL 1** = Input from auxiliary pump PL 1  
On ZSB



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8.12.2000	a	14/23			0000	D

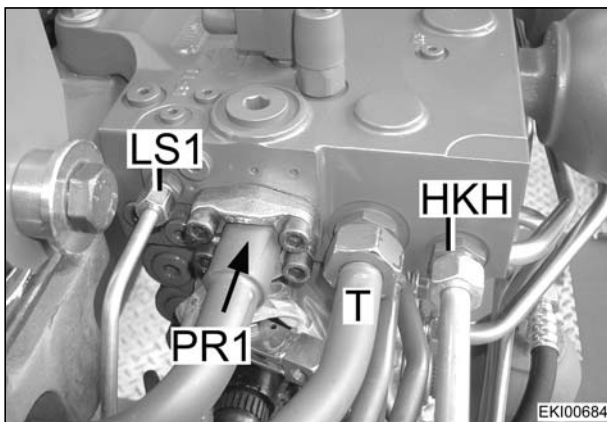
<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Hydraulic components</b></p>	<p><b>D</b></p>
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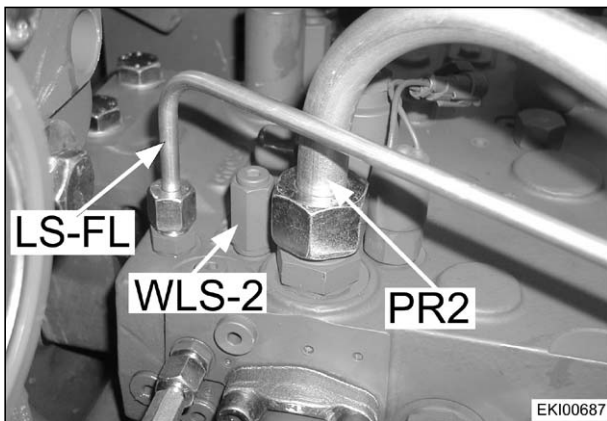
**PR** = LS pump (inclined-disc axial-flow piston pump) service hydraulics.  
In clutch housing.



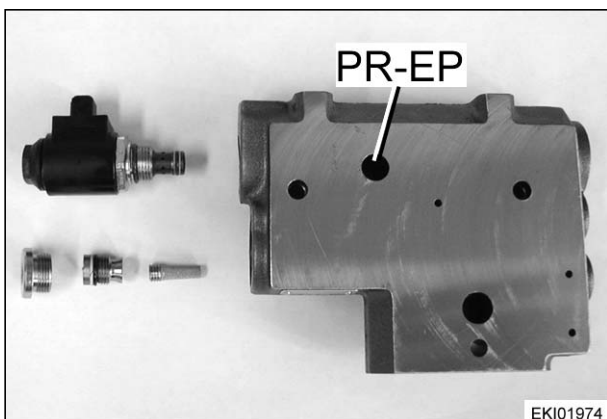
Remove rear right wheel, right auxiliary tank and clutch housing hatch cover.



**PR1** = Input from LS pump  
Left side of central control block (ZSB)



**PR2** = PR (LS pump) to external connection (P-ext.)  
On top of ZSB



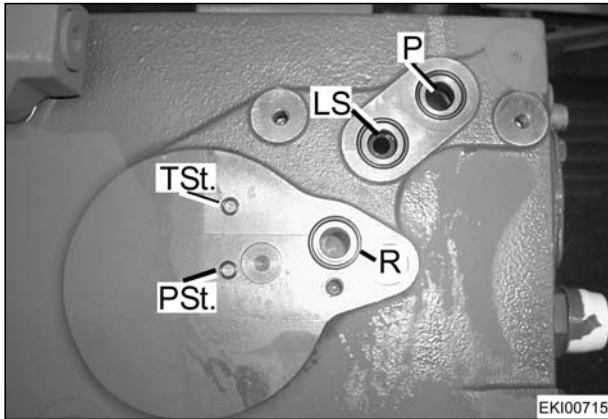
**PR-EP** = PR inlet (LS pump) in end plate  
Lower end plate on control valve array.



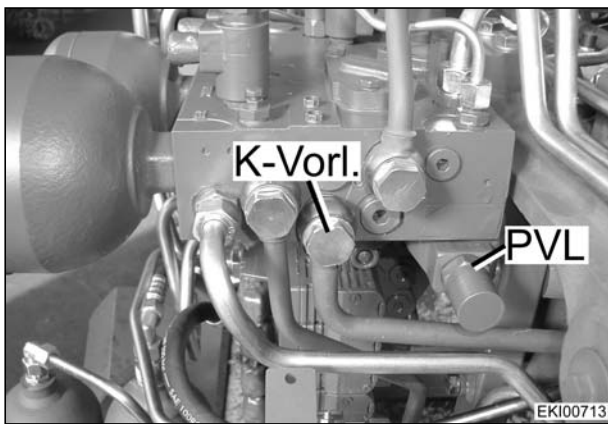
Pivot cover on right step out of way.

Date	Version	Page	Hydraulic components	Capitel	Index	Docu-No.
8.12.2000	a	15/23			0000	D

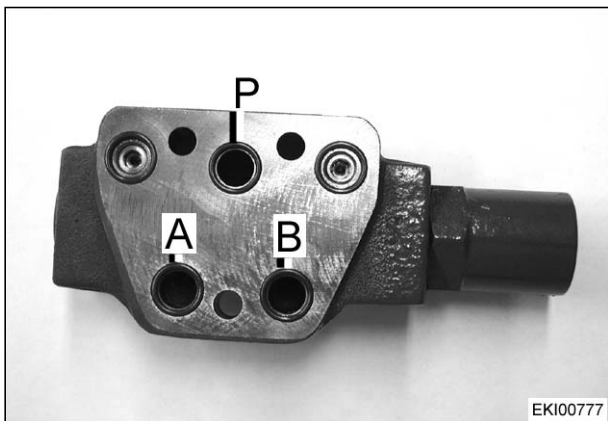
<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Hydraulic components</b></p>	<p><b>D</b></p>
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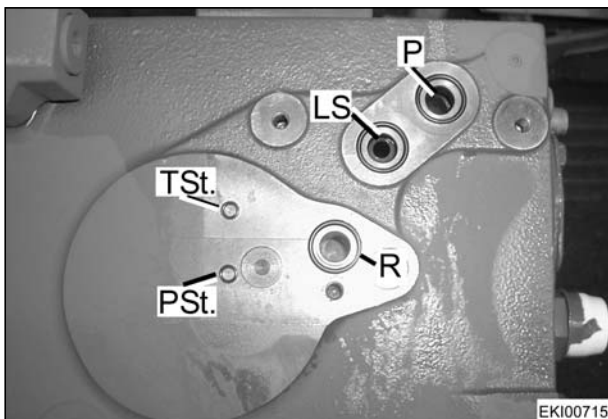
**PSt. on ZSB** = Control pressure 22 bar  
On bottom of ZSB



**PVL** = Priority valve  
= Automatic switching of auxiliary pump when required (need scenario); steering always has priority  
On underside of central control block ZSB



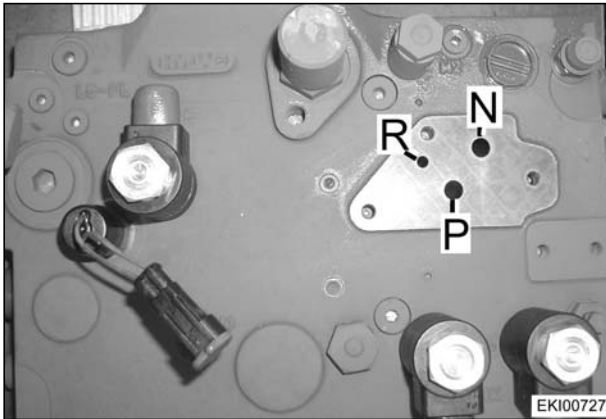
**P on PVL** = Auxiliary pump connection (PL)  
**A on PVL** = Output to steering unit  
**B on PVL** = Return flow via trailer brake



**R** = Return flow from control valves  
On bottom of ZSB

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8.12.2000	a	16/23	0000	D	000035

<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Hydraulic components</b></p>	<p><b>D</b></p>
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**R on ABV** = Return flow connection for hydraulic trailer brake (ABV)

On top of ZSB

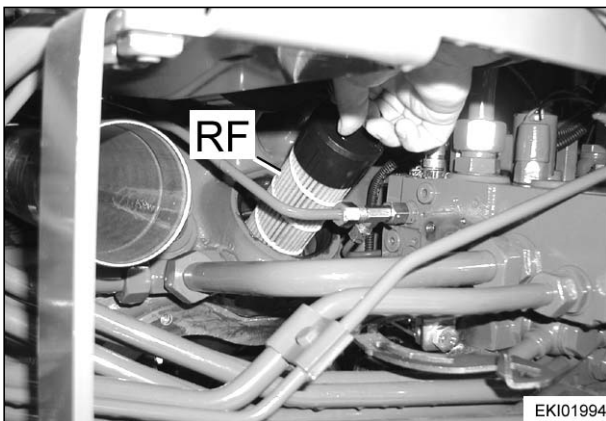


**R on LE** = Steering unit for steering cylinder (steering to right).

In steering column



Remove steering column panel.

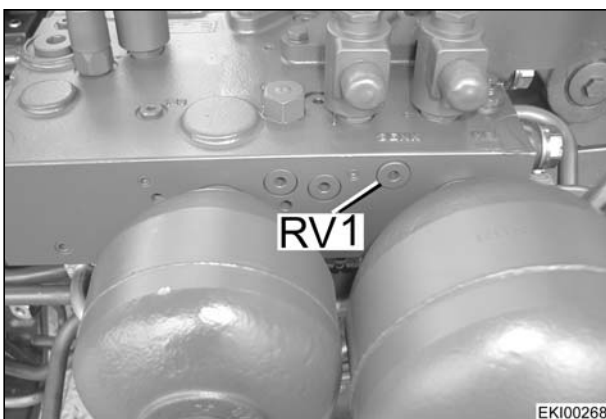


**RF** = Filter for tank return flow

On right side of tractor, above ZSB (central control block) in clutch housing.



Remove cover at right entrance step.



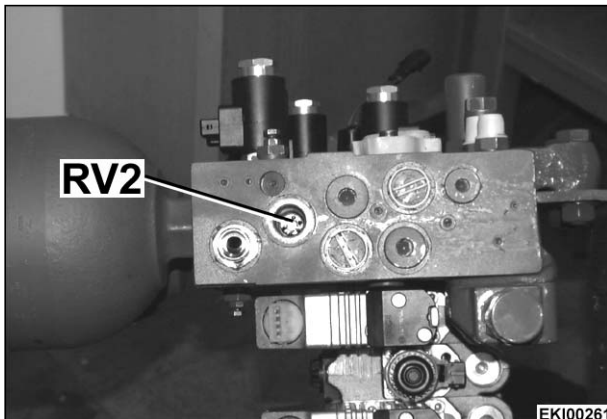
**RV1** = Non-return valve no. 1  
= In suspension system

Interior of ZSB (viewed from frame)

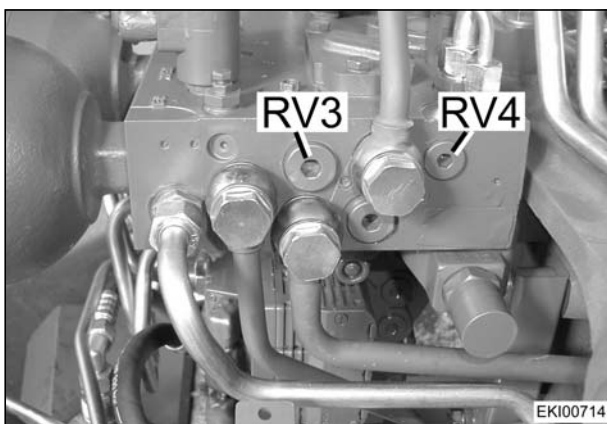


Date	Version	Page	Capitel	Index	Docu-No.
8.12.2000	a	17/23	0000	D	000035

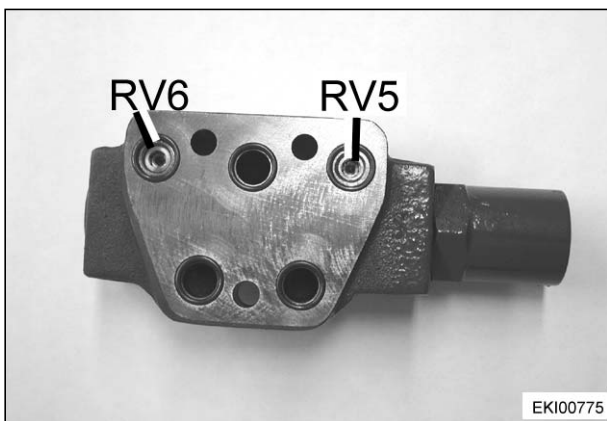
<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Hydraulic components</b></p>	<p><b>D</b></p>
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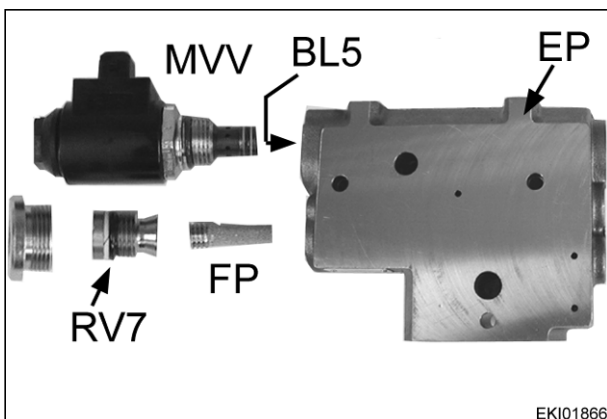
**RV2** = Non-return valve no. 2  
 = Lower suspension in connection bore "B"  
 On right side of ZSB



**RV3** = Non-return valve no. 3  
**RV4** = Non-return valve no. 4  
 = RV3 and RV4 separate auxiliary pump and LS pump from each other.  
 On left side of ZSB



**RV5/RV6** = Shutoff valve in priority valve (PVL)



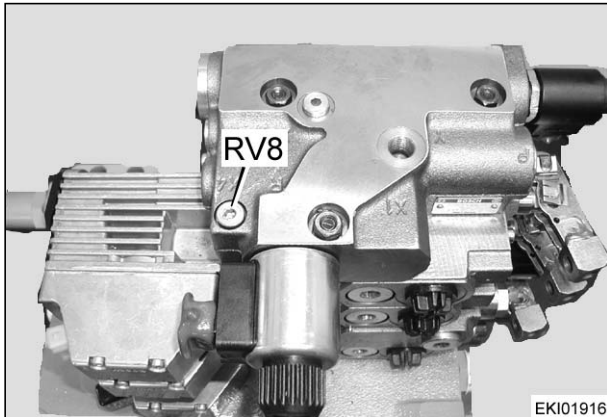
**RV7** = End plate shutoff valve  
 Lowest plate of control valve array



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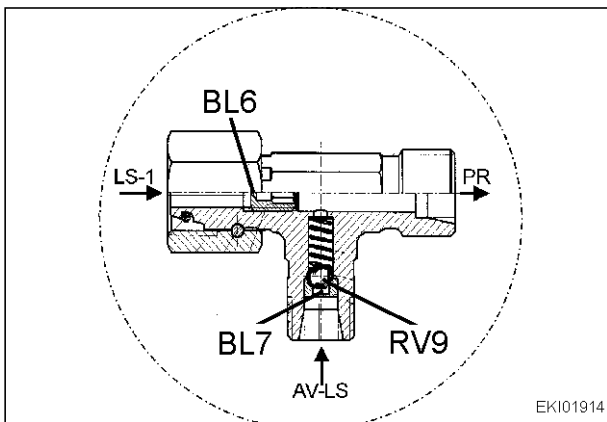
<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Hydraulic components</b></p>	<p><b>D</b></p>
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**RV8** = End plate shutoff valve  
Lowest plate of control valve array



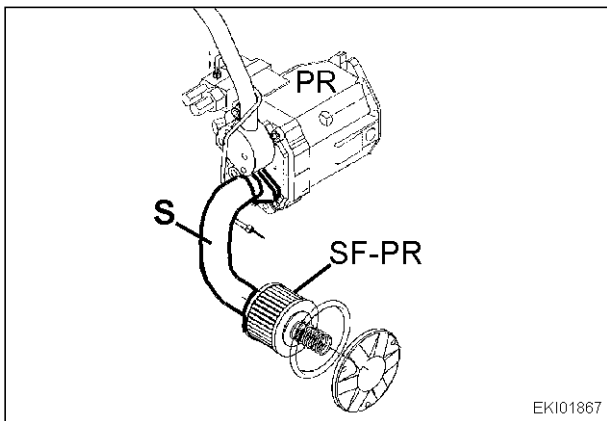
Open cover panel on right entrance step.



**RV9** = Control pressure increase shutoff valve.  
LS-1 connection on central control block (ZSB) right side.



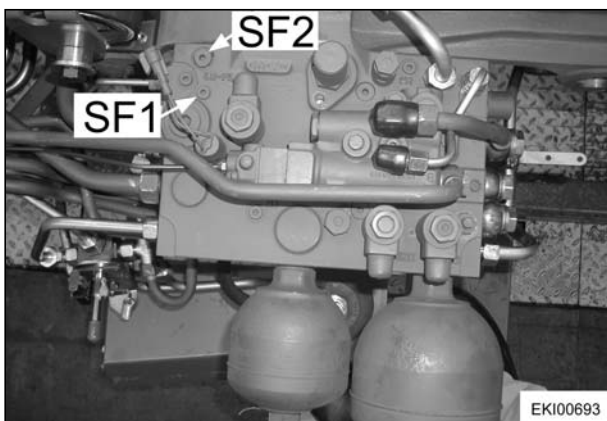
Pivot cover on right step out of way.



**S** = LS pump (PR) intake pipe  
In clutch housing



Remove screw cap on right side of clutch housing.

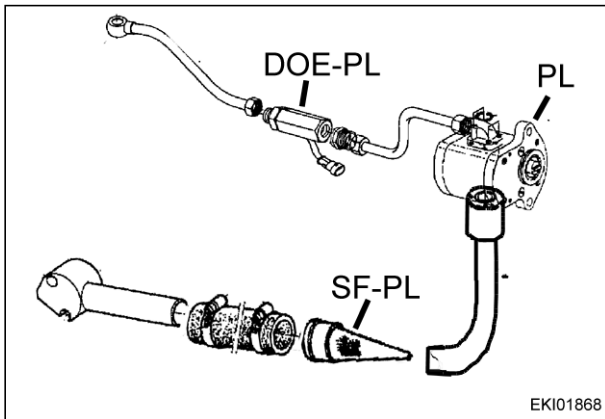


**SF1** = Strainer no. 1  
= Safety prefilter for suspension system  
**SF2** = Strainer no. 2  
= Only fitted if "External pressure supply" is available.  
= Safety filter in LS line  
On top of ZSB

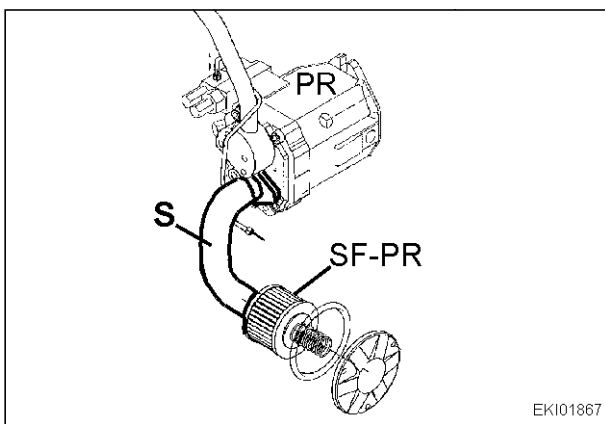


Date	Version	Page	Hydraulic components	Capitel	Index	Docu-No.
8.12.2000	a	19/23		0000	D	000035

<b>Fav 900</b>	<b>Tractor / General system</b> <b>Hydraulic components</b>	<b>D</b>
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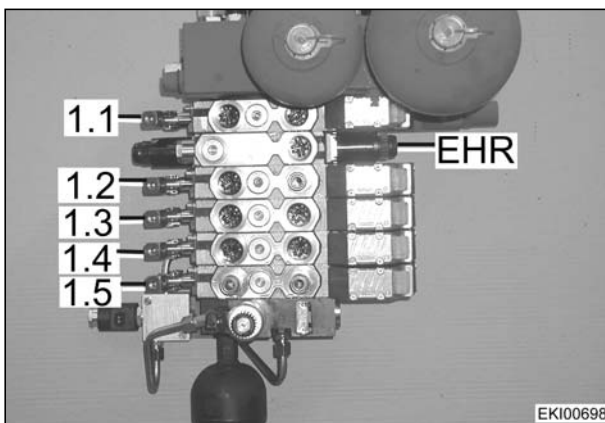


**SF-PL** = Filter upstream of auxiliary pump  
On right side of tractor - on bottom of clutch housing.



**SF-PR** = LS pump suction filter  
In clutch housing.

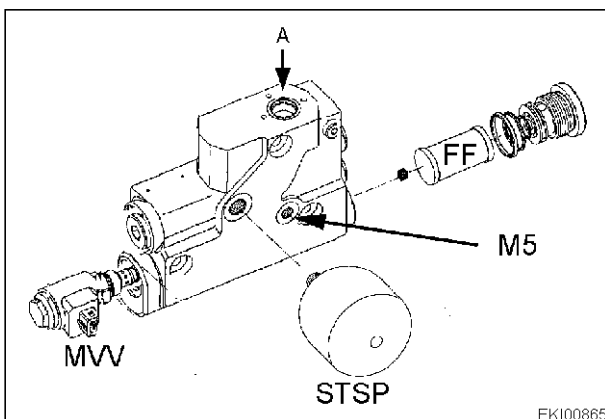
Remove hatch cover from clutch housing on left side of tractor



**SB 23 LS EHS** = Control valve  
= Relevant control valve for front power lift or for connections, depending on tractor's equipment level

- 1.1 = 1. Valve
- 1.2 = 2. Valve
- 1.3 = 3. Valve
- 1.4 = 4. Control valve
- 1.5 = 5. Control valve

**Note:**  
**EPC control valve is between 1.1 and 1.2**

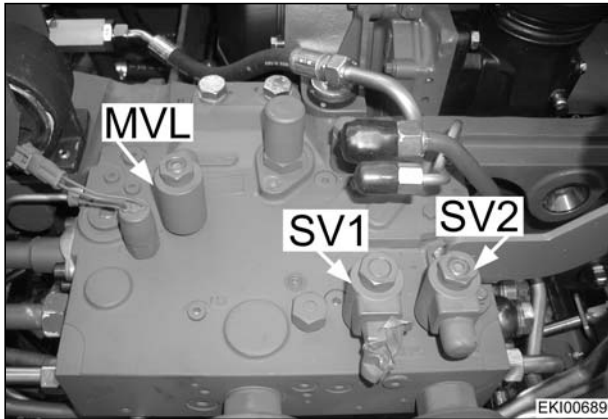


**STSP** = Nitrogen diaphragm accumulator control pressure  
= Capacity: 0.32 litres

On right at entrance step, on underside of end plate EP

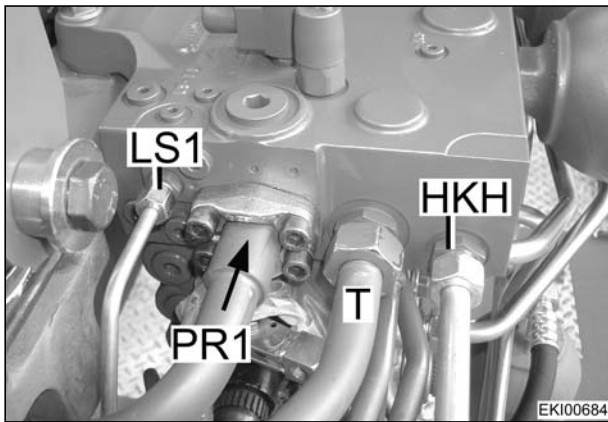
Date	Version	Page	Capitel	Index	Docu-No.
8.12.2000	a	20/23	0000	D	000035

<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Hydraulic components</b></p>	<p><b>D</b></p>
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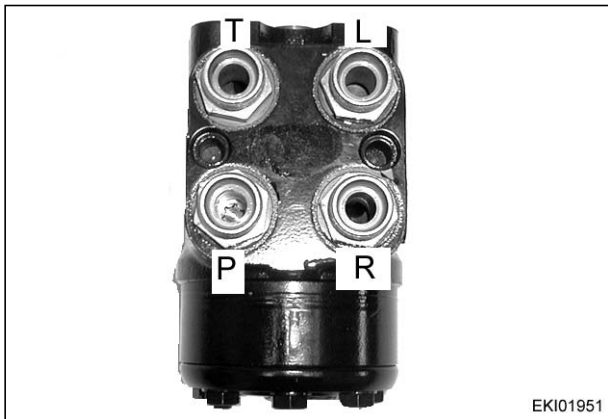


- SV1** = "Lower" suspension solenoid valve  
= Identifying feature of SV1: valve body yellow-chromated and without counterbore
- SV2** = "Raise" suspension solenoid valve  
= Identifying feature of SV2: valve body white-chromated and with counterbore

At right entrance step, on top of central control block



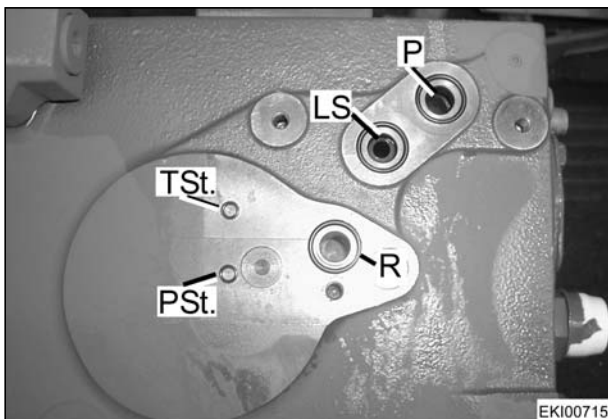
- T** = Return flow to tank  
Left side of ZSB



- T on LE** = Steering unit return flow  
In steering column.



Remove steering column panel.

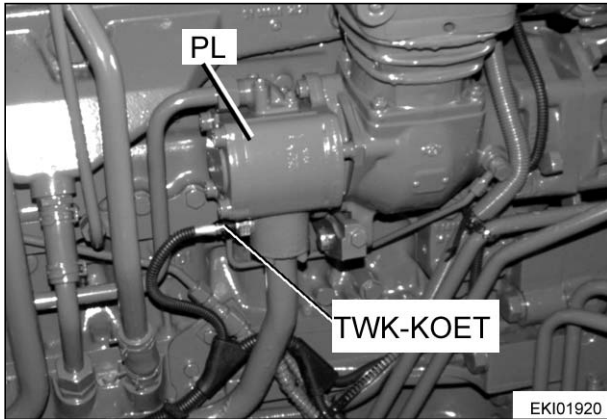


- TSt.** = Return flow control pressure (PSt.)  
On bottom of ZSB



Date	Version	Page	Hydraulic components	Capitel	Index	Docu-No.
8.12.2000	a	21/23		0000	D	000035

Fav 900	Tractor / General system <b>Hydraulic components</b>	<b>D</b>
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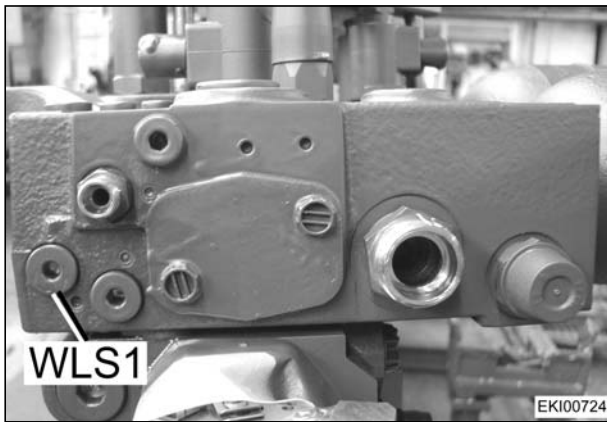


**TWK-KOET** = Hydraulic oil thermostat  
 Right side of engine - intake pipe on auxiliary pump



Open right side of bonnet.

EKI01920

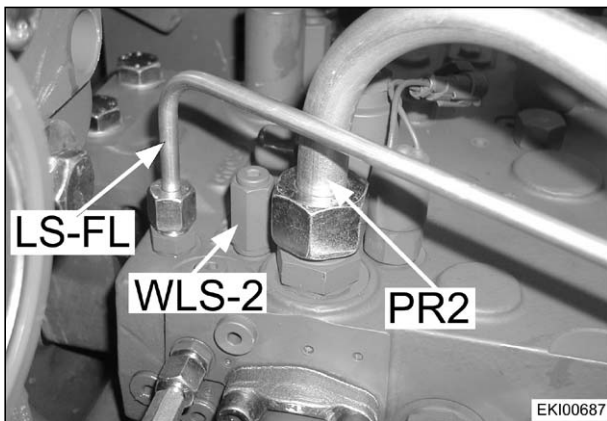


**WLS-1** = Shuttle valve no. 1  
 = Compares LS pressure between steering and result from other consumers.



Left side of ZSB

EKI00724

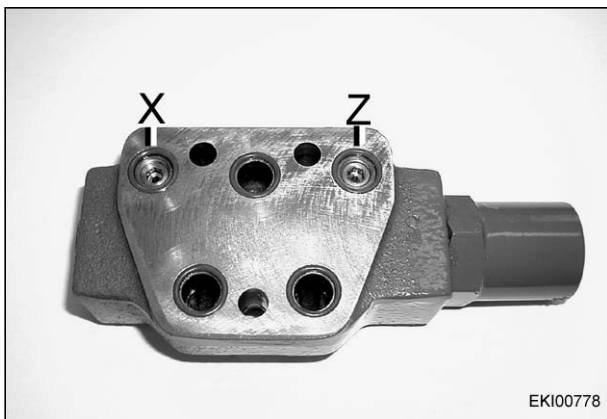


**WLS-2** = Shuttle valve no. 2  
 = Only fitted if "External pressure supply" is available, gravity-controlled shuttle valve



On top of ZSB

EKI00687

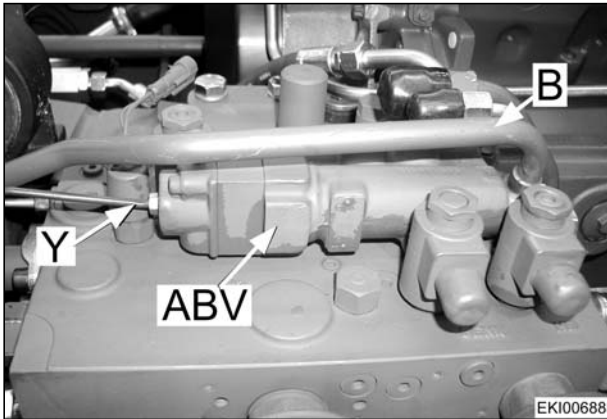


**X on PVL** = Input to LS pump (PR)  
**Z on PVL** = Input of LS pressure of steering unit

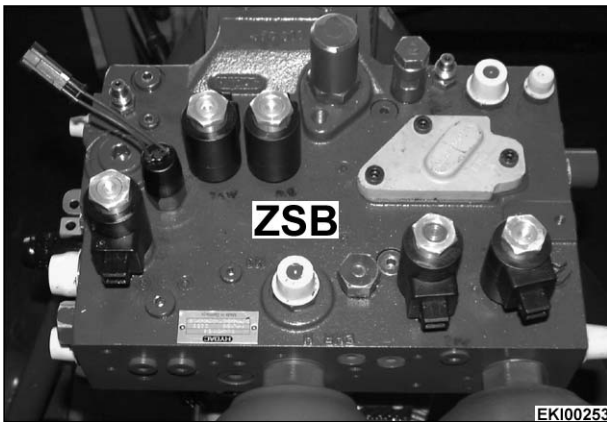
EKI00778

Date	Version	Page	Capitel	Index	Docu-No.
8.12.2000	a	22/23	Hydraulic components	0000	D 000035

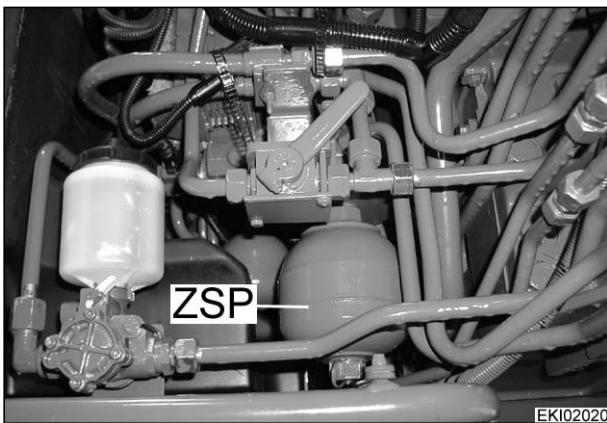
<p><b>Fav 900</b></p>	<p>Tractor / General system <b>Hydraulic components</b></p>	<p><b>D</b></p>
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**Y on ABV** = Brake line connection  
On top of ZSB



**ZSB** = Central control block  
= Hydraulic oil block with internal and external components for many different functions.



**ZSP** = Front-axle suspension auxiliary accumulator

On righty side of tractor, below control valves.



Open cover panel on right entrance step.

Date	Version	Page	Capitel	Index	Docu-No.
8.12.2000	a	23/23	Hydraulic components	0000	D 000035

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>General points on calibration</b>	<b>F</b>
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In order to equalise the mechanical and electrical tolerances of the sensors, it is necessary to calibrate the relevant sensor. If a sensor is replaced, the replacement must be calibrated. A complete calibration must generally be carried out after replacement of the e-boxes (A001, A002), EPC (A005), control console (A004) or actuator unit (A009).

**The following sensors and functions have to be calibrated.**

1. Calibration - rear EPC, code 8001 and 8002
2. Calibration - enhanced-control front power lift (where fitted), code 9001 and 9002
3. Calibration - hydraulic auxiliary control valves ( **not** Farmer 400), code 1001
4. Calibration - suspension sensor, code 7666
5. Calibration - engagement point of rear PTO, code 6034
6. Calibration - engagement point of front PTO, code 7034
7. Calibration - clutch pedal sensor, code 4001
8. Calibration - range control sensor, code 4003
9. Calibration - accelerator sensor, code 4005
10. Calibration - transmission ratio characteristic curve, code 4007
11. Calibration - turboclutch operation, code 4009
12. Calibration - hand throttle (only Fav 900/23/... EDC), code 4002
13. Calibration - accelerator (only Fav 900/23/... EDC), code 4005

**Note:**

**Keep to the calibration sequence.**

**Calibrations 1. - 6. can be carried out as required.**

**Calibrations 7. - 11 (13 - Fav 900 from 23/3001 onwards) must be carried out in ascending order and in a block (transmission calibration).**

**Calibrations 12. - 13. can be carried out as required (engine EDC)**

**The emergency control must not be engaged during calibration.**

If incorrect values are found or conditions are not met, **ERROR** message is displayed.

If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

Data are only accepted when ignition key is turned to position "0".

Date	Version	Page	Capitel	Index	Docu-No.
10/2000	<b>a</b>	1/1	<b>0000</b>	<b>F</b>	<b>000012</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Calibration code 8001, 8002</b>	<b>F</b>
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## 1. Calibration of rear EPC

**Caution: following preparatory steps must be carried out.**

- Handbrake on
- Start engine
- If error messages are displayed, faults must be individually cleared



A00462

First press key and hold,



A00458

then press key, and fault symbol is cleared. Clear other faults in same way.



A00460

Press key.



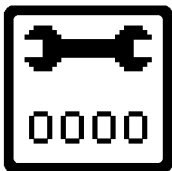
A00475

Pictogram at left displayed.



A00462

Press key



A00447

Input code **8001**



A00461

Press one of keys until desired number is displayed.



A00462

Store with key.



A00472

Pictogram at left displayed.

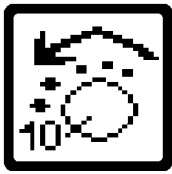


A00462

Turn setpoint potentiometer to pos. 1 and store with key.

Date	Version	Page	<b>Calibration code 8001, 8002</b>	Capitel	Index	Docu-No.
05/2000	<b>a</b>	1/3		<b>0000</b>	<b>F</b>	<b>000001</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Tractor / General system <b>Calibration code 8001, 8002</b>	<b>F</b>
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A00473

Pictogram at left displayed.



A00462

Turn setpoint potentiometer to pos. 10 and store with key.

If incorrect values are found or conditions are not met, **ERROR** message is displayed.  
 If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

**Note:**

Data are only accepted when ignition key is turned to position "0".

**Caution: following preparatory steps must be carried out.**

- Handbrake on
- Start engine
- If error messages are displayed, faults must be individually cleared



A00462

First press key and hold,



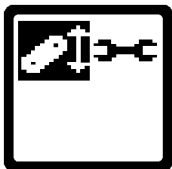
A00458

then press key, and fault symbol is cleared. Clear other faults in same way.



A00460

Press key



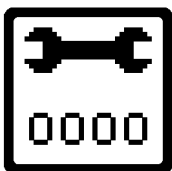
A00475

Pictogram at left displayed.



A00462

Press key



A00447

Input code **8002**



A00461

Press one of keys until desired number is displayed.



A00462

Store with key

Date	Version	Page	Calibration code 8001, 8002	Capitel	Index	Docu-No.
05/2000	a	2/3		0000	F	000001



<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Calibration code 8001, 8002</b>	<b>F</b>
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A00471

Pictogram at left displayed.

Switch rapid lift control to "Lift", power lift rises and halts at top.



A00462

Store with key



A00470

Pictogram at left displayed.

Switch rapid lift control to "Lower", power lift lowers and halts at bottom.



A00462

Store with key

If incorrect values are found or conditions are not met, **ERROR** message is displayed.  
 If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

**Note:**

Data are only accepted when ignition key is turned to position "0".

Date	Version	Page	Calibration code 8001, 8002	Capitel	Index	Docu-No.
05/2000	a	3/3		0000	F	000001

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Tractor / General system <b>Calibration code 9001, 9002</b>	<b>F</b>
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## 2. Calibrating the enhanced-control front power lift (where fitted)

**Caution: following preparatory steps must be carried out.**

- Handbrake on
- Start engine
- If error messages are displayed, faults must be individually cleared



A00462

First press key and hold,



A00458

then press key, and fault symbol is cleared. Clear other faults in same way.



A00460

Press key.



A00475

Pictogram at left displayed.



A00456

Press key



A00474

Pictogram at left displayed.  
Key flashes



A00462

Press key



A00447

Input code **9001**



A00461

Press one of keys until desired number is displayed.



A00462

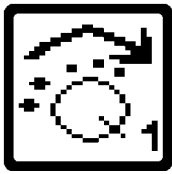
Store with key.

Date	Version	Page	Calibration code 9001, 9002	Capitel	Index	Docu-No.
05/2000	a	1/3			0000	F

Farmer 400  
Fav 700  
Fav 900

Tractor / General system  
Calibration code 9001, 9002

F



A00472

Pictogram at left displayed.



A00462

Turn setpoint potentiometer to pos. 1 and store with key.



A00473

Pictogram at left displayed.



A00462

Turn setpoint potentiometer to pos. 10 and store with key.

If incorrect values are found or conditions are not met, **ERROR** message is displayed.  
If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

**Note:**

Data are only accepted when ignition key is turned to position "0".

**Caution: following preparatory steps must be carried out.**

- Handbrake on
- Start engine
- If error messages are displayed, faults must be individually cleared



A00462

First press key and hold,



A00458

then press key, and fault symbol is cleared. Clear other faults in same way.



A00460

Press key



A00475

Pictogram at left displayed.



A00456

Press key



A00474

Pictogram at left displayed.  
Key flashes

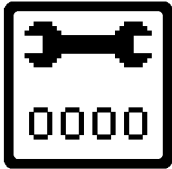
Date	Version	Page	Calibration code 9001, 9002	Capitel	Index	Docu-No.
05/2000	a	2/3		0000	F	000010

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Calibration code 9001, 9002</b>	<b>F</b>
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A00462

Press key



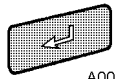
A00447

Input code **9002**



A00461

Press one of keys until desired number is displayed.



A00462

Store with key



A00469

Pictogram at left displayed.

Switch rapid lift control to "Lift", power lift rises and halts at top.



A00462

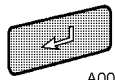
Store with key



A00468

Pictogram at left displayed.

Switch rapid lift control to "Lower", power lift lowers and halts at bottom.



A00462

Store with key

If incorrect values are found or conditions are not met, **ERROR** message is displayed.  
 If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

**Note:**

Data are only accepted when ignition key is turned to position "0".

Date	Version	Page	Calibration code 9001, 9002	Capitel	Index	Docu-No.
05/2000	a	3/3		0000	F	000010

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Tractor / General system  <b>Calibration code 1001</b></p>	<p><b>F</b></p>
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### 3. Calibrating hydraulic auxiliary valves

**Caution: following preparatory steps must be carried out.**

- Handbrake on
- Start engine



A00462

First press key and hold,



A00458

then press key, and fault symbol is cleared. Clear other faults in same way.



A00460

Press key



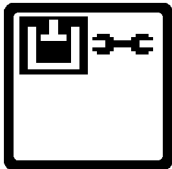
A00475

Pictogram at left displayed.



A00456

Press key twice



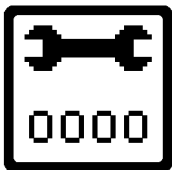
A00481

Pictogram at left displayed.  
Key flashes



A00462

Press key, next pictogram displayed



A00447

Input code **1001**



A00461

Press one of keys until desired number is displayed.



A00462

Store with key

Date	Version	Page	Calibration code 1001	Capitel	Index	Docu-No.
12/1999	a	1/2		0000	F	000002

Farmer 400  
Fav 700  
Fav 900

Tractor / General system  
Calibration code 1001

F



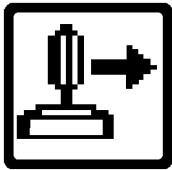
A00464

Push joystick forwards and hold against stop (do not exert excessive pressure)



A00462

Store with key in this position, and next pictogram is displayed



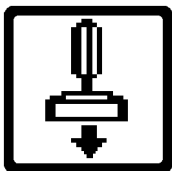
A00465

Push joystick to right and hold against stop (do not exert excessive pressure)



A00462

Store with key in this position, and next pictogram is displayed



A00466

Pull joystick to rear and hold against stop (do not exert excessive pressure)



A00462

Store with key in this position, and next pictogram is displayed



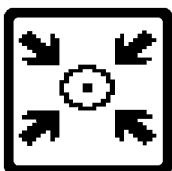
A00467

Pull joystick to left and hold against stop (do not exert excessive pressure)



A00462

Store with key in this position, and next pictogram is displayed



A00463

Release joystick (centres automatically).



A00462

Store this position with key.

If incorrect values are found or conditions are not met, **ERROR** message is displayed.  
If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

**Note:**

Data are only accepted when ignition key is turned to position "0".

Date	Version	Page	Calibration code 1001		
12/1999	a	2/2	Capitel	Index	Docu-No.
			0000	F	000002

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Calibration code 7666</b>	<b>F</b>
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#### 4. Calibrating the suspension

**Caution: following preparatory steps must be carried out.**

- Handbrake on
- Start engine
- If error messages are displayed, faults must be individually cleared



A00462

First press key and hold,



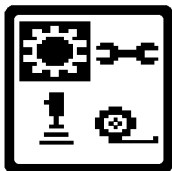
A00458

then press key, and fault symbol is cleared. Clear other faults in same way



A00457

Press key



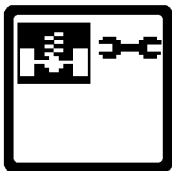
A00448

Key flashes



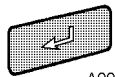
A00456

Press key, next pictogram displayed



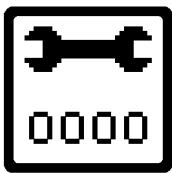
A00449

Key flashes



A00462

Press key, next pictogram displayed



A00447

Input code **7666**



A00461

Press one of keys until desired number is displayed.

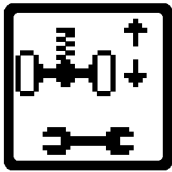


A00462

Store with key, following pictogram displayed

Date	Version	Page	<b>Calibration code 7666</b>	Capitel	Index	Docu-No.
05/2000	<b>a</b>	1/2		<b>0000</b>	<b>F</b>	<b>000003</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Calibration code 7666</b>	<b>F</b>
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A00450

Flashing arrow indicates desired end position, tractor is raised



A00462

Store with key, following pictogram displayed



A00450

Lower arrow flashes, and tractor is lowered



A00462

Store with key

If incorrect values are found or conditions are not met, **ERROR** message is displayed.  
 If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

**Note:**

Data are only accepted when ignition key is turned to position "0".

Date	Version	Page	Calibration code 7666	Capitel	Index	Docu-No.
05/2000	a	2/2		0000	F	000003



<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Tractor / General system  <b>Calibration code 6034</b></p>	<p><b>F</b></p>
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## 5. Calibrating the engagement point of the rear PTO

**Caution: following preparatory steps must be carried out.**

- Handbrake on
- Start engine
- If error messages are displayed, faults must be individually cleared



A00462

First press key and hold,



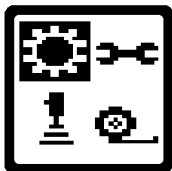
A00458

then press key, and fault symbol is cleared. Clear other faults in same way.



A00457

Press key



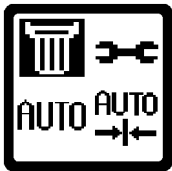
A00448

Key flashes



A00456

Press key **twice** , next pictogram displayed



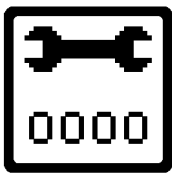
A00476

Key flashes



A00462

Press key, next pictogram displayed



A00447

Input code **6034**



A00461

Press one of keys until desired number is displayed.

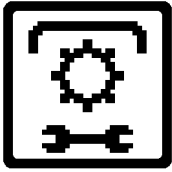


A00462

Store with key, following pictogram displayed

Date	Version	Page	Calibration code 6034	Capitel	Index	Docu-No.
05/2000	a	1/2		0000	F	000004

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Calibration code 6034</b>	<b>F</b>
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A00452

Set any PTO speed and engage rear PTO.

If incorrect values are found or conditions are not met, **ERROR** message is displayed.  
 If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

**Note:**

Data are only accepted when ignition key is turned to position "0".  
 We recommend calibrating PTO with implement mounted. This ensures PTO accelerates to correct speed after calibration with mounted implement.

Date	Version	Page	<b>Calibration code 6034</b>	Capitel	Index	Docu-No.
05/2000	<b>a</b>	2/2		<b>0000</b>	<b>F</b>	<b>000004</b>

**Farmer 400**  
**Fav 700**  
**Fav 900**

**Tractor / General system**  
**Calibration code 7034**

**F**

## 6. Calibrating the engagement point of the front PTO

**Caution: following preparatory steps must be carried out.**

- Handbrake on
- Start engine
- If error messages are displayed, faults must be individually cleared



A00462

First press key and hold,



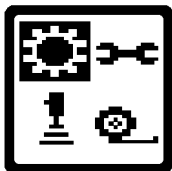
A00458

then press key, and fault symbol is cleared. Clear other faults in same way.



A00457

Press key, next pictogram displayed.



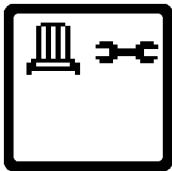
A00448

Key flashes



A00456

Press key **three times** , next pictogram displayed



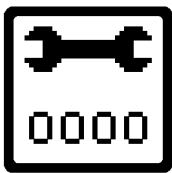
A00477

Key flashes



A00462

Press key, next pictogram displayed



A00447

Input code **7034**



A00461

Press one of keys until desired number is displayed.

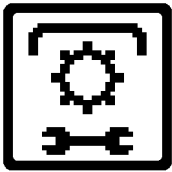


A00462

Store with key, following pictogram displayed

Date	Version	Page	Calibration code 7034	Capitel	Index	Docu-No.
05/2000	a	1/2		0000	F	000011

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Calibration code 7034</b>	<b>F</b>
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A00452

Engage front PTO.

If incorrect values are found or conditions are not met, **ERROR** message is displayed.  
 If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

**Note:**

Data are only accepted when ignition key is turned to position "0".  
 We recommend calibrating PTO with implement mounted. This ensures PTO accelerates to correct speed after calibration with mounted implement.

Date	Version	Page	Calibration code 7034	Capitel	Index	Docu-No.
05/2000	a	2/2		0000	F	000011

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Tractor / General system  <b>Calibration code 4001</b></p>	<p><b>F</b></p>
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## 7. Calibrating the clutch pedal

**Caution: following preparatory steps must be carried out.**

- Handbrake on
- Start engine
- If error messages are displayed, faults must be individually cleared



A00462

First press key and hold,



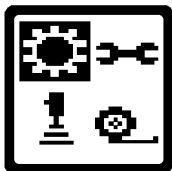
A00458

then press key, and fault symbol is cleared. Clear other faults in same way.



A00457

Press key, next pictogram displayed



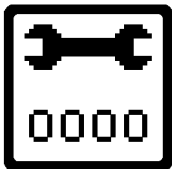
A00448

Key flashes



A00462

Press key, next pictogram displayed



A00447

Input code **4001**



A00461

Press one of keys until desired number is displayed.



A00462

Store with key, following pictogram displayed



A00431

Clutch pedal **not** actuated



A00462

Store with key, following pictogram displayed

Date	Version	Page	Calibration code 4001	Capitel	Index	Docu-No.
12/1999	<b>a</b>	1/2		<b>0000</b>	<b>F</b>	<b>000005</b>

Farmer 400  
Fav 700  
Fav 900

Tractor / General system  
Calibration code 4001

F



A00430

Clutch pedal **actuated**



A00462

Store with key

If incorrect values are found or conditions are not met, **ERROR** message is displayed.  
If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

**Note:**

Data are only accepted when ignition key is turned to position "0".

Date	Version	Page	Calibration code 4001	Capitel	Index	Docu-No.
12/1999	a	2/2		0000	F	000005

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Calibration code 4003</b>	<b>F</b>
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## 8. Calibrating the range control

**Caution: following preparatory steps must be carried out.**

- Handbrake on
- Start engine
- Clutch pedal remains depressed
- Engine speed less than 800 rpm
- If error messages are displayed, faults must be individually cleared



A00462

First press key and hold,



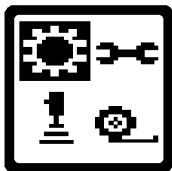
A00458

then press key, and fault symbol is cleared. Clear other faults in same way.



A00457

Press key, next pictogram displayed



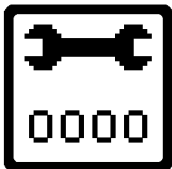
A00448

Key flashes



A00462

Press key, next pictogram displayed



A00447

Input code **4003**



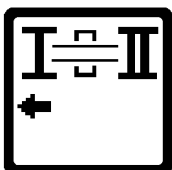
A00461

Press one of keys until desired number is displayed.



A00462

Store with key, following pictogram displayed

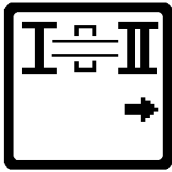


A00432

Range I is shown to be engaged, see pictogram

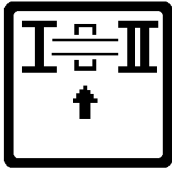
Date	Version	Page	<b>Calibration code 4003</b>	Capitel	Index	Docu-No.
12/1999	<b>a</b>	1/2		<b>0000</b>	<b>F</b>	<b>000006</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Calibration code 4003</b>	<b>F</b>
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A00433

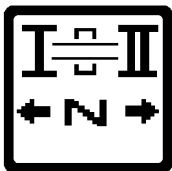
Range II is automatically displayed and engaged, see pictogram



A00434

Mid-position is automatically displayed and engaged, see pictogram

If incorrect values are found or conditions are not met, **ERROR** message is displayed.



A00437

If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.



A00462

Check:  
Press key and hold,



A00458

then press key, pictogram shown above is cleared.  
**OK** is displayed

If incorrect values are found or conditions are not met, **ERROR** message is displayed.

If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

**Note:**

Data are only accepted when ignition key is turned to position "0".

Date	Version	Page	Calibration code 4003	Capitel	Index	Docu-No.
12/1999	a	2/2		0000	F	000006



<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Tractor / General system  <b>Calibration code 4005</b></p>	<p><b>F</b></p>
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## 9. Calibrating the accelerator

**Caution: following preparatory steps must be carried out.**

- Handbrake on
- Start engine
- If error messages are displayed, faults must be individually cleared



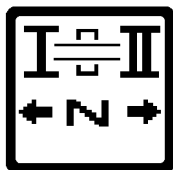
A00462

First press key and hold,



A00458

then press key, and fault symbol is cleared. Clear other faults in same way.



A00437

Pictogram at left displayed.



A00462

First press key and hold,



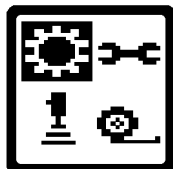
A00458

then press key, pictogram shown above is cleared



A00457

Press key



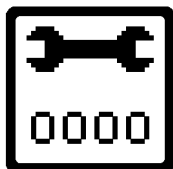
A00448

Pictogram at left displayed.  
Key flashes



A00462

Press key, next pictogram displayed



A00447

Input code **4005**



A00461

Press one of keys until desired number is displayed.



A00462

Store with key, following pictogram displayed

Date	Version	Page	Calibration code 4005	Capitel	Index	Docu-No.
12/1999	a	1/2		0000	F	000007

Farmer 400  
Fav 700  
Fav 900

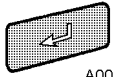
Tractor / General system  
Calibration code 4005

F



A00435

Set engine speed at 800 ± 20 rpm using hand throttle



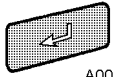
A00462

and store with key.  
Max. 30 sec for this setting.



A00436

Pictogram at left displayed.  
Set engine speed at 1300 ± 20 rpm using hand throttle



A00462

and store with key.  
Max. 30 sec for this setting.



A00440

Pictogram at left displayed.  
Set engine speed at 1700 ± 20 rpm using hand throttle



A00462

and store with key.  
Max. 30 sec for this setting.

**Proceed in same way for engine speeds of 1900 and 2200.**

If incorrect values are found or conditions are not met, **ERROR** message is displayed.  
If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

**Note:**

Data are only accepted when ignition key is turned to position "0".

Date	Version	Page	Calibration code 4005	Capitel	Index	Docu-No.
12/1999	a	2/2		0000	F	000007

Farmer 400  
Fav 700  
Fav 900

Tractor / General system  
Calibration code 4007

F

## 10. Calibrating the transmission ratio characteristics

**Caution: following preparatory steps must be carried out.**

- Handbrake released
- Start engine
- Tractor stationary (less than 0.01 km/h)
- Engine speed 1600 rpm  $\pm$  30
- Engine speed must not fall below 1400 rpm during calibration
- No error message from speed sensors
- Neutral switch not set to neutral - transmission is in non-positive lock (both F/R lamps light up, though this does not apply to new transmission e-box at initial calibration)
- Range control set to neutral (range control is normally neutral after calibration). If necessary, shift to neutral manually via emergency control system.
- Clutch pedal not actuated
- If necessary, actuate footbrake.
- If error messages are displayed, faults must be individually cleared



A00462

First press key and hold,



A00458

then press key, and fault symbol is cleared. Clear other faults in same way.



A00429

Pictogram at left displayed.



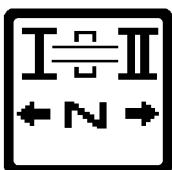
A00462

Press key and hold,



A00458

then press key, and fault symbol is cleared



A00437

Pictogram at left displayed.



A00462

Press key and hold,



A00458

then press key, and fault symbol is cleared



A00457

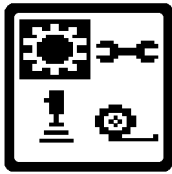
Press key, next pictogram displayed

Date	Version	Page	Calibration code 4007	Capitel	Index	Docu-No.
12/1999	a	1/5			0000	F

Farmer 400  
Fav 700  
Fav 900

Tractor / General system  
Calibration code 4007

F



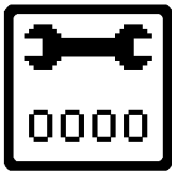
A00448

Key flashes



A00462

Press key, next pictogram displayed



A00447

Input code **4007**



A00461

Press one of keys until desired number is displayed.



A00462

Store with key, following pictograms displayed



A00441

Step 1 to



A00442

step 7 proceed automatically.



A00443

If incorrect values are found or conditions are not met, ERROR message is displayed. Explanation of error messages F1 to F15.



A00453

If calibration proceeds without errors, this pictogram is displayed, and new sensor settings are stored.

Date	Version	Page	Calibration code 4007	Capitel	Index	Docu-No.
12/1999	a	2/5		0000	F	000008

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Tractor / General system</b> <b>Calibration code 4007</b>	<b>F</b>
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**Check:**

A00462

Press key and hold,



A00458

then press key

If incorrect values are found or conditions are not met, **ERROR** message is displayed.  
 If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

**Note:**

Data are only accepted when ignition key is turned to position "0".

**Possible error messages when calibrating the transmission ratio, code 4007**

Error message	Cause / remedy
F 1	Preconditions not met
F 2	1. After ignition OFF relay in transmission e-box has not released. Once ignition has been switched off, release of relay in transmission e-box must be audible. 2. Test plug connections to actuator unit.
F 3	Actuator unit does not go to exact setpoint. Test ease of movement of transmission control, e.g. engage emergency control and test.
F 4	Transmission ratio has not been adjusted within 8 sec. Test ease of movement of transmission control, e.g. engage emergency control and test.
F 5	Step 1 = actuator unit does not find zero point from 0 in forward direction. Step 2 = actuator unit does not find zero point from 0 in reverse direction. Test connection between actuator unit and actuator shaft.
F 6	See error message F 5
F 7	Step 2: zero points of transmission control unit for forward and reverse travel are too far apart, greater than 8°. Test connection between actuator unit and actuator shaft. Actuator unit.
F 8	Step 3: maximum point of transmission ratio forwards not found. Target value min. 155°, max. 187°. Step 4: maximum point of transmission ratio in reverse not found. Target value min. 136°, max. 165°. Test connection between actuator unit and actuator shaft.
F 9	Step 3: actuator shaft is displaced by more than 155° forwards. However, transmission displacement reacts by less than 155°. Step 4: actuator shaft is displaced by more than 135° forwards. However, transmission displacement reacts by less than 135°. Test connection between actuator unit and actuator shaft. Actuator unit.
F 10	Transmission ratio characteristic curve not logical. For example, forward set, reverse detected. Repeat calibration. See also error message F 2 Test rotational direction signal from accumulator shaft sensor.
F 11 / F 12	Step 7 = verify figures of steps 1 to 6. ML transmission ratio not OK. Repeat calibration. See also error message F 2 Then, if necessary, test hydrostatic power branch, e.g. by means of Emergency mode.
F 13	1. Incorrect EOL programming (before step 1) 2. Stored values in transmission e-box not logical Remedy: 1. Run EOL programming again 2. See 1, if necessary fit new transmission e-box.
F 14	See F 11 / F 12

Date	Version	Page	Calibration code 4007	Capitel	Index	Docu-No.
12/1999	a	3/5		0000	F	000008

<i>Farmer 400</i> <i>Fav 700</i> <i>Fav 900</i>	Tractor / General system <b>Calibration code 4007</b>	<b>F</b>
---	--	----------

**Possible error messages when calibrating the transmission ratio, code 4007 (Forts.)**

<b>Error message</b>	<b>Cause / remedy</b>
F 15	1. Maximum forward and/or reverse transmission ratio is not reached 2. Speed-governor valve (30 km/h) defective. Remedy: 1. Repeat calibration (see also F 2). Then, if necessary, test hydraulic power branch, e.g. by means of Emergency mode. 2. Test speed-governor valve (30 km/h).

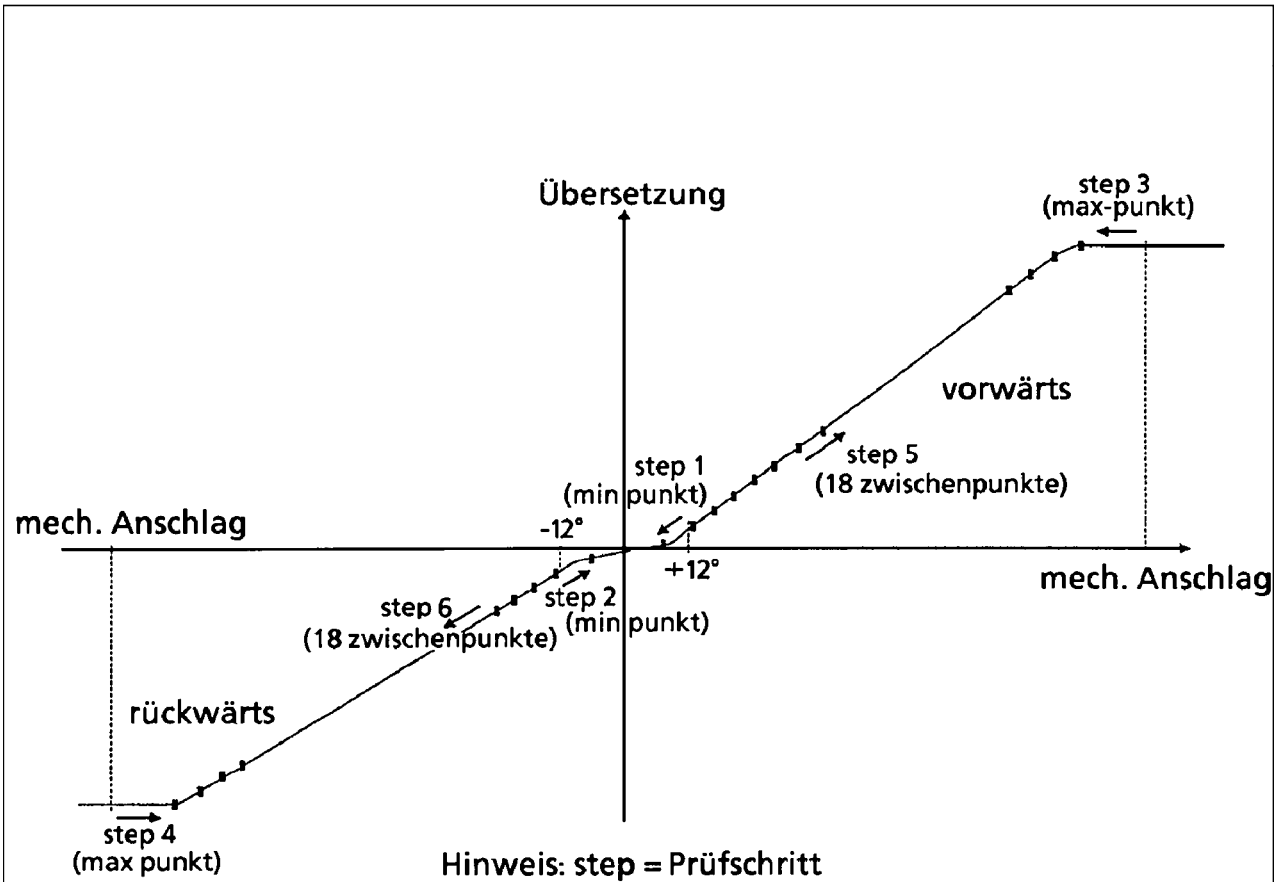
Date	Version	Page	Calibration code 4007	Capitel	Index	Docu-No.
12/1999	<b>a</b>	4/5		<b>0000</b>	<b>F</b>	<b>000008</b>

Farmer 400  
Fav 700  
Fav 900

Tractor / General system  
Calibration code 4007

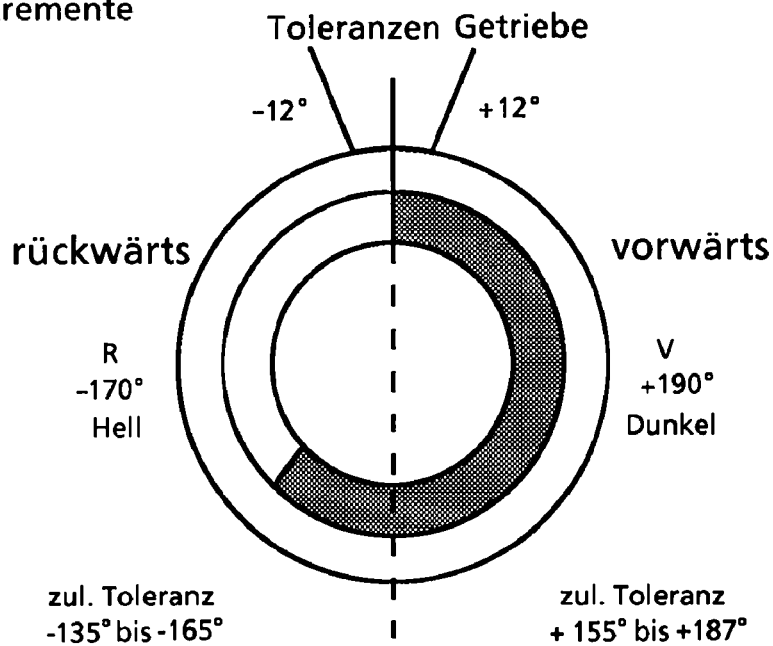
F

Graphic representation of transmission ratio calibration procedure



Der Inkrementalgeber in der Stelleinheit ist ein Drehwinkelgeber mit digitale Auflösung, der pro Umdrehung 8000 Impulse abgibt.

1° = 22,2 Inkremente



A000537

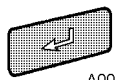
Date	Version	Page	Calibration code 4007	Capitel	Index	Docu-No.
12/1999	a	5/5		0000	F	000008

<b>Farmer 400</b> <b>Fav 700</b>	Tractor / General system <b>Calibration code 4009</b>	<b>F</b>
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## 11. Calibrating turboclutch operation

**Caution: following preparatory steps must be carried out.**

- Handbrake pulled on **tight**
- Start engine
- Tractor stationary (less than 0.01 km/h)
- Engine speed 1100 rpm  $\pm$  40
- During calibration engine speed falls to approx. 700 rpm
- Engage range II via switch in armrest
- Transmission oil temperature approx. 40°C
- If error messages are displayed, faults must be individually cleared



A00462

First press key and hold,



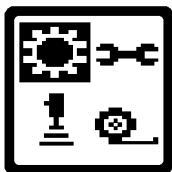
A00458

then press key, and fault symbol is cleared. Clear other faults in same way



A00457

Press key, next pictogram displayed.



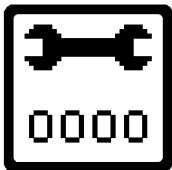
A00448

Key flashes



A00462

Press key, next pictogram displayed



A00447

Input code **4009**



A00461

Press one of keys until desired number is displayed.



A00462

Store with key, following pictogram displayed



A00444

System runs through following five pictograms automatically

Date	Version	Page	Calibration code 4009	Capitel	Index	Docu-No.
12/1999	<b>a</b>	1/2			<b>0000</b>	<b>F</b>



*Farmer 400*  
*Fav 700*

Tractor / General system  
**Calibration code 4009**

**F**



A00445



A00446



A00445



A00446

If incorrect values are found or conditions are not met, **ERROR** message is displayed.  
If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.

**Note:**

Data are only accepted when ignition key is turned to position "0".

Date	Version	Page	Calibration code 4009	Capitel	Index	Docu-No.
12/1999	a	2/2		0000	F	000009

Fav 900	Tractor / General System <b>Calibration 4002</b>	<b>F</b>
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## 12. Calibrating Hand Throttle

### Caution: Following preliminaries must be fulfilled.

- Parking Brake applied
- Ignition "ON"
- In Presence of Failure Codes, they must be cancelled individually



A00462

Press Key and hold,



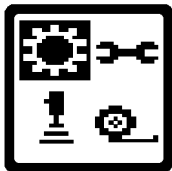
A00458

then press key and the failure code will be cancelled. Proceed the same way for eventual further Failure Codes.



A00457

Press Key



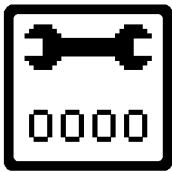
A00448

Wrench is flashing



A00462

Press Key, next symbol is displayed



A00447

Enter Code **4002**



A00461

Press any key, until desired value appears



A00462

Memorize with key.



EKI00679

Following symbol will appear



A00462

Hand Throttltle in min. Position and memorize with key

Date	Version	Page	Calibration 4002	Capitel	Index	Docu-No.
30.11.2000	a	1/2		0000	F	000013

<b>Fav 900</b>	Tractor / General System <b>Calibration 4002</b>	<b>F</b>
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EK100678

Following symbol will appear



A00462

Hand Throtttle in maximal Position and memorize with key

If values are out of range or any condition is not fulfilled, Failure **ERROR** will be displayed.  
 If Calibration runs OK without problem, **OK** will be displayed and the new values are memorized.

**Remark:**

Definite Memorization occurs only after having set Ignition to "OFF".

Date	Version	Page	<b>Calibration 4002</b>	Capitel	Index	Docu-No.
30.11.2000	<b>a</b>	2/2		<b>0000</b>	<b>F</b>	<b>000013</b>

Fav 900	Tractor / General System <b>Calibration 4005</b>	<b>F</b>
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### 13. Calibrating Accelerator Pedal Sensors (B029, B038)

**Caution: Following preliminaries must be fulfilled..**

- Parking Brake applied
- Start Engine
- In Presence of Failure Codes, they must be cancelled individually



A00462

Press Key and hold,



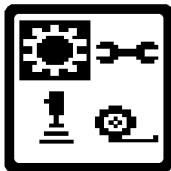
A00458

then press key and the failure code will be cancelled. Proceed the same way for eventual further Failure Codes.



A00457

Press Key



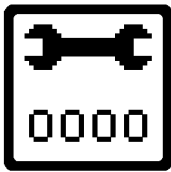
A00448

Wrench is flashing



A00462

Press Key, next symbol is displayed



A00447

Enter Code **4005**



A00461

Press any key, until desired valui appears



A00462

Memorize with key. Following symbol will appear



A02890

Set 850 Rpm Engine Speed with accelerator Pedal.



A00462

memorize with key

Date	Version	Page	Calibration 4005	Capitel	Index	Docu-No.
30.11.2000	a	1/2		0000	F	000014

Fav 900	Tractor / General System <b>Calibration 4005</b>	<b>F</b>
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A00436

Following symbol will appear  
Set 1300 Rpm Engine Speed with accelerator Pedal.



A00462

memorize with key



A00440

Following symbol will appear  
Set 1700 Rpm Engine Speed with accelerator Pedal.



A00462

memorize with key



A02889

Following symbol will appear  
Set 1900 Rpm Engine Speed with accelerator Pedal.



A00462

Following symbol will appear



A02891

Following symbol will appear  
Set Maximum Engine Speed with accelerator Pedal.



A00462

memorize with key

If values are out of range or any condition is not fulfilled, Failure **ERROR** will be displayed.  
If Calibration runs OK without problem, OK will be displayed and the new values are memorized.

**Remark:**

Definite Memorization occurs only after having set Ignition to "OFF".

Date	Version	Page	Calibration 4005	Capitel	Index	Docu-No.
30.11.2000	a	2/2		0000	F	000014

<b>Fav 900</b>	<b>Transmission / Transmission control unit</b> <b>Transmission control unit functional sequence</b>	<b>A</b>
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## Transmission type ML 200

- M = Marschall, designer of this development  
 L = Stands for the German term Leistungsverzweigung (= power splitting), mechanical and hydrostatic power transmission  
 200 = Average power 200 bhp, 100 - 300 bhp is economically transmitted to the wheels.

## ML 200 transmission

The ML 200 transmission is a continuously variable transmission for forward and reverse travel.

Synchronised range shifting is integrated in the transmission.

Range I is for forward speeds from 0 to approx. 32 km/h.

Range II is for forward speeds from 0 to approx. 50 km/h.

Range I is intended for heavy traction work at low travel speeds, i.e. less than 12 km/h.

Range II is intended for use on roads (transporting applications). At 50 km/h the transmission ratio is electronically matched to the engine speed. Should the electronic governor not engage, the tractor runs at a max. travel speed of approx. 70 km/h.

Power transmission can be hydrostatic or mechanical or hydrostatic and mechanical.

Basically this means:

Slow forward travel = hydrostatic power transmission high / mechanical low

Fast forward travel = hydrostatic power transmission low / mechanical high

Detailed explanation: Chapter 1005 Reg. A - Transmission function schematic

## Hydrostatic power branch

The ML transmission unit is flexibly mounted in the transmission housing. The transmission housing is also the oil reservoir for the hydrostatic drive.

Oil: STOU oil

Initial fill: approx. 85 l

Refill: approx. 65 l, e.g. at an oil change

Functional sequence: Chapter 1005 Reg. C - Hydraulic circuit diagram

The lubricating pump (1P2) draws in oil via the intake filter (1Z1).

The temperature sensor (1S1 / B009) monitors the transmission oil temperature.

Oil flow through the oil cooler (1Z3) depends on the temperature.

This means that if the transmission oil is cold, little oil flows through the oil cooler, while most flows via the bypass valve which opens when the pressure differential exceeds approx. 3.5 bar. The transmission oil temperature is monitored by the temperature sensor.

The servopump (1P1) generates the system pressure for the ML control valves and the enhanced control valves. The system pressure of approx. 25 bar is restricted by the pressure-relief valve with its throttling port.

### The system uses different pressures.

1. System pressure for ML transmission control unit approx. 25 bar and enhanced pressure approx. 18 bar for rear PTO clutch, differential locks and cardan brake.
2. High pressure in ML transmission. Max. pressure-measuring point approx. 500 + 20 bar.

Contamination of the pressure filter is monitored by a pressure-operated switch (1S2 / So17) as a function of the transmission oil temperature. If the transmission oil temperature is below 50°C, filter contamination is not monitored.

Date	Version	Page	Capitel	Index	Docu-No.
6.8.2001	a	1/4	<b>Transmission control unit functional sequence</b>		
			<b>1005</b>	<b>A</b>	<b>000005</b>

<b>Fav 900</b>	<b>Transmission / Transmission control unit</b> <b>Transmission control unit functional sequence</b>	<b>A</b>
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Cooled transmission oil is supplied to the high-pressure circuit via two non-return valves alternately. Hot transmission oil is discharged from the high-pressure circuit via the flush valve (2V5).

The high-pressure circuit incorporates: a variable-displacement pump (2P1) and two variable-displacement motors (2A1 / 2A2), two non-return valves, two servo-assisted high-pressure-relief valves (2V3 / 2V4), a flush valve 2V5), a turboclutch pressure-relief valve (4V4 / Y004), a clutch pressure-relief valve (4V5) and a test connection.

The regulator cylinders of the variable-displacement pump and variable-displacement motors are actuated by two 4/3-way valves.

The 4/3-way valves are activated mechanically by the actuator shaft.

The actuator shaft is rotated as required by the actuator unit, thereby setting the correct quantity of oil to be supplied or consumed.

The variable-displacement pump and variable-displacement motors swivel accordingly.

In Emergency mode the actuator shaft is operated manually from the cab.

For further details on the actuator unit (A009), please see the section dealing with electronics.

In Emergency mode the transmission is automatically locked at approx. 30 km/h after the engine has been started.

If the clutch pedal, handbrake or neutral switch is operated, the high-pressure circuit is depressurised by means of the two high-pressure-relief valves.

Operation of the turboclutch is controlled via the pressure-relief valve.

**Important note** on filling the ML 200 transmission with oil:

During normal maintenance work, e.g. for a transmission oil change, the transmission oil should be added as in a normal change-gear transmission.

If there is no oil in the high-pressure circuit, the transmission must be filtered via an external hydraulic oil-filling unit.

See Chapter 1080 Reg. G

The transmission oil is also filtered through the connection as it is being added.

If the oil is not topped up, it may result in damage to the variable-displacement pump and variable-displacement motors if they run dry after starting up.

**Electrical / electronic control**

**The CAN-bus** is a data line which connects various components (also called users) to each other. If a large amount of data is transmitted, the voltage in the CAN-bus (+ and - wires) rises.

In the Favorit 900 chassis number 23/3001 and up data are transmitted via three CAN-bus systems

K-bus = enhanced control bus

G-bus = transmission bus

EDC-bus = Electronic Diesel Control

The voltage can be checked at the CAN-bus sockets

Date	Version	Page	Capitel	Index	Docu-No.
6.8.2001	a	2/4	1005	A	000005

<b>Fav 900</b>	<b>Transmission / Transmission control unit</b> <b>Transmission control unit functional sequence</b>	<b>A</b>
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The **A009 - actuator unit** controls the actuator shaft, thereby changing the transmission ratio in the ML transmission.

The actuator unit comprises:

1. Drive for Emergency mode (required in case of failure of the electronic control system)
2. Clutch for the drive
3. Incremental encoder which is a position sensor with digital resolution emitting 8000 pulses per revolution.
4. Planetary gear  $i = 192 : 1$  (electric motor to actuator shaft)
5. 12 V<sub>DC</sub> electric motor, 0.4 to 7 amps, actuator unit no-load speed of 4500 rpm
6. Slip clutch 2.5 to 3.5 Nm, 4 to 5 Nm at key-operated actuator of emergency control

Once the ignition is on, the actuator unit locates the reference point (approximate neutral point between forward and reverse travel).

When the engine has started, the actuator unit locates the reference point (exact neutral point between forward and reverse travel).

**Automatic maximum output control** (restricting the reduction in engine speed or adaptation to the engine output)

Example: the engine speed is reduced when a load is applied. The electronics change the transmission ratio towards slow so that the engine speed is not reduced too far.

Automatic maximum output control is always engaged once the engine is started. However, the reduction in engine speed can be changed from 0 to 30% (see Operating Manual).

The default setting is 14%.

**Automatic maximum output control functions:**

The electronics detect the setpoint engine speed from the position of the accelerator pedal by means of the analogue position sensor (potentiometer) on the accelerator.

**Control - setpoint transmission ratio has been reached.**

The tractor is put under load, and the engine speed drops.

The automatic maximum output control only ever changes the transmission ratio towards slow.

The automatic maximum output control is engaged at:  
reduction in engine speed of over 180 rpm + set value.

**Example:**

Engine speed according to accelerator pedal position	2000 rpm
Setting for automatic maximum output control 10% =	200 rpm
Calculation:	
2000 rpm - 180 rpm - 200 rpm =	1620 rpm

This means that the automatic maximum output control changes the transmission ratio towards "Slow" from 1620 rpm. Theoretically the automatic maximum output control changes the transmission ratio when under load until the travel speed reaches 0.

**Note:**

**Since the automatic maximum output control only changes the transmission ratio towards slow, it is beneficial to switch on cruise control.**

**If the engine speed rises again with cruise control switched on, the transmission ratio is changed towards fast again, up to the stored speed at a maximum.**

**Control by means of the automatic maximum output control + cruise control can be damped or accelerated using the crossgate lever (accelerator ramp switch) on the joystick.**

Date	Version	Page	Transmission control unit functional sequence	Capitel	Index	Docu-No.
6.8.2001	a	3/4		1005	A	000005



<b>Fav 900</b>	<b>Transmission / Transmission control unit</b> <b>Transmission control unit functional sequence</b>	<b>A</b>
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**Sensors**

**B010 - engine sensor 1 and B011 - engine sensor 2** measure the engine speed. Both sensors must provide an identical signal. If one sensor fails, it is only possible to proceed in Emergency mode.

**B014 - sensor, accumulator shaft and B015 - sensor, bevel pinion** measure the rotational and forward speeds and detect the rotational direction.

**B008 - sensor, high-pressure** transmits the instantaneous hydraulic pressure in the high-pressure circuit to the electronics.

**B029 - sensor, accelerator** transmits the accelerator pedal position to the electronics and compares it with the engine speed. This position sensor is required for automatic maximum output control.

**B017 - sensor, clutch pedal** electronically monitors the clutch pedal travel. Before the clutch is engaged, the transmission ratio is reduced. Pulling away in speed range I approx. 5 km/h, pulling away in speed range II approx. 10 km/h.

**B016 - range sensor I / II** electronically monitors the range control travel.

**B009 - sensor, output temperature** monitors the transmission oil temperature. Temperatures above 110°C are stored under fault code 4.1.53.

**Actuators**

**The range control I and II solenoids** charge the selector cylinders of range control I / II with hydraulic oil.

Range control I / II can be actuated under the following conditions:

**a) The tractor is stationary.**

1. The engine is running.
2. The neutral switch has been operated, **LED N** in the armrest **is illuminated** or the clutch pedal has been actuated (which opens the high-pressure valves).
3. The tractor can drive at a maximum speed of 2.5 km/h.
4. The range control can be shifted from I to II or from II to I.

**b) The tractor is moving.**

1. Speed above 5 km/h
2. The neutral switch has been operated, **LED N** in the armrest is **off** (which closes the high-pressure valves). It is also possible to shift range with the clutch pedal depressed.
3. The transmission must not be under an excessive load (max. 150 bar in the high-pressure circuit).
4. It is only possible to shift from range I up to II.

**The transmission neutral / turboclutch valve solenoid** controls the turboclutch operation. The high-pressure valves open as a function of the engine speed.

**The speed governor solenoid** cancels the approx. 30 km/h speed restriction when the electronics are operational. The speed restriction is cancelled when  $800 \pm 50$  mA is applied to the solenoid.

**The pressure-operated switch** monitors clogging of the pressure filter on the ML transmission.

**Handbrake switch**, with the handbrake on, the two high-pressure valves are opened - both F/R lamps flash. The transmission is switched to neutral.

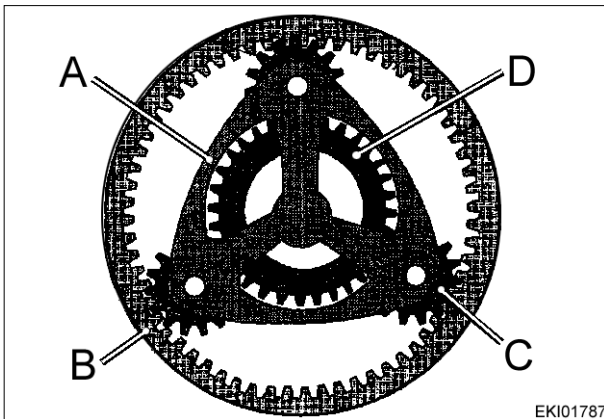
**Joystick** in the right **armrest**.

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6.8.2001	a	4/4	1005	A	000005

Fav 900

Transmission / Transmission Control Unit  
Transmission function schematic

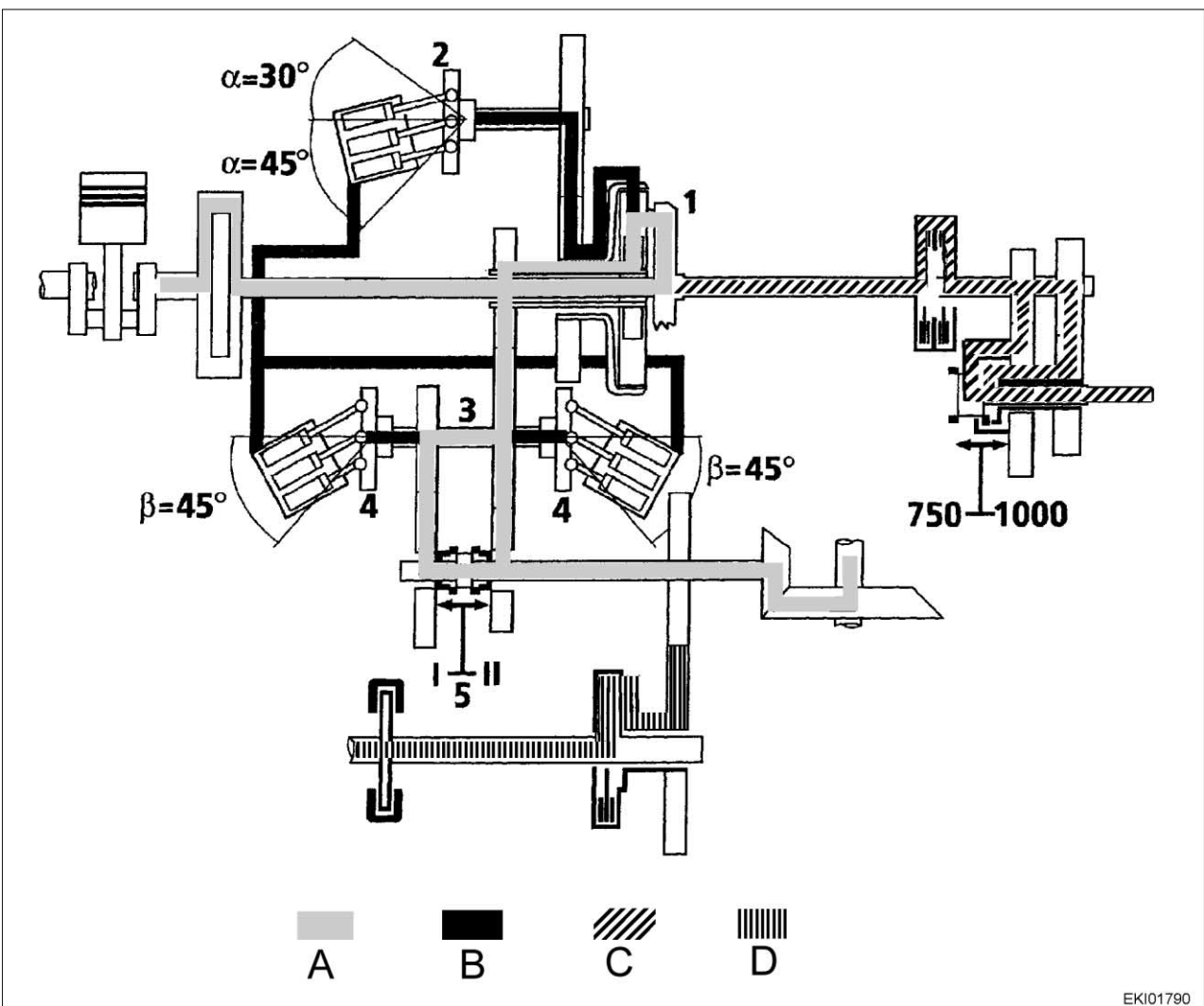
**A**



EKI01787

**Planetary gear / power splitting**

- A = Planet carrier**  
Drive from engine
- B = Annulus**  
Drive to pump
- C = Planet wheel**
- D = Sun wheel**  
Drive to accumulator shaft



EKI01790

A	Mechanical power flux	1	Planetary gear
B	Hydrostatic power flux	2	Hydraulic pump
C	PTO drive	3	Accumulator shaft
D	4WD	4	Hydraulic motor
		5	Range control

Date	Version	Page	Capitel	Index	Docu-No.
07/2001	a	1/6	1005	A	000004

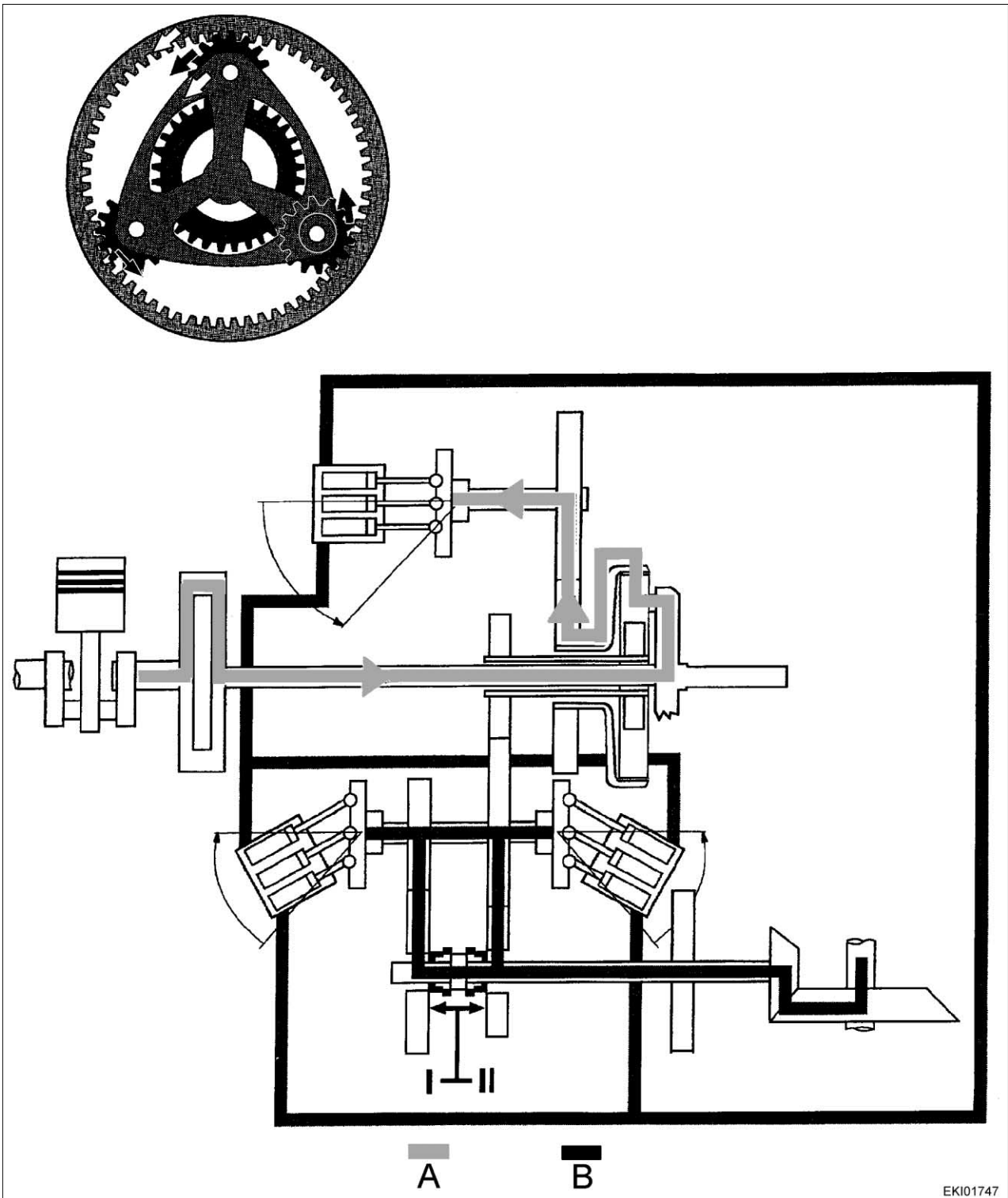
Fav 900

Transmission / Transmission Control Unit  
Transmission function schematic

A

Active stationary mode

Engine running, tractor stationary



EKI01747

A Mechanical power flux	B Hydrostatic power flux
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Date	Version	Page	Transmission function schematic	Capitel	Index	Docu-No.
07/2001	a	2/6			1005	A

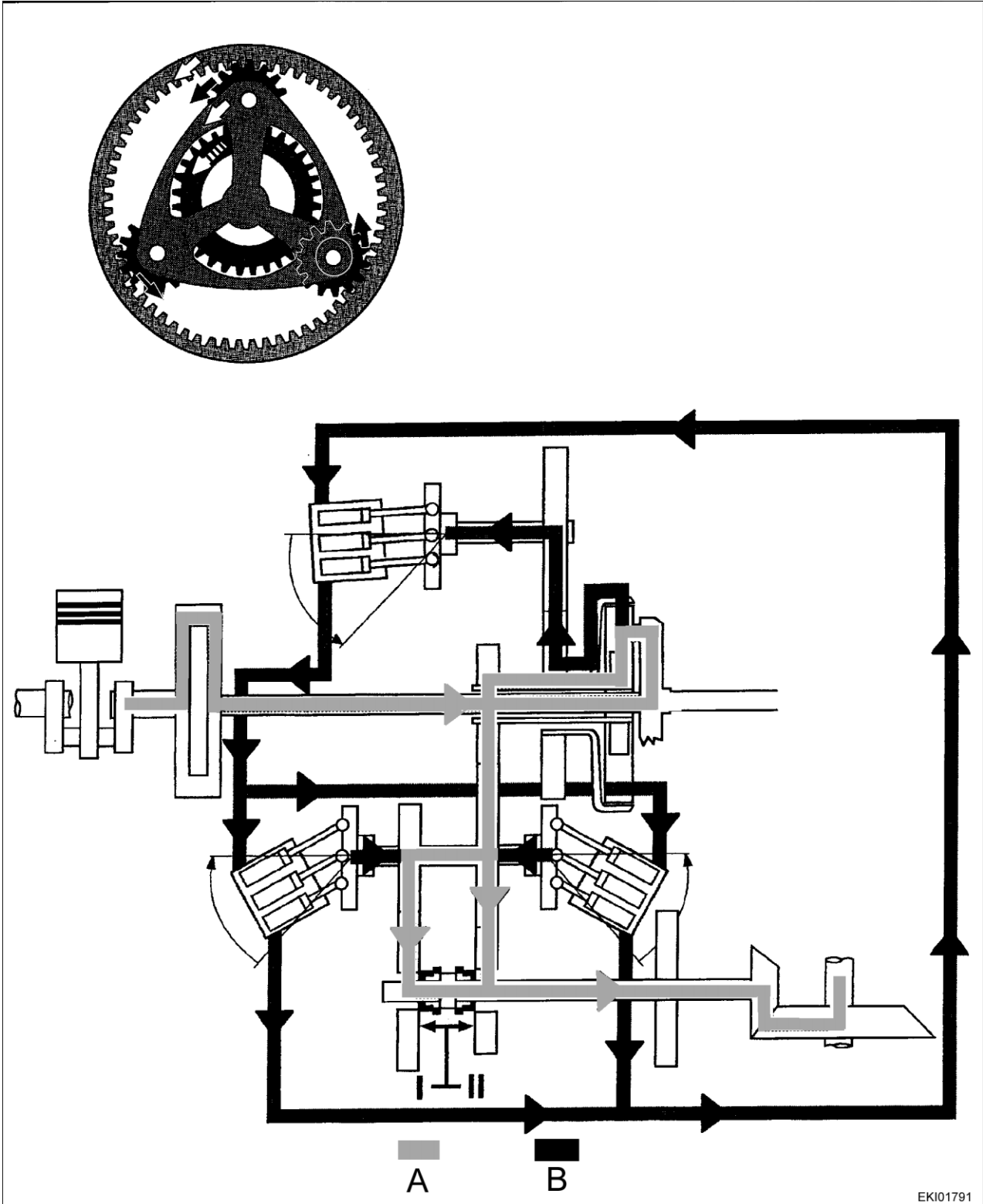
Fav 900

Transmission / Transmission Control Unit  
**Transmission function schematic**

**A**

**Pulling away**

99% hydrostatic power transmission  
 1% mechanical power transmission



EKI01791

A	Mechanical power flux	B	Hydrostatic power flux
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Date	Version	Page	Capitel	Index	Docu-No.
07/2001	a	3/6	1005	A	000004

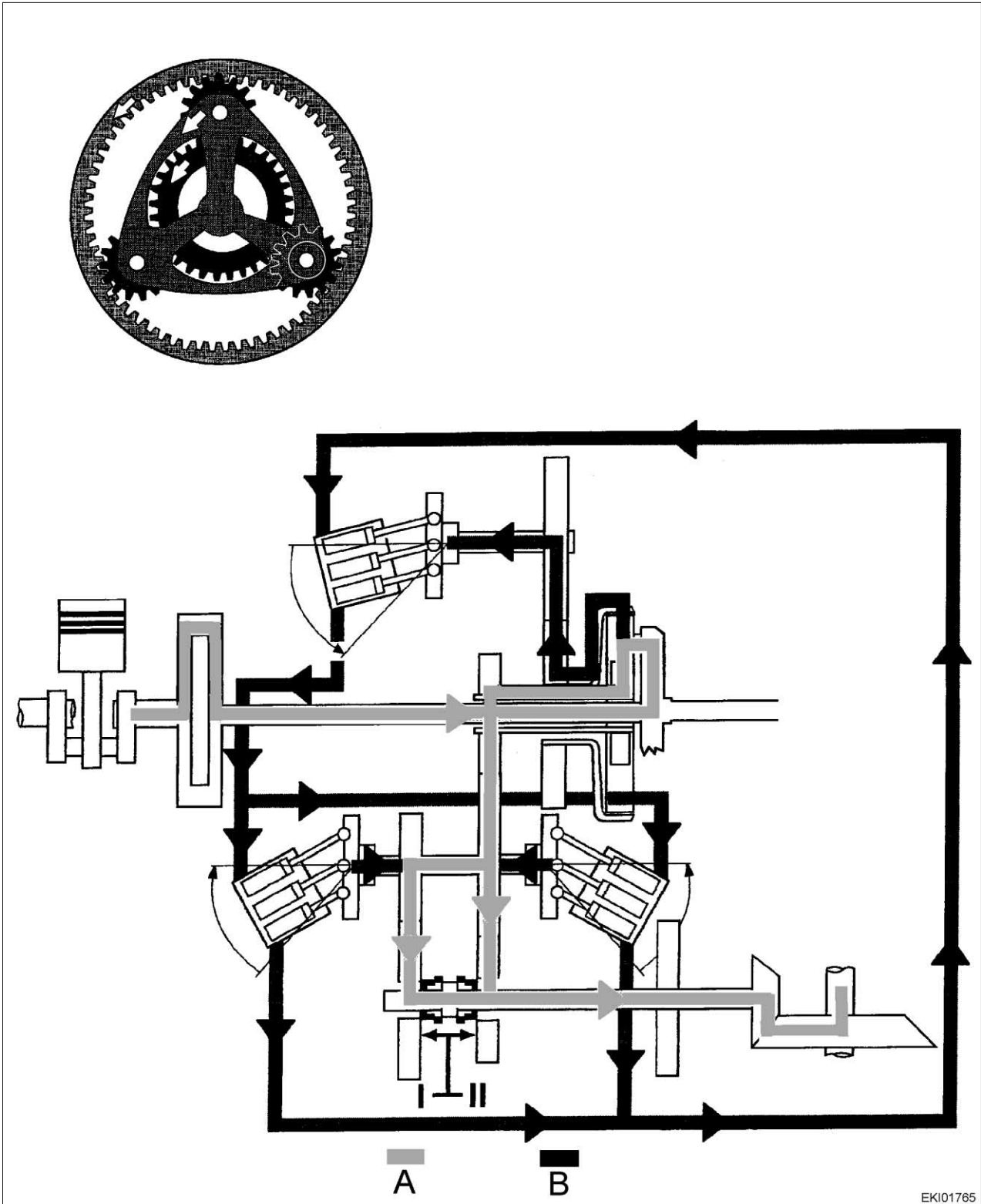
Transmission function schematic

Fav 900

Transmission / Transmission Control Unit  
**Transmission function schematic**

**A**

**Driving, medium speed**  
 50% hydrostatic power transmission  
 50% mechanical power transmission



EKI01765

A	Mechanical power flux	B	Hydrostatic power flux
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Date	Version	Page	Capitel	Index	Docu-No.
07/2001	a	4/6	1005	A	000004

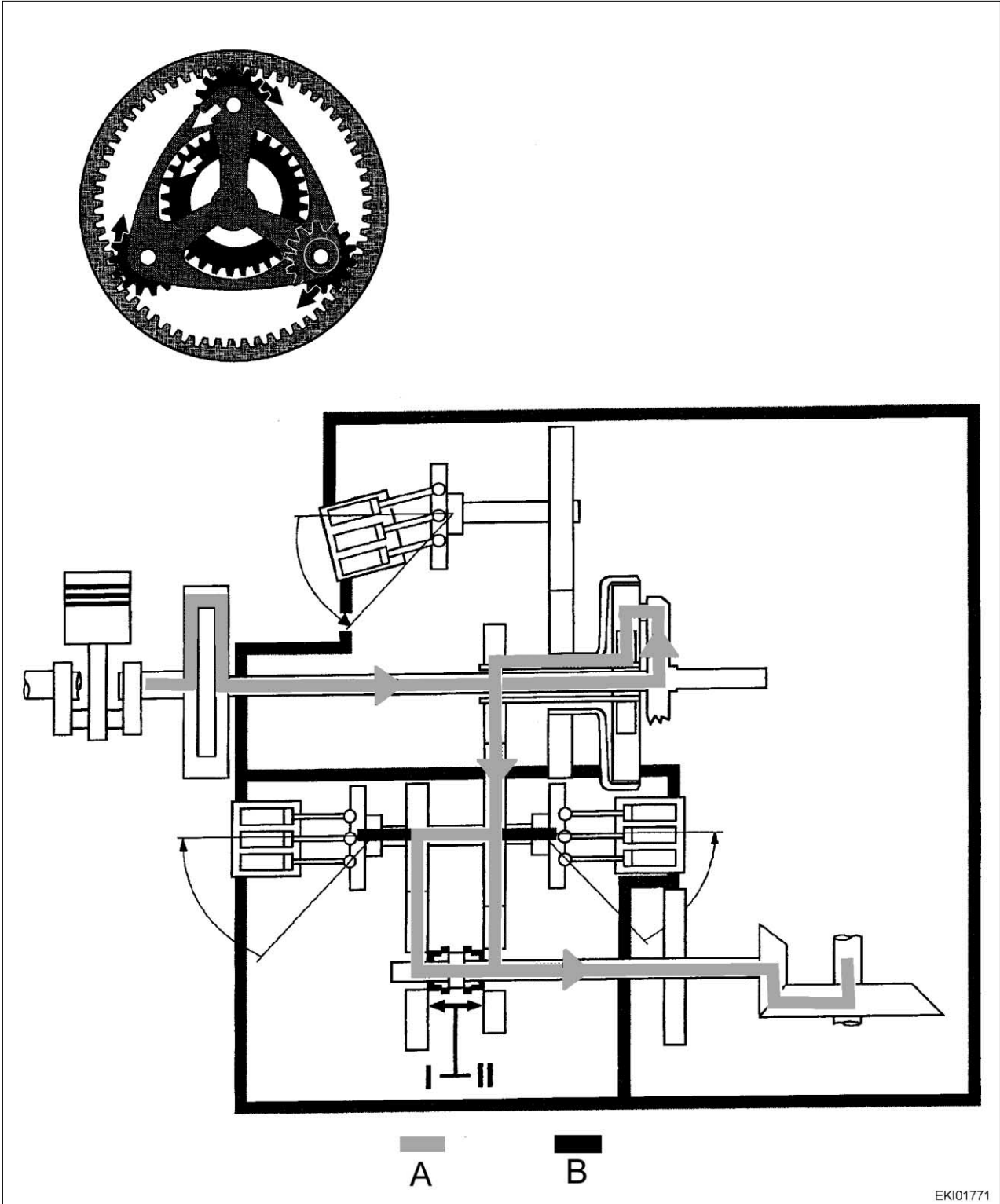
Transmission function schematic

Fav 900

Transmission / Transmission Control Unit  
Transmission function schematic

A

Transporting 50 km/h  
Engine 1500 rpm  
100% mechanical power transmission



EKI01771

A	Mechanical power flux	B	Hydrostatic power flux
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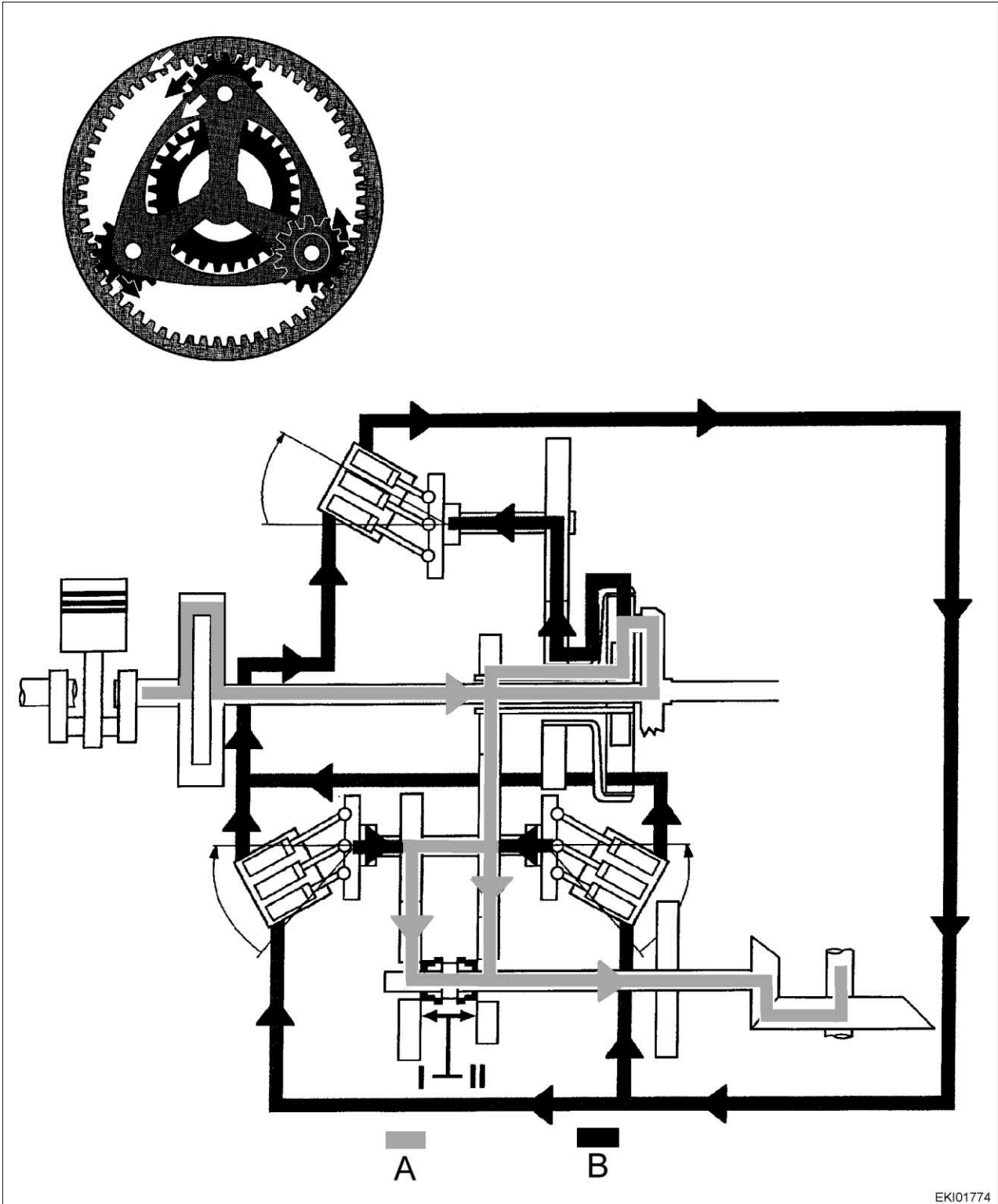
Date	Version	Page	Capitel	Index	Docu-No.
07/2001	a	5/6	1005	A	000004

Fav 900

Transmission / Transmission Control Unit  
**Transmission function schematic**

**A**

**Reversing**  
**Medium speed**  
 100% hydrostatic power transmission  
 Ring gear turning faster than engine

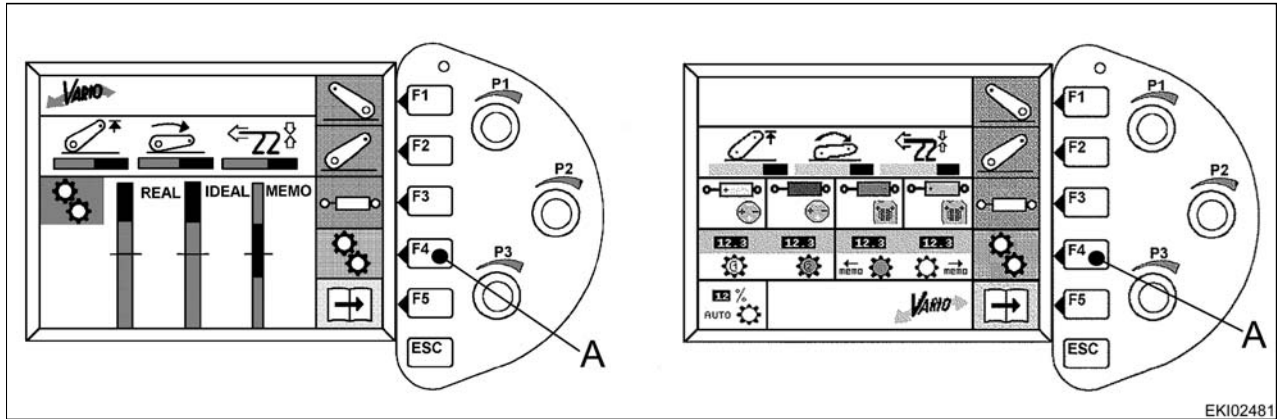


A Mechanical power flux	B Hydrostatic power flux
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Date	Version	Page	Transmission function schematic	Capitel	Index	Docu-No.
07/2001	a	6/6		1005	A	000004

Fav 900	Transmission / Transmission control unit <b>Transmission programming</b>	<b>A</b>
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The transmission is programmed via the Vario terminal. Press **F4** to move to the transmission settings menu level.



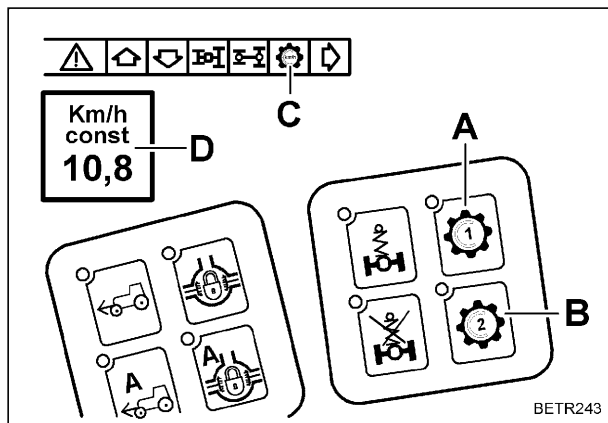
Vario terminal main menu level	
Variotronic 1.0	Variotronic 2.0

### 1. Setting cruise control.

**The speed is kept constant.**

The cruise control function enables the driver to reach and maintain a predefined speed whenever required, simply and accurately.

With the Vario transmission there are two independent cruise control memories so two speeds (e.g. for agricultural operations and on-road driving) can be stored.



The setpoint speed is displayed in the centre of the **instrument panel (D)**.

When cruise control is ON, the **cruise control pictogram (C)** lights up.

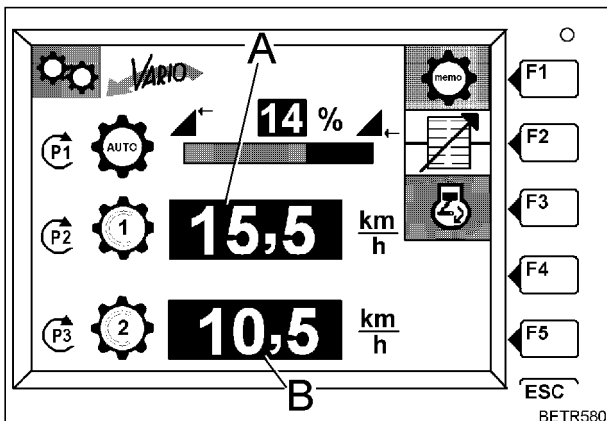
Cruise control memory 1 ( **A** )

Cruise control memory 2 ( **B** )

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Fav 900	Transmission / Transmission control unit <b>Transmission programming</b>	<b>A</b>
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**Presetting speeds using the rotary controls on the control console**

Once the transmission menu has been called up, the desired speed can be set using the rotary controls.

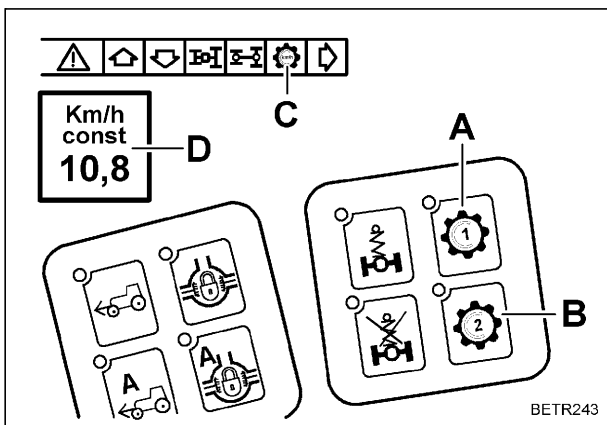
P2 = cruise control 1 ( A )

P3 = cruise control 2 ( B )

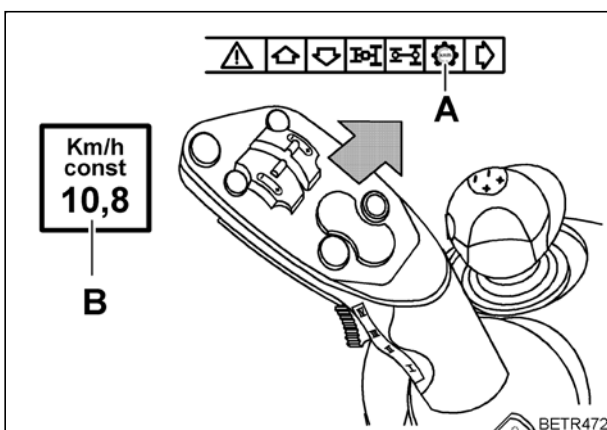
The set values are automatically stored and remain stored even when the ignition is switched off.

When driving with cruise control engaged, the stored speed can be adapted to the current operating conditions by adjusting the relevant **rotary control P2 or P3** .

**2. Activating cruise control.**



Press the key ( **A or B** ) briefly to toggle between the two cruise control memories.



If you wish to drive at the stored speed again, press the joystick to the right ( "**Cruise control on**" ).

The transmission accelerates or decelerates until the stored speed is reached.

The cruise control pictogram ( **A** ) lights up on the instrument panel, and the stored speed is displayed on the multi-display ( **B** ).

**The cruise control can only be activated if the following conditions are met:**

- Clutch pedal is not operated
- Vehicle is in motion
- Engine speed is greater than 1400 rpm

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Otherwise, the cruise control function is cancelled, and the current transmission ratio is maintained. It is not possible to pull away from stationary with cruise control engaged.

The stored speeds can be used in both directions.

#### Cruise control is terminated by:

- moving the joystick from its neutral position
- operating the footbrake or the exhaust brake
- reducing the engine speed to below 1400 rpm
- changing to neutral
- shifting the range control from range I to range II

### 3. Automatic maximum output control

(Limiting the reduction in engine speed or adapting to the engine output)

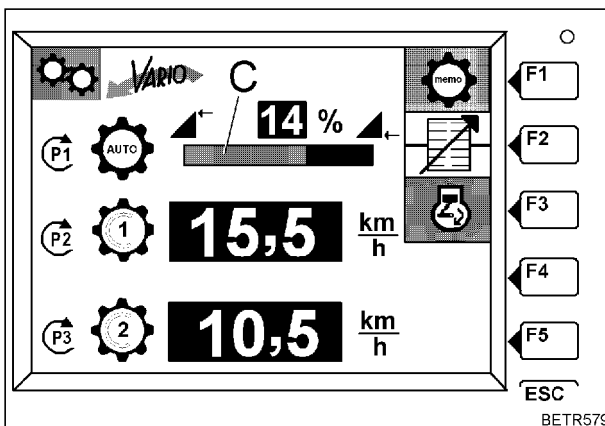
The aim is to free the driver from having to adapt the driving speed to the available engine output when operating at the engine's power limit.

The **setpoint engine speed** (accelerator pedal position) is therefore compared constantly with the **actual engine speed**.

The automatic maximum output control is engaged automatically when the engine speed falls under load.

#### Example:

The engine speed is reduced when a load is applied. The electronics change the transmission ratio towards slow so that the engine speed is not reduced too far. The permissible reduction in engine speed can be set from 0 to 30% via the control console.



#### Setting the automatic maximum output control:

The set reduction in engine speed, e.g. 14%, is displayed by the bar display ( C ).

Turn the rotary control ( P1 ) to set the reduction in engine speed level from 0 to 30%.

The engine speed can be reduced by 180 rpm without any control action being initiated. This ensures that the control unit is not constantly actuated.

#### When is the automatic maximum output control activated?

With a reduction in engine speed of over 180 rpm + set value

#### Example:

Engine speed according to accelerator pedal position = 2000 rpm

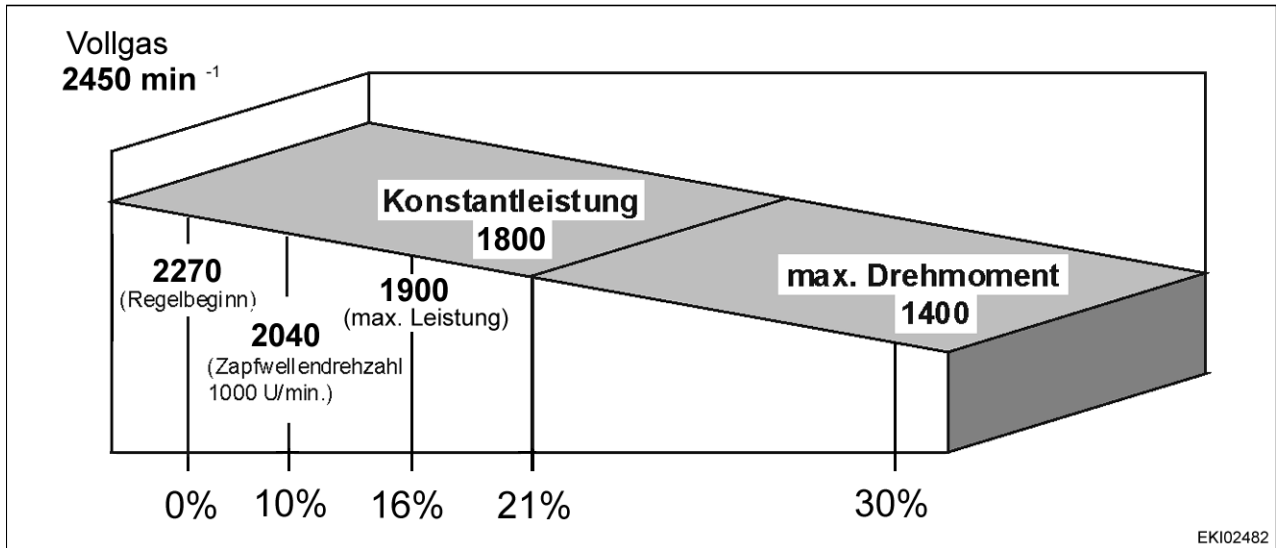
Automatic maximum output control setting 10% = 200 rpm

**2000 rpm - 180 rpm - 200 rpm = 1620 rpm = automatic maximum output control activated**

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**Favorit 900 automatic maximum output control**



**Application examples:**

**Heavy traction work (ploughing)**

Utilising constant output range, maximum output per unit area, best possible utilisation of total available engine output

Engine speed (accelerator)	Full throttle 2450 rpm
Automatic maximum output control setting:	16%
Reduction in engine speed to	1900 rpm

**PTO work (rotary harrow)**

Maximum PTO output. PTO speed must be maintained to achieve optimum work quality.

Engine speed (accelerator)	Full throttle 2450 rpm
Automatic maximum output control setting:	10%
Reduction in engine speed to	2040 rpm

**Transport (maximum transport speed)**

Maximum transport speed, utilising constant output range, best possible utilisation of total available engine output

Engine speed (accelerator)	Full throttle 2450 rpm
Automatic maximum output control setting:	16%
Reduction in engine speed to	1900 rpm

<b>Fav 900</b>	<b>Transmission / Transmission control unit</b> <b>Transmission programming</b>	<b>A</b>
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**Transport (minimum fuel consumption)**

Lowest possible fuel consumption, utilising engine torque

Engine speed (accelerator)	1850 rpm
Automatic maximum output control setting:	16%
Reduction in engine speed to	1400 rpm

**Note:**

Since the automatic maximum output control only changes the transmission ratio towards slow, it is beneficial to switch on cruise control. If the engine speed rises again with cruise control switched on, the transmission ratio is changed towards fast again, up to the stored speed at a maximum.

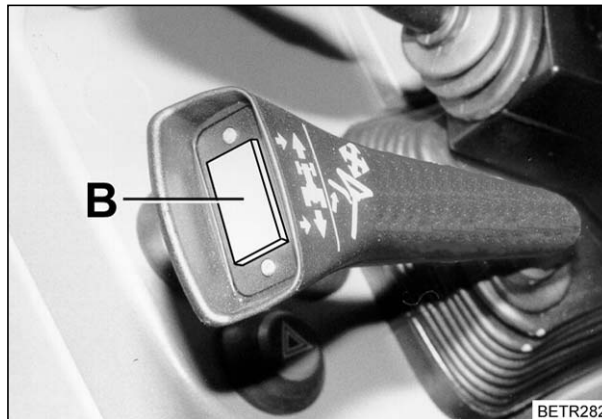
**4. Reversing and storing the transmission ratio.****Gentle direction change**

Pull the joystick backwards (when driving forwards) until the tractor comes to a halt, then press the activating control and pull the joystick backwards again.

**Rapid direction change**

The Vario 900 has two means of quickly changing the direction of travel:

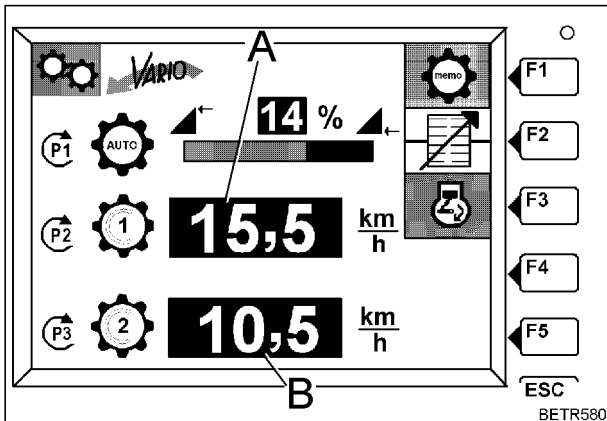
- Press activating control and move joystick to left
- Operate switch (B) in steering wheel adjustment lever.



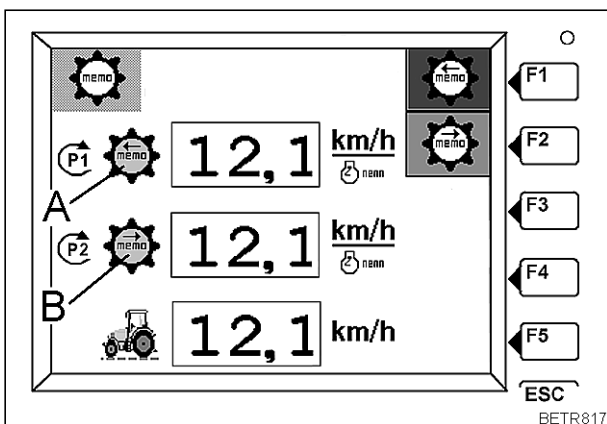
If the driver moves the joystick to the left while driving and then presses the activating control or the switch in the steering wheel adjustment lever ( **B** ), a programmed direction-change procedure is initiated. The tractor decelerates to a standstill, then accelerates away in the opposite direction. During deceleration, the preset direction of travel is indicated by the relevant display flashing, while the actual direction of travel is shown by a steady light.

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Fav 900	Transmission / Transmission control unit <b>Transmission programming</b>	<b>A</b>
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Press **F1** in the transmission settings menu level to go to the transmission ratio menu level.



The speed setting is carried out using rotary control P1 (forwards) and rotary control P2 (reverse). Activate the speed settings using keys **F1** = forwards and **F2** = reverse.

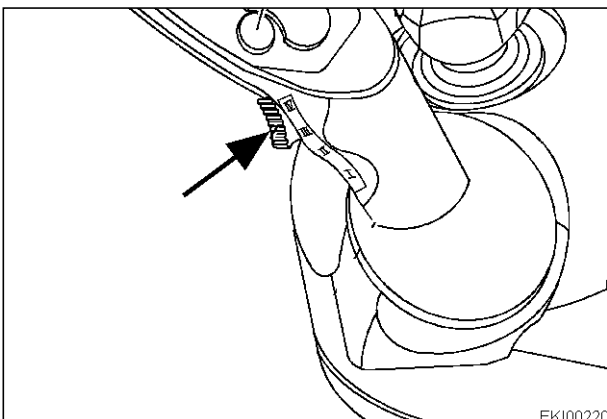
This enables the shuttle process to be optimally adapted to the prevailing conditions. These are not cruise control functions; in other words, no ongoing corrections are carried out.

**Without any preset the tractor drives forwards and backwards equally fast ("shuttle control").**

### 5. Adjusting acceleration

During the direction-change procedure the driver can release the joystick. The direction-change procedure can be cancelled at any time by moving the joystick (forwards or backwards).

Acceleration and deceleration during rapid direction change depend on the position of the accelerator control ( **B** ) on the joystick ( I = gentle, IV = aggressive ).



	<b>1x touch</b>	<b>0 to 50 km/h</b>
Level I:	0.03 - 0.5 km/h	250-45.5 sec
Level II:	0.5 km/h	45.5 secs
Level III:	1 km/h	23.8 secs
Level IV:	2 km/h	10 secs

Rapid direction change can be initiated at any travel speed.

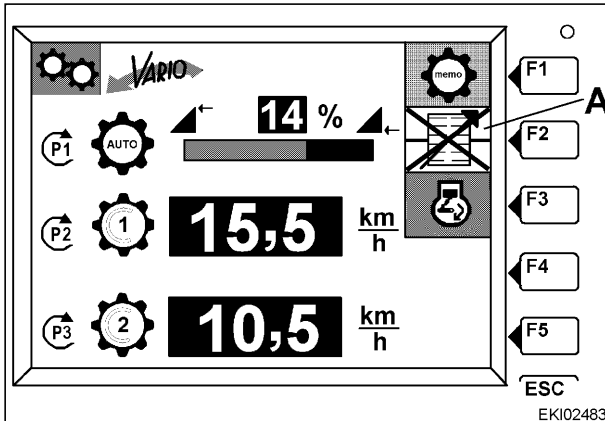
Date	Version	Page	Transmission programming	Capitel	Index	Docu-No.
20.11.2001	a	6/7		1005	A	000006

<b>Fav 900</b>	<b>Transmission / Transmission control unit</b> <b>Transmission programming</b>	<b>A</b>
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## 6. Turboclutch operation

The turboclutch function is simulated by modulating the working pressure in the hydrostatic circuit as a function of the engine speed. By reducing the pressure in the hydrostatic circuit, the tractive power is reduced at low engine speeds. The effect of the turboclutch function, therefore, is comparable to measured actuation of the clutch pedal.

If the engine speed falls below 1400 rpm, the working pressure in the hydrostatic circuit is steadily reduced with decreasing engine speed. In this way the engine load is reduced, as in a real turboclutch, and the engine is prevented from stalling.



### Disabling turboclutch operation.

The driver can disable the turboclutch for certain operations by pressing F2 on the terminal. With the turboclutch disabled the pictogram (A) is displayed as shown.

### Shut-off conditions

- Engine running
- Transmission in neutral
- System not in Emergency mode
- No fault message generated

### Note:

Turboclutch operation is automatically reactivated after every restart.

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<b>Fav 900</b>	Transmission / transmission Control <b>Transmission hydraulic diagram and legend</b>	<b>C</b>
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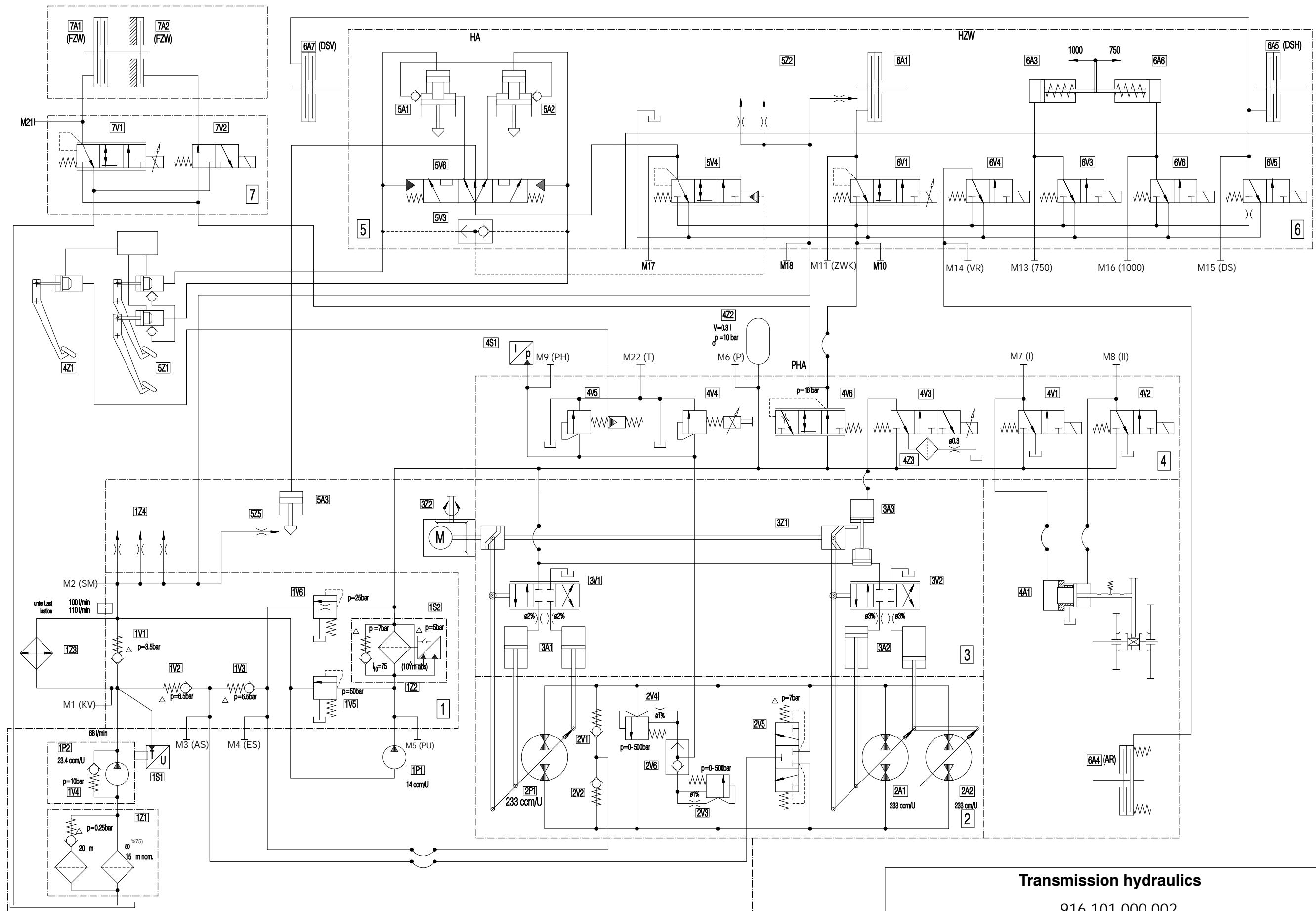
Date	Version	Page		Capitel	Index	Docu-No.
04/2000	<b>a</b>	1/3	<b>Transmission Hydraulik diagram and legnd</b>	<b>1005</b>	<b>C</b>	<b>000003</b>

<b>Fav 900</b>	<b>Transmission / transmission Control</b> <b>Transmission hydraulic diagram and legend</b>	<b>C</b>
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<b>Circuits:</b>			<b>Valves:</b>		
1		Valves bloc "Supply / Lubrication"	1V1		Radiator Bypass Valve
2		Main Circuit	1V2		Pressure Limiting Valve Feed line
3		Control	1V3		Pressure Limiting Valve Supply line
4		Valves bloc Comfort hydraulics	1V4		Pressure Limiting Valve Lubrication
5		Brakes and Rear Axle	1V5		Pressure Limiting Valve Servo pump
6		Valves bloc on Rear Axle	1V6		Pressure Limiting Valve Servo- Circuit
7		Front PTO	2V1		Supply Valve "Ahead"
<b>Pumps:</b>			2V2		Supply Valve "Reverse"
1P1		Pump Control Pressure	2V3		High Pressure Limiting valve "Ahead"
1P2		Lubrication pump	2V4		High Pressure Limiting valve "Reverse"
2P1		Hydrostatic Pump	2V5		Flushing valve
		Drives:	2V6		Switching valve
2A1		Hydrostatic Pump	3V1		Controller valve Hydrostatic Pump
2A2		Hydrostatic Motor	3V2		Controller valve Hydrostatic Motor
3A1		Control Cylinder Hydrostatic Pump	4V1	Y002	Solenoid Valve Operating range 1
3A2		Control Cylinder Hydrostatic Motor	4V2	Y003	Solenoid Valve Operating range 2
3A3		Speed limiter in auxilliary operation	4V3	Y005	Solenoid valve speed limiter
4A1		Shifting Operating Ranges	4V4	Y004	Pressure Limiter valve Turboclutch
5A1		Brake actuator right	4V5		Pressure limiting valve clutch
5A2		Brake actuator left	4V6		Pressure reducer Rear axle
5A3		Front axle brake	5V1		Cooling oil valve Right brake
6A1		Clutch Rear PTO	5V2		Cooling oil valve Left brake
6A2		Control Cylinder PTO 540	5V3		Swithing Valve
6A3		Control Cylinder PTO 750	5V4		Relay Valve Brakes
6A4		4WD Clutch	5V5		Cooling oil valve front axle brake
6A5		Differential Lock Rear Axle	5V6		Direction Brake Valve
6A6		Control Cylinder PTO 1000	6V1	Y008	Pressure Reducing Valve PTO
6A7		Differential Lock front Axle			
7A1		Clutch Front PTO	6V3	Y027	Solenoid Valve PTO 750
7A2		Brake Front PTO	6V4	Y009	Solenoid valve 4WD clutch
<b>Sensors:</b>			6V5	Y010	Solenoid Valve Differential Lock
1S1	B009	Temperature switch Transmission Oil	6V6	Y026	Solenoid valve PTO 1000
1S2	S017	Pressure switch "Filter Contamination"	7V1	Y011	Pressure Reducing valve Front PTO
4S1	B008	High presure Sensor	7V2	Y034	Solenoid Valve "Brake Front PTO"
		Further Components:	<b>Measuring Points:</b>		
1Z1		Aspiration Filter with Bypass	M1	KV	Radiator Inlet
1Z2		Pressure Filter with Bypass	M2	SM	Lubrication Pressure
1Z3		Transmission Oil Radiator	M3	AS	Feed
1Z4		Lubrication of transmission	M4	ES	Supply Pressure
3Z1		Control shaft	M5	PU	Pressure Pump Control Circuit
3Z2	A009	Transmission Control Unit	M6	P	Transmission system Pressure
4Z1		Clutch Pedal with emitter cylinder	M7	I	Switching presure Operating range 1
4Z2		Hydraulic accumulator	M8	II	Switching presure Operating range 2
4Z3		Strainer insert	M9	PH	High Pressure
5Z1		Brake Pedals with main Cylinder	M10		System Pressure Rear AQxle and Brakes
5Z2		Lubrication Rear PTO	M11	ZWK	Pressure PTO Clutch
5Z3		Lubrication Differential Lock and Right hand Brake	M13	750	Switching Pressure PTO 750
5Z4		Lubrication Differential Lock and Left hand Brake	M14	VR	Pressure 4 WD Clutch
5Z5		Lubrication Front axle Brake	M15	DS	Pressure Differential lock
			M16	1000	Switching Pressure PTO 1000
			M17		Control Pressure for Brakes
			M18		Lubrication Pressure Rear axle
			M21		Prssure Front PTO Clutch
			M22	T	Leak flow Clutch Valve / Turboclutch Valve

Date	Version	Page	<b>Transmission Hydraulik diagram and legnd</b>	Capitel	Index	Docu-No.
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**Transmission hydraulics**  
 916.101.000.002  
 Fav 900 chassis number 23/... and up

<i>Fav 900</i>	Transmission / Transmission Control Unit <b>Valve unit - feed/lubrication</b>	<b>C</b>
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30.11.2001	<b>a</b>	1/3	<b>1005</b>	<b>C</b>	<b>000005</b>

<b>Fav 900</b>	<b>Transmission / Transmission Control Unit Valve unit - feed/lubrication</b>	<b>C</b>
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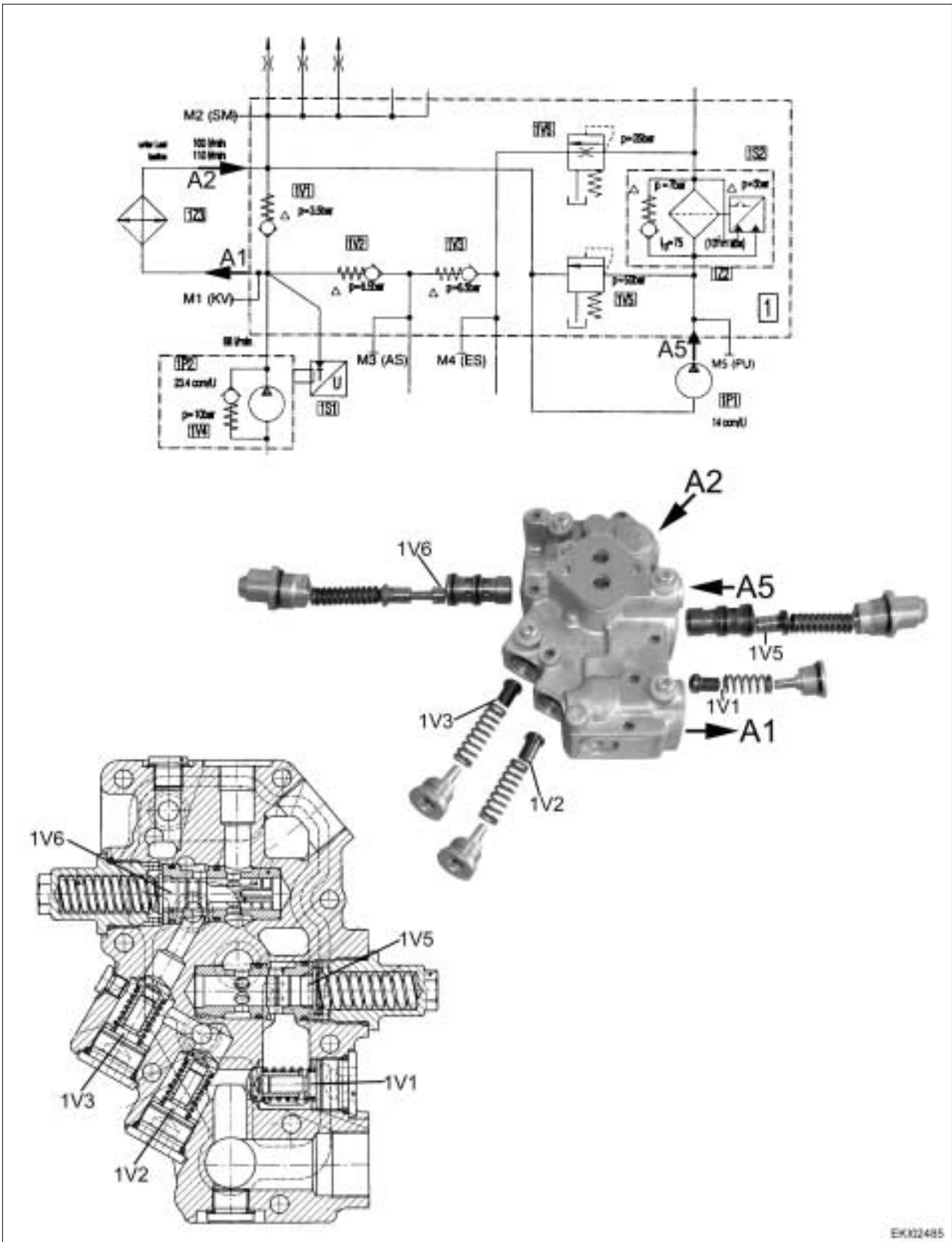
- 1V1 = Radiator bypass valve (3.5 bar)
- 1V2 = Discharge pressure-relief valve (6.5 bar)
- 1V3 = Supply pressure-relief valve (6.5 bar)
- 1V5 = Servopump pressure-relief valve (50 bar)
- 1V6 = Servocircuit pressure-relief valve (25 bar)

Date	Version	Page	Capitel	Index	Docu-No.
30.11.2001	<b>a</b>	2/3	<b>1005</b>	<b>C</b>	<b>000005</b>

Fav 900

Transmission / Transmission Control Unit  
Valve unit - feed/lubrication

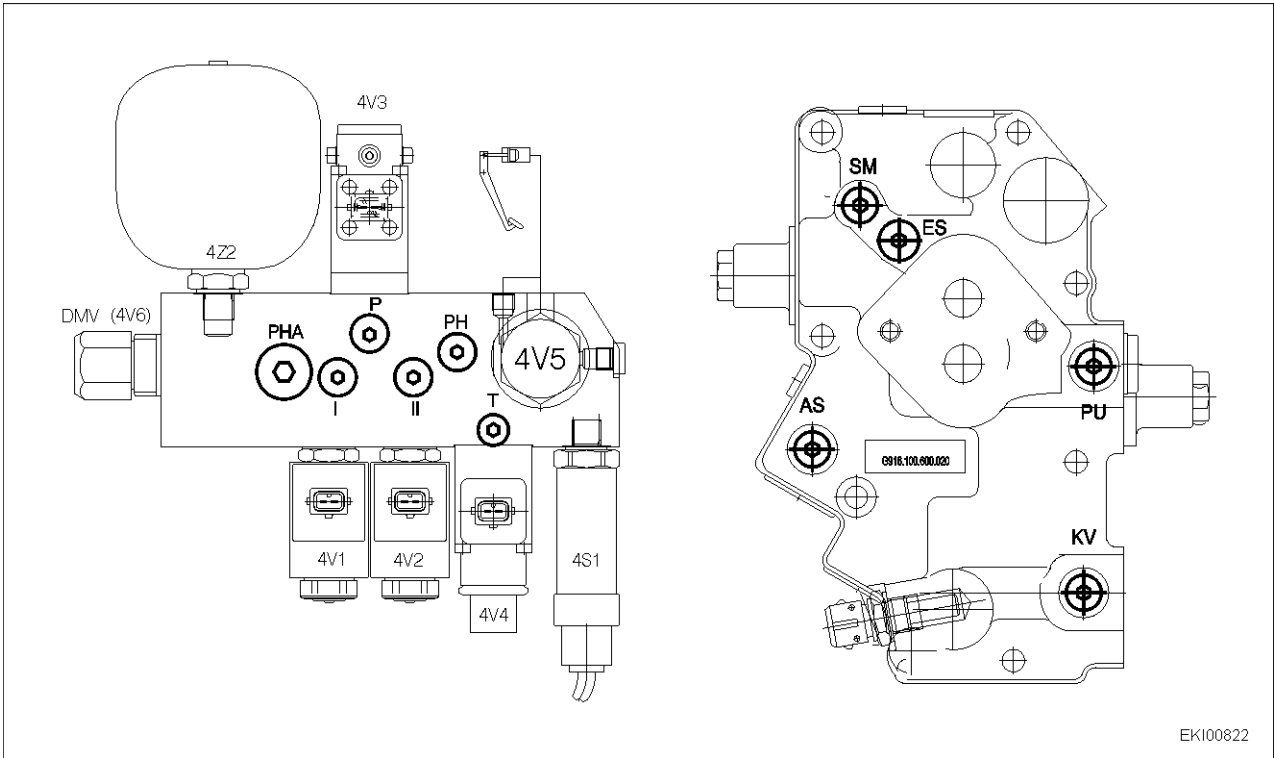
C



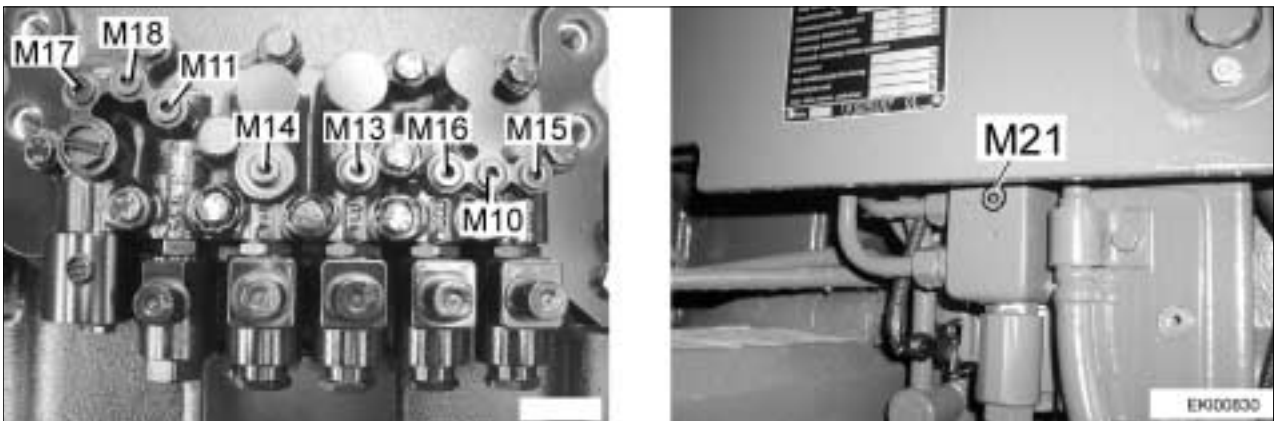
EK02485

Date	Version	Page	Capitel	Index	Docu-No.
30.11.2001	a	3/3	Valve unit - feed/lubrication	1005	C
					000005

<b>Fav 900</b>	<b>Transmission / Transmission Control</b> <b>Measuring Points Transmission - and Comfort Controls</b>	<b>D</b>
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EKI00822



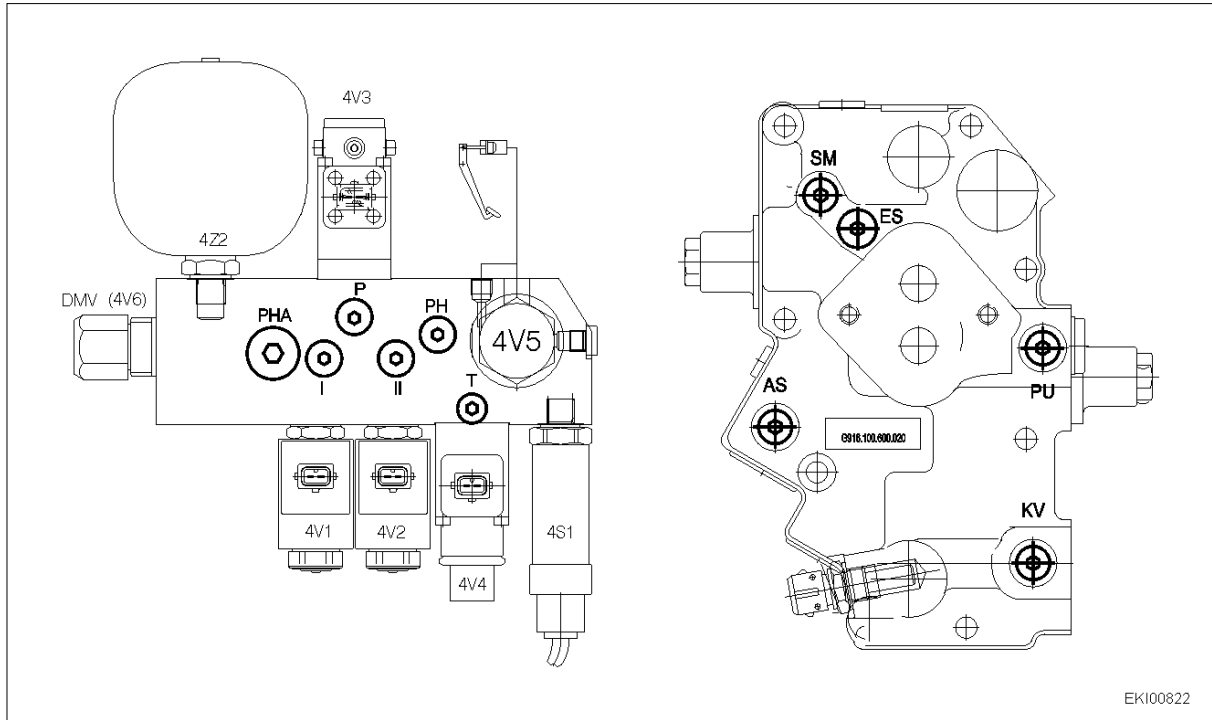
Measuring point	Marking on the component	Component	Measuring point	Marking on the component	Component
M1	KV	Radiator supply flow	M11	ZWK	Operating Pressure PTO Clutch
M2	SM	Lubrication Pressure	M13	750	Switching Pressure PTO 750
M3	AS	Feed	M14	VR	Operating Pressure 4WD Clutch
M4	ES	Supply Pressure	M15	DS	Control Pressure Differential Lock
M5	PU	Operating Pressure Control Pump	M16	1000	Switching Pressure PTO 1000
M6	P	Operating Pressure Transmission	M17	-	Operating Pressure Brake Control
M7	I	Switching Pressure Operating Range 1	M18	-	Lubricating Pressure rear Axle
M8	II	Switching Pressure Operating Range 2	M21	-	Operating pressure Front PTO Clutch
M9	PH	High pressure	M22	T	Leak flow Clutch valve /Turboclutch valve
M10	PHA	Operating Pressure Rear axle, brakes and Front PTO			

Date	Version	Page	<b>Measuring Points Transmission - and Comfort Controls</b>	Capitel	Index	Docu-No.
04.12.2000	a	1/1		<b>1005</b>	<b>D</b>	<b>000001</b>

<b>Fav 900</b>	<b>Transmission / Transmision Control Transmission Pressures Recordings</b>	<b>E</b>
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**⚠ DANGER:**  
To avoid accident hazard, always jack up all 4 whels of the tractor for hydraulic pressure measurements!

**1. Checking supply pressures**



**NOTE:**  
Measurements are to be performed at transmission Oil temperature of 35 - 45°C

Measuring Point	Engine speed	Requested value in Bar	Actual value in Bar
PU M5 Pump Control circuit	800	25 ± 2	
	1200	26 ± 2	
	1600	27 ± 2	
	2000	28 ± 2	
P M6 Transmission System Pressure	800	25 ± 2	
	1200	25,5 ± 2	
	1600	26 ± 2	
	2000	27 ± 2	
ES M4 Supply pressure	800	16 ± 2	
	1200	19 ± 2	
	1600	20 ± 2	
	2000	23,0 ± 2	
AS M3 Feed pressure	800	9 ± 2	
	1200	11,5 ± 2	
	1600	13 ± 2	
	2000	15 ± 2	
SM M2 Lubrication pressure	800	1,4 ± 0,2	
	1200	2,2 ± 0,3	
	1600	3,6 ± 0,5	
	2000	5,0 ± 0,5	

<b>Fav 900</b>	<b>Transmission / Transmission Control Transmission Pressures Recordings</b>	<b>E</b>
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## II. High Pressure measurement



**DANGER:**

**High Pressure measurement must not exceed 5 Seconds for Reverse and Forward, risk of Oil overheating!**

**Preliminaries:** Operating range II, Acceleration ramp 4 or

Auxilliary operation ( By turning the handle do not exceed an angle of 15° risk of Oil overheating!

Meßstelle	Motordrehzahl	Sollwert in bar	Istwert in bar
PH	1600	Neu 500 + 20 Längere Zeit im Einsatz 500 - 40	

**NOTE:**

**Hochdruckkreis PH maximal 5 Sekunden belasten und dabei nachfolgende Messungen durchführen.**

Measuring Point	Engine speed	Requested value in bar	Actual value in bar
P	1600	26 ± 2	
ES	1600	13 ± 2	
AS	1600	12 ± 2	
SM	1600	1,6 ± 0,4	

## III. Checking control pressures

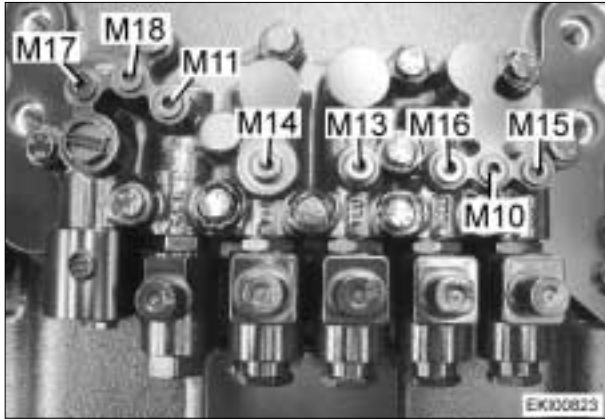
Measuring Point	Engine speed	Requested value in bar	Actual value in bar
I and II Operating range switching 1 + 2	1600	26 ± 2	

Supply alternately 12 V<sub>DC</sub> to Solenoid valve 1 (4V1) and 2 (4V2)

Date	Version	Page	Transmission Pressures Recordings	Capitel	Index	Docu-No.
04.12.2000		2/4		1005	E	000002

<b>Fav 900</b>	<b>Transmission / Transmision Control Transmission Pressures Recordings</b>	<b>E</b>
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**Rear PTO , Differential lock and 4WD clutch**



**Mounted on top of rear axle housing (Cabin must be lifted):**

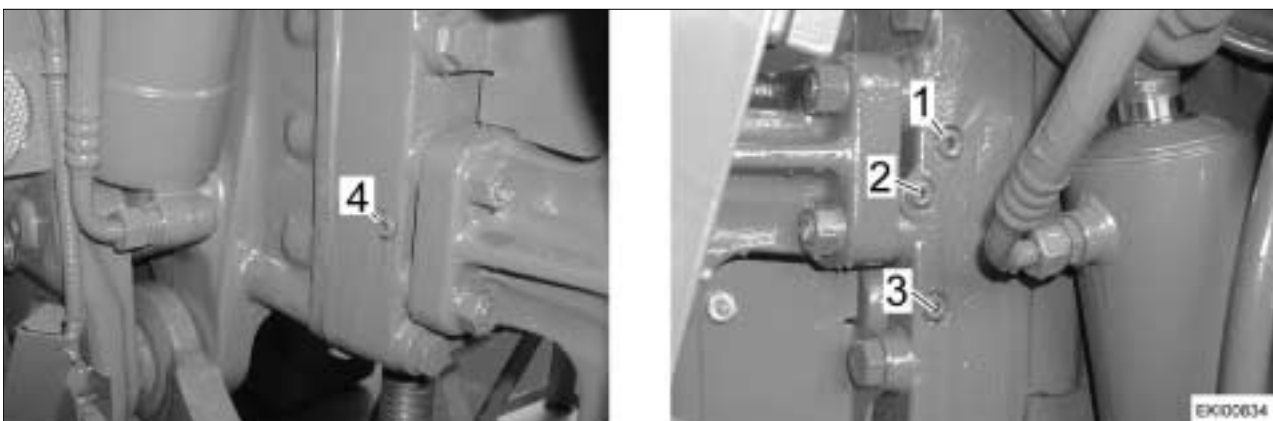
- M10 = System Pressure rear axle, Brakes and Front PTO
- M11 = PTO Clutch
- M13 = Engaging Pressure PTO 750
- M14 = 4WD Clutch
- M15 = Differential lock
- M16 = Engaging Pressure PTO 1000
- M17 = Control Pressure Brakes
- M18 = Lubrication pressure rear axle

**NOTE:**

Run engine at 1200 Rpm. Check pressure simultanously at measuring points M10 and M18 (SM).

Verbraucherschaltstellung	Measuring point	System Pressure M10	System Pressure M10	Lubrication Pressure M18 (SM)	Lubrication Pressure M18(SM)
		Requested value in bar	Actual value in bar	Requested value in bar	Actual value in bar
PTO - ON / OFF	M11	18 + 2,0		2 ± 0,3	
Differential lock - ON / OFF	M15	18 + 2,0		2,0 ± 0,3	
4WD - ON / OFF	M14	18 + 2,0		2,1 ± 0,3	
Apply single wheel brake	M17	18 + 2,0		1,6 ± 0,3	
Apply both brakes (Linked Pedals )	M17	18 + 2,0		1,2 ± 0,3	

Measuring connections on the rear right side of the cover of the rear axle casing can also be used to check Rear PTO



- 1 = PTO Clutch ( Measuring point M12 - 1,5 )
- 2 = Lubrication Pressure rear axle ( Measuring point M 10 - 1 )
- 3 + 4 = PTO Engagement 750 rel. 540 ( Measuring point M 10 - 1 )



<b>Fav 900</b>	<b>Transmission / Transmision Control Transmission Pressures Recordings</b>	<b>E</b>
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**Checking Front PTO**

**NOTE:**

Run engine at 1200 Rpm. Engage and disengage alternately Front PTO



Measuring Point	Requested value in bar	Actual Value in bar
M 21	18 +2	



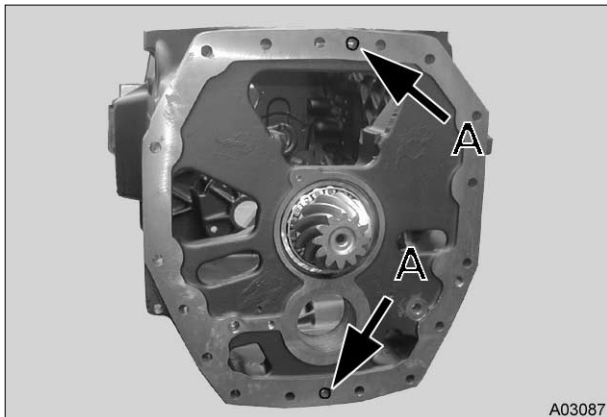
Fav 900

Transmission / Differential

**Reference dimension for bevel drive correction**

**G**

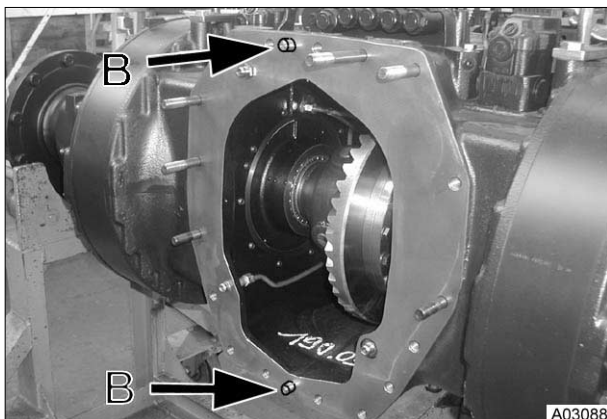
The following points must be borne in mind when replacing the ring gear or a ring gear plus pinion shaft:



If eccentric bushes are inserted in the pin bores (A), these must be removed.

**Removing the eccentric bushes**

- Tap M14 thread in bore and withdraw bush using M14 screw.



- If stepped bolts are inserted in the housing (see B), these must be removed and the bolts supplied must be fitted.

**Note:**

If only the pinion shaft is replaced, the bushes and stepped bolts remain in place.

Please refer to the workshop manual for details of testing and adjusting the backlash and gear-tooth contact pattern.

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13.07.2001	a	1/1	1010	G	000005

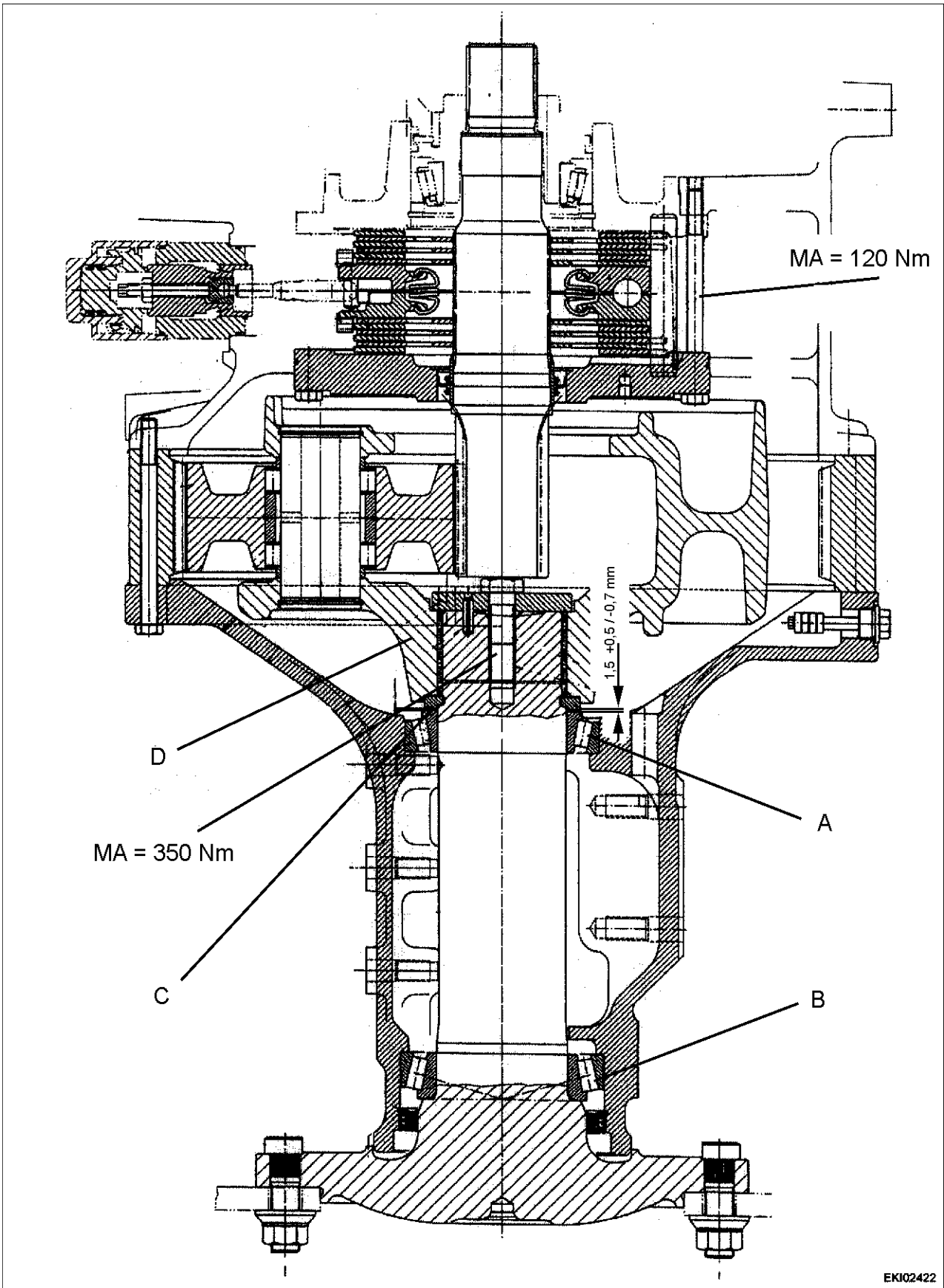
<b>Fav 900</b>	<b>Transmission / Axle drives</b> <b>Axle drives (flange)</b>	<b>C</b>
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15.10.2001	<b>a</b>	1/3	<b>1015</b>	<b>C</b>	<b>000003</b>

Fav 900

Transmission / Axle drives  
Axle drives (flange)

C



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15.10.2001	a	2/3	1015	C	000003

Axle drives (flange)

<i>Fav 900</i>	Transmission / Axle drives <b>Axle drives (flange)</b>	<b>C</b>
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**Bearing settings (A, B)**

Pretension the taper roller bearings (A, B) using the adjusting washers (C) such that the **rotational resistance (without shaft seal) is 4-6 Nm.**

**Axial play in planet carrier (D)**

**Setpoint : 0.2- 0.5 mm (note: axial play must be present!)**

**Note:**

**Chapter 1015 Reg. G - Disassembly and reassembly of axle drives**

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15.10.2001	<b>a</b>	3/3	<b>Axle drives (flange)</b>	<b>1015</b>	<b>C</b>	<b>000003</b>

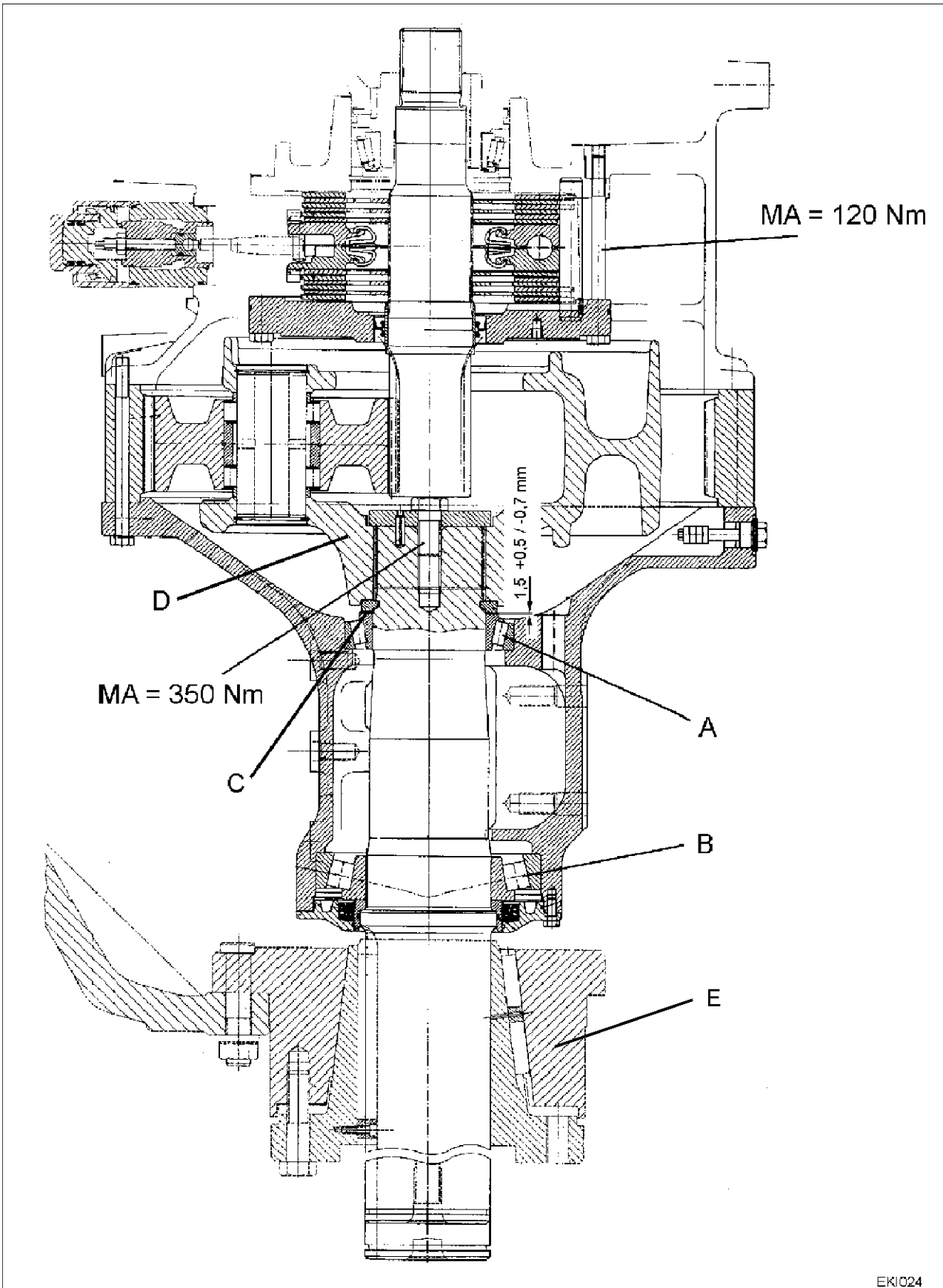
<b>Fav 900</b>	<b>Transmission / Axle drives Axle drives (stub axle)</b>	<b>C</b>
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11.10.2001	<b>a</b>	1/3	<b>1015</b>	<b>C</b>	<b>000002</b>

**Fav 900**

**Transmission / Axle drives  
Axle drives (stub axle)**

**C**



Date	Version	Page	Capitel	Index	Docu-No.
11.10.2001	a	2/3	1015	C	000002

**Axle drives (stub axle)**

<b>Fav 900</b>	<b>Transmission / Axle drives Axle drives (stub axle)</b>	<b>C</b>
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**Bearing settings (A, B)**

Pretension the taper roller bearings (A, B) using the adjusting washers (C) such that the **rotational resistance (without shaft seal) is 4-6 Nm.**

**Axial play in planet carrier (D)**

**Setpoint : 0.2- 0.5 mm (note: axial play must be present!)**

**Note:**

**Chapter 1015 Reg. G - Disassembly and reassembly of axle drives**

**Note:**

**Attachment cone (E)**

**To change track see:**

**Operating Manual - 22. Track distribution**

Date	Version	Page	Capitel	Index	Docu-No.
11.10.2001	<b>a</b>	3/3	<b>Axle drives (stub axle)</b>	<b>1015</b>	<b>C</b>
					<b>000002</b>

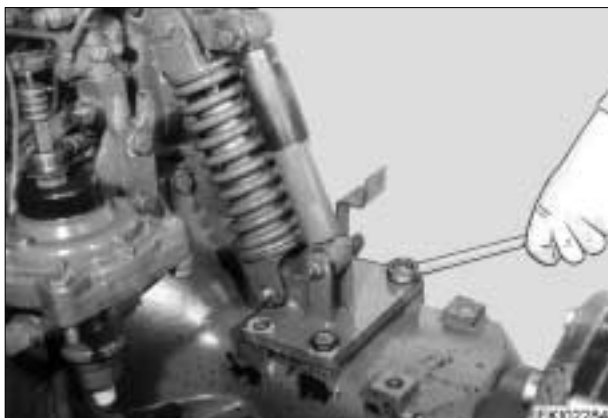


Fav 900

## Transmission / Axle drives

### Installation and remove of axle drives

G



#### Axle drives (rear axle)

##### Removal

Remove relevant rear wheel.

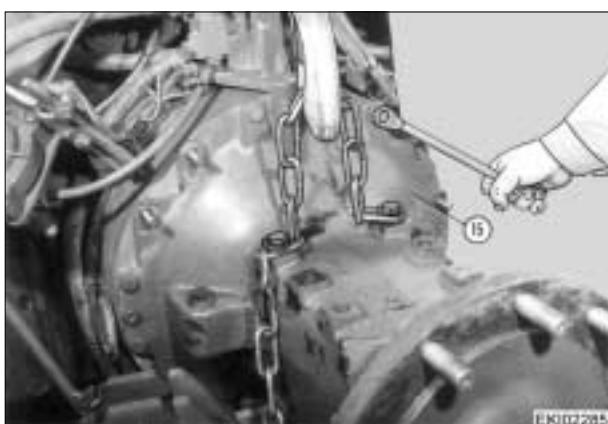
Drain oil from axle drive.

Remove any obstructing panels.

Remove lateral stabilisation rod from three-point linkage or complete lateral stabilisation unit.

Prop cab, taking appropriate safety precautions

Remove axle housing/cab support.



Remove any other obstructing components.

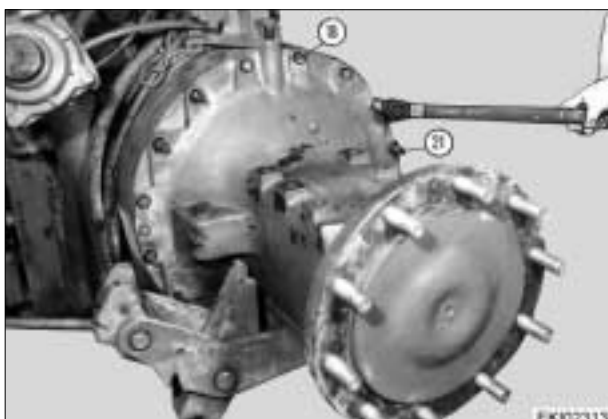
Prop rear-axle housing, taking appropriate safety precautions. Attach axle housing (15) to hoist (e.g. small jib crane), taking appropriate safety precautions and raise.



##### Fitting

Clean flange surface and coat with surface sealant X 903.050.074.

Attach axle housing (15) in hoist, taking appropriate safety precautions, and flange-mount on rear-axle housing.

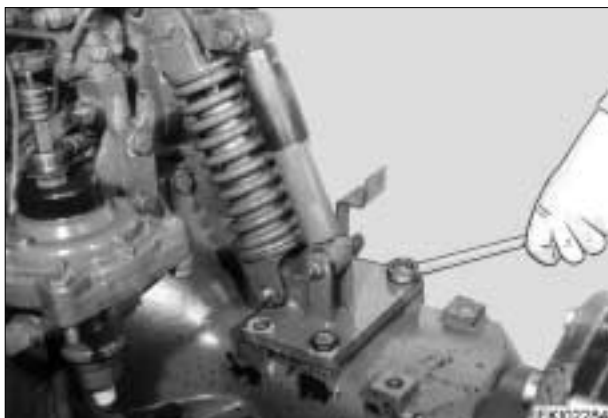


Tighten hexagon nuts (21) and bolts (18) crosswise in stages to **120 Nm** .

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Fav 900

Transmission / Axle drives  
**Installation and remove of axle drives**

**G**

Fit axle housing/cab support and other components.

Fill axle drive with oil.

Observe instructions for oil types and quantities.  
 Approx. 13 l per side.

Fit rear wheel, tighten wheel nuts to **620 Nm** .

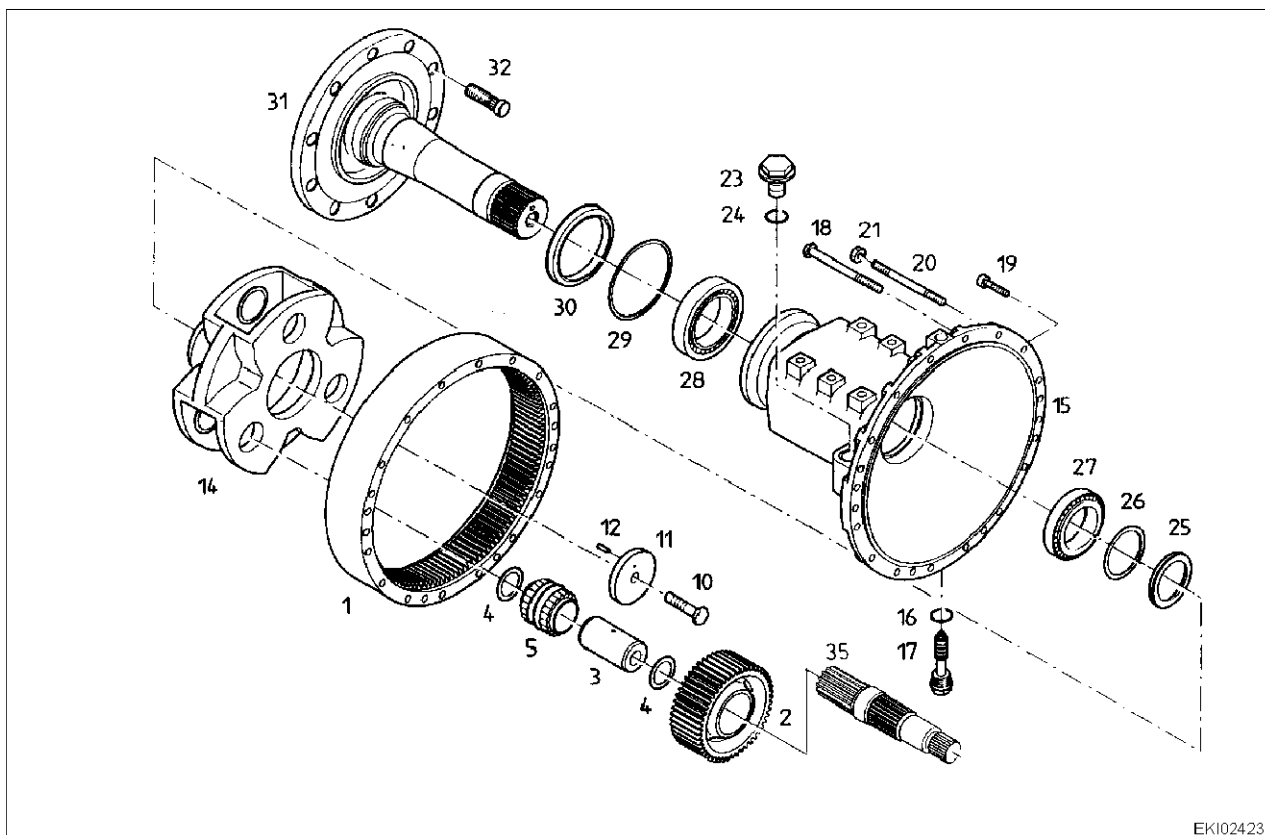
Remove prop.

**Note:**

**See also Chapter 0000 Reg. A - Fuels and lubricants**

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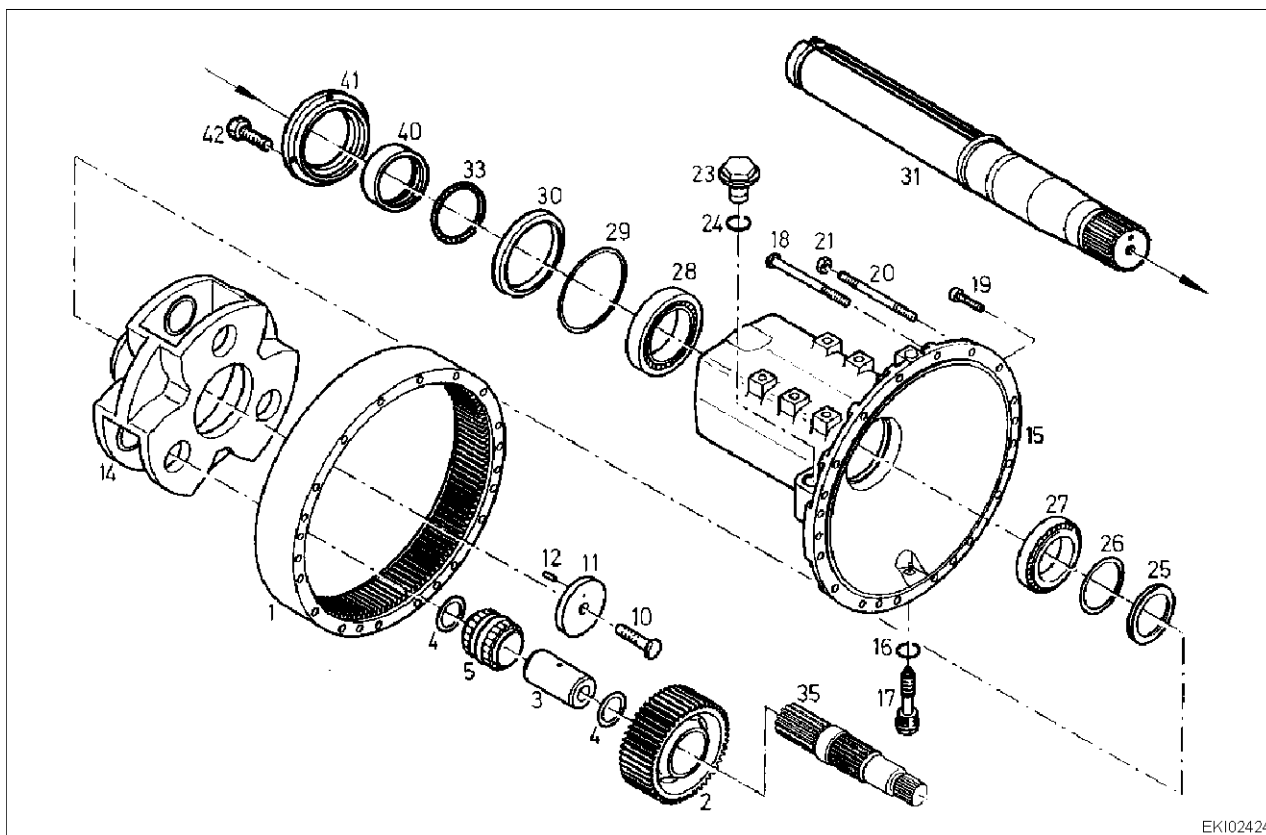
## Axle drives (flange)



EKI02423

Item	Designation	Item	Designation
1	Annulus	20	M12x165-10.9 stud bolt
2	Spur gear	21	M12-10 hexagon nut
3	Axle	23	M30x1.5 drain plug
4	Circlip	24	Sealing ring
5	Cylinder roller ring	25	Ring
10	Hexagon screw	26	Adjusting washer
11	Plate	27	Taper roller bearing
12	Dowel pin	28	Taper roller bearing
14	Planet carrier	29	Snap ring
15	Axle housing	30	Shaft seal
16	Sealing ring	31	Rear-axle shaft
17	Magnetic plug	32	Wheel bolt
18	M12x160-10.9 hexagon screw	35	Shaft
19	Socket head cap screw		

## Axle drives (stub shaft)

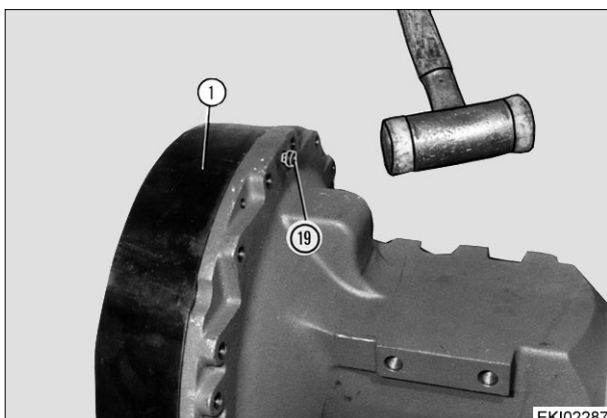


EKI02424

Item	Designation	Item	Designation
1	Annulus	21	M12-10 hexagon screw
2	Spur gear	23	M30x1.5 drain plug
3	Axle	24	Sealing ring
4	Circlip	25	Ring
5	Cylinder roller ring	26	Adjusting washer
10	Hexagon screw	27	Taper roller bearing
11	Plate	28	Taper roller bearing
12	Dowel pin	29	O-ring
14	Planet carrier	30	Shaft seal
15	Axle housing	31	Rear-axle shaft
16	Sealing ring	33	O-ring
17	Magnetic plug	35	Shaft
18	M12x160-10.9 hexagon screw	40	Spacer
19	Socket head cap screw	41	Cover
20	M12x165-10.9 stud bolt	42	Hexagon screw

Fav 900

Transmission / Axle drives  
**Disassembly and reassembly of axle drives**

**G****Note:**

**The work shown was carried out on the axle drive (flange).**

**Repair and adjust the axle drive (stub shaft) in the same manner.**

Preliminary work: remove relevant axle drive.

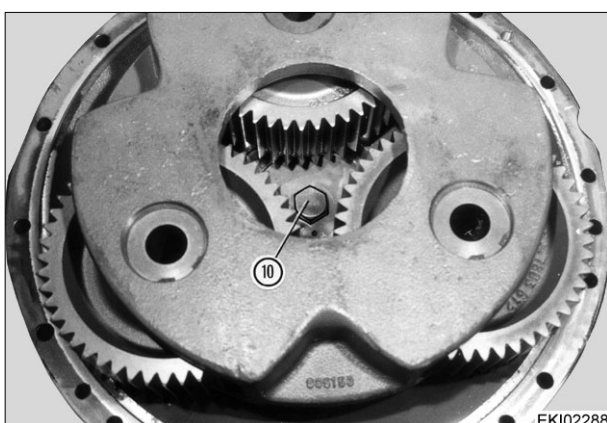
**Chapter 1015 Reg. G - Installation and removal of axle drives**

**Disassembly**

If necessary, remove annulus (1).

**Note:**

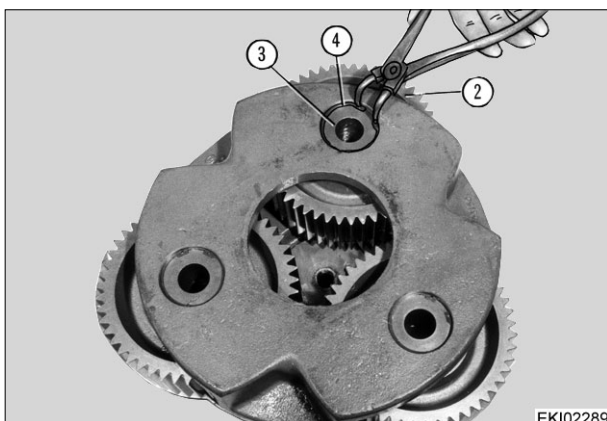
**Unscrew socket head cap screws (19) by approx. 10 mm and force annulus (1) off by striking gently.**



Unscrew hexagon screw (10) and remove planet carrier.

**Note:**

**Hexagon screw (10) is secured with synthetic bonding agent!**



If necessary:

Unclip circlip (4).

Disconnect axle (3).

Remove spur gear (2).

Fit spur gears (2) (planet wheels).

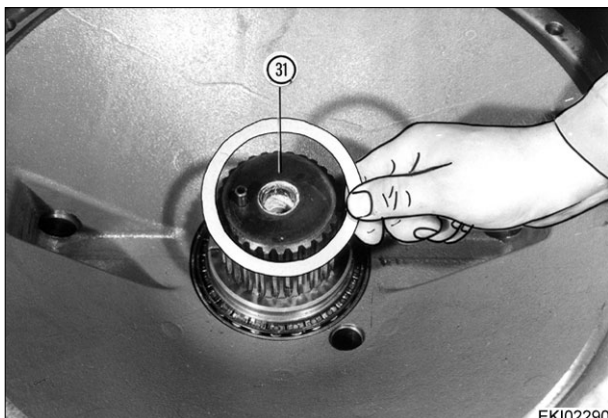
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Fav 900

## Transmission / Axle drives

### Disassembly and reassembly of axle drives

G

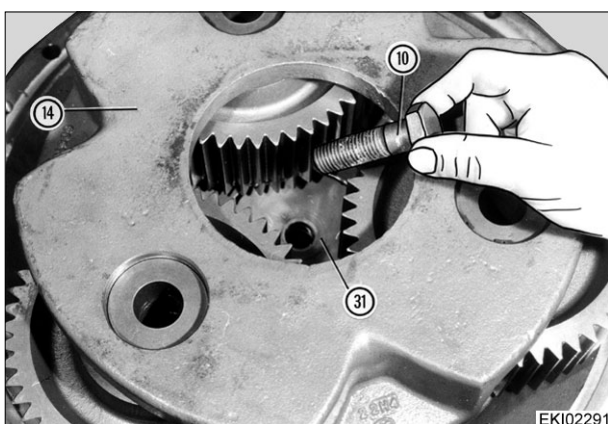


EKI02290

Locate one or two adjusting washers, order no. X 534.739.501 (each 1.0 mm thick) on rear-axle shaft (31). Then refit planet carrier.

**Note:**

**If no adjusting washer is available, rear-axle shaft bearing can also be pretensioned using clamping bush (DIY).**

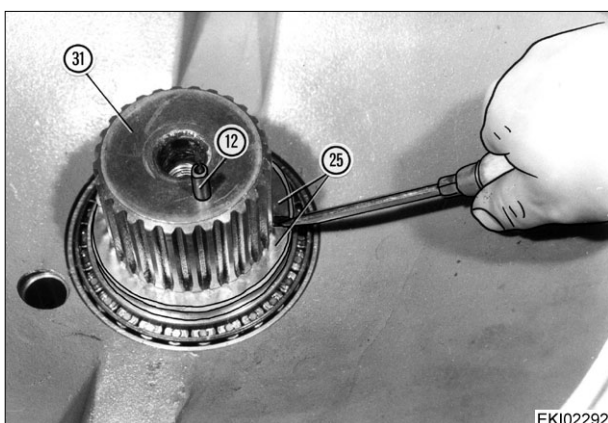


EKI02291

Pretension rear-axle shaft bearing using hexagon screw (10).

Remove planet carrier (14) again.

Do not turn rear-axle shaft (31)!



EKI02292

Press split ring (25) out of groove in rear-axle shaft (31).

Remove adjusting washers.

Withdraw dowel pin (12).



EKI02293

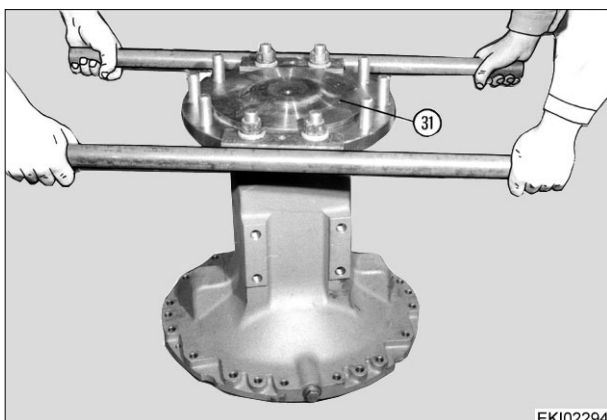
Fit protective cap X 899.980.157 on rear-axle shaft.

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Fav 900

## Transmission / Axle drives

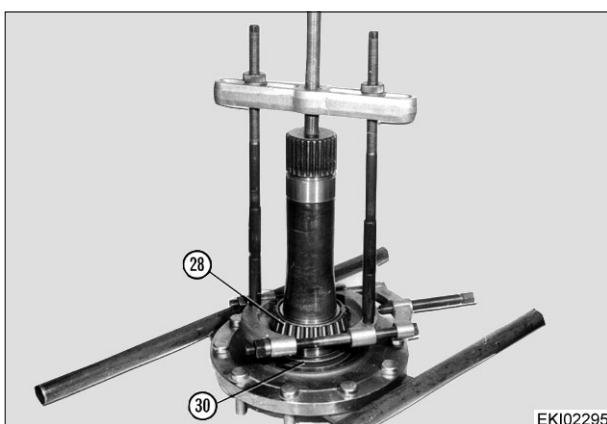
### Disassembly and reassembly of axle drives

**G**

EKI02294

Attach mounting handles (DIY, see photo) to rear-axle shaft (31).

Knock rear-axle shaft (31) onto metal block.



EKI02295

Withdraw inner race of taper roller bearing (28) using bearing separator X 899.980.159.

Then force shaft seal (30) off.



EKI02296

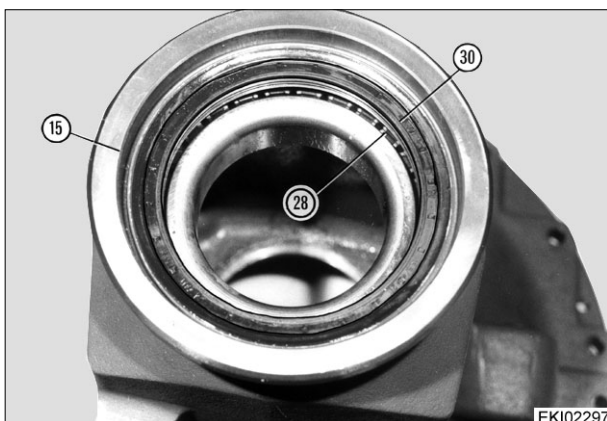
### Assembly

Where removed:

Press outer race of taper roller bearing (28) in as far as stop.

Clip snap ring (29) into groove.

On other side press in outer race of taper roller bearing as far as stop.



EKI02297

Heat inner race of taper roller bearing (28) to approx. 80°C and insert into axle housing (15).

Coat new shaft seal (30) on outside with sealant X 903.051.711 and on inside with alcohol/water mixture (1:1) and then insert until stop is reached.

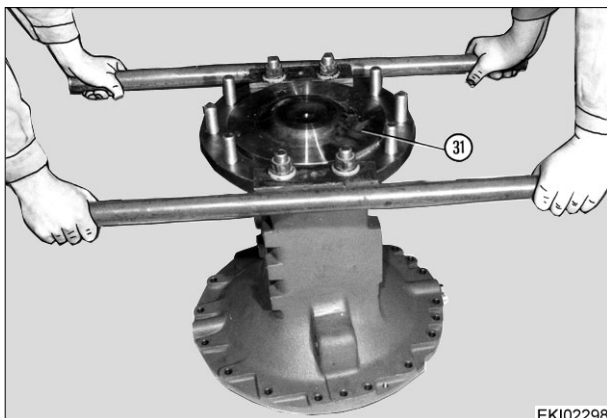
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Fav 900

## Transmission / Axle drives

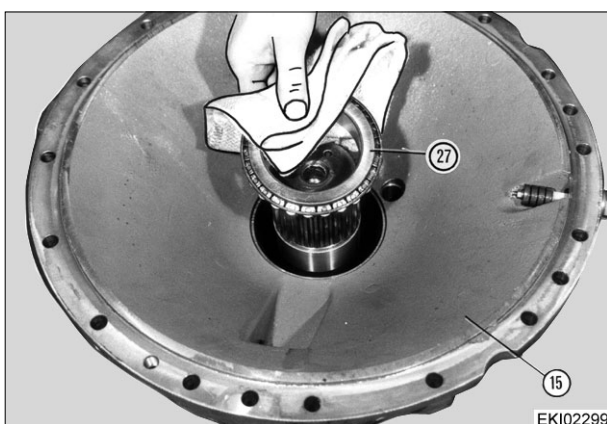
### Disassembly and reassembly of axle drives

G



EKI02298

Before bearing inner race cools down, insert rear-axle shaft (31) using fitted mounting handles (DIY, see photo) as far as stop.

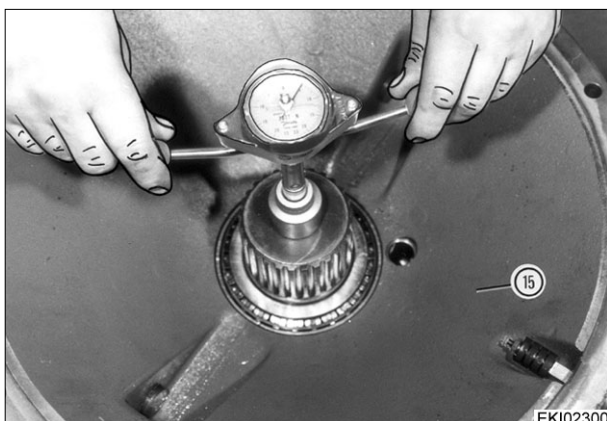


EKI02299

Turn axle housing (15) round.

Heat inner race of taper roller bearing (27) to approx. 80°C and press on as far as stop.

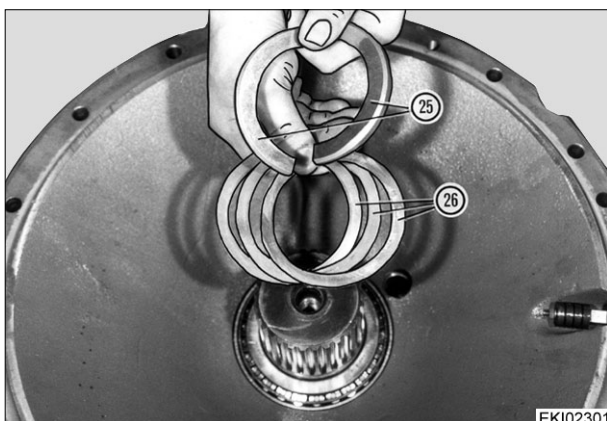
Lubricate rear-axle shaft bearing with transmission oil.



EKI02300

Prop axle housing (15). Rear-axle shaft bearing must have small amount of play.

Fit torque gauge X 899.980.150 and measure and record rotational resistance of shaft seal, e.g. 5.0 Nm.



EKI02301

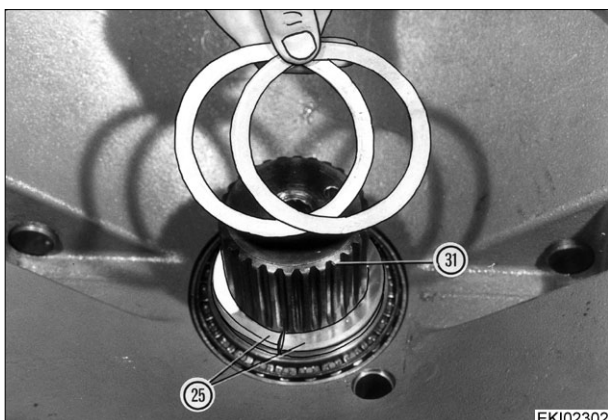
Select thickness of adjusting washers (26) such that split ring (25) can be inserted play-free.

**Note:**

If possible, fit adjusting washers (26) such that 1.0 mm thick adjusting washer (26) faces split ring (25).

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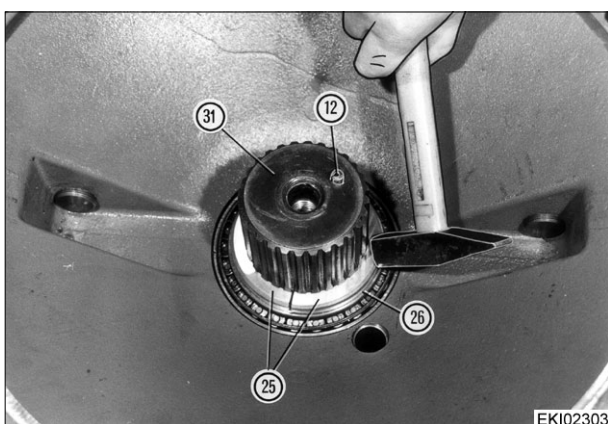




Locate two adjusting washers, order no. X 534.739.501 (each 1.0 mm thick), on rear-axle shaft (31). Then fit planet carrier and tighten. Rotational resistance of rear-axle shaft bearing must rise.

**Note:**

**If rotational resistance does not rise, remove planet carrier again and fit further adjusting washers (26) under split ring (25) - see photo EKI02301, then pretension rear-axle shaft bearing again.**

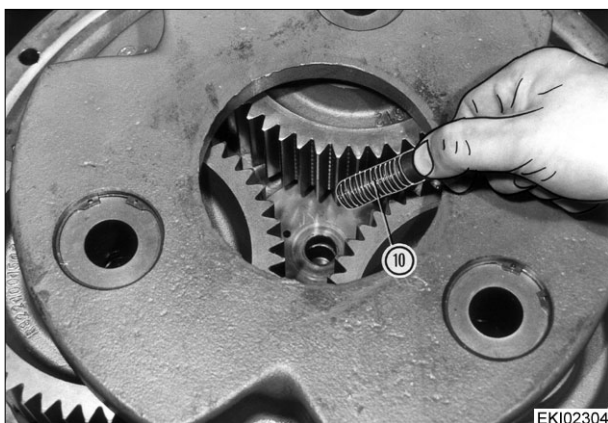


Strike bearing in both directions to relieve stress on it.

Remove planet carrier again.

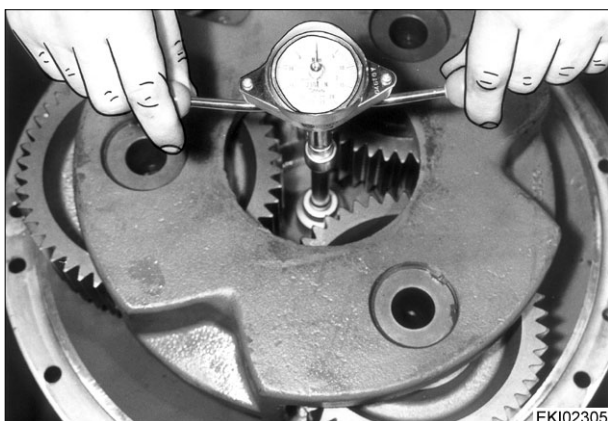
Select thickness of adjusting washers (26) such that split ring (25) can be inserted with gentle hammer blows.

Fit dowel pin (12) into rear-axle shaft (31).



Coat thread of hexagon screw (10) with synthetic bonding agent X 903.050.084 and tighten to 350 Nm.

Strike bearing in both directions to relieve stress on it.



Measure rotational resistance of shaft seal plus bearing using torque gauge X 899.980.150 and record result.

Target value: 4.0-6.0 Nm (bearing) plus rotational resistance (shaft seal in photo EKI02300 e.g. 5.0 Nm).

In event of discrepancies correct by means of adjusting washers (26) - see photos EKI02301 and EKI02303.

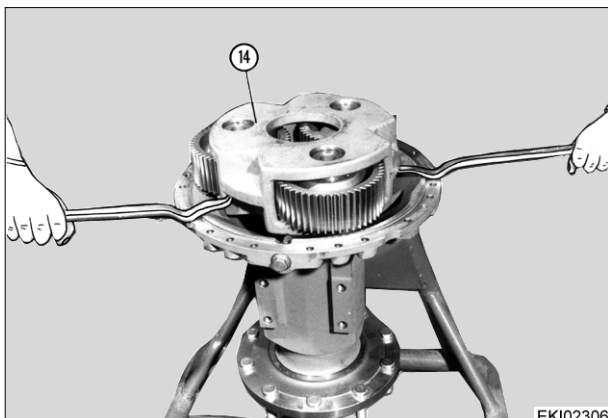
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Fav 900

## Transmission / Axle drives

### Disassembly and reassembly of axle drives

G



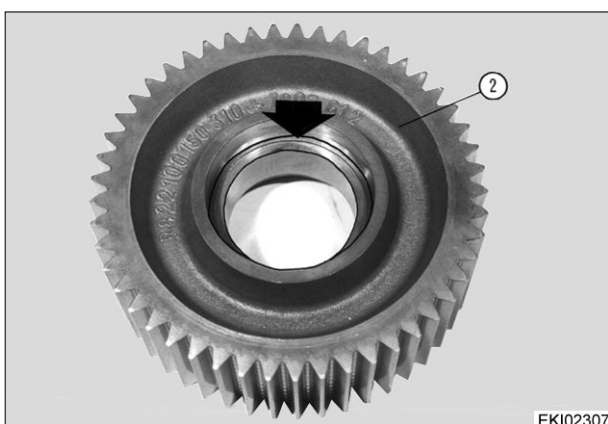
EKI02306

Check axial play of planet carrier (14) using two tyre levers.

Target value: 0.2-0.5 mm axial play

**Note:**

**Important - axial play must be present.**



EKI02307

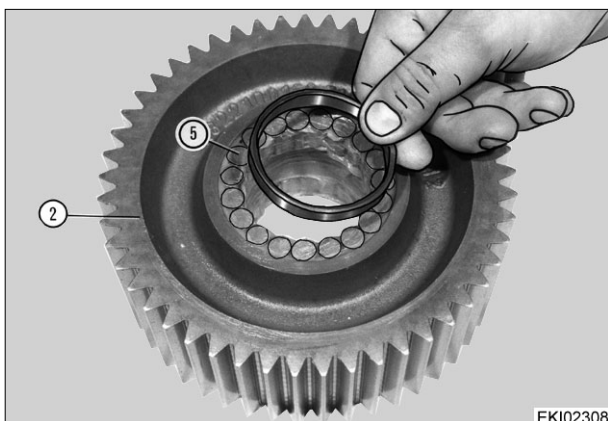
Where removed - see photo EKI02289 -

Fit planet wheels:

Clip snap ring into groove in bush and press bush (arrowed) into spur gear (2) (planet wheel) until snap ring engages.

**Note:**

**Bush (arrowed) cannot be removed.**



EKI02308

Use grease to hold 19 rollers of roller set (5) in spur gear (2).

Then use grease to hold ring of roller set (5) in spur gear (2).

Preassemble other side of spur gear (2) in same manner.



EKI02309

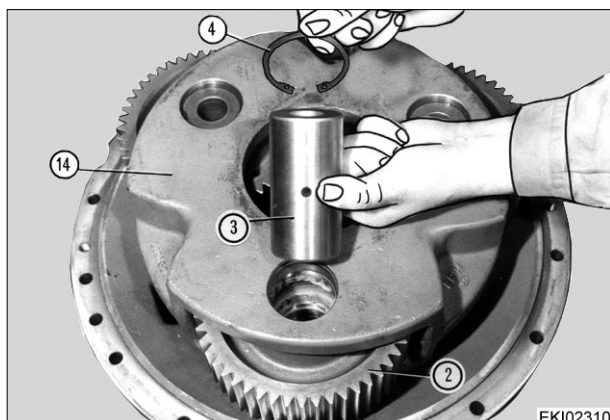
Clip circlip (4) into groove in planet carrier (14).

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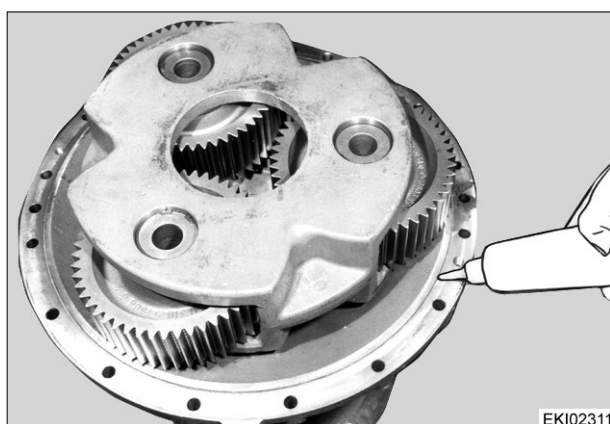
Fav 900

## Transmission / Axle drives

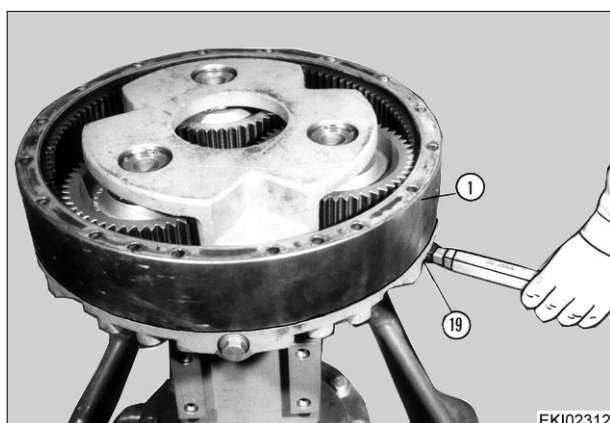
### Disassembly and reassembly of axle drives

**G**

Insert pre-assembled spur gear (2).  
Insert axle (3) and clip circlip (4) into groove in planet carrier (14).



Clean flange surface and then coat with surface sealant X 903.050.074.



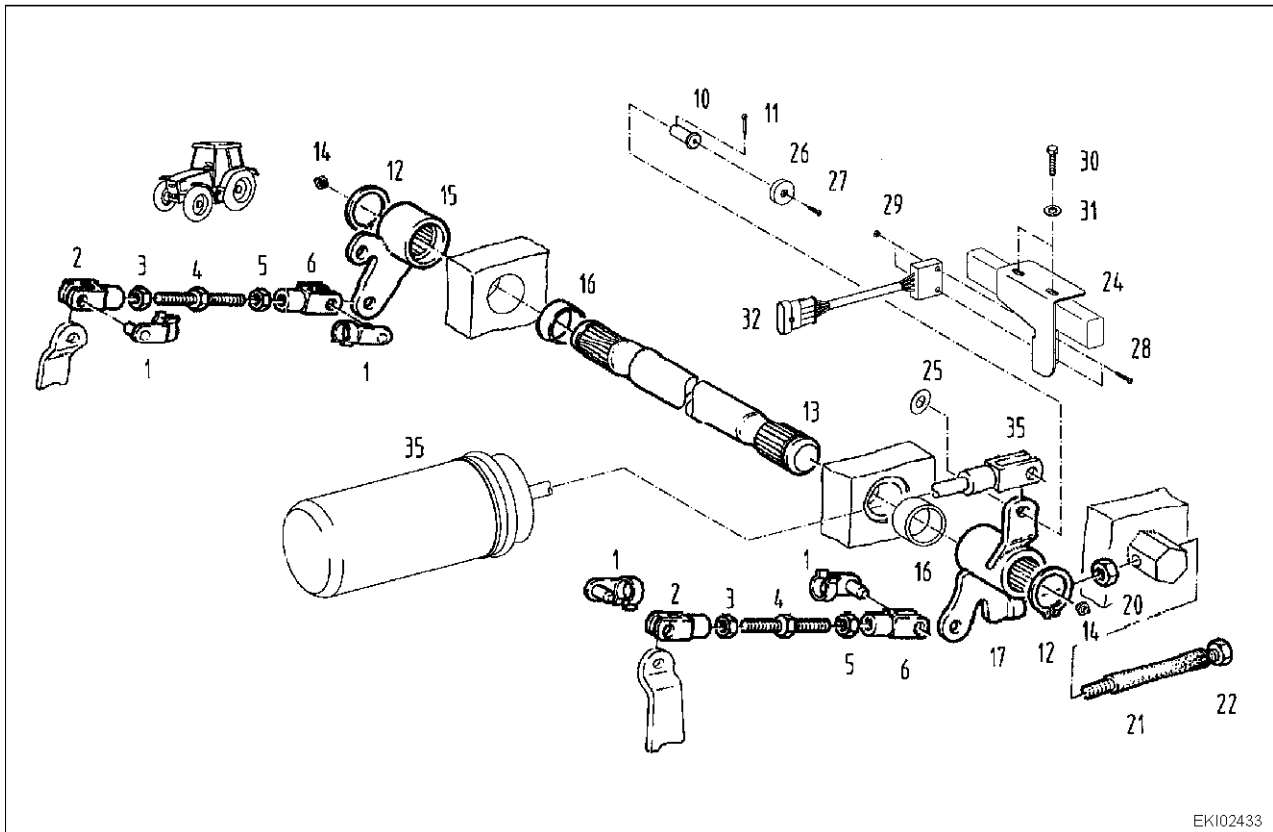
Fit annulus (1).  
Tighten socket head cap screws (19) to 86 Nm.  
Fitting axle drive  
**Chapter 1015 Reg. G - Installation and removal of axle drives**

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Fav 900

Transmission / Handbrake  
Adjusting handbrake

F



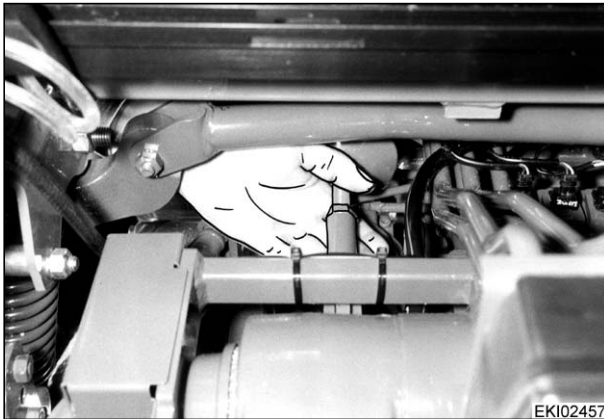
Item	Designation	Item	Designation
1	Pin	20	Hexagon nut
2	Fork connection	21	Hose
3	Hexagon nut	22	Hexagon screw
4	Threaded rod	24	Bracket
5	Hexagon nut	25	Washer
6	Fork connection	26	Solenoid
10	Pin	27	Socket head cap screw
11	Split pin	28	Socket head cap screw
12	Circlip	29	Hexagon nut
13	Shaft	30	Self-tapping screw
14	Lubricator	31	Washer
15	Lever	32	S015 - switch, handbrake
16	Bush	35	Accumulator (diaphragm cylinder)
17	Lever		

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Fav 900

Transmission / Handbrake  
Adjusting handbrake

F

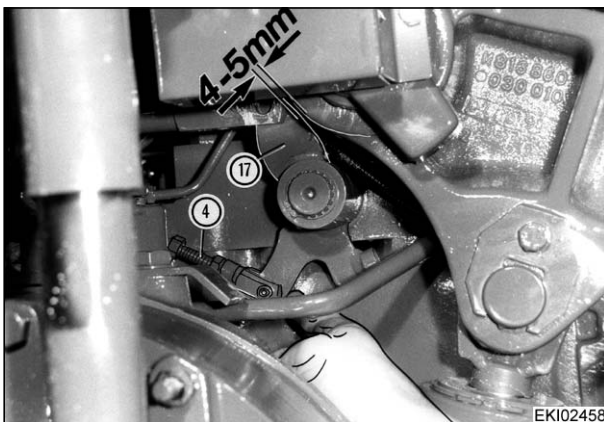
**Adjusting handbrake****Note:**

The work was carried out on a Fav 900/21/....  
Carry out work on a Fav 900 chassis number  
23/3001 and up in same manner.

Handbrake released.

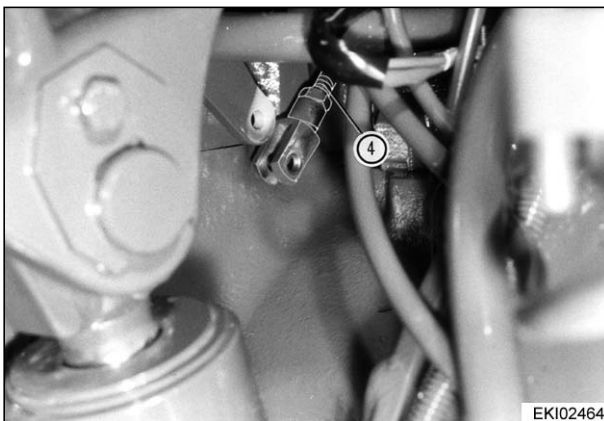
Detach actuating linkage of handbrake  
accumulator on left.

Detach actuating linkage from right brake cylinder.



Turn threaded rod (4) (turnbuckle) such that gap  
of **4.0 to 5.0 mm** is created between lever (17)  
and left lift arm.

Fasten threaded rod (4) in this position with lock  
nut.



Hold actuating linkage of right brake cylinder to  
rear such that it is pressed gently against stop.

Turn threaded rod (4) (turnbuckle) such that pin  
can be inserted play-free.

Fasten threaded rod (4) in this position with lock  
nut.



Hold actuating linkage of left brake cylinder to rear  
such that it is pressed gently against stop.

Turn fork connection on actuating rod  
(accumulator) such that pin can be disconnected  
play-free.

Fasten fork connection with lock nut.

Secure pin with washer and split pin.

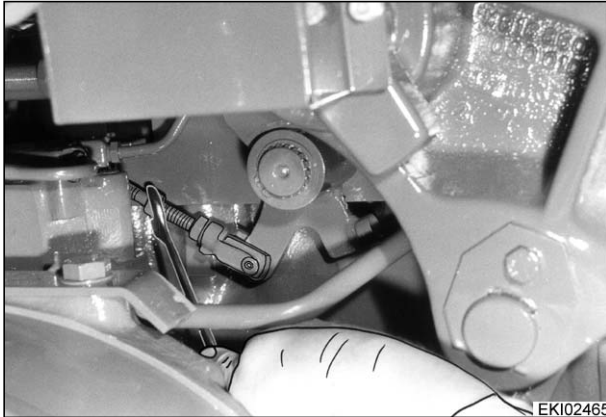
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Fav 900

## Transmission / Handbrake

### Adjusting handbrake

F

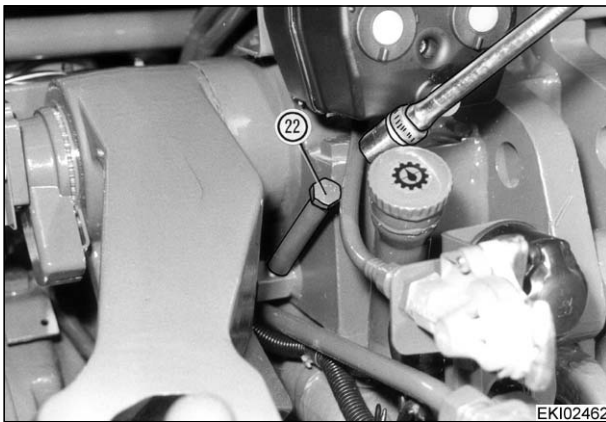


EKI02465

Carry out test drive and operate handbrake.

**Note:**

**If rear-wheel braking effect is greater on one side: lengthen actuating linkage on side where greater braking effect occurs.**



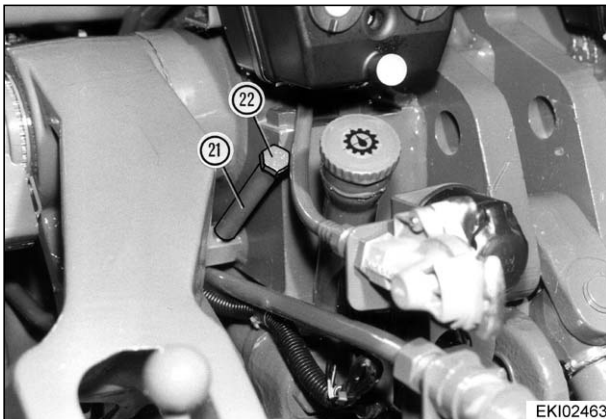
EKI02462

**Mechanically releasing (unlocking) handbrake**

If air compressor is unpressurised, handbrake can be mechanically released.

Tighten screw (22) at left rear on rear power lift as far as stop, then tighten a further **3 to 5 turns** .

Accumulator effect is cancelled out, handbrake is free.

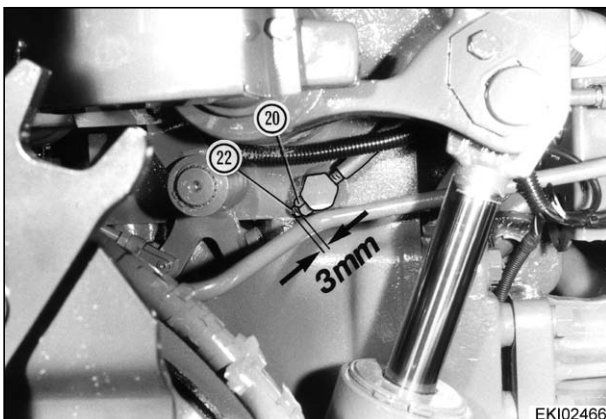


EKI02463

Following must be borne in mind if screw (22) is replaced:

Slide hose (21) onto screw (22).

Grease thread of screw (22) and screw into welded hexagon.

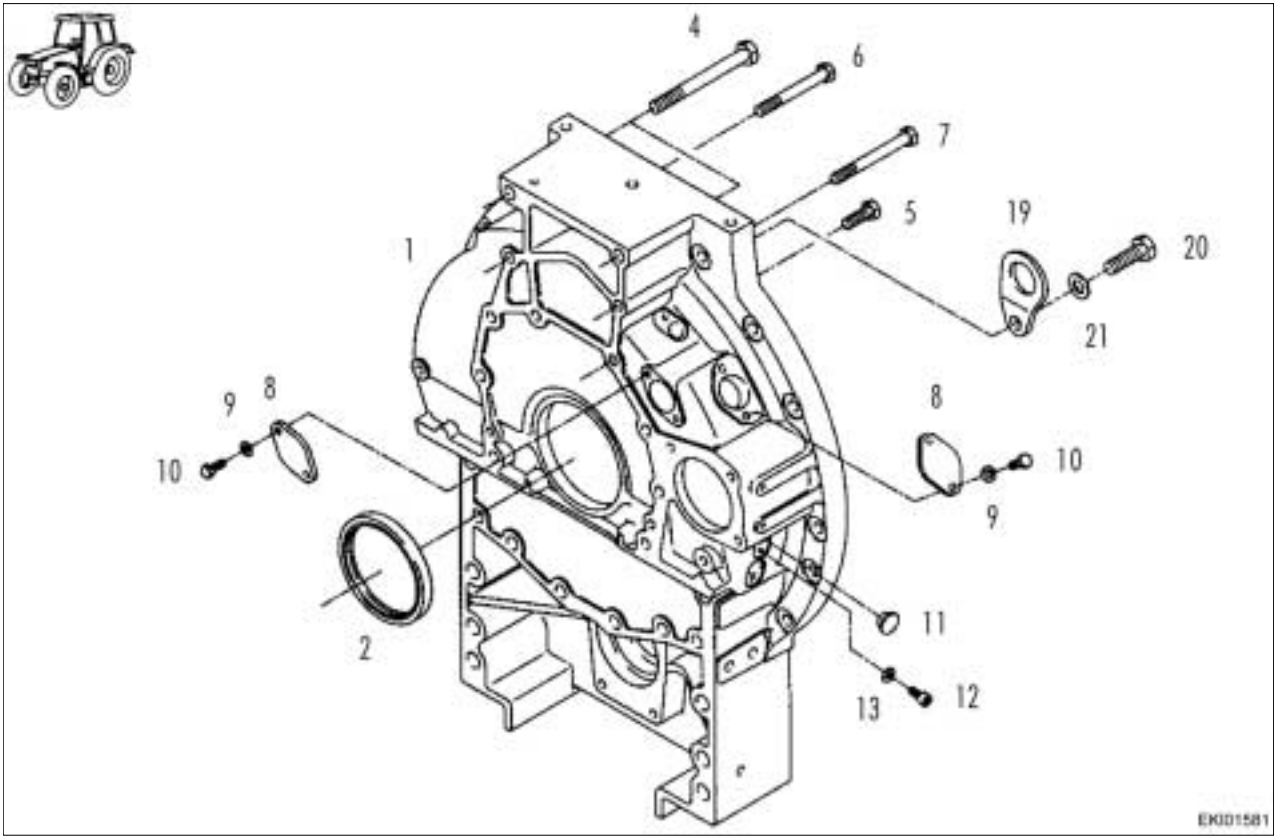


EKI02466

On opposite side, screw hexagon nut (20) on with crowned face pointing downwards until screw (22) protrudes **3.0 mm** .

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<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, flywheel and clutch housing</b>	<b>G</b>
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Item	Designation	Item	Designation
1	Flywheel housing	10	M8x25-8.8 hexagon screw
2	Shaft seal	11	Sealing plug
4	M14x14-10.9 hexagon screw	12	Socket head cap screw
5	M12x35-10.9 hexagon screw	13	Sealing ring
6	M12x100-10.9 hexagon screw	19	Eye
7	M12x110-10.9 hexagon screw	20	M14x25-8.8 hexagon screw
8	Blind flange	21	Washer
9	Washer		



Remove panel at front. Remove right engine cover.

Date	Version	Page	<b>Disconnecting tractor, flywheel and clutch housing</b>	Capitel	Index	Docu-No.
06.06.2001	a	1/17		<b>1050</b>	<b>G</b>	<b>000003</b>

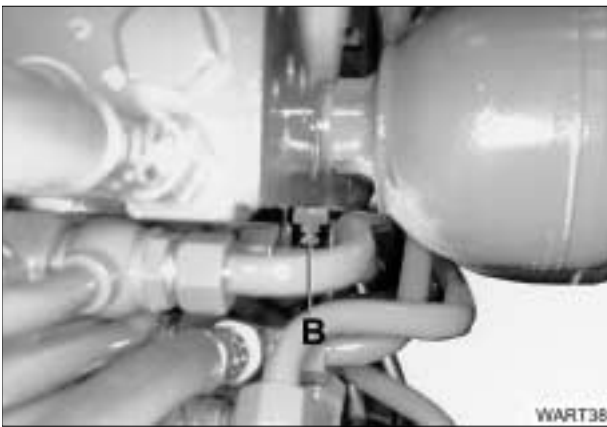
Fav 900	Transmission / Housing <b>Disconnecting tractor, flywheel and clutch housing</b>	<b>G</b>
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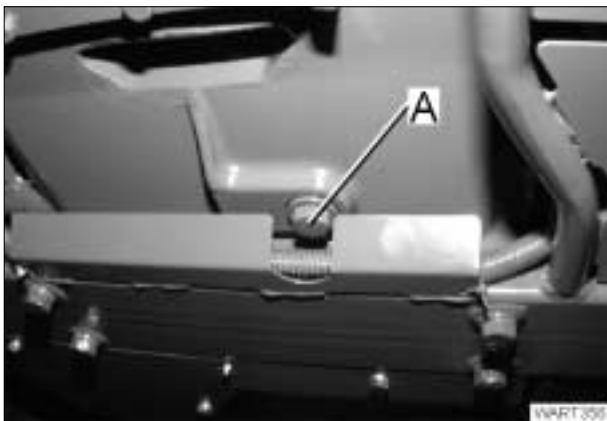
Open front-axle suspension stopcocks on central control block (ZSB).

**Warning:**  
 **Front axle lowers against block.**

Open stopcock A.



Open stopcock B.



**Disconnecting tractor**

**Preliminary work:**

- Prop tractor, taking appropriate safety precautions, and remove both rear wheels.
- Remove left and right front mudguards.
- Remove panels.
- Drain hydraulic oil (approx. 70 l).



Raise cab at front.

**Fitting sequence as in - Disconnecting tractor, clutch and transmission housing - Chapter 1050 Reg.G**

Date	Version	Page	Capitel	Index	Docu-No.
06.06.2001	a	2/17	1050	G	000003



<p><b>Fav 900</b></p>	<p>Transmission / Housing  <b>Disconnecting tractor, flywheel and clutch housing</b></p>	<p><b>G</b></p>
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Remove fuel tank and auxiliary tank.  
**Fitting sequence as in - Disconnecting tractor, clutch and transmission housing - Chapter 1050 Reg.G**



**Left side**

Remove engine cover and disconnect air-conditioning cooling hoses.

**Note:**  
**Disconnect coolant hoses only at these screw couplings. Internal valves prevent the coolant from escaping.**



Remove both batteries.



Remove clips for cable loom.

Date	Version	Page	Disconnecting tractor, flywheel and clutch housing	Capitel	Index	Docu-No.
06.06.2001	a	3/17		1050	G	000003

<p><b>Fav 900</b></p>	<p>Transmission / Housing  <b>Disconnecting tractor, flywheel and clutch housing</b></p>	<p><b>G</b></p>
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Disconnect cable B+ (to generator on right) at connector.  
 Release cable tie and pull cable B+ to right side of tractor.



Disconnect compressed-air line from spill valve.  
 Release cable tie and pull compressed-air line forwards.



Release cable tie at battery - terminal cable (arrowed).  
 Remove retaining strap for tank frame.



Disconnect tank venting tube at T-junction.

Date	Version	Page	Capitel	Index	Docu-No.
06.06.2001	a	4/17	1050	G	000003

<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, flywheel and clutch housing</b>	<b>G</b>
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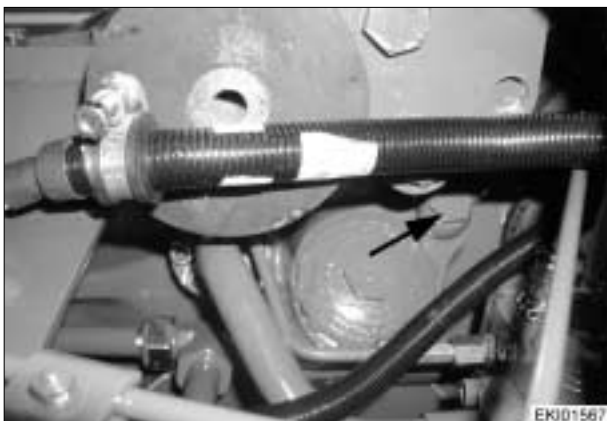


Disconnect hydraulic line and remove retaining strap.



**Right side**

Remove exhaust bend.  
Release clip (arrowed) for tank venting tube.



Remove return flow to hydraulic tank.



Remove hydraulic lines (to transmission oil cooler) from valve unit.

Date	Version	Page	Capitel	Index	Docu-No.
06.06.2001	a	5/17	1050	G	000003

<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, flywheel and clutch housing</b>	<b>G</b>
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Disconnect hydraulic lines (to transmission oil cooler) at connector.  
Remove lines



Remove hydraulic line (to hydraulic oil cooler).  
Remove hydraulic line (to steering pump).



Disconnect hydraulic lines to steering cylinder.



Disconnect hydraulic lines to front PTO.

Date	Version	Page	Capitel	Index	Docu-No.
06.06.2001	a	6/17	1050	G	000003

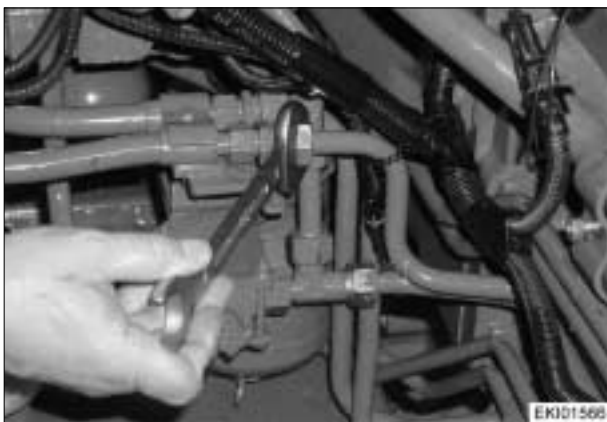
Fav 900	Transmission / Housing <b>Disconnecting tractor, flywheel and clutch housing</b>	<b>G</b>
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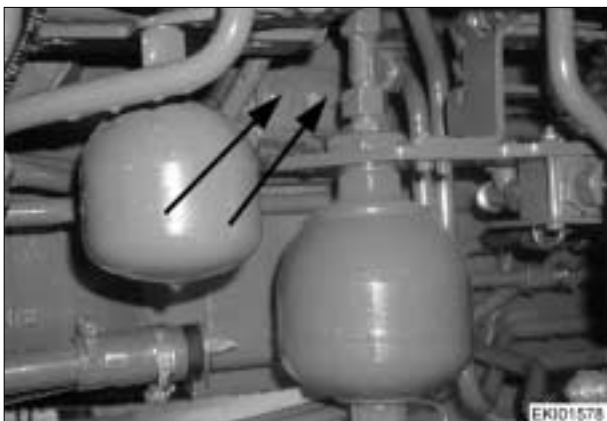
Disconnect hydraulic lines to front-axle suspension and release clip.



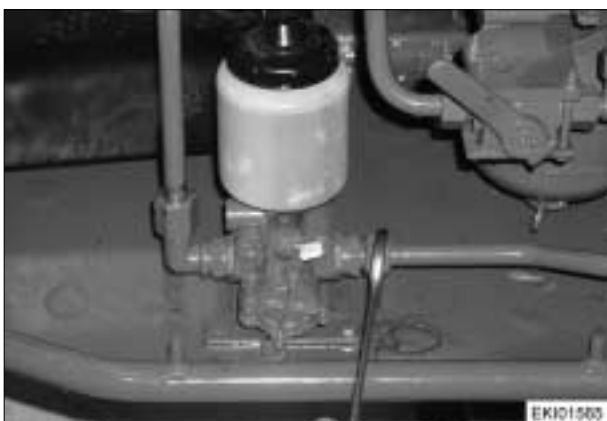
**Warning:**  
Open front-axle suspension stopcocks on central control block (ZSB) (pressure relief)!



Disconnect hydraulic lines to front power lift.



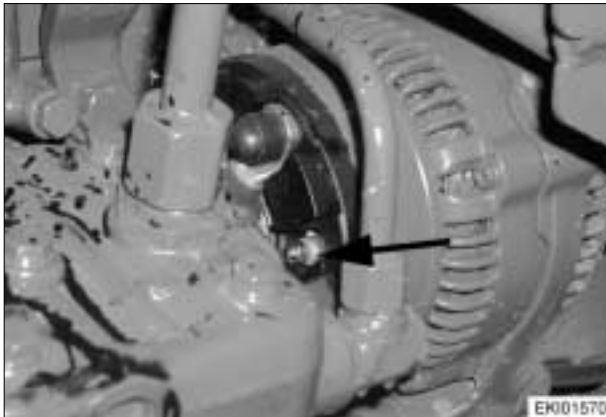
Remove bracket (arrowed) for accumulator.



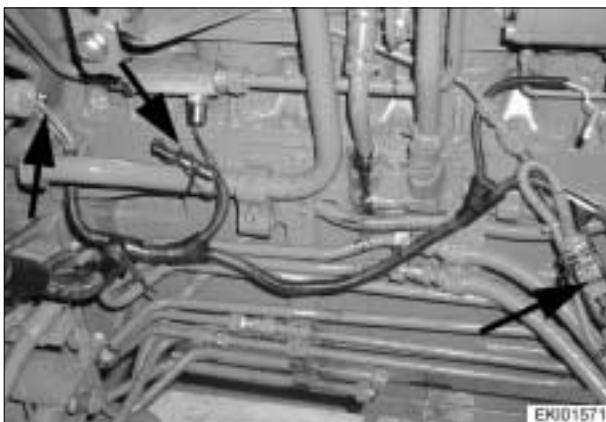
Disconnect compressed-air line at antifreeze pump.

Date	Version	Page	Capitel	Index	Docu-No.
06.06.2001	a	7/17	1050	G	000003

<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, flywheel and clutch housing</b>	<b>G</b>
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Disconnect D+ cable (arrowed) from generator.



Disconnect cable from B047 sensor (front axle: 4WD, diff. lock), disconnect cable from S026 sensor (flow monitor).  
Disconnect X520 earth.



Remove cover panel under oil pan.  
Detach cardan shaft for front-wheel drive (because of separation of 4WD).



Prop oil pan with movable and adjustable trestle, taking appropriate safety precautions.  
Prop clutch housing with adjustable trestle, taking appropriate safety precautions.

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06.06.2001	<b>a</b>	8/17	<b>1050</b>	<b>G</b>	<b>000003</b>

<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, flywheel and clutch housing</b>	<b>G</b>
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Place wedge between engine and front axle, taking appropriate safety precautions.



Remove three screws each (on left and right sides of tractor) connecting flywheel housing to oil pan.



Remove screws for flanged joint between flywheel and clutch housings.



Separate flywheel housing from clutch housing and move it away.  
Ensure clearance of all components.

Date	Version	Page	Capitel	Index	Docu-No.
06.06.2001	<b>a</b>	9/17	<b>1050</b>	<b>G</b>	<b>000003</b>

<p><b>Fav 900</b></p>	<p style="text-align: center;"><b>Transmission / Housing</b></p> <p><b>Disconnecting tractor, flywheel and clutch housing</b></p>	<p style="text-align: center; font-size: 2em;"><b>G</b></p>
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**Connecting tractor**

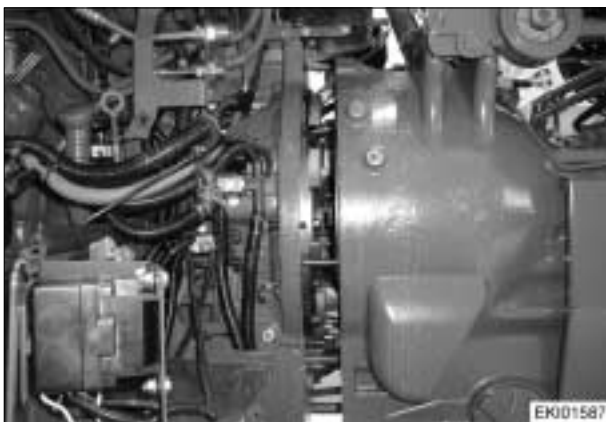
Check venting duct (arrowed) for soiling.

Clean flange surfaces.

Screw in two M12 stud bolts (fitting aid).

Locate new O-ring (A) on transmission drive shaft and grease.

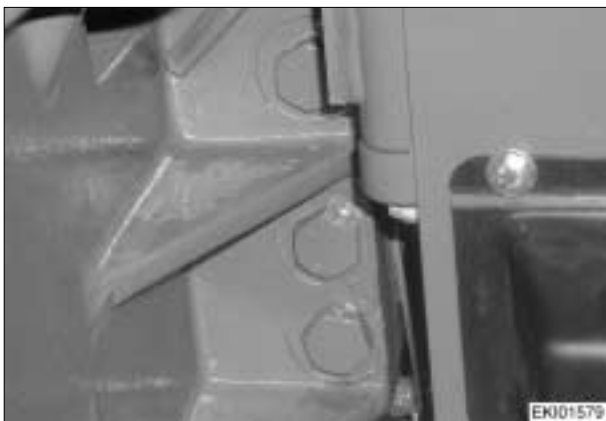
Coat drive shafts (transmission drive shaft, cardan shaft) with long-life grease X 902.002.472.



Mate flywheel and clutch housings.

If necessary, turn engine over with engine cranking device X 899.980.220.

Tighten screws for flywheel and clutch housing flanged joint to **120 Nm**.



Tighten three screws each (on left and right sides of tractor) connecting flywheel housing to oil pan to **405 Nm**.



Fit front-wheel drive cardan shaft.

Tighten M12-10.9 socket head cap screws to **150 Nm**.

Fit cover panel under oil pan.

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06.06.2001	a	10/17	<b>1050</b>	<b>G</b>	<b>000003</b>

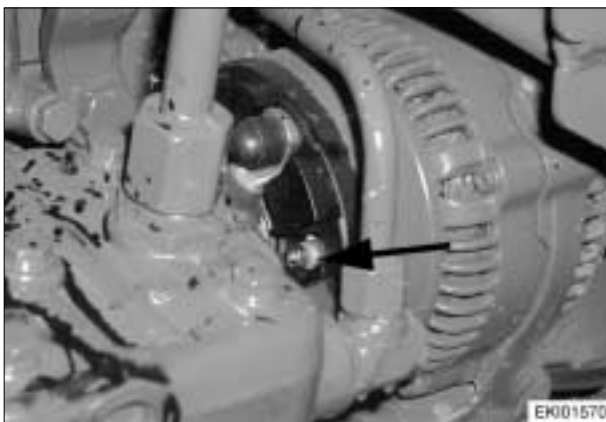


<p><b>Fav 900</b></p>	<p>Transmission / Housing  <b>Disconnecting tractor, flywheel and clutch housing</b></p>	<p><b>G</b></p>
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**Right side**

Fit cable to B047 sensor  
 (front axle: 4WD, diff. lock).  
 Fit cable to sensor (flow monitor).  
 Fit X520 earth.



Fit D+ cable (arrowed) to generator.



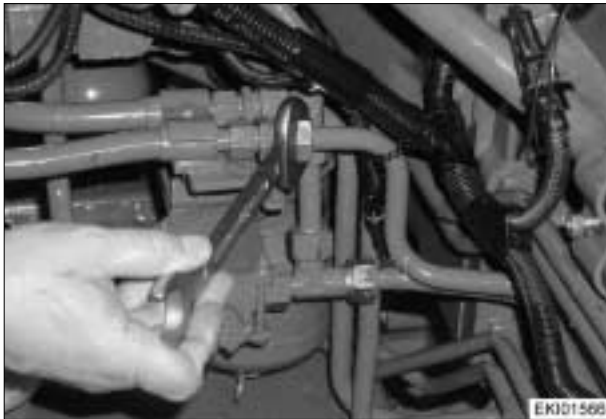
Fit compressed-air line to antifreeze pump.



Fit bracket (arrowed) for accumulator.

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06.06.2001	a	11/17	1050	G	000003

<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, flywheel and clutch housing</b>	<b>G</b>
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Fit hydraulic lines to front power lift.



Fit hydraulic lines to front-axle suspension and fit clip.



Fit hydraulic lines to front PTO.



Fit hydraulic lines to steering cylinder.

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06.06.2001	a	12/17	1050	G	000003

<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, flywheel and clutch housing</b>	<b>G</b>
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Fit hydraulic line (to hydraulic oil cooler).  
 Fit hydraulic line (to steering pump).



Fit hydraulic lines (transmission oil cooler) to connector.



Fit hydraulic lines (transmission oil cooler) to valve unit.



Fit exhaust bend.  
 Fit clip (arrowed) for tank venting tube.

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<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, flywheel and clutch housing</b>	<b>G</b>
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**Left side**

Fit hydraulic line and retaining strap.



Fit tank venting tube at T-junction.



Fit retaining strap for tank frame.

Fasten battery - terminal cable (arrowed) with cable tie.



Fit compressed-air line to spill valve.

Fasten compressed-air line with cable ties.

Date	Version	Page	Capitel	Index	Docu-No.
06.06.2001	a	14/17	1050	G	000003

<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, flywheel and clutch housing</b>	<b>G</b>
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Fit cable B+ (to generator on right) to connector.  
Fasten cable B+ with cable ties.



Fit clips for cable loom.



Fit both batteries.



Fit coolant hoses to connector.

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06.06.2001	a	15/17	1050	G	000003

<p><b>Fav 900</b></p>	<p>Transmission / Housing  <b>Disconnecting tractor, flywheel and clutch housing</b></p>	<p><b>G</b></p>
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Fit fuel tank and auxiliary tank.

**Fitting sequence as in - Disconnecting tractor, clutch and transmission housing - Chapter 1050 Reg.G**



Lower cab.

**Fitting sequence as in - Disconnecting tractor, clutch and transmission housing - Chapter 1050 Reg.G**



**Fill with oil preferably via return flow connection with pump. (Oil is filtered in return flow.)**

If this is not possible, unscrew venting filter (A) and add oil.

Observe instructions for oil type and quantity.

Initial fill approx. 70 l

**Note:**

**See also :**

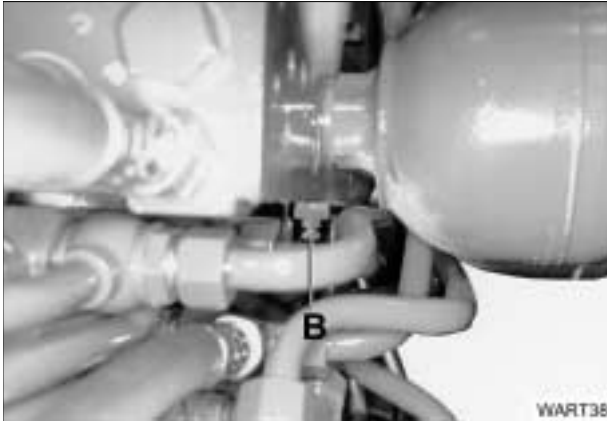
**Chapter 0000 Reg. A - Fuels and lubricants**



Close stopcock of front-axle suspension (A).

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06.06.2001	a	16/17	1050	G	000003

<b>Fav 900</b>	Transmission / Housing <b>Disconnecting tractor, flywheel and clutch housing</b>	<b>G</b>
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**Concluding work:**

Close stopcock of front-axle suspension (B).

Fit other panels.

Fit wheels.

Close front-axle suspension stopcocks.

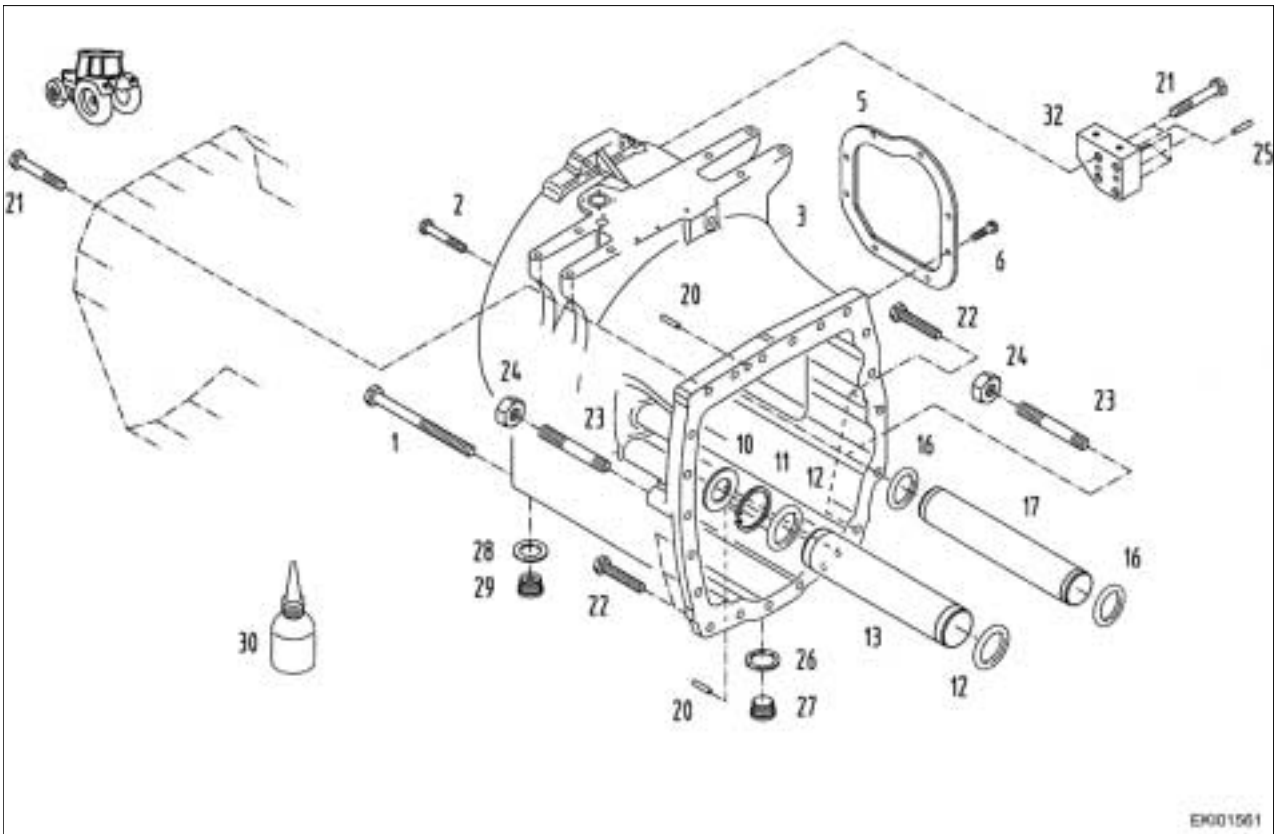
**Check tractor for operation and leaks.**

Date	Version	Page	Capitel	Index	Docu-No.
06.06.2001	a	17/17	1050	G	000003

**Fav 900**

**Transmission / Housing**  
**Disconnecting tractor, clutch and transmission housing**

**G**



EK001561

Item	Designation	Item	Designation
1	Hexagon screw	21	Hexagon screw
2	Hexagon screw	22	Hexagon screw
3	Clutch housing	23	Stud bolt
5	Cover	24	Hexagon nut
6	Hexagon screw	25	Dowel pin
10	Washer	26	Sealing ring
11	Circlip	27	Drain plug
12	O-ring	28	Sealing ring
13	Pipe	29	Drain plug
16	O-ring	30	Surface seal
17	Pipe	32	Block
20	Dowel pin		



Remove panel at front. Remove right engine cover.

EK00384

Date	Version	Page	Capitel	Index	Docu-No.
30.05.01	a	1/27	1050	G	000002



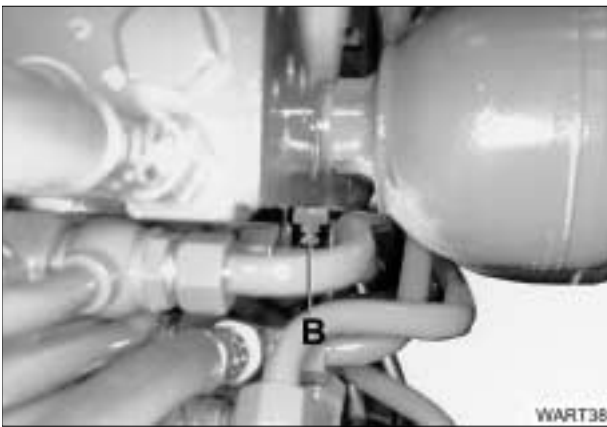
Fav 900	Transmission / Housing Disconnecting tractor, clutch and transmission housing	G
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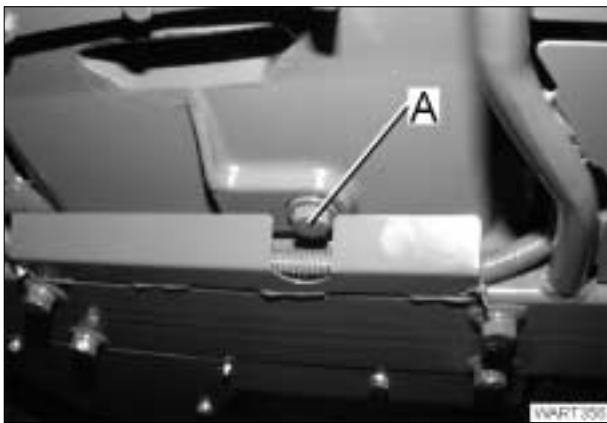
Open front-axle suspension stopcocks on central control block (ZSB).

**Warning:**  
 Front axle lowers against block.

Open stopcock A.



Open stopcock B.



**Disconnecting tractor**

**Preliminary work:**

- Prop tractor, taking appropriate safety precautions, and remove both rear wheels.
- Remove mudguard of front right wheel.
- Remove panels.
- Drain hydraulic oil (approx. 70 l).



**Raise cab or, depending on repair required, completely remove cab.**

Raising the cab is sufficient for repairs to the cardan-shaft brake and leaks in the drive shaft. Completely removing the cab is necessary for repairs to the pump drive, the cardan-shaft coupling or the differential.

Date	Version	Page	Capitel	Index	Docu-No.
30.05.01	a	2/27	Disconnecting tractor, clutch and transmission housing	1050	G 000002

<p><b>Fav 900</b></p>	<p align="center"><b>Transmission / Housing</b>  <b>Disconnecting tractor, clutch and transmission housing</b></p>	<p align="center"><b>G</b></p>
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**Raising cab at front:**

Open side sections and remove cover panel.



Remove left and right support plates .



Open coolant water drain plug with caution.



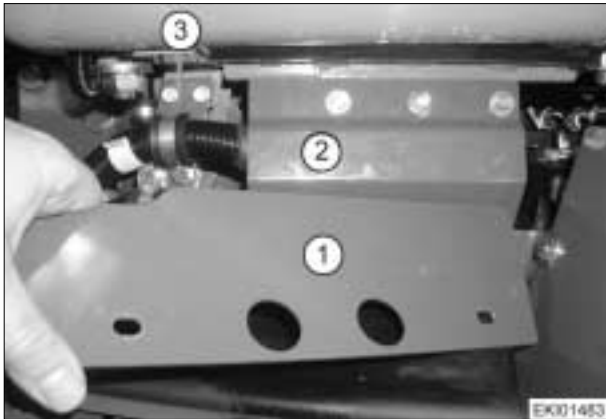
**Caution:**  
**If engine is warm**  
**- danger of scalding injury!**



Disconnect heating system water pipes.

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30.05.01	a	3/27	1050	G	000002

Fav 900	Transmission / Housing Disconnecting tractor, clutch and transmission housing	G
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On left in direction of travel  
Remove cover panel (1), cover of cable coupler (2) and bracket of cable loom (3).



Label and disconnect cable couplers.



Remove engine cover and disconnect air-conditioning cooling hoses.

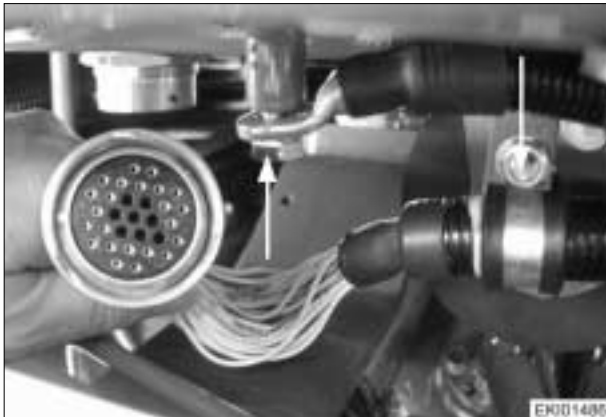
**Note:**  
**Disconnect coolant hoses only at these screw couplings. Internal valves prevent the coolant from escaping.**



On right in direction of travel:  
Remove footplate.

Date	Version	Page	Capitel	Index	Docu-No.	
30.05.01	a	4/27	Disconnecting tractor, clutch and transmission housing	1050	G	000002

<p><b>Fav 900</b></p>	<p align="center"><b>Transmission / Housing</b></p> <p><b>Disconnecting tractor, clutch and transmission housing</b></p>	<p align="center"><b>G</b></p>
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Disconnect cable coupler.  
Remove cable loom bracket (arrowed) and earth cable (arrowed).



Remove cover of EPC-DA switchover.



Remove support at rear left and right and fit in tilted position (arrowed).



Attach cab to hoist at front on mirror bracket, taking appropriate safety precautions.

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30.05.01	a	5/27	Disconnecting tractor, clutch and transmission housing	1050	G 000002

<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, clutch and transmission housing</b>	<b>G</b>
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Remove hexagon screw in front cab mount.  
Remove opposite side in same manner.



**Raise cab at front until rear window is against EPC-DA multiway valve.**

Check on clearance of all components when raising cab.

**Note:**  
**Prop cab using timber prop (risk of accident!)**



**Remove fuel tank and auxiliary tank.**

Remove step at left.



Remove clamp, braces and bracket (arrowed) of fuel tank.

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30.05.01	a	6/27	Disconnecting tractor, clutch and transmission housing	1050	G 000002

<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, clutch and transmission housing</b>	<b>G</b>
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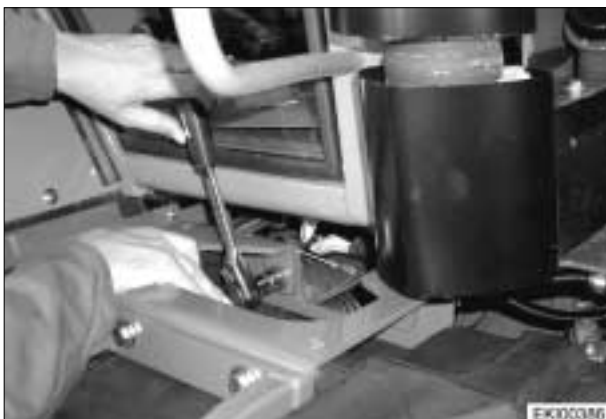
Open battery case and remove toolbox storage compartment.



Remove cover panel from spill valve and air tank.



Remove guard from fuel hose. Release clip (arrowed).



Remove step on right.

Date	Version	Page	Capitel	Index	Docu-No.
30.05.01	<b>a</b>	7/27	<b>1050</b>	<b>G</b>	<b>000002</b>

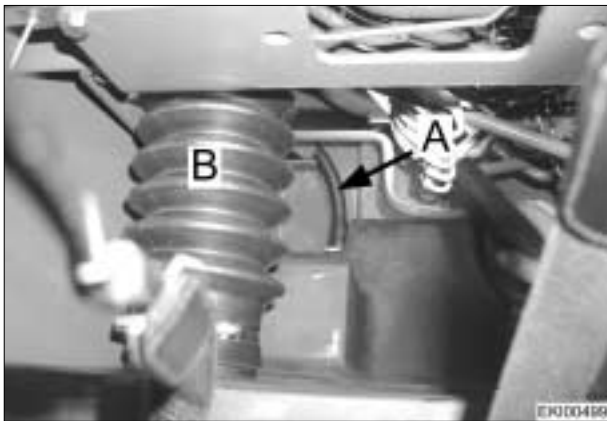
Fav 900	Transmission / Housing Disconnecting tractor, clutch and transmission housing	G
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Withdraw auxiliary tank on right as far as retaining cable.



Seal tank hose at bottom with hose clamp.  
Pump fuel out of auxiliary tank.



Release hose clips.  
Withdraw connecting hoses A and B, remove retaining cable.

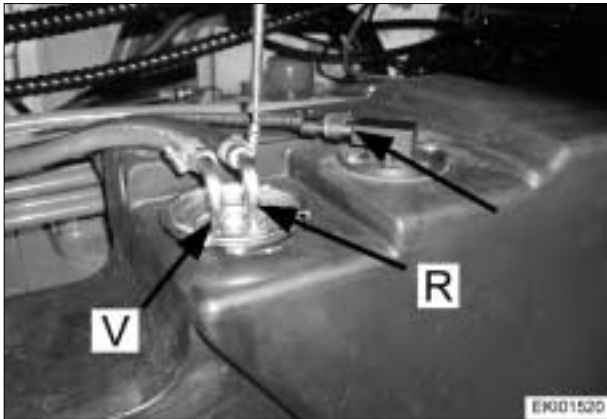
**Note:**  
Pump fuel off to level of upper connecting pipe B.



Withdraw venting tube from fuel tank.  
Remove auxiliary tank.

Date	Version	Page	Capitel	Index	Docu-No.
30.05.01	a	8/27	Disconnecting tractor, clutch and transmission housing	1050	G 000002

<p><b>Fav 900</b></p>	<p align="center"><b>Transmission / Housing</b></p> <p><b>Disconnecting tractor, clutch and transmission housing</b></p>	<p align="center"><b>G</b></p>
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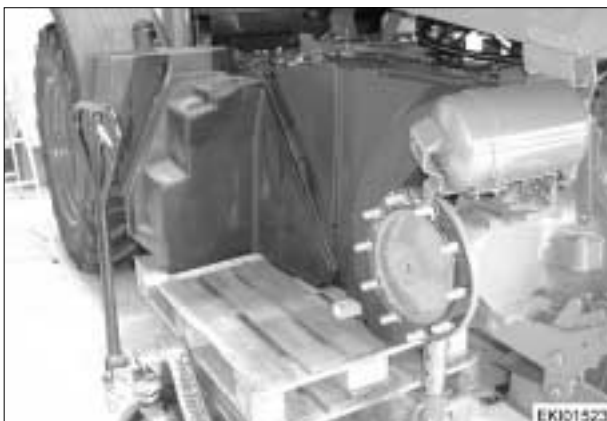
Disconnect feed (V) and return flow (R) intake pipe.  
 Disconnect fuel level sensor connector (arrowed).



Withdraw tank venting device.



Remove connecting pipe (clearance when removing fuel tank).



Remove fuel tank.

Date	Version	Page	Capitel	Index	Docu-No.
30.05.01	a	9/27	1050	G	000002



<p><b>Fav 900</b></p>	<p align="center"><b>Transmission / Housing</b>  <b>Disconnecting tractor, clutch and transmission housing</b></p>	<p align="center"><b>G</b></p>
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**Left side of tractor**  
 Disconnect hydraulic line.



Remove clip.



Disconnect compressed-air line from spill valve,  
 cut cable tie and pull compressed-air line  
 forwards.



**Right side of tractor**  
 Disconnect hydraulic lines to steering cylinder.

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30.05.01	a	10/27	Disconnecting tractor, clutch and transmission housing	1050	G 000002

Fav 900	Transmission / Housing Disconnecting tractor, clutch and transmission housing	<b>G</b>
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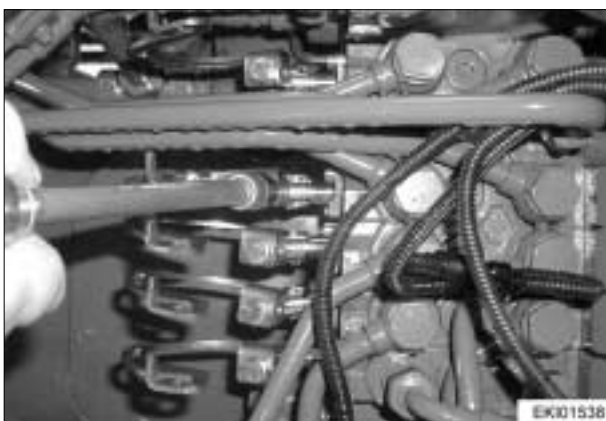
Disconnect hydraulic lines to front PTO.



Release pipe clip.  
Remove steering system return flow.



Remove hydraulic line (arrowed) from central control block (ZSB).  
Remove load-sensing line to steering system (LS-LE).



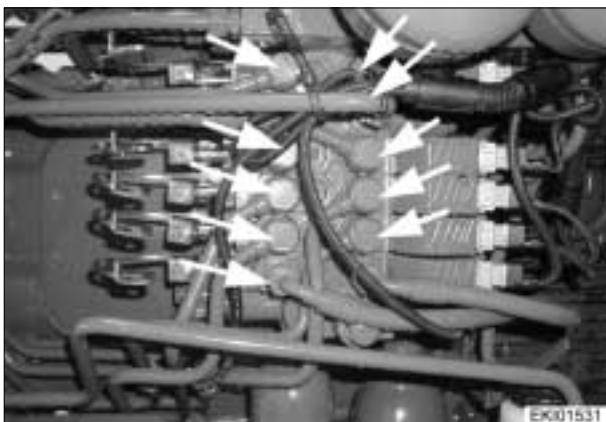
Remove emergency control valve (clearance for hydraulic lines).

Date	Version	Page	Capitel	Index	Docu-No.
30.05.01	a	11/27	1050	G	000002

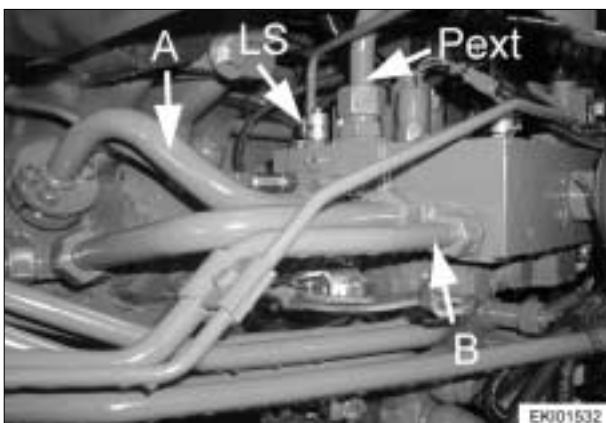
<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, clutch and transmission housing</b>	<b>G</b>
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Remove bracket (clearance for hydraulic lines).



Remove hydraulic lines (arrowed) to spool valves.  
Remove screw socket (clearance for hydraulic lines).



Remove pressure pipe (A) of LS pump.  
Remove hydraulic line (B) for EPC-DA switchover.  
Remove load-sensing line (LS).  
Remove external pressure supply (P ext. - optional extra).



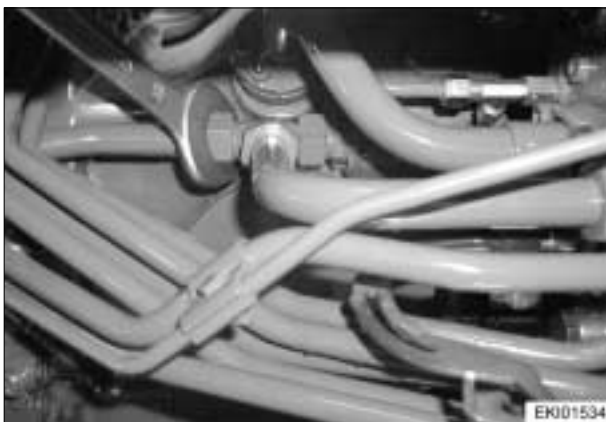
Remove bracket.

Date	Version	Page	Capitel	Index	Docu-No.
30.05.01	a	12/27	Disconnecting tractor, clutch and transmission housing	1050	G 000002

<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, clutch and transmission housing</b>	<b>G</b>
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Remove entire intake pipe for steering pump (clearance for hydraulic lines).



Remove return flow to hydraulic tank at T-junction.



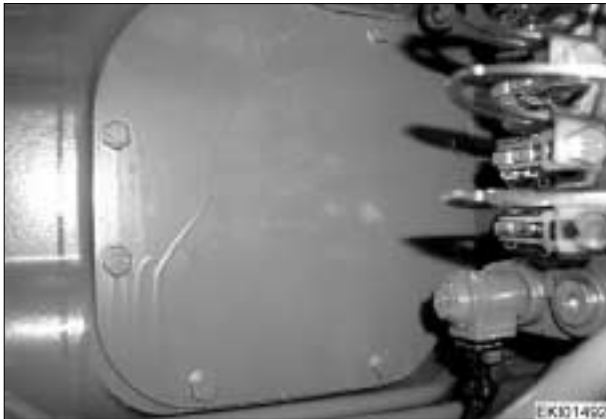
Remove hydraulic lines (to transmission oil cooler) from valve unit.



Disconnect hydraulic lines (to transmission oil cooler) at connector.  
Remove lines (clearance for hatch).

Date	Version	Page	Capitel	Index	Docu-No.
30.05.01	<b>a</b>	13/27	<b>Disconnecting tractor, clutch and transmission housing</b>	<b>1050</b>	<b>G</b>
					<b>000002</b>

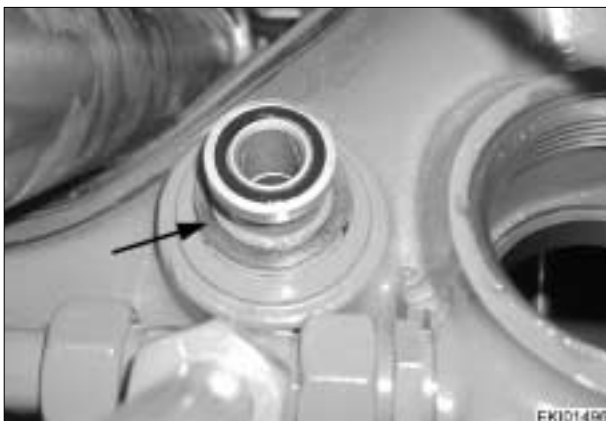
<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, clutch and transmission housing</b>	<b>G</b>
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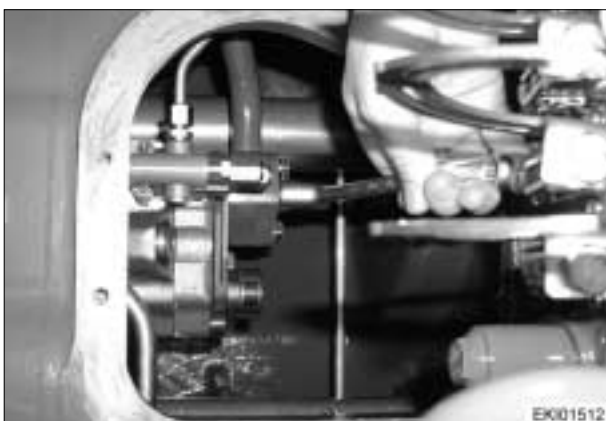
Remove hatch.



Remove screw cap (arrowed) from return-flow filter and remove entire filter.



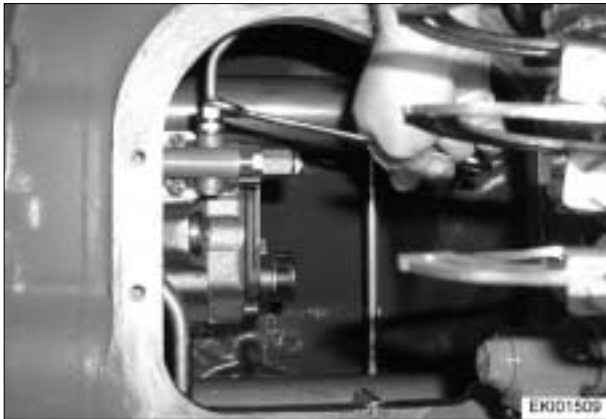
Remove V-section sealing ring (arrowed) from pressure pipe.



Remove 4 M10 hexagon screws from pressure pipe.  
Pull pressure pipe out of housing towards inside.

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<p><b>Fav 900</b></p>	<p align="center"><b>Transmission / Housing</b>  <b>Disconnecting tractor, clutch and transmission housing</b></p>	<p align="center"><b>G</b></p>
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Remove control line (load-sensing system) from LS pump.



Remove intake pipe from LS pump.



Remove compressed-air line from antifreeze pump.



Remove cover panel under oil pan.  
 Detach cardan shaft for front-wheel drive (necessary because of distortions in drivetrain when separating clutch and transmission housing).

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30.05.01	a	15/27	1050	G	000002

<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, clutch and transmission housing</b>	<b>G</b>
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Prop clutch housing (3) with movable and adjustable trestle, taking appropriate safety precautions.

Prop transmission housing with movable and adjustable trestle, taking appropriate safety precautions.



Place wedge between engine and front axle, taking appropriate safety precautions.



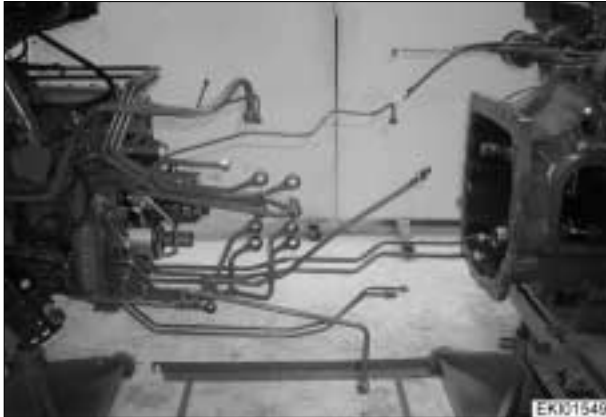
Remove tank support plate.



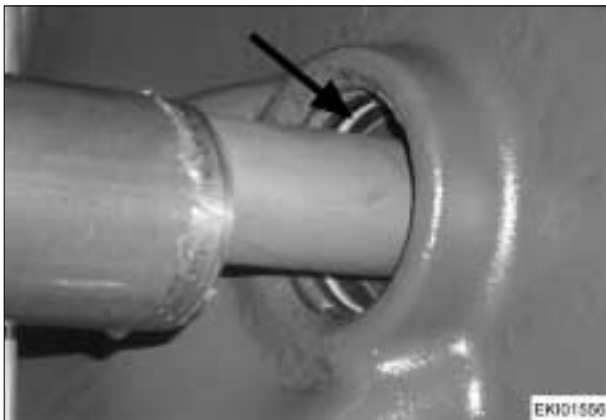
Remove nuts and bolts of clutch and transmission housing flange connection.

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30.05.01	a	16/27	Disconnecting tractor, clutch and transmission housing	1050	G 000002

<p><b>Fav 900</b></p>	<p align="center"><b>Transmission / Housing</b></p> <p><b>Disconnecting tractor, clutch and transmission housing</b></p>	<p align="center"><b>G</b></p>
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Separate clutch housing (3) from transmission housing and move it away.  
 Ensure that all components move freely.



**Reassembling clutch and transmission housings**

Where removed:  
 Seal pipe (17) (transmission drive shaft).  
 Insert O-ring (16) into housing groove and grease.



Where removed:  
 Seal pipe (13) (cardan shaft).  
 Insert washer (10). Clip circlip (11) into housing groove.  
 Insert O-ring (12) into housing groove and grease.  
 Press pipe (13) into clutch housing (3) until stop is reached.

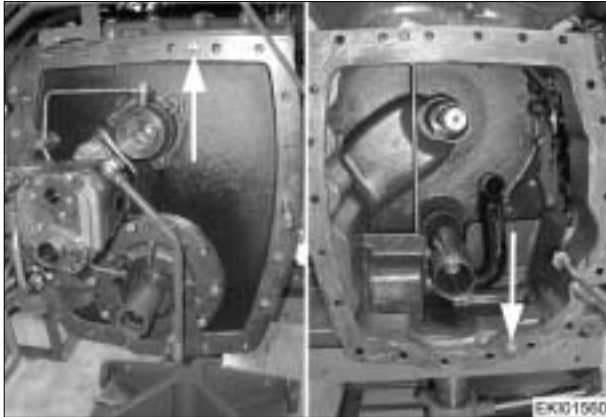


Coat splines on cardan shaft with long-life grease and fit cardan shaft.

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<p><b>Fav 900</b></p>	<p align="center"><b>Transmission / Housing</b></p> <p><b>Disconnecting tractor, clutch and transmission housing</b></p>	<p align="center"><b>G</b></p>
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Clean flange surfaces.  
 Check that two dowel pins (20) (arrowed) are present.  
 Grease all O-rings.  
 Coat flange surface with sealant X 903.050.074 and bring tractor together again.



Mate clutch and transmission housings.  
 If necessary, turn engine over with engine cranking device X 899.980.220.

**Note:**  
**When bringing clutch and transmission housings together, raise pipes (transmission drive shaft (17) and cardan shaft (13)) and guide them into seats (above hatch cover).**  
**Tighten hexagon screws and nuts in stages to 295 Nm.**

Remove clutch and transmission housing props and front axle wedge.



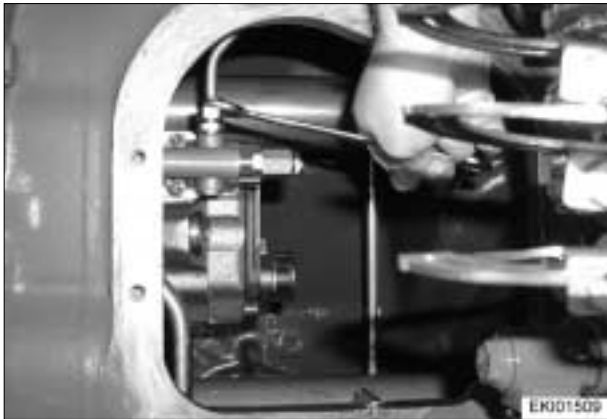
Fit front-wheel drive cardan shaft.  
 Tighten M12-12.9 socket head cap screws to **150 Nm** .  
 Fit cover panel under oil pan.



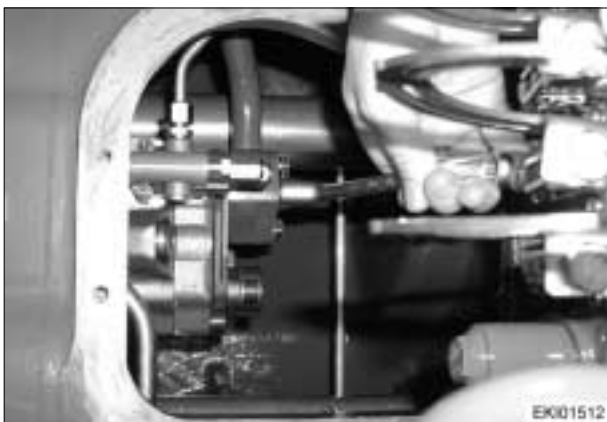
**Right side**  
 Fit LS pump intake pipe.

Date	Version	Page	Capitel	Index	Docu-No.
30.05.01	a	18/27	Disconnecting tractor, clutch and transmission housing	1050	G 000002

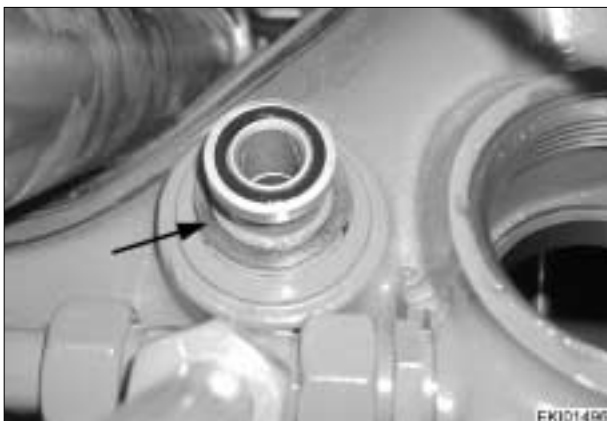
<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, clutch and transmission housing</b>	<b>G</b>
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Fit control line (load-sensing system) to LS pump.



Fit LS pump pressure pipe.



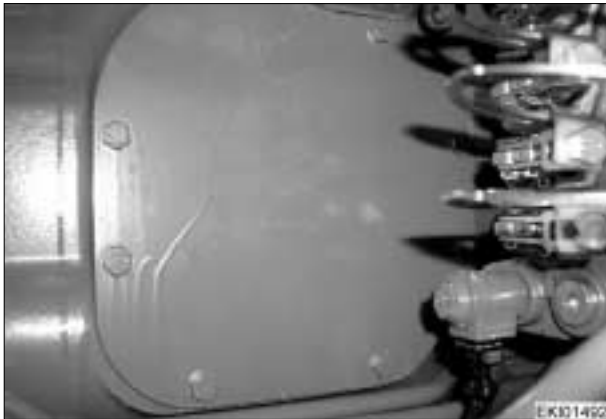
Fit V-section sealing ring (arrowed) to pressure pipe.



Fit new filter element and hand-tighten filter cover.

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30.05.01	<b>a</b>	19/27	<b>1050</b>	<b>G</b>	<b>000002</b>

<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, clutch and transmission housing</b>	<b>G</b>
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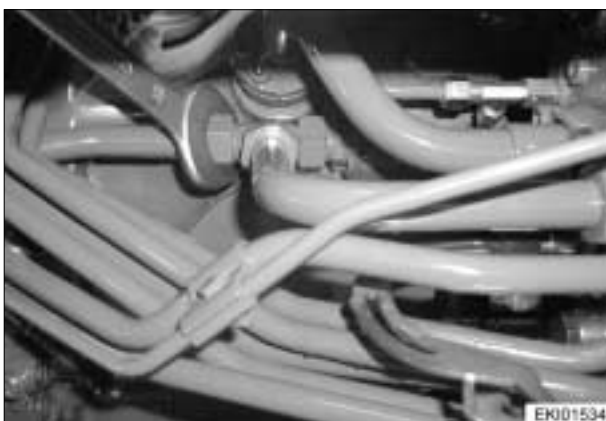
Clean flange surface, coat with sealant X 903.050.074 and fit hatch cover.



Fit pressure pipe to antifreeze pump with new sealing ring.



Fit hydraulic lines (to transmission oil cooler).



Fit return flow to hydraulic tank at T-junction.

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30.05.01	<b>a</b>	20/27	<b>Disconnecting tractor, clutch and transmission housing</b>	<b>1050</b>	<b>G</b>	<b>000002</b>

Fav 900	Transmission / Housing Disconnecting tractor, clutch and transmission housing	G
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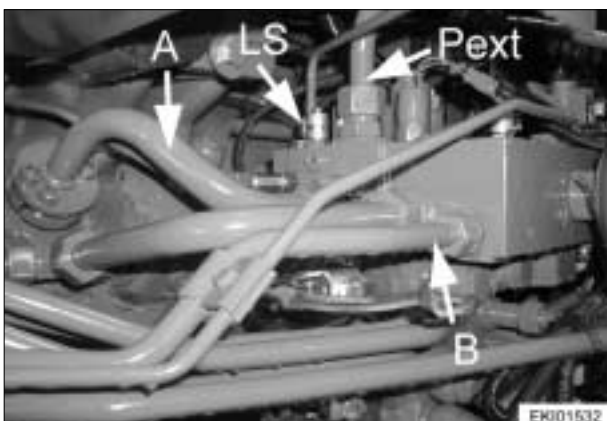
Fit steering pump intake pipe.



**Note:**  
Check suction filter in intake pipe for soiling.



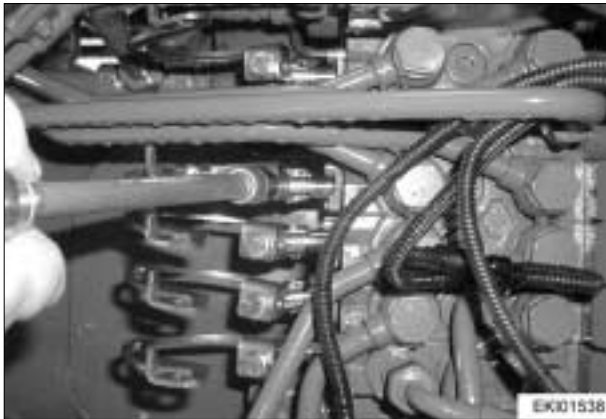
Fit bracket.



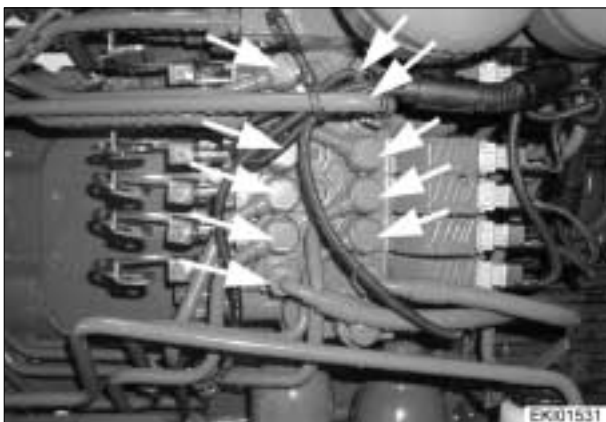
Fit LS pump pressure pipe (A).  
Fit hydraulic line (B) for EPC-DA switchover.  
Fit load-sensing line (LS).  
Fit external pressure supply  
(P ext. - optional extra).

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30.05.01	a	21/27	Disconnecting tractor, clutch and transmission housing	1050	G 000002

<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, clutch and transmission housing</b>	<b>G</b>
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Fit emergency control valve.



Fit screw socket.  
Fit hydraulic lines (arrowed) with new Usit rings.



Fit hydraulic line (arrowed) to central control block (ZSB).  
Fit load-sensing line to steering system (LS-LE).



Fit pipe clip.  
Fit return flow of steering system.

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30.05.01	a	22/27	Disconnecting tractor, clutch and transmission housing	1050	G 000002

<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, clutch and transmission housing</b>	<b>G</b>
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Fit hydraulic lines to front PTO.



Fit hydraulic lines to steering cylinder.



**Left side**

Fit hydraulic line.

Lay compressed-air line to spill valve and fasten with cable tie.



Fit clip.

Date	Version	Page	Capitel	Index	Docu-No.
30.05.01	a	23/27	Disconnecting tractor, clutch and transmission housing	1050	G 000002

<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, clutch and transmission housing</b>	<b>G</b>
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**Fitting fuel tank and auxiliary tank**



Fit clamp, brace and bracket (arrowed).



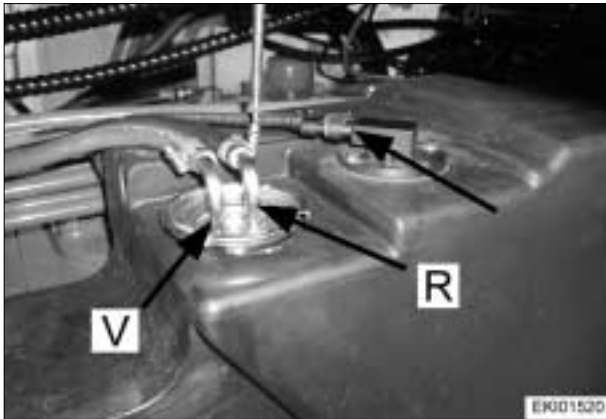
Fit connecting pipe.



Fit tank venting tube.

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30.05.01	<b>a</b>	24/27	<b>Disconnecting tractor, clutch and transmission housing</b>	<b>1050</b>	<b>G</b>
				<b>G</b>	<b>000002</b>

<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, clutch and transmission housing</b>	<b>G</b>
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Fit fuel lines to feed and (V) and return flow (R) intake pipes.  
Fit cable coupler X 182 to fuel level sensor.



Fit air tank, then fit compressed-air line to spill valve and cover panel.



Fit toolbox storage compartment, close battery case.



Fit left step.

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30.05.01	a	25/27	Disconnecting tractor, clutch and transmission housing	1050	G 000002



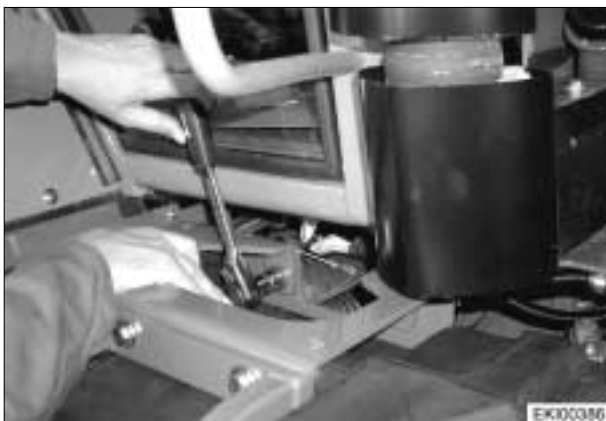
<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, clutch and transmission housing</b>	<b>G</b>
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Locate auxiliary tank on right and connect connecting hoses.



Release hose clamp.



Fit right step.



**Lowering cab**

**Fitting sequence: in reverse order to raising cab.**

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30.05.01	a	26/27	Disconnecting tractor, clutch and transmission housing	1050	G 000002

<p><b>Fav 900</b></p>	<p style="text-align: center;"><b>Transmission / Housing</b></p> <p><b>Disconnecting tractor, clutch and transmission housing</b></p>	<p><b>G</b></p>
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**Fill with oil preferably via return flow connection with pump. (Oil is filtered in return flow.)**

If this is not possible, unscrew venting filter (A) and add oil.

Observe instructions for oil type and quantity.

Initial fill approx. 70 l

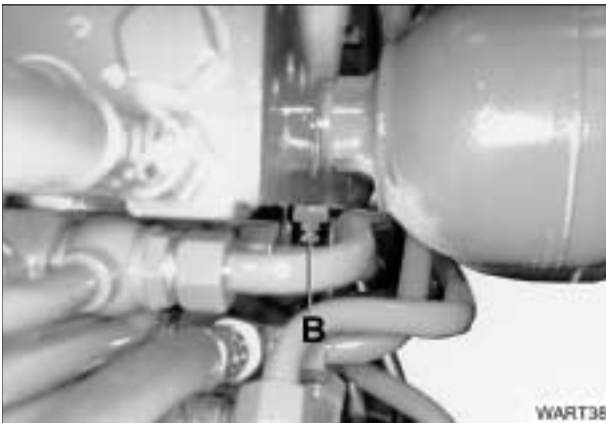
**Note:**

**See also:**

**Chapter 0000 Reg. A - Fuels and lubricants**



Close stopcock of front-axle suspension (A).



**Concluding work:**

Close stopcock of front-axle suspension (B).

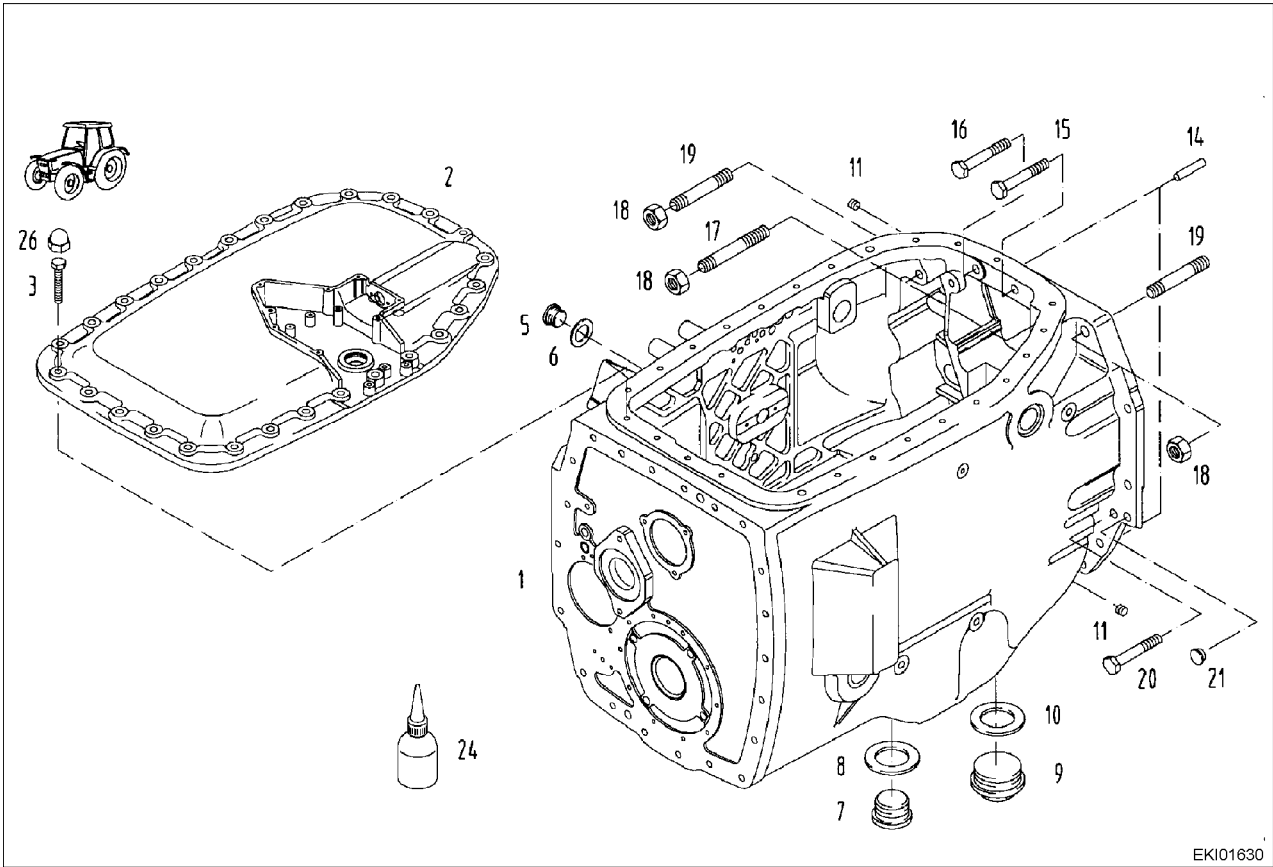
Fit other panels.

Fit wheels.

**Check tractor for operation and leaks.**

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<b>Fav 900</b>	<b>Transmission / Housing</b>	<b>G</b>
<b>Disconnecting tractor, transmission and rear-axle housings</b>		



Item	Designation	Item	Designation
1	Transmission housing	14	Parallel pin
2	Housing cover	15	M16x80-10.9 hexagon screw
3	M12x50-8.8 hexagon screw	16	M16x90-10.9 hexagon screw
5	Drain plug	17	M16x110-10.9 stud bolt
6	Sealing ring	18	Hexagon nut
7	Drain plug	19	M16x75-10.9 stud bolt
8	Sealing ring	20	M16x60-10.9 hexagon screw
9	Drain plug	21	Sealing plug
10	Sealing ring	24	Sealant
11	Drain plug	26	Hexagonal protective cap



Remove front panels. Remove right engine cover.

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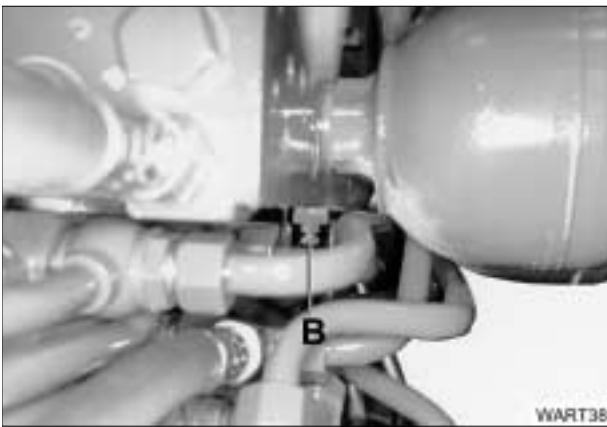
<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, transmission and rear-axle housings</b>	<b>G</b>
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Open front-axle suspension stopcocks on central control block (ZSB).

**Warning:**  
 **Front axle lowers against block.**

Open stopcock A.



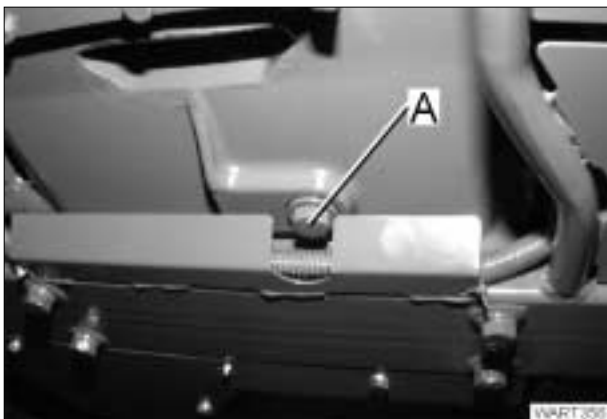
Open stopcock B.



**Disconnecting tractor**

**Preliminary work:**

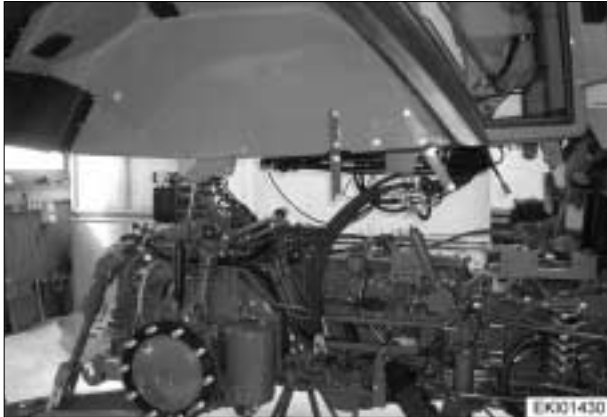
- Lower rear power lift.
- Prop tractor, taking appropriate safety precautions, and remove rear wheels.
- Remove panels.
- Drain hydraulic oil (approx. 65 l).



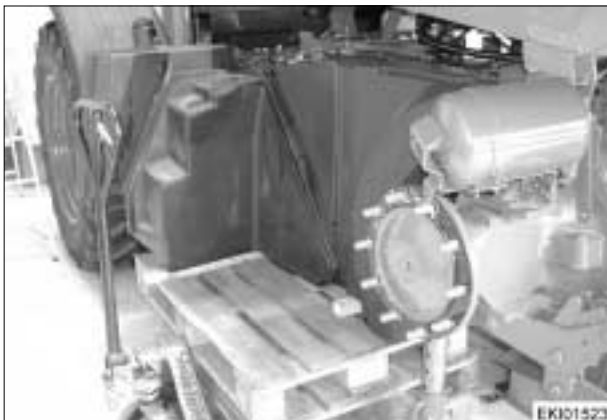
Drain hydraulic oil (approx. 70 l).

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<p><b>Fav 900</b></p>	<p align="center"><b>Transmission / Housing</b></p> <p><b>Disconnecting tractor, transmission and rear-axle housings</b></p>	<p align="center"><b>G</b></p>
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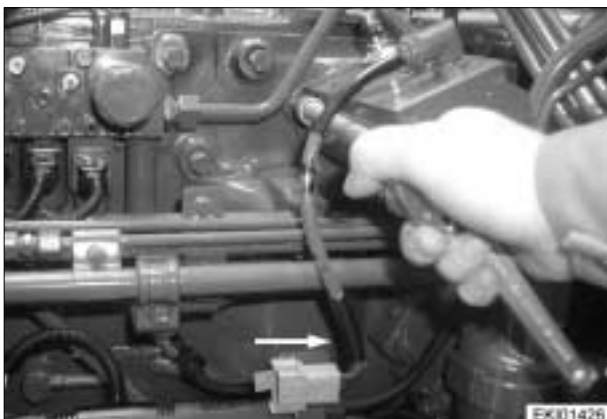
**Removing cab - see Chapter 8100 Reg.G**



**Remove fuel tank and auxiliary tank.  
Fitting sequence as in - Disconnecting tractor, clutch and transmission housing - Chapter 1050 Reg.G**



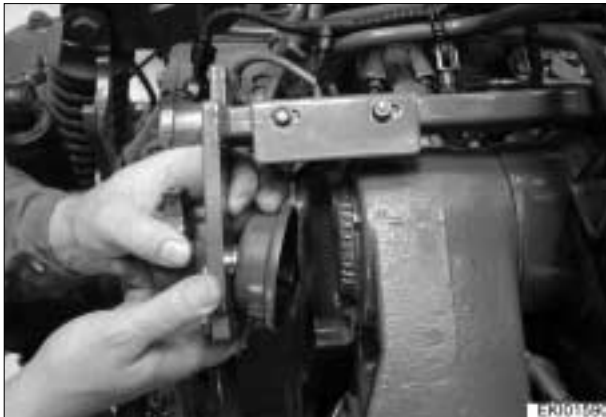
**Note:**  
**Shift range control to neutral position (to separate 4WD).**  
Unscrew console with auxiliary lever (to provide access to return line (hydraulic oil)).



Disconnect cable coupler X307. Unlock plug housing and slide out of bracket in direction of arrow.  
**Remove A009 - actuator unit (to provide access to return line (hydraulic oil)).**

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<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, transmission and rear-axle housings</b>	<b>G</b>
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**Left side**

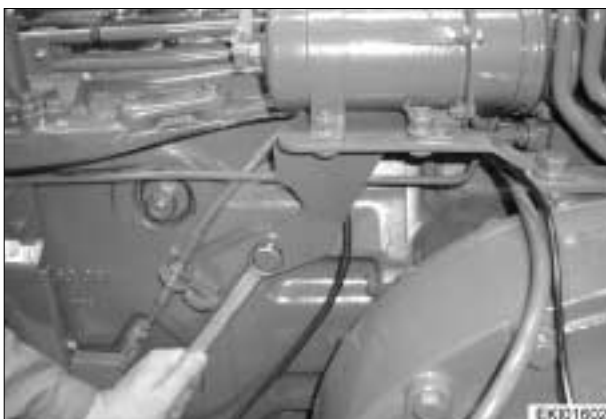
Remove bracket for B030 sensor.



Handbrake is released with compressed air.  
Create external connector (DIY) to accumulator.  
Detach handbrake linkage.



External connector (DIY) to accumulator



Detach Bowden cable for range control I - II on console.  
Remove accumulator (handbrake) with console.

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Disconnect compressed-air line from spill valve.



Remove hydraulic line to diff. lock.



Remove stabiliser strut.

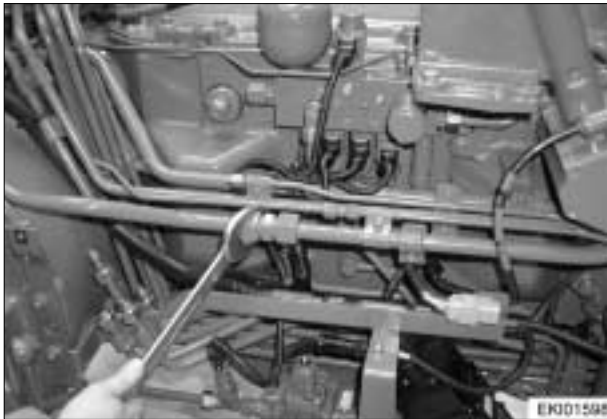


**Right side**

Remove bracket for steering lines.

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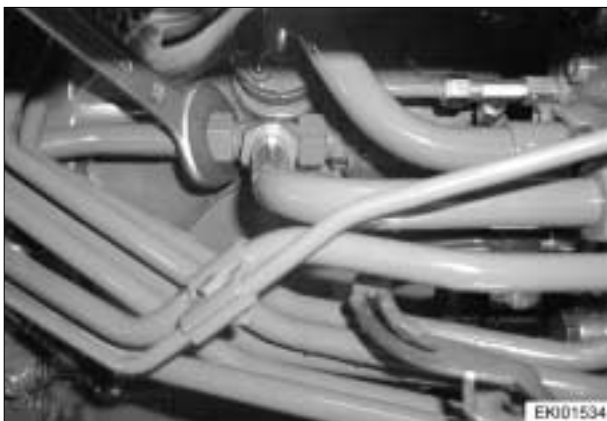
<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, transmission and rear-axle housings</b>	<b>G</b>
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Remove entire hydraulic line for external pressure supply.



Remove entire clutch venting system.



Remove return flow to hydraulic tank at T-junction.



Remove return flow to hydraulic tank hydraulic couplings.  
Release clips.

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Remove both connecting lines of lift cylinders in their entirety.



Withdraw drain pan.



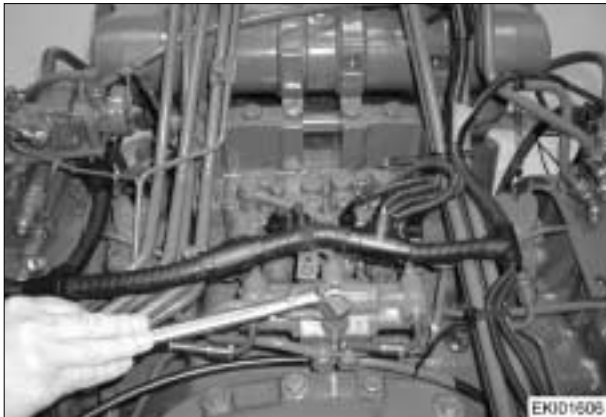
Disconnect hydraulic lines for EPC-DA switchover.



Remove lift cylinder pressure pipe.

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Remove hydraulic line to cardan brake from 5V6 selector valve.



Remove entire vent unit with bleed lines.



Remove bracket for hydraulic couplings.



Label and disconnect electrical connectors in region of rear axle.  
Disconnect trailer socket.  
Release cable tie and pull cable loom forwards.

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<p><b>Fav 900</b></p>	<p align="center"><b>Transmission / Housing</b></p> <p><b>Disconnecting tractor, transmission and rear-axle housings</b></p>	<p align="center"><b>G</b></p>
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Remove bracket for pipes and clamp.  
 Unscrew screws from cover. Screw in M10 eye bolt and raise cover.



Place wedge between engine and front axle, taking appropriate safety precautions.



Prop transmission housing with movable and adjustable trestle, taking appropriate safety precautions.  
 Prop rear-axle housing using trestle, taking appropriate safety precautions.



Remove nuts and bolts from transmission/rear-axle housing flanged joint.

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<p><b>Fav 900</b></p>	<p align="center"><b>Transmission / Housing</b></p> <p><b>Disconnecting tractor, transmission and rear-axle housings</b></p>	<p align="center"><b>G</b></p>
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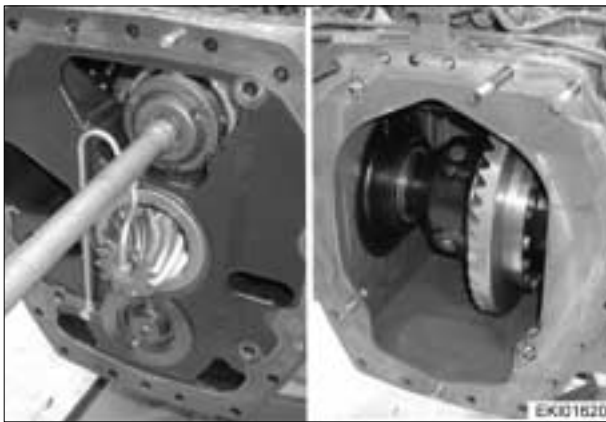


Separate transmission housing from rear-axle housing and move it away.

Ensure clearance of all components.

**Note:**

**Range control I - II is set to neutral (to separate 4WD).**

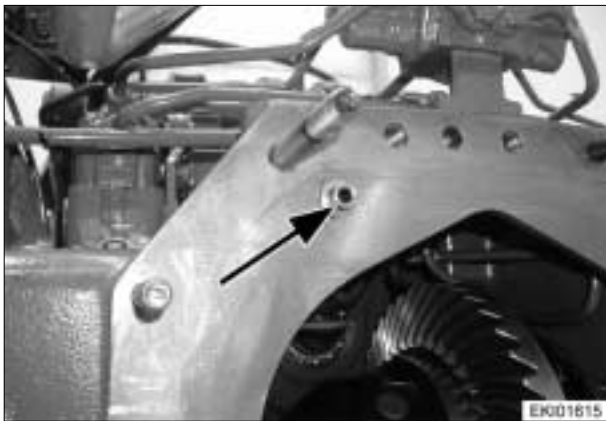


**Connecting tractor**

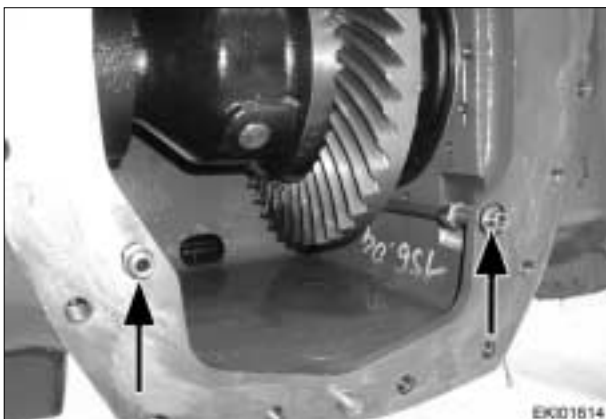
Clean flange surfaces.

Check that dowel pins are present.

Coat flange surface with sealant X 903.050.074.



Locate O-ring on oil transfer point and grease.



Locate O-ring on oil transfer point and grease.

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<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, transmission and rear-axle housings</b>	<b>G</b>
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Mate transmission and rear-axle housings.  
 If necessary, turn engine over with engine cranking device X 899.980.220.

**Note:**  
**Range control I - II is set to neutral (to separate 4WD).**  
**Engage live PTO in gearing.**



Tighten hexagon screws and nuts in stages to **295 Nm** .  
 Remove transmission and rear-axle housing props and front axle wedge.



Coat transmission housing cover with sealant X 903.050.074 and fit cover.  
 Tighten M12 hexagon screws to **86 Nm** .  
 Fit bracket for pipes and clamp.



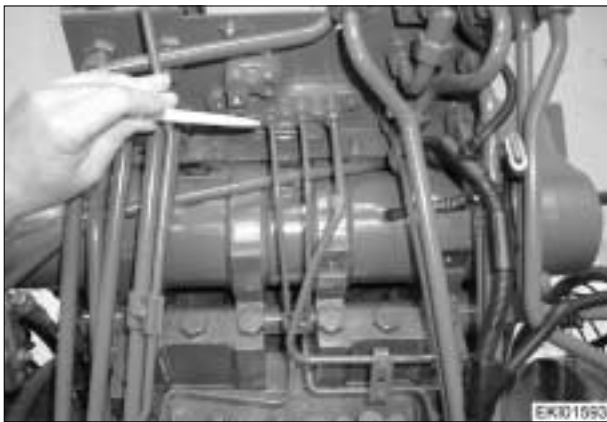
Connect electrical connectors in region of rear axle.  
 Connect trailer socket.  
 Attach cable ties.

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Fit bracket for hydraulic couplings.



**Right side**  
Fit vent unit with bleed lines.



Fit hydraulic line to cardan brake at 5V6 selector valve.



Fit lift cylinder pressure pipe.

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Fit both connecting lines of lift cylinders.



Fit hydraulic lines for EPC-DA switchover.



Fit drain pan.



Fit return flow to hydraulic tank at T-junction.

Date	Version	Page	Capitel	Index	Docu-No.
11.06.2001	<b>a</b>	13/18	<b>1050</b>	<b>G</b>	<b>000004</b>

<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, transmission and rear-axle housings</b>	<b>G</b>
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Fit return flow to hydraulic tank at hydraulic coupling.  
Fit clips.



Fit A009 - actuator unit and console with auxiliary lever.



Fit clutch venting system.



Fit hydraulic line for external pressure supply.

Date	Version	Page	Capitel	Index	Docu-No.
11.06.2001	<b>a</b>	14/18	<b>1050</b>	<b>G</b>	<b>000004</b>



<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, transmission and rear-axle housings</b>	<b>G</b>
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Fit bracket for steering lines.



**Left side**

Fit hydraulic line to diff. lock.



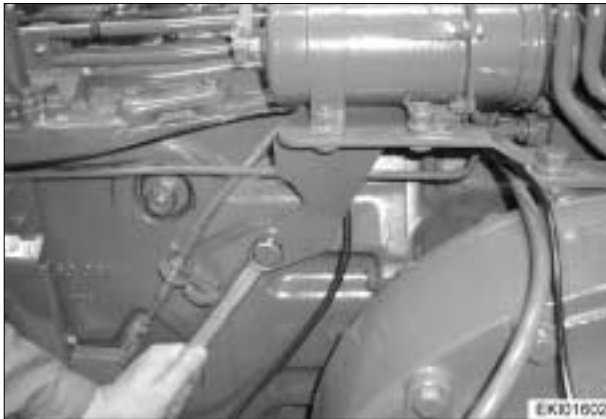
Fit stabiliser strut.



Fit compressed-air line to spill valve.  
Fasten compressed-air line with cable ties.

Date	Version	Page	Capitel	Index	Docu-No.
11.06.2001	a	15/18	Disconnecting tractor, transmission and rear-axle housings	1050	G 000004

<p><b>Fav 900</b></p>	<p align="center"><b>Transmission / Housing</b></p> <p><b>Disconnecting tractor, transmission and rear-axle housings</b></p>	<p align="center"><b>G</b></p>
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Attach Bowden cable for range control I - II.  
Fit accumulator (handbrake) with console.

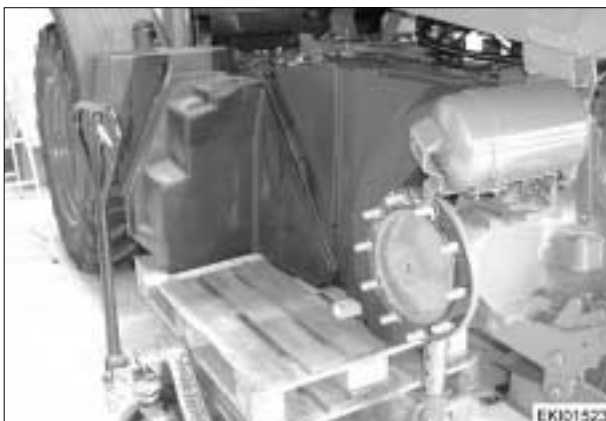
**Note:**  
**Engage speed range I or II with auxiliary lever.**



Handbrake is released with compressed air.  
Create external connector (DIY) to accumulator.  
Attach handbrake linkage.



Fit bracket for B030 sensor.

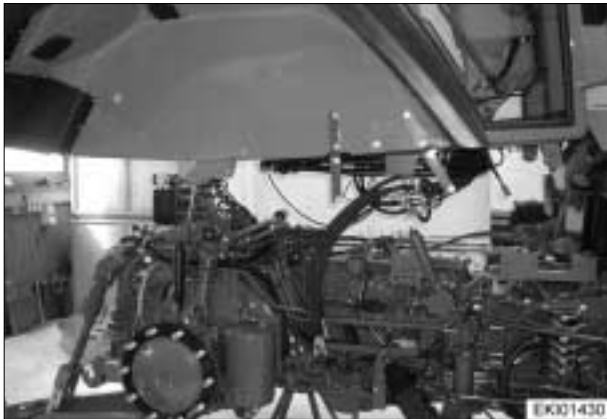


Fit fuel tank and auxiliary tank.

**Fitting sequence as in - Disconnecting tractor, clutch and transmission housing - Chapter 1050 Reg.G**

Date	Version	Page	Capitel	Index	Docu-No.
11.06.2001	a	16/18	1050	G	000004

<p><b>Fav 900</b></p>	<p style="text-align: center;"><b>Transmission / Housing</b></p> <p><b>Disconnecting tractor, transmission and rear-axle housings</b></p>	<p style="text-align: center; font-size: 2em;"><b>G</b></p>
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Fitting cab - see Chapter 8100 Reg.G



During normal maintenance work, e.g. transmission oil change and / or filter change

**Fill with transmission oil at rear left.**

**Fill with oil preferably using external oil-filling unit with superfine filter.**

Observe instructions for oil type and quantity.

Initial fill approx. 65 l

**Note:**

**See also:**

**Chapter 0000 Reg. A - Fuels and lubricants**



**Fill with oil preferably via return flow connection with pump. (Oil is filtered in return flow.)**

If this is not possible, unscrew venting filter (A) and add oil.

Observe instructions for oil type and quantity.

Initial fill approx. 70 l

**Note:**

**See also :**

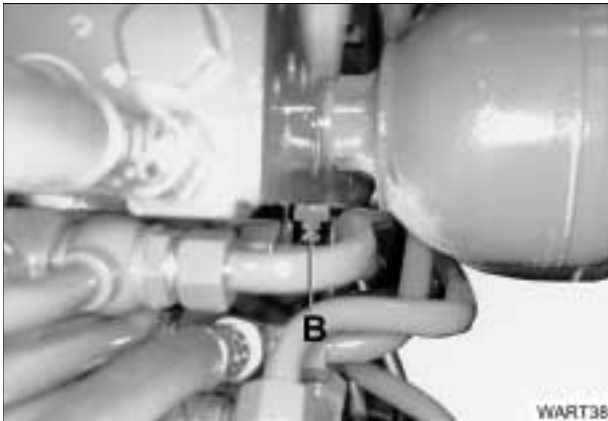
**Chapter 0000 Reg. A - Fuels and lubricants**



Close stopcock of front-axle suspension (A).

Date	Version	Page	Capitel	Index	Docu-No.
11.06.2001	a	17/18	1050	G	000004

<b>Fav 900</b>	<b>Transmission / Housing</b> <b>Disconnecting tractor, transmission and rear-axle housings</b>	<b>G</b>
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**Concluding work:**

Close stopcock of front-axle suspension (B).

Fit other panels.

Fit wheels.

**Check tractor for operation and leaks.**

Date	Version	Page		Capitel	Index	Docu-No.
11.06.2001	a	18/18	Disconnecting tractor, transmission and rear-axle housings	1050	G	000004

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Transmission / brake system</b> <b>General description of brake system</b>	<b>A</b>
---	--	----------

**Comparison of Farmer 400, Fav 700 and Fav 900 brake systems**

	<b>Farmer 400</b>	<b>Fav 700</b>	<b>Fav 900</b>
Cardan-shaft brake	No	Yes	Yes
Brake pad	-	Sintered metal	Sintered metal
Cardan-shaft brake actuation	-	Piston	Wedge
Hydraulically-assisted cardan-shaft brake	-	Yes	Yes
4WD engagement	Yes	No	Yes
Wet rear brake	Yes	Yes	Yes
Brake pad	Sintered metal	Sintered metal	Sintered metal
Hydraulically-assisted rear brake	No	No	Yes
Medium	Pentosin	Pentosin	Pentosin

**Note:**

Hydr. circuit diagram for transmission hydraulics - Chapter 1005 Index C

Rear brake - Chapter 1070 Index G

Cardan-shaft brake - Chapter 1150 Index G

Date	Version	Page	General description of brake system	Capitel	Index	Docu-No.
8.2.2001	a	1/1		1070	A	000001

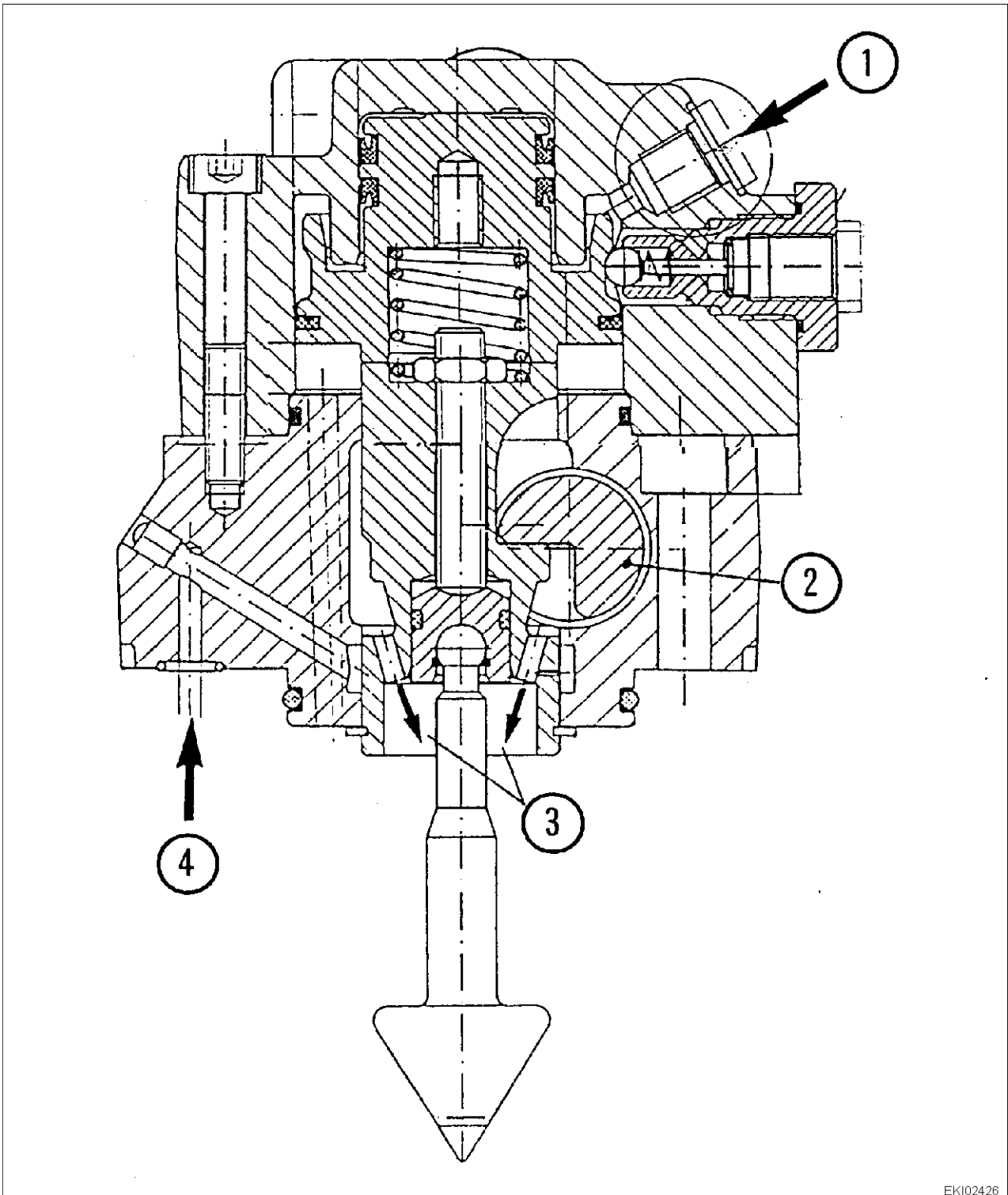
<b>Fav 900</b>	<b>Transmission / Brake system</b> <b>Technical drawing of brake cylinder</b>	<b>C</b>
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Date	Version	Page	Capitel	Index	Docu-No.
15.10.2001	<b>a</b>	1/3	<b>1070</b>	<b>C</b>	<b>000003</b>

Fav 900

Transmission / Brake system  
Technical drawing of brake cylinder

C



EKI02426

Date	Version	Page	Capitel	Index	Docu-No.
15.10.2001	a	2/3	1070	C	000003

Technical drawing of brake cylinder

Fav 900

Transmission / Brake system  
**Technical drawing of brake cylinder**

**C****Adjusting brake cylinder**

- Remove upper part of brake cylinder.
- Unscrew lock nut on M10 setscrew.
- Tighten setscrew using torque gauge X899.980.151 until tightening torque of **4.0 to 5.0 Nm (rear wheel locks)** is reached.

**If new brake package has been fitted**

- Tighten setscrew to **15 Nm (brake package moves into contact)**.
- Loosen setscrew.
- Tighten setscrew to **4.0 to 5.0 Nm (rear wheel locks)**.

**Fav 900 /21/ ...**

**Unscrew setscrew by 1 2/3 turns (rear wheel can be turned) and then lock.**

**Fav 900 chassis number 23/3001 and up**

**Unscrew setscrew by 2/turns (rear wheel can be turned) and then lock.**

- Tighten hexagon nut to **40 +5 Nm** .

**Note:**

**When locking, only tighten hexagon nut. Outer hexagon socket (or inner hexagon socket) is only for holding, not for locking.**

**Chapter 1070 Reg. C - Technical drawing of brake cylinder**

- Fit upper part of brake cylinder.

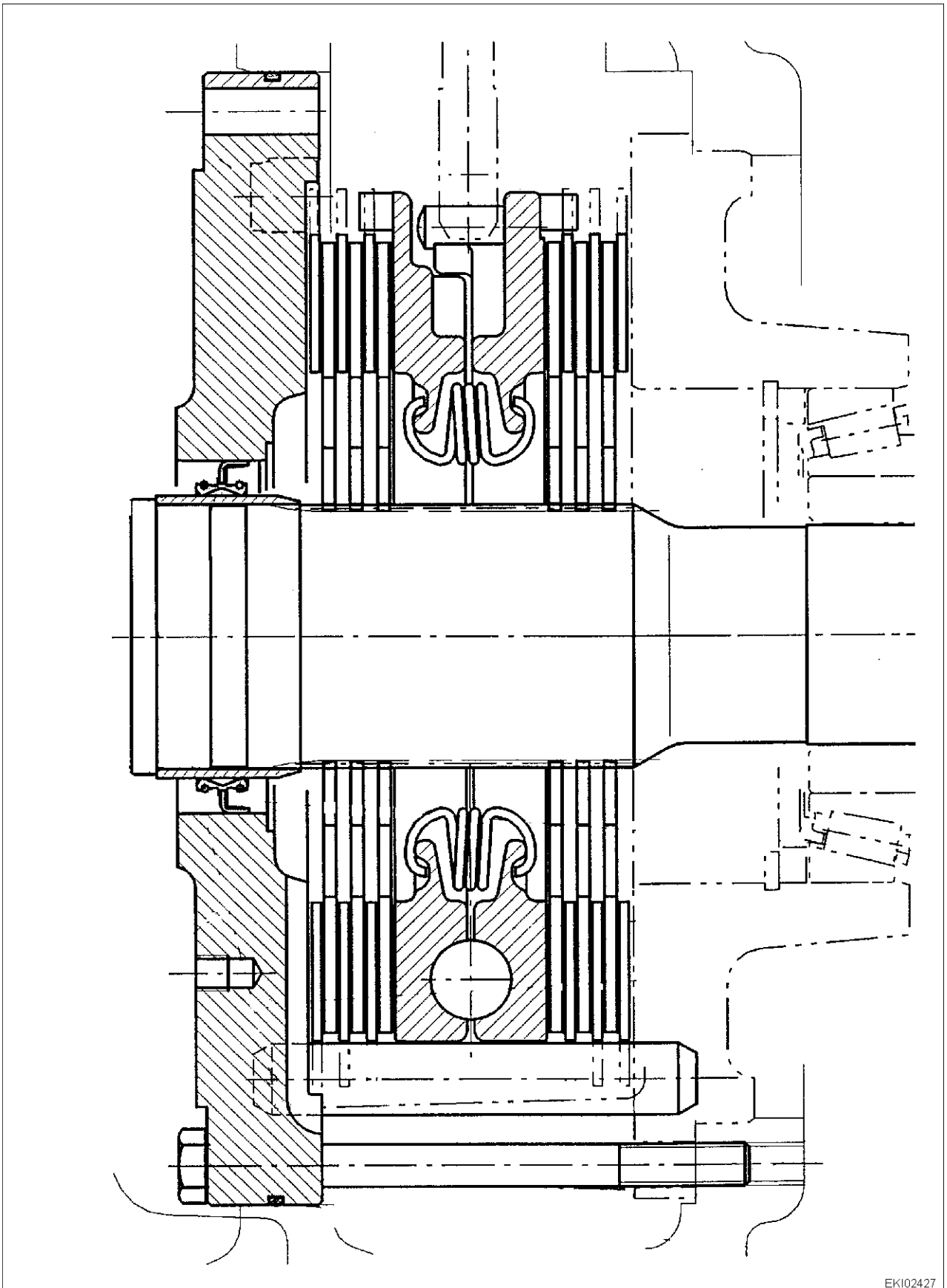
Date	Version	Page	Capitel	Index	Docu-No.
15.10.2001	<b>a</b>	3/3	<b>1070</b>	<b>C</b>	<b>000003</b>



Fav 900

Transmission / Brake system  
Technical drawing of rear brake

C



EKI02427

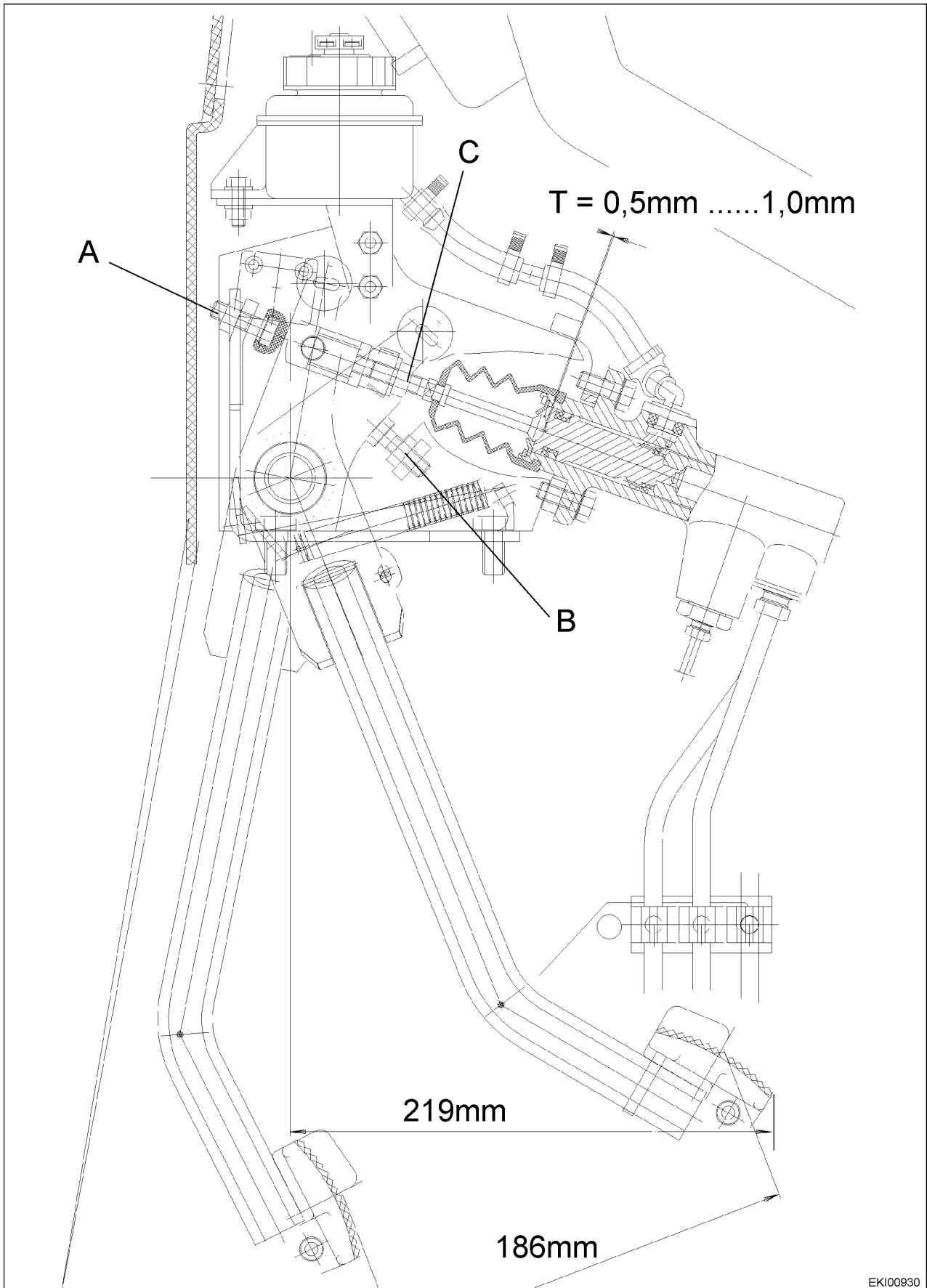
Date	Version	Page	Capitel	Index	Docu-No.
16.10.2001	a	1/1	1070	C	000004

Technical drawing of rear brake

**Farmer 400**  
**Fav 700**  
**Fav 900**

**Transmission / brake system**  
**Setting master brake cylinder**

**E**



EKI00930

Date	Version	Page	Capitel	Index	Docu-No.
17.1.2001	<b>b</b>	1/2	<b>1070</b>	<b>E</b>	<b>00001</b>

**Setting master brake cylinder**

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Transmission / brake system <b>Setting master brake cylinder</b>	<b>E</b>
---	---	----------

**Fault:** Brake system does not release (becomes hot without brake being actuated).

**Possible causes:**

- **Check settings on master brake cylinder.**
- **Check brake cylinder setting.**

### Checking settings on master brake cylinder

Release steering column cover.  
Remove combi-instrument.

### Setting brake pedal travel.

Brake pedals locked and in rest position.

Distance from brake pedal pivot point to brake pedal foot plate **approx. 219 mm** (corresponding to pedal travel of approx. 186 mm).

In event of deviations coat thread of stop screws **A** with synthetic bonding agent X 903.050.084.

Set measurement of 219 mm and lock with lock nut. Set second stop screw in same manner. Ensure that snubbers are fitted to stop screws.

**Note:**

**This dimension only has to be measured in exceptional cases, e.g. after replacing the brake pedals.**

### Setting piston rod play (T)

Set **piston rod play T=0.5 to 1.0 mm** with brake pedals locked, corresponding to **pedal travel of approx. 3 mm** .

In event of deviations, turn piston rod as appropriate and lock with lock nut **C** .

Set second piston rod in same manner.

### Setting piston travel

Release brake pedals. Open relevant bleed valve with full brake system. Depress brake pedal as far as stop. Tighten stop screw **B** until piston in master brake cylinder has reached limit position. Then unscrew stop screw **B by one revolution** (corresponding to approx. 1 mm clearance at base of piston) and lock.

Set second master brake cylinder in same manner.

**Note:**

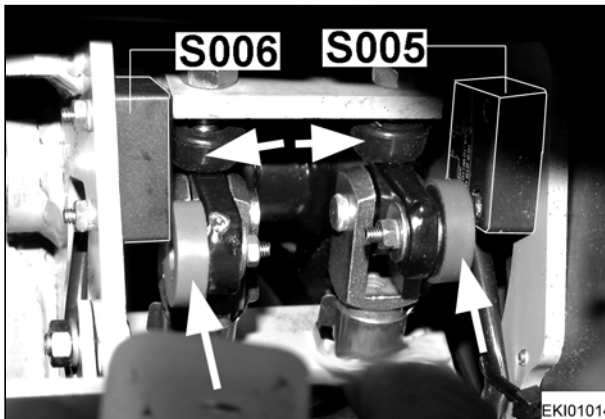
**To set brake cylinder see: - Installation and removal of brake cylinder - Chapter 1070 Index G**  
**To bleed brake hydraulics - Chapter 1070 Index G**

Date	Version	Page	Capitel	Index	Docu-No.	
17.1.2001	<b>b</b>	2/2	<b>Setting master brake cylinder</b>	<b>1070</b>	<b>E</b>	<b>000001</b>

Farmer 400  
Fav 700  
Fav 900

Transmission / brake system  
**Setting magnet for solenoid switch (S005 / S006)**

**E**



**Setting magnet for solenoid switch S005 S006**

At top of steering column.

Remove combi-instrument A007.

Loosen feed reservoir for brake and clutch hydraulic system and swivel to one side.

1. Release brake pedals. Setting is carried out individually.
2. Place 3 mm thick spacer (DIY) between snubber of stop screw **A** and brake pedal **E** (corresponding to pedal travel of approx. 16 mm).
3. Connect test lamp to pin 1 (brown) and pin 2 (white), (brake light / trailer advance-braking control system) of solenoid switch **S005** .

**Note:**

**Elec. circuit diagram for brake light, compressed-air advance control system - Chapter 9000 Index C page 9**

4. Slide magnet **D** towards switch **S005** until test lamp lights up.
5. Tighten magnet **D** .
6. Remove 3 mm spacer from between snubber of stop screw **A** and brake pedal **E** .

**Checking setting**

- Set ohmmeter to 2 KOhm range and connect to pin 3 (white) and pin 4 (brown/yellow) (diff. lock / control console A004) of switch **S005** .

**Note:**

**Elec. circuit diagram for 4WD and diff. locks - Chapter 9000 Index C page 30**

**Brake pedal E released and not operated**

- Pilot bulb of test lamp must light up.
- Ohmmeter must indicate **approx. 120 ohms** .



**Release and operate brake pedal E.**

- Pilot bulb of test lamp must go out after brake pedal travel of 25 mm.
- Ohmmeter must indicate **approx. 500 ohms** after **25 mm** at latest.

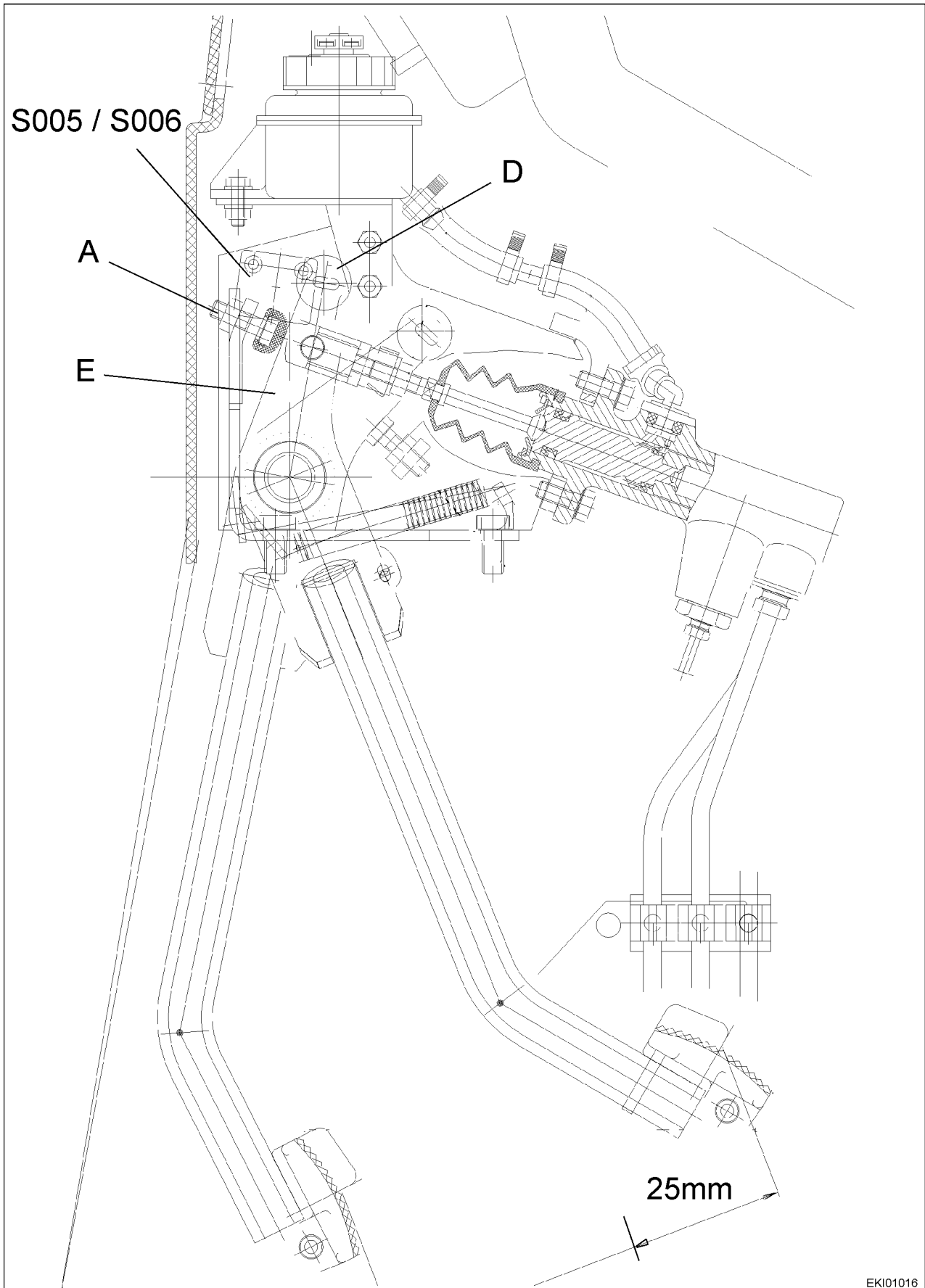
**Magnet for solenoid switch S006 is set in same fashion**

Date	Version	Page	Capitel	Index	Docu-No.
8.2.2001	<b>a</b>	1/2	<b>1070</b>	<b>E</b>	<b>000002</b>

Farmer 400  
Fav 700  
Fav 900

Transmission / brake system  
**Setting magnet for solenoid switch (S005 / S006)**

**E**



EKI01016

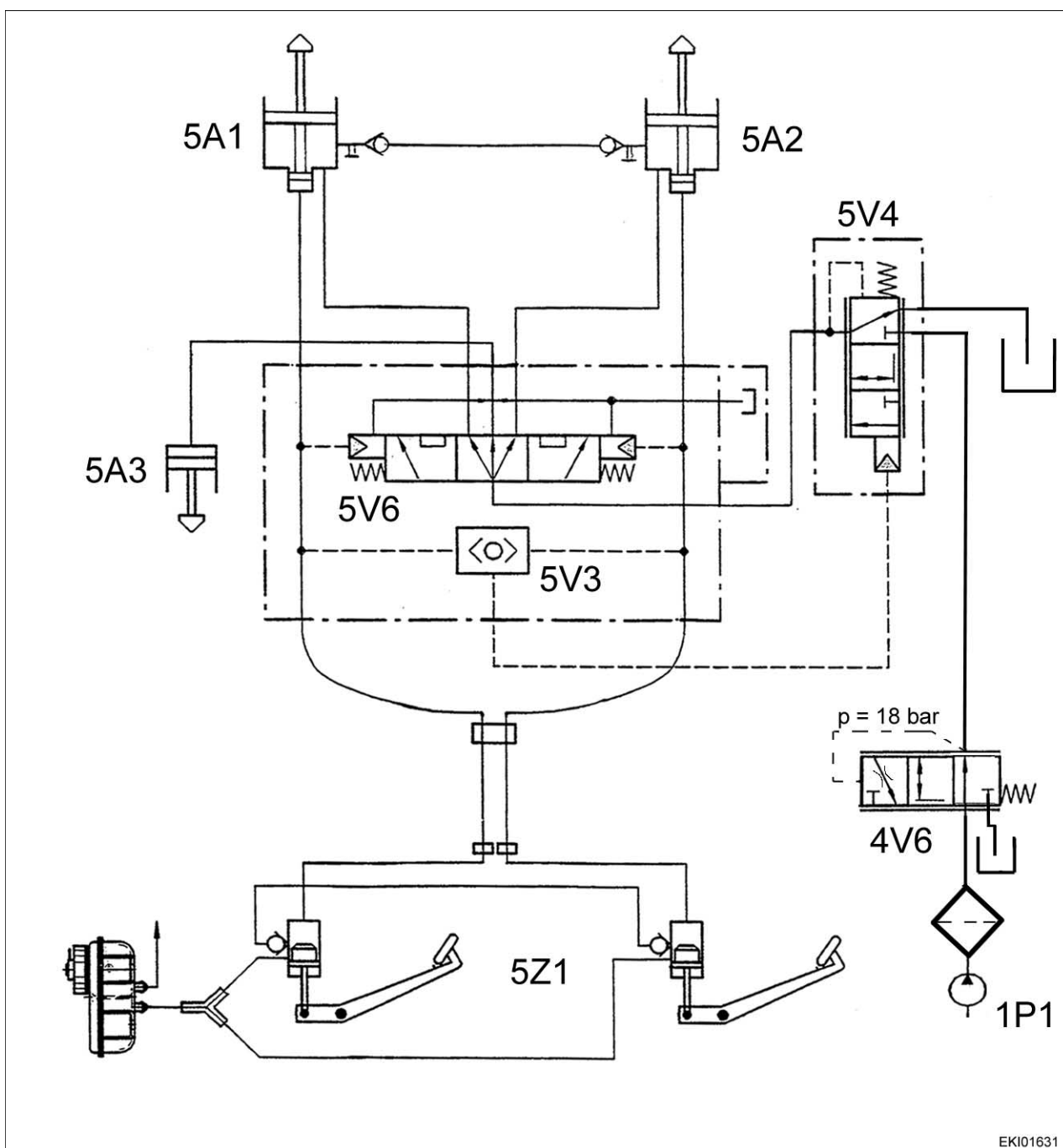
Date	Version	Page	Capitel	Index	Docu-No.
8.2.2001	a	2/2	1070	E	000002

**Setting magnet for solenoid switch (S005 / S006)**

Fav 900

Transmission / Brake system  
Bleeding brake hydraulic system

G



Item	Designation	Item	Designation
1P1	Servopump	4V6	Pressure-relief valve, rear axle
5A1	Brake cylinder, right	5V3	Shuttle valve
5A2	Brake cylinder, left	5V4	Relay valve, brake
5A3	Cardan brake	5V6	Selector valve
5Z1	Brake pedals with master brake cylinder		

Date	Version	Page	Capitel	Index	Docu-No.
13.06.2001	a	1/3	Bleeding brake hydraulic system	1070	G 000005

Fav 900

Transmission / Brake system  
**Bleeding brake hydraulic system**

**G**

EKI00703

**Bleeding clutch actuation system and brakes****Important:**

Do not use brake fluid for brake and clutch actuation system.

Only Pentosin order no. X902.011.622 is permissible (1l container).

Feed reservoir at top front of steering column.



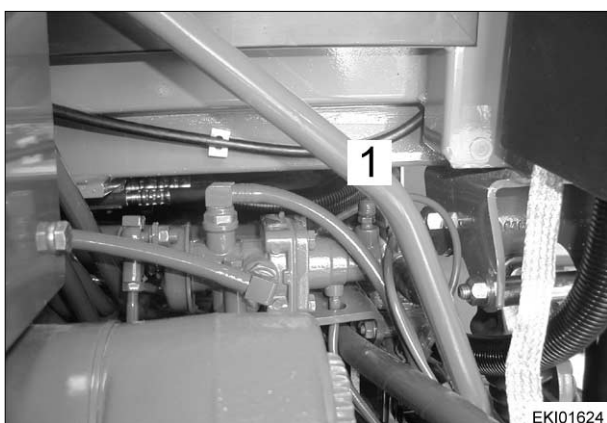
EKI01623

**Bleeding brakes**

Lock brake pedals. Depress brake pedals and slowly release.

Wait for at least 15 seconds before depressing again so that Pentosin is discharged from relevant bleed valve without bubbles, then close bleed valve.

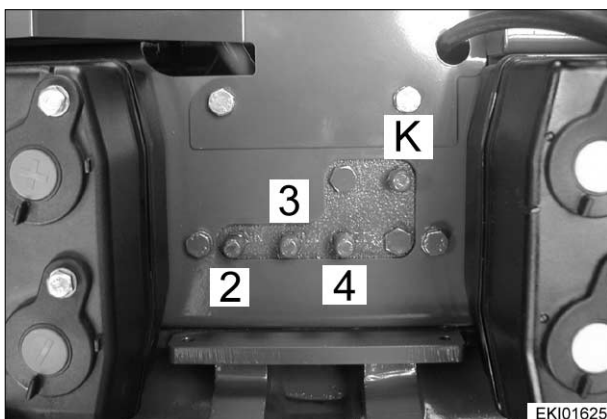
Top up feed reservoir to max. level with Pentosin.



EKI01624

**Bleeding sequence: at rear of tractor**

1 = 5A1 right brake cylinder and trailer brake valve air compressor



EKI01625

2 = 5A2 left brake cylinder

3 = 5V6 selector valve

4 = 5V4 brake relay valve

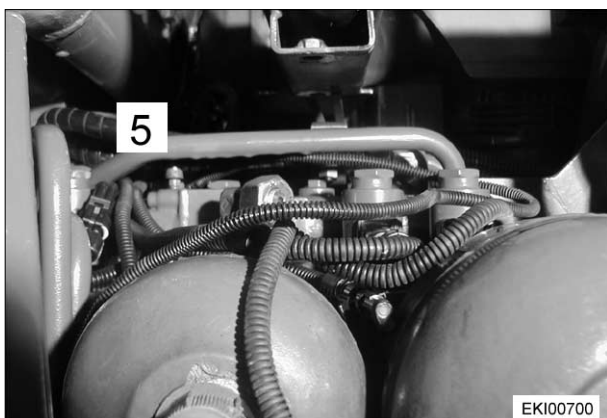
K = 4V5 clutch pressure-relief valve

**(Clutch actuation system can be bled independently of brake, see Chapter 1100 Reg. G).**

Date	Version	Page	Capitel	Index	Docu-No.	
13.06.2001	a	2/3	Bleeding brake hydraulic system	1070	G	000005

Fav 900

Transmission / Brake system  
**Bleeding brake hydraulic system**

**G**

When hydraulic trailer brake is fitted  
 right-hand side of tractor, on central control block  
**5** = hydraulic trailer brake valve (ABV)

**Test :**

Handbrake released.

Depress brake pedals with force of 500 N.

Max. free travel with pedals locked 120 mm.

Max. free travel with pedals released on right  
 150 mm.

Max. free travel with pedals released on left and  
 without hydraulic trailer brake 140 mm.

Max. free travel with pedals released on left and  
 with hydraulic trailer brake 150 mm.

If these figures are exceeded, there is still air in  
 system.

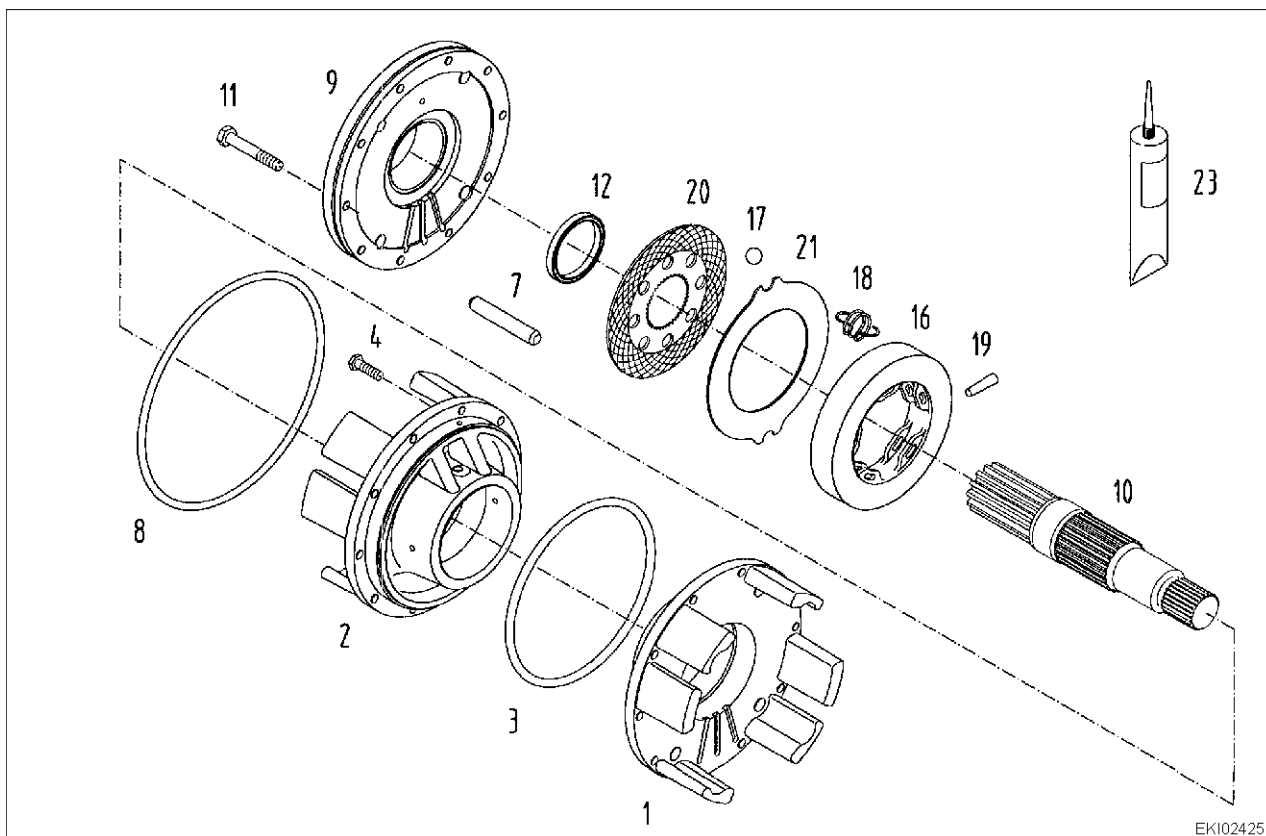
Date	Version	Page	Capitel	Index	Docu-No.
13.06.2001	a	3/3	<b>1070</b>	<b>G</b>	<b>000005</b>



Fav 900

Transmission / Brake system  
Installation and removal of rear-wheel brake

G



EKI02425

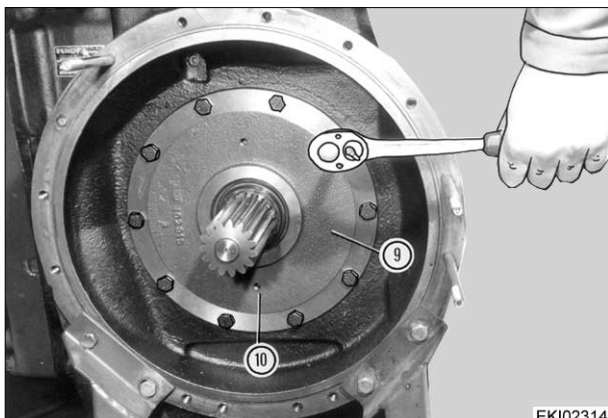
Item	Designation	Item	Designation
1	Bearing flange	12	Shaft seal
2	Bearing flange	16	Actuating disc
3	O-ring	17	Ball
4	M12x40-10.9 hexagon screw	18	Extension spring
7	Pin	19	Parallel pin
8	O-ring	20	Brake pad
9	Brake plate	21	Externally toothed disc
10	Shaft	23	Surface seal X903.050.074
11	M12x160-10.9 hexagon screw		

Date	Version	Page	Capitel	Index	Docu-No.
09.10.2001	a	1/4	1070	G	000006

Fav 900

## Transmission / Brake system

### Installation and removal of rear-wheel brake

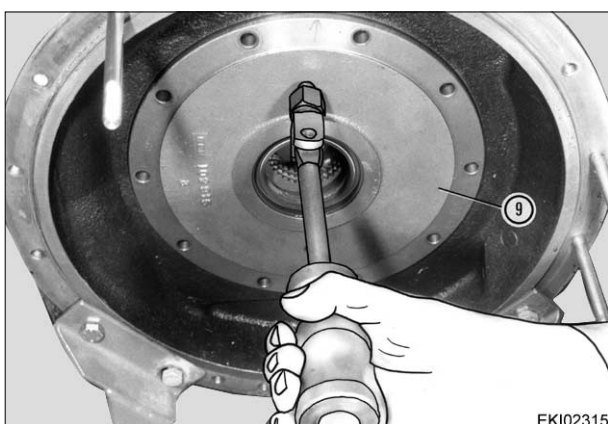
**G**

**Preliminary work: Chapter 1015 Reg. G - Installation and removal of axle drives**

#### Removal

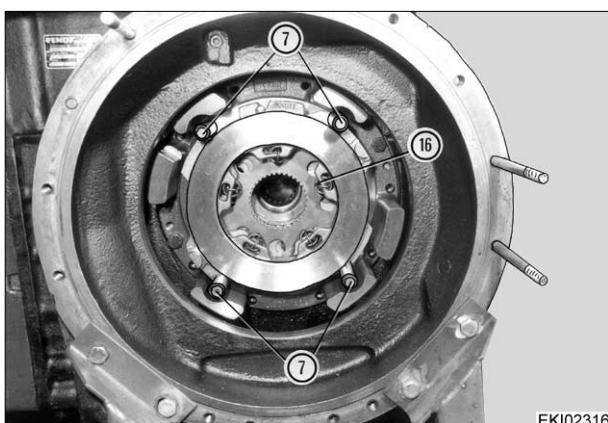
Remove relevant actuating cylinder (brake cylinder).

Remove shaft (10). Unscrew hexagon screws from brake plate (9).



Withdraw brake plate (9) using slide hammer puller X 899.980.053.

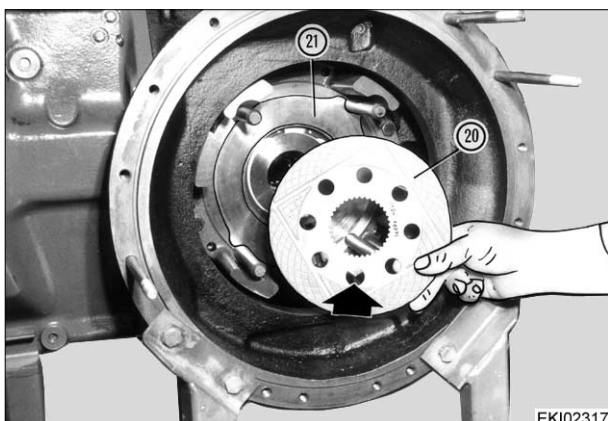
Remove internally and externally toothed discs.



Remove actuating disc (16) and other internal and external discs.

Withdraw pins (7).

Disassemble other side in same manner.



#### Installation

##### Note:

**Check brake discs for scoring and corrosion. Oil brake discs before fitting.**

Insert discs (washers).

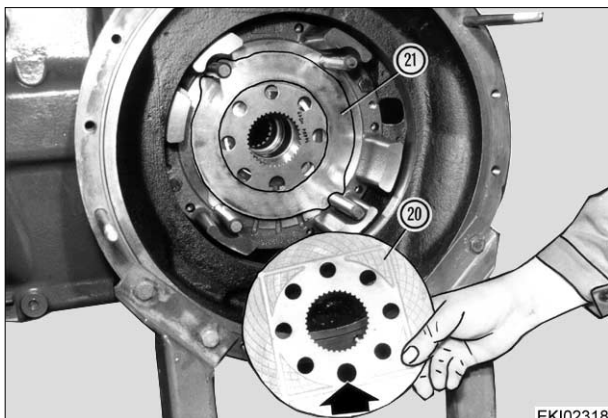
Start with intermediate disc (21), then brake pad (20), with large bore (arrowed) pointing downwards (simplifies insertion of shaft (10) at end, see photo EKI02325).

Date	Version	Page	Capitel	Index	Docu-No.
09.10.2001	a	2/4	1070	G	000006

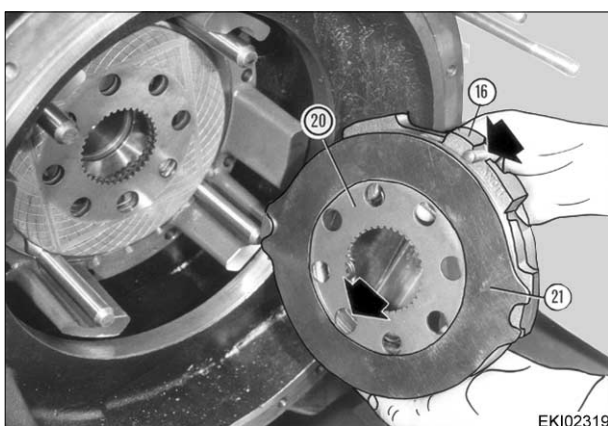
Fav 900

## Transmission / Brake system

### Installation and removal of rear-wheel brake

**G**

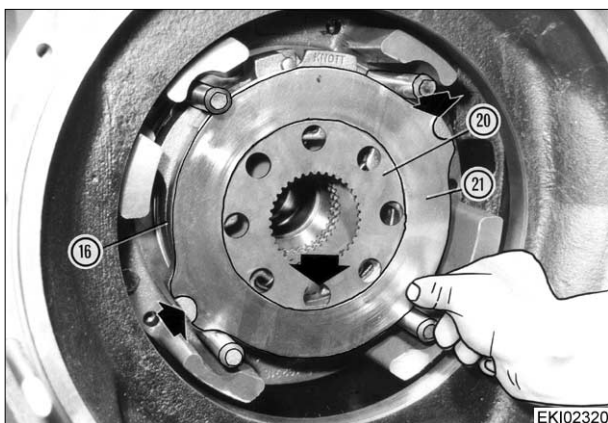
Insert intermediate disc (21) offset, then brake pad (20), with large bore (arrowed) pointing downwards.



Lay brake pad (20) with large bore (arrowed) pointing downwards onto actuating disc (16). Actuating cams (arrowed) point upwards towards brake cylinder.

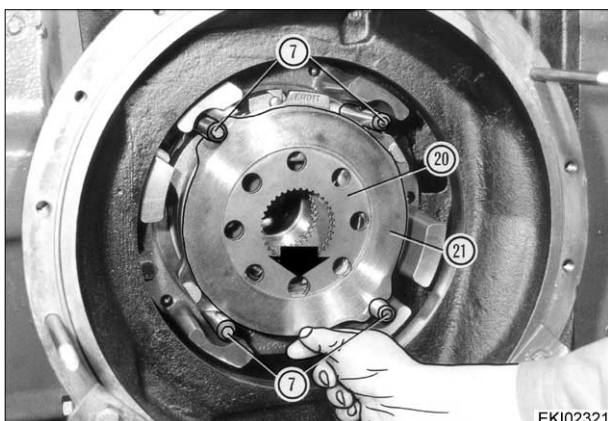
Lay intermediate disc (21) on cams of actuating disc (16) (see photo).

Insert pre-assembled brake package.



Lay brake pad (20) with large bore (arrowed) pointing downwards onto actuating disc (16).

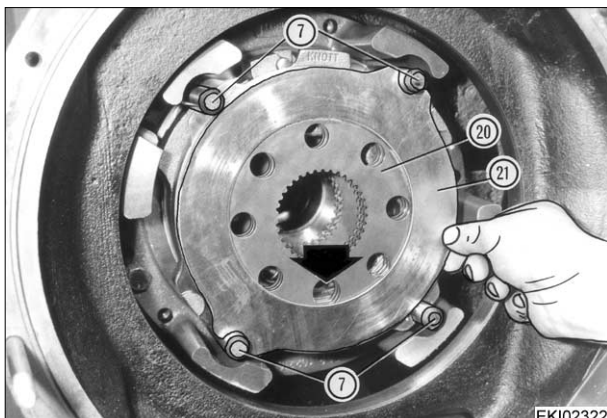
Then lay intermediate disc (21) on cams (arrowed) of actuating disc (16).



Insert brake pad (20) with large bore (arrowed) pointing downwards.

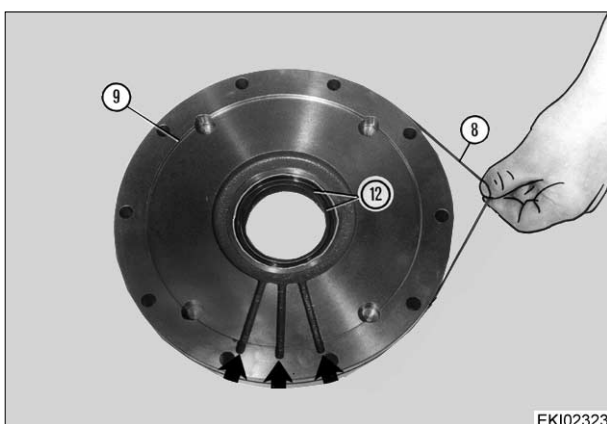
Then slide intermediate disc (21) onto pins (7).

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09.10.2001	a	3/4	1070	G	000006



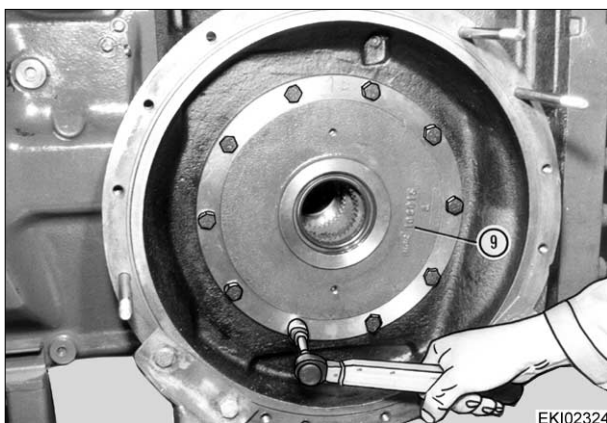
Insert brake pad (20) with large bore (arrowed) pointing downwards.

Then slide intermediate disc (21) offset - see photos EKI02321 and EKI02322 - onto pins (7).



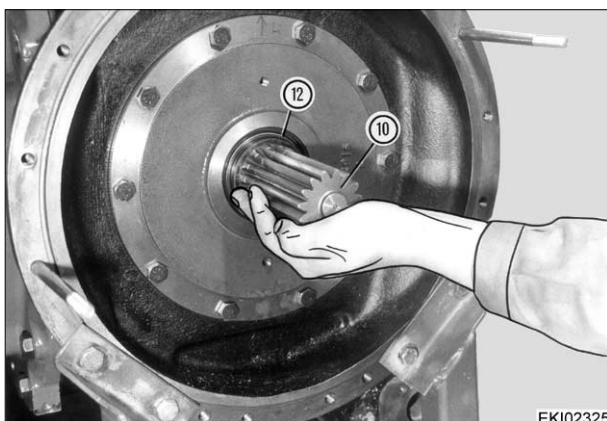
Coat new shaft seals (12) on outside with spirit/water mixture (ratio 1:1) and press centrally into brake plate (9). Sealing lips point to respective oil chamber.

Insert new O-ring (8) into groove in brake plate (9) and grease. Oil ducts (arrowed) in brake plate (9) point downwards when fitted.



Fit pre-assembled brake plate (9). Check position of oil ducts - see photo EKI02323.

Tighten hexagon screws crosswise in stages to 120 Nm.



Fill sealing lips of shaft seals (12) 2/3 with grease. Fully insert shaft (10).

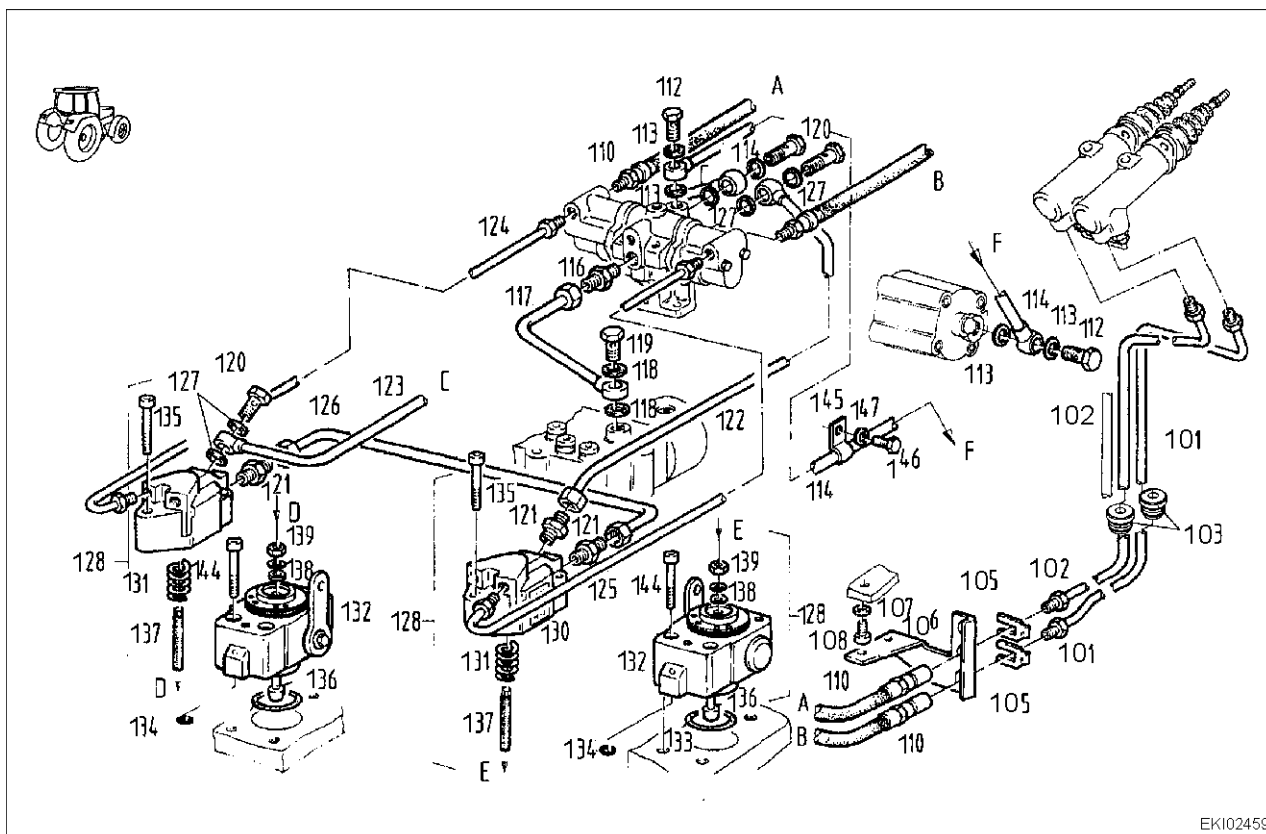
Metallic stop must be audible when shaft is inserted.

If metallic stop is not audible, it is possible that last brake pad was not fitted.

**Chapter 1015 Reg. G - Installation and removal of axle drives**

**Chapter 1070 Reg. G - Installation and removal of brake cylinders**

Date	Version	Page	Capitel	Index	Docu-No.
09.10.2001	a	4/4	1070	G	000006



EKI02459

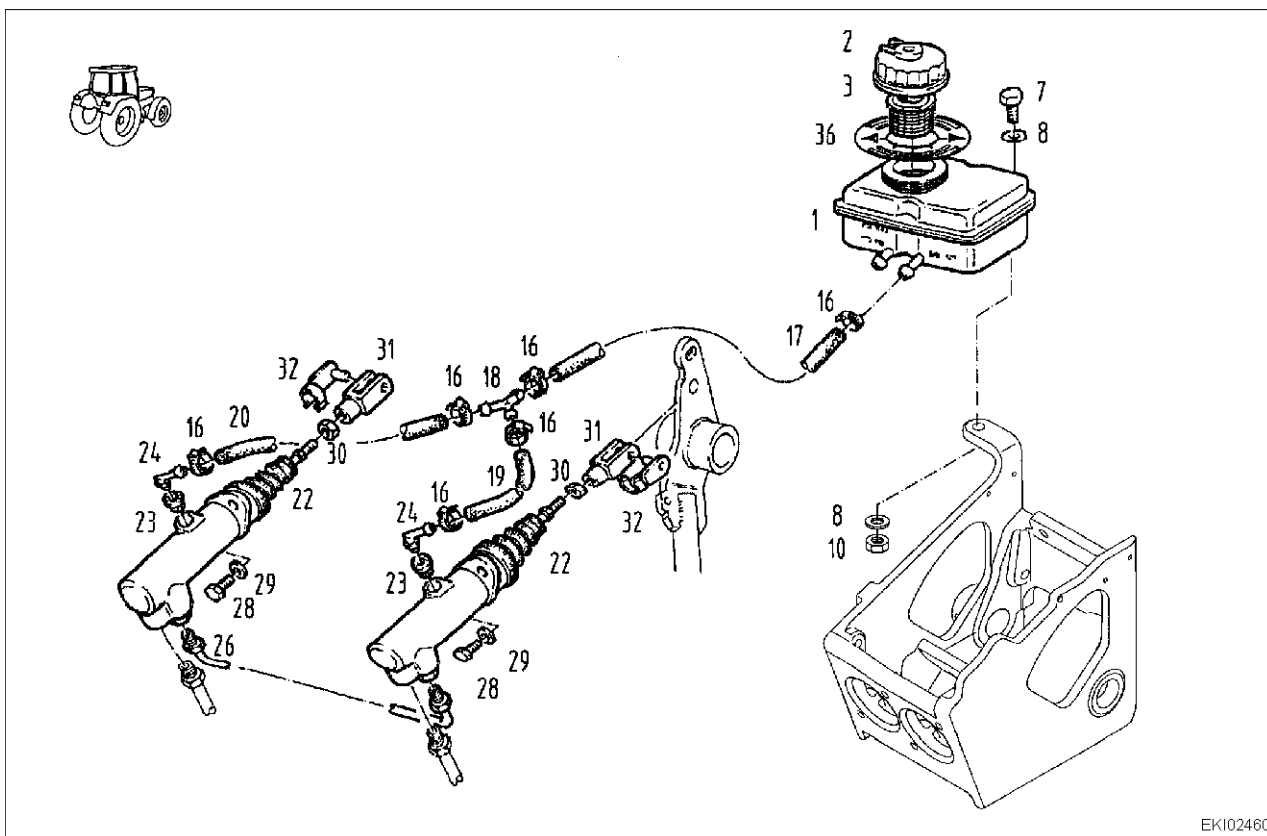
Item	Designation	Item	Designation
101	Brake line	126	Pressure pipe
102	Brake line	127	Sealing ring
103	Grommet	128	Brake cylinder (left)
105	Hose bracket	128	Brake cylinder (right)
106	Bracket	128	Seal set
107	Spring washer	130	Brake cylinder (upper part)
108	Self-tapping screw	131	Compression spring
110	Brake hose	132	Brake cylinder (lower part)
112	Hollow-core screw	132	Brake cylinder (lower part)
113	Sealing ring	133	Sealing ring
114	Pressure pipe	134	O-ring
116	Screw socket	135	Socket head cap screw
117	Pressure pipe	136	Wedge
118	Sealing ring	137	Setscrew
119	Hollow-core screw	138	Washer
120	Hollow-core screw	139	Hexagon nut
121	Screw socket	144	M10x50-10.9 socket head cap screw
122	Pressure pipe	145	Clip
123	Pressure pipe	146	Hexagon screw
124	Brake line	147	Washer
125	Brake line		

Date	Version	Page	Capitel	Index	Docu-No.
29.10.2001	a	1/7	1070	G	000007

Fav 900

Transmission / Brake system  
Installation and removal of brake cylinders

G



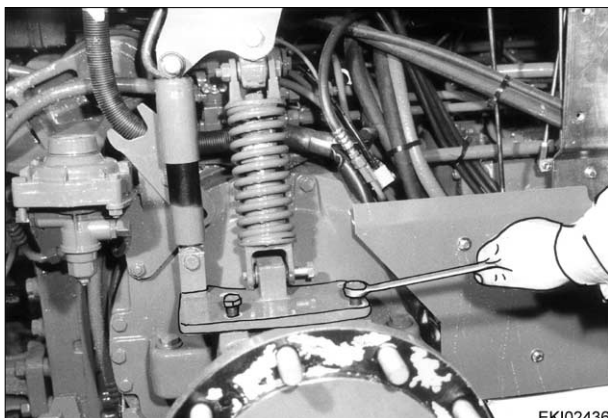
Item	Designation	Item	Designation
1	Double reservoir	22	Master brake cylinder
2	Cover with switch	22	Repair kit
3	Strainer sleeve	23	Rubber plug
7	Hexagon screw	24	Elbow joint
8	Washer	26	Compensating line
10	Hexagon nut	28	Hexagon screw
16	Hose clip	29	Spring washer
17	Pressure hose	30	Hexagon nut
18	Socket	31	Fork connection
19	Pressure hose	32	Pin
20	Pressure hose	36	Marking plate

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29.10.2001	a	2/7	1070	G	000007

Fav 900

## Transmission / Brake system

### Installation and removal of brake cylinders

**G****Removing brake cylinder****Note:**

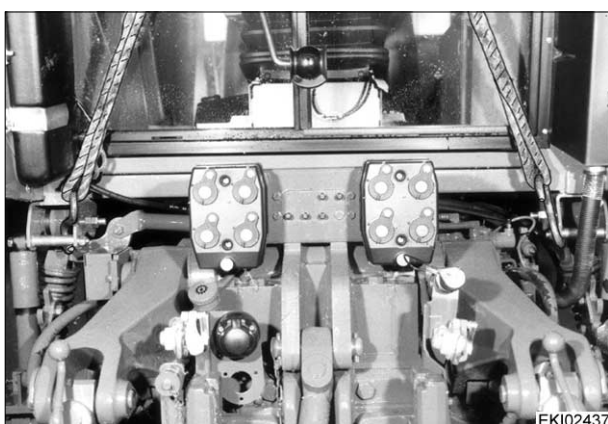
The work was carried out on a Fav 900/21/.... Carry out work on a Fav 900 chassis number 23/3001 and up in same manner.

Remove rear wheels.

Prop tractor, taking appropriate safety precautions.

Remove panel from right mudguard.

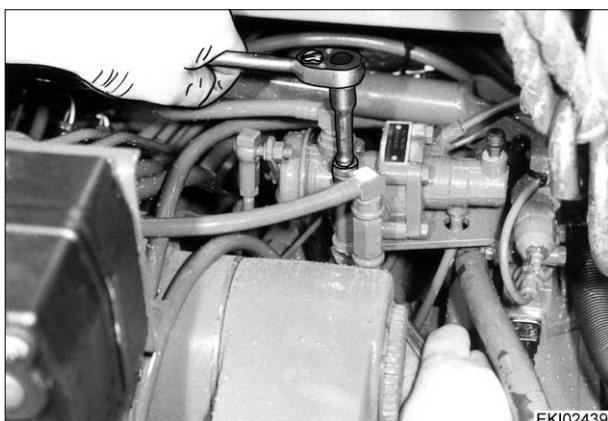
Unscrew support on left and right from axle housing.



Attach cab at rear left and right to hoist, taking appropriate safety precautions, and raise until cab is in contact with bonnet.



Only raise cab until it is in contact with bonnet (arrowed)



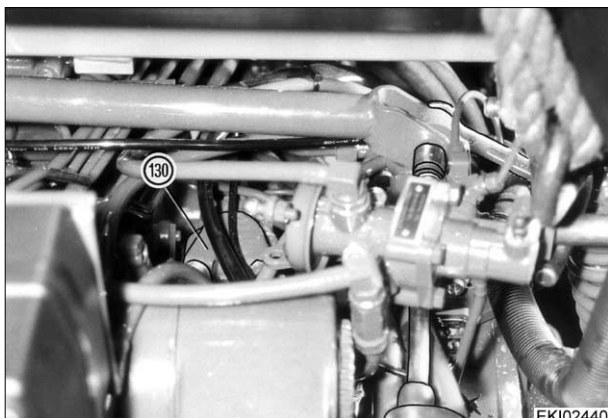
Remove trailer valve of air compressor at rear right.

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29.10.2001	a	3/7	1070	G	000007

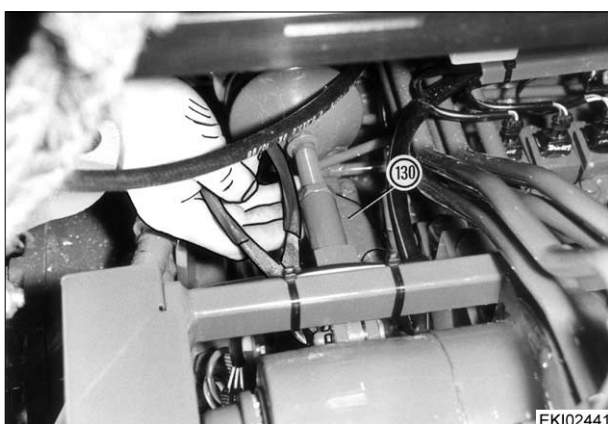
Fav 900

## Transmission / Brake system

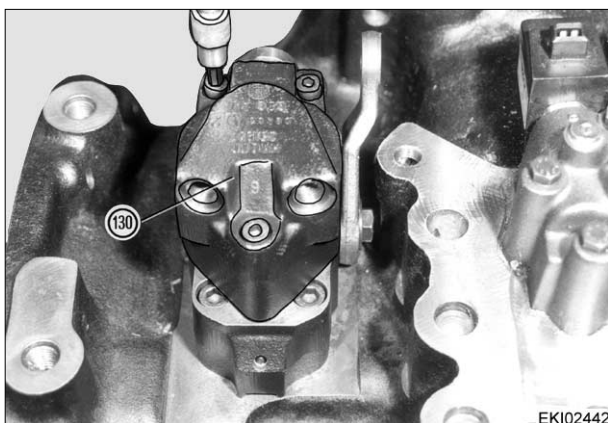
### Installation and removal of brake cylinders

**G**

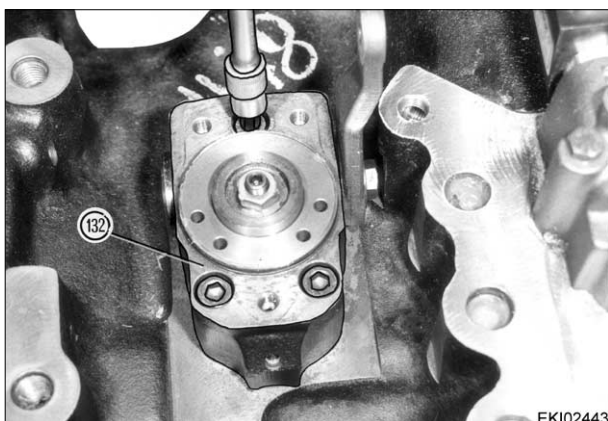
Remove stabiliser strut.  
Unscrew lines at right brake cylinder (130).



Do not actuate handbrake.  
At rear left remove split pin from actuating rod of diaphragm cylinder (handbrake) and detach.  
Then actuate handbrake.  
Unscrew lines at left brake cylinder (130).



Remove brake cylinder (130).



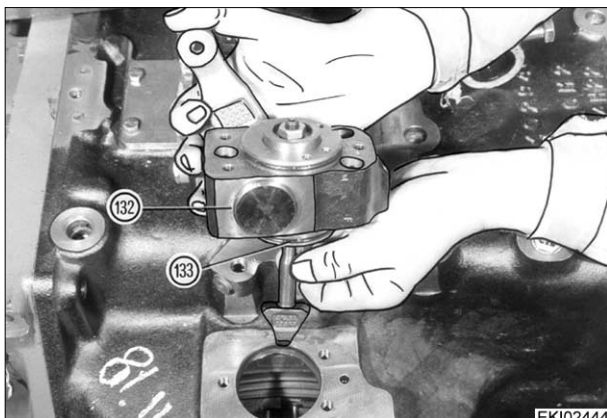
Remove left and right brake cylinders (132).

Date	Version	Page	Capitel	Index	Docu-No.
29.10.2001	a	4/7	1070	G	000007



Fav 900

Transmission / Brake system  
**Installation and removal of brake cylinders**

**G****Installing brake cylinders**

Fit new sealing ring (133) to brake cylinder (132).

Grease sealing ring (133) before fitting.

When fitting, press actuating rod upwards and actuating lever forwards.

Tighten M10 fastening screws to **49 Nm** .

**Note:**

**Installation and setting are carried out in same manner on left and right.**

**Setting brake cylinder (132)**

- Tighten setscrew (137) using torque gauge X899.980.151 until tightening torque of **4.0 to 5.0 Nm (rear wheel locks)** is reached.

**If new brake package has been fitted**

- Tighten setscrew (137) to **15 Nm (brake package moves into contact)**.
- Loosen setscrew (137).
- Tighten setscrew (137) to **4.0 to 5.0 Nm (rear wheel locks)**.

**Fav 900 /21/ ...**

**Unscrew setscrew (137) by 1 2/3 turns (rear wheel can be turned) and then lock.**

**Fav 900 chassis number 23/3001 and up**

**Unscrew setscrew (137) by 2 turns (rear wheel can be turned) and then lock.**

- Tighten hexagon nut (139) to **40 +5 Nm** .

**Note:**

**When locking, only tighten hexagon nut (139). Outer hexagon socket (or inner hexagon socket) is only for holding, not for locking.**

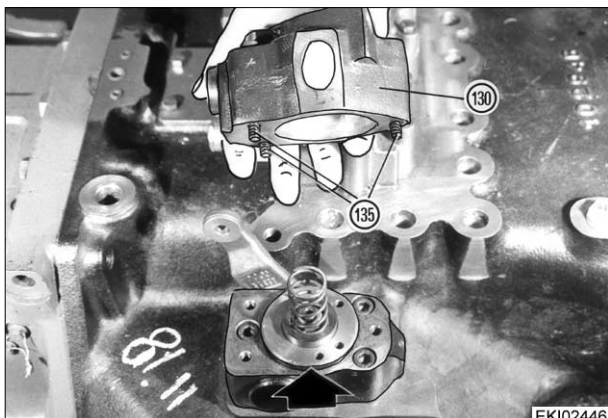
**Chapter 1070 Reg. C - Technical drawing of brake cylinder**

Date	Version	Page	Capitel	Index	Docu-No.
29.10.2001	a	5/7	1070	G	000007

Fav 900

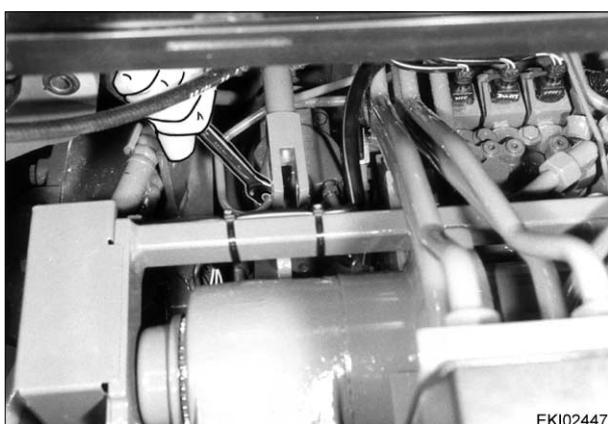
## Transmission / Brake system

### Installation and removal of brake cylinders

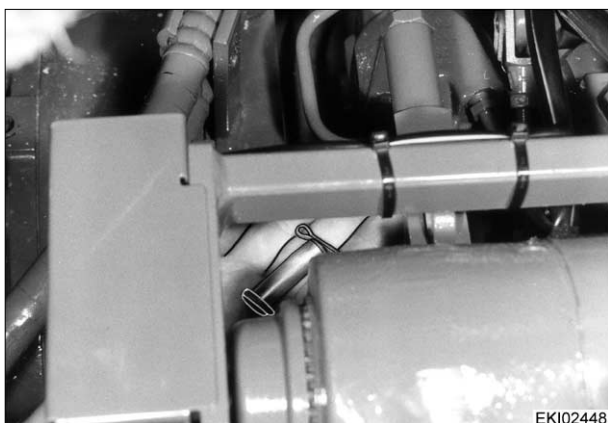
**G**

Insert new O-ring (arrowed) and grease  
Locate compression spring and fit brake cylinder (130) (upper part).

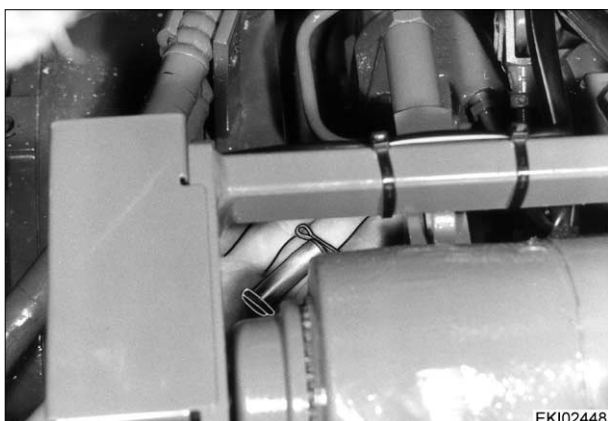
Tighten socket head cap screws (135) to **25 Nm** .



Connect lines on left and right brake cylinders.  
Use new sealing rings.



Pin actuating rod of diaphragm cylinder (handbrake) and secure with split pin.

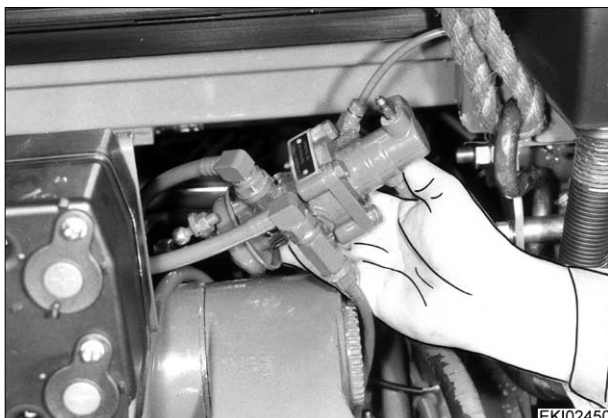


Fit stabiliser strut.

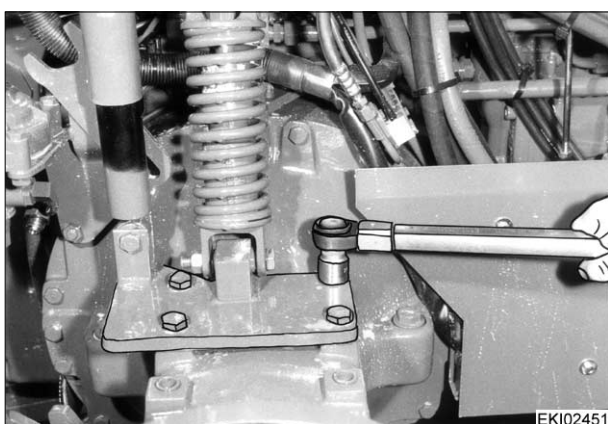
Date	Version	Page	Capitel	Index	Docu-No.
29.10.2001	<b>a</b>	6/7	<b>1070</b>	<b>G</b>	<b>000007</b>

Fav 900

Transmission / Brake system  
**Installation and removal of brake cylinders**

**G**

Fit trailer valve at rear right.  
 Connect lines which were removed.



Lower cab.  
 Tighten support for cab mount left and right to  
**210 Nm** .  
 Fit panel to right mudguard.

**Note:**  
**Chapter 1070 Reg. G - Bleeding brake  
 hydraulic system**

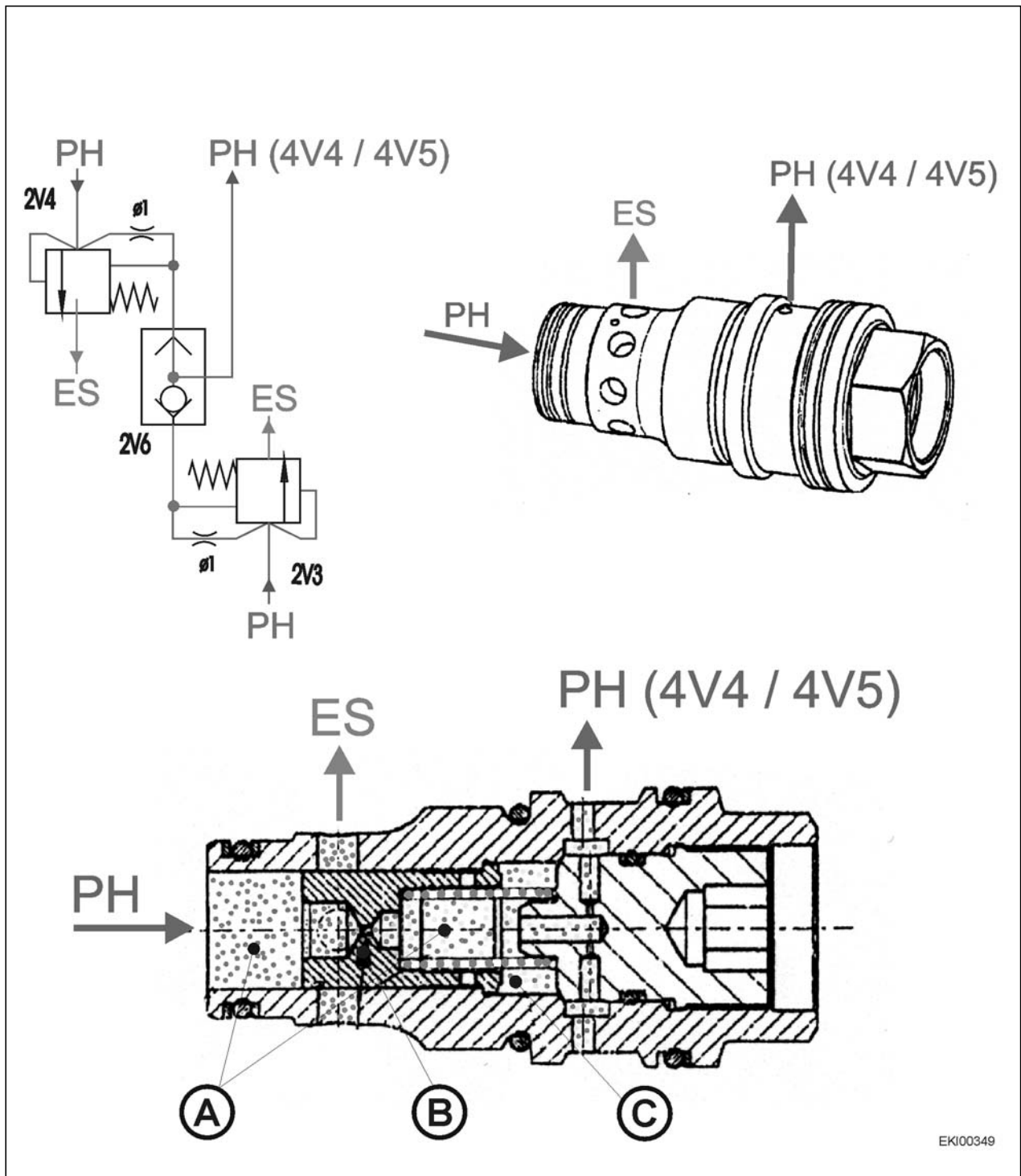
Fit rear wheels, tighten wheel nuts to **620 Nm** .  
 Unjack tractor.

Date	Version	Page	Capitel	Index	Docu-No.
29.10.2001	a	7/7	1070	G	000007

**Farmer 400**  
**Fav 700**  
**Fav 900**

Transmission / Vario transmission unit  
**2V3 / 2V4 high-pressure-relief valve forwards / reverse**

**A**



EKI00349

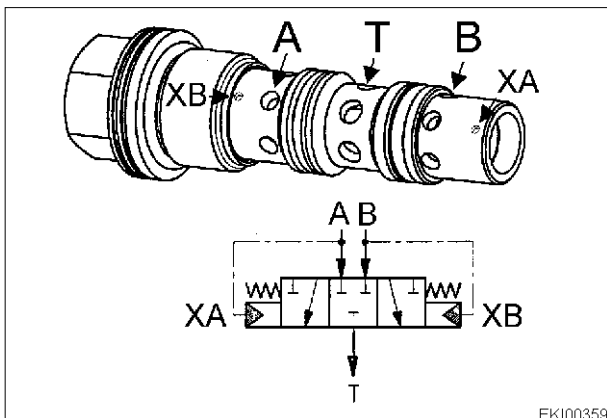
- A = The pressure is equal in both chambers if the clutch/turboclutch valve is closed. The spring holds the piston closed.
- B = If the clutch or turboclutch valve is open, the pressure drop via the diaphragm (x piston surface area) is greater than the spring load. The piston moves to the right and connects PH with ES.
- C = The pressure is relieved by the clutch and turboclutch valves.

Date	Version	Page	Capitel	Index	Docu-No.	
05/2000	a	1/1	2V3 / 2V4 high-pressure-relief valve forwards / reverse	1080	A	000001

Farmer 400  
Fav 700  
Fav 900

Transmission / Vario transmission unit  
**2V5 - flush valve (operation)**

**A**

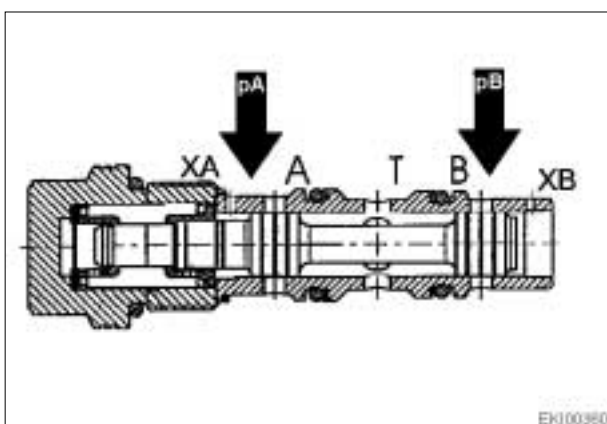


EK100359

Pressure at **A, B** max. 500 bar

Pressure at **T** max. 50 bar

Opening pressure:  $\Delta p = 7$  bar between **A** and **B**

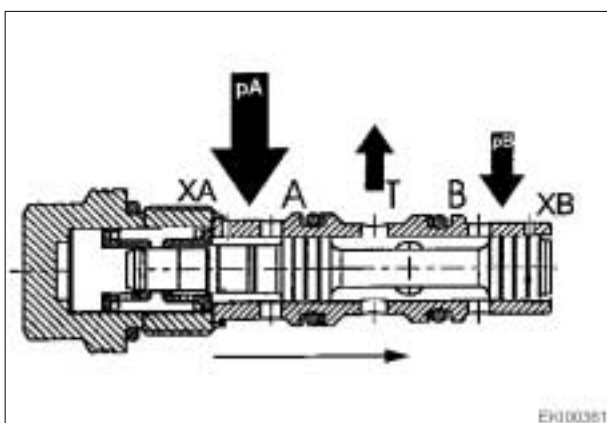


EK100360

**Transmission in "neutral"**

$p_A = p_B$ ,  $\Delta p < 7$  bar

Piston is held in mid-position by spring force.  
Both channels (**A, B**) are closed.

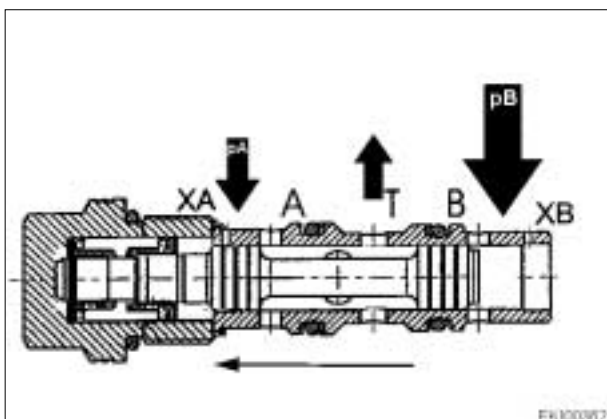


EK100361

**"Tractive mode"**

$p_A > p_B$ ,  $\Delta p > 7$  bar

Piston is pushed upwards via control bore **XA**.  
Channel **B** is linked to **T**. Hot oil can flow from low-pressure side **B** via **T** to discharge connection and to oil cooler.



EK100362

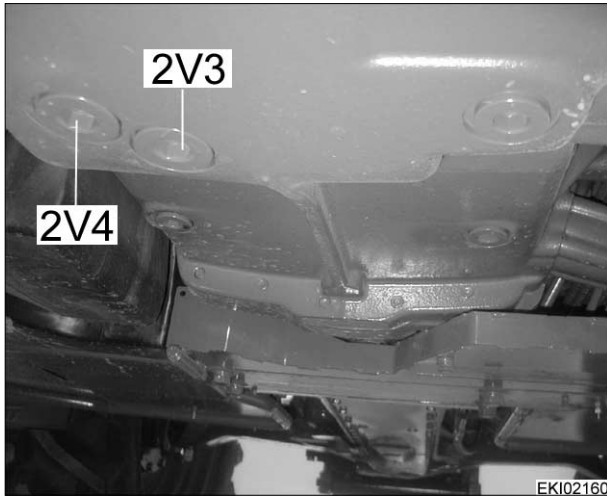
**"Pushing mode"**

$p_A < p_B$ ,  $\Delta p > 7$  bar

Piston is pushed downwards via control bore **XB**.  
Channel **A** is linked to **T**. Hot oil can flow from low-pressure side **A** via **T** to discharge connection and to oil cooler.

Date	Version	Page	Capitel	Index	Docu-No.
06/2000	a	1/1	2V5 - flush valve (operation)	1080	A
					000002

<p><b>Fav 900</b></p>	<p>Transmission / Vario transmission unit  <b>Replacing high-pressure-relief valves forwards/reverse</b></p>	<p><b>G</b></p>
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**Preliminary work:** drain transmission oil (approx. 65 l). Unscrew two drain plugs at bottom of transmission.

Remove 2V3 and 2V4 = high-pressure-relief valves using socket head (27 mm).

**Note:**

**2V3 = high-pressure-relief valve forwards**  
**2V4 = high-pressure-relief valve reverse**

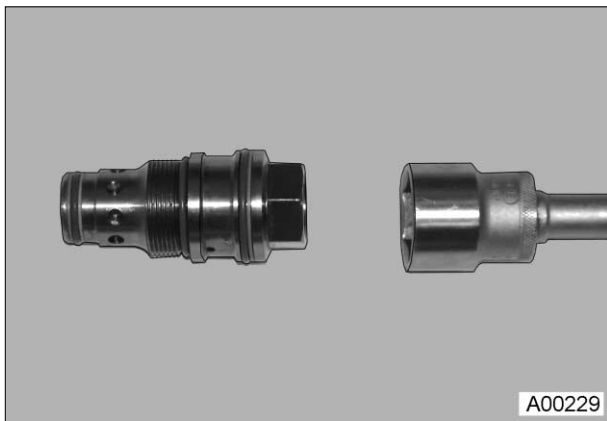


Photo shows **2V3 = high-pressure-relief valve** removed from transmission.

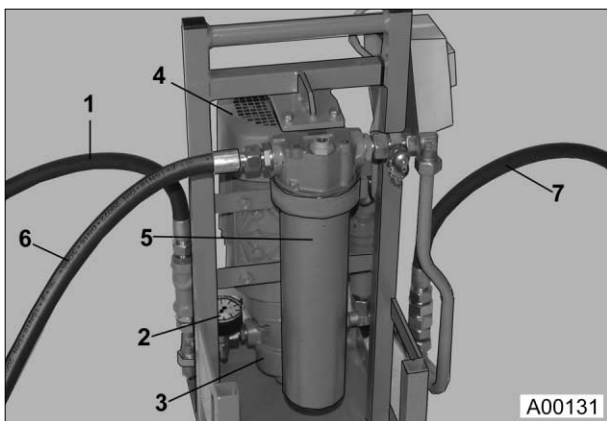
This high-pressure-relief valve is a servo-assisted pressure-relief valve.

Pressure setting new 500 + 20 bar.

Pressure setting used 480 +/- 20 bar.

Only fit new O-rings is old ones are damaged. Take care to fit locating rings correctly.

**Tighten 2V3 and 2V4 = high-pressure-relief valves to 250 + 20 Nm.**



**Note:**

**Filling with transmission oil using external oil-filling unit: Chapter 1080 Reg. G**

Date	Version	Page	Capitel	Index	Docu-No.
29.8.2001	a	1/1	1080	G	000012

<p><b>Fav 900</b></p>	<p>Transmission / Vario transmission unit  <b>Removing flush valve</b></p>	<p><b>G</b></p>
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**Preliminary work:** drain transmission oil (approx. 65 l). Unscrew drain plug at bottom of transmission.

Unscrew **2V5=flush valve** using socket head (22 mm).

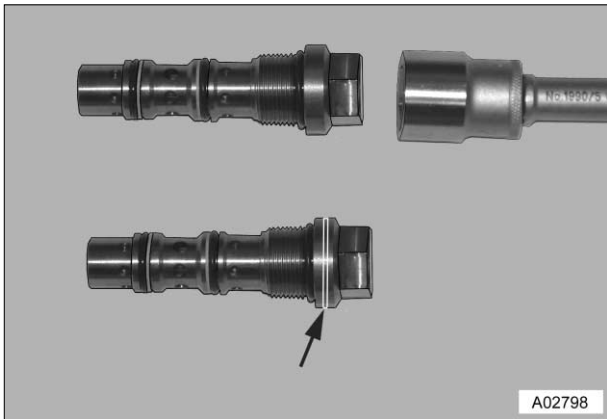
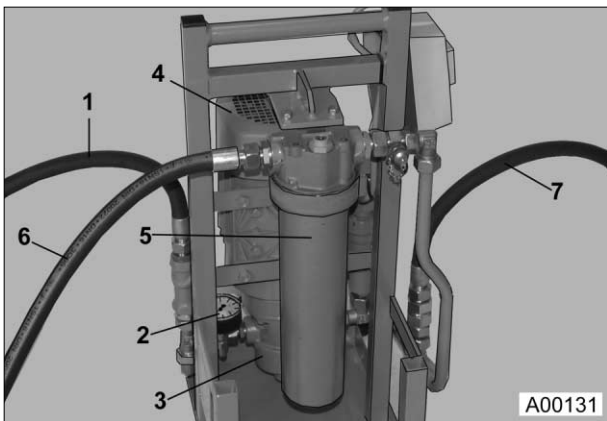


Photo shows **2V5=flush valve** removed from transmission.

Only fit new O-ring if old one is damaged. Take care to fit locating rings correctly, i.e. facing each other. Tighten flush valve to 200 + 10 Nm.

**Note:**

**New 2V5=flush valve with annular groove (arrowed) is also supplied as spare part. Tighten to 250 + 20 Nm.**



**Note:**

**Filling with transmission oil using external oil-filling unit: Chapter 1080 Reg. G**

Date	Version	Page	Removing flush valve	Capitel	Index	Docu-No.
29.8.2001	a	1/1		1080	G	000011

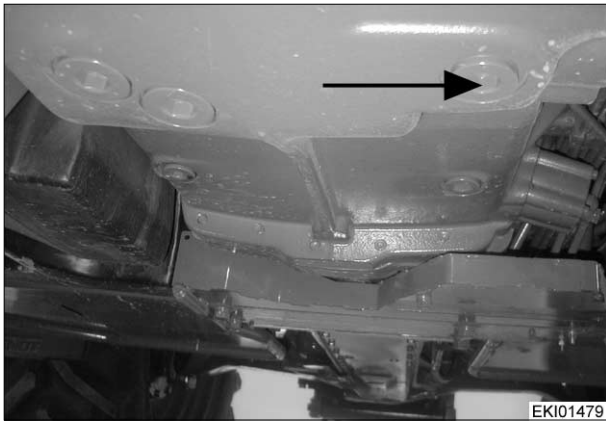
<b>Fav 900</b>	<b>Transmission / Vario transmission unit</b> <b>Removing continuously variable transmission</b>	<b>G</b>
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**Equipment required:**

- hoist (Vario transmission unit 265 kg)
- hoisting yoke (DIY, see Chapter 9920 Reg. A)

**Preliminary work**

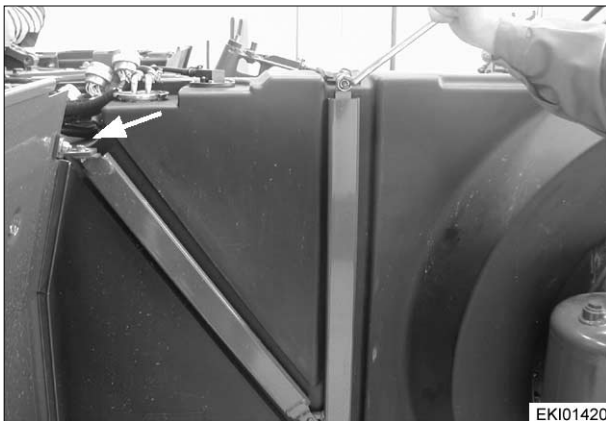
- Raise cab - see Chapter 8100 Reg.G



Drain hydraulic oil (approx. 65 l).



Remove step at left.



Remove clamp, braces and bracket (arrowed) from tank.

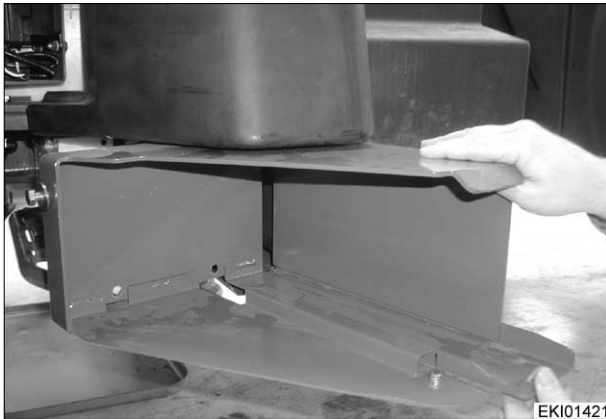
Date	Version	Page	Removing continuously variable transmission	Capitel	Index	Docu-No.
14.5.2001	a	1/7			1080	G



**Fav 900**

**Transmission / Vario transmission unit  
Removing continuously variable transmission**

**G**



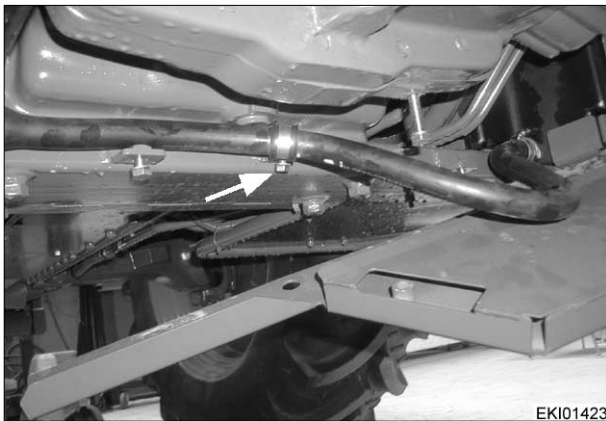
EKI01421

Open battery case and remove toolbox storage compartment.



EKI01422

Remove cover panel from spill valve and air tank.



EKI01423

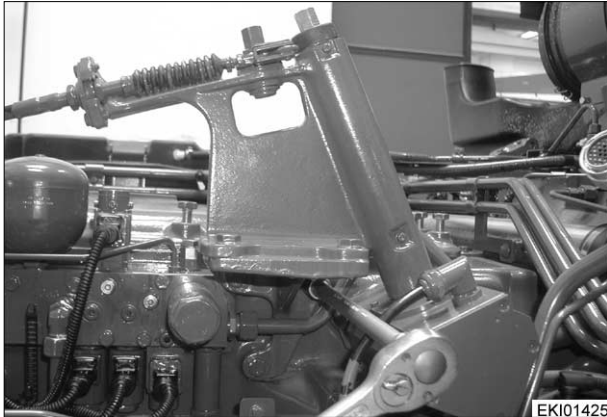
Remove guard from fuel hose.  
Release clip (arrowed).



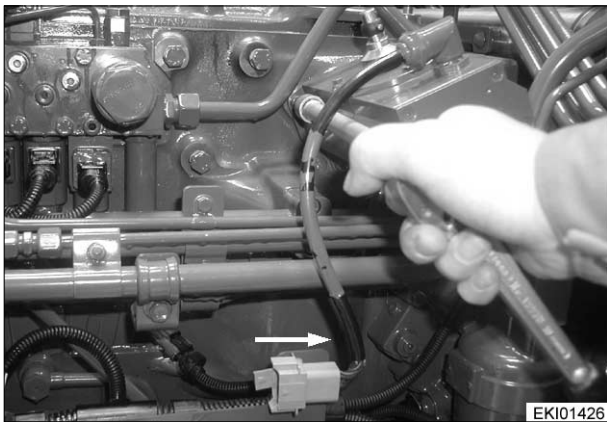
EKI01424

Withdraw tank carefully.

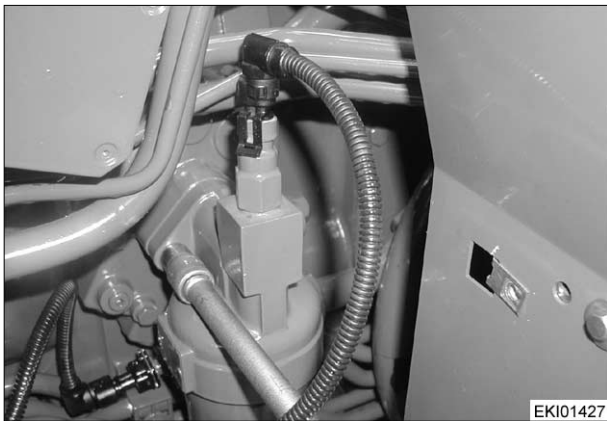
<p><b>Fav 900</b></p>	<p>Transmission / Vario transmission unit  <b>Removing continuously variable transmission</b></p>	<p><b>G</b></p>
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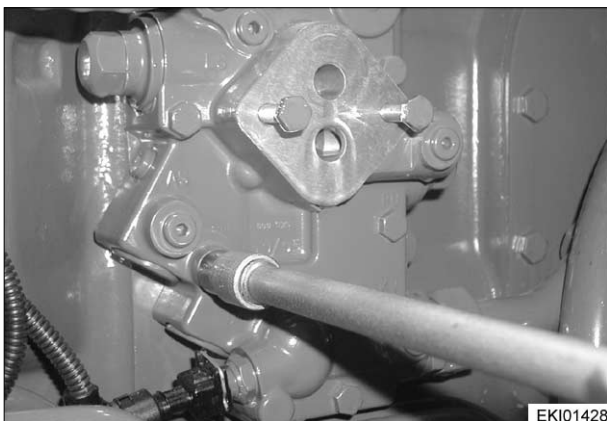
**Note:**  
**Shift range control to neutral position**  
 Remove auxiliary lever support.



Disconnect cable coupler X037. Unlock plug housing and slide out of bracket in direction of arrow.  
 Remove A009 - actuator unit.



Disconnect cable coupler X228.  
 Remove pressure filter housing. Collect any draining oil.



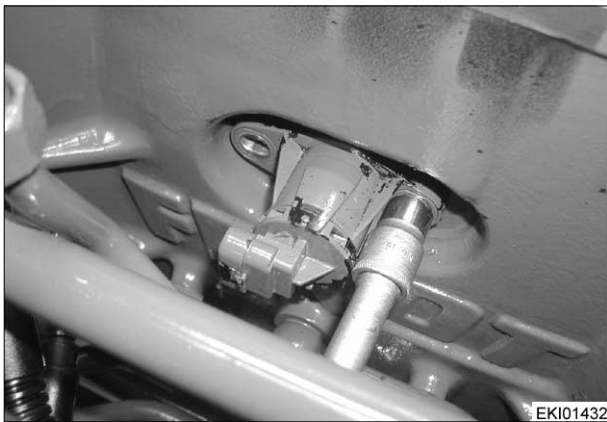
Disconnect cable coupler X158 and hydraulic lines.  
 Remove valve unit.

Date	Version	Page	Capitel	Index	Docu-No.
14.5.2001	a	3/7	1080	G	000006

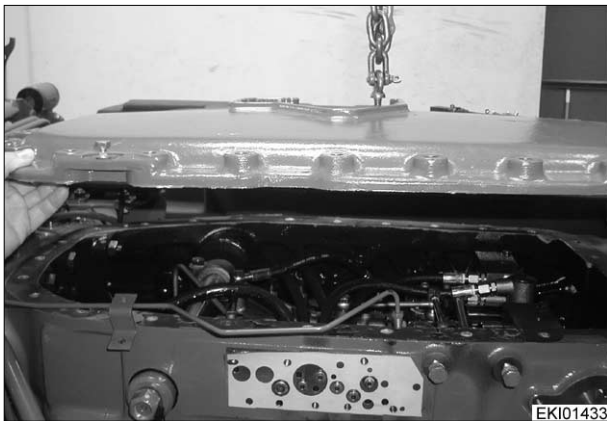
<p><b>Fav 900</b></p>	<p>Transmission / Vario transmission unit  <b>Removing continuously variable transmission</b></p>	<p><b>G</b></p>
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Disconnect cable couplers, clutch-bleed line and hydraulic lines.  
 Remove valve unit.



Disconnect cable coupler X163 and remove B014 = sensor, accumulator shaft.



Remove bracket for pipes and clamp.  
 Unscrew screws from cover.  
 Screw in M10 eye bolt and raise cover.



Unscrew stud bolt and withdraw actuator shaft.

Date	Version	Page	Capitel	Index	Docu-No.
14.5.2001	a	4/7	1080	G	000006

**Fav 900**

**Transmission / Vario transmission unit  
Removing continuously variable transmission**

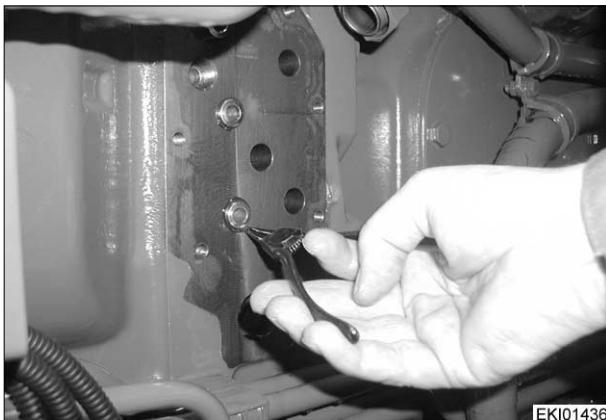
**G**



EKI01435

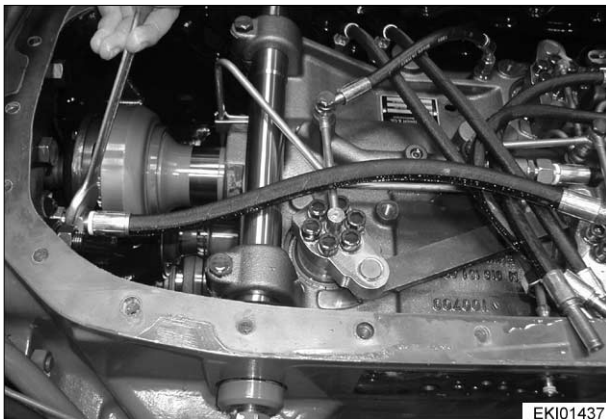
Unclip circlips and press hose assemblies inwards.

Disconnect high-pressure line (steel line).



EKI01436

Unclip three circlips and press hose assemblies inwards.



EKI01437

Remove hydraulic hose (pressure supply to enhanced shift system).



EKI01438

Unclip drive shaft circlip.

Push drive shaft to rear.

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14.5.2001	a	5/7			1080	G

**Fav 900**

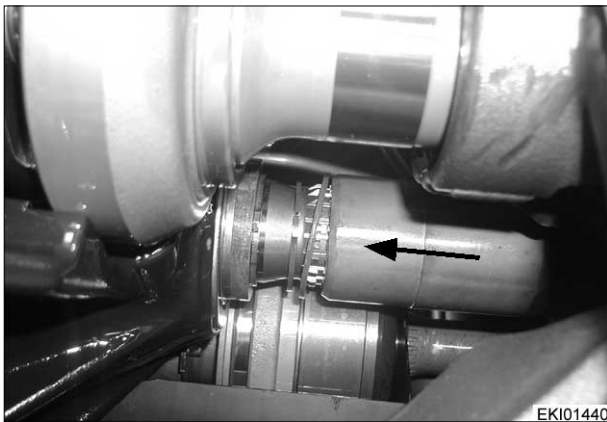
**Transmission / Vario transmission unit  
Removing continuously variable transmission**

**G**



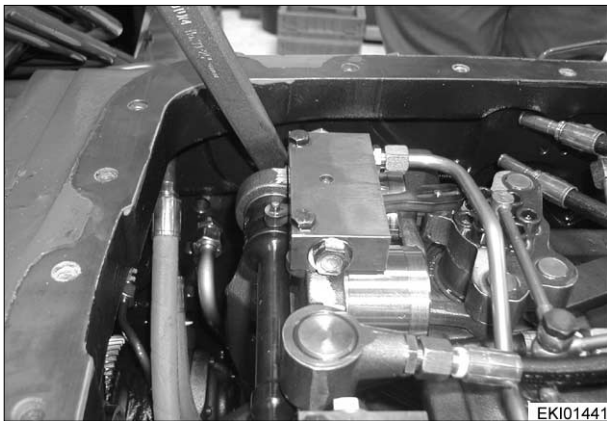
EKI01439

Unscrew three M8 hexagon screws from planetary gear.  
Push drive shaft to rear.



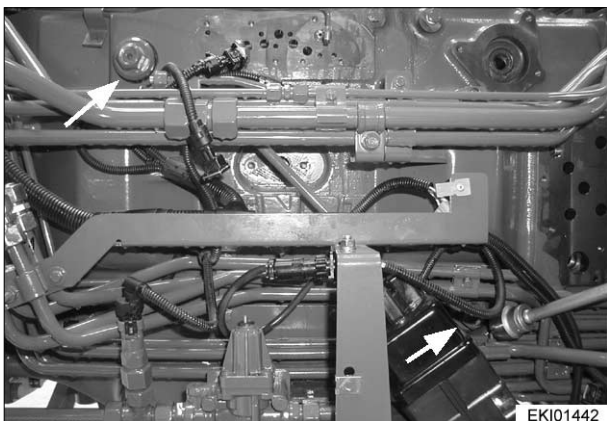
EKI01440

Unclip circlip from pinion shaft.  
Slide circlip, washer and coupling sleeve onto pinion shaft in direction of arrow.



EKI01441

Pivot hydraulic motors inwards using tyre lever.



EKI01442

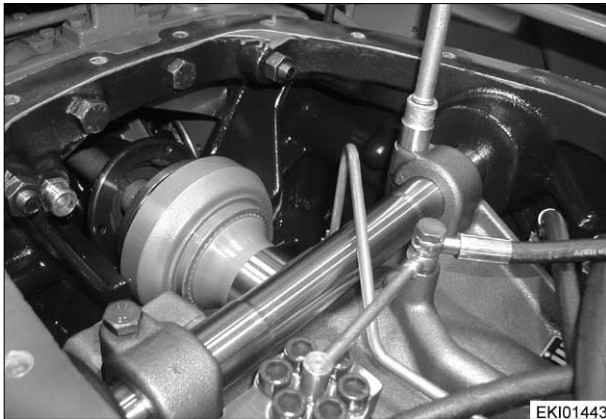
Unscrew two hexagon nuts (arrowed) on both left and right sides.

Date	Version	Page	Capitel	Index	Docu-No.
14.5.2001	a	6/7	1080	G	000006

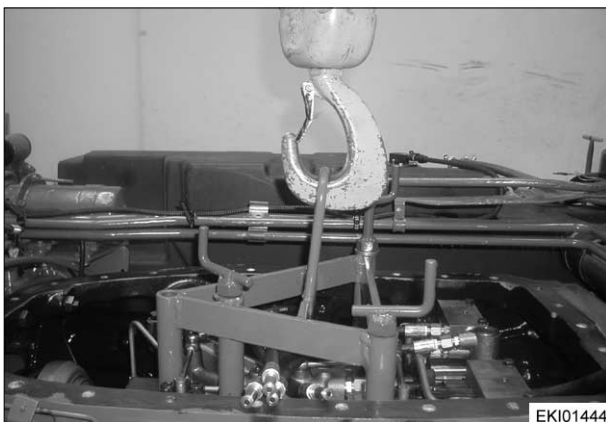
**Fav 900**

**Transmission / Vario transmission unit  
Removing continuously variable transmission**

**G**



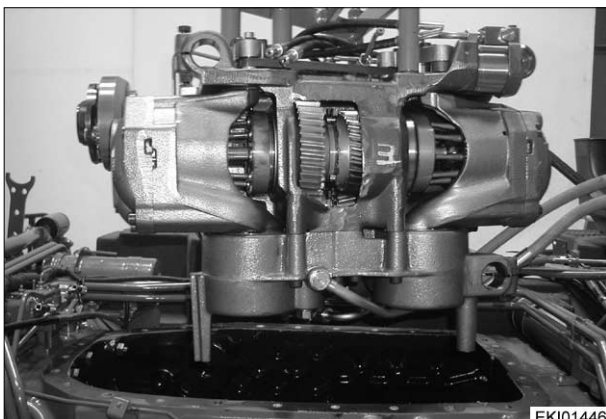
Release upper M12 clamping screws.  
 Unscrew two drain plugs on underside of transmission housing.  
 Collect any draining oil.  
 Release two clamping screws in same manner as above.



Attach hoisting yoke.  
 Attach load hook and take up tension.



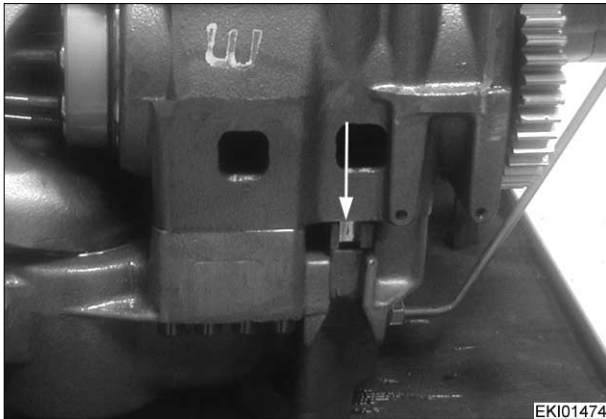
Screw on slide hammer puller with modified M20 nut (DIY).  
 Withdraw shafts for flexible mounting.



Raise transmission unit carefully out of transmission housing using hoist.  
 Ensure clearance of all components.  
 Do not walk or stand under suspended loads!

**Fav 900**

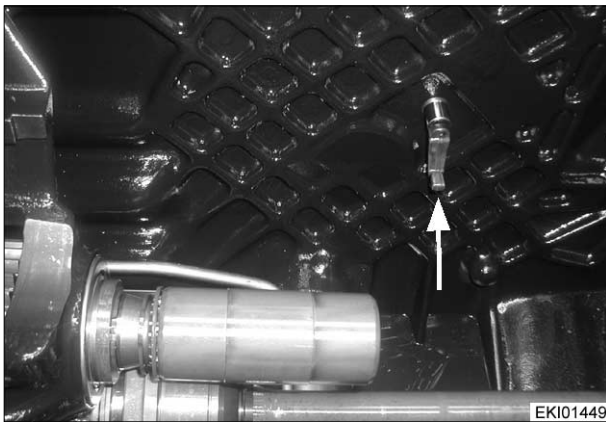
**Transmission / Vario transmission unit  
Fitting continuously variable transmission**

**G**

EKI01474

Attach transmission unit to hoist, taking appropriate safety precautions.

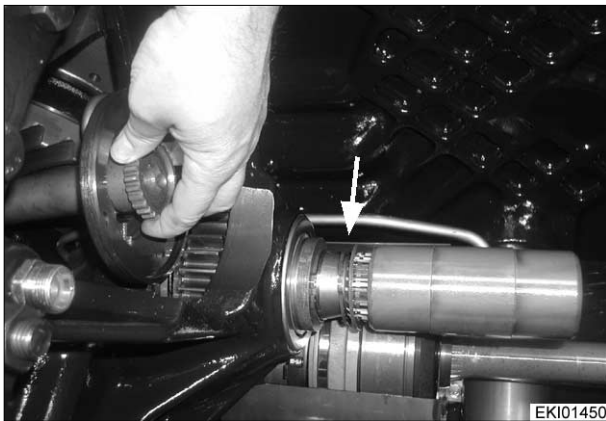
Shift range control I - II (arrowed) to "Neutral" (in mid-position).



EKI01449

Clean seal surfaces on transmission housing to remove oil and seal residues.

Move selector finger (arrowed) of range control I - II in transmission housing to "Neutral" (in mid-position).



EKI01450

Where removed:

Clamp circlip and washer to collar of pinion shaft. Slide coupling sleeve onto pinion shaft in direction of arrow until stop is reached.

Locate flange on connection shaft (PTO drive) and insert connection shaft.



EKI01451

Insert ML transmission into transmission housing. Ensure clearance of all components. Insert two shafts into bores of transmission housing and transmission unit.

**Note:**

**Insert short shaft, see photo.**

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16.05.2001	a	1/9			1080	G



<b>Fav 900</b>	<b>Transmission / Vario transmission unit</b> <b>Fitting continuously variable transmission</b>	<b>G</b>
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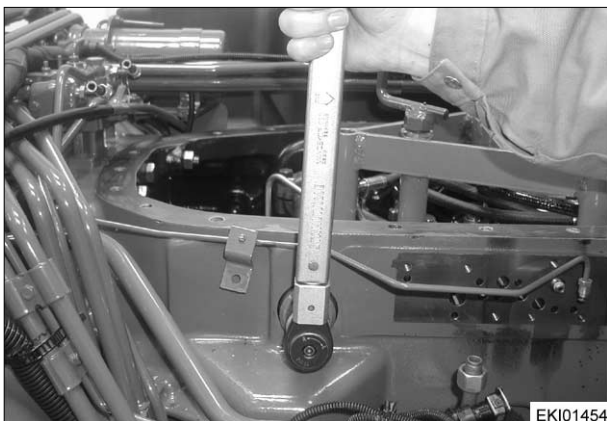
EKI01452

Check bushes (flexible) for wear. If necessary, fit new bushes.  
Insert four bushes into bores as far as stop.



EKI01453

Locate ring - with groove pointing to bush (flexible). Then screw on M20 lock nut.  
Fit three other nuts and rings in same manner.



EKI01454

Tighten all four M20 nuts to 250 Nm.

**Note:**  
**Brace while tightening nuts.**  
Remove hoist.



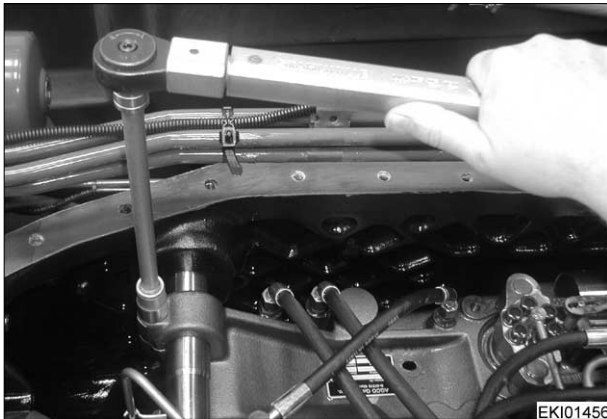
EKI01455

Turn one planet wheel of planetary gear of power splitting system upwards.  
Align (centre) transmission unit (ML transmission) using feeler gauge.  
For example, it must just be possible to fit 0.6 mm between annulus and transmission housing on left and right.

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16.05.2001	a	2/9	<b>Fitting continuously variable transmission</b> <b>1080</b>	<b>G</b>	<b>000007</b>

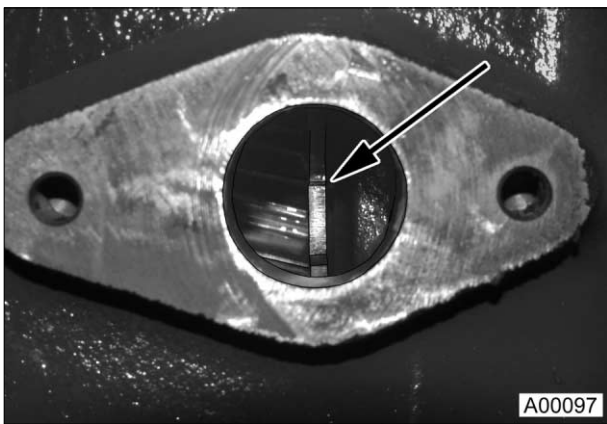


<p><b>Fav 900</b></p>	<p align="center"><b>Transmission / Vario transmission unit</b>  <b>Fitting continuously variable transmission</b></p>	<p align="center"><b>G</b></p>
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EKI01456

Tighten all four clamping screws to 86 Nm.  
 Screw in two drain plugs with new seals at bottom of transmission housing and tighten.  
 Then operate range control I - II (check at selector finger).



A00097

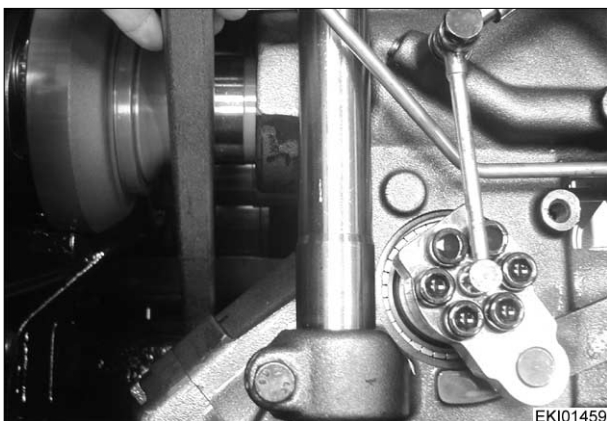
Turn ML transmission until tooth of one tooth of toothed washer is in centre of bore (arrowed) for Hall-effect sensor.



A00101

Coat seal surface of Hall-effect sensor with sealant X 903.050.553 (non-curing) and insert into bore of transmission housing. Tighten fastening screws to 25 Nm.  
 Connect electric cable.

**Note:**  
 If already installed Hall-effect sensors are re-used, stick two cardboard strips, each 0.9 mm thick, into slit in Hall-effect sensor on left and right (for centring when fitting).

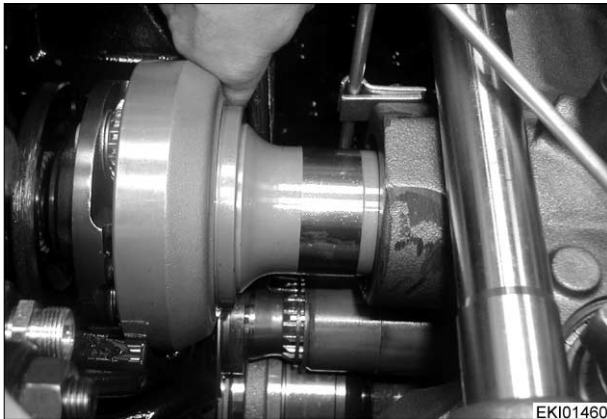


EKI01459

Pivot hydraulic motors outwards as far as stop (45°).

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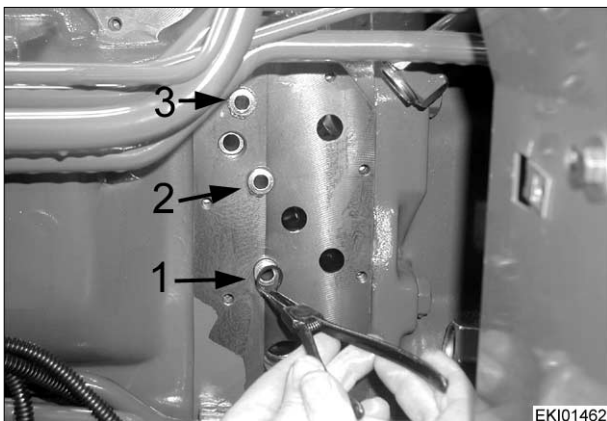
Slide coupling sleeve on pinion shaft forwards until circlip groove is revealed. Clip circlip into groove.

**Note:**

**If coupling sleeve does not engage, jack up one front wheel and turn until coupling sleeve engages.**



Mount flange on planetary gear of power splitting system. Tighten three M8 hexagon screws to 25 Nm.



Insert hydraulic hoses into bores of transmission housing at front right.

Hold inserted hoses in place with circlips (opening downwards).

**1 = short blue hose (discharge)**

**2 = long blue hose (feed)**

**3 = black hose (lubrication)**



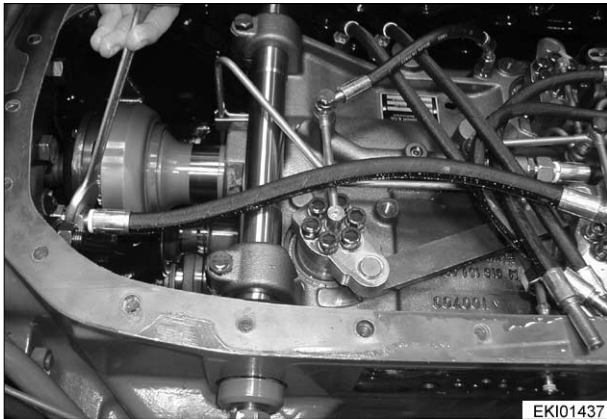
Top front of transmission housing:

Clip snap ring into shaft groove. Slide shaft forwards. Insert washer.

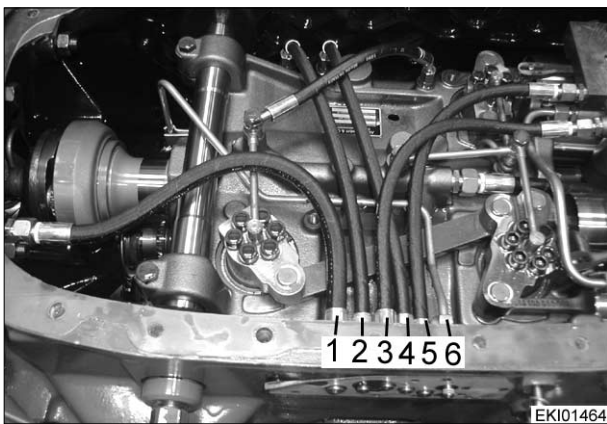
Engage circlip in spur gear groove.

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<p><b>Fav 900</b></p>	<p><b>Transmission / Vario transmission unit</b>  <b>Fitting continuously variable transmission</b></p>	<p><b>G</b></p>
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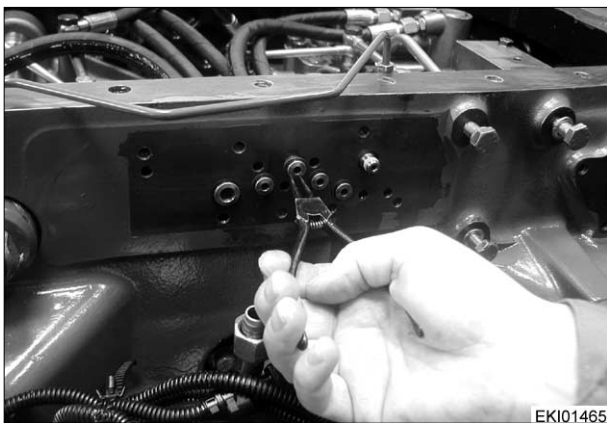


Fit hydraulic hose (pressure supply to enhanced shift system).



Insert pressure hoses into bores on right in transmission housing.

- 1 = pressure supply hydraulic hose (enhanced pressure)**
- 2 = range control I**
- 3 = mechanical speed governor**
- 4 = range control II**
- 5 = control valves (adjustment)**
- 6 = high pressure to clutch and turboclutch operation (steel line)**



Secure pressure hoses using circlips.



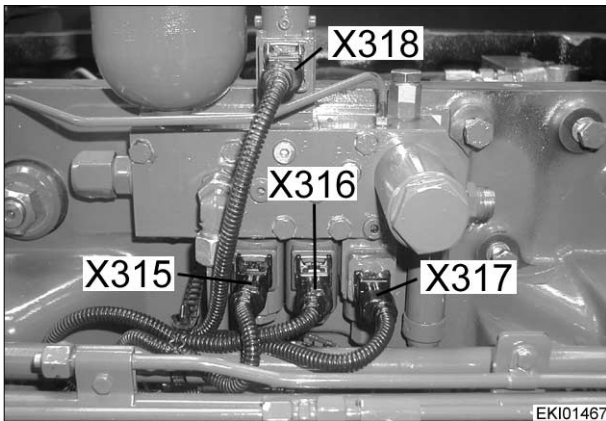
Screw two M8 stud bolts into transmission housing.

Fit new gasket, stick new O-rings into valve unit using a little grease.

Insert valve unit and tighten fastening screws to 25 Nm (from inner to outer)

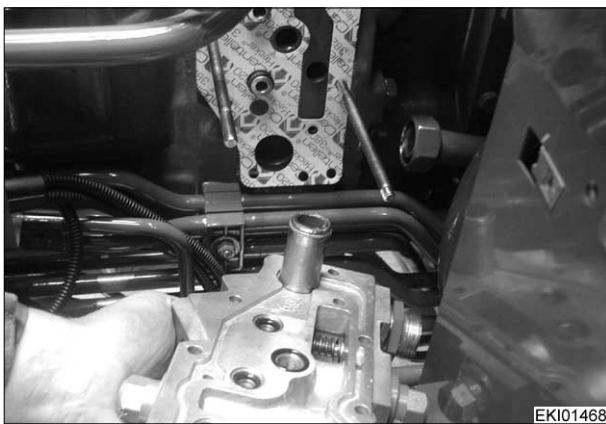
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<p><b>Fav 900</b></p>	<p>Transmission / Vario transmission unit  <b>Fitting continuously variable transmission</b></p>	<p><b>G</b></p>
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Connect cable couplers, clutch-bleed line and hydraulic line.

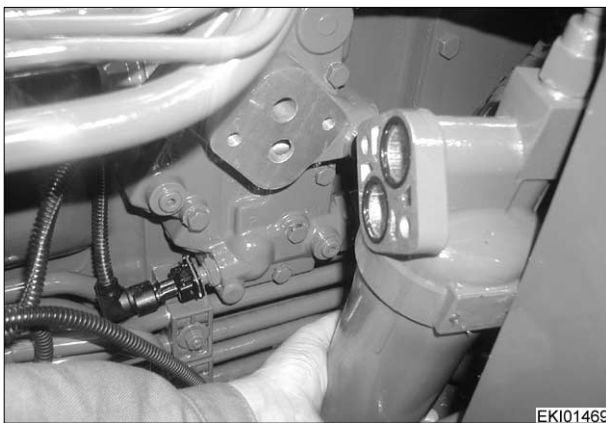
- X315 = Y002 speed range I solenoid valve**
- X316 = Y003 speed range II solenoid valve**
- X317 = Y004 turboclutch valve solenoid valve**
- X318 = Y005 speed governor solenoid valve**
- X157 = B008 high pressure sensor**



Screw two M8 stud bolts into transmission housing. Fit new gasket.

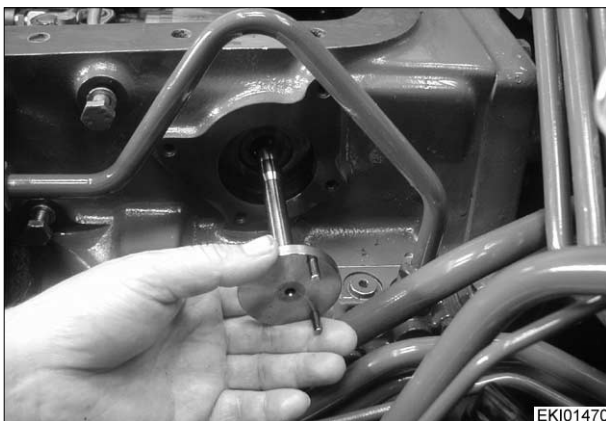
Fit new O-rings in valve unit with a little grease. Insert valve unit, tighten fastening screws to 25 Nm from inside to outside.

Connect cable coupler and hydraulic lines.



Fit new O-rings with a little grease and tighten pressure filter to 25 Nm.

Connect cable coupler.

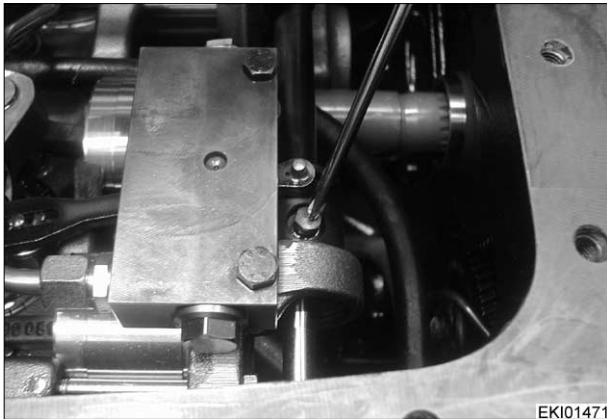


If required, coat new shaft seal on outside with 1:1 spirit/water mixture and press in as far as stop. Fill sealing lips 2/3 with grease.

Insert actuator shaft.

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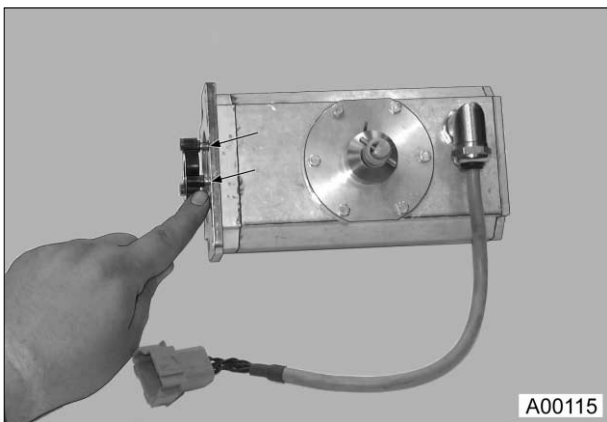
<b>Fav 900</b>	<b>Transmission / Vario transmission unit</b> <b>Fitting continuously variable transmission</b>	<b>G</b>
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EKI01471

<Mate depression in actuator shaft with threaded bore.

**Note:**  
Coat thread of hexagon screw with synthetic bonding agent X 903.050.084 and tighten to 25 Nm.



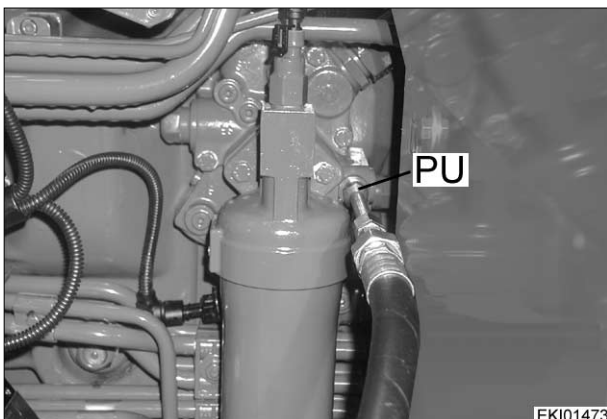
A00115

Locate driver plate with two raised sections (arrowed) facing actuator unit.



EKI01472

Mount pre-assembled actuator unit on transmission housing.  
Tighten M8 socket head cap screws to 25 Nm.  
Connect electric cable.



EKI01473

Unscrew drain plug - labelled PU.  
Connect external oil-filling unit.  
Comply with specified oil type and volume.  
**Note:**  
During filling pivot hydraulic motors and pump by turning actuator shaft.  
Check that there are no leaks from visible hydraulic connections.  
Filling with transmission oil using external oil-filling unit: Chapter 1080 Reg. G

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**Fav 900**

**Transmission / Vario transmission unit**  
**Fitting continuously variable transmission**

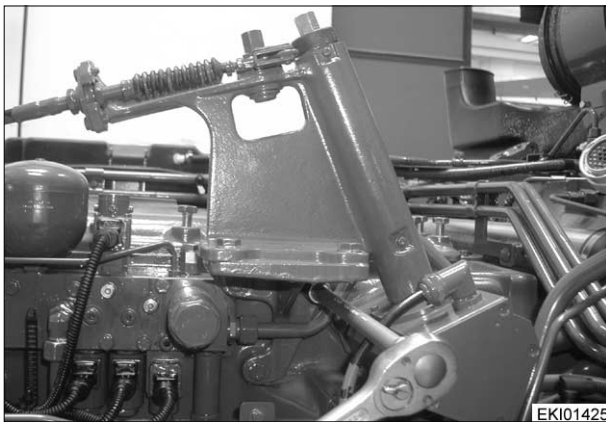
**G**

EKI01476

Coat transmission housing surface cover with sealant X903.050.074. Fit cover.

Tighten M12 hexagon screws to 86 Nm.

Fit bracket for pipes and clamp.



EKI01425

Fit auxiliary lever support.

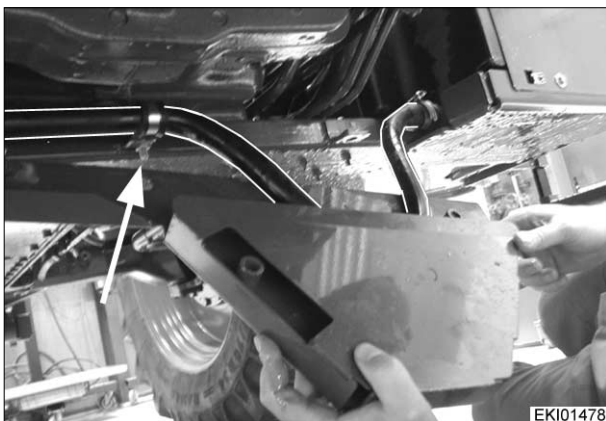


EKI01477

Slide tank carefully forwards as far as stop.

**Note:**

**When doing so, ensure that bleed pipe (see photo) is also inserted.**



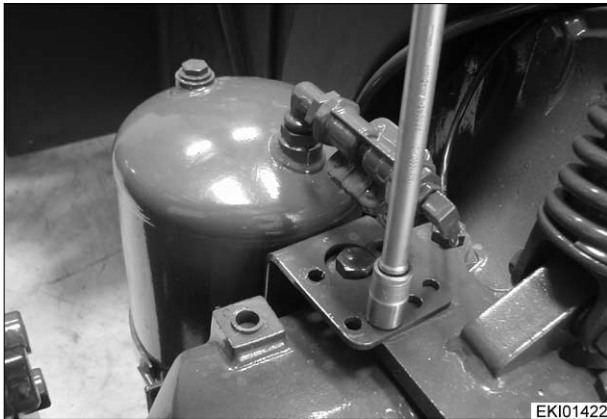
EKI01478

Fit clip for fuel hose.

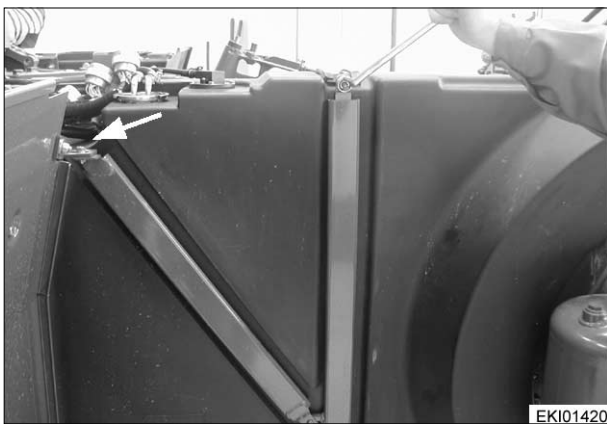
Insert guard into fuel hose and fit guard.

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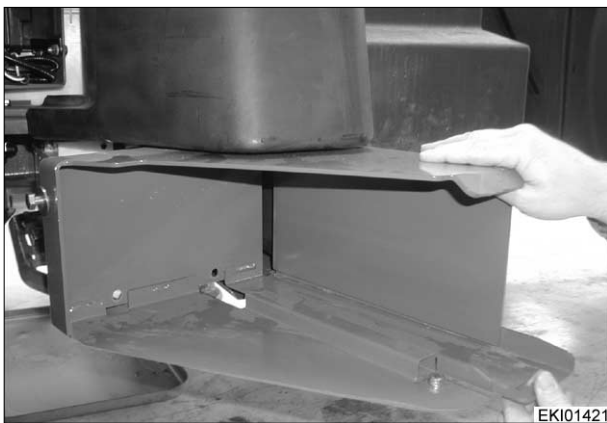
<b>Fav 900</b>	<b>Transmission / Vario transmission unit Fitting continuously variable transmission</b>	<b>G</b>
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Fit air tank with cover panel.



Fit brace with bracket and clamp.



Fit toolbox storage compartment.  
Close battery case.



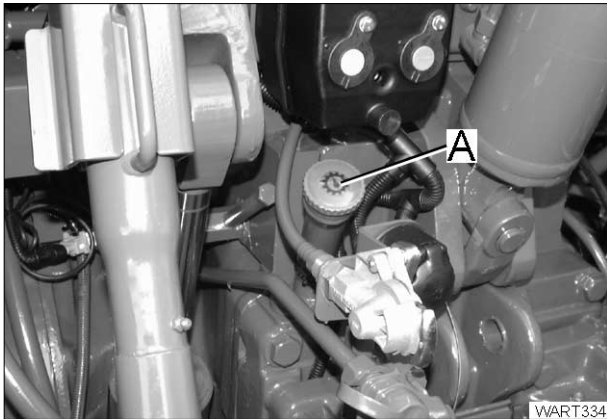
Fit left step.

**Concluding work:**  
**Fitting cab, see Chapter 8100 Reg.G**  
**Transmission calibration, see Chapter 0000 Reg. F**

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16.05.2001	<b>a</b>	9/9	<b>Fitting continuously variable transmission</b>	<b>1080</b>	<b>G</b>
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<b>Fav 900</b>	<b>Transmission / Vario transmission unit</b> <b>Filling with transmission oil</b>	<b>G</b>
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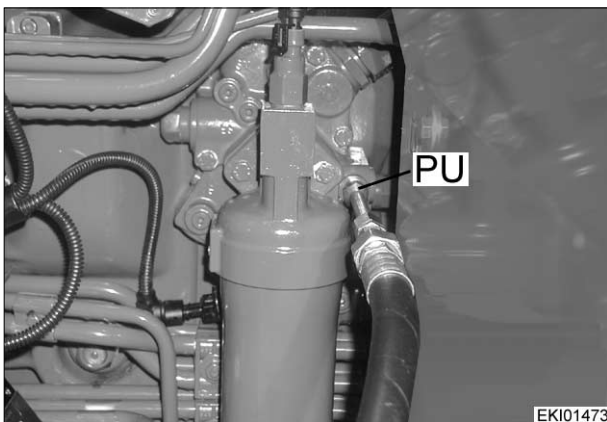


During normal maintenance work, e.g. transmission oil change and / or filter change, fill with transmission oil at rear left.

Comply with specified oil type and volume.

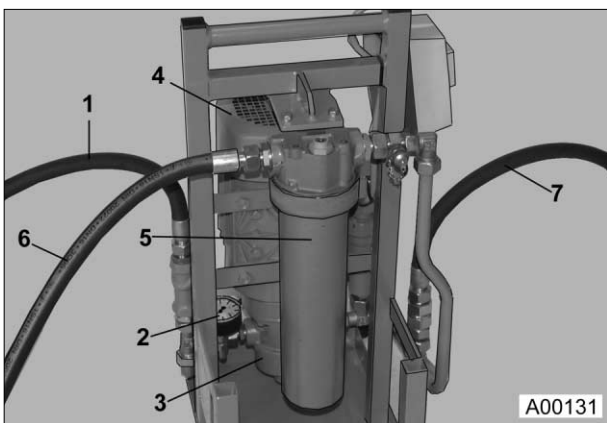
Initial fill approx. 85 l

Refill approx. 65 l



**External oil-filling unit always necessary:**

1. When replacing transmission unit (ML transmission)
2. When high-pressure unit is empty, e.g. after removal of high-pressure valves or discharge valve (flush valve)



External oil-filling unit with superfine filter

- 1 = suction line from oil reservoir
- 2 = vacuum meter
- 3 = pump
- 4 = 230 VAC electric motor
- 5 = superfine pressure filter with filter monitor
- 6 = pressure hose to tractor
- 7 = pressure hose to oil cleaner in service hydraulics (does not operate when external oil-filling unit is used)

**Note:**

**Use of external oil-filling unit prevents hydraulic pump and hydraulic motor from running dry.**

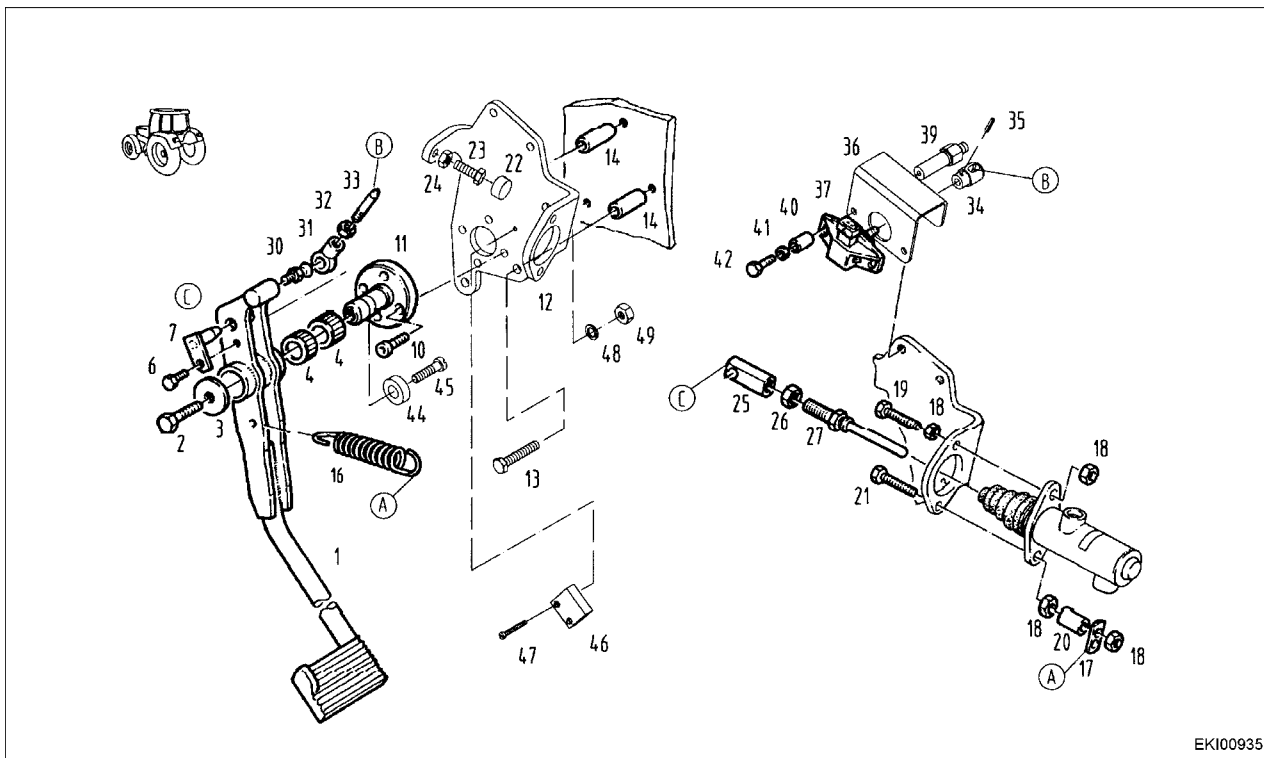
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Farmer 400  
Fav 700  
Fav 900

Transmission / clutch actuation system  
**Setting clutch master cylinder**

**E**



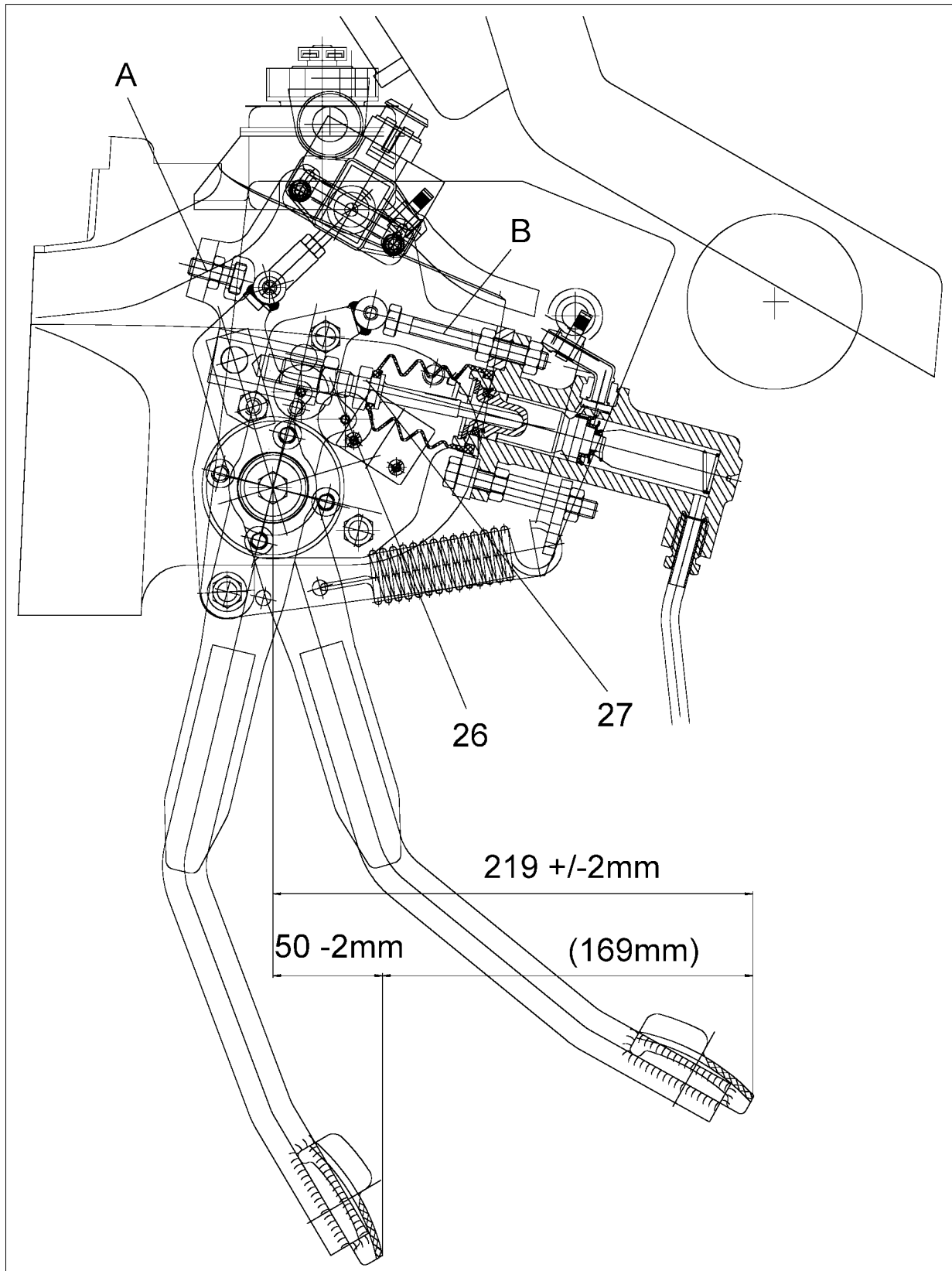
Item	Description	Item	Description
1	Clutch pedal	25	Thrust piece
2	Hexagon screw	26	Hexagon nut
3	Washer	27	Piston rod
4	Needle bush	30	Ball-headed spindle
6	Hexagon screw	31	Ball socket
7	Pin	32	Hexagon nut
10	Socket head cap screw	33	Rod
11	Axle	34	Bush
12	Plate	35	Dowel pin
13	Hexagon screw	36	Cable guard
14	Bush	37	Sensor
16	Extension spring	39	Pin
17	Strap	40	Bush
18	Hexagon nut	41	Washer
19	Hexagon screw	42	Hexagon screw
20	Spacer	44	Magnet
21	Hexagon screw	45	Socket head cap screw
22	Snubber	47	Socket head cap screw
23	Hexagon screw	48	Spring washer
24	Hexagon nut	49	Hexagon nut

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24.1.2001	a	1/3	Setting clutch master cylinder	1100	E 00001

Farmer 400  
Fav 700  
Fav 900

Transmission / clutch actuation system  
**Setting clutch master cylinder**

**E**



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24.1.2001	a	2/3	1100	E	000001

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Transmission / clutch actuation system <b>Setting clutch master cylinder</b>	<b>E</b>
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**Fault: Tractor clutch will not disengage.**

**Possible cause:**

- Check settings on master clutch cylinder .

**Preliminary work:**

Release steering column cover.

## Setting clutch pedal travel

**Clutch pedal engaged**

Distance from pivot point of clutch pedal to foot plate of clutch pedal **219 +/-2mm**

In event of deviations coat thread of stop screw **A** with synthetic bonding agent X 903.050.084.

Set distance of 219 +/-2mm and lock with lock nut. Check that snubber is on stop screw A.

**Clutch pedal disengaged**

Distance from pivot point of clutch pedal to foot plate of clutch pedal **50 -2 mm**

In event of deviations, set distance of 50 -2 mm with **stop screw B** and lock.

**Note:**

**Clutch pedal travel approx. 169 mm**

**Note:**

**Clutch pedal travel only has to be measured in exceptional cases, e.g. after replacing clutch pedal.**

## Setting clutch master cylinder

Clutch pedal engaged

Set piston rod play of clutch master cylinder. Lightly oil bellows on piston rod collar.

Loosen hexagon nut (26) and screw piston rod (27) in.

Piston rod (27) now has ample play.

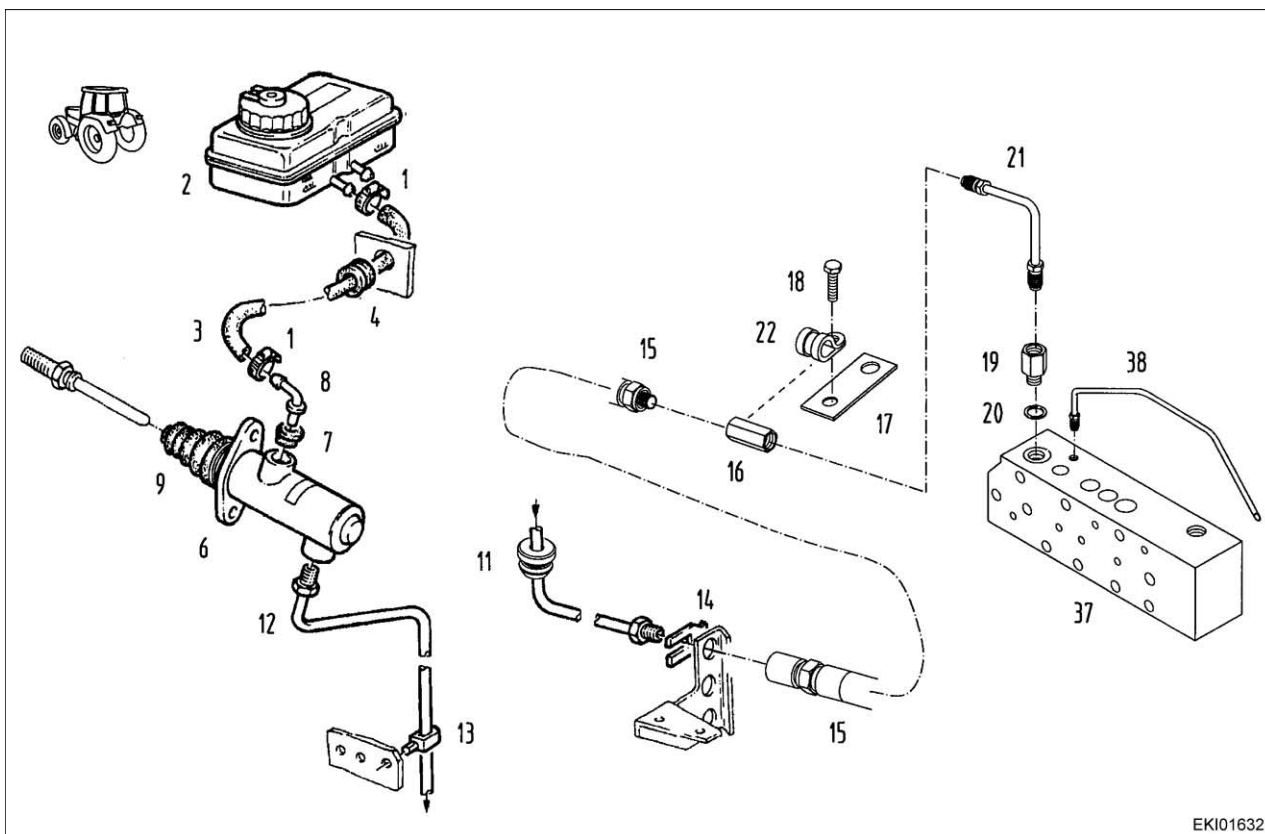
Unscrew piston rod (27) until there is no play.

Then screw piston rod (27) in by one-sixth of a turn and lock in this position with hexagon nut (26).

Piston rod (27) now has slight **play (approx. 0.1 mm)** .

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Fav 900

 Transmission / Clutch actuation system  
**Bleeding clutch hydraulics**
**G**

EKI01632

Item	Designation	Item	Designation
1	Hose clip	14	Hose bracket
2	Expansion tank	15	Brake hose
3	Pressure hose	16	Spacer
4	Grommet	17	Bracket
6	Clutch master cylinder	18	Self-tapping screw
6	Repair kit	19	Screw connector
7	Rubber plug	20	Sealing ring
8	Elbow joint	21	Brake line
9	Protective cap	22	Pipe clip
11	Grommet	37	Valve unit
12	Connecting pipe	38	Bleed line

**Note:**

Hydraulic circuit diagram of clutch hydraulics - see Chapter 1005 Reg.C - Transmission hydraulic circuit diagram

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Fav 900

## Transmission / Clutch actuation system

### Bleeding clutch hydraulics

G



EKI00703

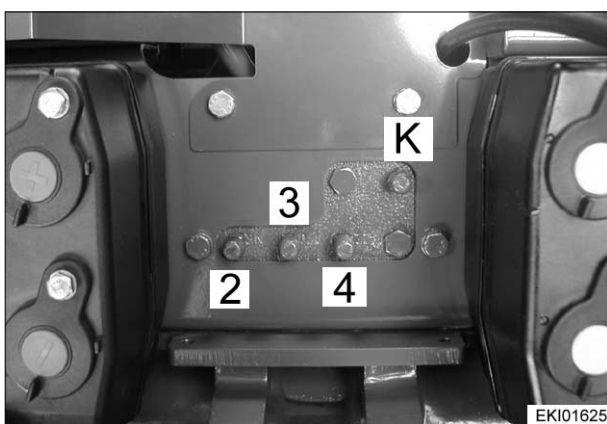
#### Bleeding clutch actuation system and brakes

**Important:**

Do not use brake fluid for brake and clutch actuation system.

Only Pentosin order no. X902.011.622 is permissible.

Feed reservoir at top front of steering column.



EKI01625

#### Bleeding clutch actuation system

Fit transparent plastic hose to oil can and connect to bleed valve at rear of tractor.

Open bleed valve (K).

Force Pentosin into feed reservoir via bleed valve using oil can.

Close bleed valve.

Fill feed reservoir to max. mark with Pentosin.



EKI00705

**Note:**

Spongy clutch pedal means that there is still air in system.

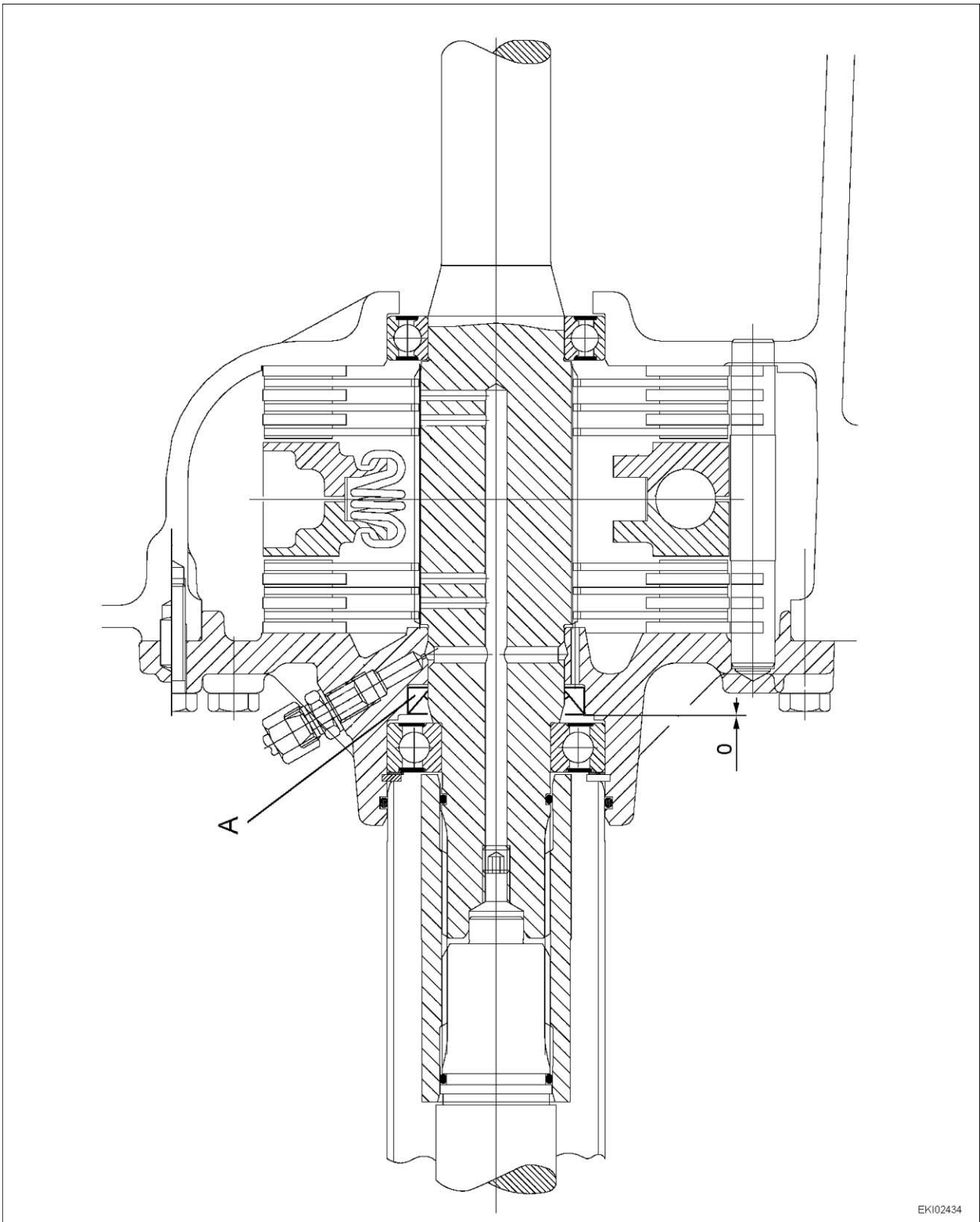
If necessary, bleed system further by pumping clutch pedal.

Then top up feed reservoir to max. level with Pentosin.

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Fav 900

Transmission / Cardan brake  
**Technical drawing of cardan-shaft brake**

**C**

EK102434

**Installation depth, shaft seal A = 0 mm**

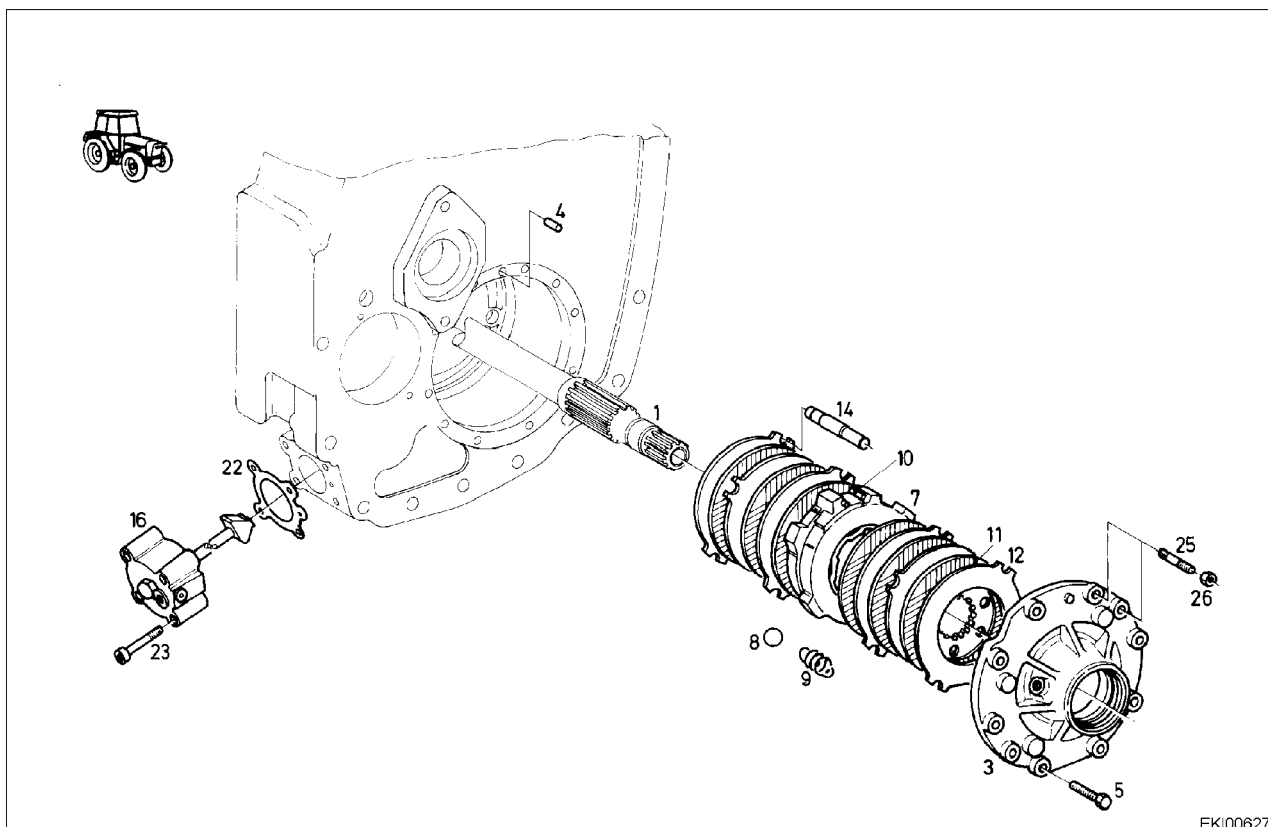
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18.10.2001	a	1/1	1150	C	000002

**Technical drawing of cardan-shaft brake**

Fav 900

 Transmission / Cardan-shaft brake  
 Repairing cardan-shaft brake

G



Item	Designation	Item	Designation
1	Shaft	11	Brake pad
3	Flange	12	Intermediate disc
4	Parallel pin	14	Pin
5	Hexagon screw	16	Cardan-brake cylinder
7	Disc brake	22	Gasket
8	Ball	23	Socket head cap screw
9	Extension spring	25	Stud bolt
10	Parallel pin	26	Hexagon nut

**The following must first be carried out:**

- Drain transmission oil (approx. 65 litres).
- Disconnect tractor between clutch housing and transmission housing: Chapter 1050 Reg. G - Disconnecting tractor, clutch and transmission housing

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Fav 900

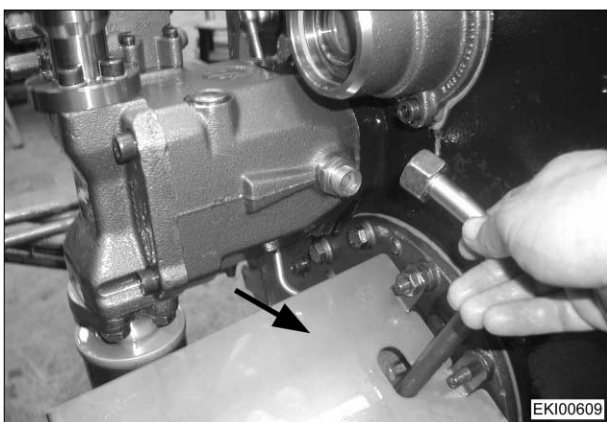
Transmission / Cardan-shaft brake  
**Repairing cardan-shaft brake**

**G**

EKI00608

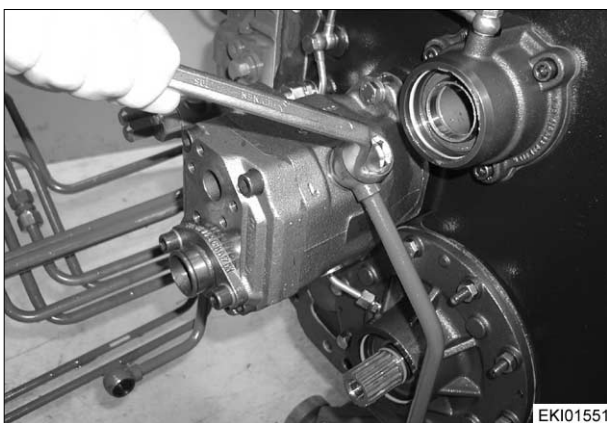
**Removing cardan-shaft brake:**  
**Fav 900 up to 23/3000/...**

Remove LS pump intake filter.



EKI00609

Remove oil leakage line and baffle plate (arrowed).



EKI01551

**Fav 900 chassis number 23/3001 and up**  
 Remove oil leakage line.



EKI00610

Remove lube oil line.

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Fav 900

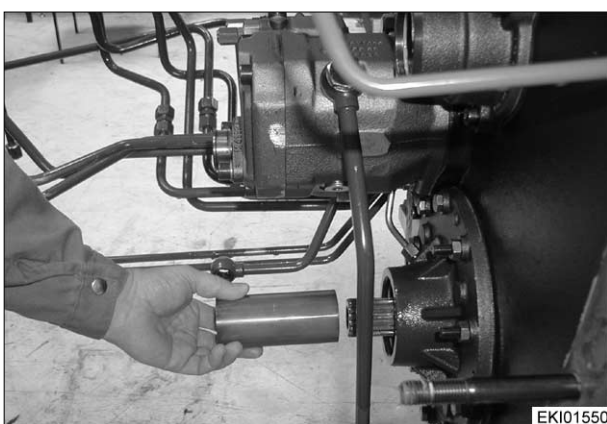
## Transmission / Cardan-shaft brake

### Repairing cardan-shaft brake

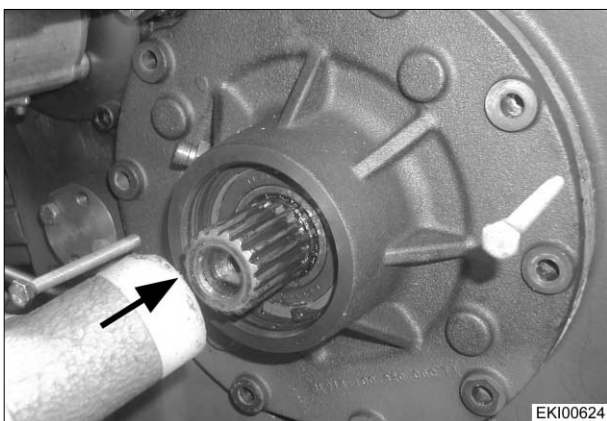
G



Remove cardan-brake cylinder (16)



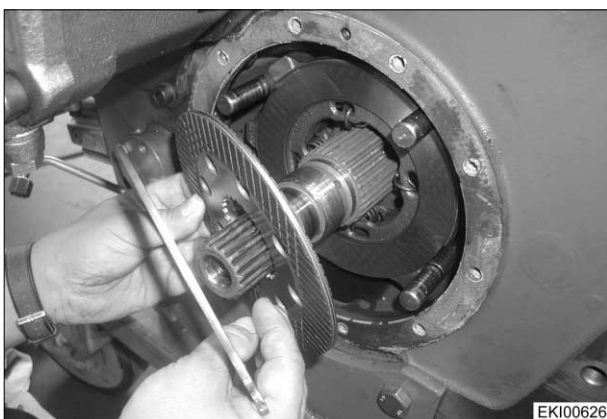
Withdraw coupling sleeve.



Remove flange screws (5).

Force flange (3) off with two M8 screws.

**Note:**  
When forcing flange off, drive shaft must not be pulled out of its bearing seat.



Remove flange (3), brake pads (11), intermediate discs (12) and disc brake (7).

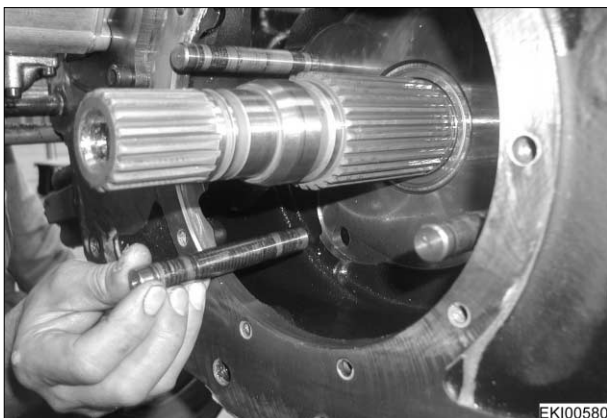
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Fav 900

## Transmission / Cardan-shaft brake

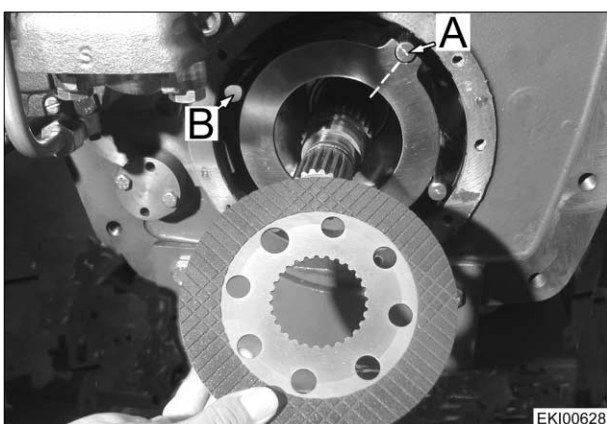
### Repairing cardan-shaft brake

G



#### Fitting cardan-shaft brake:

Insert pins (4).



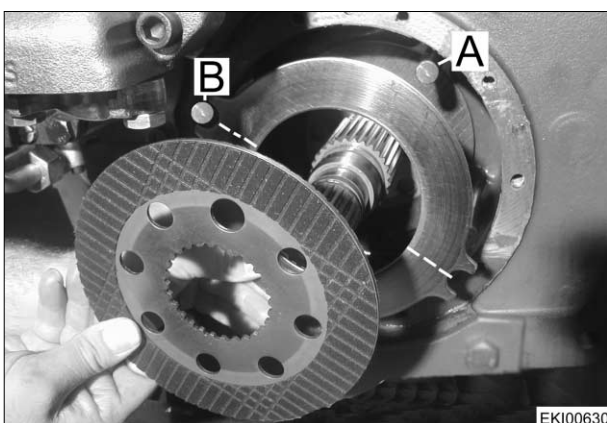
Starting with intermediate disc (12), fit three intermediate discs (12) and three brake pads (11) alternately.

1st intermediate disc (12) - installation position A.

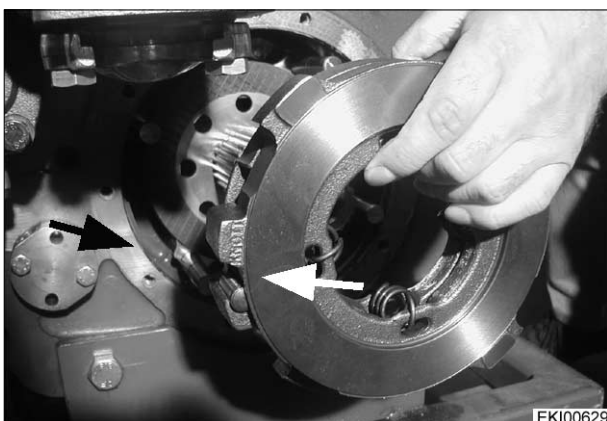
#### Note:

**Use new intermediate discs (12) and brake pads (11).**

**Immerse brake pads in oil before fitting.**



2nd intermediate disc (12) - installation position B etc.



Insert disc brake (7).

Actuating cams (arrowed) point towards bore (arrowed).

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Fav 900

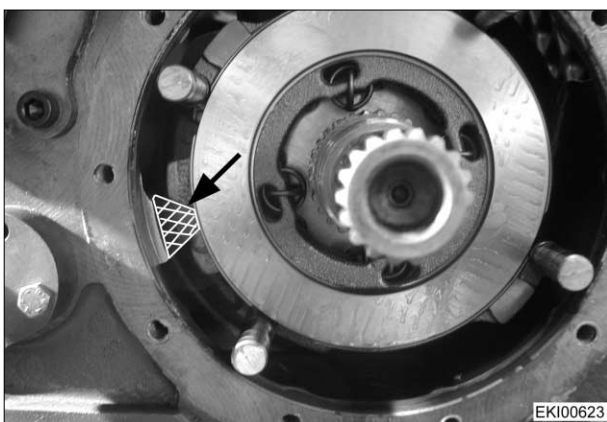
## Transmission / Cardan-shaft brake

### Repairing cardan-shaft brake

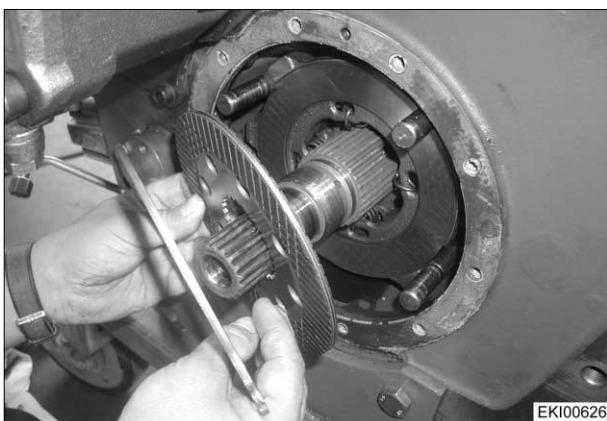
G



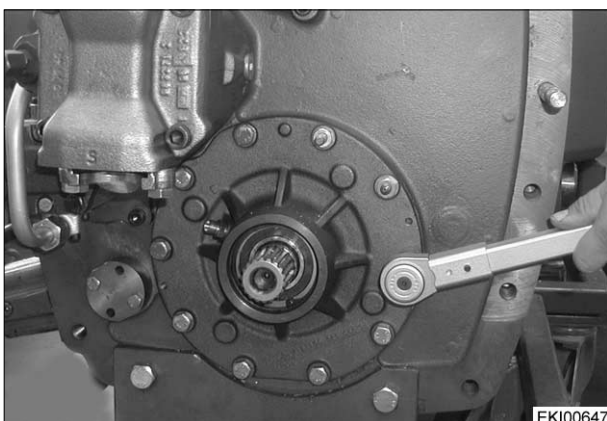
Fit cardan-brake cylinder (16) with new gasket (22).



Note installation position of trigger key (arrowed) relative to disc brake (7).



Fit remaining brake pads (11) and intermediate discs (12).



Clean flange seal surfaces and coat with sealant X 903.050.074.

Mount flange (3) and tighten screws (5) to **50 Nm**.

Date	Version	Page	Capitel	Index	Docu-No.
08/2000	a	5/8	1150	G	000001

Fav 900

## Transmission / Cardan-shaft brake

### Repairing cardan-shaft brake

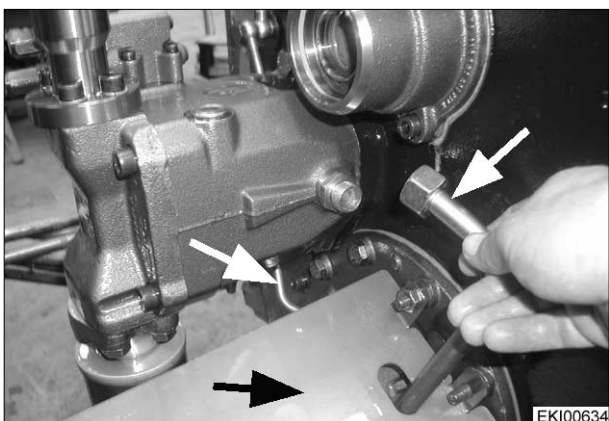
G



Check axial play of cardan shaft with gauge.  
Target value: 0.3 +0.1 mm



In event of discrepancies, correct axial play  
using spacers.



**Fav 900 up to 23/3000**

Fit lube oil line, oil leakage line and baffle plate.



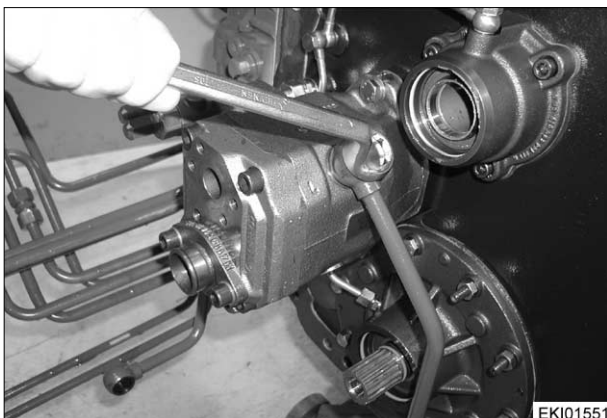
**Fav 900 up to 23/3000**

Fit new intake filter.

Date	Version	Page	Capitel	Index	Docu-No.
08/2000	a	6/8	1150	G	000001

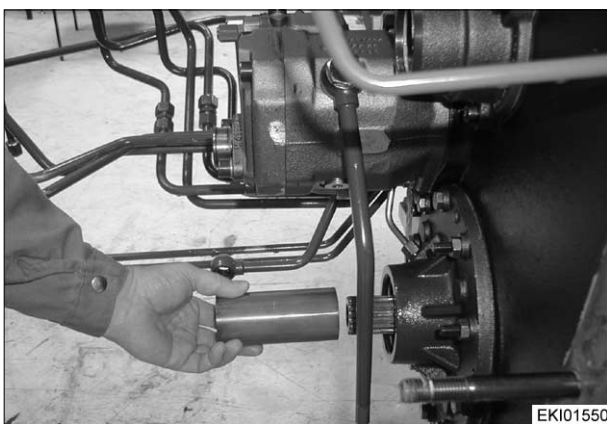
Fav 900

Transmission / Cardan-shaft brake  
**Repairing cardan-shaft brake**

**G**

EKI01551

**Fav 900 chassis number 23/3001 and up**  
 Fit oil leakage line.



EKI01550

Locate new O-ring on shaft (1) and grease.  
 Slide coupling sleeve onto shaft (1).



EKI00632

**Setting cardan-brake cylinder:**

1. Release lock nut.

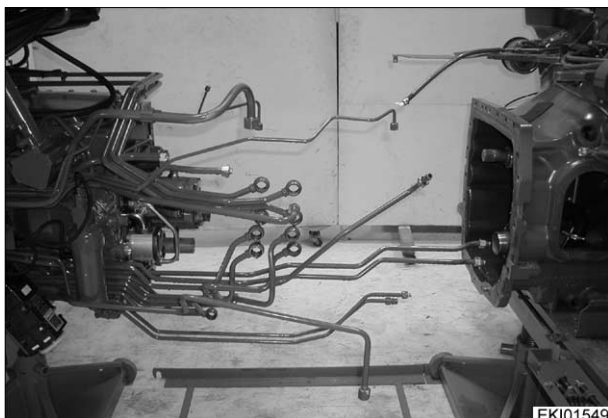
Tighten setscrew using torque gauge  
 X 899.980.151 (**4.0 to 5.0 Nm**).



EKI00633

2. Then unscrew setscrew by **3 full turns and a further 4/6 of a turn** and lock in this position.

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08/2000	a	7/8	1150	G	000001

**Fav 900****Transmission / Cardan-shaft brake  
Repairing cardan-shaft brake****G**

**Assembling clutch and transmission housing  
- see Chapter 1050 Reg.G - Disconnecting  
tractor, clutch and transmission housing.**

Date	Version	Page	Capitel	Index	Docu-No.
08/2000	a	8/8	1150	G	000001

<b>Fav 900</b>	<b>Transmission / Front PTO</b> <b>Technical specifications of front PTO</b>	<b>A</b>
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**EU (European version) = 1000 rpm**

The front PTO's direction of rotation is clockwise viewed in the direction of travel.

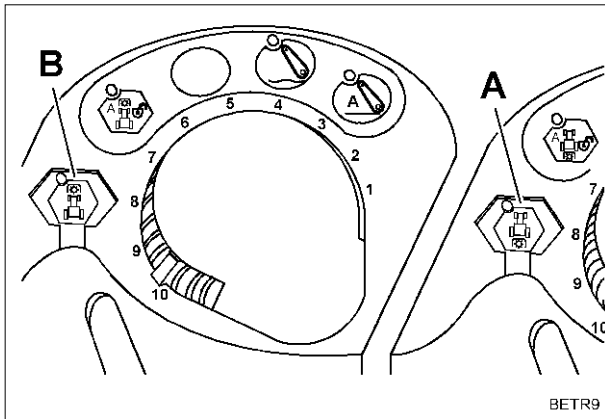
**Technical specifications of front PTO (European version)**

Model		916	920
Front PTO 1000			
PTO speed at rated speed	rpm	1062	1062
Max. permissible torque	Nm	830	830

**Technical specifications of front PTO (European version)**

Model		924	926
Front PTO 1000			
PTO speed at rated speed	rpm	1111	1111
Max. permissible torque	Nm	830	830

**Switching front PTO on and off**



**Danger:**  
Before switching PTO on, ensure that no one is near implement!

**Switch B** is used to switch front PTO on and off. When front PTO is switched on, lamp next to pushbutton switch lights up.

**Engagement depends on actuating time of switch B.**

**Less than 5 sec**

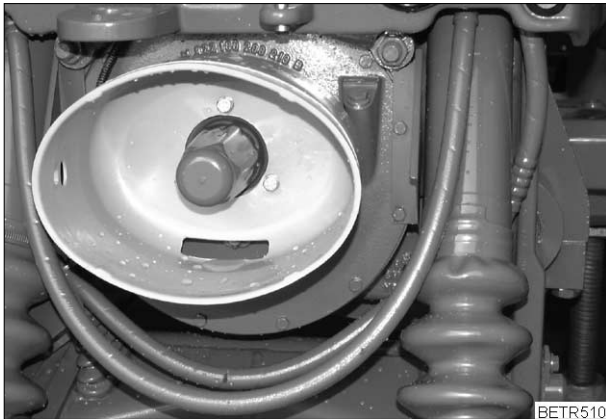
Gentle start-up, PTO clutch adapts automatically to implement's requirements.

**More than 5 sec**

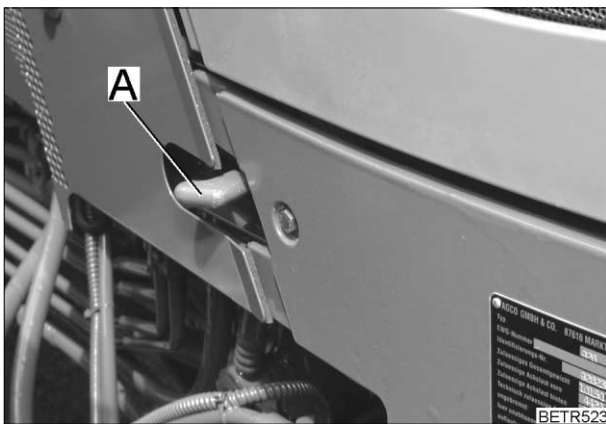
Speed and fault monitor are skipped.

Date	Version	Page	Technical specifications of front PTO	Capitel	Index	Docu-No.
31.10.2001	a	1/4		1200	A	000002

<b>Fav 900</b>	<b>Transmission / Front PTO</b> <b>Technical specifications of front PTO</b>	<b>A</b>
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**Danger:**  
After working with PTO, fit protective cover over PTO stub shaft!



**Switch engine off**  
Switch season control on using lever (A).


**Note:**  
For operation of front PTO see section 8 of Operating Manual

Date	Version	Page	Technical specifications of front PTO	Capitel	Index	Docu-No.
31.10.2001	a	2/4		1200	A	000002



Fav 900	Transmission / Front PTO <b>Technical specifications of front PTO</b>	<b>A</b>
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## Calibrating front PTO clutch



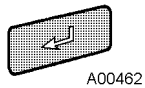
**Danger:**  
During calibration process PTO starts to rotate briefly.  
Observe all necessary safety measures.

**Note:**

Calibration of front PTO clutch adjusts starting operation to particular implement, e.g. in case of implements which are slow to get up to speed.  
The data determined in this way are used for future starting operations.  
Only calibrate with implement mounted.

- Start engine.

If faults are displayed, these must be cleared individually.



Press key and hold,

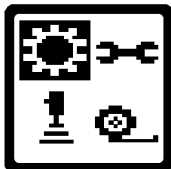


then press key and fault message is cleared.

Once there are no more fault warnings:



Press key, following pictogram is displayed



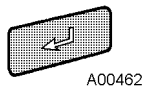
Key pictogram flashes



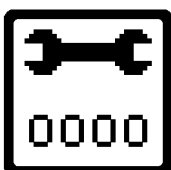
Press key **three times** , and following pictogram is displayed



Key pictogram flashes



Press key, next pictogram is displayed



Input code **7034** for front PTO

Date	Version	Page	Technical specifications of front PTO	Capitel	Index	Docu-No.
31.10.2001	a	3/4		1200	A	000002

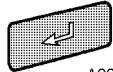
<b>Fav 900</b>	Transmission / Front PTO <b>Technical specifications of front PTO</b>	<b>A</b>
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Press one of keys until desired number is displayed.

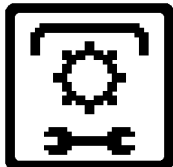


A00461



Store with key.  
After last number has been stored, following pictogram is displayed.

A00462



A00452

Engage front PTO.

If calibration proceeds without errors, **OK** is displayed, and new sensor settings are stored.  
If incorrect values are found or conditions are not met, **ERROR** message is displayed.



Press key

A00457

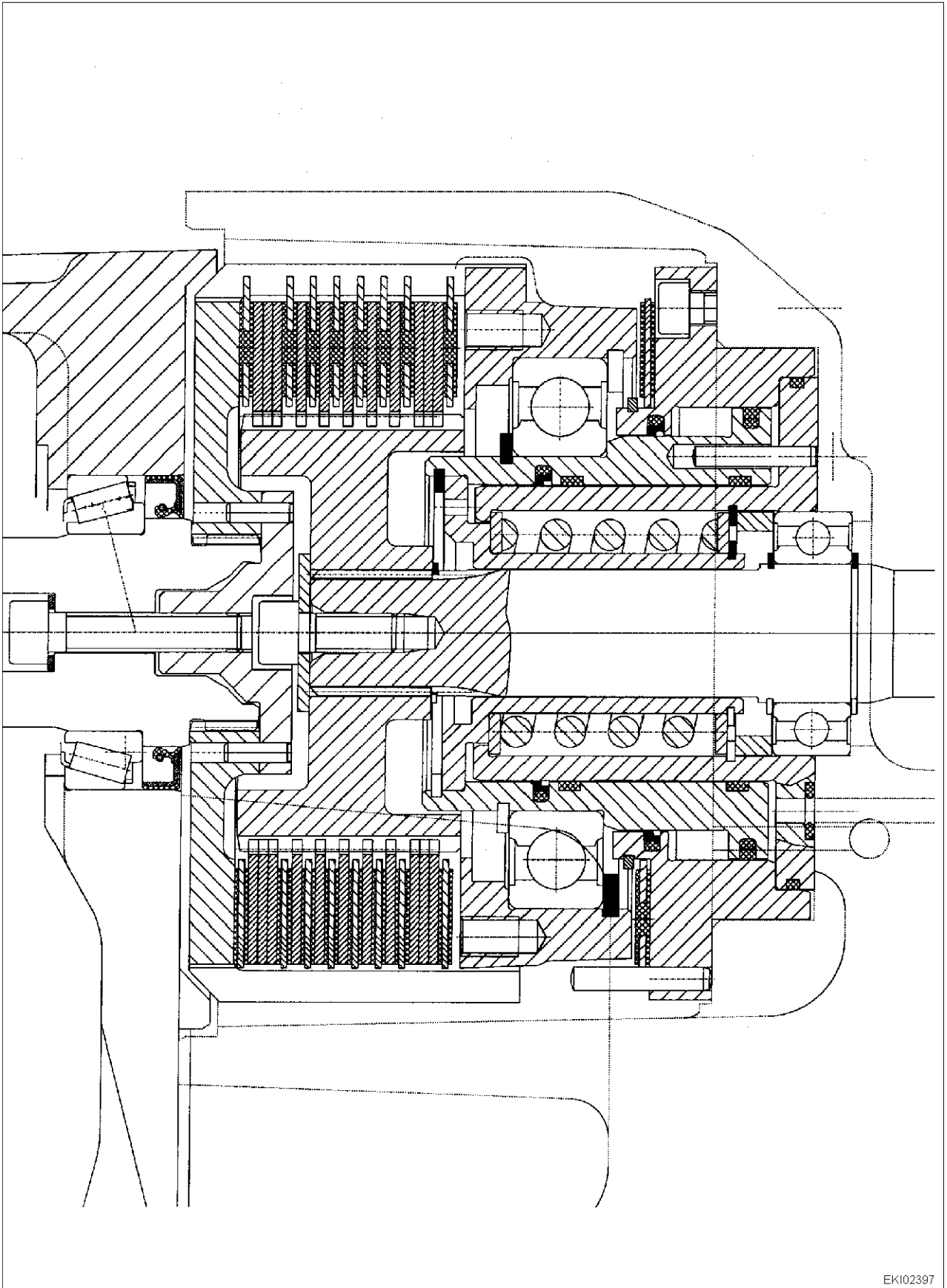
- New data are accepted by switching ignition OFF - ON.

Date	Version	Page	<b>Technical specifications of front PTO</b>	Capitel	Index	Docu-No.
31.10.2001	<b>a</b>	4/4		<b>1200</b>	<b>A</b>	<b>000002</b>

**Fav 800**  
**Fav 900**

**Transmission / Front PTO**  
**Front PTO clutch**

**C**



EKI02397

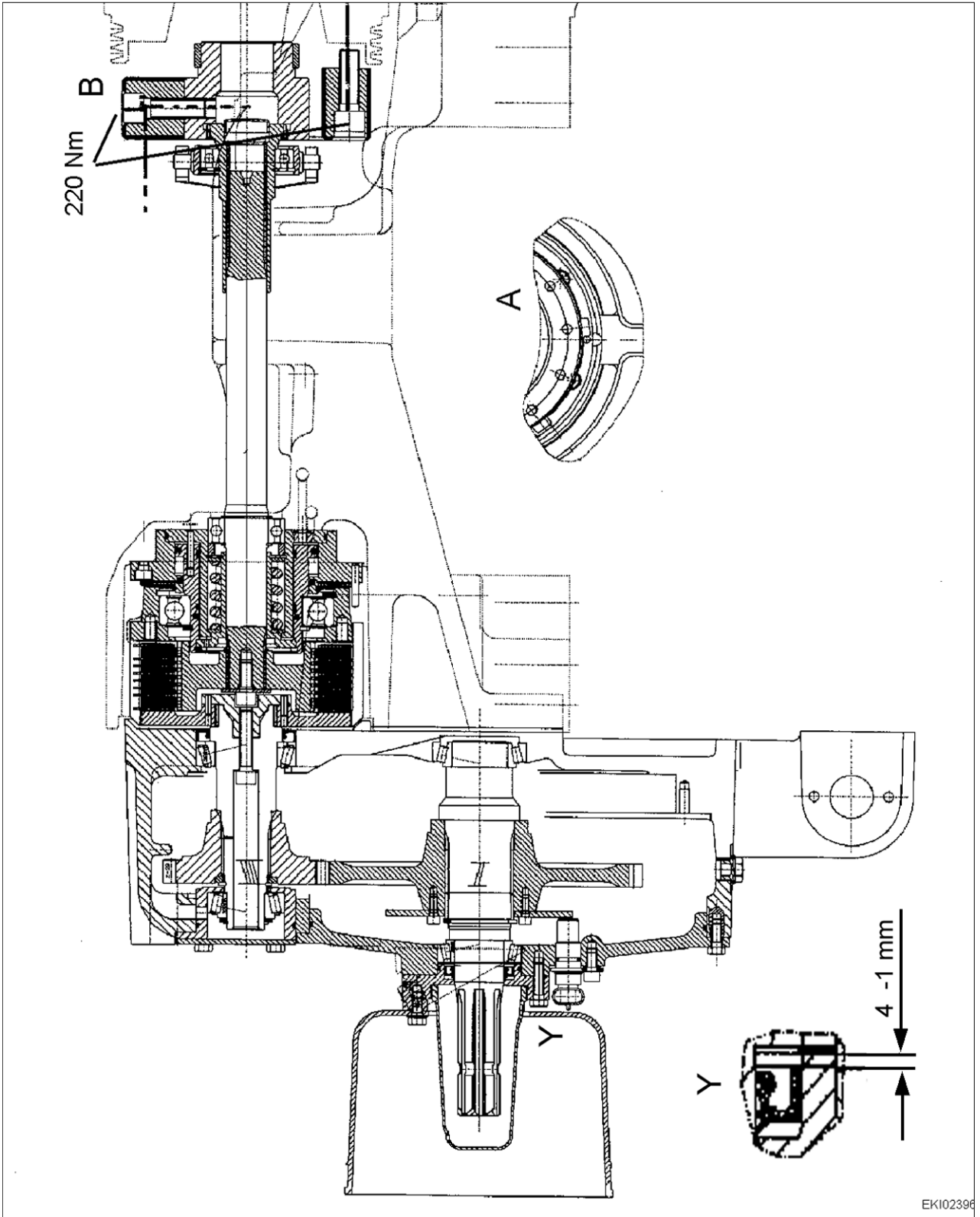
Date	Version	Page	Capitel	Index	Docu-No.
04.10.2001	a	1/1	1200	C	000006

**Front PTO clutch**

Fav 800  
Fav 900

Transmission / Front PTO  
Front PTO 1000 (European version)

C



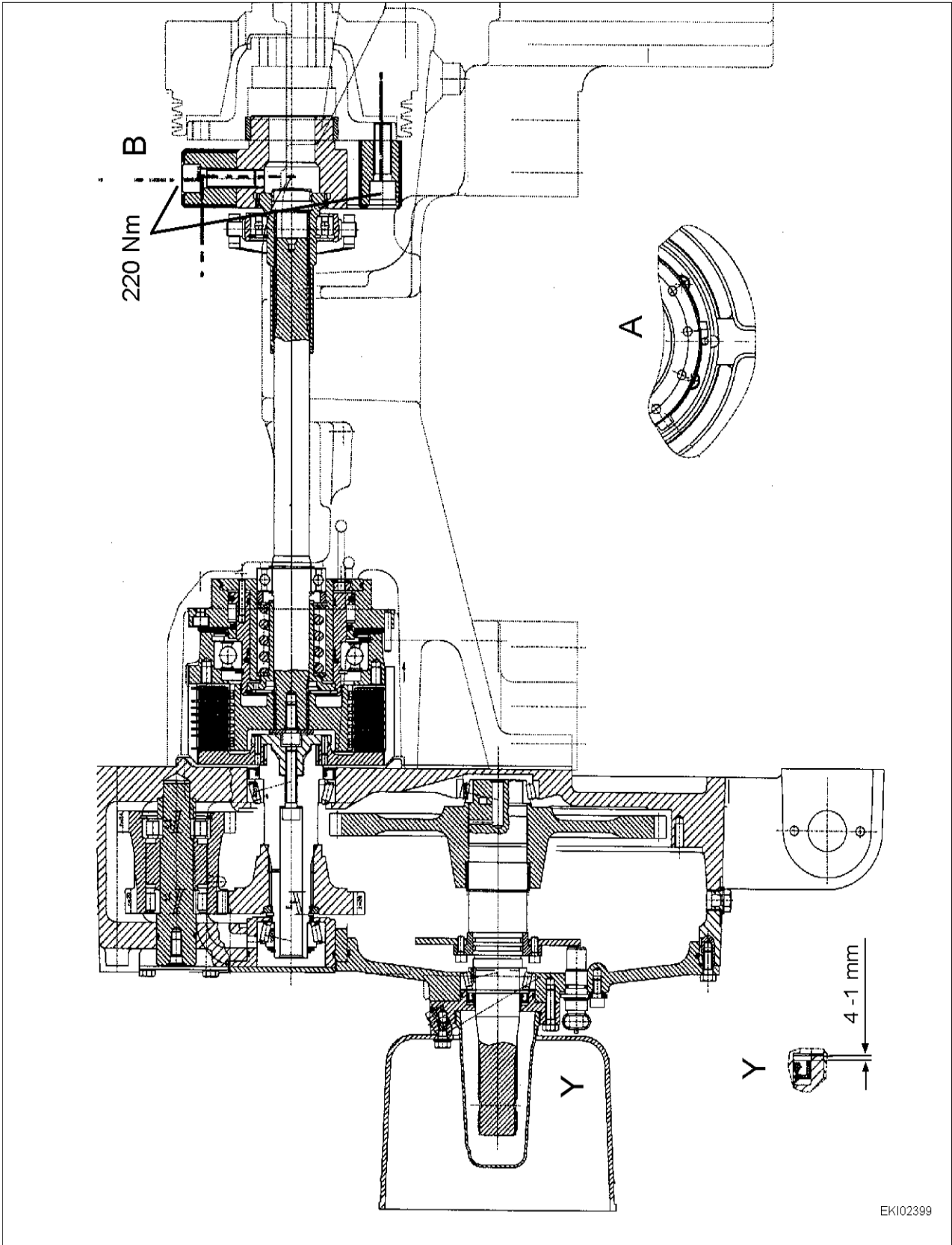
A	Position of brake disc	Y	Shaft seal
B	Front PTO drive		

Date	Version	Page	Front PTO 1000 (European version)	Capitel	Index	Docu-No.
04.10.2001		1/1		1200	C	000005

Fav 800  
Fav 900

Transmission / Front PTO  
Front PTO 1000 right (NA version)

C



EK102399

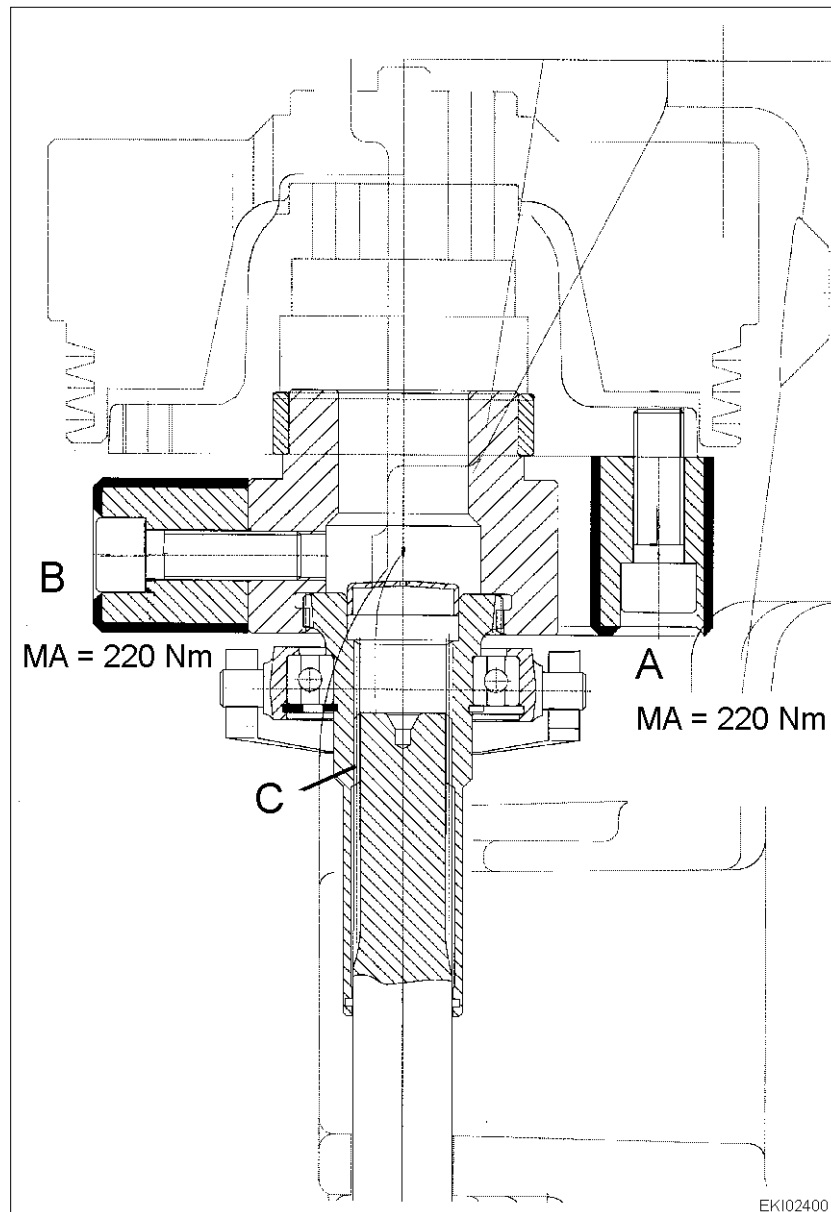
A	Position of brake disc	Y	Shaft seal
B	Front PTO drive		

Date	Version	Page	Capitel	Index	Docu-No.
05.10.2001		1/1	1200	C	000008

Fav 800  
Fav 900

Transmission / Front PTO  
Front PTO drive (season control)

C



**Fitting tip for socket head cap screws (A and B) (Centaflex clutch)**

**Fitting sequence:**

1. Tighten axial screws to 220 Nm.
2. Tighten radial screws to 220 Nm.

**Note:**

**Centaflex clutch must not deform when tightening, therefore grease screw head bed. When tightening, avoid displacing (skewing) rubber component.**

Lightly grease tothing (C) with long-life grease X 902.002.472.

Date	Version	Page	Capitel	Index	Docu-No.
5.10.2001		1/1	1200	C	000007

<b>Fav 900</b>	<b>Transmission / Front PTO</b> <b>Front PTO system pressure</b>	<b>E</b>
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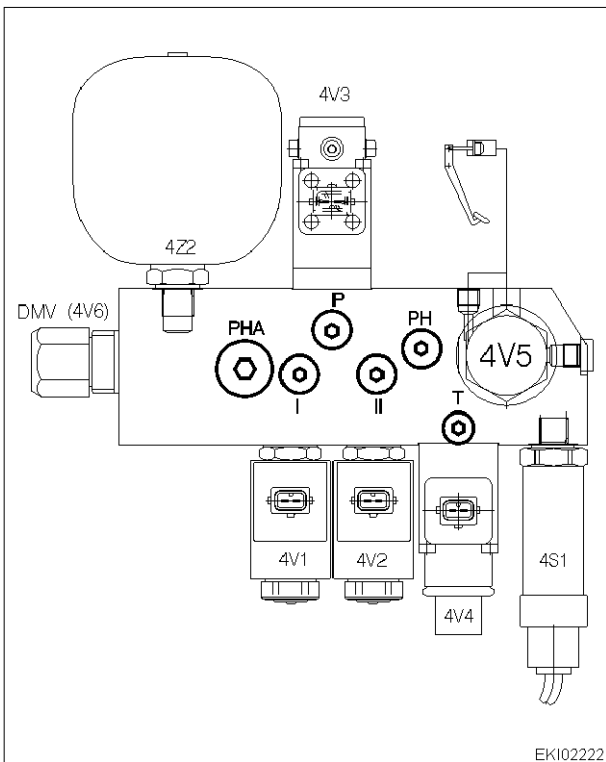
**Checking clutch pressure**

Unscrew cover panel at front right on valve unit.  
Connect M10 x1 test connection (X598.303.000) to **M21** .

<b>Condition</b>	<b>Target value</b>
Run engine at 1200 rpm. Engage front PTO.	18 + 2 bar
Switch off front PTO.	0 bar

**Note:**

**Chapter 1005 Reg. C - Transmission hydraulics circuit diagram**



If there is no clutch pressure:

Measure system pressure at **connection P** of enhanced hydraulics valve unit.

**Target value 25 + 2 bar** at 1200 rpm.

**Note:**

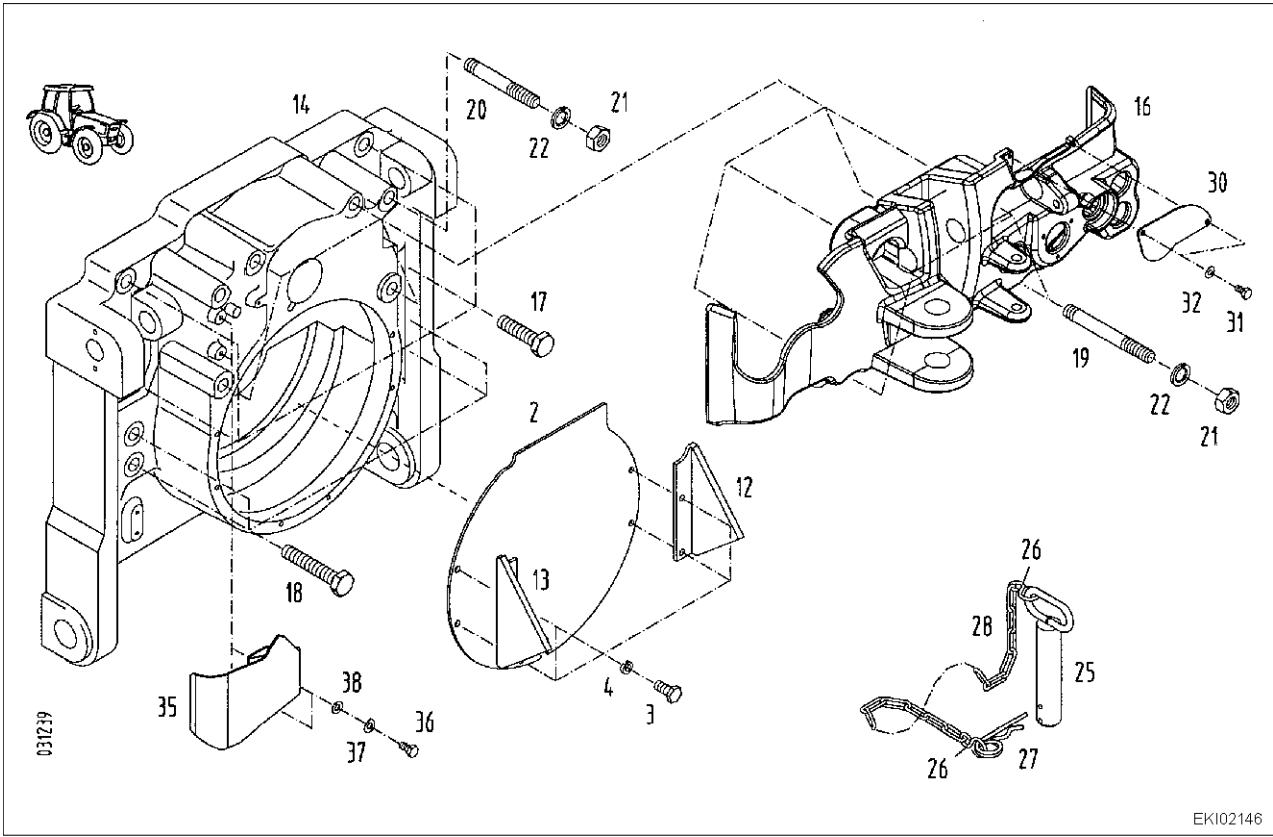
**Chapter 1005 Reg. C - Transmission hydraulics circuit diagram**

Date	Version	Page	<b>Front PTO system pressure</b>	Capitel	Index	Docu-No.
31.8.2001	a	1/1		<b>1200</b>	<b>E</b>	<b>000002</b>

**Fav 900**

**Transmission / Front PTO  
Installation and removal of front PTO gearbox**

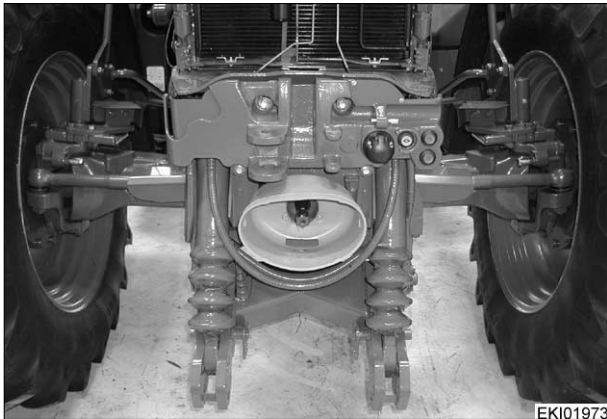
**G**



Item	Designation	Item	Designation
2	Cover	21	M18-8 hexagon nut
3	M8x16-8.8 hexagon screw	22	Spring washer
4	Spring washer	25	Coupling pin
12	Cover	26	Hook
13	Cover	27	Clip pin
14	Housing	28	Chain
16	Front plate	30	Panel
17	M18x90-10.9 hexagon screw	31	M5x12-8.8 hexagon screw
18	M18x100-8.8 hexagon screw	32	Spring washer
19	M18x230-10.9 stud	35	Cover
20	M18x200-10.9 stud		



<p><b>Fav 900</b></p>	<p align="center"><b>Transmission / Front PTO Installation and removal of front PTO gearbox</b></p>	<p align="center"><b>G</b></p>
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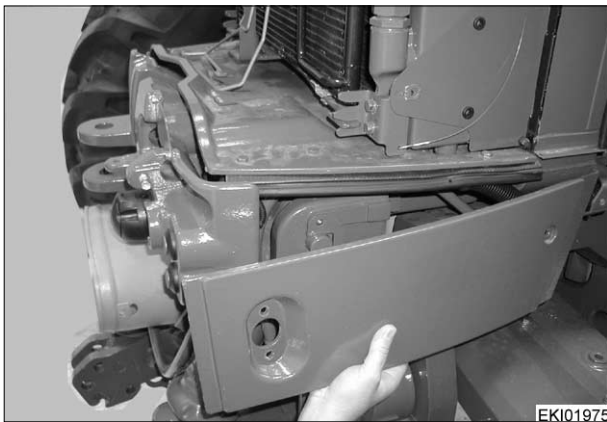


**Removing front PTO gearbox**

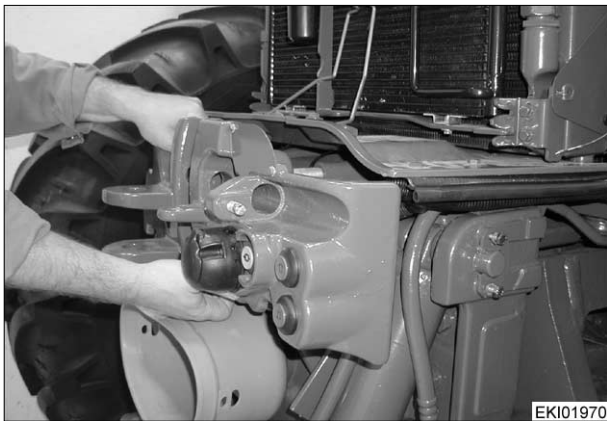
- Lower front power lift.
- Remove bottom link.
- Open bonnet front.

**When carrying out repairs on gearbox (PTO, layshaft) drain transmission oil (approx. 4.2 l).**

**When carrying out repairs on PTO clutch do not drain transmission oil.**



Remove left and right front cover panels.



Release front plate.



X231 = connector, S021 - switch, raise front power lift

X232 = connector, S022 - switch, lower front power lift

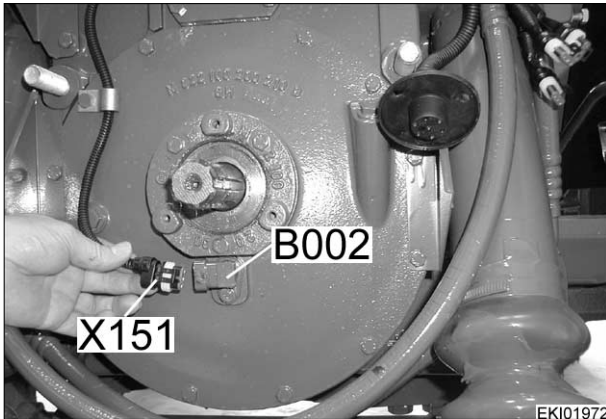
X223 = connector, S041 - switch, release PTO brake

X017 = front socket, for front power lift

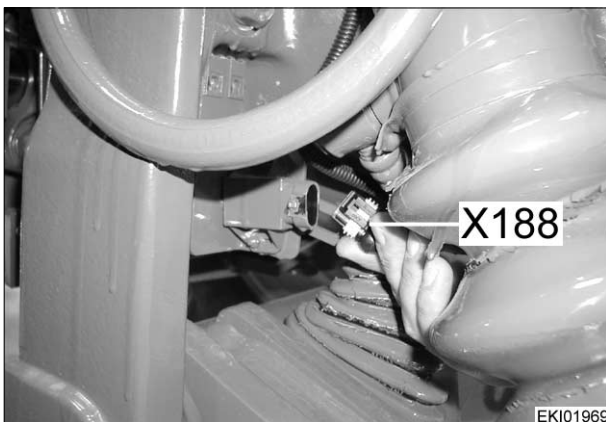
Label and disconnect above.

Date	Version	Page	Installation and removal of front PTO gearbox	Capitel	Index	Docu-No.
20.08.2001	a	2/11			1200	G

<p><b>Fav 900</b></p>	<p>Transmission / Front PTO  <b>Installation and removal of front PTO gearbox</b></p>	<p><b>G</b></p>
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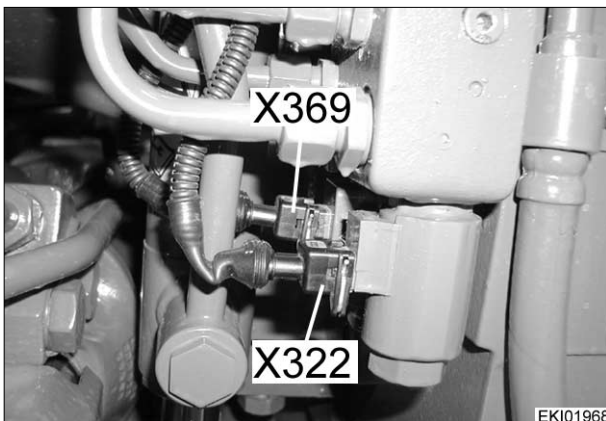


X151 = connector, B002 - sensor, front PTO  
 Label and disconnect above.



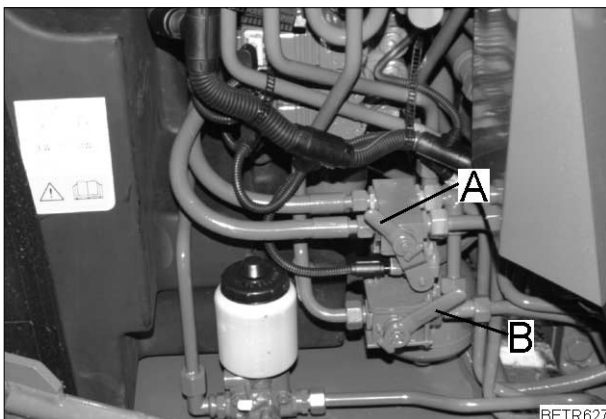
**Only with enhanced front power lift (optional extra)**

X188 = connector, B040 - sensor, front power lift position  
 Label and disconnect above.



X322 = connector, Y011 - valve, front PTO  
 X369 = connector, Y034 - valve, release PTO brake

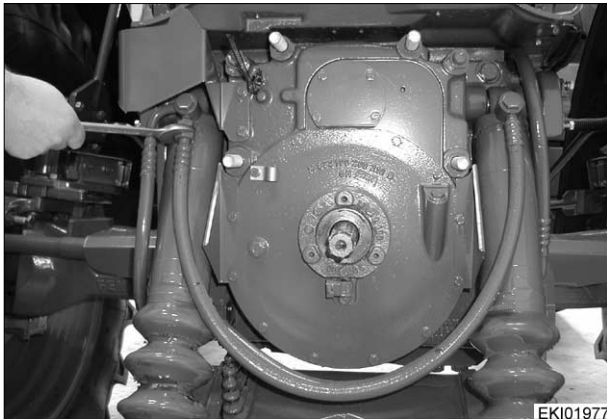
Label and disconnect above.  
 Unclip front PTO cable loom and place to one side.



A = AV8 - stopcock, front power lift (**only in standard power lift**), to CLOSED position (turn to right)  
 B = AV5 - multiway valve, switch SA-DA front power lift to DA position (turn to right)  
 This prevents hydraulic oil from continuing to run.

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20.08.2001	a	3/11	1200	G	000006

<p><b>Fav 900</b></p>	<p>Transmission / Front PTO  <b>Installation and removal of front PTO gearbox</b></p>	<p><b>G</b></p>
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EKI01977

Remove hydraulic lines from lift cylinders.



EKI01978

Cap hydraulic lines and place to one side.



EKI01963

Detach PTO valve.



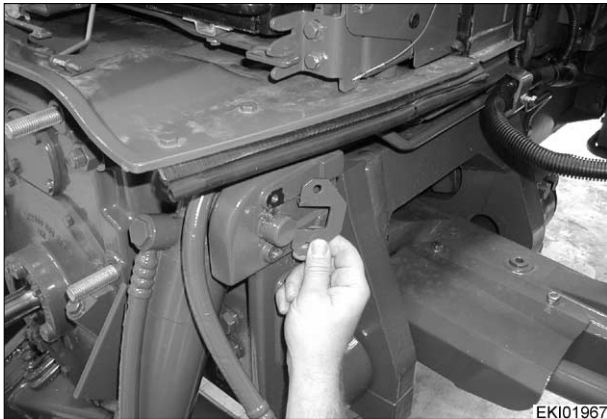
EKI01965

**Only with enhanced front power lift (optional extra)**

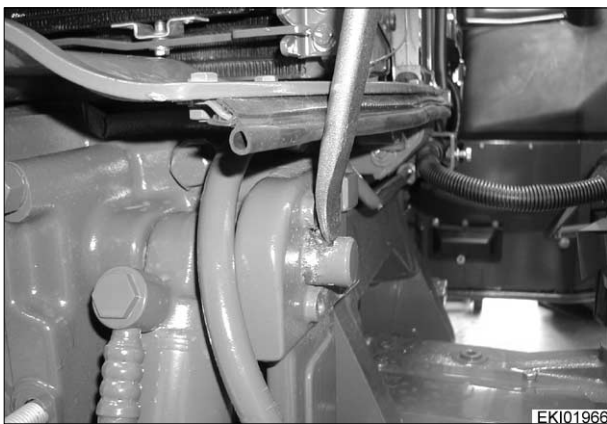
Detach linkage for B040 - sensor, front power lift position.

Date	Version	Page	Capitel	Index	Docu-No.
20.08.2001	a	4/11	1200	G	000006

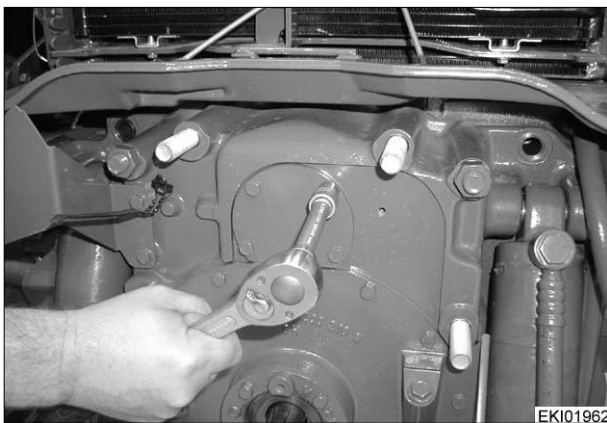
<p><b>Fav 900</b></p>	<p>Transmission / Front PTO  <b>Installation and removal of front PTO gearbox</b></p>	<p><b>G</b></p>
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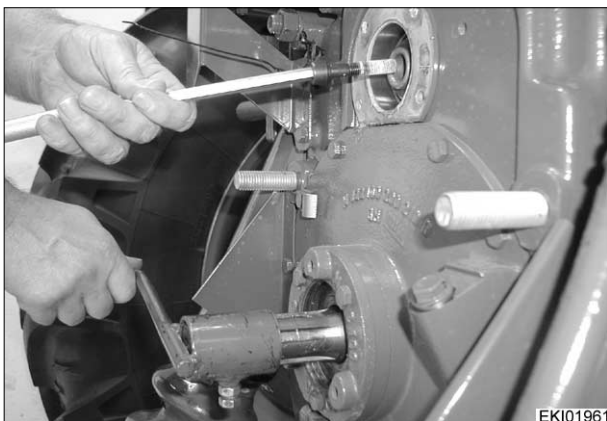
Remove pin lock.



Withdraw pin using tyre lever and swing lift cylinder forwards.



Remove cover.



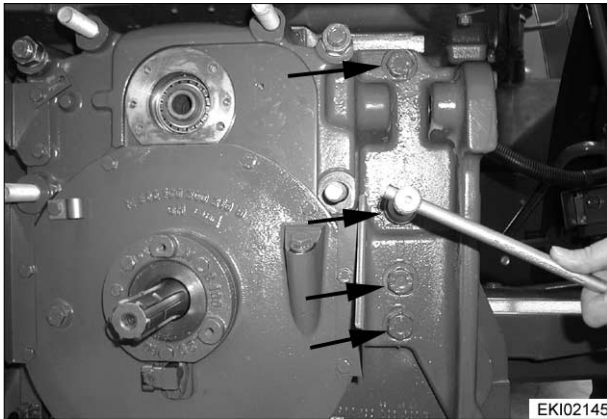
- Brace PTO stub shaft.
- Loosen socket head cap screw.

**Note:**  
 Socket head cap screw is secured with Loctite.

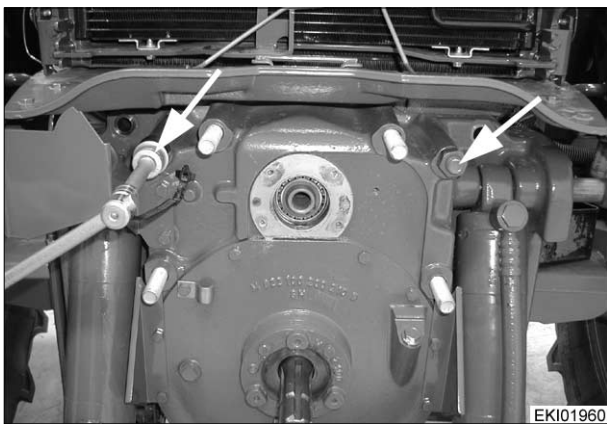
**Note:**  
 Chapter 1200 Reg. C - Technical drawing of front PTO

Date	Version	Page	Capitel	Index	Docu-No.
20.08.2001	a	5/11	1200	G	000006

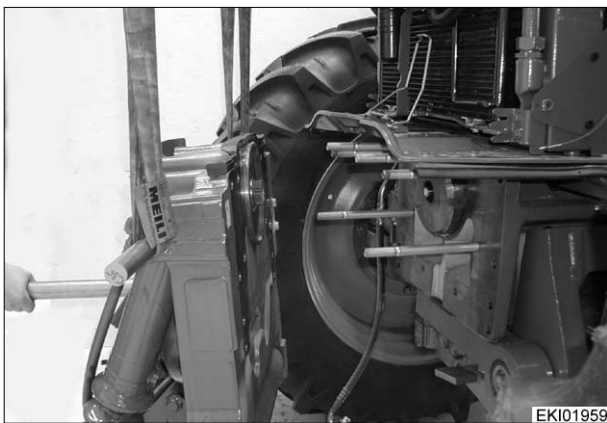
<p><b>Fav 900</b></p>	<p>Transmission / Front PTO  <b>Installation and removal of front PTO gearbox</b></p>	<p><b>G</b></p>
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Attach front PTO to hoist, taking appropriate safety precautions.  
 Unscrew four hexagon screws (arrowed) on left and right.

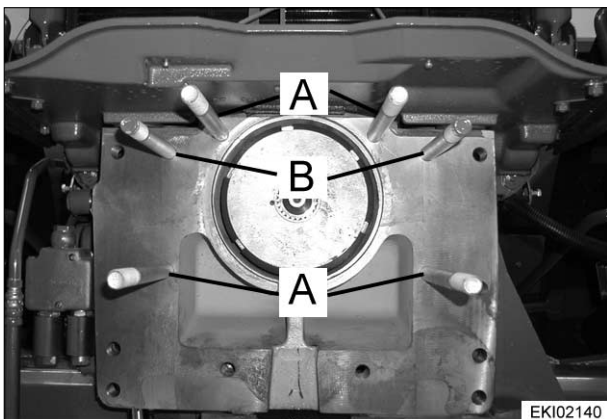


Unscrew two hexagon nuts.



Remove front PTO.

**Note:**  
 Hold clutch bell housing (30).  
 Chapter 1200 Reg. C - Technical drawing of front PTO



**Mounting front PTO gearbox**

Screw in studs as far as stop and tighten to **290 Nm**.

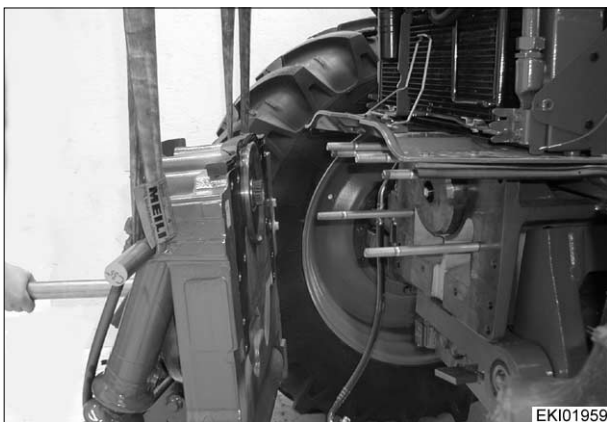
- A = long studs
- B = short studs

Date	Version	Page	Capitel	Index	Docu-No.
20.08.2001	a	6/11	1200	G	000006

<p><b>Fav 900</b></p>	<p>Transmission / Front PTO  <b>Installation and removal of front PTO gearbox</b></p>	<p><b>G</b></p>
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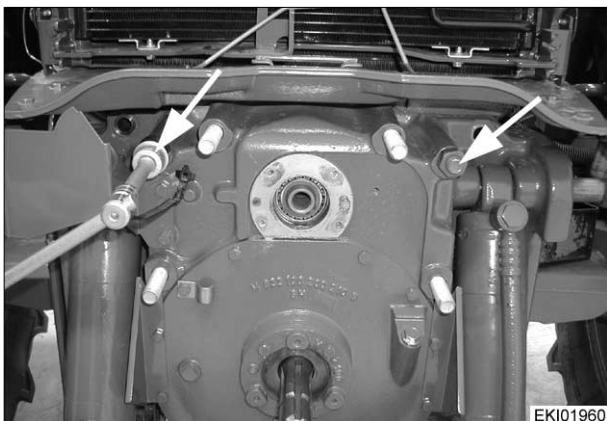


Lightly coat gearing for clutch bell housing with long-life grease.

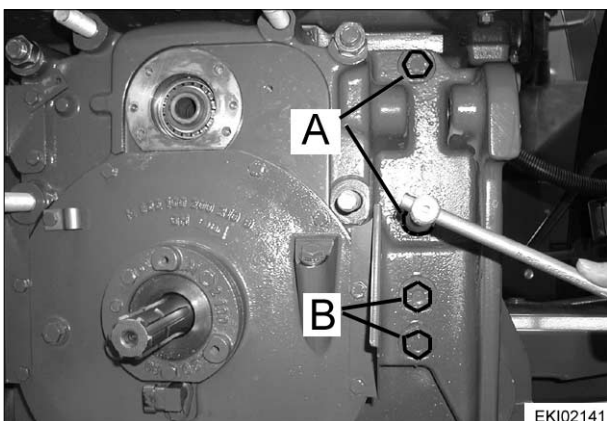


Attach front PTO to hoist, taking appropriate safety precautions, and mount on tractor.

**Note:**  
**Align externally toothed discs and locate clutch bell housing.**



Initially tighten two hexagon nuts as far as stop.



Initially tighten four hexagon screws on left and right as far as stop.

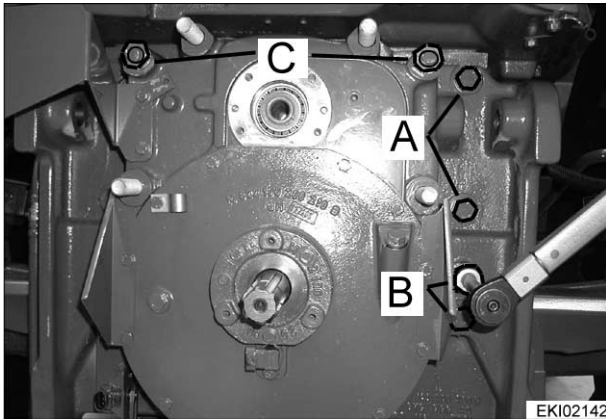
A = M18 x 90-10.9

B = M18 x 100-8.8

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20.08.2001	a	7/11	1200	G	000006

**Fav 900**

## Transmission / Front PTO Installation and removal of front PTO gearbox

**G**

Tighten all hexagon screws and nuts to relevant torque.

A = M18-10.9 = **400 Nm**

B = M18-8.8 = **290 Nm**

C = M18-8 nut = **290 Nm**



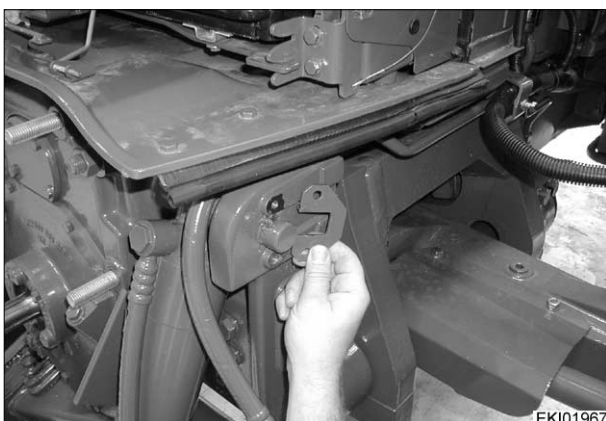
Screw on PTO with clutch bell housing.

- Fit socket head cap screw with new Usit ring.
- Coat socket head cap screw with Loctite X 903.050.084.
- Brace PTO stub shaft and tighten socket head cap screw to **69 Nm**.



Coat cover with surface sealant X 903.050.074.

Tighten cover crosswise and in stages to **25 Nm**.

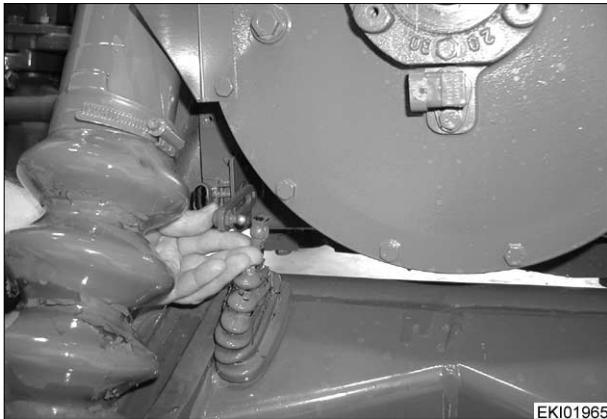


Fit pin lock.

Date	Version	Page	Capitel	Index	Docu-No.	
20.08.2001	a	8/11	<b>Installation and removal of front PTO gearbox</b>	<b>1200</b>	<b>G</b>	<b>000006</b>



Fav 900	Transmission / Front PTO Installation and removal of front PTO gearbox	G
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**Only with enhanced front power lift (optional extra)**

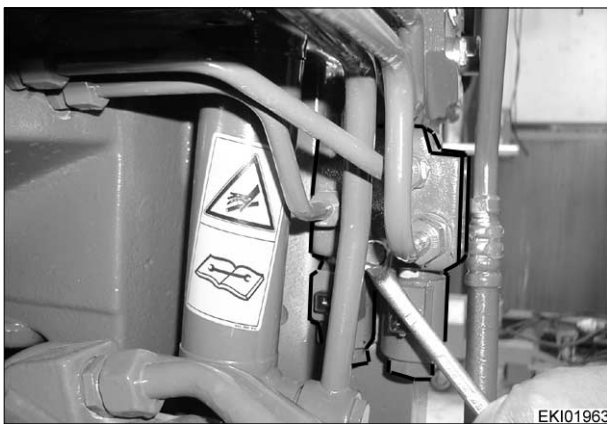
Attach linkage for B040 - sensor, front power lift position.

**Note:**

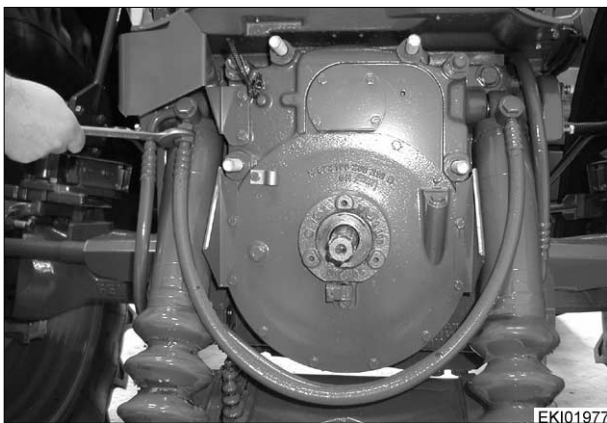
If B040 - sensor was moved, sensor must be recalibrated.

Calibration 9001 and 9002

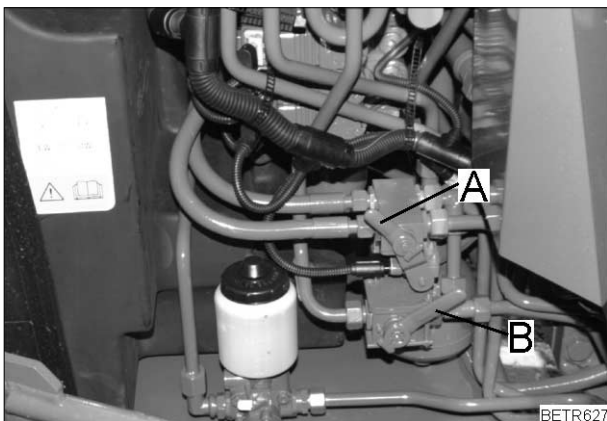
Chapter 0000 Reg. F - Calibration code



Mount PTO valve.



Connect hydraulic lines to lift cylinders.



If necessary:

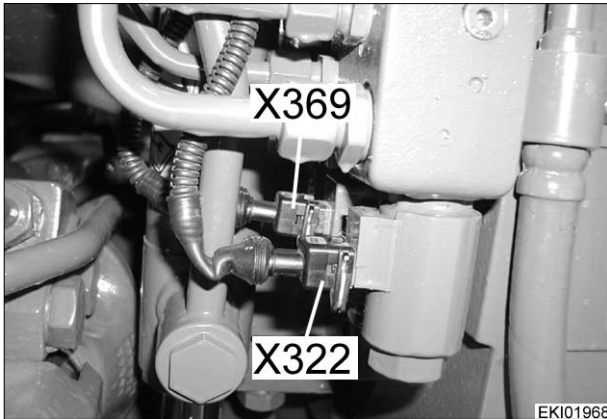
A = AV8 - stopcock, front power lift (**only in standard power lift**), to CLOSED position (turn to right)

B = AV5 - multiway valve, switch EW-DA front power lift to DA position (turn to right)

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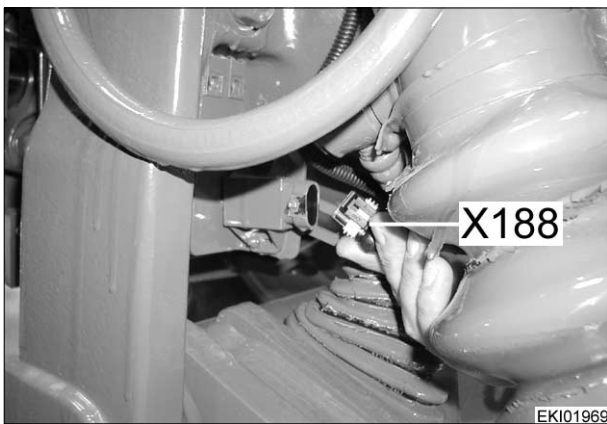
<p><b>Fav 900</b></p>	<p>Transmission / Front PTO  <b>Installation and removal of front PTO gearbox</b></p>	<p><b>G</b></p>
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**Connecting connectors**

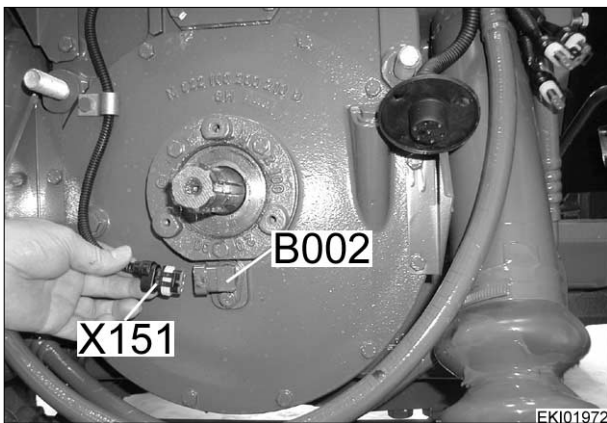
X322 = connector, Y011 - valve, front PTO

X369 = connector, Y034 - valve, release PTO brake



**Only with enhanced front power lift (optional extra)**

X188 = connector, B040 - sensor, front power lift position



X151 = connector, B002 - sensor, front PTO



X231 = connector, S021 - switch, raise front power lift

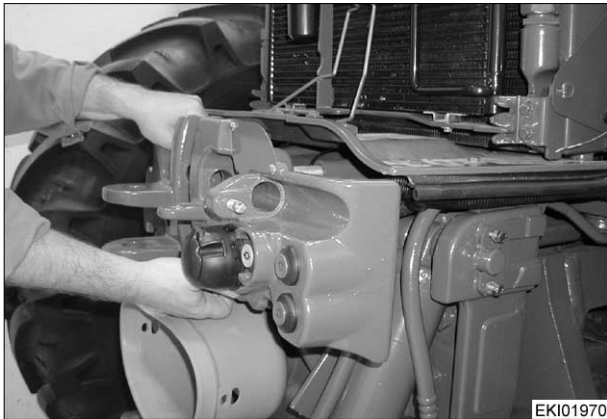
X232 = connector, S022 - switch, lower front power lift

X223 = connector, S041 - switch, release PTO brake

X017 = front socket, for front power lift

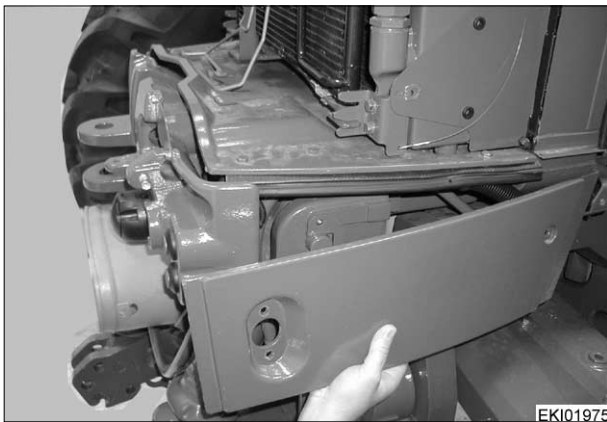
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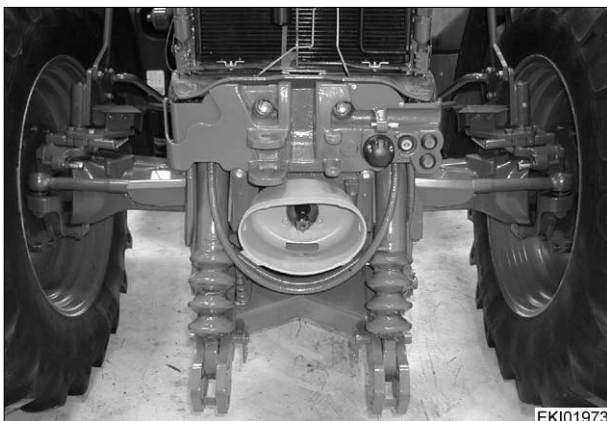
EKI01970

Fit front plate.  
 Tighten M18-8 hexagon nuts to **290 Nm** .  
**Note:**  
**Check clearance of cable loom.**



EKI01975

Fit left and right front cover panels.

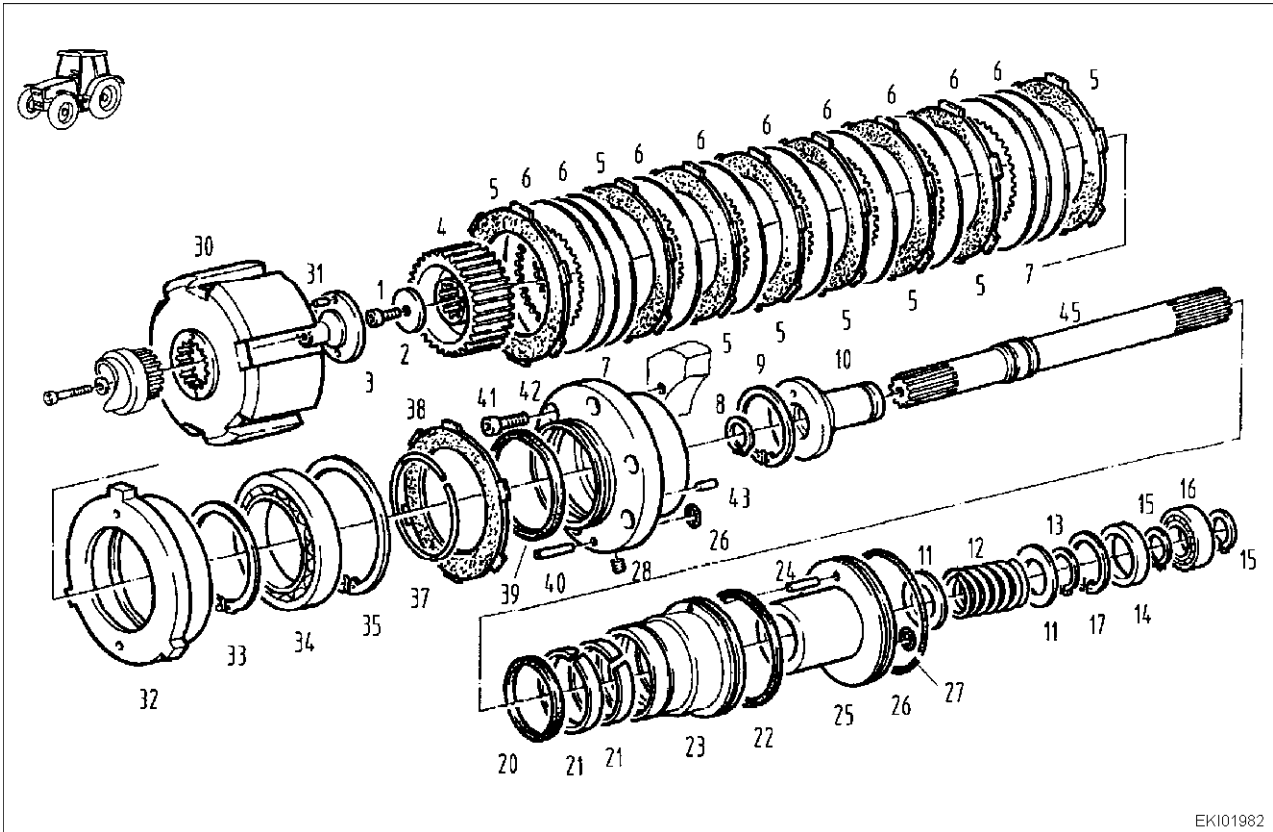


EKI01973

**If necessary:**  
 Fill front PTO with transmission oil - for details of quantity please see Chapter 0000 Reg. A - Fuels and lubricants  
 Carry out performance test on front PTO.

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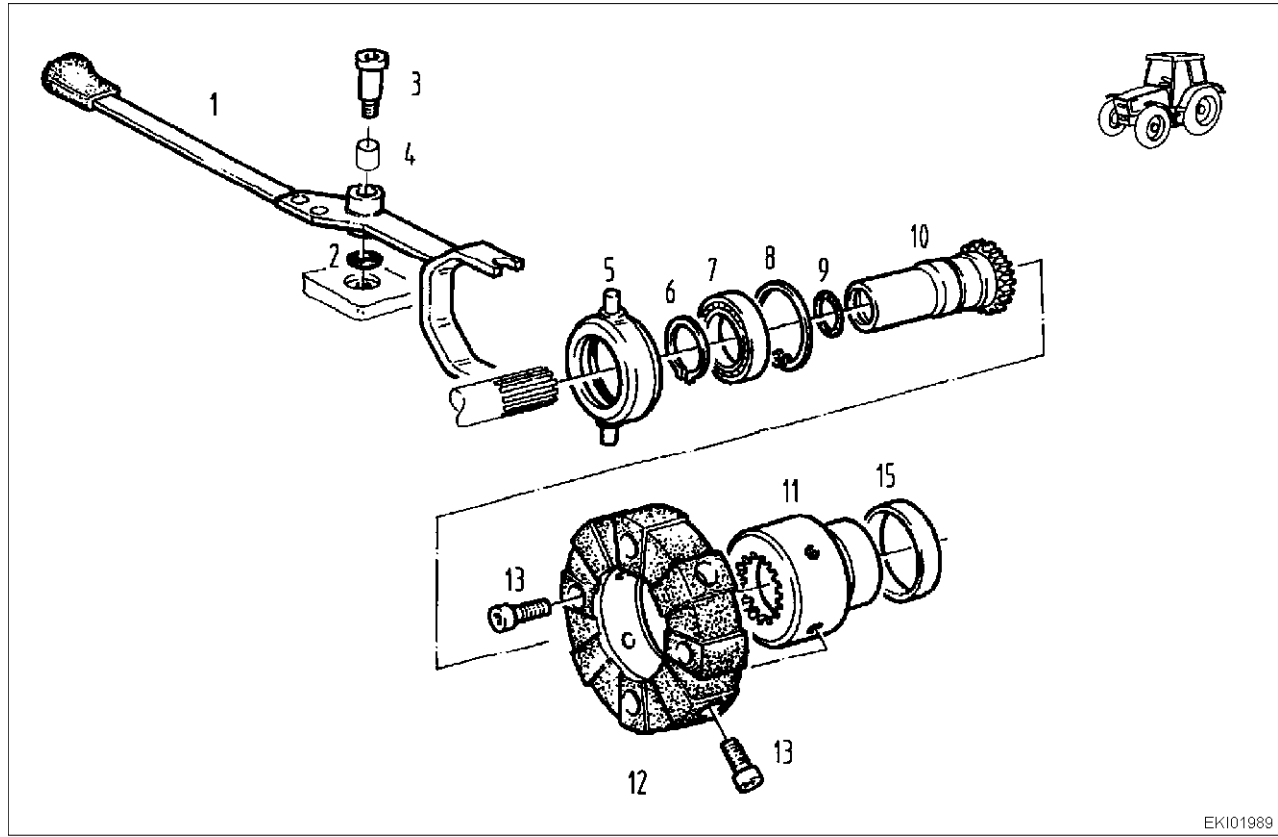
<b>Fav 900</b>	<b>Transmission / Front PTO</b> <b>Installation and removal of front PTO clutch</b>	<b>G</b>
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<b>Front PTO clutch</b>			
Item	Designation	Item	Designation
1	Socket head cap screw	23	Piston
2	Washer	24	Parallel pin
3	Retaining ring	25	Cylinder liner
4	Internally toothed disc carrier	26	O-ring
5	Externally toothed disc	27	O-ring
6	Internally toothed disc	28	Setscrew
7	Sine disc	30	Clutch bell housing
8	Circlip	31	Dowel pin
9	Circlip	32	Thrust collar
10	Flanged bush	33	Circlip
11	Locating ring	34	Deep-groove ball bearing
12	Compression spring	35	Circlip
13	Circlip	37	Snap ring
14	Ring	38	Brake disc (externally toothed disc)
15	Circlip	39	Form seal
16	Deep-groove ball bearing	40	Parallel pin
17	Circlip	41	Socket head cap screw
20	Form seal	42	Cylinder liner
21	Guide ring	43	Dowel pin
22	Form seal	45	Shaft

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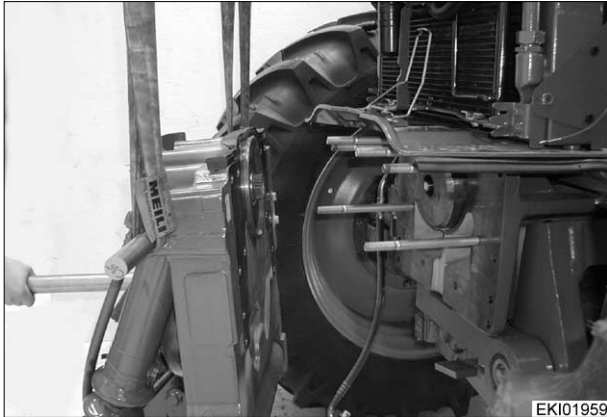


EKI01989

<b>Front PTO season control</b>			
<b>Item</b>	<b>Designation</b>	<b>Item</b>	<b>Designation</b>
1	Control lever	8	Circlip
2	Washer	9	O-ring
3	Adjusting washer	11	Selector sleeve
4	Bearing bush	12	Clutch
5	Release ring	13	Socket head cap screw
7	Deep-groove ball bearing	15	Bush

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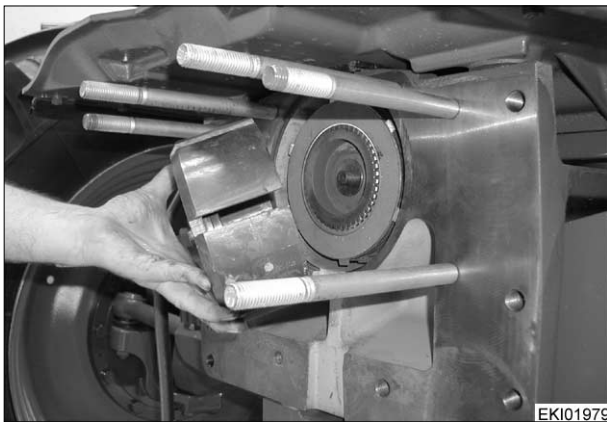
**Preliminary work:**

Remove front PTO gearbox.

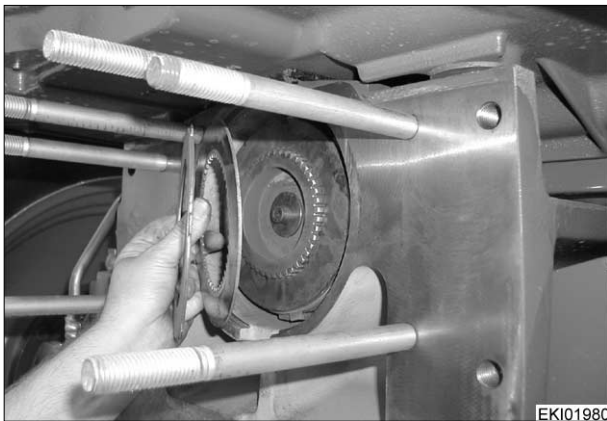
**Note:**

**Hold clutch bell housing (30).**

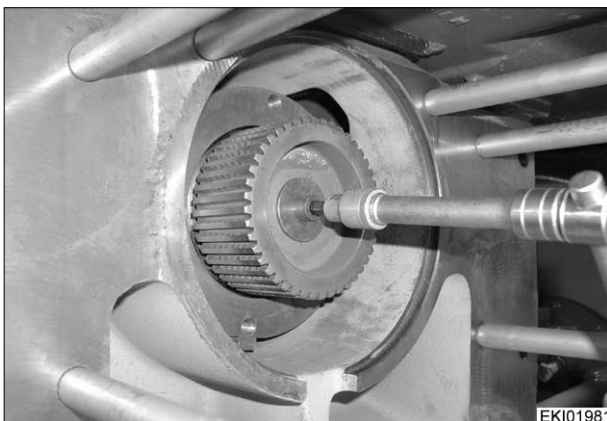
**Chapter 1200 Reg. G - Installation and removal of front PTO gearbox**



Remove clutch bell housing (30).



Remove externally toothed discs (5), internally toothed discs (6) and sine discs (7) from internally toothed disc carrier (4) one by one.



Loosen socket head cap screw (1).

**Note:**

**Switch on front PTO season control (see Operating Manual).**

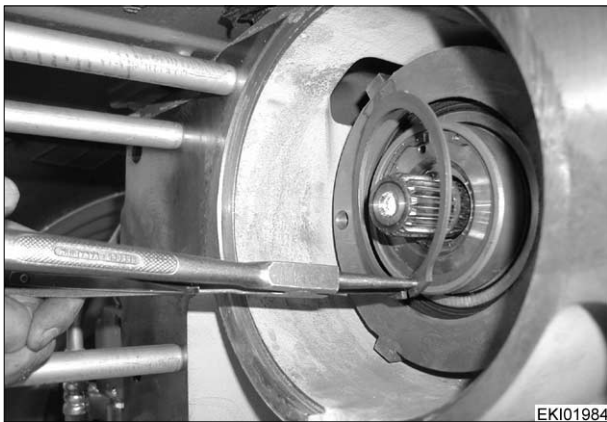
**Socket head cap screw (1) is secured with Loctite.**

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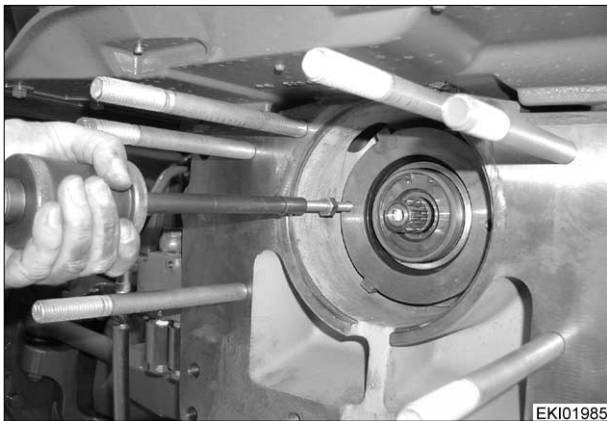
<p><b>Fav 900</b></p>	<p>Transmission / Front PTO  <b>Installation and removal of front PTO clutch</b></p>	<p><b>G</b></p>
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Remove internally toothed disc carrier (4).

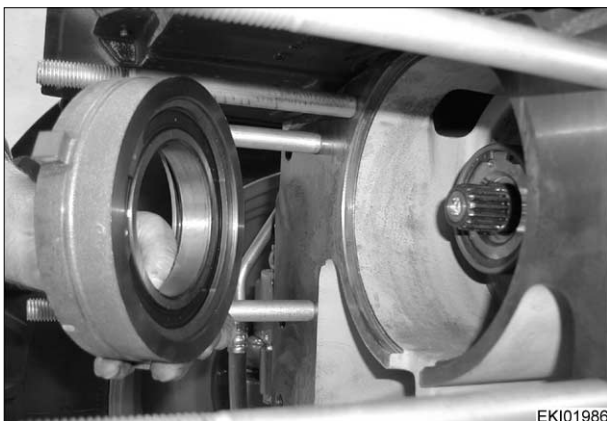


Unclip circlip (9).



Withdraw thrust collar (32) and deep-groove ball bearing (34) with slide hammer puller.

**Note:**  
**Do not tilt deep-groove ball bearing (34).**



Remove thrust collar (32) and deep-groove ball bearing (34).

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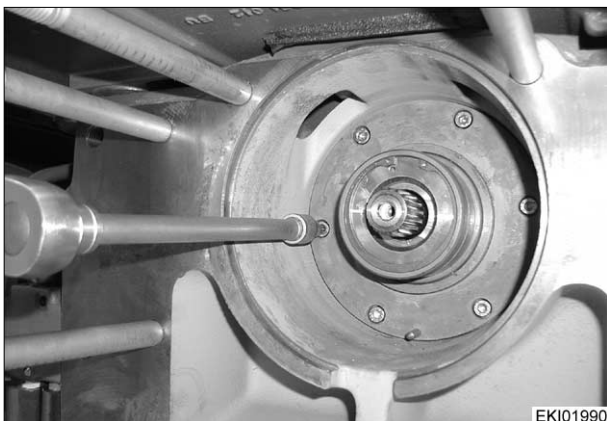
Unclip snap ring (37).  
 Remove brake disc (externally toothed disc).

EKI01987



Unclip circlip (8).

EKI01988



Loosen socket head cap screws (41).

EKI01990



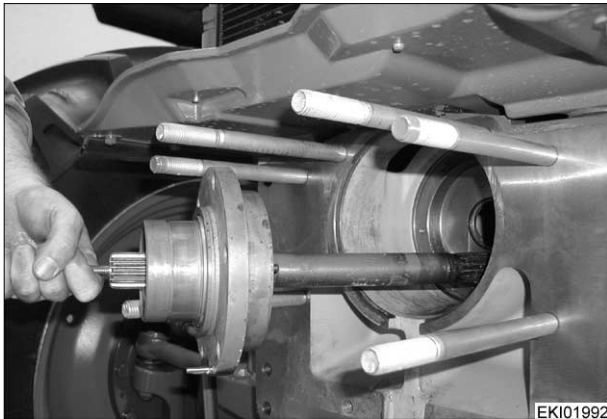
Screw slide hammer puller into shaft (45).  
 Withdraw piston package complete with shaft (45).

**Note:**  
 Switch on front PTO season control. This prevents bush from falling out.  
 Chapter 1200 Reg. C - Technical drawing of front PTO

EKI01991

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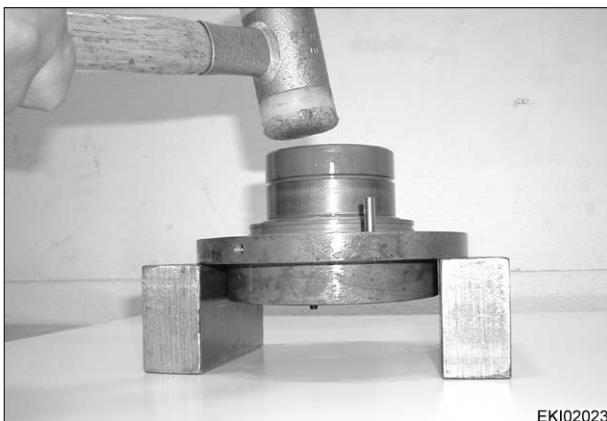
Withdraw piston package complete with shaft (45).



Knock shaft (45) carefully out of piston package.



Remove shaft (45) with deep-groove ball bearing (16) and ring (14).



Remove cylinder liner (42).

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<p><b>Fav 900</b></p>	<p align="center"><b>Transmission / Front PTO</b> <b>Installation and removal of front PTO clutch</b></p>	<p align="center"><b>G</b></p>
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Tension compression spring (12) using press and third hand and unclip circlip (13).



Tension compression spring (12) using press and third hand and unclip circlip (9).



Remove flanged bush (10).



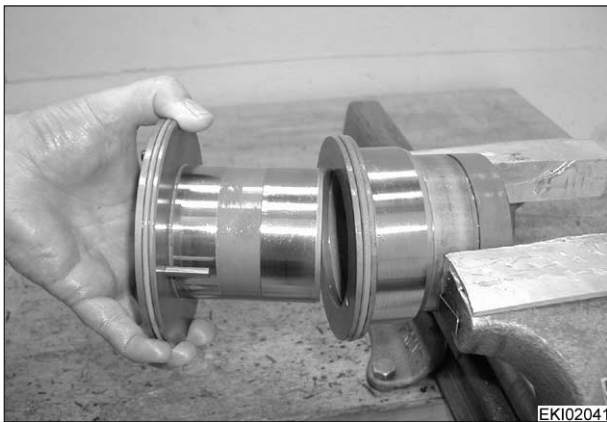
Tension compression spring (12) using press and third hand and unclip circlip (17).

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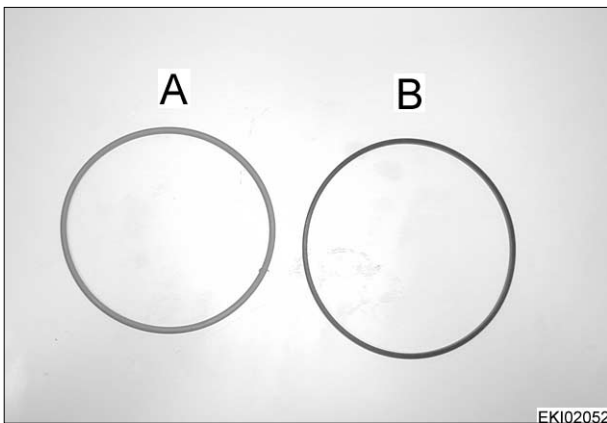
Fav 900	Transmission / Front PTO Installation and removal of front PTO clutch	G
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Remove compression spring (12) and locating rings (11).



Force off piston (23) from cylinder liner (25).



**Installing front PTO clutch**

**Pre-assembling piston (23)**

Form seal (22) consists of:

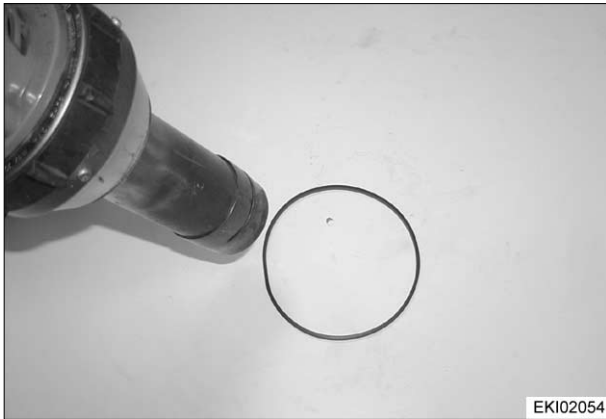
- O-ring (A)
- Sealing ring (B)



Insert O-ring into groove in piston (23) and grease.

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EKI02054

Carefully warm sealing ring up with hot-air blower.

**Note:**  
**Do not burn sealing ring.**



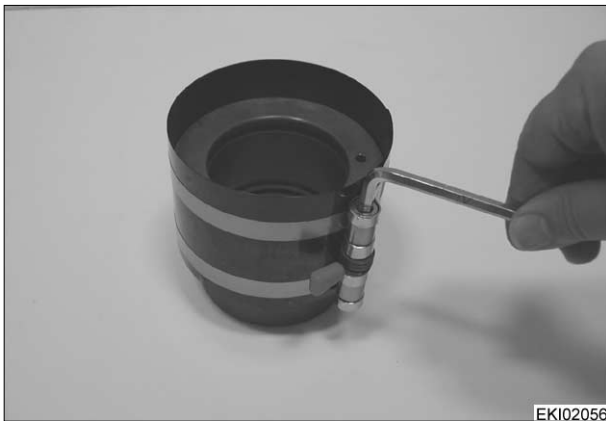
**Warning:**  
**Beware of hot surfaces!**



EKI02055

Insert sealing ring into groove in piston (23) over O-ring.

**Note:**  
**Chapter 1200 Reg. C - Technical drawing of front PTO clutch**



EKI02056

Compress sealing ring using clamp.

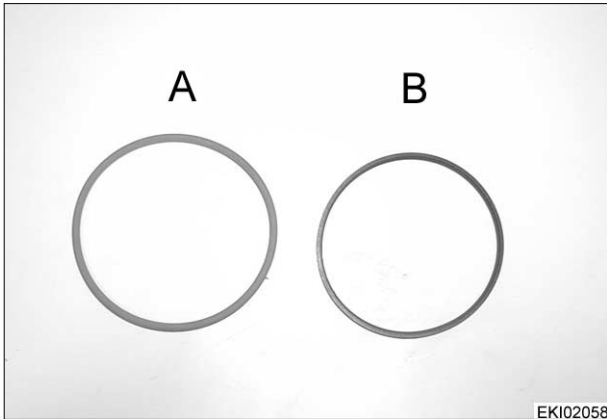


EKI02057

Place two guide rings (21) into grooves of piston (23) and grease.

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Form seal (20) consists of:

- O-ring (A)
- Sealing ring (B)



Insert O-ring into groove in piston (23) and grease.



Pinch sealing ring and ..

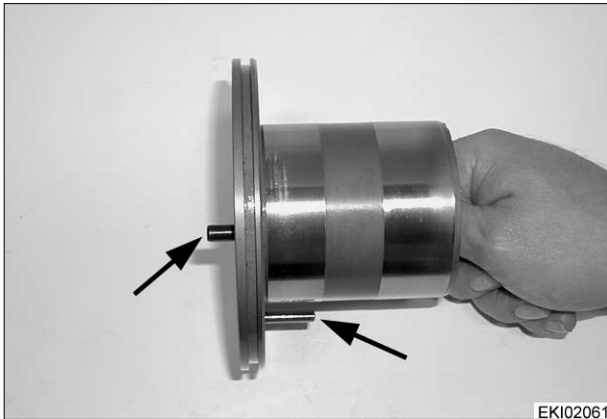


... insert sealing ring into groove in piston (23) with sealing edge facing oil pressure chamber and grease.

**Note:**  
**Chapter 1200 Reg. C - Technical drawing of front PTO clutch**

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<p><b>Fav 900</b></p>	<p>Transmission / Front PTO  <b>Installation and removal of front PTO clutch</b></p>	<p><b>G</b></p>
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**Pre-assembling cylinder liner (25)**

Coat parallel pin (24) with Loctite X 903.050.084 and insert into cylinder liner (25).

Wipe off excess Loctite.

Insert dowel pin (43).



Insert O-ring (27) into groove in cylinder liner (25) and grease.



**Fitting cylinder liner (25) and piston (23)**

Slide cylinder liner (25) onto piston (23).



Insert washer (11), compression spring (12), washer (11).

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**Fav 900**

**Transmission / Front PTO  
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**G**



EKI02039

Tension compression spring (12) using press and third hand and clip circlip (17) into place.



EKI02038

Lightly grease flanged bush (10) and insert into cylinder liner (25).

**Note:**  
**Align compression spring (12).**



EKI02036

Tension compression spring (12) using press and third hand and clip circlip (9) into place.



EKI02035

Tension compression spring (12) using press and third hand and clip circlip (13) into place.

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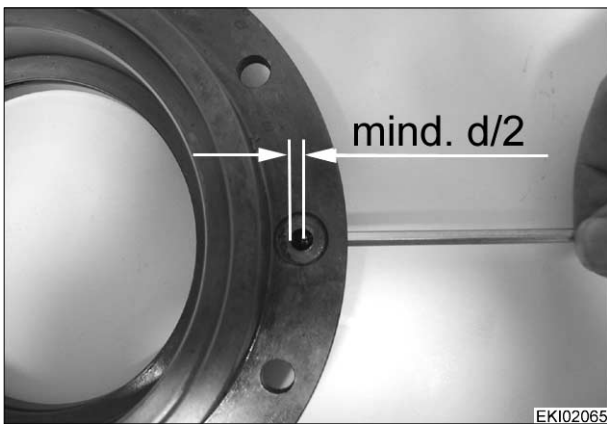


EKI02064

**Pre-assembling cylinder liner (42)**

Coat parallel pin (40) (stop for brake disc) with Loctite X 903.050.084 and insert into cylinder liner (42).

Wipe off excess Loctite.

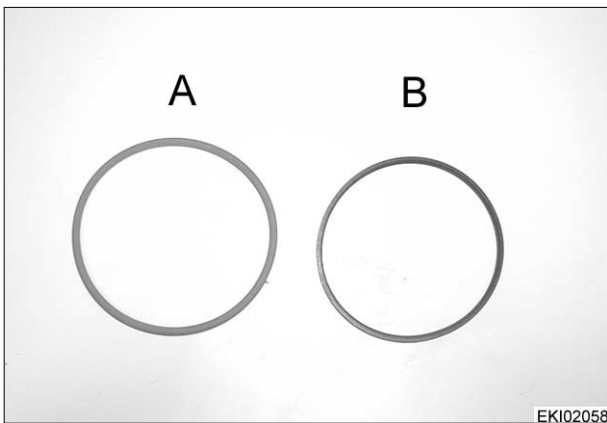


EKI02065

Coat setscrew with Loctite X 903.050.091.

Screw in setscrew.

**Important:**  
**Cross hole must remain at least half open.**



EKI02058

Form seal (20) consists of:

- O-ring (A)
- Sealing ring (B)



EKI02066

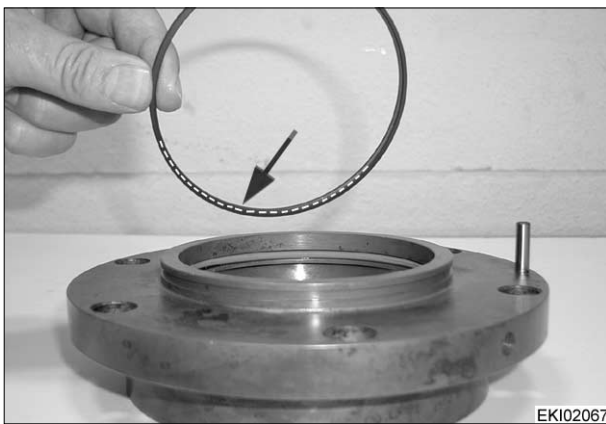
Insert O-ring into groove in cylinder liner (42) and grease.

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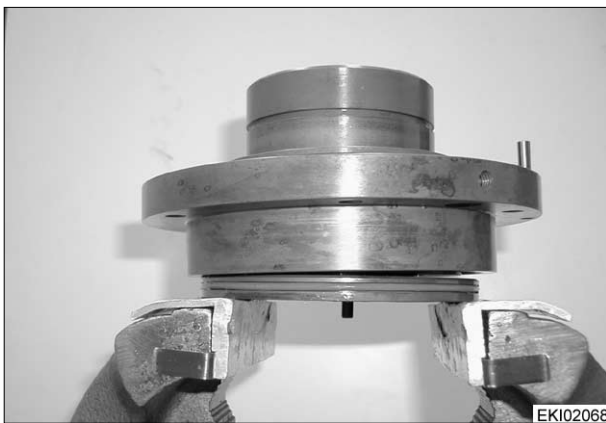


Pinch sealing ring and ..



... insert sealing ring into groove in cylinder liner (42) with sealing edge facing oil pressure chamber and grease.

**Note:**  
**Chapter 1200 Reg. C - Technical drawing of front PTO clutch**



Locate cylinder liner (42).

**Note:**  
**Note position of parallel pin (40) and dowel pin (43).**



**Pre-assembling shaft (45)**

Check deep-groove ball bearing (16) and, if necessary, replace with new bearing.

Clip in circlip (15), slide deep-groove ball bearing (16) on as far as stop and secure with circlip (15).

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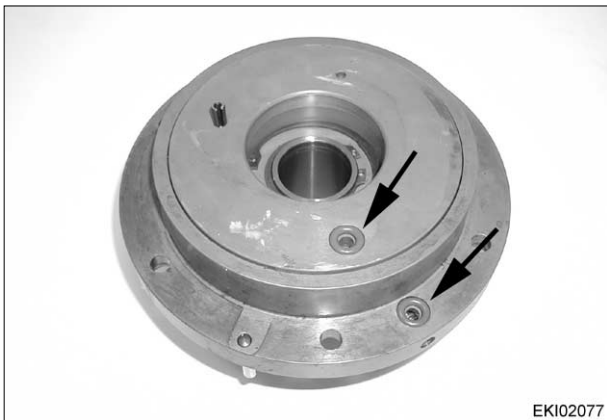
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EKI02076

Slide pre-assembled shaft (45) into gearing of season control.

Press deep-groove ball bearing (16) into bearing seat.



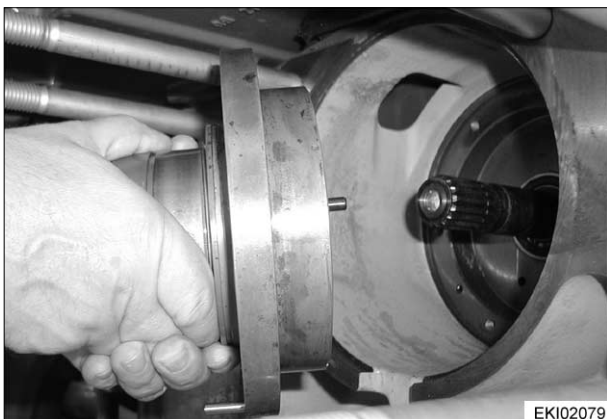
EKI02077

Insert O-rings (26 and 27) and grease.



EKI02078

Insert ring (14).

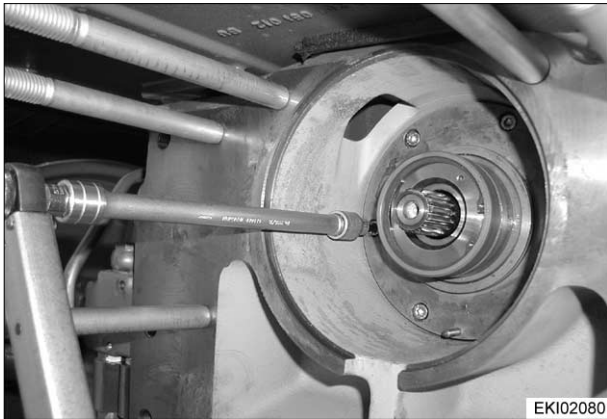


EKI02079

Insert pre-assembled piston package.

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Tighten socket head cap screws (41) crosswise to **25 Nm** .

**Note:**  
**Check operation of season control.**

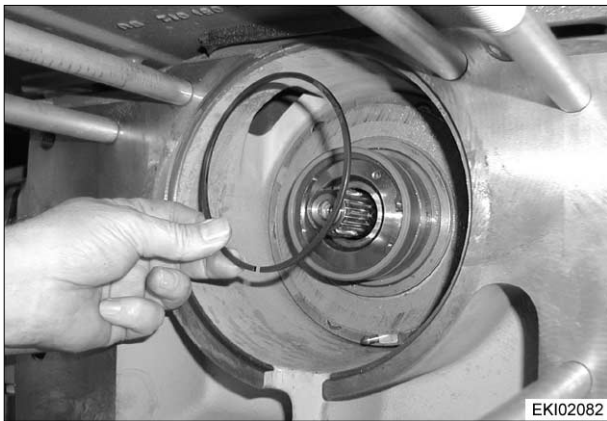
EKI02080



Locate brake disc (38).

**Note:**  
**Parallel pin (40) must be in contact with brake disc lug on left (seen in opposite direction to direction of travel).**

EKI02081



Locate snap ring (37).

EKI02082



Check deep-groove ball bearing (34) and, if necessary, replace with new bearing.  
 Press deep-groove ball bearing (34) into thrust collar (32) and clip circlip (35) in place.

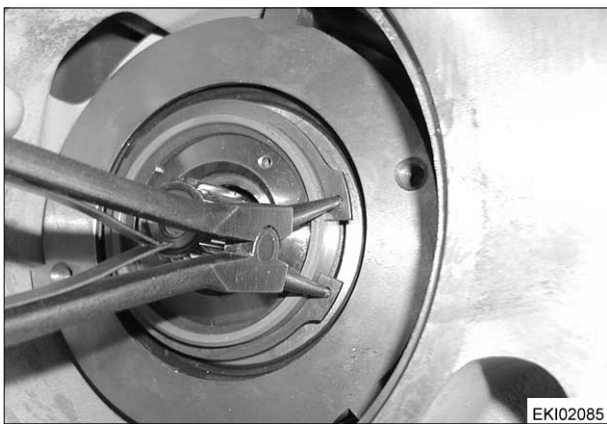
EKI02083

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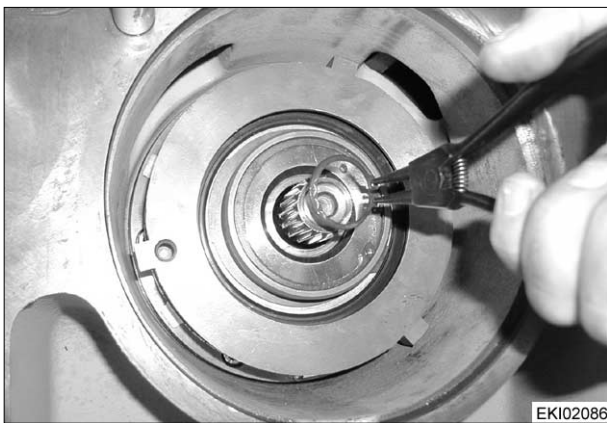
<b>Fav 900</b>	<b>Transmission / Front PTO</b> <b>Installation and removal of front PTO clutch</b>	<b>G</b>
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Press pre-assembled thrust collar into bearing seat.



Clip circlip (33) in place.



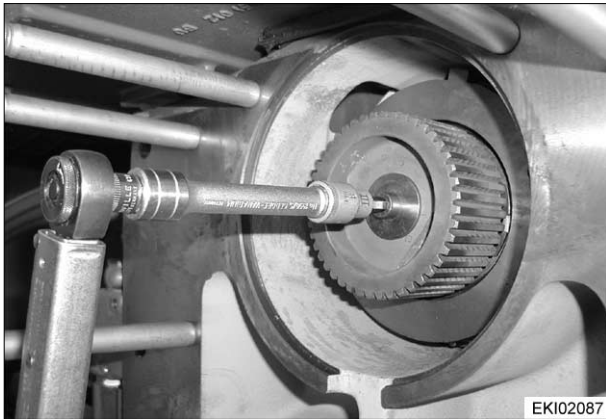
Clip circlip (8) into groove in shaft (45).



Locate internally toothed disc carrier (4).

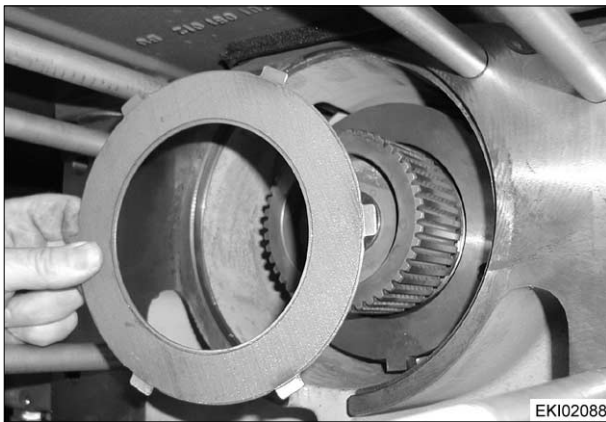
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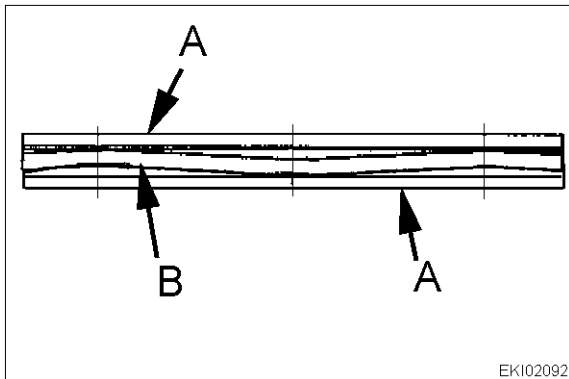


Coat socket head cap screw (1) with Loctite X 903.050.091.  
 Screw in socket head cap screw (1) with washer (2).  
 Tighten socket head cap screw (1) to **49 Nm** .

**Note:**  
**Switch on front PTO season control (see Operating Manual).**

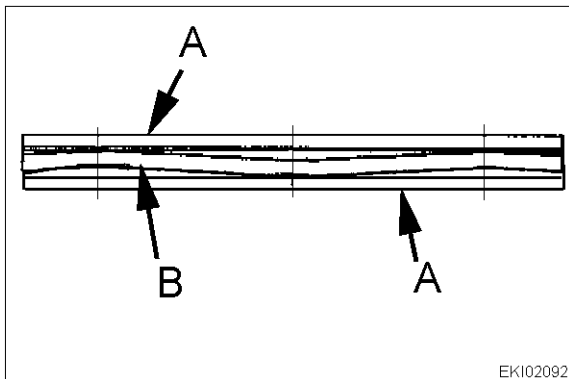


**Locate disc package.**  
 Clean internally toothed discs (6) and externally toothed discs (5) such that they are grease-free before fitting.  
**Start with externally toothed disc (5)**



**continue with:**  
 A = internally toothed disc (6)  
 B = sine disc (7)  
 A = internally toothed disc (6)  
**continue with:**  
**6 externally toothed discs (5) and 5 internally toothed discs (6) alternately.**

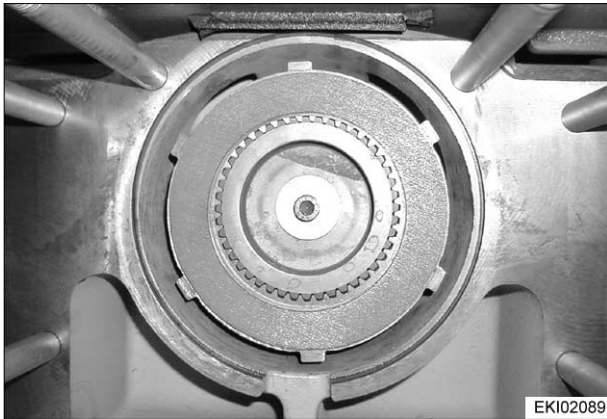
**Note:**  
**Chapter 1200 Reg. C - Technical drawing of front PTO**



**continue with:**  
 A = internally toothed disc (6)  
 B = sine disc (7)  
 A = internally toothed disc (6)

Date	Version	Page	Installation and removal of front PTO clutch	Capitel	Index	Docu-No.
13.08.2001	a	18/19		1200	G	000005

<p><b>Fav 900</b></p>	<p>Transmission / Front PTO  <b>Installation and removal of front PTO clutch</b></p>	<p><b>G</b></p>
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EKI02089

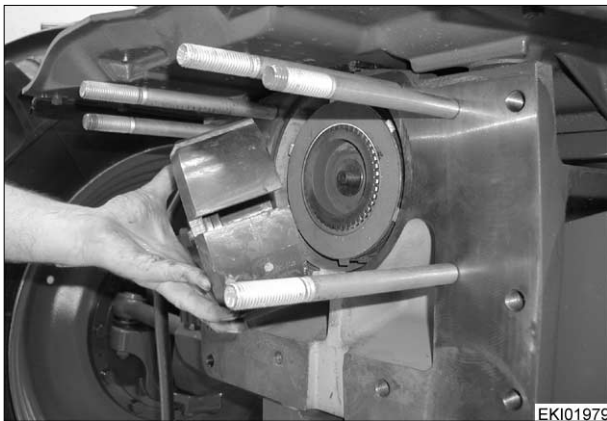
Finish with externally toothed disc (5).



EKI02090

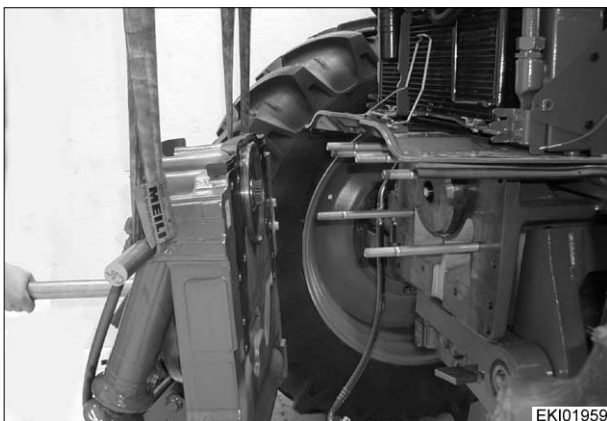
**Pre-assembling clutch bell housing (30)**

Insert retaining ring (3) into clutch bell housing (30).



EKI01979

Align externally toothed discs (5) and locate clutch bell housing (30).



EKI01959

**Concluding work**

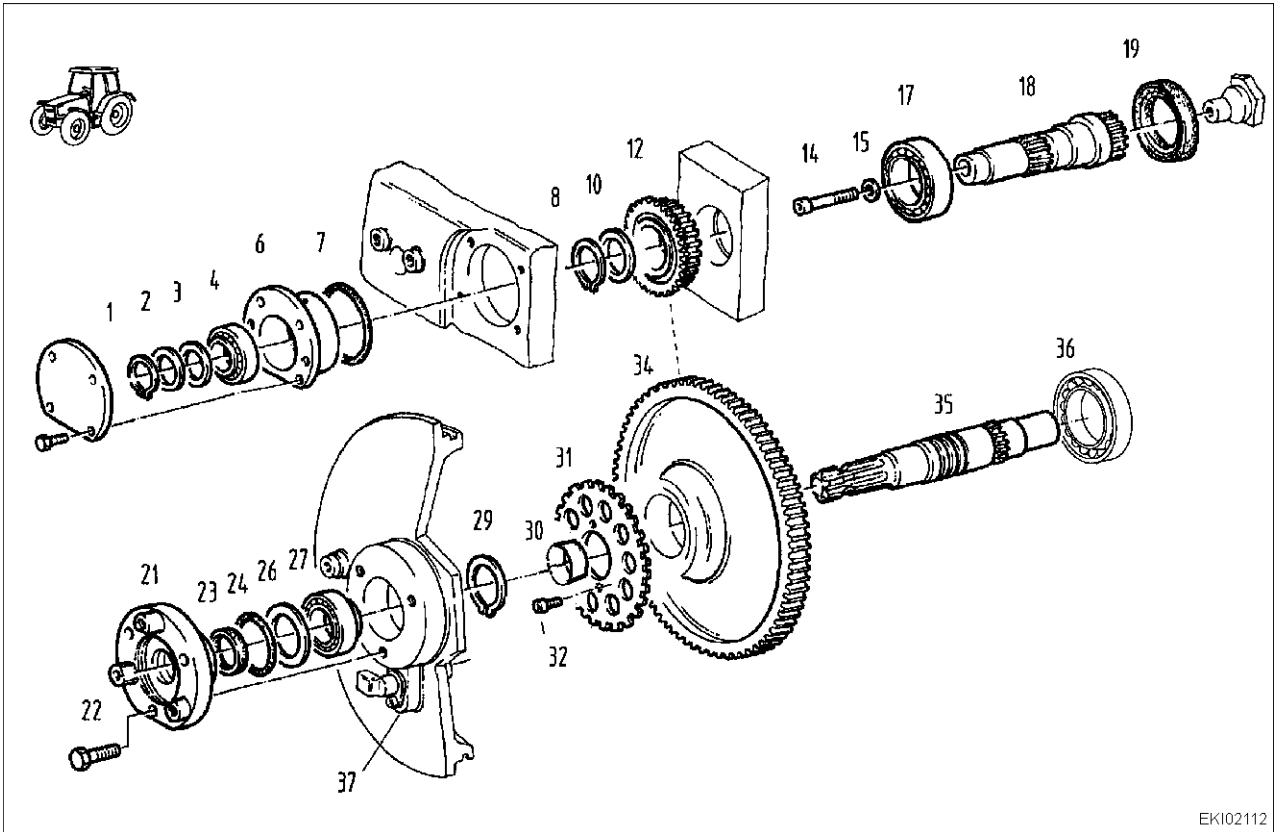
Mount front PTO gearbox.

**Note:**

**Chapter 1200 Reg. G - Installation and removal of front PTO gearbox**

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13.08.2001	a	19/19	1200	G	000005

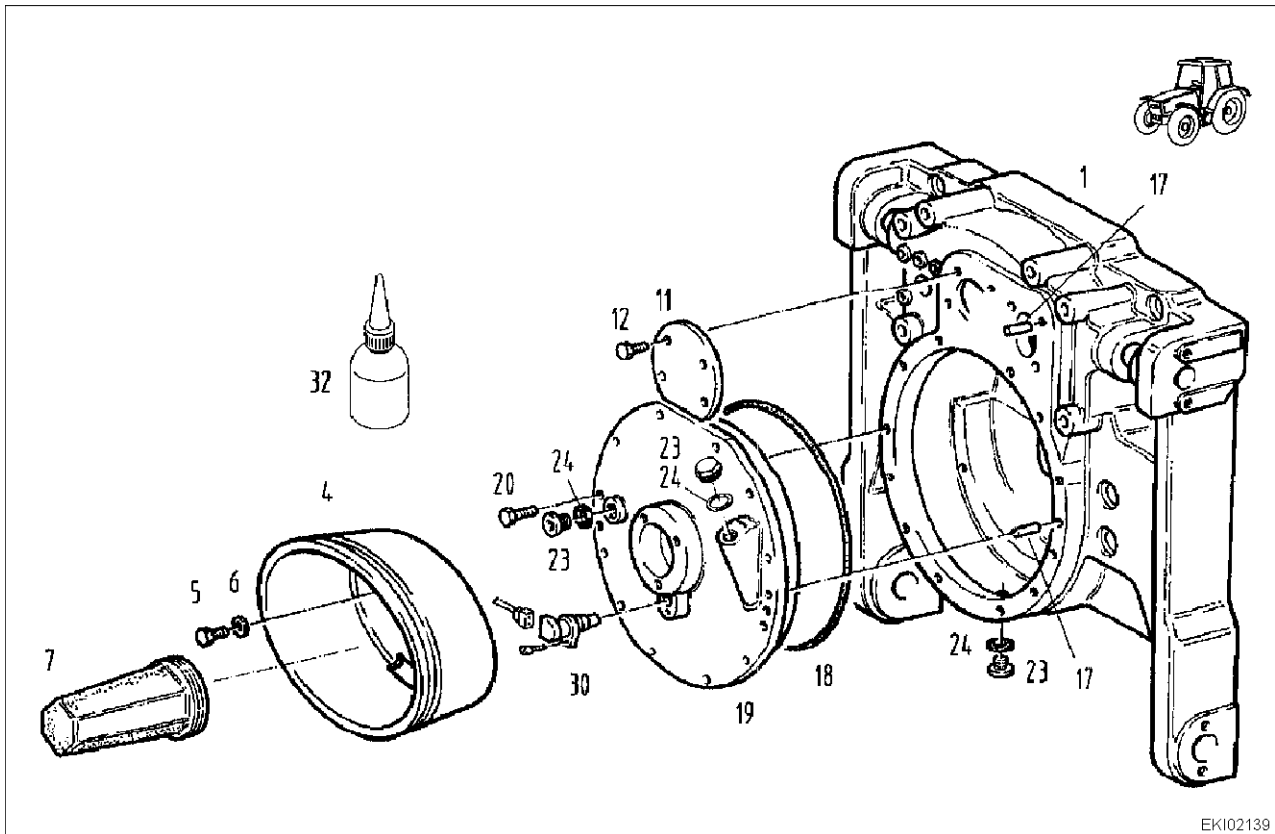
<b>Fav 900</b>	<b>Transmission /Front PTO Installation and removal of front PTO gearbox</b>	<b>G</b>
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Item	Designation	Item	Designation
1	Circlip	21	Centering cover
2	Locating ring	22	Hexagon screw
3	Adjusting washers (as required)	23	Shaft seal
4	Taper roller bearing	24	O-ring
6	Bearing bush	26	Adjusting washer
7	O-ring	27	Taper roller bearing
8	Circlip	29	Circlip
10	Ring	30	Inner race
12	Spur gear	31	Ratchet wheel
14	Socket head cap screw	32	Socket head cap screw
15	Usit ring	34	Spur gear
17	Taper roller bearing	35	PTO
18	Shaft	36	Taper roller bearing
19	Shaft seal	37	B002 - sensor

Date	Version	Page	<b>Installation and removal of front PTO gearbox</b>	Capitel	Index	Docu-No.
20.08.2001	a	1/15		<b>1200</b>	<b>G</b>	<b>000007</b>

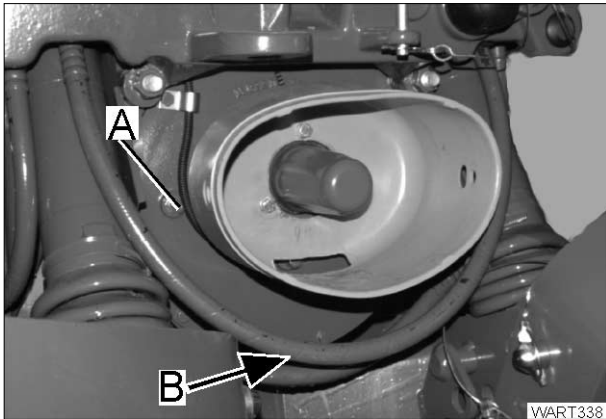
<b>Fav 900</b>	<b>Transmission /Front PTO Installation and removal of front PTO gearbox</b>	<b>G</b>
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Item	Designation	Item	Designation
1	Housing	18	O-ring
4	Protective cup	19	Cover
5	Hexagon screw	20	Hexagon screw
6	Washer	23	Drain plug
7	PTO shaft guard	24	Sealing ring
11	Cover	30	B002 - sensor
12	Hexagon screw	32	Loctite X 903.050.074.000
17	Parallel pin		

Date	Version	Page	<b>Installation and removal of front PTO gearbox</b>	Capitel	Index	Docu-No.
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Fav 900	Transmission /Front PTO Installation and removal of front PTO gearbox	G
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**For repairs to front PTO gearbox:**

Drain oil, approx. 4.2 l

A = fill with oil via filler opening

B = oil drain plug

**Note:**

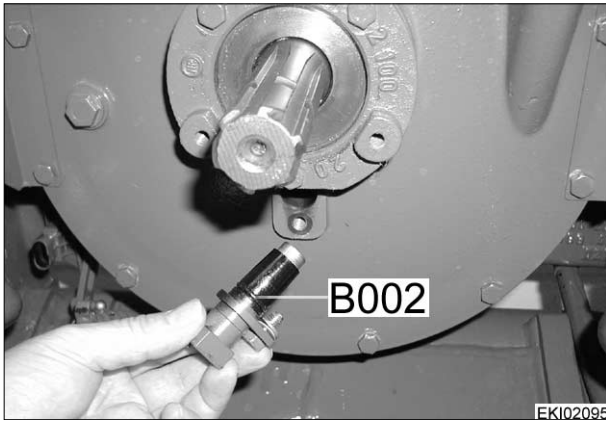
Chapter 0000 Reg. A - Fuels and lubricants

If only PTO (35) is removed: front PTO gearbox remains mounted on tractor.

If shaft (18) is removed: remove front PTO gearbox from tractor.

**Note:**

Chapter 1200 Reg. G - Installation and removal of front PTO gearbox



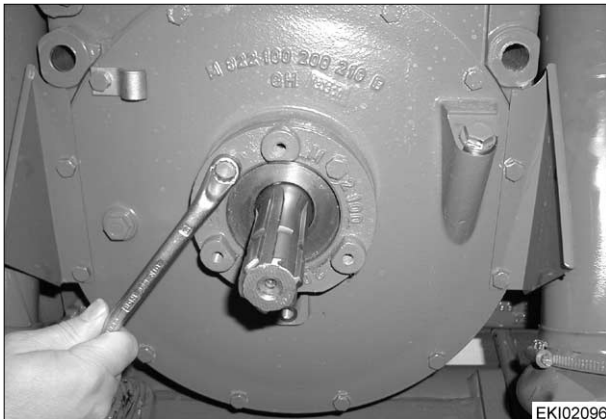
**Disassembling front PTO gearbox**

**Removing PTO (35)**

Remove B002 - sensor, front PTO.

**Note:**

Note number of washers (used for setting B002 - sensor)

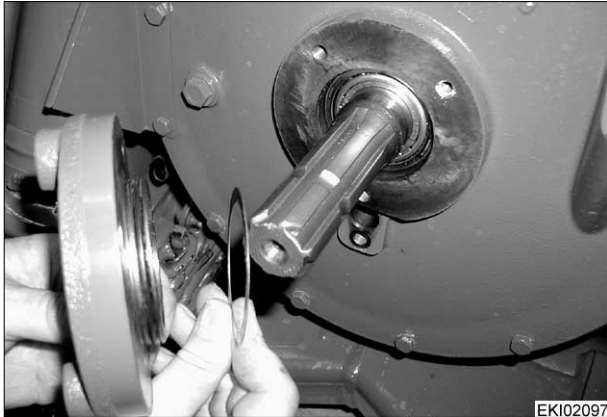


Unscrew hexagon screws from centering cover (21).

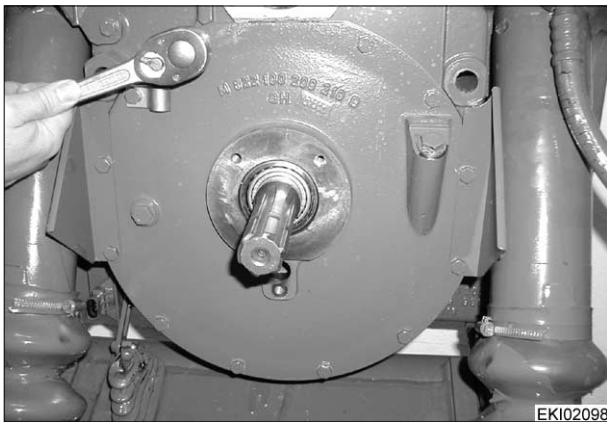
Date	Version	Page	Capitel	Index	Docu-No.
20.08.2001	a	3/15	1200	G	000007



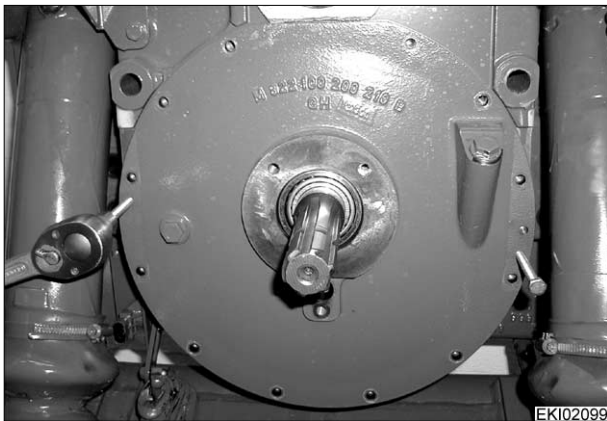
Fav 900	<p style="text-align: center;">Transmission /Front PTO  <b>Installation and removal of front PTO gearbox</b></p>	<b>G</b>
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Remove centering cover (21) and adjusting washers (26).



Unscrew twelve hexagon screws.



Force cover off using two M8 setscrews.

**Note:**  
**Hold PTO.**



Remove cover and PTO (35) with fitted components.

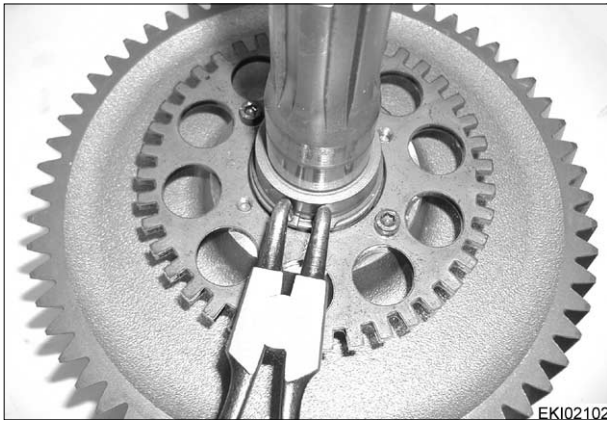
Date	Version	Page	Capitel	Index	Docu-No.
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Fav 900	Transmission /Front PTO Installation and removal of front PTO gearbox	G
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Withdraw taper roller bearing (27) from PTO (35) with extractor.

EKI02101



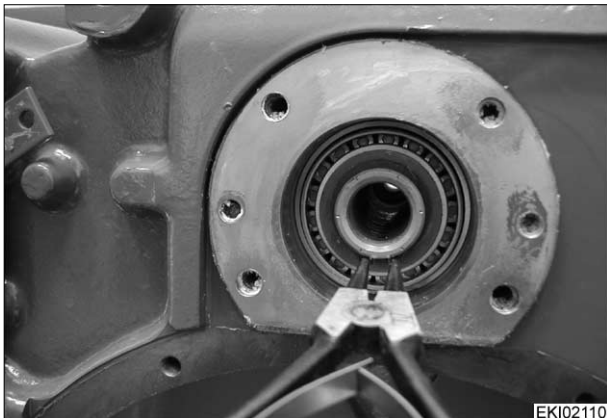
Unclip circlip (29).

EKI02102



Remove fitted components from PTO (35).

EKI02103



**Removing shaft (18)**

Preliminary work: remove front PTO gearbox.

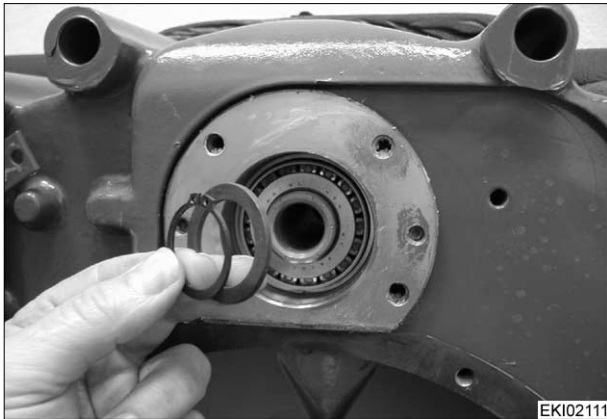
**Note:**  
Chapter 1200 Reg. G - Installation and removal of front PTO gearbox

Unclip circlip (1).

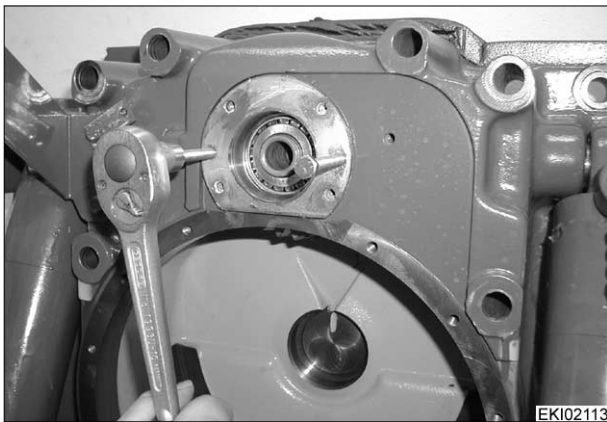
EKI02110

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<p><b>Fav 900</b></p>	<p align="center"><b>Transmission /Front PTO Installation and removal of front PTO gearbox</b></p>	<p align="center"><b>G</b></p>
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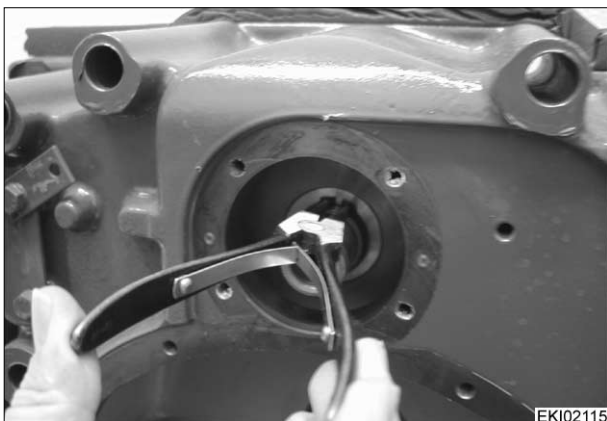
Remove circlip (1), locating ring (2) and, if appropriate, adjusting washers (3).



Force bearing bush (6) off with two M8 setscrews.



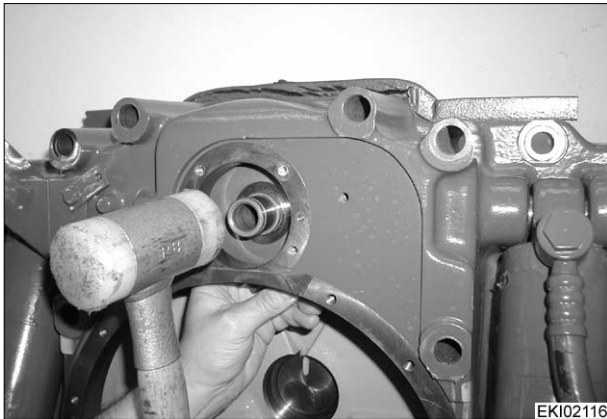
Remove taper roller bearing (4) and bearing bush (6).



Unclip circlip (8).

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<p><b>Fav 900</b></p>	<p>Transmission /Front PTO  <b>Installation and removal of front PTO gearbox</b></p>	<p><b>G</b></p>
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EKI02116

Press shaft (18) out of bearing seat.

**Note:**  
**Hold spur gear (12).**



EKI02117

Fitted components on shaft (18)



EKI02108

**Assembling front PTO gearbox**  
**Installing and setting shaft (18)**

Heat inner race of taper roller bearing (17) to approx. 80°C.

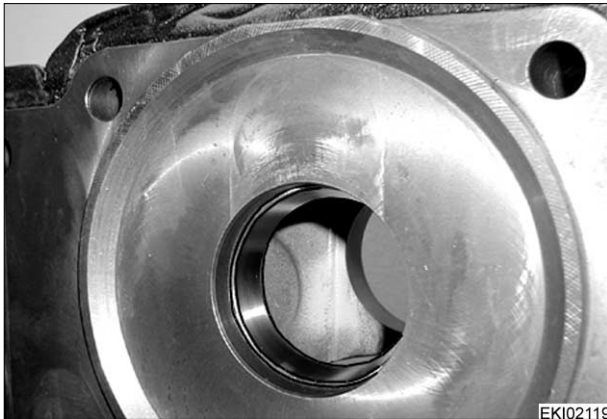


EKI02118

Press inner race of taper roller bearing (17) onto shaft (18) as far as stop.

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20.08.2001	a	7/15		1200	G	000007

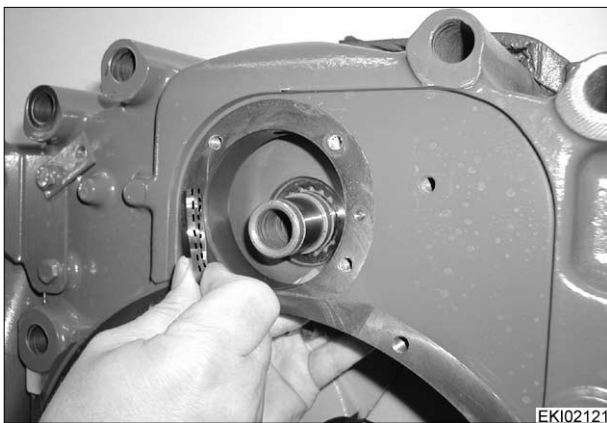
<p><b>Fav 900</b></p>	<p align="center"><b>Transmission /Front PTO Installation and removal of front PTO gearbox</b></p>	<p align="center"><b>G</b></p>
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Press outer race of taper roller bearing (17) into gearbox housing as far as stop.



Install shaft (18) with fitted components.



Fit locating ring (2).

**Note:**  
**Chamfer faces gearwheel.**



Clip circlip (1) in place.

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Fav 900	<p style="text-align: center;">Transmission /Front PTO  <b>Installation and removal of front PTO gearbox</b></p>	<b>G</b>
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EKI02123

Press outer race of taper roller bearing (4) into bearing bush (6) as far as stop.



EKI02124

Insert O-ring (7) into groove in bearing bush (6) and grease.



EKI02125

Fit bearing bush (6) and tighten with two hexagon screws to **25 Nm** (for setting bearing).



EKI02108

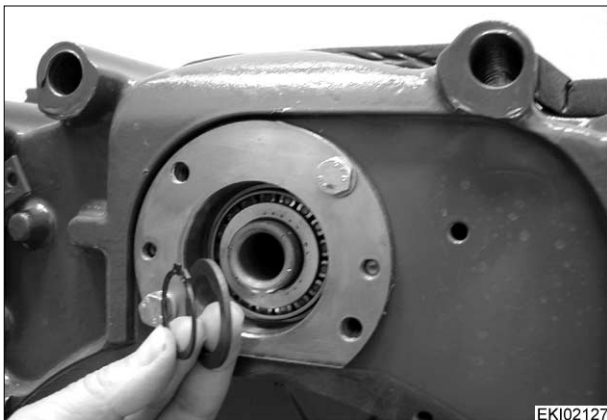
Heat inner race of taper roller bearing (4) to approx. 80°C.

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20.08.2001	a	9/15		1200	G	000007

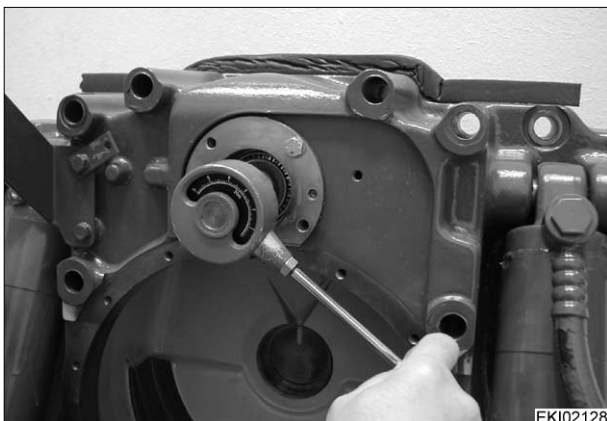
Fav 900	Transmission /Front PTO Installation and removal of front PTO gearbox	G
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Slide inner race of taper roller bearing (4) onto shaft (18).



Fit locating ring (2) and clip circlip (1) in place. Oil bearing, knock bearing in both directions and turn bearing.



Fit torque gauge X 899.980.151 and check rotational resistance of shaft bearing.

**Target value = 40-60 Ncm (0.4-0.6 Nm)**

In event of discrepancies, correct using adjusting washers (3) and check rotational resistance again.

**Note:**

**To measure rotational resistance, fit socket head cap screw to shaft (18) and lock with washer and nut.**



Coat shaft seal (19) on outside with spirit/water mixture (1:1 ratio).

Fill sealing lips 2/3 with grease.

Press uniformly deeply into gearbox housing with sealing lip facing oil chamber.

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<p><b>Fav 900</b></p>	<p>Transmission /Front PTO  <b>Installation and removal of front PTO gearbox</b></p>	<p><b>G</b></p>
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EKI02108

**Installing and setting PTO shaft (35)**

Heat inner race of taper roller bearing (36) to approx. 80°C.



EKI02104

Press inner race of taper roller bearing (36) onto PTO (35) as far as stop.



EKI02105

Slide spur gear (34) (1000 rpm) onto splines of PTO (35) and press spur gear (34) as far as stop.

**Note:**  
**Take care not to damage taper roller bearing (36).**



EKI02106

Press bush (30) in using fitting tool.

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20.08.2001	a	11/15	Installation and removal of front PTO gearbox	1200	G 000007



<p><b>Fav 900</b></p>	<p>Transmission /Front PTO  <b>Installation and removal of front PTO gearbox</b></p>	<p><b>G</b></p>
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Locate ratchet wheel.  
 Coat two M6 screws using Loctite X 903.050.084.  
 Tighten screws to **10 Nm** .



Clip circlip (29) in place.



Heat inner race of taper roller bearing (27) to approx. 80°C.



Press inner race of taper roller bearing (27) onto PTO (35) as far as stop.

Date	Version	Page	Installation and removal of front PTO gearbox	Capitel	Index	Docu-No.
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**Fav 900**

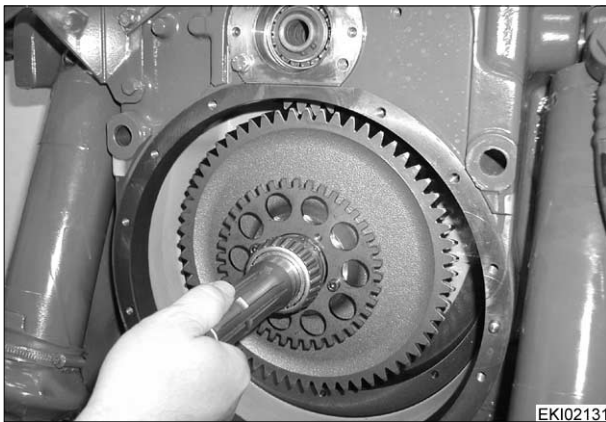
**Transmission /Front PTO  
Installation and removal of front PTO gearbox**

**G**



EKI02130

Press outer race of taper roller bearing (36) into gearbox housing as far as stop.



EKI02131

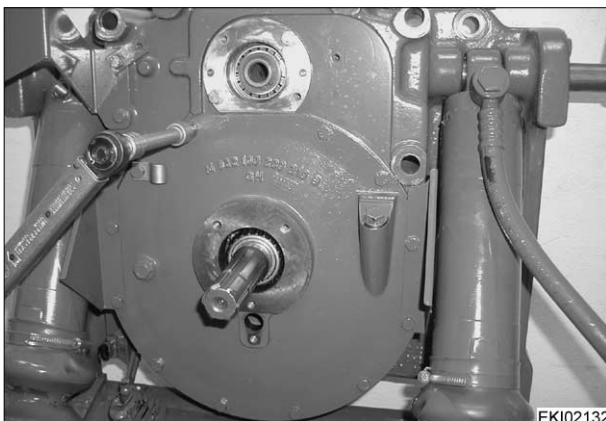
Insert PTO (35) with fitted components into transmission housing.

**Note:**  
**Oil bearing.**



EKI02133

Insert O-ring into groove in cover and grease.



EKI02132

Mount cover and tighten hexagon screws to 25 Nm .

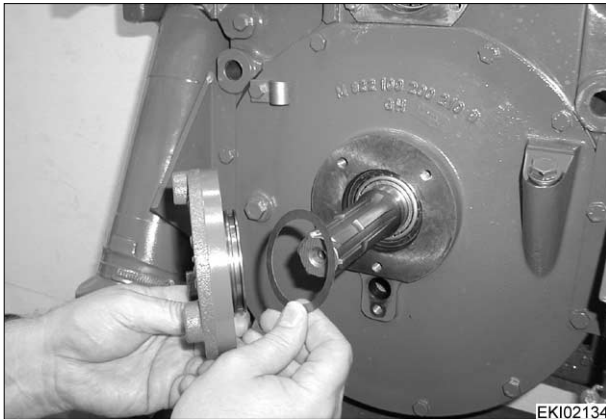
**Note:**  
**Note position of dowel pin.**

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Fav 900

## Transmission /Front PTO Installation and removal of front PTO gearbox

G



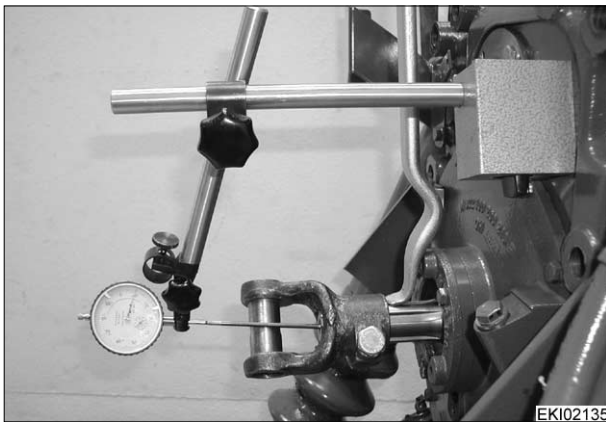
Press outer race of taper roller bearing (27) into cover.

Fit centering cover (21) with **thinnest adjusting washer (26)**.

Tighten hexagon screws to 25 Nm.

**Note:**

**To set bearing: fit centering cover (21) without shaft seal (23) and without O-ring (24).**



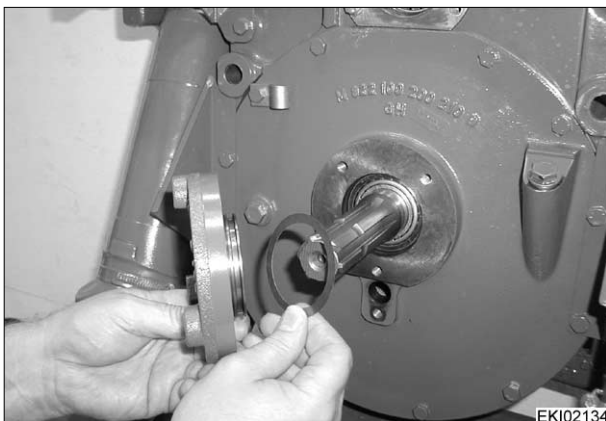
Tap bearing lightly and rotate bearing approx. 10 turns.

Fit gauge and pull **once** on PTO (35).

Note play.

**Note:**

**Measurement is more accurate and also simpler if gearbox is vertical.**



Set axial play of PTO (35) using adjusting washers (26).

**Target value: 0.0-0.03 mm axial play**

Rotate PTO (35) again at least 10 turns and repeat measurement procedure as described above.



Insert O-ring (24) into groove in centering cover (21) and grease.

Coat shaft seal (23) on outside with spirit/water mixture (1:1 ratio).

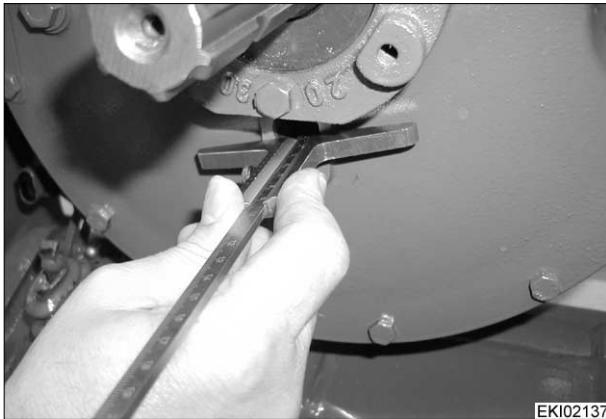
Fill sealing lips 2/3 with grease.

Press into centering cover (21) as far as stop with sealing lip facing oil chamber.

Mount centering cover (21) and tighten hexagon screws to **25 Nm**.

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20.08.2001	a	14/15	1200	G	000007

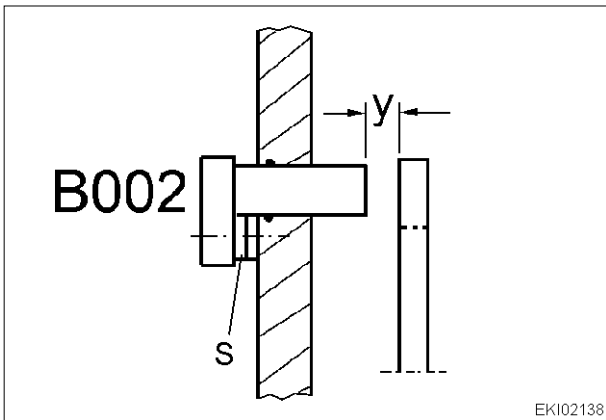
<p><b>Fav 900</b></p>	<p>Transmission /Front PTO  <b>Installation and removal of front PTO gearbox</b></p>	<p><b>G</b></p>
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EKI02137

**Fitting and setting B002 - sensor**

Measure gap between cover and ratchet wheel (31) using depth gauge.



EKI02138

Set B002 - sensor using washers (S).

**Target value: 0.5 mm < y < 1.5 mm**

Measure length of sensor = approx. 40 mm

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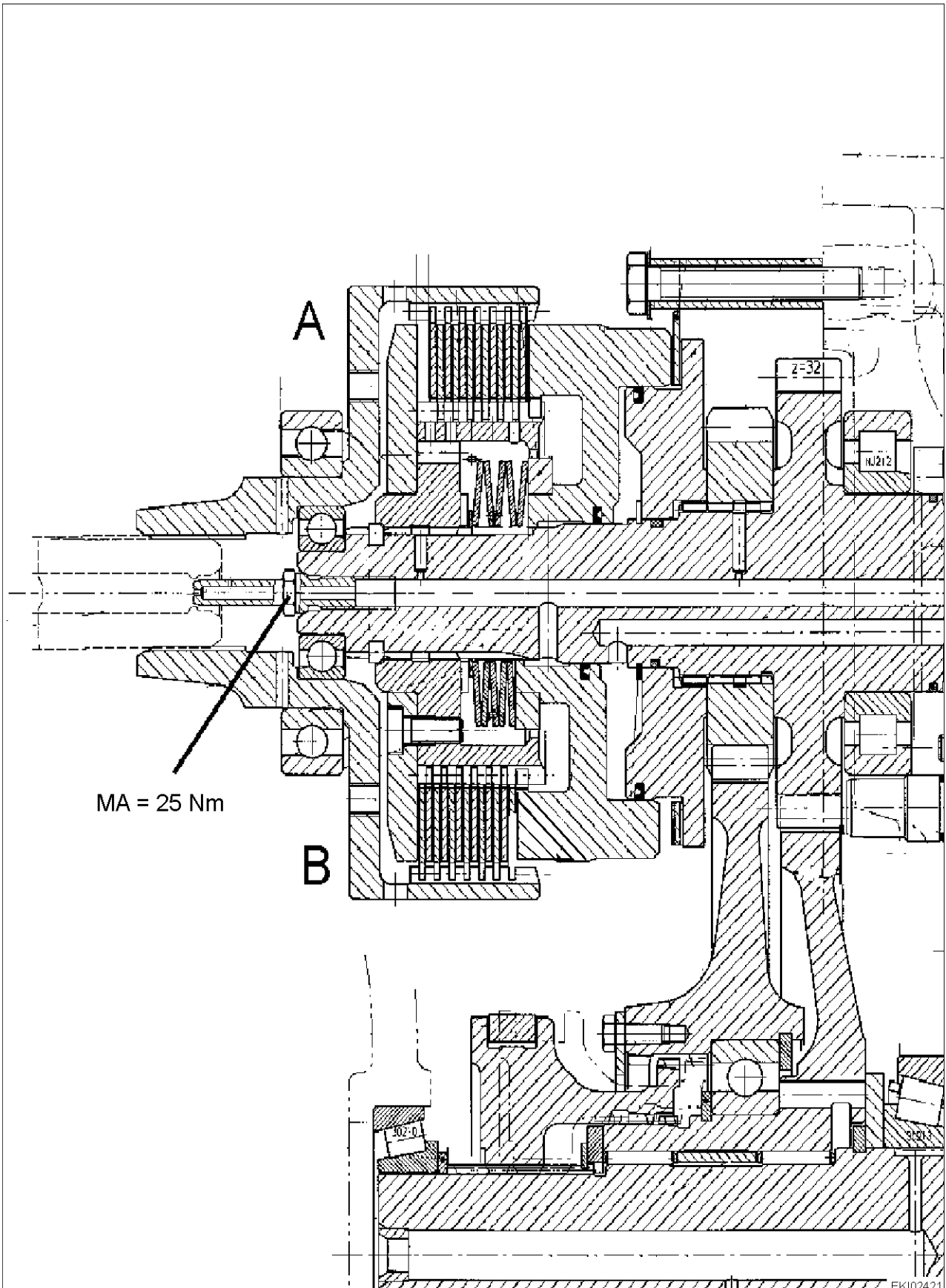
<b>Fav 900</b>	<b>Transmission / Live PTO Live PTO clutch</b>	<b>C</b>
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12.10.2001	<b>a</b>	1/3	<b>1220</b>	<b>C</b>	<b>000004</b>

Fav 900

Transmission / Live PTO  
Live PTO clutch

C



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Live PTO clutch

<b>Fav 900</b>	<b>Transmission / Live PTO Live PTO clutch</b>	<b>C</b>
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**A** = Clutch OFF / brake ON

**B** = Clutch ON / brake OFF

**Note:**

**Chapter 1005 Reg. C - Transmission hydraulic circuit diagram with key**

**Chapter 1005 Reg. D - Pressure-measuring points in transmission and enhanced controls**

**Chapter 1005 Reg. E - Pressure measurement in transmission**

**Chapter 1220 Reg. G - Installation and removal of live PTO clutch**

**Chapter 1220 Reg. G - Installation and removal of live PTO gearbox**

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12.10.2001	<b>a</b>	3/3	<b>1220</b>	<b>C</b>	<b>000004</b>

<b>Fav 900</b>	<b>Transmission / Live PTO Live PTO 750 / 1000</b>	<b>C</b>
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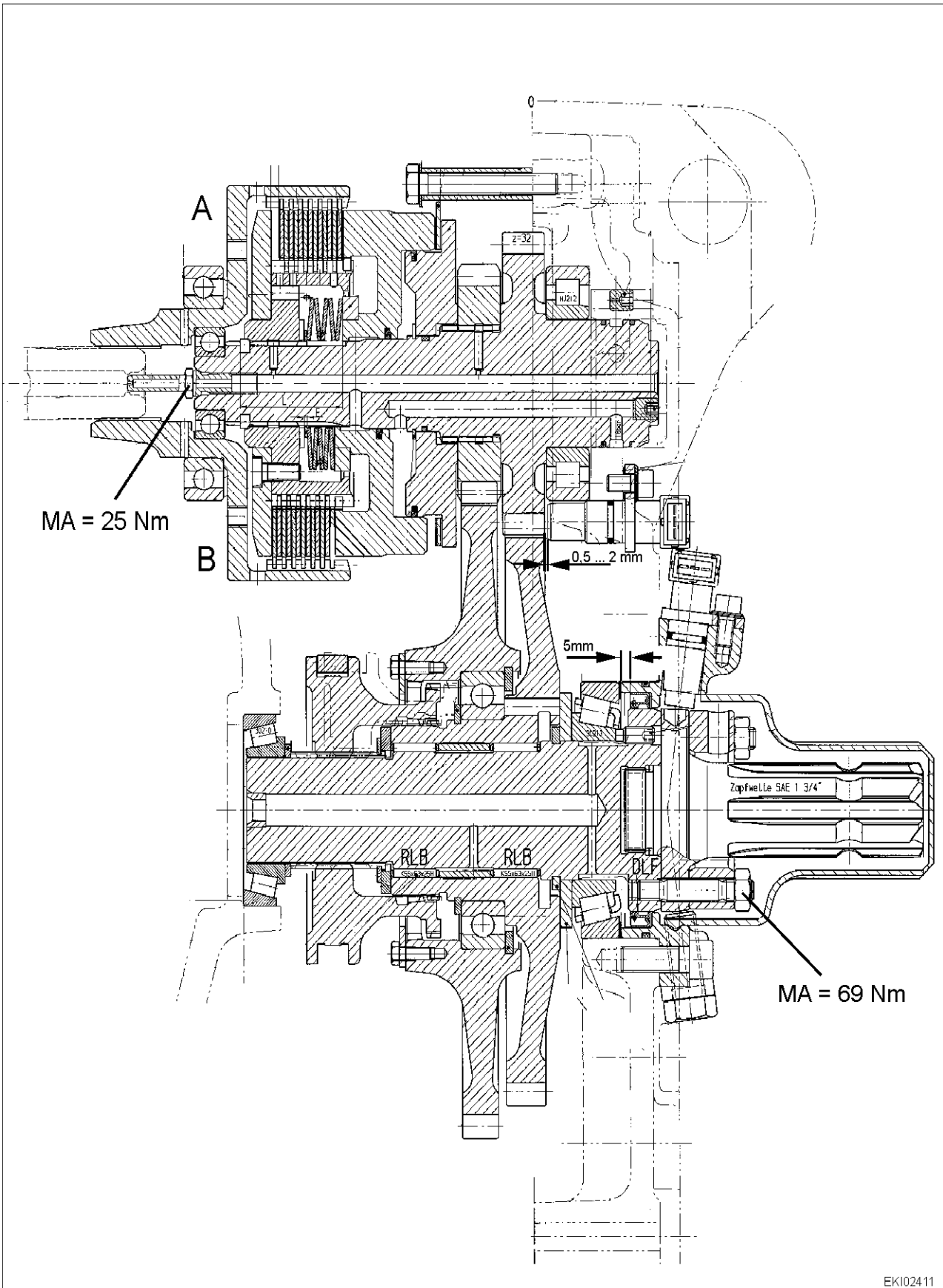
Date	Version	Page	Capitel	Index	Docu-No.
12.10.2001	<b>a</b>	1/3	<b>1220</b>	<b>C</b>	<b>000003</b>



Fav 900

Transmission / Live PTO  
Live PTO 750 / 1000

C



EKI02411

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12.10.2001	a	2/3	1220	C	000003
Live PTO 750 / 1000					

<b>Fav 900</b>	<b>Transmission / Live PTO Live PTO 750 / 1000</b>	<b>C</b>
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**A** = Clutch OFF / brake ON

**B** = Clutch ON / brake OFF

**Note:**

**Live PTO 750 / 1000 (standard)**

**Live PTO 540 / 1000 (option)**

**Note:**

**Chapter 1005 Reg. C - Transmission hydraulic circuit diagram with key**

**Chapter 1005 Reg. D - Pressure-measuring points in transmission and enhanced controls**

**Chapter 1005 Reg. E - Pressure measurement in transmission**

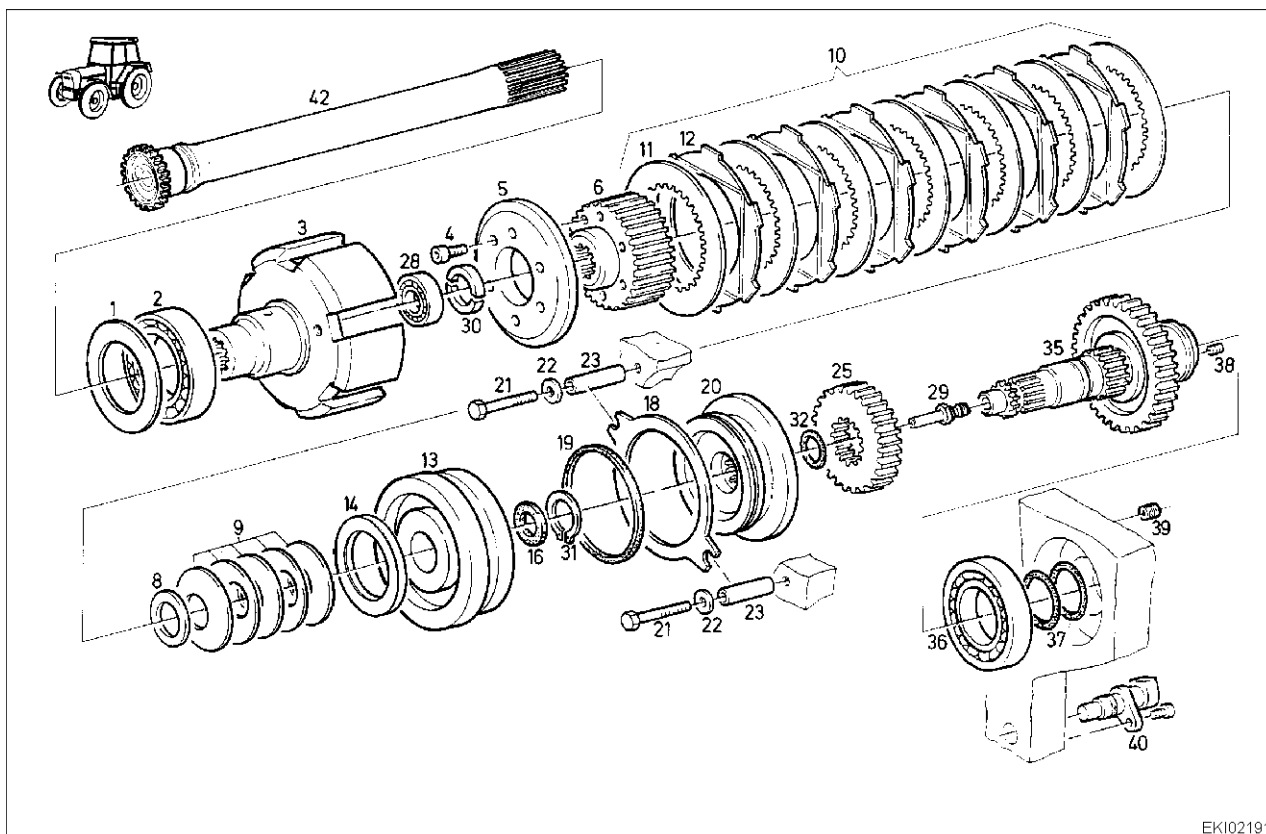
**Chapter 1220 Reg. G - Installation and removal of live PTO clutch**

**Chapter 1220 Reg. G - Installation and removal of live PTO gearbox**

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12.10.2001	<b>a</b>	3/3	<b>1220</b>	<b>C</b>	<b>000003</b>

Fav 900

## Transmission / Live PTO Installation and removal of live PTO clutch

**G**

EKI02191

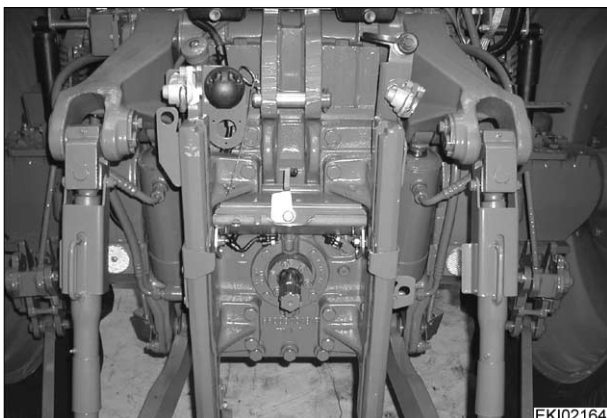
Item	Designation	Item	Designation
1	Adjusting washer	21	Hexagon screw
2	Deep-groove ball bearing	22	Spring washer
3	Clutch bell housing	23	Bush
4	Socket head cap screw	25	Spur gear
5	Locating ring	28	Deep-groove ball bearing
6	Internally toothed disc carrier	29	Nozzle
8	Adjusting washer	30	Half-ring
9	Belleville spring	31	Circlip
10	Disc package (11, 12)	32	O-ring
11	Internally toothed disc	35	Shaft
12	Externally toothed disc	36	Cylindrical roller bearing
13	Piston	37	Rectangular-section ring
14	Ring	38	Setscrew
16	Lip seal	39	Nozzle
18	Disc	40	B021 - sensor
19	Lip seal	42	Shaft
20	Brake disc		

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27.08.2001	a	1/9	1220	G	00002

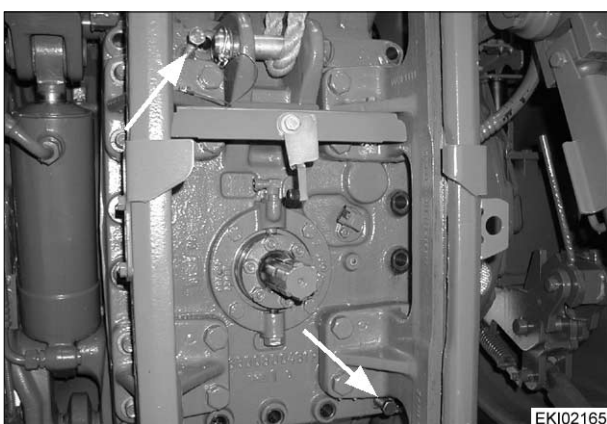
Fav 900

## Transmission / Live PTO Installation and removal of live PTO clutch

G

**Preliminary work:**

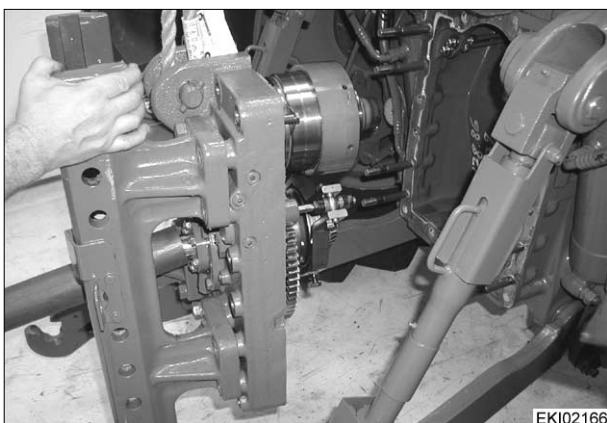
- Lower rear power lift.
- Drain transmission oil (approx. 65 l).
- Remove trailer hitch.
- Label and disconnect connector X169 from B020 - sensor, PTO 1.
- Label and disconnect connector X170 from B021 - sensor, PTO 2.
- Unscrew compressed-air connections from connecting frame.



Unscrew all fastening nuts and bolts. Connecting frame remains on housing cover.

Remove silicone plastic from threaded bores and screw in two M12 forcing screws (arrowed).

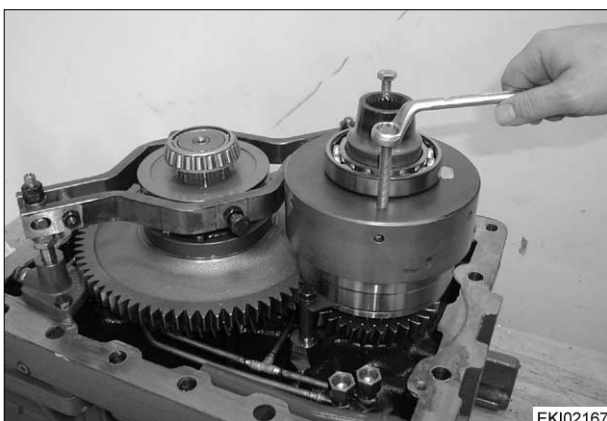
Attach housing cover to hoist, taking appropriate safety precautions, and force housing cover off.



Remove housing cover (with rear PTO).

**Note:**

**Note adjusting washer (1). This is used in setting bearing play.**

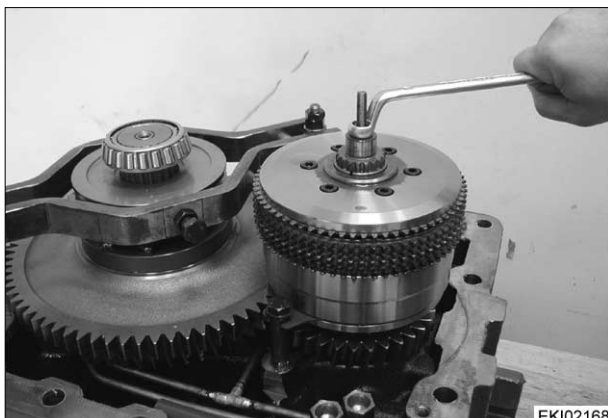


Force clutch bell housing (3) off using two hexagon screws.

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Fav 900

## Transmission / Live PTO Installation and removal of live PTO clutch

**G**

Unscrew nozzle (29).



Attach tensioning device X 899.980.145 and tension clutch.

Remove half-rings (30).

Release tension on clutch.

Remove internally toothed disc carrier (6) and disc package (10).



Remove adjusting washers (8), Belleville spring package (9) and ring (14).



Remove piston (13).

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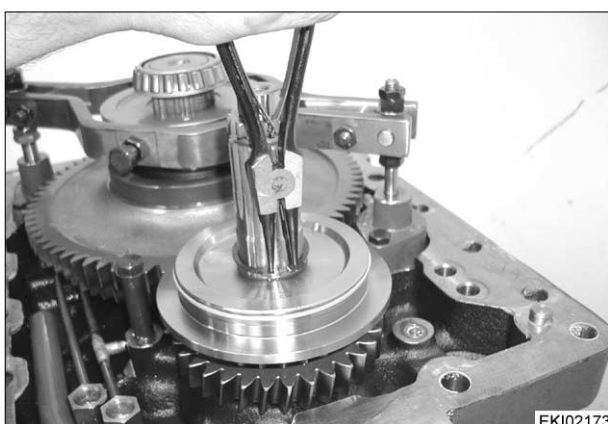
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## Transmission / Live PTO Installation and removal of live PTO clutch

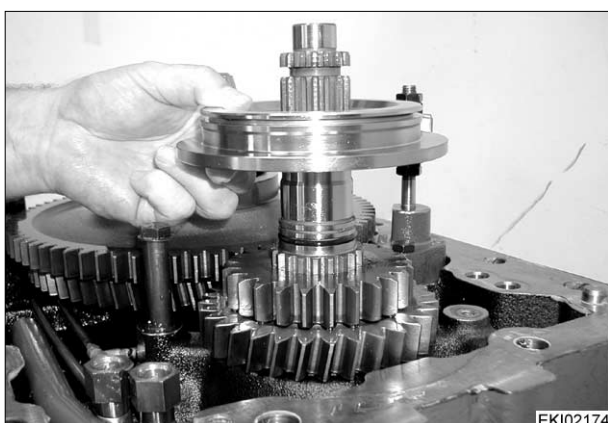
G



Unscrew one hexagon screw (21) and remove disc (18).



Unclip circlip (31) and remove brake disc (20).



### Assembling clutch

Insert new O-ring (32) into groove in shaft (35) and grease.

Check brake disc (20) for damage.

If required, fit new brake disc (20).



Clip circlip (31) in place.

Insert new lip seal (19) into groove in brake disc (20) with sealing lip facing oil chamber and grease.

### **Note:**

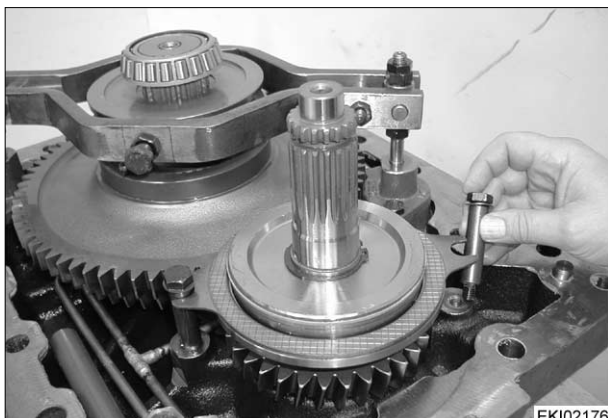
**Chapter 1220 Reg. C - Technical drawing of live PTO clutch**

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## Transmission / Live PTO Installation and removal of live PTO clutch

G



Locate disc (18).

Coat thread of hexagon screw (21) with synthetic bonding agent X 903.054.084, then locate spring washer (22) and bush (23).

Tighten hexagon screw.



Insert new lip seal (16) into inner groove in piston (13) with sealing lip facing oil chamber and grease.

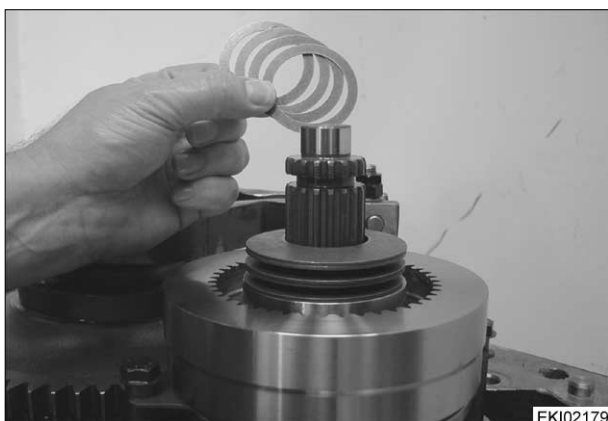
**Note:**

**Chapter 1220 Reg. C - Technical drawing of live PTO clutch**



Locate pre-assembled piston (13).

Locate ring (14).



Locate five belleville springs (9) with outer diameters facing each other and also locate adjusting washers (8).

**Note:**

**Outer diameter of first belleville spring (9) faces ring (14) in piston (13).**

**Chapter 1220 Reg. C - Technical drawing of live PTO clutch**

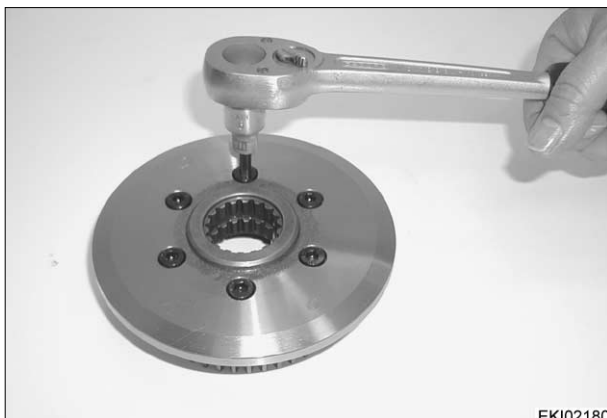
**If necessary, e.g. adjusting washer (8) has been lost:**

**determine pretension of belleville springs (9).**

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## Transmission / Live PTO Installation and removal of live PTO clutch

**G**

EKI02180

**Determining pretension of belleville springs**

If removed: mount locating ring (5) on internally toothed disc carrier (6).

Coat thread of socket head cap screws (4) with synthetic bonding agent X 903.050.084 and tighten.



EKI02181

Locate pre-assembled internally toothed disc carrier (6).

Measure distance between face end of shaft (35) and internally toothed disc carrier (6) and record distance, e.g. 23.2 mm.



EKI02182

Attach tensioning device X 899.980.145 and tension belleville springs (9).

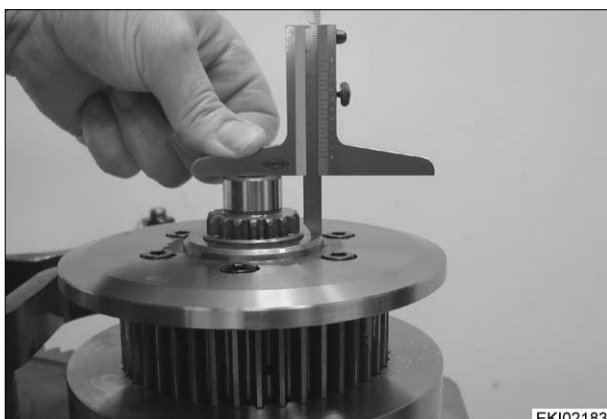
Insert half-rings (30).

With chamfered half-rings (30) chamfer faces internally toothed disc carrier (6).

Remove tensioning device X 899.980.145.

**Note:**

**Chapter 1220 Reg. C - Technical drawing of live PTO clutch**



EKI02183

Measure distance between face end of shaft (35) and internally toothed disc carrier (6) and record distance, e.g. 25.8 mm.

**If belleville spring package is compressed by approx. 2.5 mm, pre-tension is correct.**

In event of discrepancies, correct using adjusting washers (8).

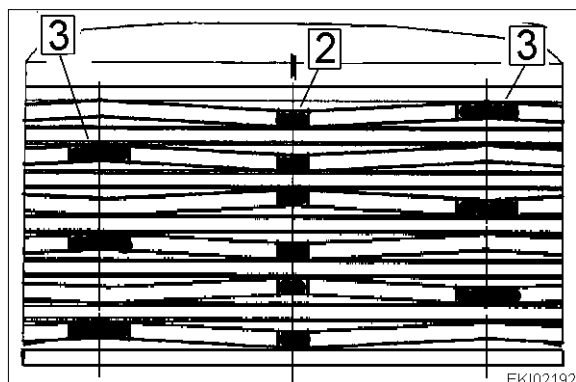
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## Transmission / Live PTO Installation and removal of live PTO clutch

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**Slide disc package (10) onto internally toothed disc carrier (6).**

**Start with externally toothed disc (12)**

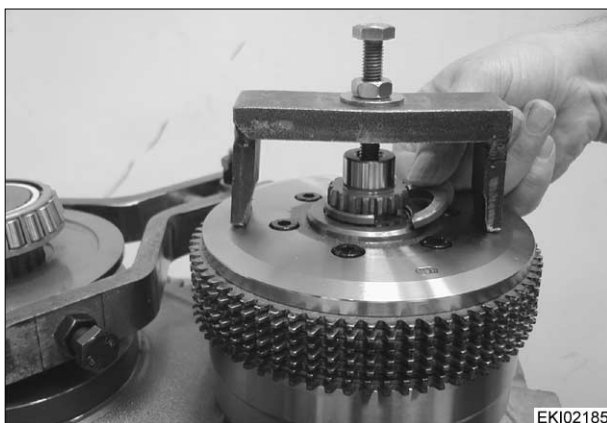
then continue, fitting internally (11) and externally (12) toothed discs alternately. Narrow groove (item 2) in **each** internally toothed disc (11) and broad groove in **every second** internally toothed disc (11) must be aligned.

**Note:**

**Total number of discs: seven externally toothed discs (12) and six internally toothed discs (11)**



Locate internally toothed disc carrier (6) with disc package (9).



Fit tensioning device X 899.980.145.

Tension clutch.

Insert half-rings (30).

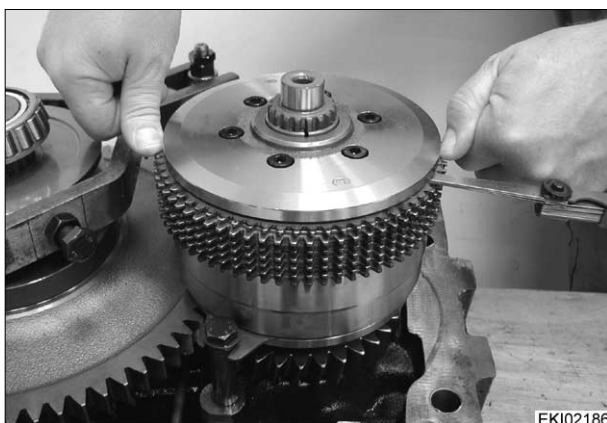
With chamfered half-rings (30) chamfer faces internally toothed disc carrier (6).

**Note:**

**Chapter 1220 Reg. C - Technical drawing of live PTO clutch**

**Note:**

**If internally toothed disc carrier (6) does not engage, locate internally toothed disc carrier (6) without disc package (10) and mark gearing with coloured pen.**



Press down on disc package centrally.

Measure gap (ventilating path) with feeler gauge.

**Target value: 1.75-3.50 mm**

If minimum gap of 1.75 mm is not reached, discs are bowed.

Fit new disc package (10).

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## Transmission / Live PTO Installation and removal of live PTO clutch

**G**

Coat thread of nozzle (29) with synthetic bonding agent X903.903.050.084.

Tighten nozzle (29) to 25 Nm.



Where removed: press deep-groove ball bearing (28) into clutch bell housing (3) as far as stop with closed side facing upwards.



Where removed: press deep-groove ball bearing (2) onto clutch bell housing (3) as far as stop.

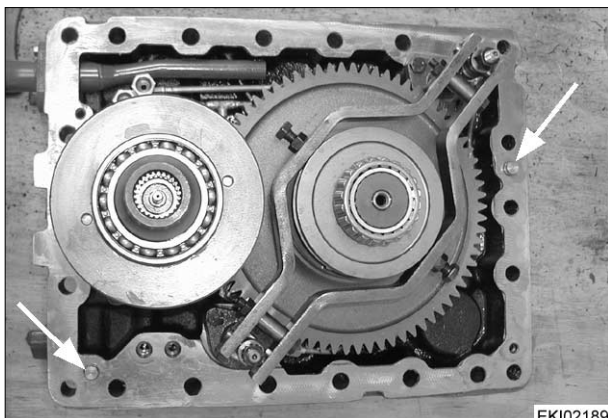


Align externally toothed discs (12) and press clutch bell housing (3) in place as far as stop.

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## Transmission / Live PTO Installation and removal of live PTO clutch

**G**

EKI02189

Clean flange surfaces.

Check that two dowel pins (20) (arrowed) are present.

Coat flange surface with surface sealant X 903.050.074.



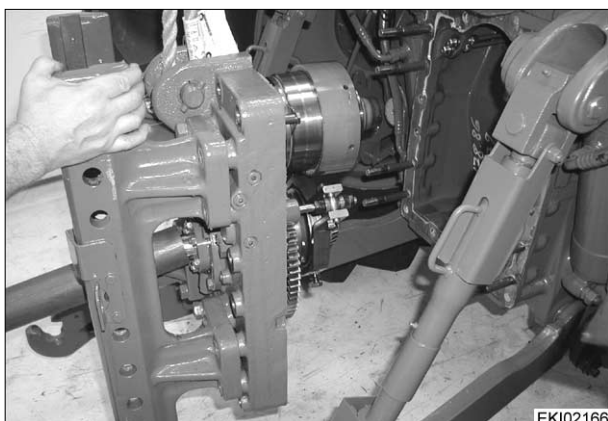
EKI02190

Insert existing adjusting washers (1) into upper bore.

**Note:**

**Determining required adjusting washer (1)  
Chapter 1220 Reg. G - Installation and removal  
of live PTO gearbox**

Fit and grease four new O-rings for pressure connections.



EKI02166

Attach housing cover to hoist, taking appropriate safety precautions, and mount on rear-axle housing.



EKI02164

Tighten M18 fastening nuts and bolts to **400 Nm** .

Fit B020 - sensor, PTO 1 (connector X 169)

Fit B021 - sensor, PTO 2 (connector X170)

Clip electric cables in place.

Screw compressed-air connections to connecting frame.

Mount trailer hitch.

Fill with transmission oil.

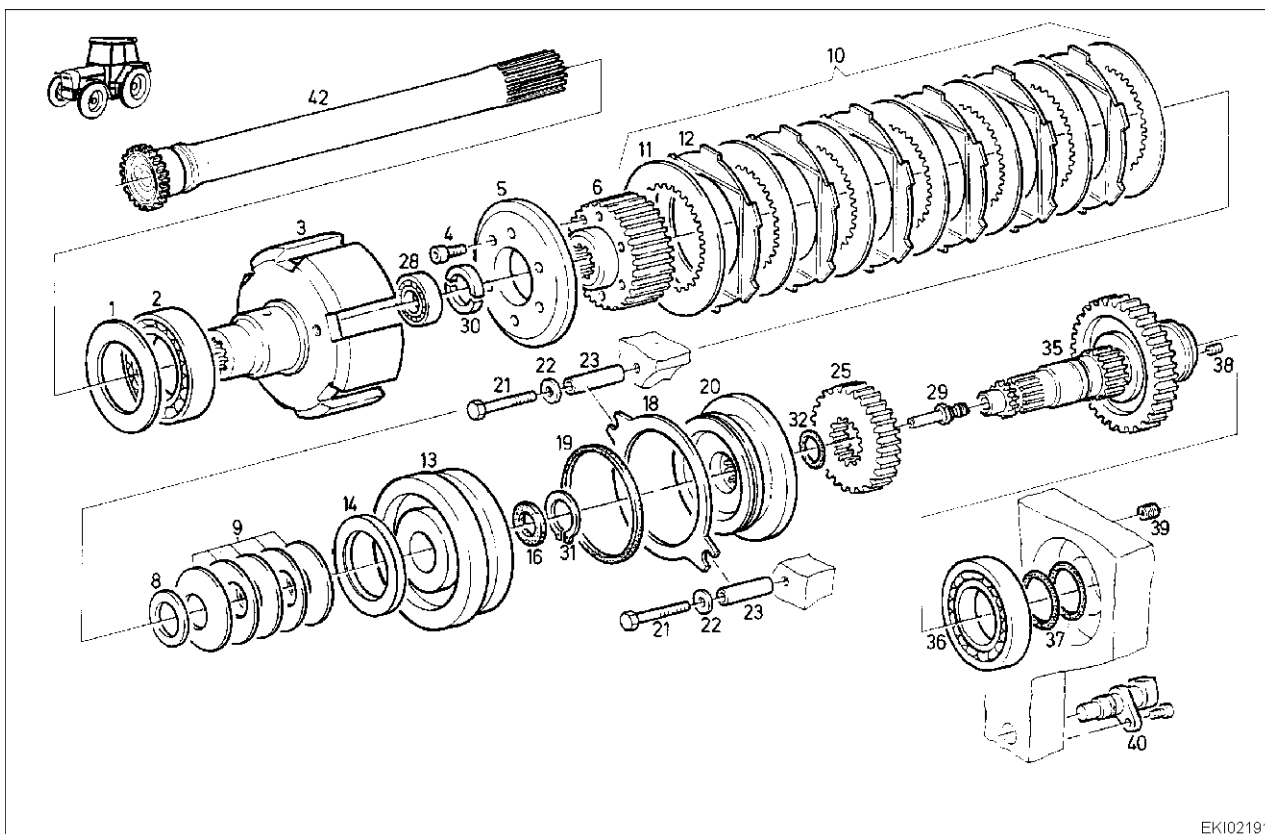
**Note:**

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## Transmission / Live PTO Installation and removal of live PTO gearbox

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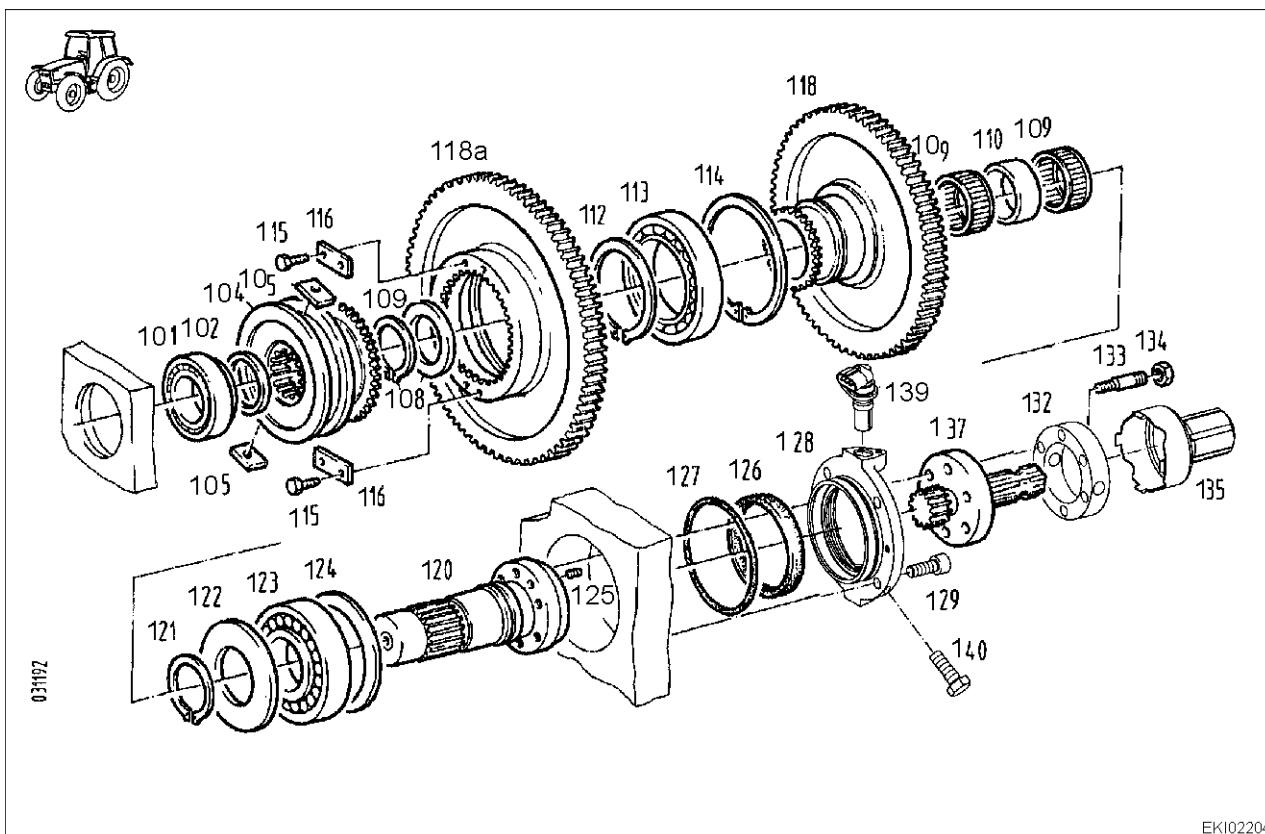
EKI02191

Item	Designation	Item	Designation
1	Adjusting washer	21	Hexagon screw
2	Deep-groove ball bearing	22	Spring washer
3	Clutch bell housing	23	Bush
4	Socket head cap screw	25	Spur gear
5	Locating ring	28	Deep-groove ball bearing
6	Internally toothed disc carrier	29	Nozzle
8	Adjusting washer	30	Half-ring
9	Belleville spring	31	Circlip
10	Disc package (11, 12)	32	O-ring
11	Internally toothed disc	35	Shaft
12	Externally toothed disc	36	Cylindrical roller bearing
13	Piston	37	Rectangular-section ring
14	Ring	38	Setscrew
16	Lip seal	39	Nozzle
18	Disc	40	B021 - sensor
19	Lip seal	42	Shaft
20	Brake disc		

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## Transmission / Live PTO Installation and removal of live PTO gearbox

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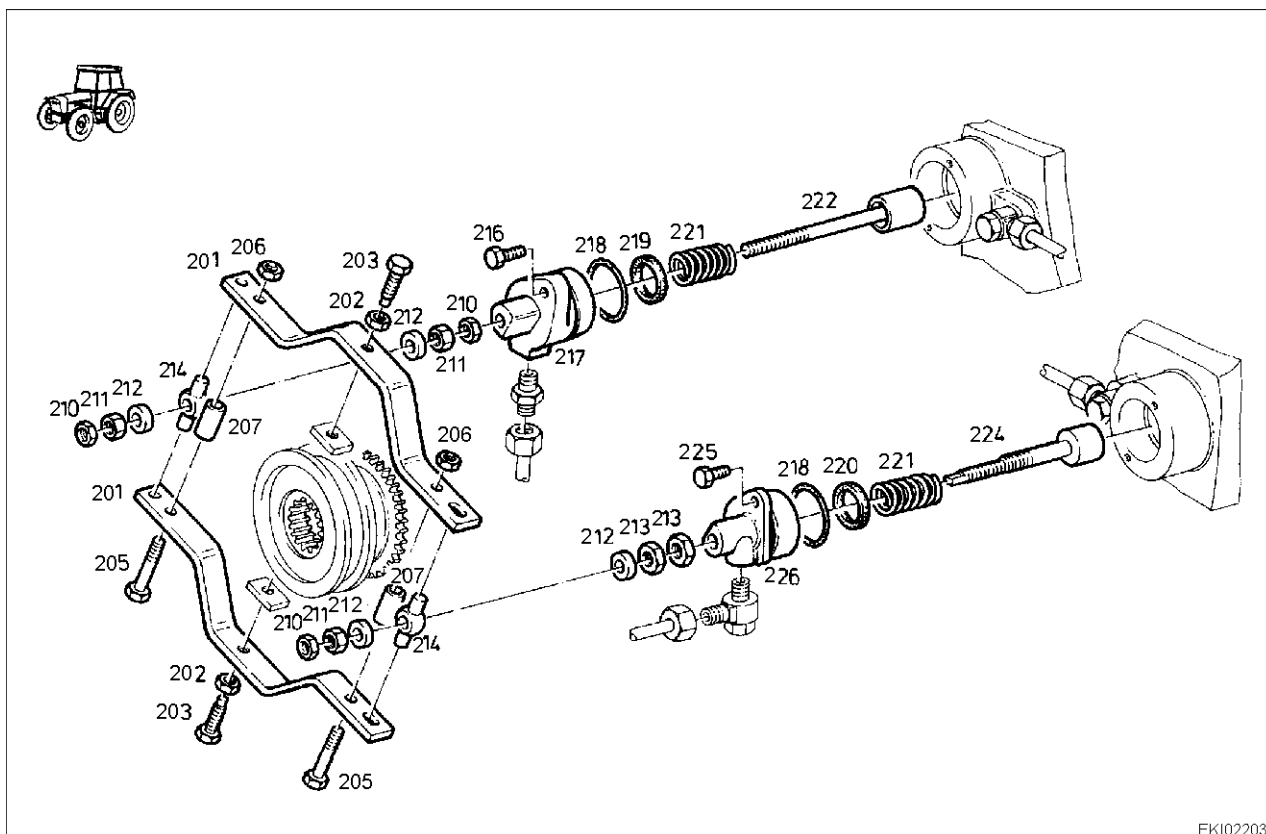
Item	Designation	Item	Designation
101	Taper roller bearing	121	Circlip
102	Locating ring	122	Washer
104	Clutch hub	123	Taper roller bearing
105	Slider	124	Adjusting washer
107	Circlip	125	Setscrew
108	Washer	126	Shaft seal
109	Needle-roller assembly	127	O-ring
110	Spacer	128	Bearing cap
112	Circlip	129	Socket head cap screw
113	Deep-groove ball bearing	132	Spacer
114	Circlip	133	M10x50-10.9 stud bolt
115	Hexagon screw	134	M10-10 hexagon nut
116	Stop	135	PTO shaft guard
118	Spur gear (1000 rpm)	137	Flanged pin
118A	Spur gear (540 or 750 rpm)	139	B020 - sensor
120	Shaft	140	Hexagon screw

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Transmission / Live PTO  
Installation and removal of live PTO gearbox

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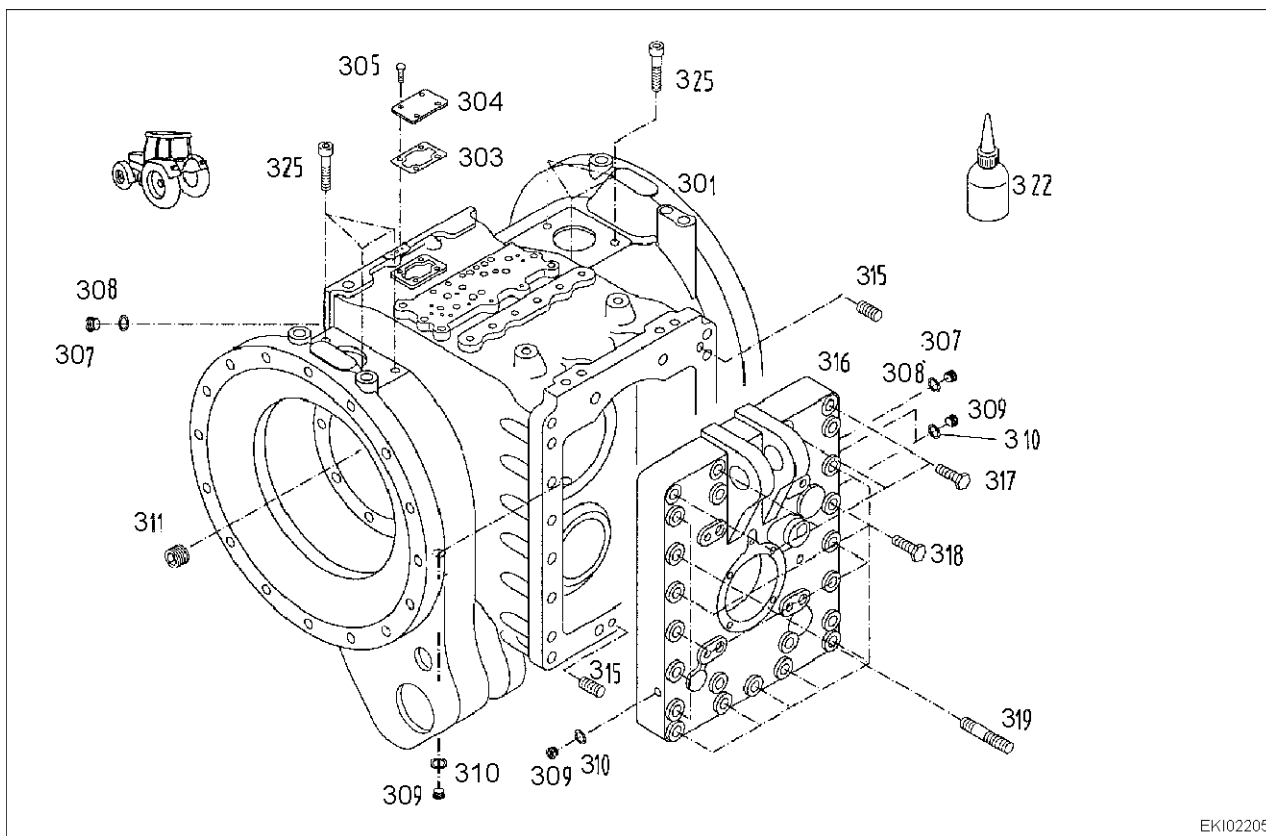


Item	Designation	Item	Designation
201	Strap	216	Hexagon screw
202	Hexagon nut	217	Cylinder
203	Stud bolt	218	O-ring
205	Hexagon screw	219	Compact sealing ring
206	Hexagon nut	220	Compact sealing ring
207	Spacer sleeve	221	Compression spring
210	Hexagon nut	222	Piston
211	Hexagon nut	224	Piston
212	Washer	225	Hexagon screw
213	Hexagon nut	226	Cylinder
214	Support		

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## Transmission / Live PTO Installation and removal of live PTO gearbox

**G**

EK102205

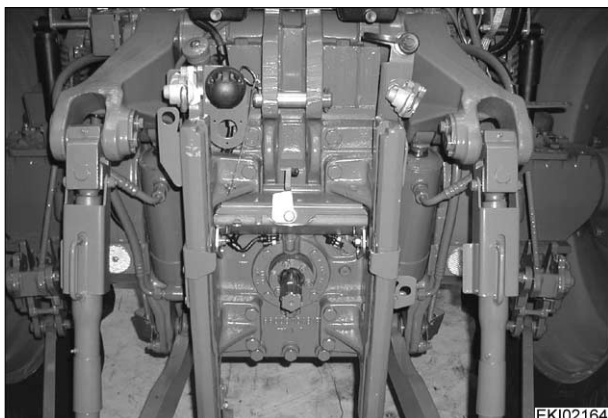
Item	Designation	Item	Designation
301	Rear-axle housing	311	Drain plug
303	Gasket	315	Parallel pin
304	Cover	316	Housing cover
305	Hexagon screw	317	M18x90-10.9 hexagon screw
307	Drain plug	318	M18x110-10.9 hexagon screw
308	Sealing ring	319	M18x130-10.9 stud bolt
309	Drain plug	322	Surface seal X 903.050.074
310	Sealing ring	325	Socket head cap screw

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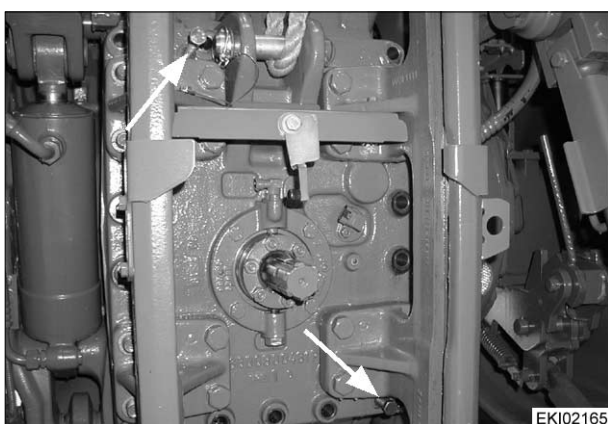
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## Transmission / Live PTO Installation and removal of live PTO gearbox

G

**Preliminary work:**

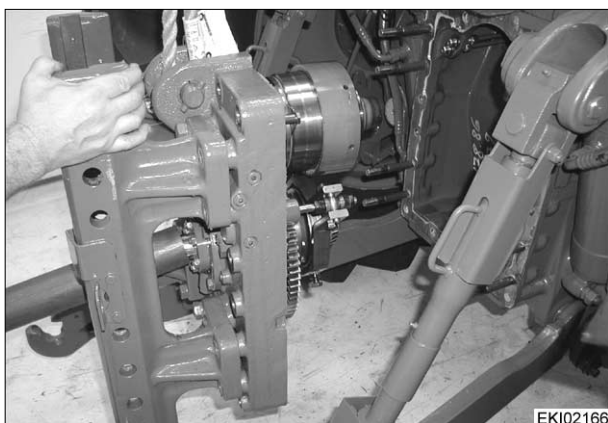
- Lower rear power lift.
- Drain transmission oil (approx. 65 l).
- Remove trailer hitch.
- Label and disconnect connector X169 from B020 - sensor, PTO 1.
- Label and disconnect connector X170 from B021 - sensor, PTO 2.
- Unscrew compressed-air connections from connecting frame.



Unscrew all fastening nuts and bolts. Connecting frame remains on housing cover.

Remove silicone plastic from threaded bores and screw in two M12 forcing screws (arrowed).

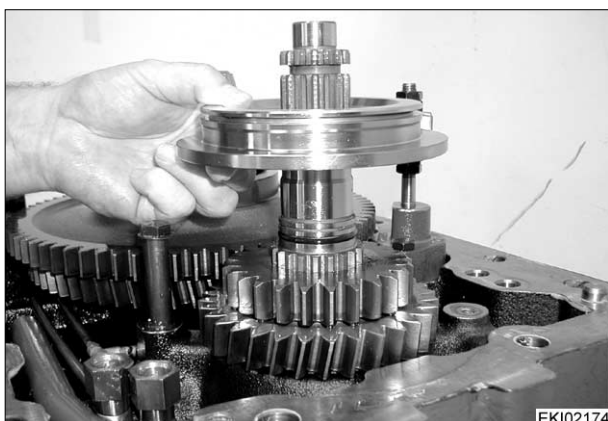
Attach housing cover to hoist, taking appropriate safety precautions, and force housing cover off.



Remove housing cover (with rear PTO).

**Note:**

**Note adjusting washer (1). This is used in setting bearing play.**



Remove clutch.

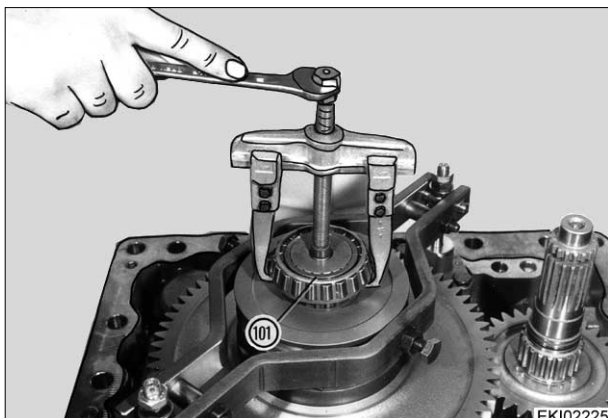
**Chapter 1220 Reg. G - Installation and removal of live PTO clutch**

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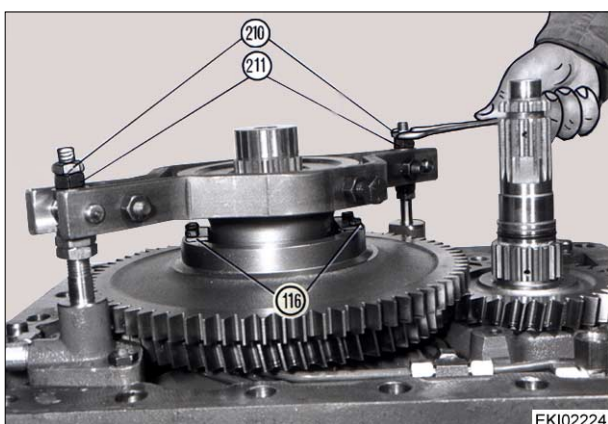


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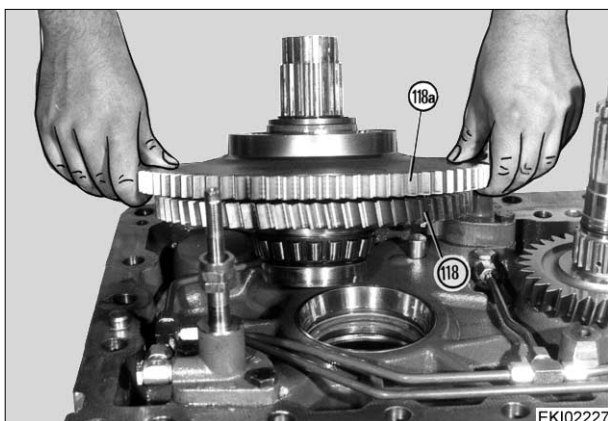
## Transmission / Live PTO Installation and removal of live PTO gearbox

**G**

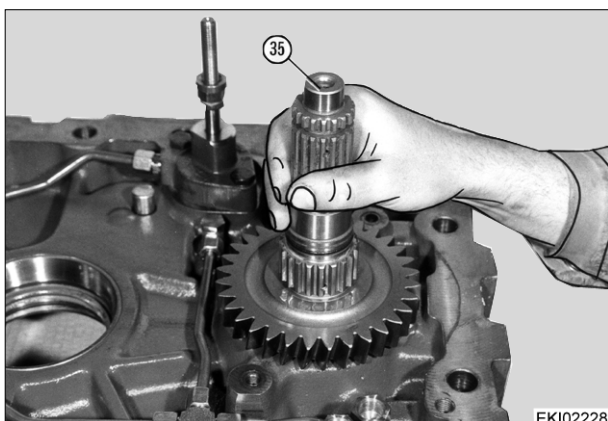
Withdraw taper roller bearing (101) using commercially available extractor.  
Remove locating ring.



Unscrew hexagon nuts (210 and 211).  
If necessary, record spacing of hexagon nuts (210 and 211).  
Remove stops (116).  
Remove switching mechanism.



Remove spur gears (118) and (118a).



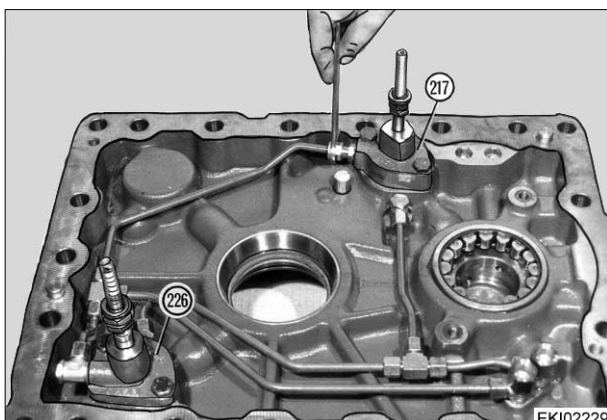
Withdraw shaft (35).  
If necessary, press bearing outer race out.

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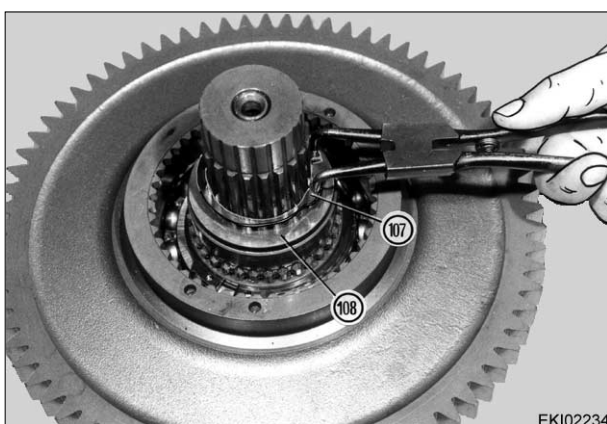
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## Transmission / Live PTO Installation and removal of live PTO gearbox

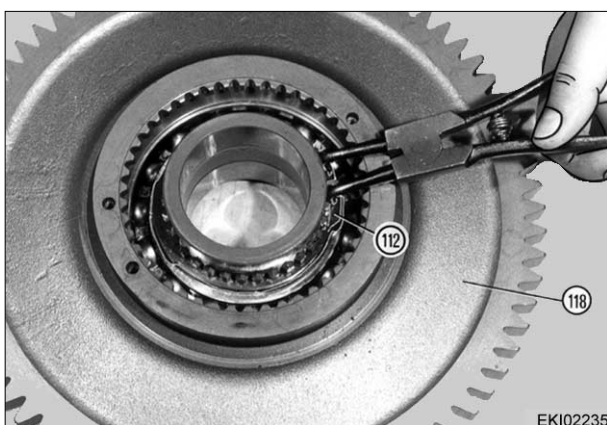
G



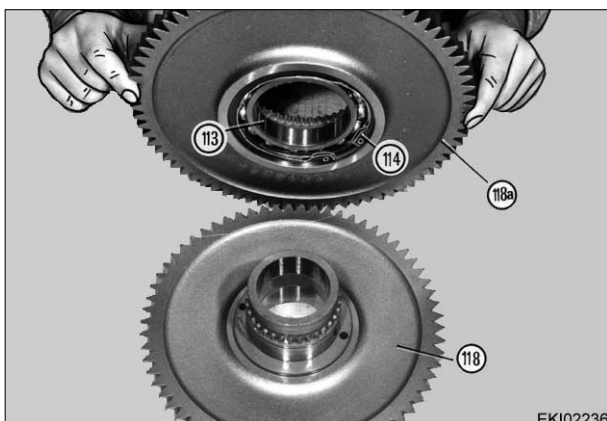
If necessary, remove cylinder (217) and / or cylinder (226).



Unclip circlip (107) and remove washer (108) and spur gears.



Unclip circlip (112).  
Press spur gear (118) out.



### **Assembly**

Press deep-groove ball bearing (113) into spur gear (118a) as far as stop and secure with circlip (114).

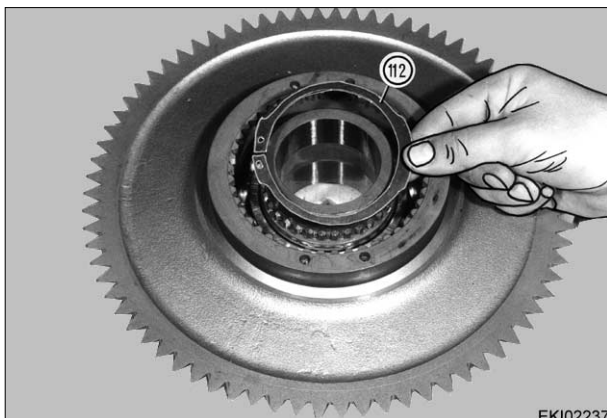
Then press spur gear (118) in as far as stop.

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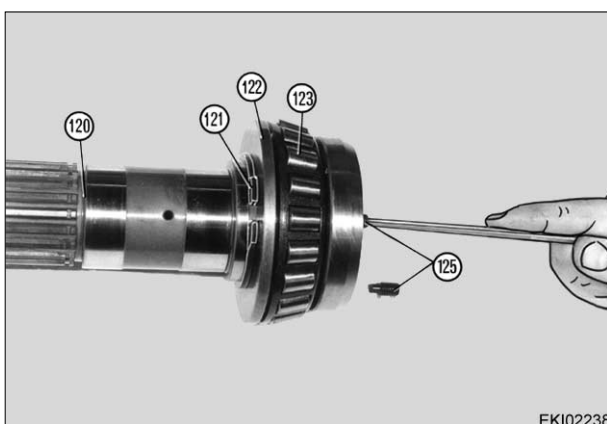
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## Transmission / Live PTO Installation and removal of live PTO gearbox

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Clip circlip (112) in place on opposite side.



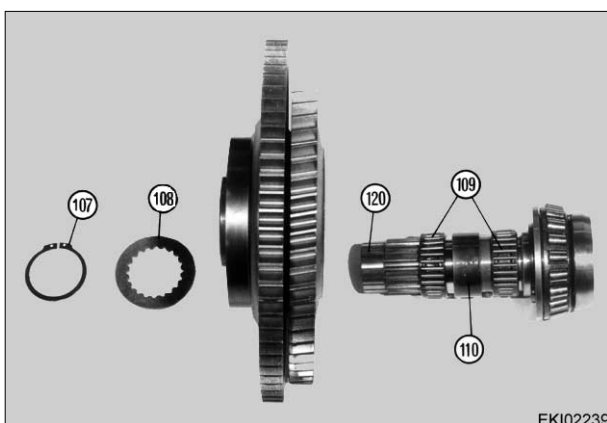
Slide inner race of taper roller bearing (123) onto shaft (120).

Fit washer (122).

Clip circlip (121) in place.

Coat two setscrews (125) with synthetic bonding agent X903.050.084 and screw in until inner race of taper roller bearing (123) is in contact.

Washer (122) must be firmly held.

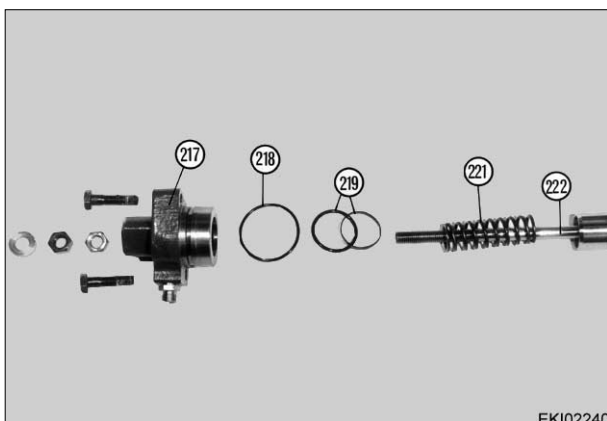


Slide needle-roller assembly (109), spacer (110) and needle-roller assembly (109) onto shaft (120).

Insert shaft (120).

Fit washer (108).

Clip circlip (107) in place.



Insert new compact sealing rings (219) into cylinder (217).

Insert new O-ring (218) into groove in cylinder (217) and grease. Grease seal elements.

Insert piston (222) with compression spring (221) into cylinder (217) in configuration shown.

**Note:**

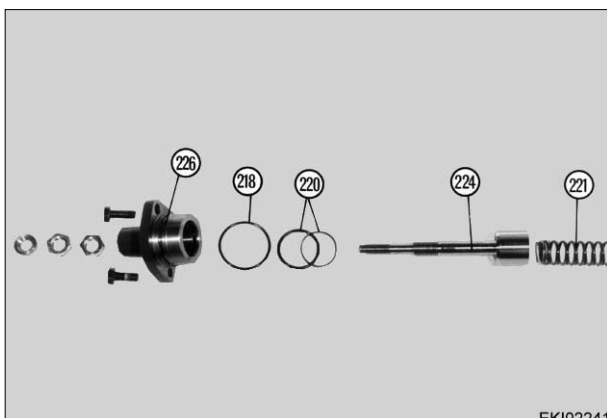
**Compact sealing ring (219) consists of two parts, O-ring on outside and piston guide ring on inside.**

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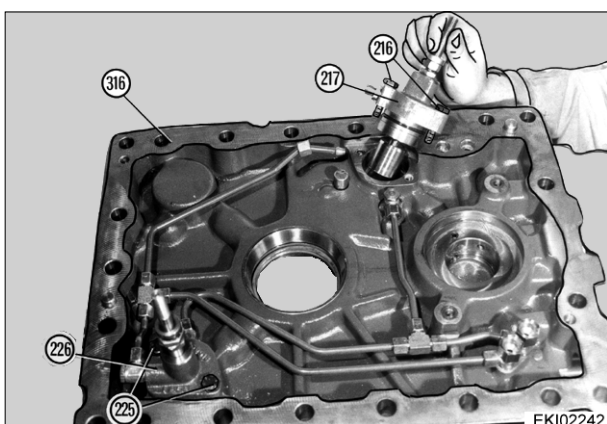
Insert new compact sealing rings (220) into cylinder (226).

Insert new O-ring (218) into groove in cylinder (226) and grease. Grease seal elements.

Insert piston (224) with compression spring (221) into cylinder (226) in configuration shown.

**Note:**

**Compact sealing ring (220) consists of two parts, O-ring on outside and piston guide ring on inside.**

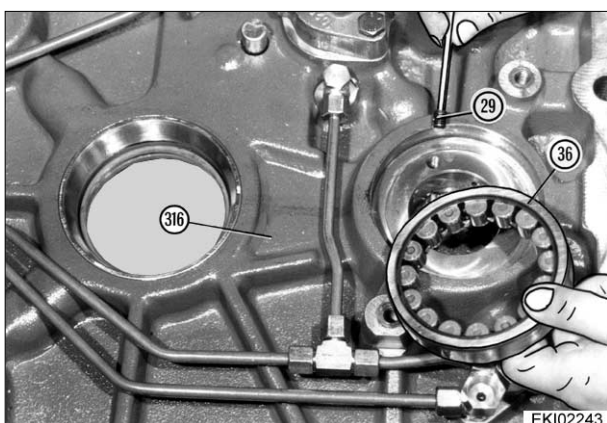


EKI02242

Fit cylinder (217) and cylinder (226).

Coat thread of hexagon screws (216) and (225) with synthetic bonding agent X 903.050.084 and tighten to **49 Nm**.

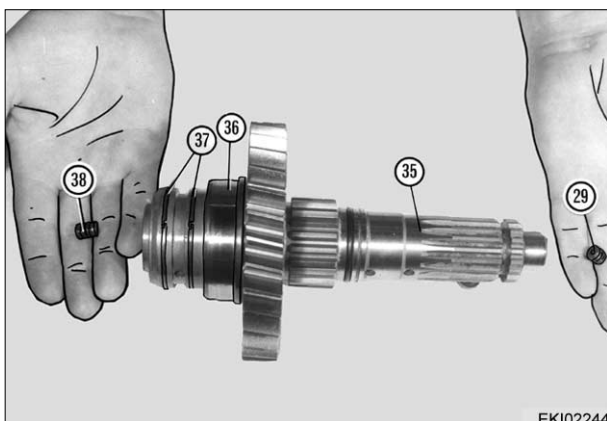
Connect hydraulic lines - where removed - to housing cover (316).



EKI02243

If new housing cover (316) is fitted, screw nozzle (29) into threaded bore as far as stop.

Press outer race of cylindrical roller bearing (36) in as far as stop.



EKI02244

Insert two new rectangular-section rings (37) into grooves in shaft (35), lock and grease.

Press inner race of cylindrical roller bearing (36) in as far as stop.

When fitting new shaft (35), coat setscrew (38) with synthetic bonding agent X 903.050.084 and screw in as far as stop.

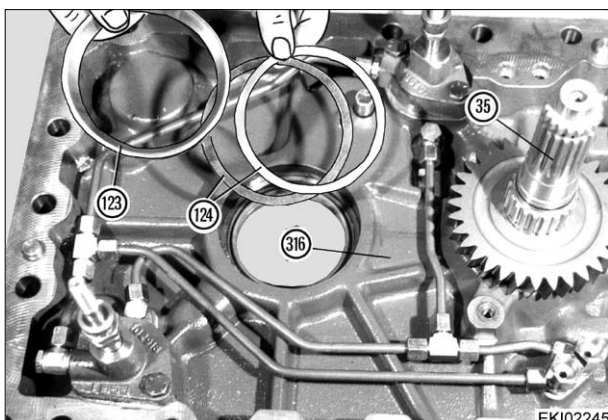
Screw nozzle (29) in as far as stop.

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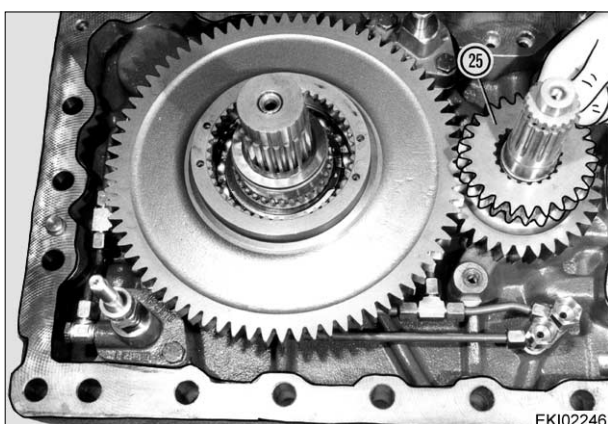
## Transmission / Live PTO Installation and removal of live PTO gearbox

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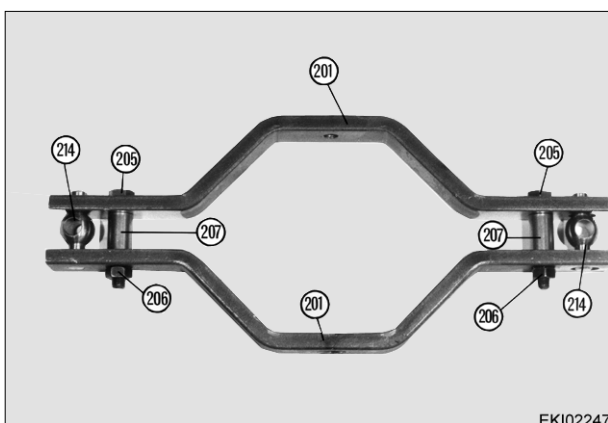


Hold pre-assembled shaft (35) in place in housing cover (316).

Where removed: insert existing adjusting washers (124) and press bearing outer race of taper roller bearing (123) in as far as stop.



Insert pre-assembled pair of gears and spur gear (25).

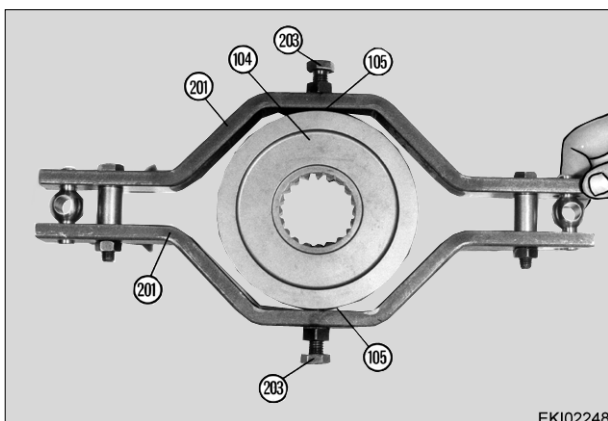


### Pre-assembling strap (201):

Coat thread of hexagon screws (205) with synthetic bonding agent X903.050.084.

Fit spacer sleeves (207) and supports (214).

Tighten hexagon nuts (206).



Fit sliders (105) into clutch hub (104).

Coat thread of stud bolts (203) with synthetic bonding agent X903.903.050.084.

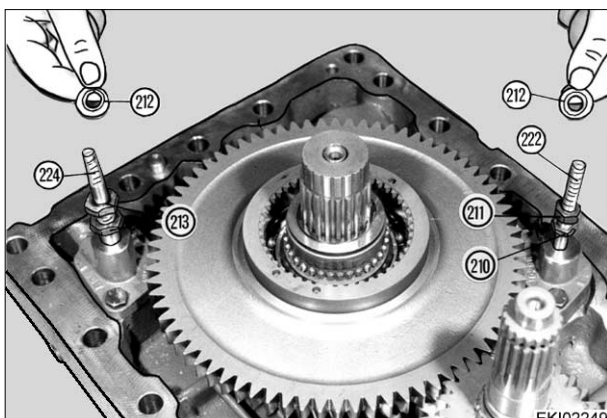
Set straps (201) equidistantly such that they are play-free.

Then loosen each stud bolt (203) by 1/6 turn and lock in this position.

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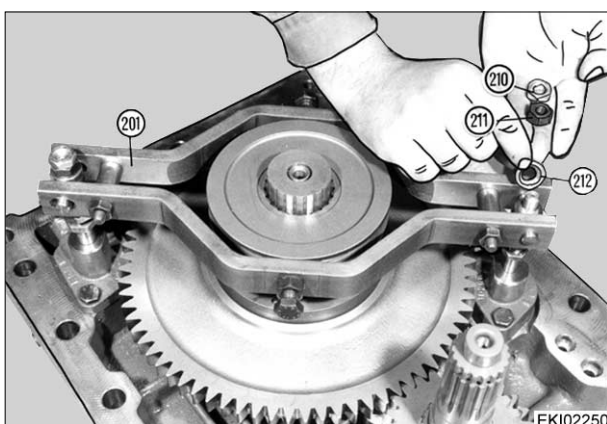
Fav 900

## Transmission / Live PTO Installation and removal of live PTO gearbox

**G**

Screw hexagon nuts (210), (211) and (213) onto piston rods (222) and (224).

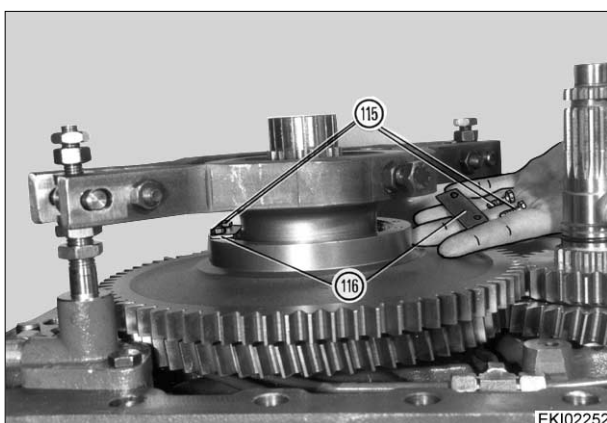
Locate washers (212) with depression facing upwards.



Fit pre-assembled strap (201).

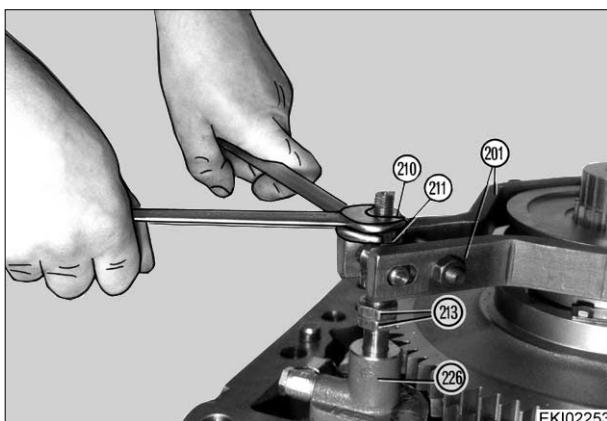
Locate washers (212) with depression facing downwards.

Screw on hexagon nuts (211) and (210).



Coat thread of hexagon screws (115) with synthetic bonding agent X903.903.050.084.

Insert stops (116) and tighten hexagon screws (115).



**Note following before setting switching travel :**

Slot in strap (201) faces cylinder (226).

Screw hexagon nuts (213) fully onto piston rod of cylinder (226).

Screw hexagon nuts (211) and (210) as far as stop and lock.

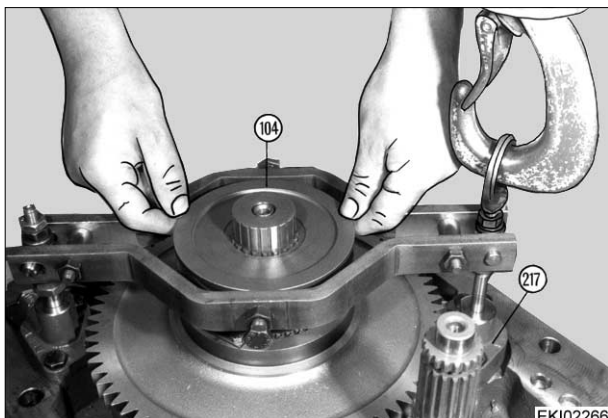
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Fav 900

## Transmission / Live PTO Installation and removal of live PTO gearbox

G

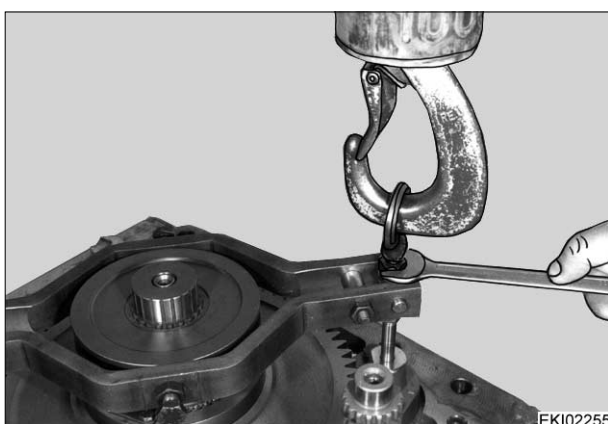


Screw M12 ring nut (DIY) onto piston rod of cylinder (217).

Use hoist to withdraw piston rod as far as stop (750 or 540 rpm position).

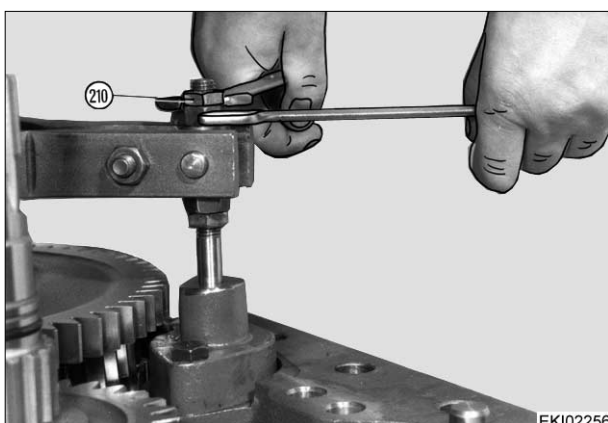
Check play in clutch hub (104).

**Target value: 0.1-0.2 mm play**

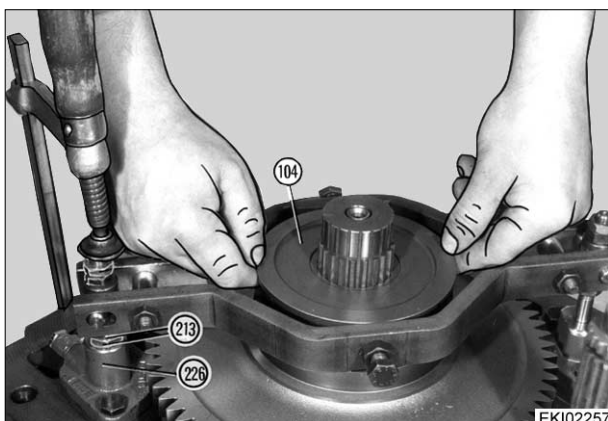


### In event of discrepancies

Adjust M12 setting nut at top and bottom correspondingly until play of 0.1-0.2 mm is reached.



Remove hoist, then unscrew and lock M12 ring nuts (DIY).



Press piston rod of cylinder (226) in using G clamp until hexagon nuts (213) are in contact (stroke limit, 1000 rpm position).

Check play in clutch hub (104).

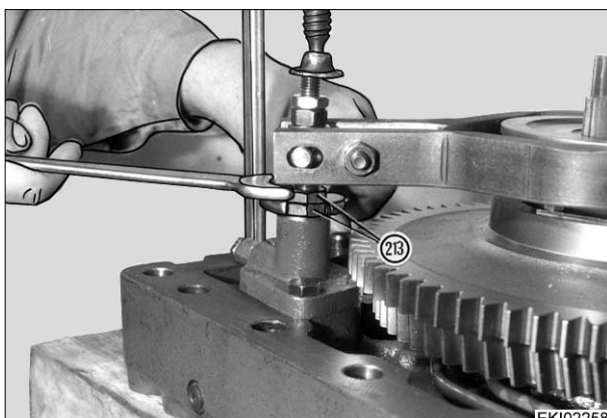
**Target value: 0.1-0.2 mm play**

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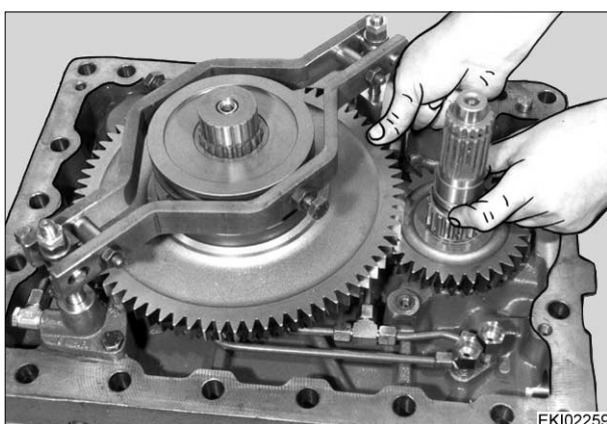
Fav 900

## Transmission / Live PTO Installation and removal of live PTO gearbox

G

**In event of discrepancies**

Adjust hexagon nut (213) correspondingly until play of 0.1-0.2 mm is reached and then lock.



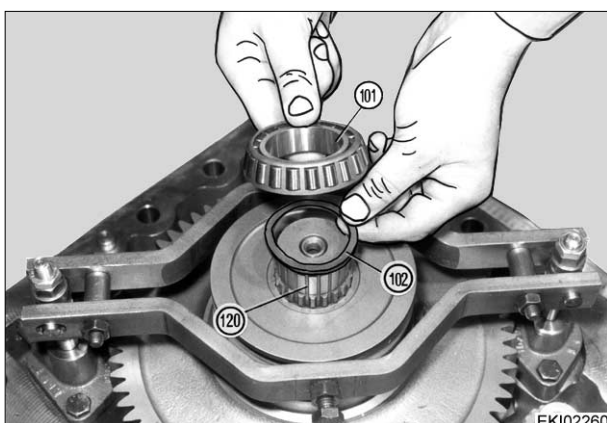
Remove G clamp.

Switching mechanism engages in "Neutral".

It must be possible to rotate spur gears for 750 or 540 and 1000 positions freely.

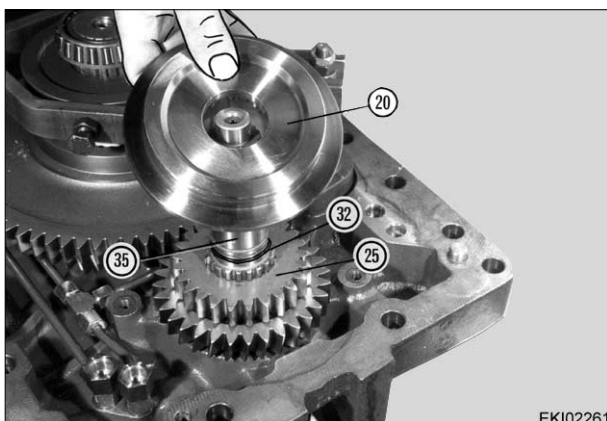
Free travel in switching mechanism must be equally large upwards and downwards.

In event of discrepancies repeat setting procedure for switching mechanism.



Fit locating ring (102).

Slide inner race of taper roller bearing (101) onto shaft (120) as far as stop.



Locate spur gear (25).

Insert new O-ring into groove in shaft (35) and grease.

Check brake disc (20) for damage.

If required, fit new brake disc (20).

**For further details on fitting clutch please refer to:**

**Chapter 1220 Reg. G - Installation and removal of live PTO clutch**

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Fav 900

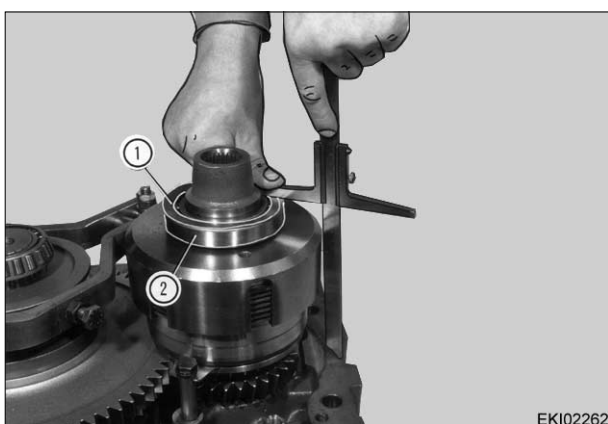
## Transmission / Live PTO Installation and removal of live PTO gearbox

G



EKI02188

Align externally toothed discs (12) and press clutch bell housing (3) in place as far as stop.

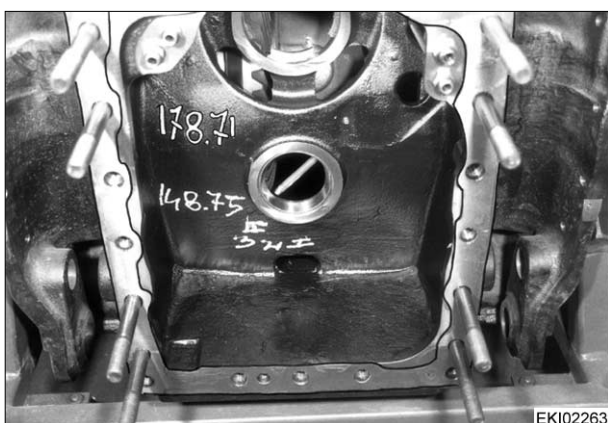


EKI02262

Locate existing adjusting washer (1) or adjusting washers (1) on deep-groove ball bearing (2).

Measure and record distance to flange surface.

E.g. 178.6 mm



EKI02263

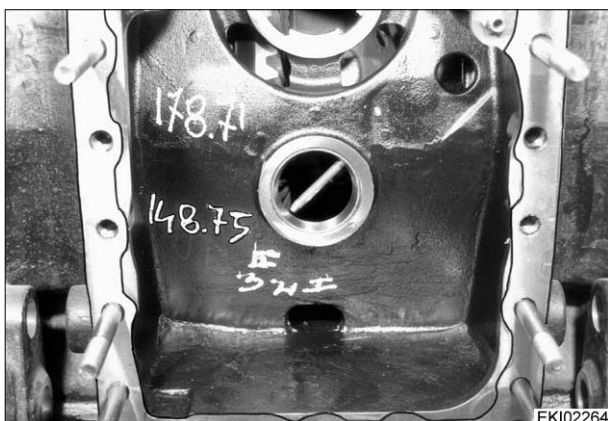
Distance from bearing face surface to flange surface is marked in white at top in rear-axle housing.

E.g. 178.71 mm

Distance from adjusting washer of deep-groove ball bearing (2) to flange surface of housing cover must be 0.1-0.2 mm less than marked distance.

**In other words, bearing system must have play of 0.1-0.2 mm.**

In event of discrepancies, correct using adjusting washer (1).



EKI02264

Distance of lower shaft from bearing face surface to flange surface is marked in white at bottom in rear-axle housing.

E.g. 148.75

**Note:**

**This dimension is not required for repairs since a measurement device is needed to measure bearing play.**

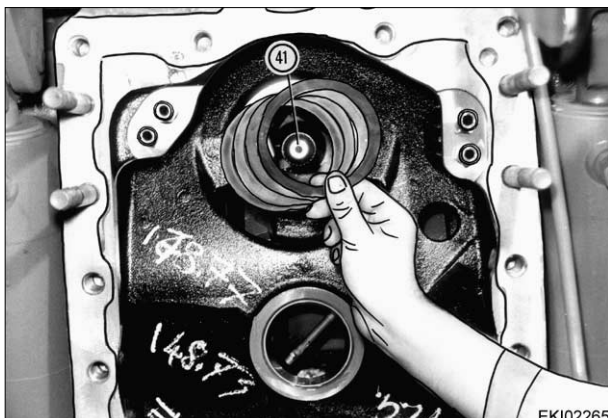
**To check bearing play in lower shaft (120): see description below.**

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Fav 900

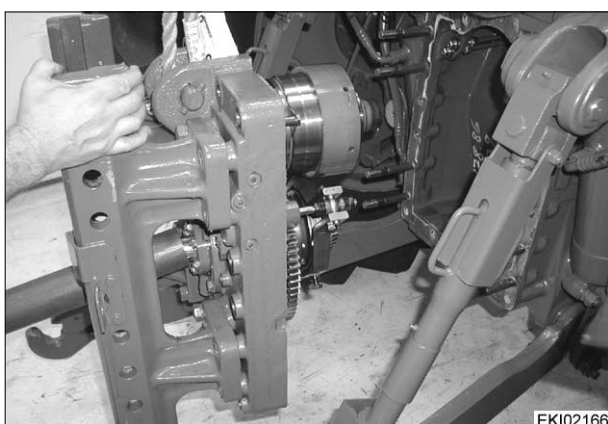
## Transmission / Live PTO Installation and removal of live PTO gearbox

G

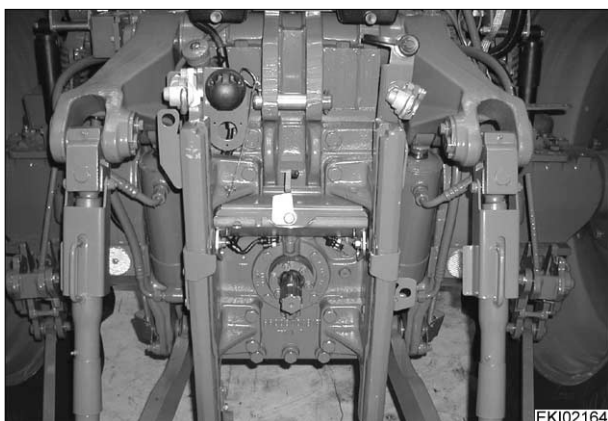


Insert appropriate adjusting washers (1) into upper bore.

Fit and grease four new O-rings for pressure connections.



Attach housing cover to hoist, taking appropriate safety precautions, and mount on rear-axle housing.



Tighten M18 fastening nuts and bolts to **400 Nm** .



Where removed:

Coat new shaft seal (126) thinly on outside with sealant X 903.051.711 - with sealing lip facing oil chamber - and press into bearing cap (128) until stop is just reached

**(to depth of approx. 5mm).**

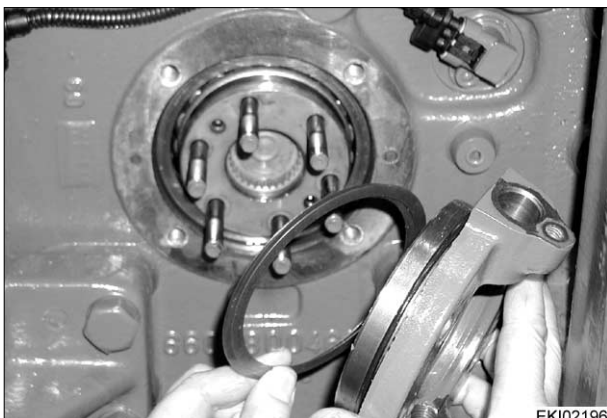
Fill sealing lips 2/3 with grease.

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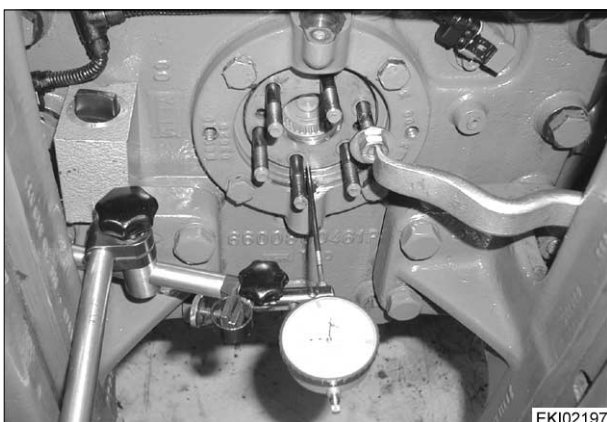
Fav 900

## Transmission / Live PTO Installation and removal of live PTO gearbox

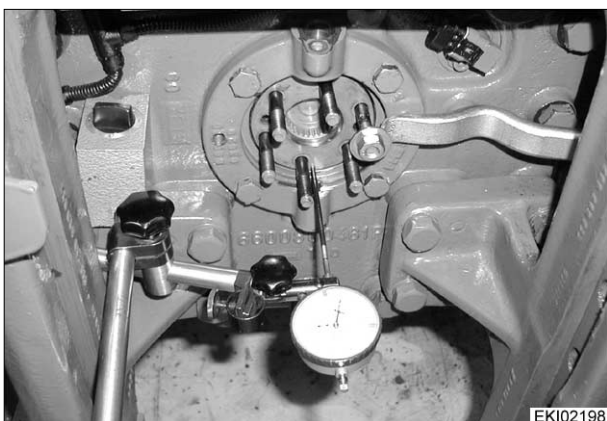
G



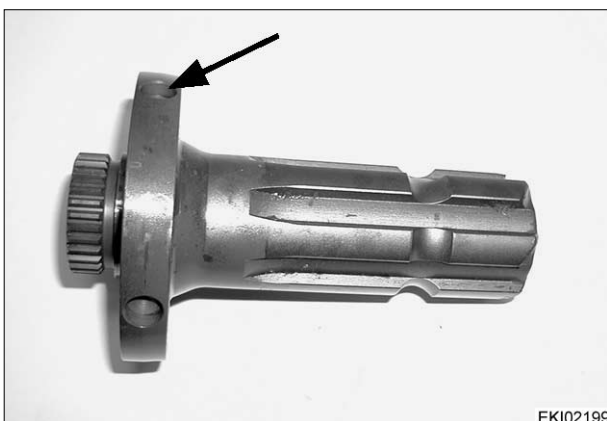
Insert existing adjusting washers (124).  
 Insert new O-ring (127) into groove in bearing cap (128) and grease.  
 Coat thread of hexagon screws (129) with synthetic bonding agent X903.903.050.084 and tighten.



Rotate shaft (120) approx. 10 times.  
 Attach gauge.  
 Press shaft (120) in once and record play.



Rotate shaft (120) approx. 10 times.  
 Attach gauge.  
 Withdraw shaft (120) once and record play.  
**Total play = play, pressing shaft (120) in + play, withdrawing shaft (120)**  
**Target value: 0.02-0.07 mm play**  
 In event of discrepancies, correct using adjusting washers (124).

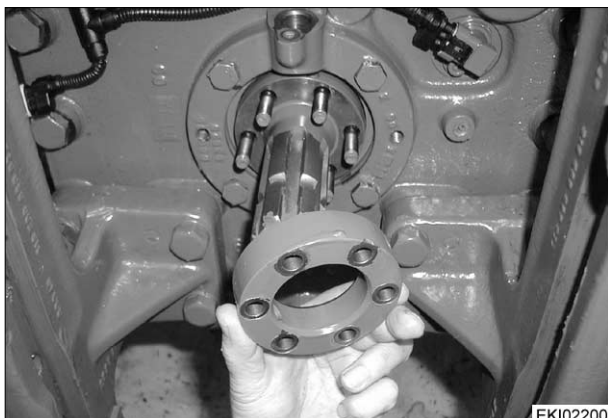


Flanged pin splined shaft 6-part 1 3/8"  
 Optionally:  
 Flanged pin involute 21-part 1 3/8"  
 Flanged pin splined shaft 6-part 1 3/4"  
 Flanged pin involute 20-part 1 3/4"  
**Note:**  
**Flanged pin has four pulse bores (arrowed) for B020 - sensor.**

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Fav 900

Transmission / Live PTO  
**Installation and removal of live PTO gearbox**

**G**

Fit flanged pin (137).

Fit spacer (132).



Lock flanged pin (137) in place using M16 screw (arrowed) (as fitting aid).

Tighten M10-10 hexagon nuts (134) to **69 Nm** .

Fill with transmission oil.

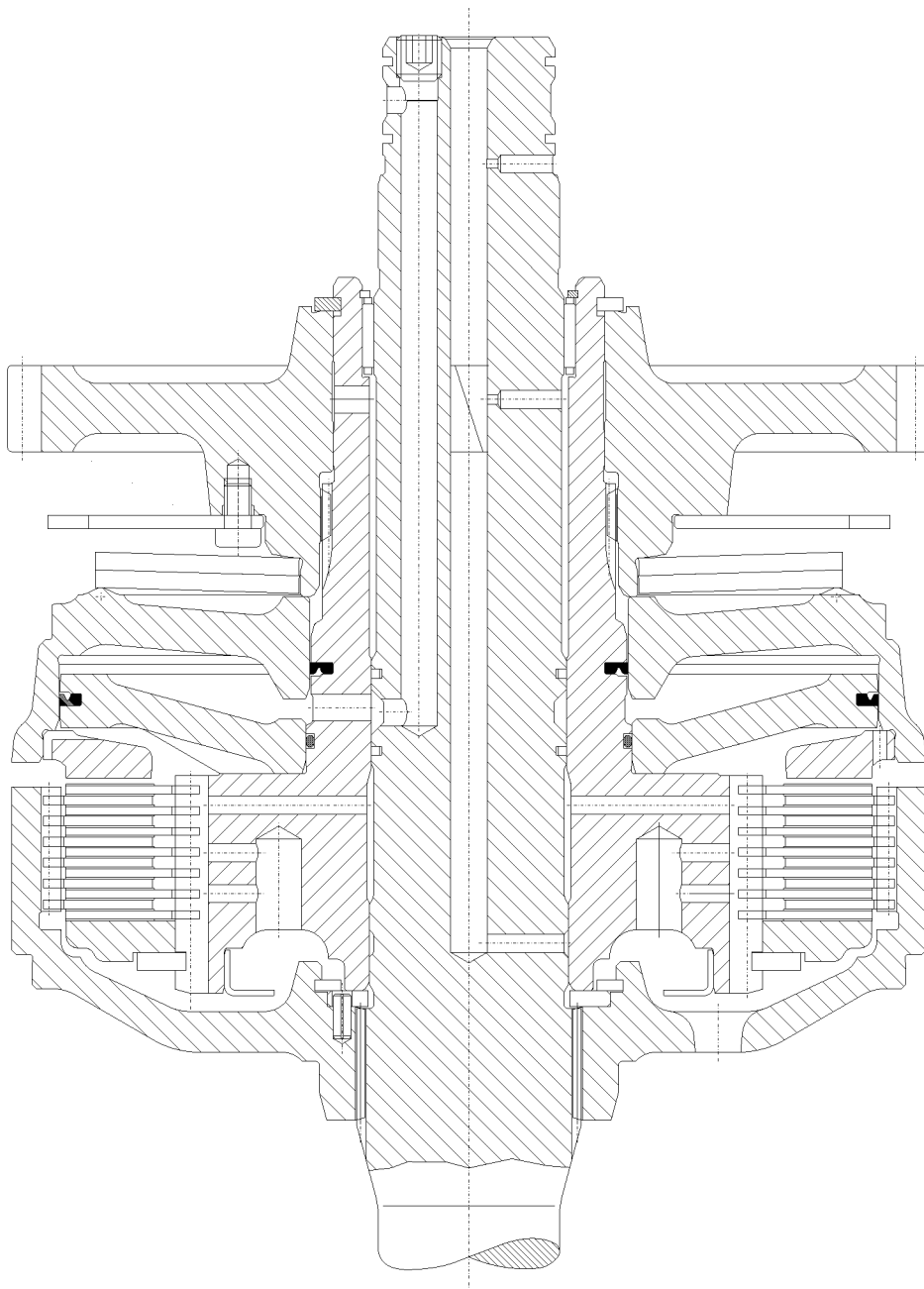
**Note:****Chapter 0000 Reg. A - Fuels and lubricants**

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**Fav 700**  
**Fav 900**

**Transmission / front-wheel drive**  
**Technical drawing of front-wheel drive clutch**

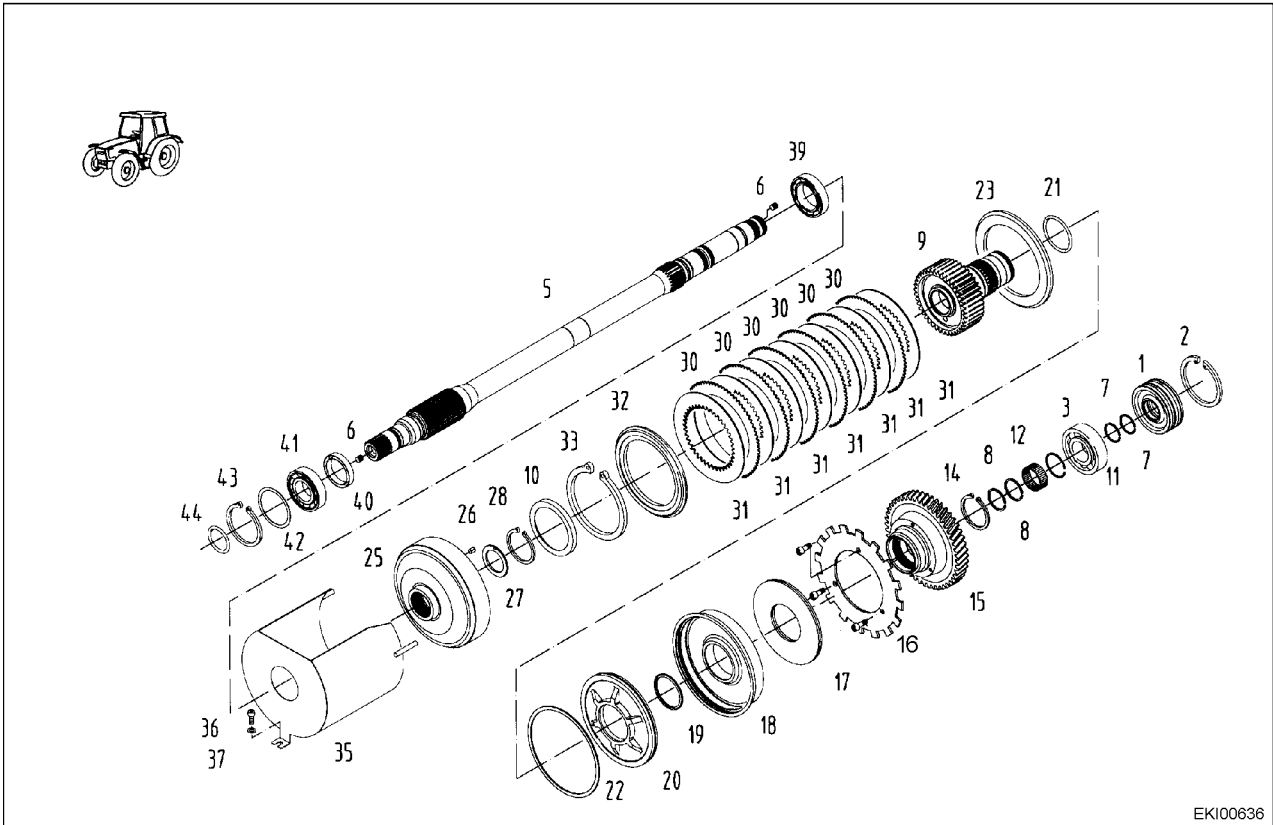
**C**



EKI00763

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09/2000	a	1/1		1320	C	000001

<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Transmission / front-wheel drive <b>Repairing front-wheel drive clutch</b></p>	<p><b>G</b></p>
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EKI00636

Item	Description	Item	Description
1	Cover	22	Lip seal
2	Circlip	23	Supporting plate
3	Ball bearing	25	Clutch bell housing
5	Shaft	26	Dowel pin
6	Setscrew	27	Washer
7	Rectangular-section ring	28	Circlip
8	Rectangular-section ring	30	Externally toothed disc
9	Disc carrier	31	Internally toothed disc
10	Oil tray	32	Supporting plate
11	Snap ring	33	Circlip
12	Needle roller bearing	35	Shroud
14	Circlip	36	Hexagon screw
15	Spur gear	37	Washer
16	Ratchet wheel	39	Ball bearing
17	Belleville spring package	40	Shaft seal
18	Piston	41	Ball bearing
19	Lip seal	42	Shim
20	Piston disc	43	Circlip
21	O-ring	44	O-ring

**Note:**

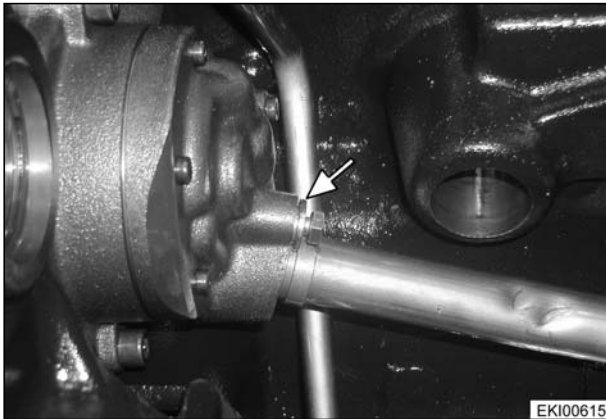
The procedure was performed on a model for greater clarity.

**The following must first be carried out:**

- Removing continuously variable drive - Chapter 1080 Index G
- Repairing cardan-shaft brake - Chapter 1320 Index G

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<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Transmission / front-wheel drive <b>Repairing front-wheel drive clutch</b></p>	<p><b>G</b></p>
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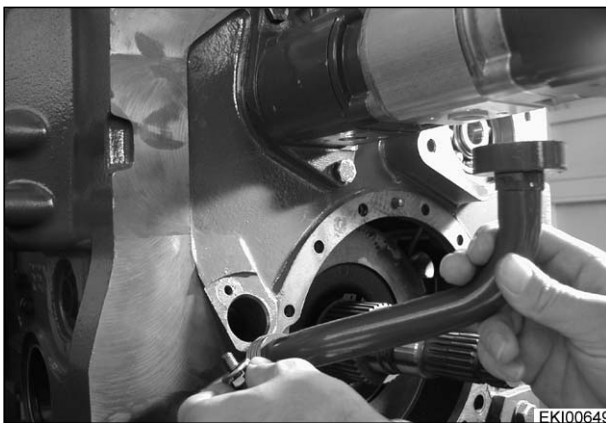


**Removing front-wheel drive clutch:**  
**Removing Fav 900 suction pipe**

Remove M8 screw and withdraw locating washer.



Slide suction pipe out of filter housing.



**Removing Fav 700 suction pipe**

Detach suction pipe bend.



Slide suction pipe out of filter housing.

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**Fav 700**  
**Fav 900**

**Transmission / front-wheel drive**  
**Repairing front-wheel drive clutch**

**G**



**Further disassembly work shown on Fav 900:**  
Detach screw cap. Remove suction filter.



Remove suction filter housing (using DIY special tool).



DIY special tool

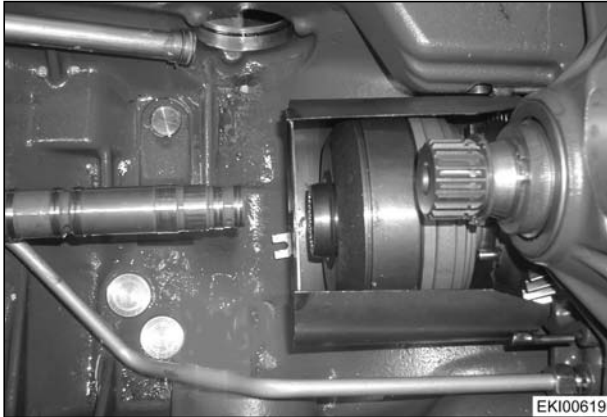


Remove speed sensor bevel pinion.

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<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Transmission / front-wheel drive <b>Repairing front-wheel drive clutch</b></p>	<p><b>G</b></p>
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Withdraw shaft (5).



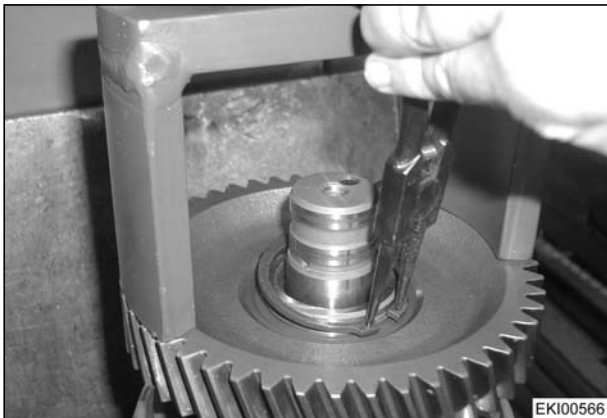
**Caution:**  
Once shaft has been removed, there is no further control over front-wheel drive clutch. Beware of injury risk!



Remove front-wheel drive clutch together with shroud (35).



Locate third hand (DIY).  
Press belleville spring package (17) together with press until circlip (2) can move freely.



Unclip circlip (2) and carefully release press.

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**Fav 700**  
**Fav 900**

**Transmission / front-wheel drive**  
**Repairing front-wheel drive clutch**

**G**



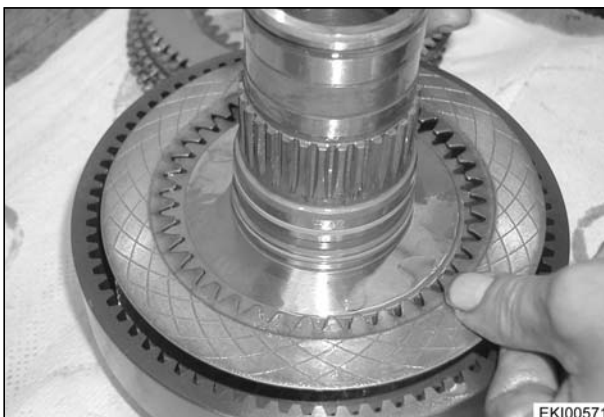
Remove spur gear (15).



Remove belleville spring package (17).



Remove piston (18), piston disc (20) and supporting plate (23).



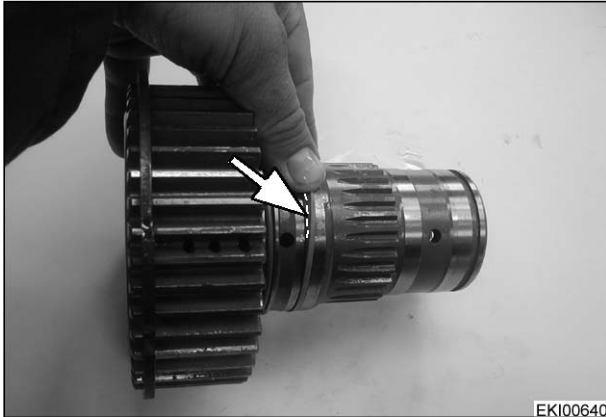
Remove disc package (30/31), supporting plate (32) and disc carrier (9).

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Fav 700  
Fav 900

Transmission / front-wheel drive  
**Repairing front-wheel drive clutch**

**G**



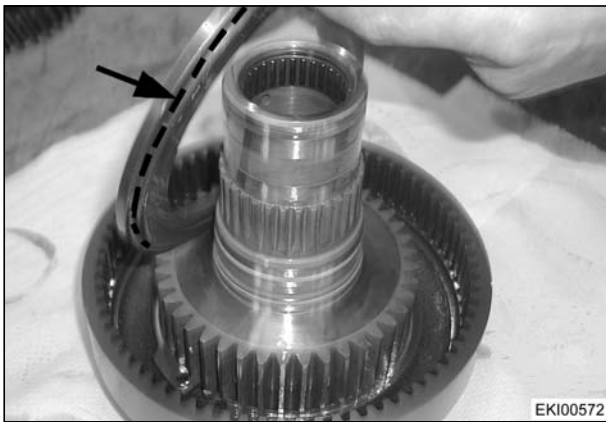
EKI00640

**Installing front-wheel drive clutch:**

Fit disc carrier (9) with new O-ring (21) and new lip seal (19).

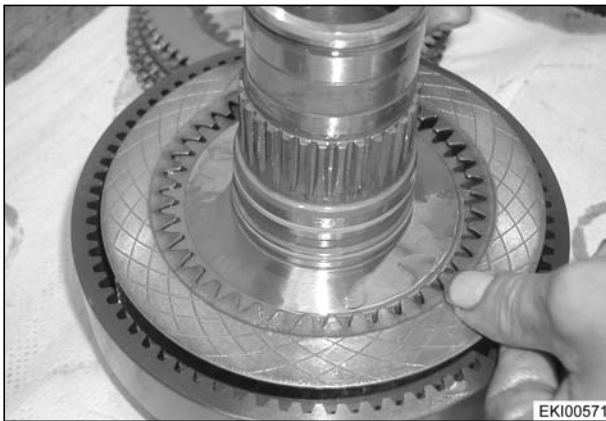
**Note:**

**Grease O-ring (9) and lip seal (21).  
Groove (arrowed) in lip seal faces oil chamber.**



EKI00572

Insert disc carrier (9) into clutch bell housing (25).  
Fit supporting plate (32). Groove (arrowed) faces clutch bell housing (25)



EKI00571

Fit disc package, starting with internally toothed disc (31).  
Oil internally toothed discs. Fit internally toothed disc (31) and externally toothed disc (30) alternately.



EKI00643

Fit supporting plate (23). Groove (arrowed) faces internally toothed disc (31).

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<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Transmission / front-wheel drive <b>Repairing front-wheel drive clutch</b></p>	<p><b>G</b></p>
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Fit new lip seal (22) to piston disc (20).

**Note:**  
Grease lip seal (22).  
Groove (arrowed) in lip seal faces oil chamber.



Insert piston disc (20) into piston (18).  
Note installation position (arrowed).



Fit piston (18), piston disc (20).



Fit Belleville spring package (17).

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**Fav 700**  
**Fav 900**

**Transmission / front-wheel drive**  
**Repairing front-wheel drive clutch**

**G**



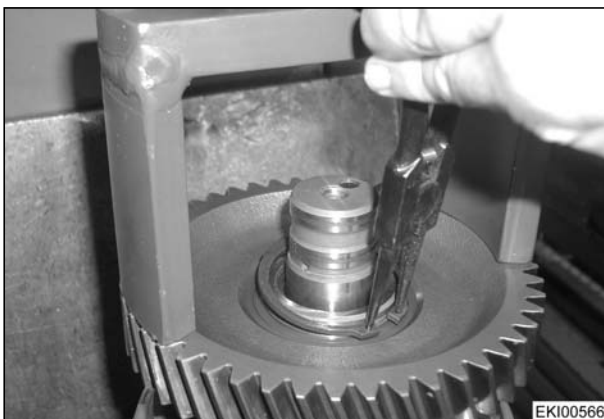
Fit spur gear (15).



Insert shaft (5) to centre front-wheel drive clutch.



Place front-wheel drive clutch with mounted shaft (5) in press.



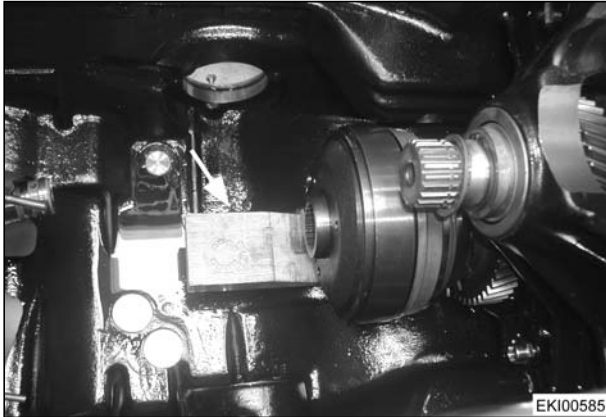
Locate third hand (DIY).

Press belleville spring package (17) together in press.

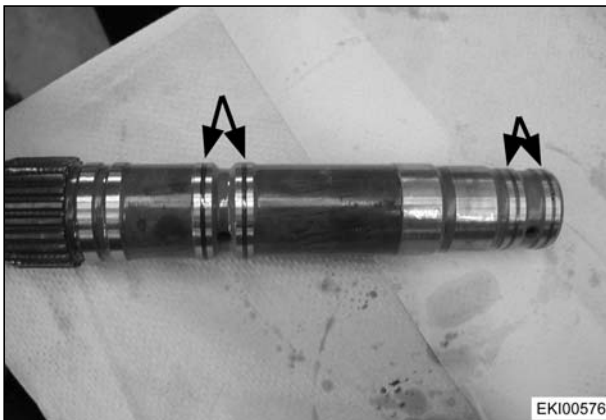
Clip circlip (2) in place.

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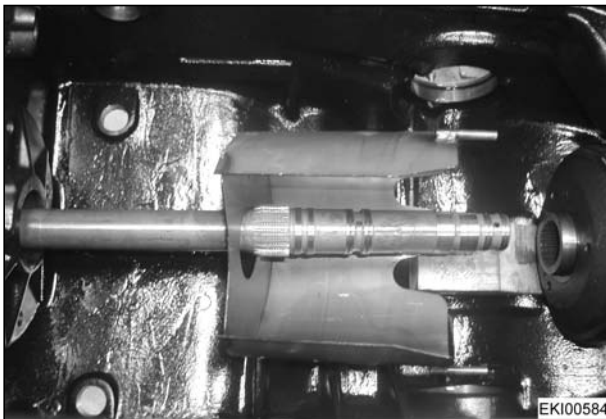
<p>Fav 700 Fav 900</p>	<p>Transmission / front-wheel drive <b>Repairing front-wheel drive clutch</b></p>	<p><b>G</b></p>
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Fit front-wheel drive clutch, placing wedge underneath.

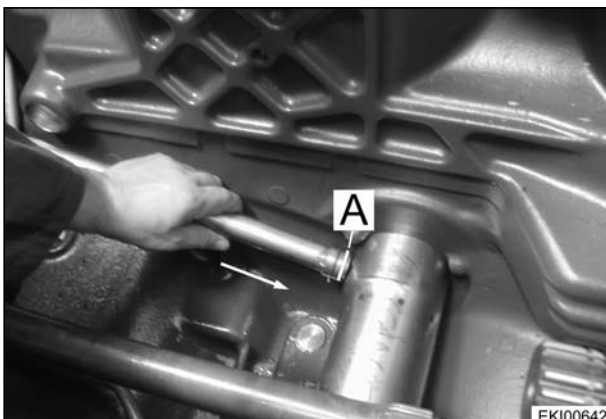


Insert four rectangular-section rings (arrowed) into grooves of shaft (5) such that they are offset relative to each other, then secure and grease them.



Insert shaft (5), remove wedge and fit shroud (35).

**Note:**  
**Ball bearing (32) must not be damaged.**  
**Move shaft (5) carefully to stop.**



Fit suction filter housing.

Slide suction pipe with new seal (item A) into suction filter housing.

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**Fav 700**  
**Fav 900**

Transmission / front-wheel drive  
**Repairing front-wheel drive clutch**

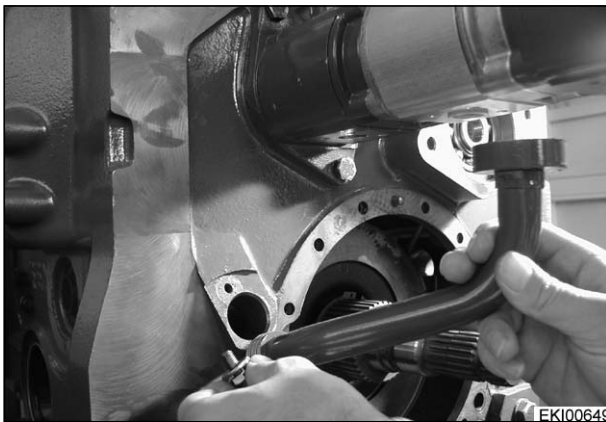
**G**



EKI00650

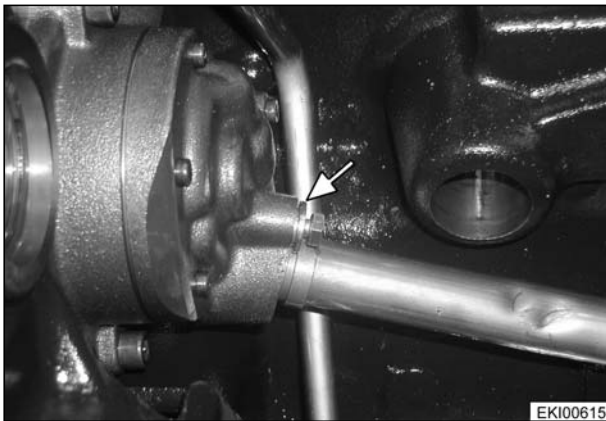
**Fitting Fav 700 suction pipe bend**

Fit new seals.  
Grease seals.



EKI00649

Fit suction pipe bend.



EKI00615

**Fitting Fav 900 suction pipe**

Insert locating washer in groove. Fasten with M8 screw.



EKI00616

Fit screw cap with new gasket.

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<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Transmission / front-wheel drive <b>Repairing front-wheel drive clutch</b></p>	<p><b>G</b></p>
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Fit speed sensor bevel pinion with sealant X 903.050.553.

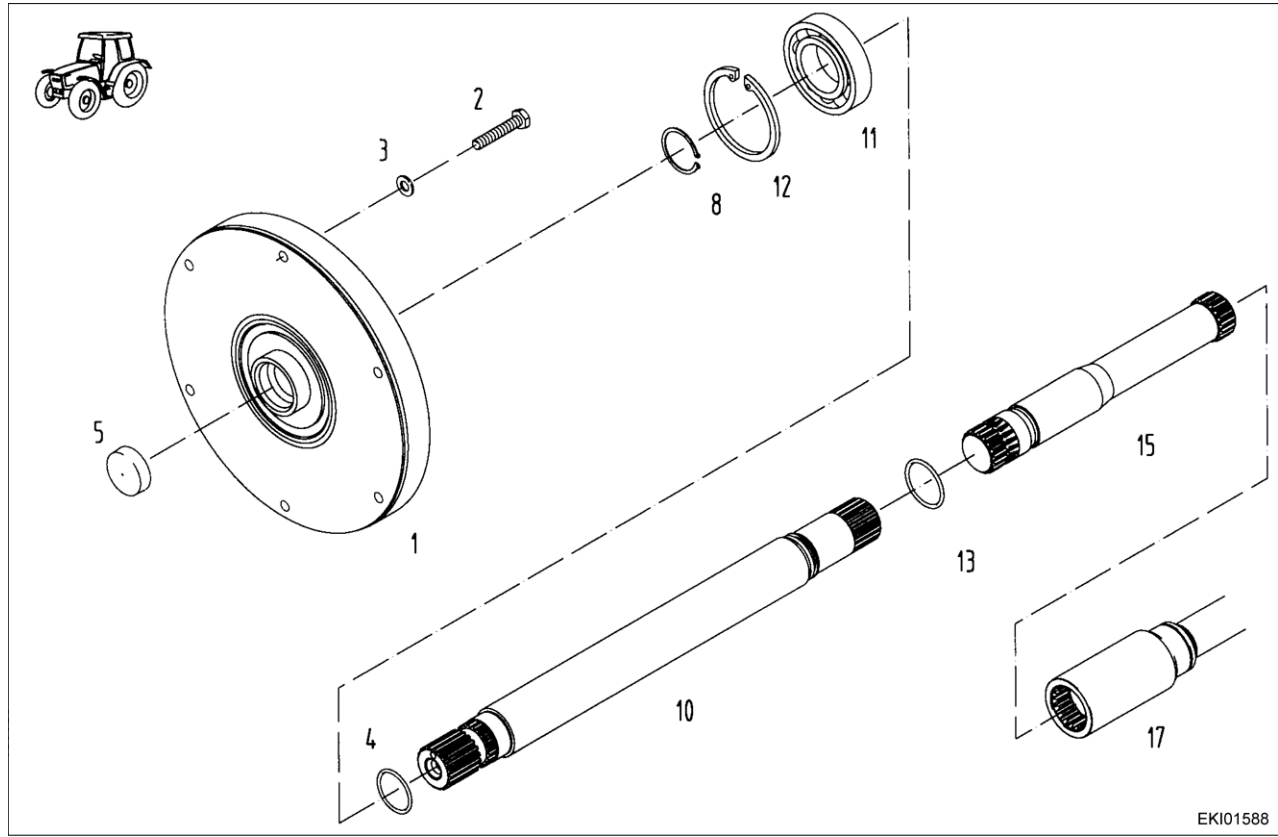
Repairing speed sensor - Chapter 9720 Index G

**Note:**  
**Drive shaft axial play setting: Repairing car-dan-shaft brake - Chapter 1150 Index G**

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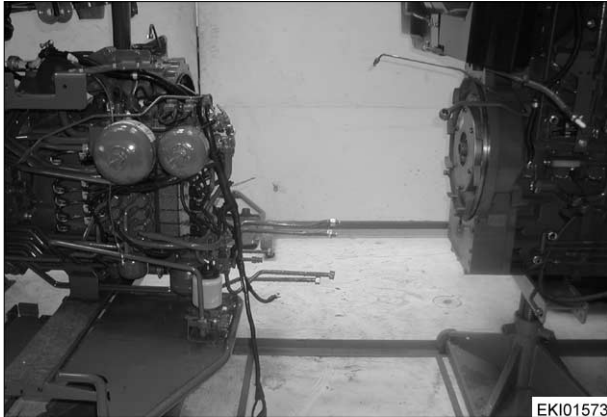


<b>Fav 900</b>	<b>Transmission / Hydrodamp Installation and removal of hydrodamp</b>	<b>G</b>
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Item	Designation	Item	Designation
1	Hydrodamp	10	Drive shaft
2	Hexagon screw	11	Deep-groove ball bearing
3	Washer	12	Circlip
4	O-ring	13	O-ring
5	Screw cap	15	Shaft
8	Circlip	17	Shaft

<p><b>Fav 900</b></p>	<p>Transmission / Hydrodamp  <b>Installation and removal of hydrodamp</b></p>	<p><b>G</b></p>
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EKI01573

**Preliminary work:**

**Disconnecting tractor, flywheel and clutch housing - see Chapter 1050 Reg.G**



EKI01572

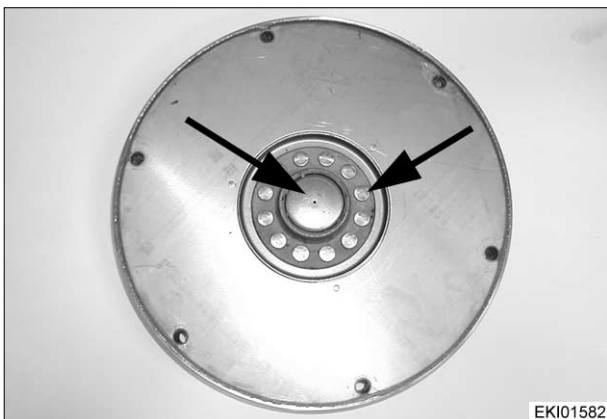
**Removing hydrodamp**

Unscrew hexagon screws.



EKI01574

Remove hydrodamp.



EKI01582

**Fitting hydrodamp**

If screw cap (5) is not fitted with new hydrodamp, fit screw cap (5).

**Note:**

**Ensure that rivets (arrowed) are firmly seated.**

Date	Version	Page	Installation and removal of hydrodamp	Capitel	Index	Docu-No.
06.06.2001	a	2/4		1430	G	000002

**Fav 900**

**Transmission / Hydrodamp  
Installation and removal of hydrodamp**

**G**



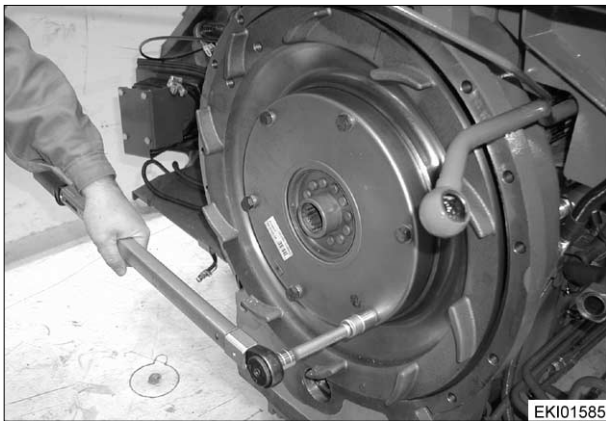
EKI01574

Locate hydrodamp on flywheel, taking care that it is grease-free and dry.



EKI01586

Coat M10-10.9 hexagon screws with synthetic bonding agent X 903.050.084.



EKI01585

Tighten hydrodamp crosswise and in stages to **71 Nm** .

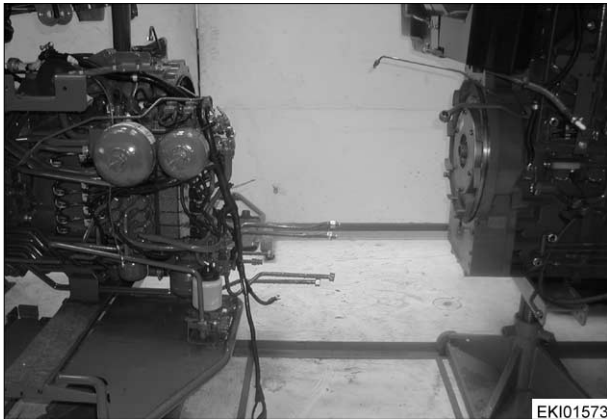


EKI01584

Coat inner splines of hydrodamp with long-life grease X 902.002.472.

Date	Version	Page	Installation and removal of hydrodamp	Capitel	Index	Docu-No.
06.06.2001	a	3/4		1430	G	000002

<b>Fav 900</b>	<b>Transmission / Hydrodamp Installation and removal of hydrodamp</b>	<b>G</b>
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**Connect tractor.  
Disconnecting tractor, flywheel and clutch housing - see Chapter 1050 Reg.G**

Date	Version	Page		Capitel	Index	Docu-No.
06.06.2001	<b>a</b>	4/4	<b>Installation and removal of hydrodamp</b>	<b>1430</b>	<b>G</b>	<b>000002</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Transmission / enhanced actuation system valves <b>Operation of turboclutch pressure-relief valve (4V4)</b>	<b>A</b>
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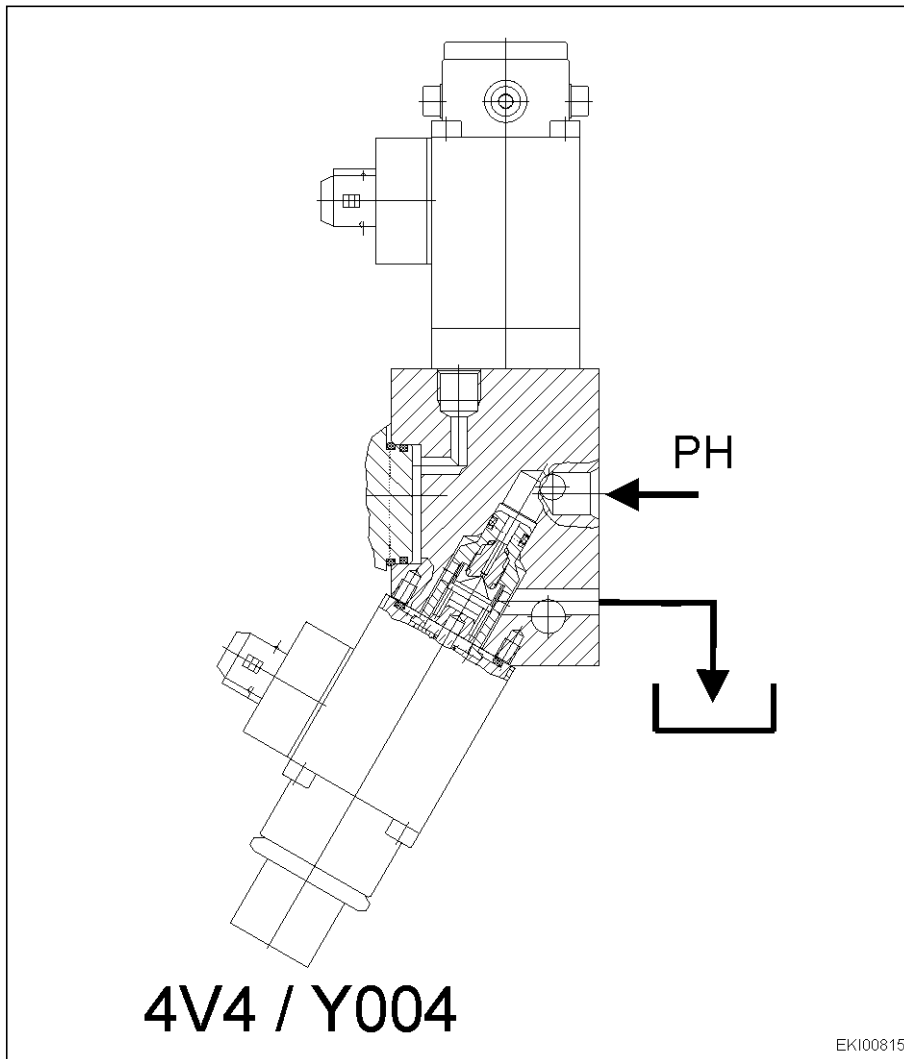
### Turboclutch pressure-relief valve 4V4 / Y004

Turboclutch valve (4V4) regulates build-up of high pressure **PH** such that it is proportional to engine speed.

This enables turboclutch operation.

Turboclutch valve is mounted in valve unit which also contains connection between high-pressure circuit **PH** and tank. If this connection is not closed, high pressure cannot be generated, and tractor does not reach maximum tractive power.

High-pressure circuit **PH** to tank is closed by turboclutch valve (4V4).



Turboclutch valve is actuated from electronic box. Electrical power consumption depends on engine speed and is as follows:

Engine speed	Power consumption	Max. PH	Note
800 rpm	0 A	0 bar	Transmission neutral
800 rpm	approx. 0.46 A	78 bar	Transmission actuated
1200 rpm	1.23 A	105 bar	
1400 rpm onwards	1.71 A	500 bar	

High-pressure build-up therefore depends on electrical supply and tightness of turboclutch valve against leaks.

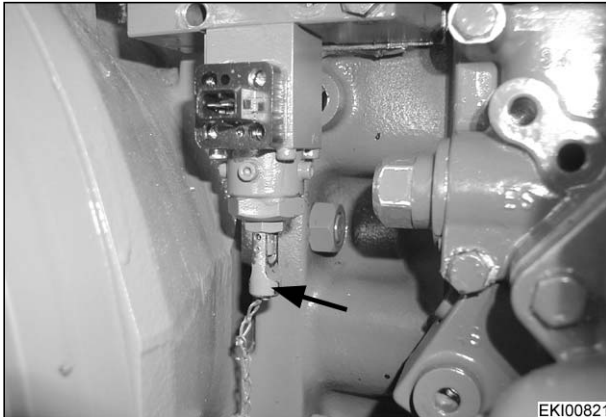
Date	Version	Page	Capitel	Index	Docu-No.
29.11.2000	a	1/2	1600	A	000001

**Farmer 400**  
**Fav 700**  
**Fav 900**

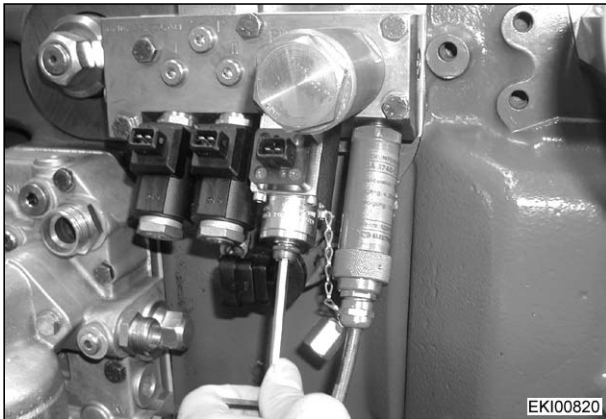
Transmission / enhanced actuation system valves  
**Operation of turboclutch pressure-relief valve (4V4)**

**A**

Turboclutch valve can be **mechanically locked** to check tightness against leaks.



- Move actuating lever (see arrow)



- or tighten hexagon socket screw

Date	Version	Page	Capitel	Index	Docu-No.
29.11.2000	<b>a</b>	2/2	<b>1600</b>	<b>A</b>	<b>000001</b>

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Transmission / enhanced actuation system valves  <b>Operation of clutch pressure-relief valve (4V5)</b></p>	<p><b>A</b></p>
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**Clutch pressure-relief valve 4V5**

Clutch pressure-relief valve is mounted in valve unit which also contains connection between high-pressure circuit **PH** and tank.

Clutch valve also limits max. high pressure **PH** to 500 bar (+/- 20 bar).

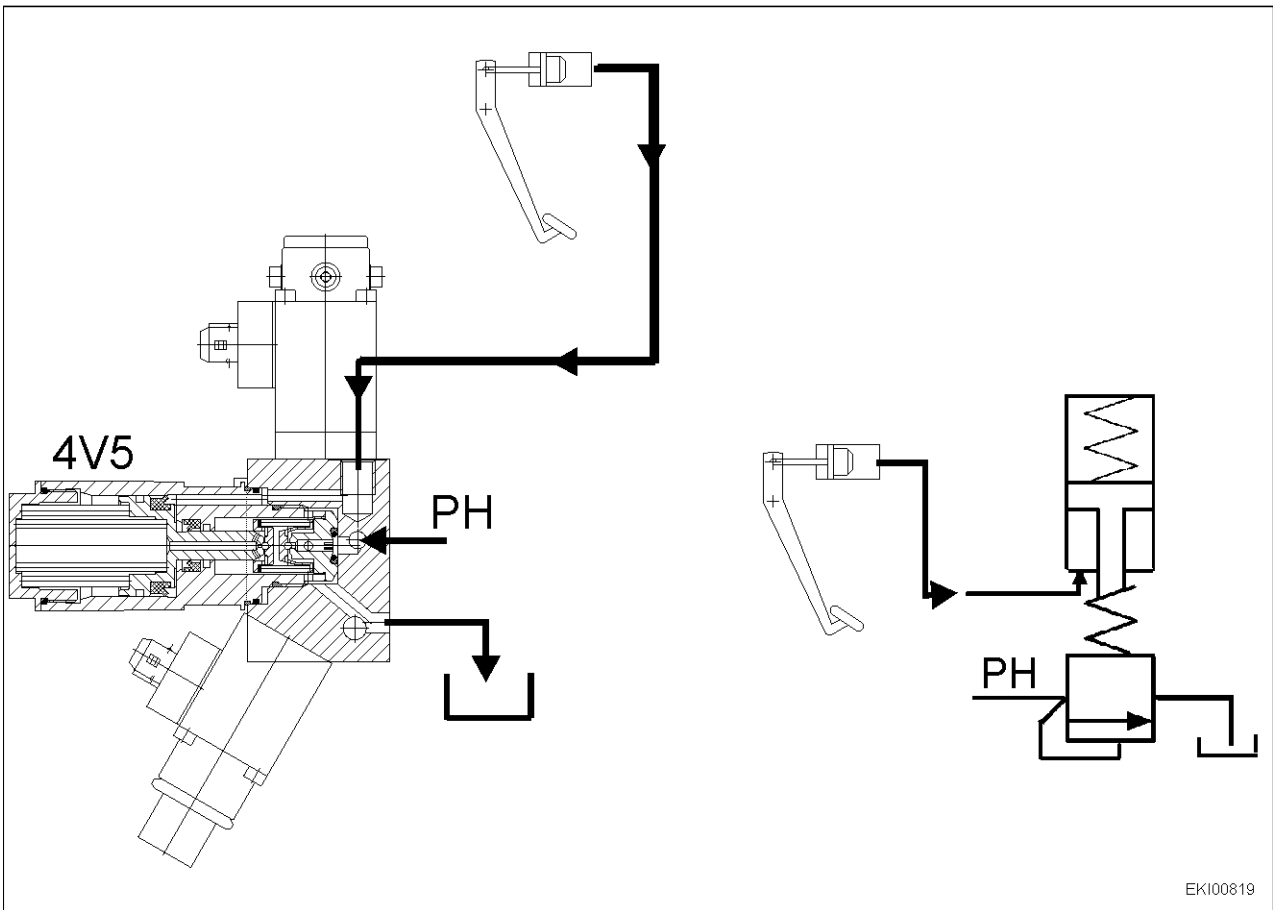
Clutch valve closes high-pressure circuit to tank when clutch pedal is not actuated.

When clutch pedal is actuated, clutch valve opens, and high pressure PH is discharged via tank connection.

Discharge of high pressure (interruption in tractive power) is therefore proportional to clutch pedal travel (comparable to mechanical clutch).

Clutch pedal fully depressed, **high pressure PH = 0 bar** .

**Max. high pressure and high-pressure build-up depend on operation and tightness against leaks of clutch pressure-relief valve (4V5).**



EK100819

Date	Version	Page	Operation of clutch pressure-relief valve (4V5)	Capitel	Index	Docu-No.
30.11.2000	a	1/1		1600	A	000002

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Transmission / enhanced actuation system valves  <b>Checking valve unit</b></p>	<p><b>E</b></p>
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If max. high pressure is not reached during high-pressure measurement, cause may lie in Vario transmission unit or outside this in valve unit. In order to decide whether Vario transmission unit has to be removed, valve unit (transmission control unit) should first be checked for tightness against leaks. Generation of high pressure in valve unit depends on tightness against leaks of

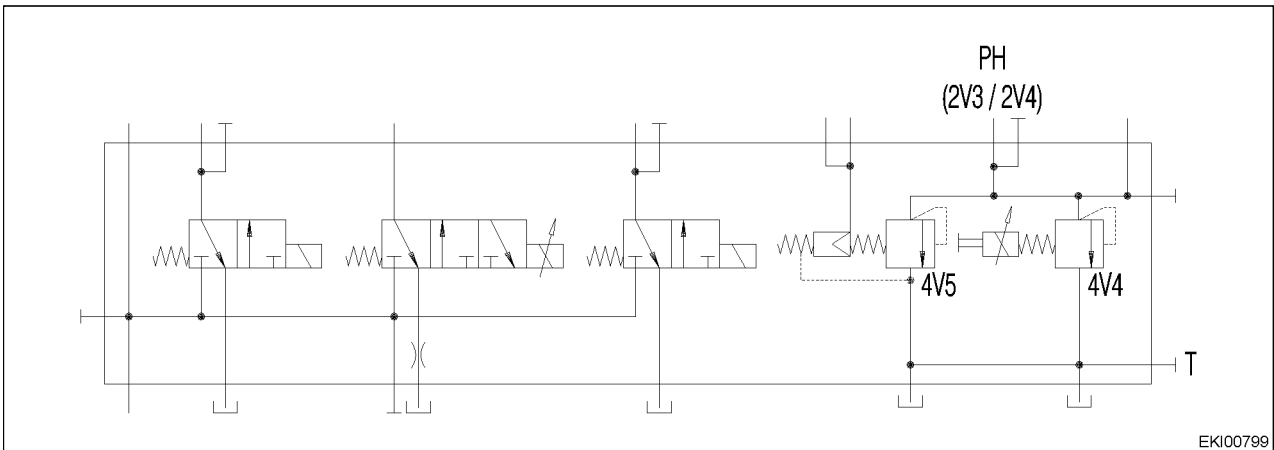
- turboclutch [ 4V4 / Y 004 ]
- clutch [ 4V5 ]

pressure-relief valves.

Turboclutch valve is closed under following circumstances, and therefore high pressure cannot be generated:

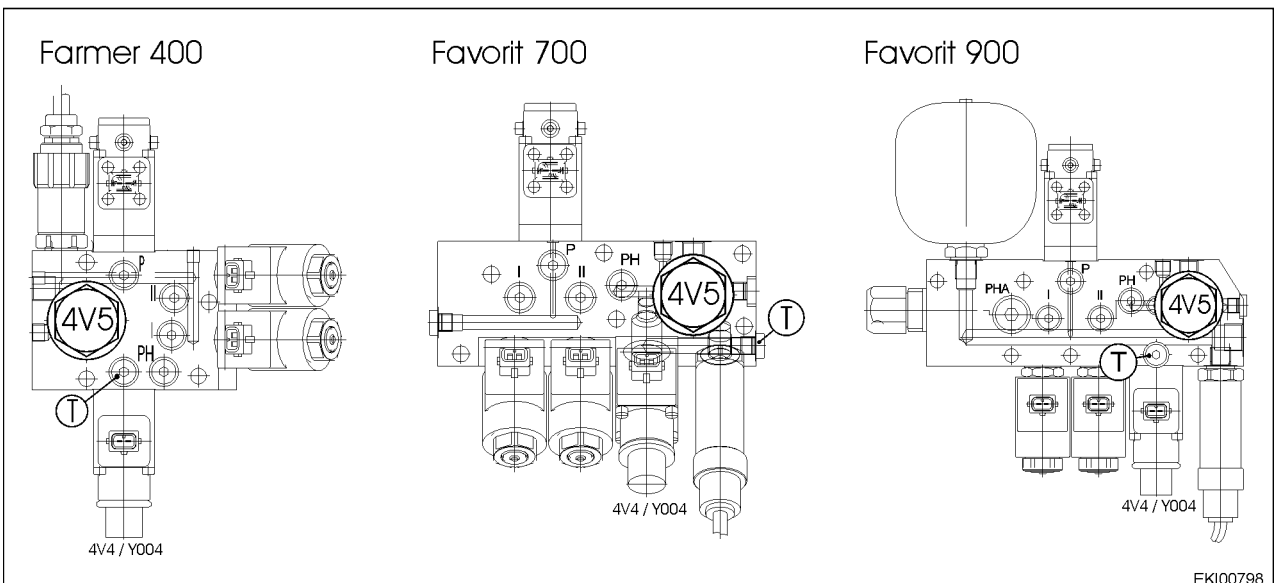
- Engine speed greater than 1400 rpm (energised to maximum)
- Emergency mode actuated.
- Valve mechanically locked (tighten hexagon socket screw or operate actuating lever)

Clutch valve is closed (high pressure can be generated) when clutch pedal is **not actuated** .



EKI00799

Tightness of both pressure-relief valves (4V4 / 4V5) against leaks can be checked at connection **T** .



EKI00798

Date	Version	Page	Checking valve unit	Capitel	Index	Docu-No.
24.11.2000	a	1/3		1600	E	00001



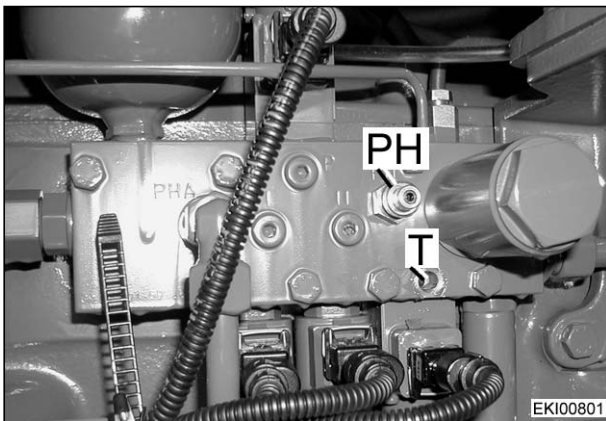
<p><i>Farmer 400</i>  <i>Fav 700</i>  <i>Fav 900</i></p>	<p>Transmission / enhanced actuation system valves  <b>Checking valve unit</b></p>	<p><b>E</b></p>
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**Checking high-pressure circuit in valve unit**

Following preliminary work must be carried out:

 **Danger:**  
**Jack tractor up on 4 trestles taking appropriate safety precautions (high-pressure measurement).**

- Remove right rear wheel and panels.
- Remove drain plug at **connection T** .
- Connect pressure gauge with range of greater than 500 bar to **test connection PH** .



**Test sequence:**

1. Start engine.
2. Actuate Emergency mode.  
 Actuate clutch pedal.  
 Actuate push-button to left of steering wheel.



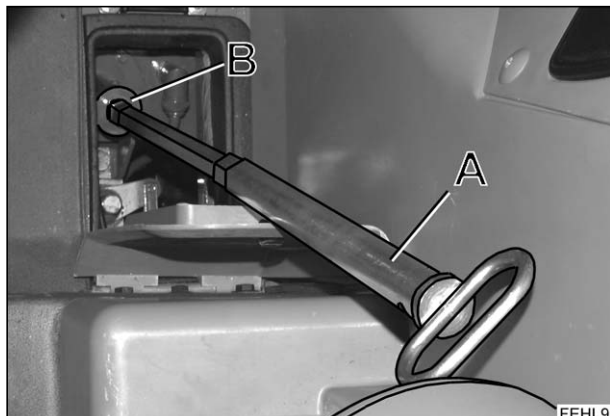
Following is displayed on combi-instrument:

3. Pull on handbrake.

Date	Version	Page	Checking valve unit	Capitel	Index	Docu-No.
24.11.2000	a	2/3		1600	E	000001

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Transmission / enhanced actuation system valves <b>Checking valve unit</b>	<b>E</b>
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4. Attach auxiliary actuation device (A) and operate transmission against high pressure.



#### Measurement (example):

PH	Connection T	Possible cause of fault
250 bar	No oil flows from T	Fault in Vario transmission unit (shuttle valve, screw coupling in pressure pipe); remove Vario transmission unit.
250 bar	Oil flows from T	Leaky turboclutch valve (4V4) or clutch valve (4V5).

#### Checking turboclutch valve (4V4):

Turboclutch valve mechanically locked (tighten hexagon socket screw or operate actuating lever)

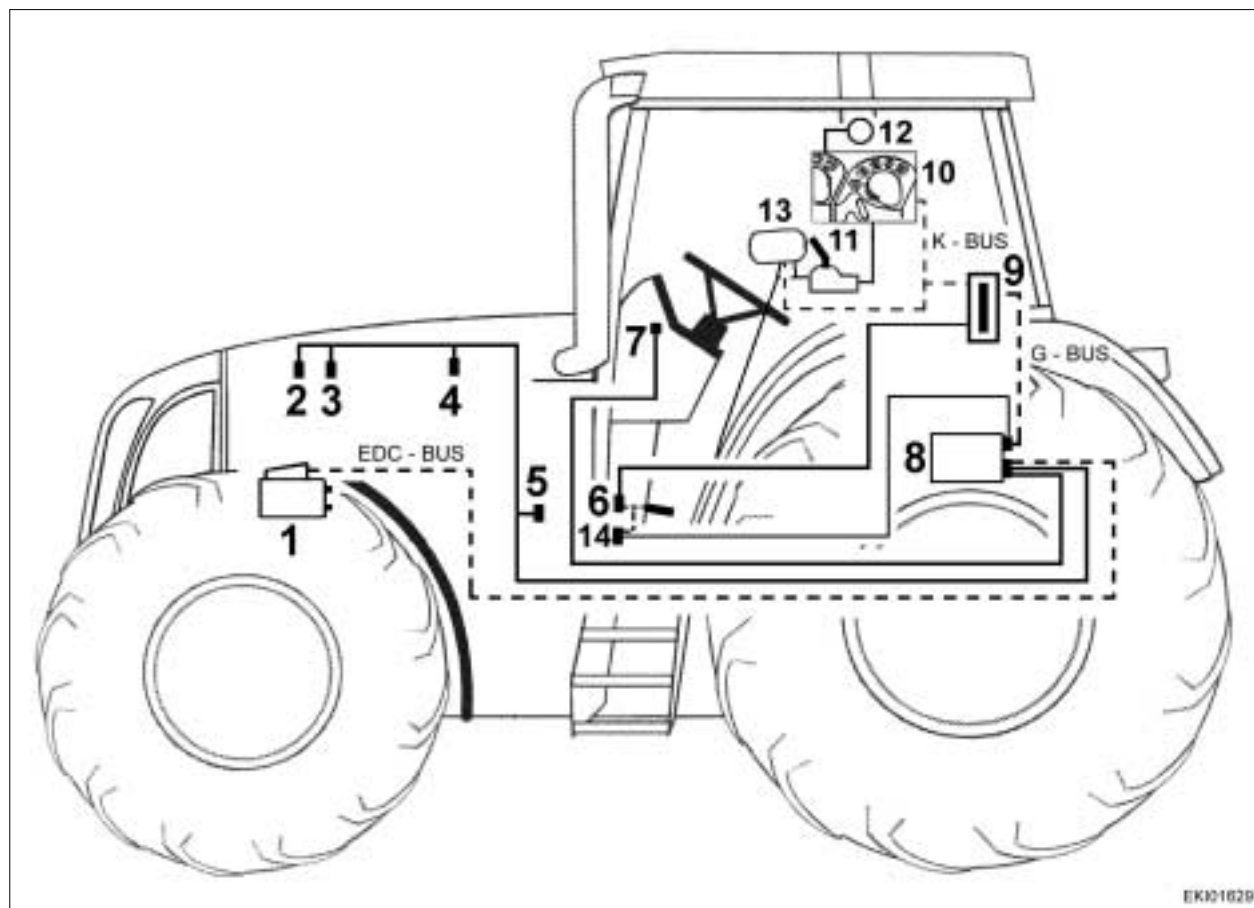
PH	Connection T	Possible cause of fault
250 bar	Oil flows from T	Leak in clutch valve (4V5) (replace)
500 bar	Oil flows from T (limit pressure)	Electrical check of turboclutch valve Y004 Chapter 9000 Index E

Date	Version	Page	Checking valve unit	Capitel	Index	Docu-No.
24.11.2000	a	3/3		1600	E	000001

Fav 900

Engine / General System  
EDC -Injection system

A



1	Injection Pump VP44 (A020)	8	EDC Control Module (A021)
2	Intercooler Pressure Sensor (B028)	9	EST Control Module (A022)
3	Nozzle lift Sensor (B026)	10	Side console (A004)
4	Temperature Sensor (water) (B027)	11	Vario joystick (A003)
5	Speed Sensor EDC (B025)	12	Hand throttle position sensor (B035)
6	Position Sensor Accelerator Pedal (B029)	13	Terminal (A008)
7	Ignition lock (S022)	14	Pedal position sensor (oversees B029) (B038)

Date	Version	Page	Capitel	Index	Docu-No.
19.6.2001	<b>b</b>	1/1	<b>2000</b>	<b>A</b>	<b>000004</b>

<b>Fav 900</b>	<b>Engine / System in general</b> <b>Engine Data Fav 900</b>	<b>A</b>
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Typ	916	920
Description	MAN	MAN
	D 0836	D 0836
	LE 504	LE 503
Power (KW/PS)	132/180	154/210
at nominal Speed ECE		
max power (KW/PS)	146/198	162/220
at 1800-2100 Rpm		
Displacement (l)	6,9	6,9
Diameter/Course (mm)	108/125	108/125
Number of cylinders	6	6
Nominal Speed	2150	2150
Rpm		
Unloaded Speed (Rpm)	2350 +/-30	2350 +/-30
Start of delivery	O.T. +/-0,5°	O.T. +/-0,5°
(Setting Value)		
Pre displacement VP44 (mm)	Specific to each pump	Specific to each pump
Operation	Turbocharger, Intercooler, Viscofan	

Typ	924	926
Description	MAN	MAN
	D 0836	D 0836
	LE 502	LE 501
Power (KW/PS)	176/240	199/270
at nominal speed ECE		
max Power (KW/PS)	186/253	210/286
ati 1800-2100 Rpm		
Displacement (l)	6,9	6,9
Course (mm)	108/125	108/125
Number of cylinders	6	6
Nomial Speed	2250	2250
Rpm		
No Load Speed Rpm	2450 +/-30	2450 +/-30
Start of delivery	Top dead Point. +/-0,5°	Top dead Point. +/-0,5°
(SettingValue)		
Pre displacement VP44 (mm)	Specific to each pump	Specific to each pump
Operation	Turbocharger, Intercooler, Viscofan	

Date	Version	Page	<b>Engine Data Fav 900</b>	Capitel	Index	Docu-No.
21.11.2000	<b>a</b>	1/1		<b>2000</b>	<b>A</b>	<b>000003</b>

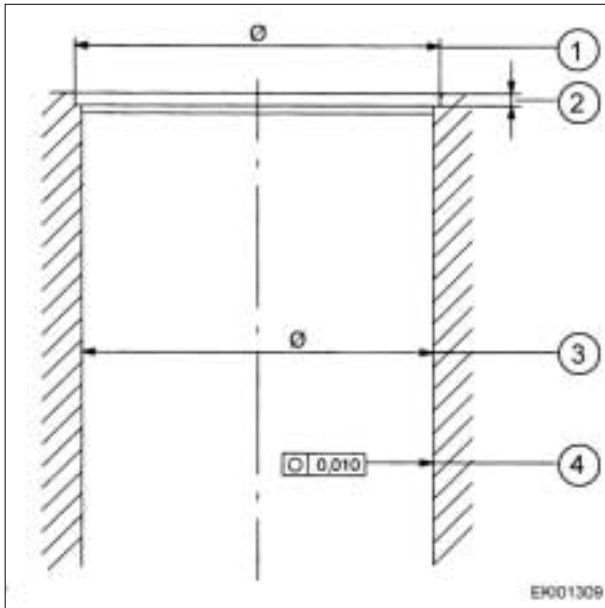
<b>Fav 900</b>	<b>Engine / Generalities Specifications</b>	<b>A</b>
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<b>Engine</b>	
Design	In-line vertical
Principle of operation	4- Stroke Diesel with turbocharger and inter-cooler
Method	Direct injection
Number of cylinders	6
Compression ratio	18 : 1
Bore	108 mm (4.25")
Stroke	125 mm (4.92")
Swept volume	6871 cm <sup>3</sup> (419.29 in <sup>3</sup> )
Firing sequence	1-5-3-6-2-4
Emission category	MVEG 1
<b>Max. output to ISO 1585 88/195 EWG</b>	
D 0836 LE 501	210 kW (285 PS) at 2250 rpm (281HP)
D 0836 LE 502	186 kW (255 PS) at 2250 rpm (249HP)
D 0836 LE 503	162 kW (220 PS) at 2150 rpm (217 HP)
D 0836 LE 504	146 kW (200 PS) at 2150 rpm (196 HP)
<b>Max. torque to ISO 1585 88/195 EWG</b>	
D 0836 LE 501	1175 Nm at 1400 rpm
D 0836 LE 502	1070 Nm at 1400 rpm
D 0836 LE 503	970 Nm at 1400 rpm
D 0836 LE 504	880 Nm at 1400 rpm
<b>Rotation in rpm</b>	
D 0836 LE 501 / 502	Idling speed - Final speed 800±30 ; 2250; 2420-2480
D 0836 LE 503 / 504	800±30 ; 2150; 2320-2380
<b>Start of delivery</b>	
D 0836 LE 501 / 502 / 503 / 504	Crankshaft angle before TDP 0°±0,5°
Engine number D 0836 LE 50. 164 9790 ... and up	5°±0,5°
<b>Lubrication</b>	
method	Forced feed lubrication gear oil pump
Quantities	
Quantities in oil pan	min. 18 ltr. (19 qt.) max. 23 ltr. (24.3 qt.)
Oil change with filter	25,5 ltr. (27 qt.)
<b>Cooling</b>	
Method	Liquid cooling Impeller pump
<b>Coolant temperature</b>	
D 0836 LE 501 / 502	
normal	102°C (215°F)
momentary	max. 108°C (226°F)
D 0836 LE 503 / 504	
normal	105°C (221°F)
momentary	max. 113°C (235°F)

Date	Édition	Page	<b>Specifications</b>	Chapitre	Reg.	Docu-No.
12/03/2001	<b>a</b>	1/1		<b>2000</b>	<b>A</b>	<b>000005</b>

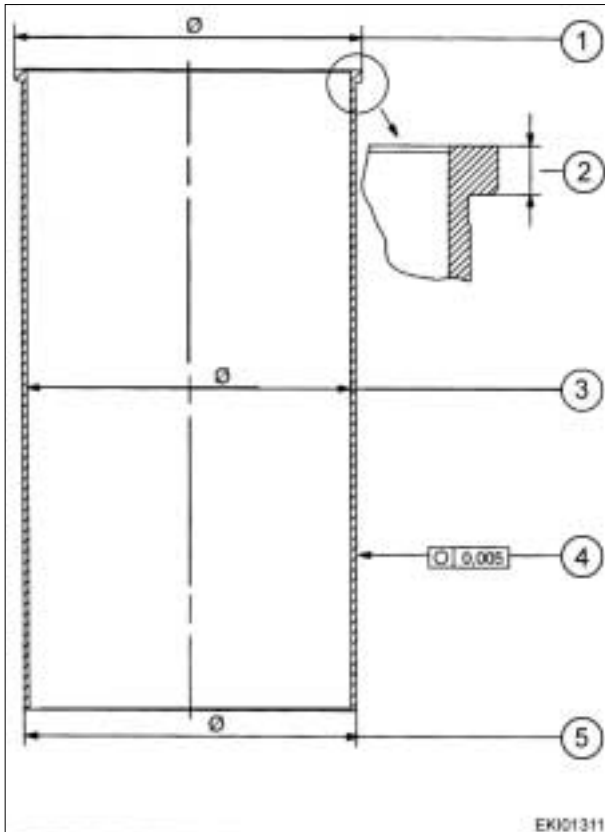
Fav 900	Engine / Generalities <b>Service Data</b>	<b>A</b>
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**Crankcase**



- 1. 116,0-116,1 mm (4.4567 - 4.4570 ")
- 2. Standard size: 4,00-4,03 mm (.157 - .159")  
Oversize: 4,20-4,23 mm (.165 - .167")
- 3. Standard size: 111,50-111,52 mm (4.389 - 4.390")  
Oversize 0,5 mm: 112,00-112,02 mm (4.409 - 4.410")
- 4. Max. permissible taper over length of cylinder

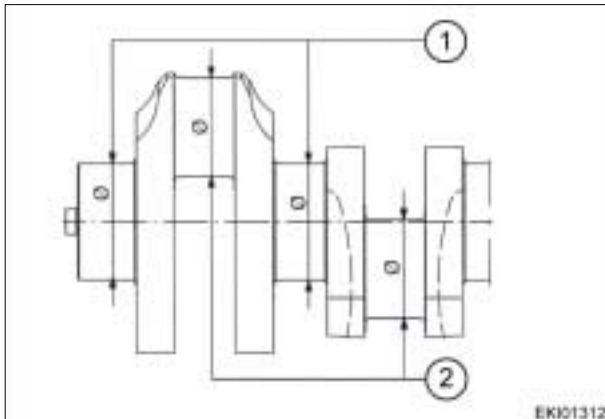
**Cylinder liner**



- 1. 115,74-115,88 mm (4.556 - 4.562")
- 2. Standard size 4,04-4,06 mm (.159 - .160")  
Oversize: 4,24-4,26 mm (.167 - .168")
- 3. 108,00-108,22 mm (4.252 - 4.260")  
max. wear limit: 0,1 (.039") above basic size
- 4. Max. permissible taper over length of cylinder
- 5. Standard size: 111,475-111,490 mm (4.388 - 4.389")  
Oversize: 0,5 mm (.020"): 111,975-111,990 mm (4.408 - 4.409")

Date	Version	Page	Service Data	Capitel	Index	Docu-No.
13/03/2001	b	1/14		2000	A	000006

<b>Fav 900</b>	<b>Engine / Generalities</b> <b>Service Data</b>	<b>A</b>
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**Crankshaft**

## 1. Dimensions:

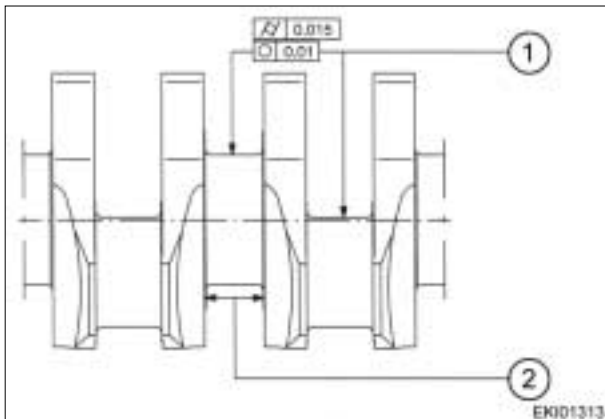
Standard: 76,981-77,000 mm (3.031 - 3.032")

Under size: 0,10 mm (.004"): 76,881-76,900 mm (3.027 - 3.028")

## 2. Con-rod bearing journal diameter:

Standard : 69,981-70,000 mm (2.755 - 2.756")

Under size: 0,10 mm (.004"): 69,881-69,900 mm (2.751 - 2.752")



## 1. For all crankshaft journals:

maximal permissible runout

maximal deviation from conical form

## 2. Thrust bearing journal width:

Standard size: 34,000-34,062 mm

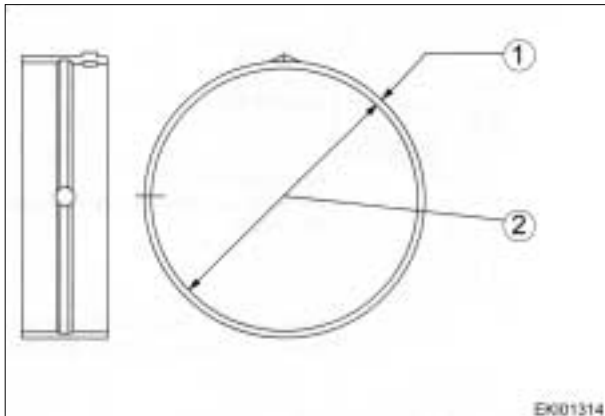
(1.339 - 1.341")

Repair sizes: 34,500-34,562 mm (1.358 - 1.361")

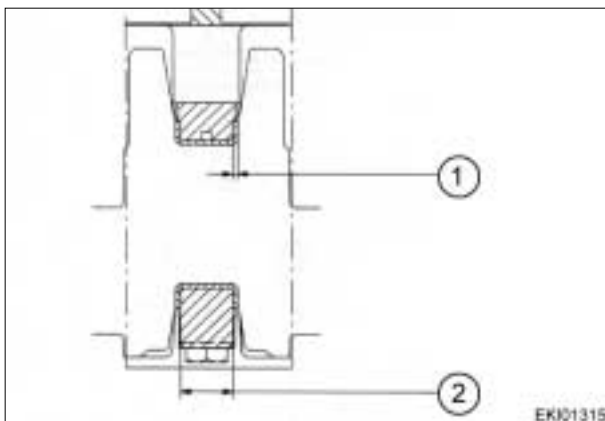
Date	Version	Page	<b>Service Data</b>	Capitel	Index	Docu-No.
13/03/2001	<b>b</b>	2/14		<b>2000</b>	<b>A</b>	<b>000006</b>

<b>Fav 900</b>	<b>Engine / Generalities</b> <b>Service Data</b>	<b>A</b>
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**Main bearing**

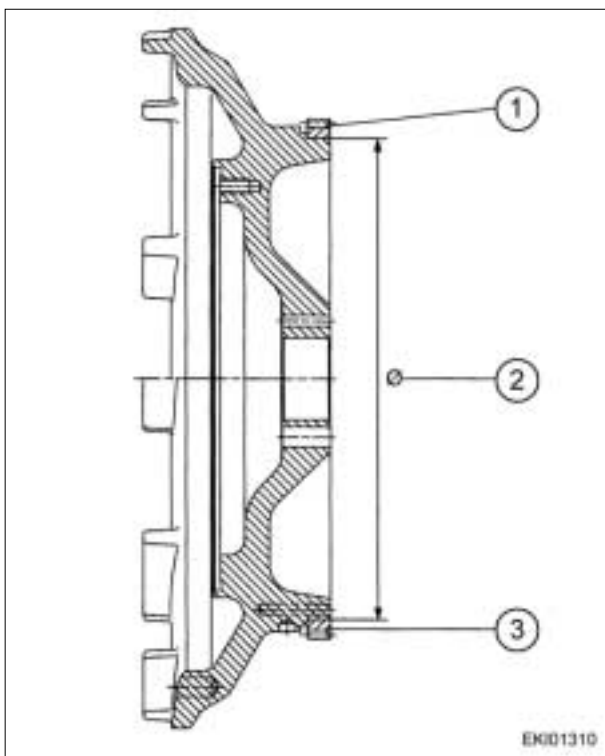


- 1. Standard size: 2,468-2,480 mm (.097 - .098")  
Oversize 0,10 mm (.004"): 2,518-2,530 mm (.099 - .100")
- 2. Fitted bearing inner Ø for main bearing :  
Standard size : 77,040-77,086 mm (3.033 - 3.035")  
Undersize 0,10mm (.004"): 76,940-76,986 mm (3.029 - 3.031")  
Housing bore for main bearing: 82,000-82,022 mm (3.228 - 3.229")  
Axial play: 0,040-0,105 mm (.002 - .004")  
Spread of main bearing shells: 0,5-1,5 mm (.020 - .059")



- max permissible crankshaft axials play: 0,200-0,395 mm (.008 - .016")
- 1. Thrust bearing journal width thrust washer:  
Standard size: 2,850-2,900 mm (.112 - .114")  
Repair size: 3,100-3,150 mm (.122 - .124")
- 2. 27,967-28,000 mm (1.101 - 1.102")

**Flywheel**



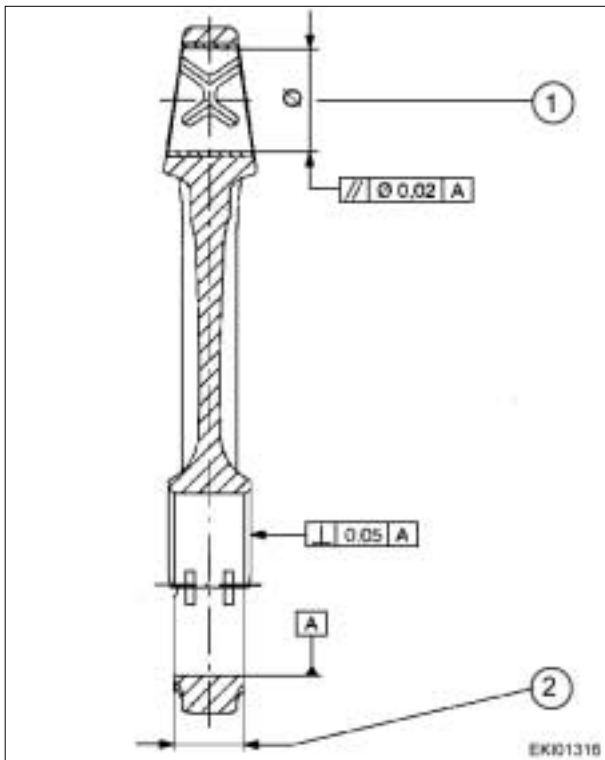
- 1. Watch position of chamfer!  
Fitting temperature (Shrink-on temperature): 220-240°C (428-464°F)
- 2. Flywheel: 352,390-352,447 mm (13.874 - 13.876")  
Ring gear (Internal): 351,671-351,760 mm (13.845 - 13.849")  
m total. = 50,3 kg (110.89 lbs.)  
J total = 1,65 kgm<sup>2</sup>
- 3. Number of teeth : Z=125, Module 3  
Mating gear (Z=11)  
Backlash : 0,4-0,7 mm (.016 - .020")

Date	Version	Page	<b>Service Data</b>	Capitel	Index	Docu-No.
13/03/2001	<b>b</b>	3/14		<b>2000</b>	<b>A</b>	<b>000006</b>

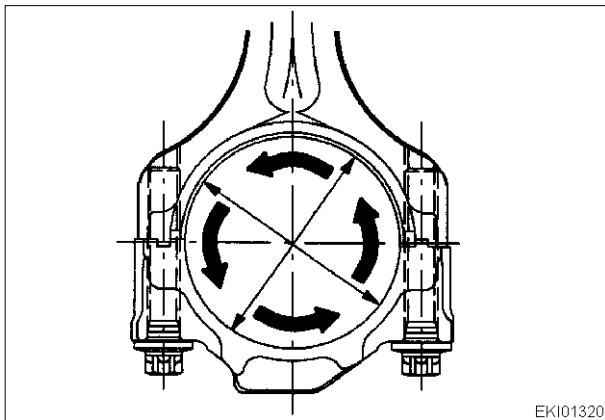


<p><b>Fav 900</b></p>	<p>Engine / Generalities <b>Service Data</b></p>	<p><b>A</b></p>
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**Connecting rod**

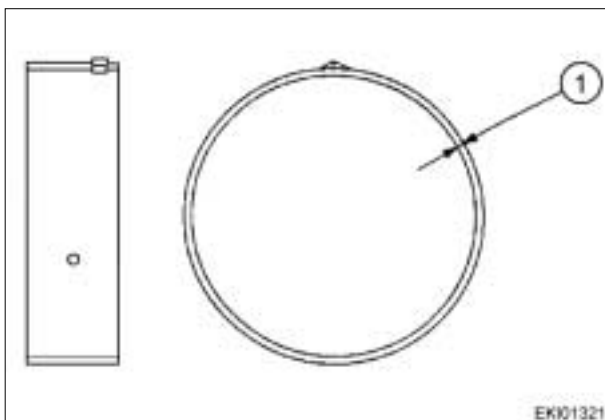


- 1. 42,050-42,066 mm (1.655 - 1.656")
  - 2. 32,78-32,88 mm (1.290 - 1.294")
- Con-rod journal width: 33,0-33,1mm (1.299 - 1.303")



Fit con-rod bearing caps (without shells). Measure basic bore with an internal micrometer.  
74,000-74,019 mm (2.913 - 2.914")

**Con-rod bearing**

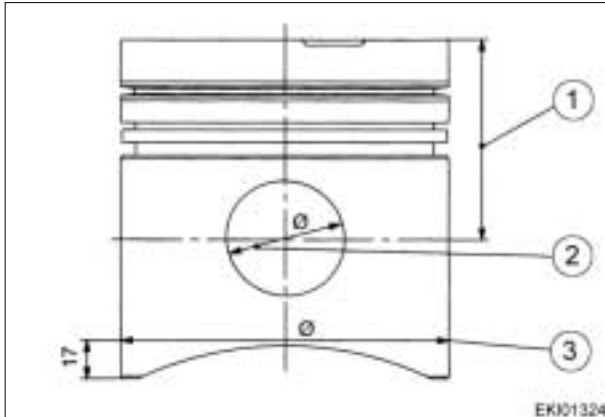


- 1. Standard size: 1,975-1,987 mm (.077 - .078")
- Oversize 0,10 mm (.004"): 2,025-2,037 mm (.079 - .080")
- Spread of new bearing shells : 0,5-2,0 mm (.020 - .079")

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13/03/2001	<b>b</b>	4/14		<b>2000</b>	<b>A</b>	<b>000006</b>

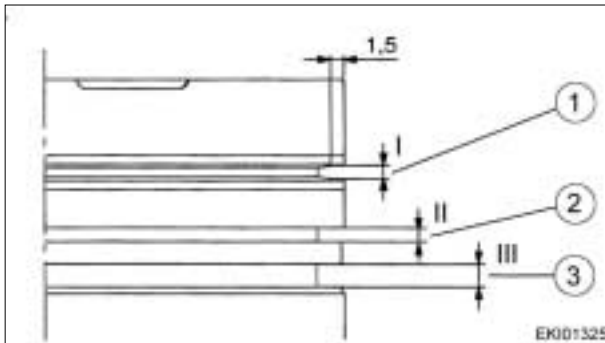
<b>Fav 900</b>	<b>Engine / Generalities</b> <b>Service Data</b>	<b>A</b>
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**Piston**



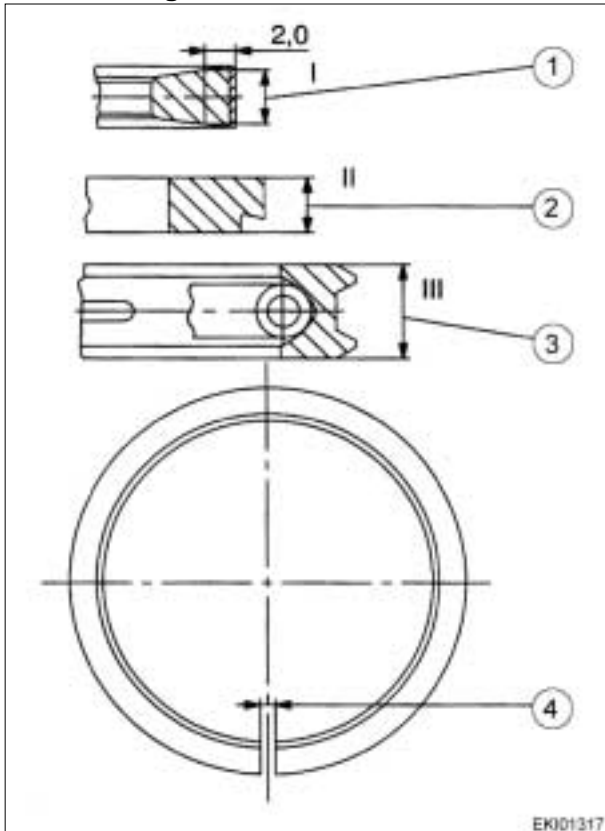
- 1. Compression height: 63,90-64,00 mm (2.516 - 2.519")  
with undersizes 0,2 mm (.008"): 63,70-63,80 mm (2.508 - 2.511")  
with undersizes 0,4 mm (.016"): 63,50-63,60 mm (2.500 - 2.503")  
Piston projection above crankcase: 0,0093-0,391 mm (.004 - .015")
- 2. 42,003-42,009 mm (1.6537 - 1.6539")
- Piston pin diameter: 41,994-42,000 mm (1.6533 - 1.6535")
- 3. 107,891-107,900 mm (4.2477 - 4.2480")

**Piston ring grooves**



- 1. 2,685 mm (.106")
- 2. 2,54-2,56 mm (.100 - .101")
- 3. 4,02-4,04 mm (.158 - .159")

**Piston rings**

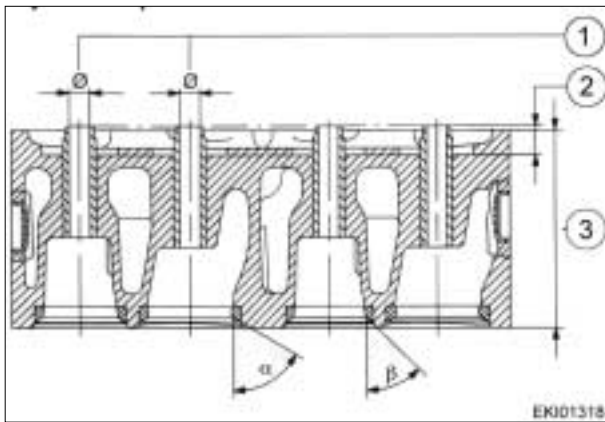


- 1. Ring - keystone ring:  
Height: 2,429-2,463 mm (.096 - .097")
- 2. Ring - chamfered ring:  
Height: 2,478-2,490 mm (.097 - .098")  
Axial play: 0,050-0,082 mm (.002 - .003")
- 3. Ring - D-ring with spring:  
Height: 3,975-3,990 mm (.156 - .157")  
Axial play: 0,030-0,065 mm (.001 - .002")
- 4. End gap clearance:
  - 1. Ring: 0,35-0,55 mm (.001 - .002")
  - 2. Ring: 0,3-0,5 mm (.001 - .002")
  - 3. Ring: 0,3-0,6 mm (.001 - .002")

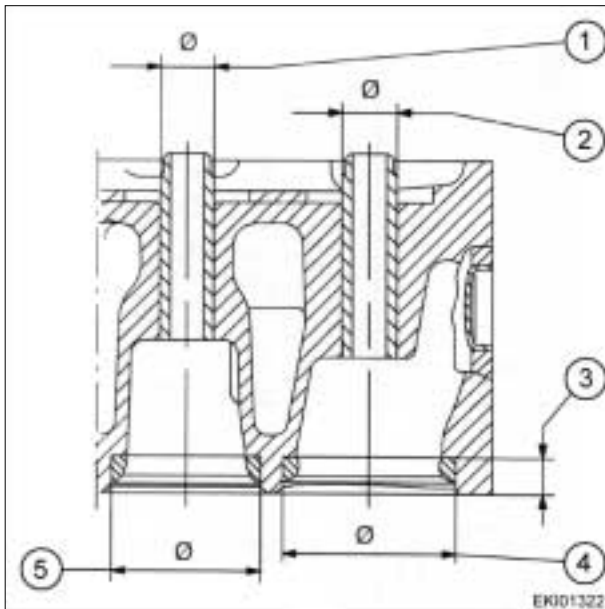
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**Cylinder head**



1. 10,000-10,015 mm (.3937 - .3942") at intake and exhaust valves
  2. 14,1-14,15 mm (.555 - .557")
  3. 97,8-98,0 mm (3.850 - 3.860")  
Minimum: 96,8 mm (3.811")
- alpha = 60° Intake valve  
beta = 45° Exhaust valve

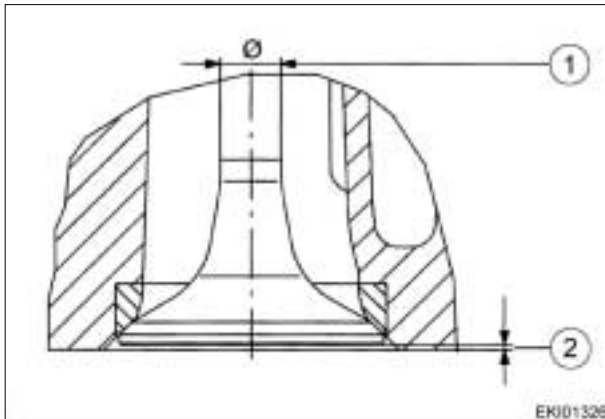


1. Valve guide bore in cylinder head:  
Standard size: 16,000-16,018 mm (.630 - .631")  
Oversize: 16,250-16,268 mm (.640 - .641")
2. Valve guide outer diameter:  
Standard size: 16,028-16,046 mm (.631 - .632")  
Oversize: 16,278-16,296 mm (.641 - .642")
3. Standard size:  
Intake valve: 10,8-10,9 mm (.425 - .429")  
Exhaust valve: 11,0-11,1 mm (.433 - .437")  
Oversize:  
Intake valve: 11,0-11,1 mm (.433 - .437")  
Exhaust valve: 11,2-11,3 mm (.441 - .445")
4. Cylinder head basic bore:  
Standard size: 51,00-51,03 mm (2.008 - 2.009")  
Oversize: 51,20-51,23 mm (2.016 - 2.017")  
Valve seat insert outer diameter:  
Standard size: 51,10-51,11 mm (2.011 - 2.012")  
Oversize: 51,30-51,31 mm (2.019 - 2.020")
5. Cylinder head basic bore:  
Standard size: 44,000-44,025 mm (1.732 - 1.733")  
Oversize: 44,200-44,225 mm (1.740 - 1.741")  
Valve seat insert outer diameter:  
Standard size: 44,10-44,11 mm (1.736 - 1.737")  
Oversize: 44,30-44,31 mm (1.744 - 1.745")

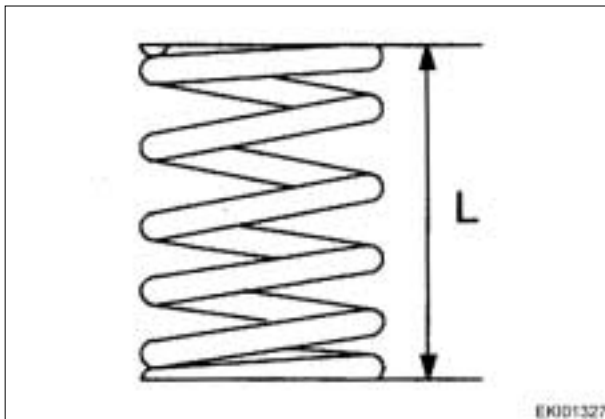
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**Valves**



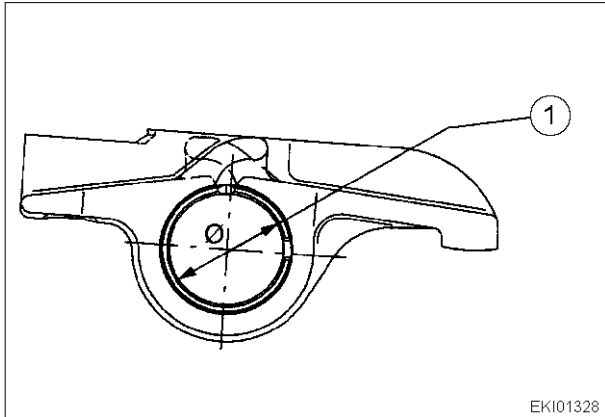
- 1. Intake valve: 9,965-9,980 mm (.3923 - .3929")  
Exhaust valve: 9,950-9,965 mm (.3917 - .3923")  
Wear limit: max. 0,1 mm (.0039")
- 2. Valve recess:  
Intake valve : 0,25-0,71 mm (.010 - .028")  
Exhaust valve: 0,45-1,05 mm (.018 - .041")



- Valve springs:
- Untensioned approx.: 59,5-61,0 mm (2.343 - 2.401")
  - Spring resistance L = 45 mm: 410-471 N (92 - 106 lbs.)
  - Spring resistance L = 33,5 mm: 744-825 N (167 - 185 lbs.)

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**Valve operation**

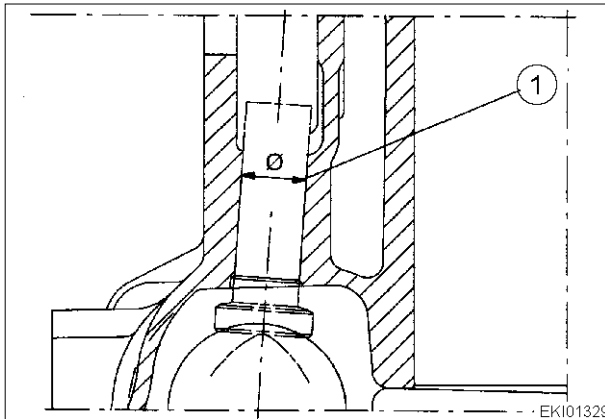
EKI01328

**Rocker arm**

1. 20,000-20,001 mm (.78740 - .78744")

Diameter of rocker arm bearing: 19,957-19,970 mm (.7857 - .7862")

Wear limit: 0,08 mm (.003")



EKI01329

**Valve tappets**

1. Tappet housing bore:

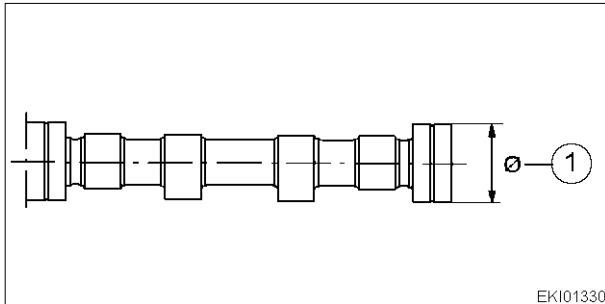
Standard size: 20,000-20,021 mm (.787 - .788")

Oversize: 20,250-20,271 mm (.797 - .798")

Tappet outer diameter:

Standard size: 19,944-19,965 mm (.785 - .786")

Oversize: 20,194-20,215 mm (.795 - .796")



EKI01330

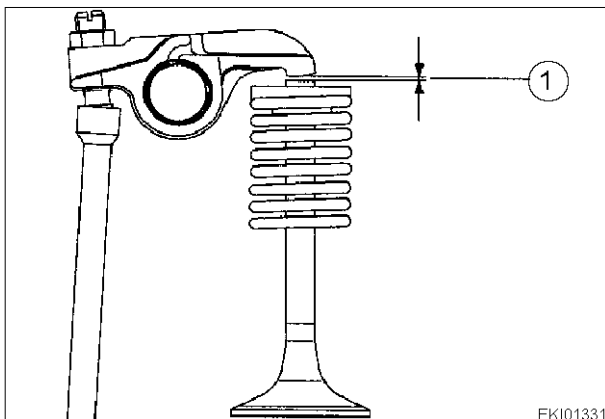
**Camshaft**

Camshaft bush inner diameter: 55,07-55,14 mm (2.168 - 2.170")

1. 54,91-54,94 mm (2.162 - 2.163")

Camshaft axial diameter: 0,14-0,27 mm (.0055 - .0106")

Wear limit: 1,5 mm (.059")



EKI01331

**Valve clearance**

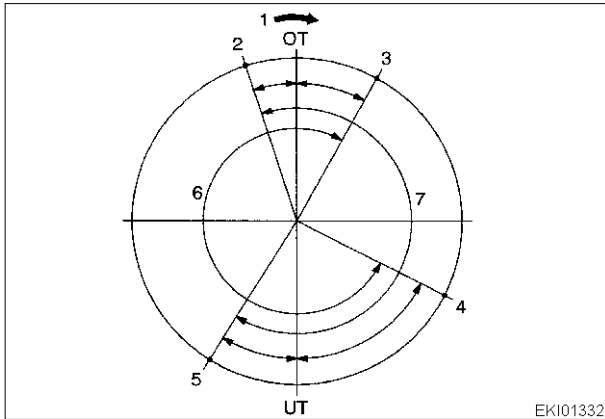
1. Adjust when engine is cold.

Intake valve: 0,5 mm (.020")

Exhaust valve: 0,5 mm (.020")

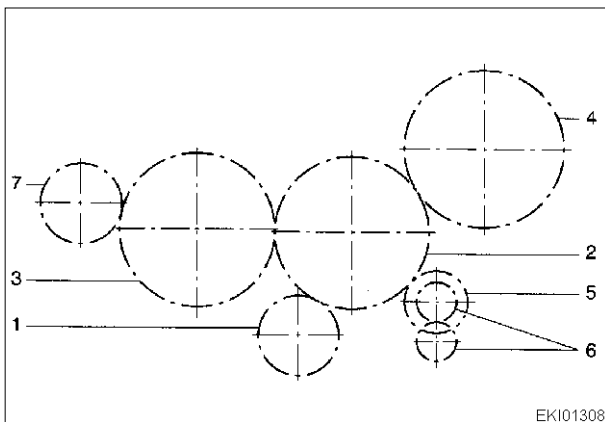
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**Valve timing**

1. Engine direction of rotation
  2. Intake valve opens 18° before TDC.
  3. Exhaust valve closes 29° after TDC.
  4. Exhaust valve opens 63° before TDC.
  5. Intake valve closes 32° after bottom dead point.
  6. Exhaust valve opening point 272°.
  7. Intake valve opening point 230°.
- Figures in degrees relate to the crankshaft angle.



**Layout of engine timing**

1. Crankshaft gear
2. Intermediate timing gear
3. Camshaft gear
4. Injection pump drive gear
5. Oil pump drive gear
6. Oil pump delivery gear
7. Power take off / air compression take off

**Backlash between**

Crankshaft gear and intermediate gear	0,000-0,465 mm (0 - .018")
Intermediate gear and crankshaft gear	0,062-0,324 mm (.002 - .013")
Intermediate gear and injection pump drive	0,10-0,27 mm (.004 - .010")
Intermediate gear and oil pump drive	0,100-0,266 mm (.004 - .010")
Oil pump delivery gears	0,10-0,22 mm (.004 - .009")
Camshaft gear and hydraulic pump gear	0,10-0,15 mm (.004 - .006")

**Compression pressures**

good	above 30 bar (435 PSI)
permissible	27 - 30 bar (391 - 435 PSI)
needs repairing	under 26 bar (377 PSI)
pressure difference	max. 4 bar (58 PSI)

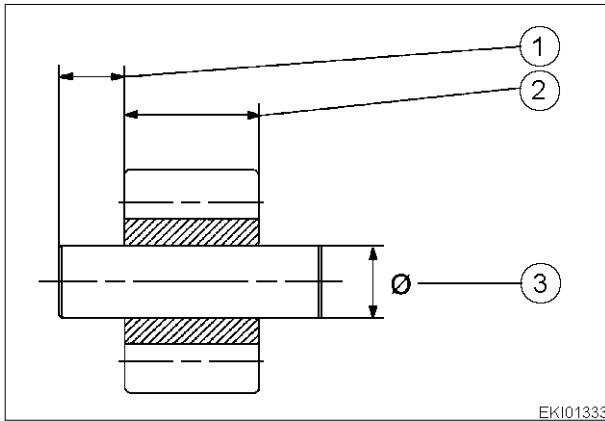
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**Engine lubrication**

Valve opening pressures	
Bypass valve for full flow oil filter	2-3 bar (29 - 44 PSI)
Oil pump pressure relief valve	5-6 bar (73 - 87 PSI)
Pressure valve of oil nozzles	
Opening pressure	1,9-2,1 bar (27.5 - 30.5 PSI)
Closing pressure	1,4-1,6 bar (20.3 - 23.2 PSI)
Oil splash nozzle orifice	1,75-1,85 mm (.069 - .073")

**Oil pump**



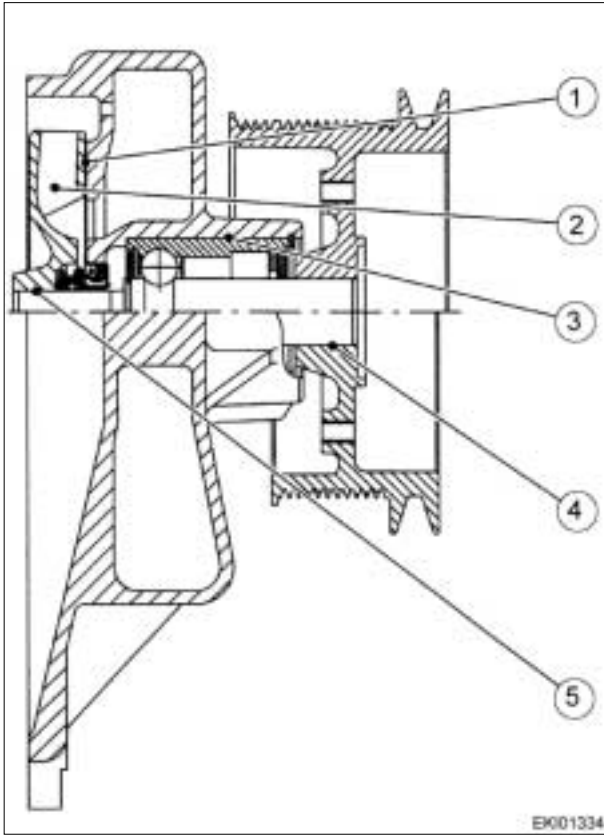
**Oil pump drive gear**

- 1. 16 mm (.630")
- 2. D 0836 LE 501/502: 31,925-31,950 mm (1.257 - 1.258")  
D 0836 LE 503/504: 31,920-31,950 mm (1.257 - 1.258")  
Housing depth: 32,000-32,039 mm (1.260 - 1.261")  
Housing bore: 10000 N
- 3. Shaft: 15,94-15,95 mm (.627 - .628")  
Housing bore: 16,000-16,018 mm (.630 - .631")

Oil pump delivery at pump speed (with SAE 20W/20 Oil, at 90°C (194°F) and p=6bar (87 PSI))	
Gear spread 32 mm (1.260")	
at n = 1008 1/min (rpm 800 1/min)	17 ltr./min (4.5 GPM)
at n = 2709 1/min (rpm 2150 1/min)	53,5 ltr./min (14 GPM)
at n = 2835 1/min (rpm 2250 1/min)	56,5 ltr./min (15 GPM)
at n = 2961 1/min (rpm 2350 1/min)	59 ltr./min (15.5 GPM)
at n = 3087 1/min (rpm 2450 1/min)	62,5 ltr./min (16.5 GPM)

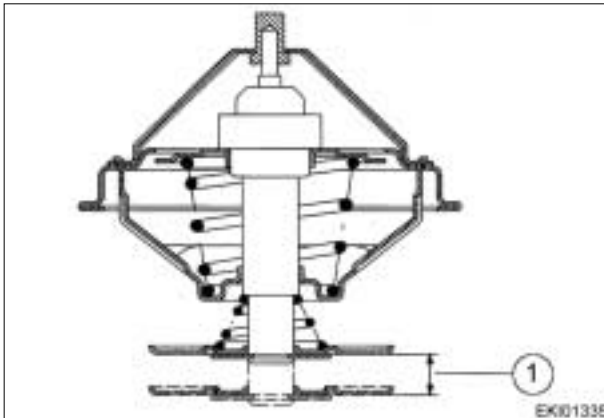
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**Cooling system**



**Water pump (engine)**

1. Gap between impeller and housing: 0,5-0,9 mm (.020 - .035")
2. Impeller diameter: 136 mm (5.354")
3. Bearing location in housing: 54,940-54,970 mm (2.163 - 2.164").  
Bearing diameter: 54,981-54,994 mm (2.1646 - 2.1651")
4. Bore in hub: 25,000-25,013 mm (.984 - .985").  
Bearing shaft diameter: 25,048-25,061 mm (.986 - .987").
5. Impeller bearing shaft bore: 16,000-16,018 mm (.630 - .631").  
Bearing shaft diameter : 16,045-16,056 mm (.6316 - .6321).



**Thermostat**

Opening at 83°C (±2°) (181°F ±3.6°F).

Fully open: 95°C (203°F).

1. Stroke: min 8 mm at 95°C (.315" at 203°F).

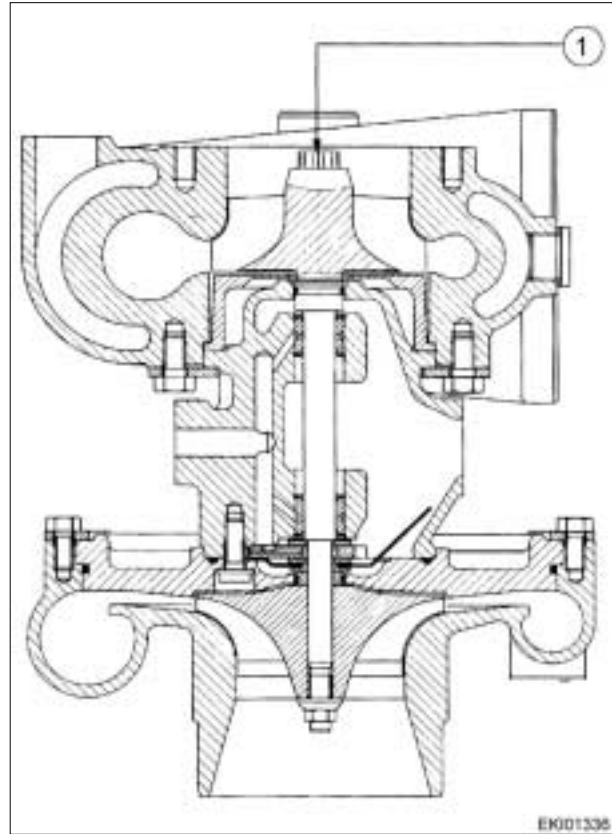
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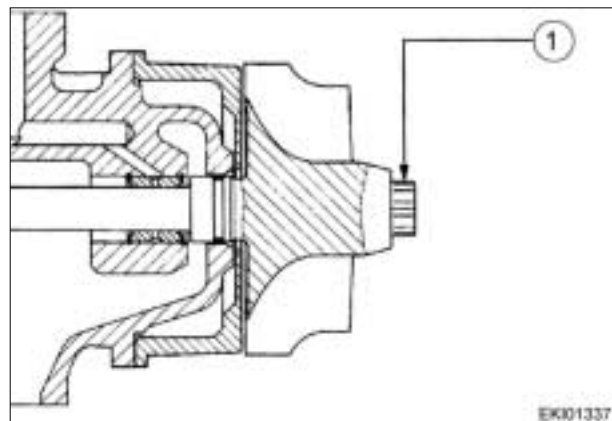
**Turbocharger**

Manufacturer D 0836 LE 501/502/503/504	KKK HX40-8274AW/H18WA8
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**Axial play**

- 1. 0,038-0,093 mm (.0015 - .0037")



**Radial play**

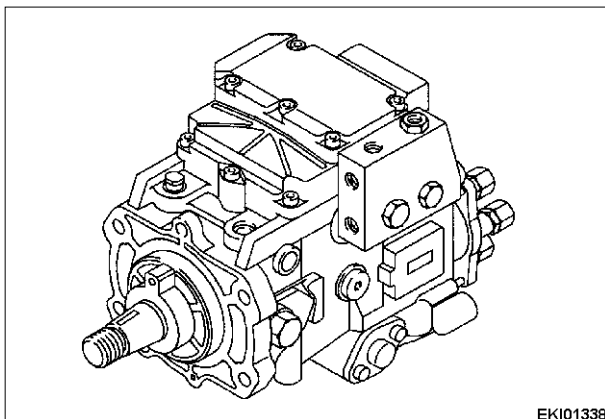
- 1. 0,329-0,501 mm (.0130 - .0197")

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**Fuel system****Injection nozzles**

Manufacturer Type : N° of orifices Nozzle opening pressure : Nozzle holder new : Nozzle holder used : Nozzle injection pump with vane-cell feed pump and automatic pressure controlled injection timer Nozzle holder	Bosch DSLA 154 P 625 6  320 + 8 bar (4641 +116 PSI) 300 + 8 bar (4351 +116 PSI) 2,68-3,47 mm (.106 - .137")  KDEL 82 P 55
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**Injection pump**

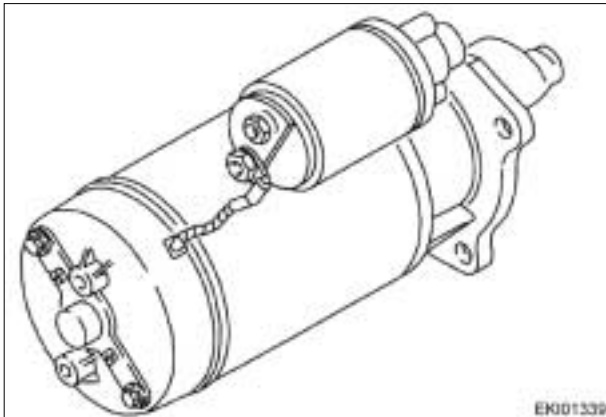
Nozzle injection pump with vane pump and automatic pressure controlled injection timer

Manufacturer : Bosch.

Type: VP 44.

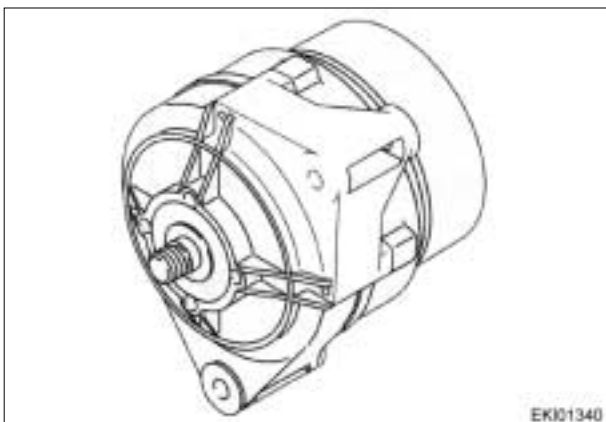
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**Starter**

Manufacturer : Bosch  
 Type : EV  
 operating method : pre-engaged drive  
 Starter pinion gear  
 Number of teeth: 11  
 Module: 3  
 Nominal voltage: 24 Volt  
 Nominal output : 4 kW (5.36 HP)

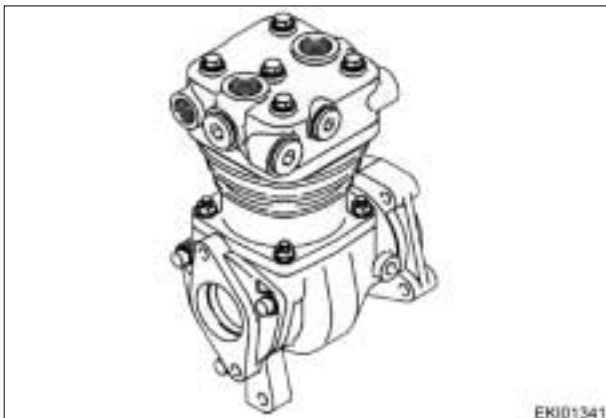


**Generator**

Manufactured : Bosch  
 Type : KC  
 Operating method : 3\_PHASE  
 Nominal voltage : 14 Volt  
 Max. current : 45-90 Ampere

**Power take-off for hydraulic pump / Air compressor**

Speed	0,97 * engine speed
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**Air compressor**

Single cylinder air compressor  
 Manufacturer: Knorr  
 Lubrication: Circulatory system with pressure compression  
 Cooling: air-cooled  
 Displacement: 213 cm<sup>3</sup> (129 in<sup>3</sup>)  
 Op speed: max. 3000 1/min  
 Op pressure: max 12,5 bar (181 PSI)

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**Note:**

**All threaded unions not specified in this table must be tightened according to our works standard M 3059. Bolts and screws must be lightly oiled before tightening !**

**Plugs**

DIN 908	
M 14*1,5; M16*1,5	80 Nm (59,00 lbf-ft)
M 18*1,5; M22*1,5	100 Nm (73,76 lbf-ft)
M 24*1,5; M26*1,5	120 Nm (88,51 lbf-ft)
M 30*1,5	150 Nm (110,63 lbf-ft)
DIN 7604	
AM 10*1; M12*1,5	50 Nm (36,88 lbf-ft)
AM 14*1,5	80 Nm (59,00 lbf-ft)

**Crankcase, crank gear**

Crankshaft bearing cap on and crankcase	
Initial torque	115 Nm (84,82 lbf-ft)
Angular torque	90-100°
Damper on crankshaft M14*1,5 10,9	
Initial torque	150 Nm (110,63 lbf-ft)
Angular torque	90-100°
Damper on crankshaft M14*1,5 12,9	
Initial torque	150 Nm (110,63 lbf-ft)
Angular torque	90-100°
Angular torque	90-100°
Flywheel on crankshaft	
Initial torque	100 Nm (73,76 lbf-ft)
Angular torque	90-100°
Con-rod bearing caps	
Initial torque	50-60 Nm (36,88-44,25 lbf-ft)
Angular torque	90-100°

**Cylinder head**

For tightening and retightening of cylinder head bolts see following page	
Lock nut for valve adjusting screw	40 Nm (29,50 lbf-ft)
Cheese-head screws with hexagonal socket for bolts of intermediate gear	115 Nm (84,82 lbf-ft)
Collar screw for crankshaft	65 Nm (47,94 lbf-ft)
Rocker socket (Torx E12)	65 Nm (47,94 lbf-ft)

**Lubrication**

Oil pressure valve for piston spray nozzle	38-42 Nm (28,03-30,98 lbf-ft)
Oil pump drive gear on shaft	30 Nm (22,13 lbf-ft)
Screw plug for pressure relief valve in crankcase	60 Nm (44,25 lbf-ft)
Oil pan drain plug	60 Nm (44,25 lbf-ft)
Screw plug for oil filter head (M 10*1)	20 Nm (14,75 lbf-ft)
Threaded coupling for oil filter	40 Nm (29,50 lbf-ft)
Screw plug in oil filter (M 18*1,5)	30 Nm (22,13 lbf-ft)
Screw plug in oil filter (M 24*1,5)	30 Nm (22,13 lbf-ft)
Screw plug in oil filter (M 30*1,5)	40 Nm (29,50 lbf-ft)
Oil change filter	25 Nm (18,44 lbf-ft)

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**Cooling system**

Screw plug in coolant pipe (M14*1,5)	20 Nm (14,75 lbf-ft)
Hose clips :	
Clamping range 12 to 31 mm, 9 mm wide	3,6 Nm (2,66 lbf-ft)
over 32 mm, 13 mm wide	5 Nm (3,69 lbf-ft)

**Exhaust / Intake manifolds**

Exhaust manifold on cylinder head	
Initial torque	50-55 Nm (36,88-40,75 lbf-ft)
Angular torque	90-100°
Banjo bolt of solenoid valve	10-15 Nm (7,38-11,06 lbf-ft)
Knuckle pin clap of turbocharger	12 Nm (8,85 lbf-ft)

**Fuel system**

Nozzle holder in cylinder head	70 Nm (51,63 lbf-ft)
Nozzle adjusting nut	45 Nm (33,19 lbf-ft)
Banjo bolt for leak oil	10-12 Nm (7,38-8,86 lbf-ft)
Pressure line at nozzle	
Initial torque	10 Nm (7,38 lbf-ft)
Angular torque	60°
Banjo bolt on oil filter	20-30 Nm (14,75-22,13 lbf-ft)
Fuel filter	10-15 Nm (7,38-11,06 lbf-ft)
Purge plug on fuel filter	8-10 Nm (5,90-7,38 lbf-ft)

**Starter / Alternator / Compressor**

Alternator pulley	75-85 Nm (55,32-62,69 lbf-ft)
Compressor drive gear	200-250 Nm (147,51-184,39 lbf-ft)

**Sensors**

Oil pressure sensor	80 Nm (59,00 lbf-ft)
Temperature sensor switch	15 Nm (11,06 lbf-ft)
Coolant Temperature sensor (EDC)	35 Nm (25,82 lbf-ft)

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**Assembly tightening torques to works standard M 3059**

External or internal hexagon nuts and bolts, heads without collar or flange.

Tread size * Pitch	Property class / Tightening torque in Nm (lbf-ft)		
	at 8,8/8	at 10,9/10	at 12,9/12
M4	2,5 (1,84)	4,0 (2,95)	4,5 (3,32)
M5	5,0 (3,69)	7,5 (5,53)	9,0 (6,64)
M6	9,0 (6,64)	13,0 (9,59)	15,0 (11,06)
M7	14,0 (10,33)	20,0 (14,75)	25,0 (18,44)
M8	22,0 (16,23)	30,0 (22,13)	35,0 (25,81)
M8*1	23,0 (16,96)	35,0 (25,81)	40,0 (29,50)
M10	45,0 (33,19)	65,0 (47,94)	75,0 (55,32)
M10*1,25	45,0 (33,19)	65,0 (47,94)	75,0 (55,32)
M10*1	50,0 (36,88)	70,0 (51,63)	85,0 (62,62)
M12	75,0 (55,32)	105,0 (77,44)	125,0 (92,20)
M12*1,5	75,0 (55,32)	110,0 (81,13)	130,0 (95,88)
M12*1,25	80,0 (59,00)	115,0 (84,20)	135,0 (99,57)
M14	115,0 (84,20)	170,0 (125,39)	200,0 (147,51)
M14*1,5	125,0 (92,20)	185,0 (136,45)	215,0 (158,58)
M16	180,0 (132,76)	260,0 (191,77)	310,0 (228,64)
M16*1,5	190,0 (140,14)	280,0 (206,52)	330,0 (243,40)
M18	260,0 (191,77)	370,0 (272,90)	430,0 (317,15)
M18*2	270,0 (199,14)	290,0 (213,89)	450,0 (331,90)
M18*1,5	290,0 (213,89)	410,0 (302,40)	480,0 (354,03)
M20	360,0 (265,52)	520,0 (383,53)	600,0 (442,54)
M20*2	380,0 (280,27)	540,0 (398,28)	630,0 (464,66)
M20*1,5	400,0 (295,02)	570,0 (420,41)	670,0 (494,17)
M22	490,0 (361,40)	700,0 (516,29)	820,0 (604,80)
M22*2	510,0 (376,16)	730,0 (538,42)	860,0 (634,30)
M22*1,5	540,0 (398,28)	770,0 (567,92)	900,0 (663,80)
M24	620,0 (457,29)	890,0 (656,43)	1040,0 (767,06)
M24*2	680,0 (501,54)	960,0 (708,06)	1130,0 (833,44)
M24*1,5	740,0 (545,8)	1030,0 (759,69)	1220,0 (899,82)

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<b>Fav 900</b>	<b>Engine / Generalities</b> <b>Tightening Torque values</b>	<b>A</b>
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**Cylinder head bolts**

**Tightening cylinder head bolts following repair work (new engine)**

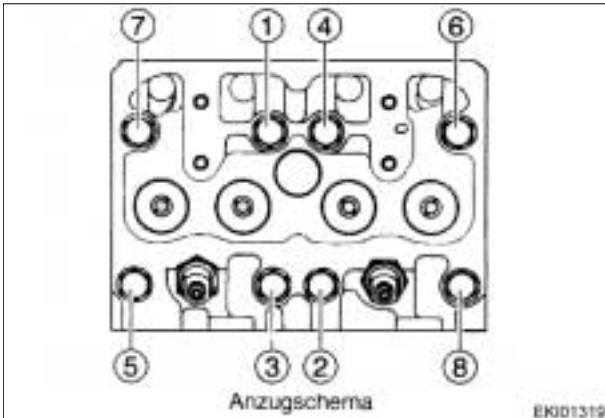
Only for Torx-head screws.

No tightening for Torx-head screws.

**Tightening cylinder head bolts following repair work**

(cold engine)

Only for Torx-head screws.



**Note:**

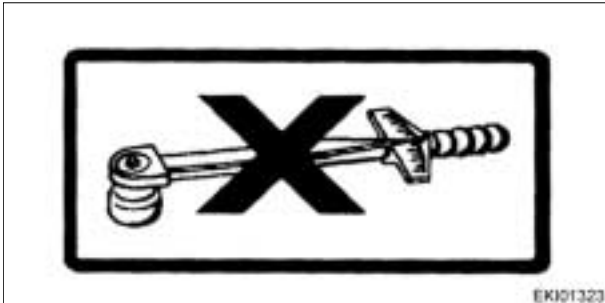
**Only use new cylinder head bolts. do not re-use.**

before inserting bolts, lubricate threads (not the tapped bores) and the bolt heads with "Optimoly White T" paste. Do not use oils or additives containing MoS<sub>2</sub>-h. Tighten bolts by the torque angle method following the diagram :

- 1.st initial stage = 10 Nm (7,38 lbf-ft).
- 2.nd initial stage = 80 Nm (59,00 lbf-ft).
- 3.rd initial stage = 150 Nm (110,63 lbf-ft).
- 4.tth initial stage = 90°.
- 5.th initial stage = 90°.
- Final stage = 90°.

Adjust valve play

Put on sticker number 51.97801-0150.



**Tightening cylinder head bolts following repair work**

Only for Torx-heads.

No tightening for Torx-head screws.

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13/03/2001	<b>a</b>	4/4		<b>2000</b>	<b>A</b>	<b>000007</b>

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## Pedal Position Sensor B029 to ESTControl module A002 Direct Diagnostic

### Failure Code (Fendt):

4.1.06

### Failure location (MAN):

not available

### Failure path:

Accelerator pedal position sensor

- Signal to high
- Signal to low

### Consequences:

Requested engine speed will be compared to the position of pedal sensor EDC (B038). In case of correspondance, control via CAN-Bus will be deactivated. Control via hand throttle, memorization keys and vario terminal will not be possible. Only accelerator pedal operation (Sensor B038 ).

### Possible origin:

Wiring interruption , Shot circuit, Power supply failure, Pedal position sensor failure, EST Control Module failure.

### Test Conditons:

Adaptor box connected

Ignition "On"

Use wiring diagrams wich are corresponding to the tractor

Fendt Component identification:

**B029** Pedal position sensor

Fendt Connector identification:

**X176** Connector, 1:Earth, 2: 5V supply, 3:Signal

Test	Measurements	Trouble shooting
Power supply	Check Voltage on Adaptor box between fuse board A013 Pin A6 (+), Connector X200 against earth.  Check wiring WF1492, WF 1744 <b>Requested value: 8 - 8,5 V</b>	- Check wiring - Check connectors - If no failure can be identified, check Fuses
Potentiometer	Current with adaptor box at EST Control Module A002 Pin 7, Connector X031 . Check wiring WF 1728 Check Signal with FENDIAS  <b>Requested value:</b>  Idle Position: 16mA - 22mA Full throttle position: 2mA - 8mA <b>Tolerances:</b> $I < 2\text{mA}$ oder $I > 22\text{mA}$	- Check wiring  - Check Connectors - Adjust mecanical link between pedal and sensor - If adjustment becomes unfeasable, replace position sensor

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**Pedal position sensor B029 with PWG B038 Plausibility (Correspondance)****Failure Code (Fendt):**

1.1.03

**Failure location (MAN):**

not Available

**Failure display :**

Failure display within dashpanel

**Failure path**

Pedal position sensor

No correspondance Pedal position sensor B038 with B029.

During calibration separate characteristics are memorized for both position sensors. Both values are permanently compared durin operation. In case of a to important deviation, a failure code will appear. No further consequences on vehicle operation.

**Possible origin:**

Mechanical attribution error of both sensors. Alteration of adjustment during operation

**Testing condition:**

FENDIAS Diagnostic program

2 Adaptor boxes, 1 \* Adaptor connector and harness

Ignition "On"

Use wiring diagrams wich are corresponding to the tractor

Fendt Component Identification:

**B029, B038**

Fendt Connector Identification:

**X176, X189**, 1: Earth, 2: 5V Supply , 3: Signal

Test	Measurement	Trouble shooting
Potentiometer Signals	Check both speed sensor signals with Diagnostic Program Check Current with Adaptor box at EST Control Module A002 Pin 7, Connector X031 simultaneously  check Voltage at EDC Control Module A021 Pin B23 Connector X048 <b>Requested values (B029)</b> Idle Position: <b>16mA - 22mA</b> Full Power Position: <b>2mA - 8mA</b> <b>Requested values (B038)</b> Idle Position: <b>0,3 - 0,6 V</b> Full Power Position: <b>4,0 - 4,5 V</b> <b>Tolerances:</b> A Deviation > 400 Rpm generates the Failure Code	- Check wiring  - Check Connectors  - Adjust mecanical linke between Pedal and Sensor - if Adjustment is not feasable, Replace Position Sensor.

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<b>Fav 900</b>	<b>Engine / Systems</b> <b>Trouble shooting program EDC</b>	<b>B</b>
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**CAN -Message Pedal Position Sensor B038 to EDC Control Module A021****Failure Code (Fendt):**

1.1.01, evtl. 4.2.81

**Failure location (MAN):**

not available, eventually Failure location 81

**Failure display:**

Message on Dashpanel

**Failure path:**

Pedal Position Sensor B038

- Signal to high
- Signal to low

**Consequences:**

During normal Operation with CAN-Bus: Only Failure Display. If Additionally Pedal Position Sensor B029 fails, last identified value will be kept. Engine Stop only via terminal 15. During Operation without CAN - Bus: Engine Speed will be brought to idle according to ramp.

**Possible Origin:**

Wiring discontinuity, Short Circuit, Voltage supply failure, Pedal Position Sensor Failure, EDC - Control Module Failure, Control Module A021 not Connected or Fuse for Control Module A021 is burned.

**Test Conditions:**

Adaptor box and adaptor Connectors connected, FENDIAS, Ignition "ON"

Use wiring diagrams which are corresponding to the tractor

Fendt Component Identification:

**B038** (PWG)

Fendt Connector Identification:

**X189** (PWG), 1: Earth, 2: 5V Supply, 3: Signal

Test	Measurement	Trouble shooting
Voltage supply	Check Voltage with Adaptor box and adaptor Connectors between Pin B16 (+) and Pin B35 (-) on Control Module A021, Connector X048.  Check wirings WF 1732, WF 1731 <b>Requested Value: 4,5 - 5,2 V</b>	- Check wiring - Check connectors - In no failure can be identified, Replace EDC Control Module A021 - Check fuse for A021 Check CAN-Bus Connection A002 to A021
Sensor Signal	Check Voltage with Adaptor box and adaptor Connectors between Pin B23 (+) and Pin B35 (-) on Control Module A021, Connector X048. Check Wires WF 1733, WF 1731 Check Signal with Diagnostic Program <b>Requested Values:</b> Idle Position: <b>0,3 - 0,6 V</b> Full Power Position: 4,0 - 4,5 V <b>Threshold values:</b> U < 0.3V or U > 4,8V	- Check Wiring - Check Connectors - Adjust mechanical link between Pedal and Position Sensor - If Adjustment is not Possible, replace Pedal Position Sensor - Check fuse (XXX) for A021 Check CAN - Bus Connection A002 to A021

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<b>Fav 900</b>	<b>Engine / Systems</b> <b>Trouble shooting program EDC</b>	<b>B</b>
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## Hand throttle Position Sensor B035 on Side Console A004 Direct diagnostic

### Fehlercode (Fendt):

1.1.7E

### Failure location (MAN):

none

### Failure display:

Message on Dashpanel

### Failure path:

#### Hand throttle Position Sensor

- Signal to high
- Signal to low

### Consequences:

In Case of Identification, actual Requested Speed will be compared to EST - Pedal Position Sensor (B029). After Correspondance being established, requested value of Hand Throttle Position Sensor B035 will be deactivated, Operation will only be possible via Accelerator pedal Position Sensor B029 . The Functions Hand Throttle and Terminal Settings are Deactivated.

### Possible origin:

Wiring Discontinuity , Short circuit, Voltage supply Failure, Pedal Position Sensor failure, EST Control Module failure

### Test Conditons:

Adaptor box connected

Ignition "ON"

Use wiring diagrams wich are corresponding to the tractor

Fendt Component Identification:

#### B035

Fendt Connector Identification:

**X183**, 1: Earth, 2: 5V, Supply 3: Signal

Test	Measurement	Trouble shooting
Voltage supply	On Adaptor box, Voltage between fuse board A013 Pin B15 (+), Connector X201 and earth  Check wires WF1491, WF 1743 <b>Requested value:</b> 8 - 8,5 V	- Check wiring - Check connectors - if no failure can be identified, check fuse
Potentiometer Signal	On Adaptor box , Current on side console A004 Pin 30 Connector X033 Check wire WF 1722  Check signal with FENDIAS .  <b>Requested values:</b> Idle position: <b>16mA - 22 mA</b> Full power position: <b>2mA - 8mA</b> Tolerances: I < 2mA or I > 22mA	- Check wires - Check connectors - Check mecanical link from accelerator Pedal to position sensor - If adjustment cannort be performed, replace position sensor

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### Hand Throttle potentiometer B035 on Side console A004 CAN - Connection

**Failure Code (Fendt):**

1.1.9E

**Failure location (MAN):**

none

**Failure display :**

Message on Dashpanel

**Failure path:**

Hand Throttle position Sensor

CAN Communication failure between EST Control Module A002 and Side Console A004

**Consequences:**

In case of Failure, actual Requested Speed will be compared to EST - Pedal Position Sensor (B029). After Correspondance being established, requested value of hand throttle position Sensor B035 will be deactivated, Operation will only be possible via Accelerator pedal Positon Sensor B029 . The Functions Hand Throttle and Terminal Settings are Deactivated.

**Possible Origin:**

CAN Connection A002 to A004 interrupted, Side Console Failure, Fuse (XXX) For Side Console burned out, Fuse Board Failure A013, CAN-Bus Wiring Short Circuit to Earth etc.

**Test Conditons:**

Adaptor box connected

Ignition "ON"

Use wiring diagrams wich are corresponding to the tractor

Test	Measurement	Trouble shooting
CAN Bus Connection EST A002 to Side Con- sole A004	Check Connection EST Control module A002, Pin 26 Connector X031 to Side Console A004 , Pin 26 , Connector X033 .	- Replace fuses
	Check Connection EST Control module A002, Pin 27, Connector X031 to Side console A004, Pin 27, Connector X033	- Replace Fuse board for side Con- sole
	Check fuse board A004	
	Check fuse board A013	

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<b>Fav 900</b>	<b>Engine / Systems</b> <b>Trouble shooting program EDC</b>	<b>B</b>
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**Memory Keys A003 on Side Console A004 Direct Diagnostic****Failure Code (Fendt):**

1.1.7E

**Failure location (MAN):**

nonet

**Failure display :**

Message on Dashpanel

**Failure path:****Memory Keys**

- Signal to high
- Signal to low

**Consequences:**

In case of Failure Identification, actual Requested Speed will be compared to EST - Pedal Position Sensor (B029). After Correspondance being established, value of Memory Keys A003 will be deactivated, Operation will only be possible via Accelerator pedal Positon Sensor B029 . The Functions Hand Throttle and Terminal Settings are Deactivated.

**Possible origin:**

Wiring Disruption, Short circuit, Voltage supply Failure, Memory key Failure, EST Control Module Failure.

**Test Conditons:**

Adaptor box connected

Ignition "ON"

Use wiring diagrams wich are corresponding to the tractor

Fendt Component Identification:

**A003, Joystick**

Fendt Connector Identification:

**X032\_P**

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
Voltage Supply	Check Voltage with adaptor Box between Joystick A003, Pin 30, Connector X032_P and earth . Check Wire WF1741. <b>Requested value: 8 - 8,5 V</b>	- Check wiring - Check Connectors - If no failure can be identified, Check fuse
Signal of Memory key	Check Current with Adaptor Box Between Joystick A003, Pin 31, Connector X032_P against eath. Check Wire WF1742. Check Signal with FENDIAS. <b>Requested Values:</b> <b>2 mA - 22 mA</b> <b>Threshold Values:</b> I < 2mA or I > 22mA	- Check Wiring - Check Connectors - Adjust mecanical link between Pedal and Position Sensor - If adjustment becomes impossible, Replace position sensor

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### Memory Key A003 on side Console A004 CAN-Communication

**Failure Code (Fendt):**

1.1.9F

**Failure location (MAN):**

not Available

**Failure Display:**

Message on Dashpanel

**Failure path:**

- Hand Throttle Potentiometer
- CAN- Communication failure between EST Control Module A002 and Side Console A004

**Consequences:**

Only pedal B029 Operation will be possible after Failure identification (actual requested Speed will be compared to requested Value of EST- Pedal position sensor (B029). After Correspondance beeing established, requested value of Hand Throttle position sensor B035 will be deactivated. Terminal settings and memorizing Key function are deactivated .

**Possible Origin:**

CAN Connection A002 to A004 disrupted, Side console Failure, Fuse (XXXXX) for Side Console burned out, Fuse Board A013 failure, CAN-Bus wiring Short Circuit to Earth etc.

**Test Conditons:**

Adaptor Box connected

Ignition "ON"

Use wiring diagrams wich are corresponding to the tractor

Test	Measurement	Trouble shooting
Connection CAN Bus EST Control Module A002 to Side Console A004	Check Connection EST Control Module A002, Pin 26, Connector X031 to Side Console A004, Pin 26, Connector X033 . Connection EST Control Module A002, Pin 27, Connector X031 to side console A004, Pin 27 Check Connector X033 Check Fuses for A004 Check Fuse board A013	- Replace fuses - Replace Fuse board, Side Console

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<b>Fav 900</b>	<b>Engine / Systems Trouble shooting program EDC</b>	<b>B</b>
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**CAN-Connection: EST Control Module to EDC Control Module A021****Failure Code (Fendt):**

1.1.A1

**Failure location (MAN):**

Not Available

**Failure Display:**

Message on Dashpanel

**Failure path:**

CAN-Bus, EST Control module, EDC Control module

CAN Communication Failure between EST Control Module A002 and EDC Control Module A021.

**Consequences:**

Failure display only

**Possible Origin:**

CAN Communication from A002 to A021 interrupted, EDC Control module Failure, Fuse for EDC Control module burned out, EDC Control module not connected, Fuse Board A013 failure, CAN-Bus Wiring, Short circuit etc.

**Test Conditons:**

Adaptor Box connected

Ignition "ON"

Use wiring diagrams wich are corresponding to the tractor

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
CAN Bus, Communication EST Control Module A002 to EDC Control Module A021	Check Connection EST, A002 ,Pin 4, Connector X031 to EDC Control Module A021, Pin 11, Connector X048. Check Connection EST, A002 ,Pin 5, Connector X031 to EDC Control Module A021, Pin 12 Check Connector X048 Check fuse (XXXX) for A048 Check fuse board A013	Restaure CAN-Bus Connection - Replace Fuse Board (XXXX) Repace EDC Control Module

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### Wrong EDC Control Module

**Failure Code (Fendt):**

**1.1.A0**

Failure location (MAN):

not available

**Failure display:**

Message on Dashpanel

**Failure path:**

EST Control Module, EDC Control Module

- End of Line Programming (EOL)

**Consequences:**

Failure Identification limits Engine Torque to values of Favorit 916.

**Possible Origin:**

Wrong EDC Control Module, EOL Programming not OK

**Test Conditons:**

FENDIAS

Ignition "ON"

Test	Measurement	Trouble shooting
??????G-Number. EST Control Module, Type of Tractor EOL Programming. Identifi- cation Number EDC Control Module	read out Tractor type with FENDIAS	- Fit appropriate EDC Control Module - Enter Correct Tractor Type

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**Pedal Position Sernsor B038 to EDC Control Module A021 (Test 1)****Failure Code (Fendt):****1.2.81**

Failure location (MAN):

81

**Failure display :**

Message on Dashpanel

**Failure path:**

Pedal Position Sensor

- Signal to High

- Signal to low

**Consequences:**

During normal CAB - BUS Operation: Only Failure Code Display

During Operation without CAN - BUS : Engine runs Idle speed

**Possible Origin:**

Dicontinued wire, Short Circuit, Voltage Supply Failure, Pedal Position Sensor Failure, EDC Control Module failure

**Test Conditons:**

Adaptor box with adapting connectors connected

Ignition "ON"

FENDIAS

Use wiring diagrams wich are corresponding to the tractor

Fendt Component Identification:

**B038** (Pedal Position Sernsor)

Fendt Connector Identification:

**X189** (Pedal Position Sernsor) 1: Earth, 2: 5V Supply, 3: Signal

Test	Measurement	Trouble shooting
Voltage supply	Check Voltage with adaptor box with adaptor Connectors between Pin B16 (+) and Pin B35 (-) on EDC Control Module A021, Connector X048 .Check Wires WM1732, WM 1731 . <b>Requested value:</b> 4,5 - 5.2 V	- Record Failure and ambient Parameters. - Delete Failure Memory - Test again - Check Wires - Check Connectors Check Voltage supply/Earth A021 . If no failure can be identified, replace EDC Control Module
Potentiometer Signal	Check Voltage with adaptor box with adaptor Connectors between Pin B23 (+) and Pin B35 (-) on EDC Control Module A021, Connector X048. Check Wires WM WM1733, WM 1731 Check Signal using FENDIAS. Requested values: <b>Idle Position:</b> 0,3 - 0,7 V <b>Full Power Position:</b> 4,0 - 4,5 V	- Record Failure and ambient Parameters. Delete Failure memory - Check again Check Wires Check Connectors - Mecanical Link from Pedal to Position sensor - Pedal Positon Sensor Adjustment - If Adjustment is not feasible, Replace Pedal Position Sensor

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Test	Measurement	Trouble shooting
EDC Control Module A021	<b>Threshold values:</b> U < 0.3V or U > 4,8V Check Voltage with adaptor box with adaptor Connectors between Pin B23 (+) and Pin B35 (-) on EDC Control Module A021, Connector X048. Check Wires WM WM1733, WM 1731	Check Voltage supply /Earth EDC Control module A021

<b>Fav 900</b>	<b>Engine / Systems Trouble shooting program EDC</b>	<b>B</b>
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## High Pressure Solenoid Valve (Q-MV) in Injection Pump (Plausibility Supply time)

### (Test 2)

**Failure Code (Fendt):**

1.2.82

**Failure location (MAN):**

82

**Failure display:**

Message on Dashpanel

**Failure path:**

Duration of supply of Solenoid Valve , Flow signal wich is communicated via CAN-Bus to Pump

**Consequences:**

Engine will be stopped

Engine does not start

**Possible Origin:**

Injection Pump Failure, Supply / Earth VP44 not OK

Test	Measurement	Trouble shooting
Injection Pump	Check Voltage supply/ Earth VP44, Pin 6,7, A020 ,Connector X046 by putting load on Supply wires WM1041, WM1352	<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete failure Memory using FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- Check Connectors</li> <li>- If Failures are still persisting , replace Injection Pump</li> </ul>

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<b>Fav 900</b>	<b>Engine / Systems</b> <b>Trouble shooting program EDC</b>	<b>B</b>
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**Speed sensor EDC B025 (Test 3)****Failure Code (Fendt):**

1.2.84

**Failure location (MAN):**

84

**Failure display :**

Message on Dashpanel

**Failure path:**

Speed Sensor

- Statically not plausible
- Dynamically not plausible

**Consequences:**

Full power flow reduced by 25-40%

Reduced maximal speed 1800 Rpm.

System switches from injection start Control to predefined injection start characteristic.

In case of error of correspondance of pump speed sensors, engine will stop

**Possible Origin:**

Wire disruption, short circuit, Speed sensor failure. Wrong signal through metallic chips , e.g.nxt to the installatin Place; Distance to fly wheel not OK? EDC Control module is not OK,

**Test Conditions:**

Adaptor Box with Adaptor Connectors , connected

Diagnostic Program

Use wiring diagrams wich are corresponding to the tractor

Fendt Component Identification:

**B025** (Speed Sensor)

Fendt Connector Identification:

**X172** (Speed Sensor), 1: Earth, 2: Signal

Remark:

Occurs simultaneously with FC 1.2.B7

Test	Measurement	Trouble shooting
Resistance	Check Resistance with Adaptor Box and adptor Cable between Pin A1 (+) and Pin A13 (-) to EDC Control Module A021, Connector X047 <b>Requested Value: 770 - 1000 Ohm</b>	<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- Check Wiring</li> <li>- Check Connectors</li> <li>- if no Failure can be identified, replace Speed Sensor</li> </ul>
Speed Signal	Check Signal with Adaptor Box and adaptor Connectors between Pin A1 (+) and Pin A13 (-) to EDC Control Module A021, Connector X047 with Oscillo-graph . Number of holes in the Flywheel: 6 Requested Value: Speed 1200 Rpm; Frequency = 120Hz	<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- Check Wires</li> <li>- Check Connectors</li> </ul>

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Test	Measurement	Trouble shooting
	See Test 3 Distance to Flywheel: 0.5 mm - 1.5 mm  Tolerances:  Triggering Threshold:	- if no Failure can be identified, replace Control Module  - Check Distance between Speed Sensor to Flywheel, Resistance of sensor must be OK.
EDC Control Module A021	Check Voltage with adaptor box with adaptor Connectors between Pin B23 (+) and Pin B35 (-) on Control Module A021, Connector X048 . Check Wiring WM WM1733, WM 1731.	-Check Voltage supply / Earth A021

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**Intake Pressure sensor B028 (Test 4)****Failure Code (Fendt):**

1.2.85

**Failure location (MAN):**

85

**Failure display :**

Message on Dashpanel

**Failure path:**

Intake pressure sensor (XXXX)

- Signal to high
- Signal to low

Signal not compatible with Atmospheric pressure sensor (within Control Module (XXXX))

**Consequences:**

Full Power Fuel Flow Reduced by 20-40%, Set Value: approx. 200 mbar Intake pressure dark smoke emission during accelerations

**Possible Origin:**

Discontinued wire, Short circuit, Intake Pressure Sensor, Leak in Intake Tubing, Control Module failure Atmospheric Pressure sensor failure within EDC Control Module A021

**Test Conditions:**

Adaptor Box with adaptor connectors connected

Ignition "ON"

Apply pressure onto Pressure sensor with ALDA- TesterP or Mitywac Duo - Manual Pump (Absolute Pressure) from MAN

**Remark:**

Only few Millibar (mBar) are to be measured with FENDIAS, the engine running idle

Use wiring diagrams which are corresponding to the tractor

Fendt Component identification:

**B028** (Intake Pressure Sensor)

Fendt Connector Identification.:

**X175** (Intake Pressure Sensor) 1: Signal, 2: 5V Supply, 3: Earth

Test	Measurement	Trouble shooting
Voltage Supply	Check Voltage with adaptor box with adaptor Connectors between Pin A23 (+) and Pin A17 (-) on Control Module A021, Connector X047 <b>Requested Value:</b> 4,75 - 5,25 V	- Record Failure and ambient Parameters with FENDIAS - Delete Failure memory with FENDIAS - Check again with FENDIAS - Check Wiring - Check Connectors - If no failure can be identified, Replace Control Module
Signal Amplitude	Check Voltage with adaptor box with adaptor Connectors between Pin A12 (+) and Pin A17 (-) on Control Module A021 Connector X047 . Check Intake Pressure with FENDIAS <b>Requested Values:</b> 1,50 - 1,70 V at 1500 mbar	- Record Failure and ambient Parameters with FENDIAS - Delete Failure memory with FENDIAS - Check again with FENDIAS - Check Wiring - Check Connectors

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<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
	2,70 - 3,00 V at 2000 mbar  <b>Threshold values:</b> U < 0.4V or U > 4,5V <b>Requested values:</b> 2,65 - 2,75 V at 1500 mbar relative pressure 3,20 - 3,40 V at 2000 mbar relative pressure  <b>Threshold values:</b> U < 0,455V or U > 4,783V Check Atmospheric Pressure Sensor with FENDIAS See Test 18	- If no failure can be identified, replace Intake Pressure sensor

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**Coolant Temperature Sensor (B027) (Test 5)****Failure Code (Fendt):**

1.2.87

**Failure location (MAN):**

87

**Failure display :**

Message on Dashpanel

**Failure path:**

Coolant Temperature Sensor (B027)

**Consequences:**

Full Power Fuel Flow reduced by 50%, Preset Value will be activated (approx. 110 °C)

Difficult Start in cold Conditions

**Possible Origin:**

Wire discontinued, Short Circuit, Temperature Sensor Failure, Control Module (XXXX) Failure

**Test Conditons:**

Adaptor box with adapting connectors connected

Diagnostic Program

Use wiring diagrams wich are corresponding to the tractor

Fendt Component Identification:

**B027** (Coolant temperature sensor)

Fendt Connector Identification:

**X174** (Coolant temperature sensor), 1: not attributed, 2: Earth, 3: Signal

Test	Measurement	Trouble shooting
Sensor Resistance	Check Resistance with adaptor box with adaptor Connectors between Pin A22 and Pin A5 on Control Module A021, Connector X047 Separate Sensor from Control Module (XXXX) ! <b>Requested Values:</b> 3,6 - 1,3 KOhm at 15 - 30°C 460 - 230 Ohm bei 75 - 80°C	<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- Check Wiring</li> <li>- Check Connectors</li> <li>- Replace temperature Sensor (XXXXX)</li> </ul>
Sensor Voltage	Check Voltage with adaptor box and adaptor Connectors between Pin A22 and Pin A5 on Control Module A021, Connector X047 <b>Requested Value:</b> 3,0 - 1,15 V at 30 - 90°C <b>Tolerances:</b> U < 0.53V oder U > 4,3V	<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- Check Wiring</li> <li>- Check Connectors</li> <li>- Replace temperature Sensor</li> <li>- If no failure can be identified, replace Control Module (XXXX)</li> </ul>

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### **Pump Control Module A020 Auto Diagnostic - Pump characteristic not found (Test 6)**

**Failure Code (Fendt):**

1.2.89

**Failure location (MAN):**

89

**Failure display :**

Message on Dashpanel

**Failure path:**

Pump Control Module (Injection Pump)

**Consequences:**

Engine does not Start

**Possible Origin:**

Pump Control Module (Injection Pump) failure

**Remark:**

Before Replacing any Pump or Control Module, failure Codes must be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
Injection Pump		<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- If Failure persists, Replace Injection Pump</li> </ul>

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**Test: Engine Stop via CAN Setting "Fuel Flow 0" (Test 7)****Failure Code (Fendt):**

1.2.92

**Failure location (MAN):**

92

**Failure display :**

Message on Dashpanel

**Failure path:**

EDC Control Module, Injection pump

**Consequences :**

Full Power Fuel Flow reduced by 25-40%

Reduced max. Speed to 1900 Rpm

**Function:**

During Relay Delay time Fuel Flow 0 is set. If the expected Speed drop does not occur, Failure Code will be emitted.

**Possible Origin:**

EDC Control Module failure, Injection Pump Failure, Bewel Pinion Speed Sensor failure, Engine Stop Path Failure

**Remark 1:**

Before Replacing any Pump or Control Module, failure Codes must be analyzed and then deleted. In case of several Failure Codes, check first the Test procedures which are not requesting a replacement of the Control Module or of the pump.

**Remark 2:**

In Case of Relay Delay Time failures, Bewel Pinion Speed Sensor must be checked.

Reason: If speed Display shows 0 km/h while tractor is moving, and Ignition will be switched "OFF", then Delay Time occurs. Several Engine Stop Paths may be identified as failed, since speed does not drop fast enough (still moving tractor).

Test	Measurement	Trouble shooting
EDC Control Module	Tractor at standstill (0 km/h) Engine speed 800 Rpm, start seven times Engine in order to delete Failure codes. Engine must stand still for at least 5 seconds between 2 Starting trials.	<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- If Failure persists, replace EDC Control Module</li> </ul>
Engine Stop Paths	Tractor at standstill (0 km/h) Engine speed 800 Rpm, start seven times Engine in order to delete Failure codes. Engine must stand still for at least 5 seconds between 2 Starting trials. Check Speed Sensor Signal with FENDIAS.	
Injection pump		<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- If Failure persists, replace Injection Pump</li> </ul>

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**Low Voltage EDC-System (Test 8)****Failure Code (Fendt):**

1.2.13

**Failure location (MAN):**

13

**Failure display :**

Message on Dashpanel

**Failure path:**

Voltage supply EDC Control Module ( Low Battery)

**Consequences:**

According to the importance of Voltage drop, different behaviours of the EDC-Systems or Engine may occur:

- Lack of power
- unsteady engine operation
- Engine stops
- heavy smoke emission
- **incompatible Failure Codes !**

**Possible Origin:**

Low Battery or Generator failure, Cable discontinuity, Short circuit,  
Main Relay failure

**Test Conditions:**

Adaptor box with adapting connectors connected

Ignition "ON"

Use wiring diagrams wich are corresponding to the tractor

Test	Measurement	Trouble shooting
Voltage Supply	Check Voltage with adaptor box with adaptor Connectors between Pin B15 (+) and Pin B1 (-), Pin B15 (+) and Pin B27 (-), Pin B3 (+) and Pin B2 (-), Pin B4 (+) and Pin B1 (-) on Control Module A021, Connector X048 <b>Sollwert:</b> 7,5 - 15 V <b>Threshold Value: Umin=7,5V</b> <b>Failure Condition:</b> Voltage has been lower than Threshold for more than 10 second	- Record Failure and ambient Parameters with FENDIAS - Delete Failure memory with FENDIAS - Check again with FENDIAS  Check Wiring - Check Connectors Replace Main Relay - If no failure can be identified, replace Control Module (XXXX)

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**Overspeed (Test 9)****Failure Code (Fendt):**

1.2.17

**Failure location (MAN):**

17

**Failure display :**

Message on Dashpanel

**Failure path:**

Engine overspeed

**Consequences:**

Fuel Flow will be interrupted.

If no further Failure can be identified , Fuel Flow will resume when speed comes into permitted range.

**Possible Origin:**

Operating Error (e.g. Downhill run ).

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
	If no further Failure can be identified , no further action is necessary <b>Threshold value:</b> N > 3100 Rpm	- Record Failure and ambient Parameters with FENDIAS - Delete Failure memory with FENDIAS - Check Again with FENDIAS

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**Start of Delivery Deviation (Test 10)****Failure Code (Fendt):**

1.2.18

**Failure location (MAN):**

18

**Failure display :**

Message on Dashpanel

**Failure path:**

Start of Delivery system deviates

**Consequences:**

Full Power Fuel Flow reduced to 50-60%

Reduced max Speed to 1700 Rpm

Heavy Smoke Emission

System switches from Normal operation into Control mode with fixed Delivery Start with fixed characteristic.

**Possible Origin:**

Failures in the fuel system (leaks, clogged, air in the System)

Overflow Valve Failure, leaks or Air in the Fuel System

Fuellifting Pump Failure

Contaminated Filter

Clogged fuel lines, squeezed Fuel lines

Empty fuel tank

Contaminated fuel system including Fuel Tank

Problem in Fuel Tank Venting (Vacuum)

Wiring disruption, Short Circuit

Connectors on Injection Pump / Cabin / Control Module

oxydation, loose , pushed back or damaged

Signal Speed sensor not OK

Wrong Signals from Needle motion Sensor

Pump is not correctly fitted (Check Adjustments)

Injection Pump Failure

**Remark:**

Even without Failure Code , Check always Function Paths , Needle Motion Sensor, Speed Sensor Engine (Flywheel) as well as Wire KW Speed, VP 44 to Control Module A012 .

Use wiring diagrams wich are corresponding to the tractor

Test	Measurement	Trouble shooting
	Check with Diagnostic program requested / actual value start of injection <b>Failure Condition:</b> +/- 3 degrees	- Record Failure and ambient Parameters with FENDIAS - Delete failure memory content with FENDIAS
	Deviation 2,5 second of duration Monitoring only with Speed > 1000 Rpm	- Check again with FENDIAS - check Wiring - Check Connectors - Check fuel system - Fill up fuel tank - Check pump

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Test	Measurement	Trouble shooting
		- replace injection pump
Needle Motion Sensor	see test 11	see test 11
Speed sensor	see test 3	see test 3



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**Needle Motion Sensor r B026 (Test 11)****Failure Code (Fendt):**

1.2.1A

**Failure location (MAN):**

1A

**Failure display :**

Message on Dashpanel

**Failure Path:**

Needle Motion Sensor (B026)

- Signal Amplitude to low
- Insufficient pulses
- To many Impulses
- Internal Resistance not OK

**Consequences:**

System switches from Control Mode to Start of Injection Control.

If failure disappears, System will switch automatically back to Control Mode.

**Possible Origin:**

Wiring Disruption, Short Circuit, Needle Motion sensor Failure

Failures in pulses from Primary speed Sensor (XXXX) ( even without Failure Code)

Disturbance Pulses between (XXXX) Control Module and Needle Motion Sensor (e.g. by switching a Relay)

Disturbance pulses on Needle motion Sensor due to Mecanical Failures (e. g. Valve control, Pistons)

Stuck Injector Needle

Leaks or Air within System

Fuel Lifting Pump failure

Contaminated Fuel Filter

Clogged fuel lines

Empty fuel Tank

Injection Pump Failure

**Test Conditions:**

Adaptor box with adapting connectors connected

Use wiring diagrams wich are corresponding to the tractor

Fendt Component identification:

**B026** (Needle Motion Sensor)

Fendt Connector Identification:

**X173** (Needle Motion Sensor), 1: Signal, 2: Earth

Test	Measurement	Trouble shooting
Internal resistance	Check Resistance with adaptor box with adaptor Connectors between Pin A29 and Pin A15 on Control Module A021, Connector X047 Requested value: 65 - 160 Ohm Failure Conditions: No indications	- Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Check wiring - Check Connectors - Replace Needle Motion Sensor

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<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
Signal	Check Voltage by Oscillograph, with adaptor box and adaptor Connectors between Pin A29 and Pin A15 on Control Module A021 Connector X047 <b>Requested Value</b> : (Amplitude) (Bosch Service) <b>Frequency</b> : Half Engine Speed	- Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Check Wiring

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**Plausibility Engine Stop via Solenoid valve (MAB-Signal) (Test 12)****Failure Code (Fendt):****1.2.9B****Failure location (MAN):****9B****Failure display :**

Message on Dashpanel

**Failure path:**

Status "Engine Stop via Solenoid valve"

**Consequence:**

Full Power Fuel Flow reduced by 25-40%

Reduced max. engine speed to 1900 Rpm

**Funktion:**

Check wether MAB-Status in Pump Control Module and EDC Control module ar identicals

**Possible Origin:**

Wiring disruption between Pum Control Module and EDC Control Module

Signal failure "Solenoid Valve Engine Stop" on EDC Control Module.

Injection Pump (Control Module ) failure

**Remark1:**

Before replacing the Injection Pump or Pump Control Module , delete Failure Code memory and analyse the failures.

Perform first all tests corresponding to failure Codes wich do not make Injection Pump or Pump Control Module replacement necessary.

**Remark 2:**

By Failures in Delay Time, check egually Signal of Bewel Pinion Speed Sensor (B015)

Reason: If speed Display shows 0 km/h while tractor is moving, and Ignition will be switched "OFF", then Delay Time occurs.

The various Solution paths can be identified as Failures , since Engine speed does not decrease sufficiently fast (while tractor is moving).

Use wiring diagrams wich are corresponding to the tractor

Test	Measurement	Trouble shooting
EDC Control Module	Check connection Pin A20 on Control module A021, Connector X047 with Pin 5 , A020 Connector X046, VP 44, Wire WM1709	- Record Failure and ambient Parameters with FENDIAS Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - If Failure persists, replace EDC Control Module
Injection Pump	Connection Pin A20 on EDC Control Module A021, Connector X047 Check VP 44 with Pin 5, A020, Connector X046, VP 44 Failure Conditions: none indicated	- Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Check Wires - Check connectors - if Failure persists, replace Injection Pump

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**CAN - System (Test 13)****Failure Code (Fendt):**

1.2.1F

**Failure location (MAN):**

1F

**Failure display :**

Message on Dashpanel

**Failure path:**

EDC Control module

**Consequences:**

Interrupted Data Transmission between EDC System and other electronic Systems

**Possible Origin:**

Interface failure

EOL- Programming not OK

EDC Control Module Failure

**Test Conditions:**

Adaptor box with adapting connectors connected

Ignition "OFF"

Use wiring diagrams wich are corresponding to the tractor

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
EDC Control Module	Check Resistance with adaptor box and adaptor Connectors between Pin B11 and Pin B12, on EDC Control Module, A021, Connector X048 <b>Requested Value</b> : 160 Ohm, all CAN -Correspondants being connected. <b>Failure Condition</b> : No message received after 5 seconds	- Record Failure and ambient Parameters with FENDIAS With FENDIAS, Delete Content of Failure Code Memory - Check again with FENDIAS - If approx.. 0 Ohm, short circuit from CAN-H to CAN-L - In case of High resistance, check connection to Fuse Board (XXXX). - Check Connection to Transmission Control Module. - Replace Control Module

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**"Timeout" CAN Connection to Transmission - BUS (Test 14)****Failure Code (Fendt):**

1.2.21

**Failure location (MAN):**

21

**Failure display :**

Message on Dashpanel

**Failure path:**

EST Control Module not connected or CAN - Connection Failure to Transmission Bus

**Consequences:**

No more fuel flow limitation

**Possible Origin:**

Disrupted wire, Short Circuit

**Test Conditions:**

Adaptor box with adapting connectors connected

Ignition "OFF"

Use wiring diagrams which are corresponding to the tractor

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
EDC Control Unit	Check resistance with Adaptor Box an adaptor connectors between Pin B11 and Pin B12 on EDC Control Module A021, Connector X048 . <b>Requested Value:</b> 160 Ohm <b>Failure Conditions:</b> Timeout - Period: 5 seconds	- Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - see Test 13

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**"Timeout" CAN - Message EST Control Module to EDC Control Module (Test 15)****Failure Code (Fendt):**

1.2.23

**Failure location (MAN):**

23

**Failure display :**

Message on Dashpanel

**Failure path:**

CAN-Signal from Fendt-EST to EDC

**Consequences:**

After 5sec system will switch to Pedal Position Sensor EDC . Operation only via Pedal Accelerator, no more Hand throttle, no Memory keys function, no Terminal Settings).

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
EDC Control Module (A021)	Check resistance with Adaptor Box an adaptor connectors between Pin B11 and Pin B12 on EDC Control Module A021, Connector X048 <b>Requested Value:</b> 160 Ohm <b>Test Conditions:</b> Timeout- period : 5 seconds Or to many messages received	- Record Failure and ambient Parameters with FENDIAS - Delete Failure code memory within FENDIAS - Check again with FENDIAS - see Test 13

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**Relay UB30 EDC (K020) (Test 16)****Failure Code (Fendt):**

1.2.25

**Failure location (MAN):**

25

**Failure display :**

Message on Dashpanel

**Failure path:**

Main relay

Contact is sticking (does not open)

**Consequences:**

Battery may run empty

**Function:**

Minus is supplied to solenoid by EDC Control module, utput Pin B27. Main Relay Switching off occurs with certain delay after switching "OFF" the ignition ( Delay Time).

Delay time allows internal functions and tests as well as the memorizing of eventual failure Codes.

**Possible Origin:**

Short Circuit with earth, Main Relay failure

**Test Conditions:**

Adaptor box with adapting connectors connected

Use wiring diagrams wich are corresponding to the tractor

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
Main Realy (XXXX)	Check Voltage with adaptor box with adaptor Connectors between Pin B3/4 and Pin B1/2 B12 on Control module A021, Connector X048 <b>Requested Values:</b> U Bat by Ignition "ON" 0 V by Ignition "OFF"  <b>Failure Conditions:</b> After interruption of supply, Check opening of Relay Max. Time: 5seconds.	- Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS  - Check Wiring - Check Connectors - if Wiring is OK , Replace main Relay

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**Check Relay Time Delay: Engine Stopf via Gate-Array (Control Module) within EDC Control Module A021 (Test 17)**

**Failure Code (Fendt):**

**1.2.A6**

**Failure location (MAN):**

**A6**

**Failure display :**

Message on Dashpanel

**Failure path:**

EDC Control Module , Driving Speed Signal, Injection Pump

**Consequences:**

- Full Power Fuel Flow reduced by 25-40%
- Reduce max Speed to 1900 Rpm
- Engine Stop is not possible via Monitoring Module

**Function:**

Mikroprocessor runs an Autotest. For Rely Delay Time, failures are simulated on purpose . If the expected Speed Loss does not occur, a Failure Code will be emitted.

**Possible origin:**

EDC Control Module Failure, Bewel pinion Sensor (XXXX) Signal not plausible, Injection Pump Failure

**Remark 1:**

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted. In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

**Remark 2:**

Bewel pinion Speed Sensor (XXXX) Signal need to be checked in Case of Relay delay Time Failures. Reason: If speed Display shows 0 km/h while tractor is moving, and Ignition will be switched "OFF", then Delay Time occurs. Several Solution Paths ???? in Delay time will then be considered as Failed, since speed does not decrease fast enough (vehicle is still moving).

Use wiring diagrams wich are corresponding to the tractor

Test	Measurement	Trouble shooting
EDC Control Unit	<b>Failure Conditions: If Speed does not drop within 10 seconds below 300 Rpm, Failure Code will be emitted.</b>	<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with Diagnostic program.</li> <li>- Delete Failure Code Memory with EDC Diagnostic Program</li> <li>- Check again with diagnostic program</li> <li>- If Failure persists, Replace EDC Control Module</li> </ul>
Injection Pump		<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- If Failure persists, Replace Injection Pump</li> </ul>



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**Relay time Delay: Engine Stop via Relay "Soplenoid valve " K021 (Test 18)**

**Failure Code (Fendt):**

**1.2.A2**

**Failure location (MAN):**

**A2**

**Failure display :**

Message on Dashpanel

**Failure path:**

EDC Control Module , Driving Speed , Injection Pump, Relay

**Consequences:**

Full Power Fuel Flow reduced by 25-40%  
 Reduced max. Speed down to 1900 Rpm  
 Engine Stop via Pump Relay is not possible

**Function:**

Pump Relay will be disconnected , Engine will stop.

**Possible Origin:**

EDC Control Module Failure, Bewel Pinion Speed Sensor not plausible, Injection Pump Failure

**Remark 1:**

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.  
 In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

**Remark 2:**

In Case of Delay Time failures, Bewel Pinion Sensor must be checked.  
 Reason: If speed Display shows 0 km/h while tractor is moving, and Ignition will be switched "OFF", then Delay Time occurs. Several Solution Paths in Delay time will then be considered as Failed, since speed does not decrease fast enough (vehicle is still moving).

Use wiring diagrams wich are corresponding to the tractor

Test	Measurement	Trouble shooting
Pumpenrelais	<b>Fehlerbedingungen: Sinkt die Drehzahl innerhalb von 10 sec nicht unter 300 1/min, erfolgt die Defekteinstufung.</b>	- Record Failure and ambient Parameters with FENDIAS  - Start Engine several Times ( 7 times), innorder to delete Failures. - Engine must be at a Standstill for at least 5seconds between 2 Start trials - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - If failure persists , Replace Pump Relay

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### Atmospheric Pressure Sensor (EDC Control Module A021) (Test 19)

**Failure Code (Fendt):**

1.2.A8

**Failure location (MAN):**

A8

**Failure Display:**

Message on Dashpanel

**Failure Path:**

EDC Control Module

Failure Atmospheric Pressure Sensor within EDC Control Module

**Consequences:**

No noticeable consequences

In specific cases, Failure Code "Intake Pressure Sensor" may appear simultaneously

**Possible Origin:**

EDC Control Module Failure

Test	Measurement	Trouble shooting
EDC Control Module	<p>Check Atmospheric pressure using MAN-Diagnostic Program. If this is the only failure, no test will be possible, since the sensor is located within the EDC Control Module.</p> <p>If the Intake Pressure Sensor is simultaneously identified as failed , then check it according to Test 4 .</p> <p><b>Failure conditions:</b> Umin=2,35V Umax=4,25V Default value: 1000hPa</p>	<p>- Record Failure and ambient Parameters with FENDIAS</p> <p>- Delete Failure Code Memory with FENDIAS</p> <p>- Check again with FENDIAS</p> <p>Replace EDC Control Module</p>

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16.11.2000	<b>b</b>	35/72		<b>2000</b>	<b>B</b>	<b>000001</b>

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**Solenoid valve in Pump Control Module A020 (Test 20)****Failure Code (Fendt):**

1.2.A9

**Failure location (MAN):**

A9

**Failure display:**

Message on Dashpanel

**Failure path:**

EDC Control Module , Injection Pump

**Failure path:**

Injection Pump

**Consequences:**

Reduced maximal speed 2000 min-1

Full Power flow reduced by 25-40%

Engine stops

Engine does not start

**Function:**

Final Stage Connection ????? or short circuit can be identified by testing Voltage on Pump Control Module

**Possible origin:**

Unsteady contact on engine Flywheel speed sensor

Injection pump failure

**Remark:**

Before Replacing any Pump or Control Module, failure Codes must be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

Use wiring diagrams wich are corresponding to the tractor

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
Injection Pump	<b>Failure Conditions:</b> None	<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- Check wiring to speed Sensor (XXXX) on Flywheel</li> <li>- If failure persists, Replace Injection Pump</li> </ul>

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16.11.2000	<b>b</b>	36/72		<b>2000</b>	<b>B</b>	<b>000001</b>

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**"Timeout" CAN-Signal on Exhaust brake (Test 21)****Failure Code (Fendt):**

1.2.2A

**Failure location (MAN):**

2A

**Failure display:**

Message on Dashpanel

**Failure path:**

EDC Control Unit , Bewel Pinion speed Sensor (XXXX) , Injection pump

**Failure path:**

CAN-Signal from EST Control Unit, Exhaust brake (EDC Control Module)

**Consequences:**

ABS/ASR does not control Exhaust brake

**Possible Origin:**

Discontinued wire, Short circuit, EDC Control Unit failure

**Test Conditions:**

Adaptor box with adapting connectors connected

Ignition "OFF"

Use wiring diagrams which are corresponding to the tractor

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
EDC Control Module	see Test 13  <b>Failure Conditions:</b> CAN Connection to EST Control Module discontinued for more than 5 seconds	- Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS  - Check again with FENDIAS - see Test 13

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16.11.2000	<b>b</b>	37/72		<b>2000</b>	<b>B</b>	<b>000001</b>

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**"Timeout" CAN-Signal EST Control Module A002 to exhaust brake A021 (Test 22)**

**Failure Code (Fendt):**

1.2.2B

**Failure location (MAN):**

2B

**Failure Display:**

Message on Dashpanel

**Failure path:**

CAN-Signal from EST Control Module to Exhaust Brake (EDC Control Module)

**Consequences:**

No control of Exhaust brake

**Possible Origin:**

Discontinued wire, Short circuit, EDC Control Unit failure

**Test Conditions:**

Adaptor box with adapting connectors connected

Ignition "OFF"

Use wiring diagrams which are corresponding to the tractor

Test	Measurement	Trouble shooting
EDC Control Module	see Test 13  <b>Failure Conditions:</b> CAN Connection to EST Control Module discontinued for more than 5 seconds	- Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS  - Check again with FENDIAS - see Test 13

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16.11.2000	<b>b</b>	38/72		<b>2000</b>	<b>B</b>	<b>000001</b>

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**"Timeout" CAN-Signal EST Control Module A002 to Exhaust brake A021  
(Test 23)**

**Failure Code (Fendt):**

1.2.2C

**Failure location (MAN):**

2C

**Failure display :**

Message on Dashpanel

**Failure path:**

CAN-Signal EST Control module to Exhaust brake

**Consequences:**

No Control of Exhaust brake

**Possible origin:**

Discontinued wire, Short circuit, EDC Control Unit failure

**test Conditions:**

Adaptor box with Adaptor Connectors connected

Ignition "OFF"

Use wiring diagrams wich are corresponding to the tractor

Test	Measurement	Trouble shooting
EDC Control Unit	see Test 13  <b>Failure Conditions:</b> CAN Connection to EST Control Module discontinued for more than 5 seconds	- Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS  - Check again with MAN FENDIAS - see test 13

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16.11.2000	<b>b</b>	39/72		<b>2000</b>	<b>B</b>	<b>000001</b>

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**"Timeout" CAN-Signal EST Control Module - EDC Control Module (Test 24)****Failure Code (Fendt):**

1.2.2D

**Failure location (MAN):**

2D

**Failure display:**

Message on Dashpanel

**Failure path:**

CAN-Signal from EST Control Module to EDC Control Module

**Consequences:**

After 5 seconds, system switches to EDC Pedal position Sensor. Then only Pedal operation possible, Hand Throttle, Memory keys and terminal settings will be deactivated.

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
EDC Control Unit	Check Resistance with adaptor box with adaptor Connectors between Pin B11 and Pin B12 on Control module A021, Connector X048 Requested Value: 160 Ohm  <b>Failure Conditions:</b> CAN Connection to EST Control Module discontinued for more than 5 seconds	- Record Failure and ambient Parameters with FENDIAS  - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS  - see Test 13

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16.11.2000	<b>b</b>	40/72		<b>2000</b>	<b>B</b>	<b>000001</b>

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### Relay Delay Time Control (Engine Stop) (Test 25)

**Failure Code (Fendt):**

1.2.38

**Failure location (MAN):**

38

**Failure display:**

Message on Dashpanel

**Failure path:**

Control Module Output failure  
Relay delay Time not operating

**Consequences:**

Max. speed reduced down to 1900 Rpm  
Full Power Fuel Flow reduced by 25-40%

**Function:**

After each Engine Stop Relay Time delay will occur.

**Possible Origin:**

EDC Control Module Voltage supply Failure , Delay Time not ensured.  
EOL not accomplished

**Test conditions:**

Adaptor box with adapting connectors connected  
Use wiring diagrams which are corresponding to the tractor

Test	Measurement	Trouble shooting
Voltage supply EDC Control Unit	Check Voltage with adaptor box with adaptor Connectors between Pin B3/B4 and Pin B1/B2 on Control Module A021, Connector X048 Requested values: U Bat , Ignition "OFF". Time delay will occur Battery - Main Switch will be held by EDC-Control Unit Failure Conditions: Relay must open within 5second	- Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Check wiring - Check Connectors - Check Relay Time delay - Check Main Relay

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16.11.2000	<b>b</b>	41/72		<b>2000</b>	<b>B</b>	<b>000001</b>



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**Final Stage Solenoid Valve A020 (Autotest Pump Control Module) (Test 26)****Failure Code (Fendt):**

1.2.C1

**Failure location (MAN):**

C1

**Failure display:**

Message on Dashpanel

**Failure path:**

Pump Control Module (Injection Pump)

**Consequences:**

non known

**Function:**

Autotest of oltage, if Solenoid Valve is not supplied

**Possible Origin:**

Pump Control Module (Injection Pump) Failure

**Remark:**

Before Replacing any Pump or Control Module, failure Codes must be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
Injection Pump		<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- If failure persists, Replace Injection Pump</li> </ul>

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16.11.2000	<b>b</b>	42/72		<b>2000</b>	<b>B</b>	<b>000001</b>

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**Pump Control Module (Fuel temperature.) A020 (Test 27)**

**Failure Code (Fendt):**

1.2.42

**Failure location (MAN):**

42

**Failure display:**

Message on Dashpanel

**Failure path:**

Injection Pump (Control Module) Fuel Temperature to high or Temperature sensor failure.

**Consequences:**

If values are not plausible, system will switch to substitution Value (75°C) . Fuel Flow will be reduced according to Speed.

**Possible Origin:**

Fuel Temperature to high , Injection Pump Failure

**Remark:**

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted. In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

**Remark 2:**

Fuel Temperature Sensor is an integrated part of the injection Pump and cannot be replaced separately.

Test	Measurement	Trouble shooting
Injection Pump	<p><b>Failure thresholds :</b> t&gt;130°C or &lt;-45°C will be substituted by 20 °C. Check with FENDIAS wether Values are out of thresholds but realistic (e.g. Temperatur by cold Engine).</p>	<p>- Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS  - Check again with FENDIAS, let fuel cool down - If Failure Persists, Replace Injection Pump</p>

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**CAN to Pump Control module A020 (Test 28)**

**Failure Code (Fendt):**

**1.2.C3**

**Failure location (MAN):**

**C3**

**Failure Display:**

Message on Dashpanel

**Failure path:**

CAN-Signal of EDC Control Module (Busoff) during Engine Start.

**Consequences:**

Engine runs idle (approx. 730 Rpm), Accelerator pedal, Hand throttle and memory keys are ineffective.

**Possible Origin:**

Wiring Discontinuity, Short Circuit, Control Module Failure, Injection Pump failure

**Remark:**

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted. In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

**Test Conditions:**

Adaptor box with adapting connectors connected

Ignition "OFF"

Use wiring diagrams wich are corresponding to the tractor

Test	Measurement	Trouble shooting
EDC Control Module	Check Resistance with adaptor box with adaptor Connectors between Pin A27 and A24 on Control Module A021, Connector X047 Connector Shut: Sollwert: 60 Ohm Connector open:Sollwert: 120 Ohm  Failure Conditions : Time Since last Busoff, in wich no more Busoff must appear: 10 sec	- Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS Check - CAN-Bus Connection to EDC Control Module to VP 44 - approx. 0 Ohm Short Circuit from von CAN-H to CAN-L - approx. 120 Ohm: Connection to external resistance (VP44) is discontinued - If failure persists , Replace Control Module
Injection Pump	Check Resistance with adaptor box with adaptor Connectors between Pin 1 and Pin 2 on Control Module A020, Connector X046 VP 44 Connector connected: requested Value: 60 W ??? Connector disconnected: requested Value: 120 W	- Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with CAN - Bus connection to EDC Control Module to VP 44 - approx. 0 Ohm Short Circuit from von CAN-H to CAN-L - approx. 120 Ohm: Connection to Control Module is discontinued - If failure persists, Replace injection Pump

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**CAN Interface To Pump Control Modulet A020 (Test 29)****Failure Code (Fendt):**

1.2.C4

**Failure location (MAN):**

C4

**Failure display :**

Message on Dashpanel

**Failure path:**

CAN-Signal Pump onrol Module

**Consequences:**

Engine runs idle ( approx. 730 Rpm), no Operation via accelerator Pedal, Hand Throttle, Memory Keys, or Terminal possible eventually Speed reduction down to 2100 Rpm in connection with power reduction

**Possible Origin:**

Injection Pump Failure

**Remark:**

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted. In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

**Test Conditions:**

Adaptor box with adapting connectors connected

Ignition "OFF"

Use wiring diagrams wich are corresponding to the tractor

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
Injection Pump		<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- If failure persists, Replace injection Pump</li> </ul>

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16.11.2000	<b>b</b>	45/72		<b>2000</b>	<b>B</b>	<b>000001</b>

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**Relay Delay Time: Engine Stop with MAB-Signal (Test 30)**

**Failure Code (Fendt):**

**1.2.C5**

**Failure location (MAN):**

**C5**

**Failure path:**

Status Engine Stop Via Solenoid Valve during Delay Time

**Consequences:**

Max. Speed Reduced to 1900 Rpm  
Full Power Fuel low reduced by 25-40%,  
since MAB- Engine stop is not possible

**Possible Origin:**

Bewel Pinion Speed Sensor Signal Failure (Display on Dashpanel "99,99 km/h")  
PTO Drives Engine due to Implement inertia.  
Injection Pump Failure

**Remark 1:**

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.  
In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

**Remark 2:**

In Case of Delay Time failures, Bewel Pinion Sensor must be checked.  
Reason: If speed Display shows 0 km/h while tractor is moving, and Ignition will be switched "OFF", then Delay Time occurs. Several Solution Paths in Delay time will then be considered as Failed, since speed does not decrease fast enough (vehicle is still moving).

Use wiring diagrams wich are corresponding to the tractor

Test	Measurement	Trouble shooting
Signal Bewel Pinion Speed Sensor (XXX)	Speed must be 0 kP/h to be checked by FENDIAS when Engine is Stopped	- Check speed Bevel pinion / Collector shaft
Injection pump	<b>Failure Conditions:</b> Failure Code will be emitted if Speed does not drop below 300 Rpm within 10 seconds	- Record Failure and ambient Parameters with Diagnostic program.  - Start Engine 7 times in order to delete Failure Codes. - Engine needs to be at standstill for at least 5seconds between 2 Start trials - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS Delete Failure memory - read out failure Memory - If failure persists, Replace injection Pump

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**Vehicle CAN (Test 31)****Failure Code (Fendt):**

1.2.46

**Failure location (MAN):**

46

**Failure display :**

Message on Dashpanel

**Failure path:**

Fahrzeug-CAN Busoff

**Fehlerauswirkung:**

System Switches after 5 seconds to EDC Pedal Position sensor. Only Pedal acceleration will be possible, no more Hand Throttle function, Memory Keys or Terminal settings available.

**Possible Origin:**

Wiring Discontinuity, Short Circuit, Control module Failure

**Hinweis 1:**

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted. In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

**Test Conditions:**

Adaptor box with adapting connectors connected

Ignition "OFF"

Use wiring diagrams wich are corresponding to the tractor

Test	Measurement	Trouble shooting
EDC Control Module	Check Resistance with adaptor box with adaptor Connectors between Pin B11 and B12 on Control Module A021, Connector X048 Sollwert: 160 Ohm <b>Failure Conditions:</b> No more Busoff must appear within 10 seconds	<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- 0 Ohm Short circuit from CAN-H to CAN-L</li> <li>- In case of High resistance , Check Connection to Fuse board (XXXX)</li> <li>- Check Connection to Transmission control module</li> <li>- Replace EDC Control Module</li> <li>- Consult Document "Checking Vehicle CAN"</li> </ul>

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16.11.2000	<b>b</b>	47/72		<b>2000</b>	<b>B</b>	<b>000001</b>

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**CAN-BUS Message: ESTControl Module A002 on EDC Control Module A021 (Test 32)**

**Failure Code (Fendt):**

1.2.DE

**Failure location (MAN):**

DE

**Failure display :**

Message on Dashpanel

**Failure path:**

No Message Driving Speed

**Consequences:**

System Switches after 5 seconds to EDC Pedal Position sensor. Only Pedal acceleration will be possible, no more Hand Throttle function, Memory Keys or Terminal settings available.

**Possible Origin:**

Wiring discontinuity , Short Circuit, EDC Control Module Failure

**Remark:**

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted. In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

**Test Conditions:**

Adaptor box with adapting connectors connected  
Ignition "OFF"

Use wiring diagrams wich are corresponding to the tractor

Test	Measurement	Trouble shooting
EDC Control Module	Check Resistance with adaptor box with adaptor Connectors between Pin B11 and B12 on Control Module A021, Connector X048 ( Requested Value: 160 Ohm <b>Failure Conditions:</b> After 5 seconds Timeout or to many messages, Failure Code will appear	- Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - 0 Ohm Short circuit from CAN-H to CAN-L  - In case of High resistance , Check Connection to Fuse board (XXXX) - Check Connection to Transmission control module - Replace EDC Control Module - Consult Document "Checking Vehicle CAN"

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**Pump Speed Sensor (IWZ-Signal) A020 (Test 33)****Failure Code (Fendt):**

1.2.C7

**Failure location (MAN):**

C7

**Failure display :**

Message on Dashpanel

**Failure path:**

Injection Pump

**Consequences :**

Engine Stops

**Possible Origin:**

Failure within Fuel lifting System (leaks, clogged, Air in System)

Injection Pump failure (Dynamically : not plausible, statically : Increments / Segment not complete)

**Remark:**

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
Injection Pump	Failure Conditions: no indications	<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- Check fuel supply system</li> <li>- Purge air from fuel lines (Filter, than Injection lines on at least 3 injectors)</li> <li>- After successfull engine start, keep engine running idle during at least 30 seconds</li> <li>- Fill up fuel tank</li> <li>- Check pump</li> <li>- if failure persists, Replace injection pump</li> </ul>

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16.11.2000	<b>b</b>	49/72		<b>2000</b>	<b>B</b>	<b>000001</b>



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### Checking Residual Flow 0 Setting (Test 34)

**Failure Code (Fendt):**

1.2.C8

**Failure location (MAN):**

C8

**Failure display :**

Message on Dashpanel

**Failure Path:**

CAN-Signal (Fuel Flow, value transmitted via CAN-Bus to Pump)

LDF

NBF

**Consequences:**

Engine stops, since calculation of Fuel Flow is not accurate

**Possible Origin:**

Wiring discontinuity, Short Circuit, Control Module failure (XXXX), Needle Motion sensor (XXXX)

Failure, Intake pressure Sensor (XXXX) failure

**Remark 1:**

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

Test	Measurement	Trouble shooting
Injection Pump	<b>Failure conditions:</b> If in spite of Setting "Fuel Flow =0", Speed is higher than 700 Rpm, Intake pressure > approx. 300 mbar and Needle motion Sensor Signal are identified, failure Code will be emitted.	- Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS -- If failure persists, Replace injection Pump
Needle Motion Sensor (XXXX)		see equally Test 4
Intake pressure sensor (XXXX)		see equally Test 4

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### **Solenoid Valve Final Stage (Pump Control Module Autodiagnostic) A020 (Test 35)**

**Failure Code (Fendt):**

1.2.C9

**Failure location (MAN):**

C9

**Failure display :**

Message on Dashpanel

**Failure path:**

Hardware Failure within Final Stage Solenoid Valve (Pump Control Module)

**Consequences:**

none known

**Function:**

Check final stage in PSG - Autodiagnostic

**Possible Origin:**

Pump Control Module Failure

**Remark 1:**

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted. In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
Injection Pump	Failure Conditions: no Indications available	<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- If failure persists, Replace Injection Pump</li> </ul>

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**Start of Delivery Controller (Pump Control module) A020 (Test 36)****Failure Code (Fendt):**

1.2.CA

**Failure location (MAN):**

CA

**Failure display :**

Message on Dashpanel

**Failure path:**

Start of Delivery Controller out of range

**Consequences:**

Maximal Speed reduced to 1700 Rpm

Reduzierte Full Power Fuel Flow by 50-60%

**Possible Origin:**

Wire Discontinuity, Short Circuit

Fuel Low Pressure system Failure

inadequate Overflow Valve or Failure

Leaks or Air within Fuel System

Fuel Lifting Pump Failure

Contaminate fuel Filter

Clogged fuel lines

empty fuel tank

Injection pump failure

**Remark 1:**

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
Injection pump	<b>Failure Conditions:</b>  In Case of deviations Rquested / actual value of more than +/- 3 Grad for more than 8seconds aund Speed >1200 Rpm	- Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS  - Check again with FENDIAS Check Fuel Supply system - Fill up fuel tank - Check pump adjustment (Wich pump) - If failure persists, Replace Injection pump

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**"Timeout" CAN - Message Pump Control Module A020 to EDC Control Module A021 (Test 37)**

**Failure Code (Fendt):**

**1.2.B4**

**Failure location (MAN):**

**B4**

**Failure display :**

Message on Dashpanel

**Failure path:**

CAN-Signal from Pump Control Module to EDC Control Module (Timeout)

**Consequences:**

Engine runs Idle (approx. 730 Rpm). After 5 seconds system switches to EDC Pedal Position Sensor, Only Pedal acceleration will be possible. Hand Throttle, memory keys and terminalö settings are no more available. Max. Speed Reduction to 2100 Rpm as well as Power Reduction may occur.

**Possible Origin:**

Wiring discontinuity , Short Circuit, Contol Module failure, Injection pump Failure

**Remark 1:**

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted. In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

**Test Conditions:**

Adaptor box with adapting connectors connected

Ignition "OFF"

Use wiring diagrams wich are corresponding to the tractor

Test	Measurement	Trouble shooting
EDC Control Module	Check Resistance with adaptor box with adaptor Connectors between Pin A27 and A24 on Control Module A021, Connector X047 Connector connected: Requested value: 60 Ohm  Connector disconnected: Requested value: 120 Ohm Failure conditions: No Indications available	- Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS  - approx. 0 Ohm Short Circuit from CAN-H to CAN-L - approx. 120 Ohm; Connection to End Resistor (VP44) is discontinued - if Failure persists, Replace Control Module (XXXX)
Injection pump	Check Resistance with adaptor box with adaptor Connectors between Pin 1 and Pin 2 on Control Module A020, Connector X046, VP 4 Failure Conditions:4  Connector closed circuit: <b>Requested value: 60 Ohm</b> Connector open circuit. <b>Requested value: 120 Ohm</b>	- Document failure ( including atmospheric parameters) using FENDIAS  - Delete EDC failure codes using FENDIAS - Test again using FENDIAS  - If failure persists, replace injection pump

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**Relay Delay Time check: Engine Stop via Voltage monitoring (Test 38)****Failure Code (Fendt):**

1.2.99

**Failure location (MAN):**

99

**Failure display :**

Message on Dashpanel

**Failure path:**

Status Engine stop via Voltage monitoring

**Consequences:**

Max Speed reduced to 1900 Rpm

Torque reduced down to 25-40%,

**Function:**

A Failure will be simulated intentionally During Time delay (Threshold Values). If the expected Speed Loss does not occur, then Failure Code will be emitted

**Possible Origin:**

Wiring discontinuity between EDC Control Module and Injection Pump, EDC Control Module Failure, Injection Pump Failure

**Remark 1:**

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted. In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

**Remark 2:**

In Case of Delay Time failures, Bewel Pinion Sensor must be checked.

Reason: If speed Display shows 0 km/h while tractor is moving, and Ignition will be switched "OFF", then Delay Time occurs. Several Solution Paths in Delay time will then be considered as Failed, since speed does not decrease fast enough (vehicle is still moving).

Test	Measurement	Trouble shooting
EDC Control Module	<b>Failure Conditions:</b> If speed does not drop below 300 Rpm within 10 seconds, Failure Code will be emitted	<ul style="list-style-type: none"> <li>- Document failure ( including atmospheric parameters) using FENDIAS</li> <li>- Start Engine several times ( 7 times), in order to delete Failure Codes.</li> <li>- Keep Engine at least 5 seconds at Standstill between 2 start trials</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- Check MAB Signal (Connection Control Module to Pump) if additionally Failure Codes 1.2.9B or 1.2.A6 are occurring</li> <li>- If Failure persists, Replace EDC Control Module</li> </ul>
Injection Pump		<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Start Engine several times ( 7 times), in order to delete Failure Codes.</li> </ul>

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Test	Measurement	Trouble shooting
		<ul style="list-style-type: none"> <li>- Keep Engine at least 5 seconds at Standstill between 2 start trials</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- If Failure persists, Replace Injection Pump</li> </ul>

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## "Timeout" CAN Message from Engine Control Module A021 to Pump Control Module A020

### (Test 39)

#### Failure Code (Fendt):

1.2.B1

#### Failure location (MAN):

B1

#### Failure display:

Message on Dashpanel

#### Failure path:

CAN-Signal from EDC Control Module to Pump Control Module (Timeout)

#### Consequence:

Maximal Speed reduced to 2000 Rpm

Torque reduced by 25-40%

#### Possible Origin:

Wiring discontinuity, Short Circuit, Control Module failure, Injection pump failure

#### Remark 1:

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.  
In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

#### Remark 2:

In Case of CAN Failure, engine speed will be set at 730 Rpm

#### Test Condition+-s:

Adaptor box with adapting connectors connected

Ignition "OFF"

Use wiring diagrams wich are corresponding to the tractor

Test	Measurement	Trouble shooting
EDC Control Module	1. Check Voltage with adaptor box with adaptor Connectors between Pin A27 and A24 Requested Value: 60 Ohm  2. Check continuity CAN-Bus between VP44 and Contol Module Wires WM1707 and WM1706  Failure Conditions: No Indications available	- Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS  - approx. 0 Ohm Short Circuit from CAN-H to CAN-L - Approx. 120 Ohm: Connection to final Resistor is discontinued - If Failure persists, Replace Control module
Injection pump		- Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - If Failure persists, Replace Injection Pump

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**Pump Control module A020 - System Voltage (Test 40)****Failure Code (Fendt):**

1.2.B3

**Failure location (MAN):**

B3

**Failure display:**

Message on Dashpanel

**Failure path:**

Voltage Supply Pump Control Module, Safety relay

**Consequences:**

Engine stops

Engine does not start

**Possible Origin:**

Wire disruption, Short Circuit

**Test Conditions:**

see further

Use wiring diagrams which are corresponding to the tractor

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
Voltage Supply	Voltage Test on Harness connector to (XXX) PSG between Pin 7 (+) and Pin 5 (-) <b>Requested value:</b> U Bat Failure Thresholds U< 7V or U > 32V <b>Failure Conditions:</b>	- Record Failure and ambient Parameters with FENDIAS  - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Check Wires - Check Connectors - Check Safety relay
Solenoid resistances of safety relay K324 (MAR)	Ignition "ON"  Check Voltage with adaptor box with adaptor Connectors between Pin B18 and Pin B2 <b>Requested Value : U Bat.</b> Ignition "OFF", disconnect EDC Control Module. Check Resistance with Adaptor Box and Adaptor Connectors between Pin B18 and Pin B1 <b>Requested Value: 58 - 72 Ohm</b>	- Record Failure and ambient Parameters with FENDIAS  - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Check wires  - Check connectors - Replace safety Relay

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**CAN - Interface Pump Control Module A020 (Test 41)****Failure Code (Fendt):**

1.2.CB

**Failure location (MAN):**

CB

**Failure display:**

Message on Dashpanel

**Failure path:**

CAN-Signal to e Pump Control Module A020 (Timeout)

**Consequences:**

Engine runs Idle. After 5seconds Pedal Position sensor Will be activated. Memory Keys , Hand throttle and terminal settings will be inactive.

**Possible Origin:**

Wiring Discontinuity, Short Circuit, Control module Failure, Injectionpump Failure

**Remark 1:**

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted. In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

**Test conditions:**

Adaptor Box with Adaptor Connectors connected

Ignition "OFF"

Use wiring diagrams wich are corresponding to the tractor

Test	Measurement	Trouble shooting
EDC Control Module (A021)	Check resistance with adaptor box with adaptor Connectors between Pin A27 and A24 <b>Requested Value:</b> 60 Ohm <b>Failure Conditions:</b> No Indications available	<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- approx. 0 Ohm Short Circuit from CAN-H to CAN-L</li> <li>- approx. 120 Ohm contact to End resistor is discontinued</li> <li>- if Failure persists, Replace Control Module (XXXX)</li> </ul>
Injection Pump		<ul style="list-style-type: none"> <li>- Document failure ( including atmospheric parameters) using FENDIAS</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- If Failure persists, Replace Injection Pump</li> </ul>

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**Speed Sensor Signal Processing, Pump Control Module A020 (Test 42)****Failure Code (Fendt):**

1.2.B7

**Failure location (MAN):**

B7

**Failure display:**

Message on Dashpanel

**Failure path:**

Speed Signal to Pum Control Module (XXXX) , Speed Sensor (XXXX) on Flywheel

**onsequences:**

Max Speed reduced to 1800 Rpm

Torque reduced down to 25-40%

**Function:**

Monitoring of negative ramp within Monitoring Window

**Possible Origin:**

Speed Sensor (XXXX) failure on Fly wheel or distance to flywheel to important, Injection pump not correctly mounted (Start of delivery to Top Dead point not OK), Control module failure , Injection Pump Failure.

**Remark 1:**

In Case of intermittent Contact , FC 4.2.18, "Start of Injection Control Deviation " may occur simultaneously

**Remark 2:**

Occurs simultaneously with FC 4.2.84

Fendt Component Identification:

**B025** (Speed Sensor)

Fendt Connector Identification:

**X172** (Speed Sensor), 1: Earth, 2: Signal

Test	Measurement	Trouble shooting
Speed sensor B025	See Test 3 Distance to Flywheel : 0,5mm - 1,5 mm	<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- siehe Test 3</li> <li>- Check Distance between Sensor and Flywheel</li> </ul>
Connection from Control module A021 to Pump A020	Check Signal with adaptor box with adaptor Connectors at Start Speed between Pin A35 Control module A021, Connector X047; and Pin 8 Injection Pump A020, Connector X046  <b>Requested Values:</b> If system is OK , Voltage will be 0,7V lower than U Bat. UB is available during Failure.	<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- Check Connectors</li> </ul>

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Test	Measurement	Trouble shooting
	Failure conditions:	<ul style="list-style-type: none"> <li>- Check Wire Continuity from Pump Control Module (???) VP44 Signal KW (???) Speed , Wire WM1710</li> <li>- If no failure can be identified, Replace control unit</li> </ul>
Injection Pump		<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- If Failure persists, Replace injection Pump</li> </ul>

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**Auto diagnostic Pump Control Modulet A020 (EEPROM-Checksum) (Test 43)****Failure Code (Fendt):**

1.2.B5

**Failure location (MAN):**

B5

**Failure display :**

Message on Dashpanel

**Failure path:**

Checksum Test E2PROM

**Consequences:**

Reduced Max. Engine speed to 1700 Rpm.

Engine Torque reduced by 50-60%,

Injection Start Controller may run on "Max. Early".

**Function:**

Checksummenprüfung im Selbsttest

**Possible Origin:**

Pump Control Module Failure , Injection Pump Failure

**Hinweis 1:**

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
Injection Pump	Failure Conditions: None	<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- if failure Persists, Replace Injection Pump</li> </ul>

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**Auto diagnostic Pump Control Module A020 (EEPROM-Status) (Test 44)****Failure Code (Fendt):**

1.2.B6

**Failure location (MAN):**

B6

**Failure display:**

Message on Dashpanel

**Failure path:**

Status E2PROM

**Consequences:**

Reduced Max. Engine Speed to 1700 Rpm

Engine Torque reduced by 50-60%,

Injection Start Controller may run on "Max. Early".

**Function:**

Hardware Auto diagnostic

**Possible Origin:**

Pump Control Module Failure , Injection Pump Failure

**Hinweis 1:**

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

Test	Measurement	Trouble shooting
Injection Pump	Failure Conditions: None	<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- If Failure persists, replace Injection Pump</li> </ul>

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### Auto Diagnostic Pump Control Module A020 (A/D C - Status) (Test 45)

**Failure Code (Fendt):**

**1.2.B2**

**Failure location (MAN):**

**B2**

**Failure display:**

Failure display in daspanel

**Failure path:**

Status Analog-Digital-Converter

**Consequences:**

Reduced max. Engine Speed to 2000 Rpm.

Engine Torque reduced by 25-40%

**Function:**

During Autodiagnostic of a channel of the A / D - Converter there will be no Flow correction, Voltage on Solenoid valve will not be monitored

**Possible Origin:**

Pump Control module Failure

**Remark 1:**

Before Replacing any Pump or Control Module, failure Codes must be analyzed and then deleted.

In case of several Failure Codes, check first the Test procedures which are not requesting a replacement of the Control Module or of the pump.

Test	Measurement	Trouble shooting
Injection Pump	Failure Conditions: None	<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- if Failure persists, Replace Injection Pump</li> </ul>

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**Autodiagnostic Pump Control Module A020 (RAM) (Test 46)****Failure Code (Fendt):****1.2.B9****Failure location (MAN):****B9****Failure display:**

Message on Dashpanel

**Failure path:**

RAM within Pum Control Module

**Consequences:**

Engine Stops

**Function:**

RAM Autodiagnostic

**Possible Origin:**

Pum Control Module Failure

**Hinweis 1:**

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted. In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
Einspritzpumpe	Failure Conditions: No Indications available	<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters FENDIAS</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- If failure persists, replace Injection Pump</li> </ul>

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**Interchanged Poles of Speed Sensor B025 (Test 47)****Failure Code (Fendt):**

1.2.91

**Failure location (MAN):**

91

**Failure display:**

Message on Dashpanel

**Failure path:**

Speed Sensor on Flywheehl (XXX)

**Consequences:**

Maximal Speed reduced to 1800 Rpm

Torque reduced by 25-40%

**Possible Origin:**

Cable on wrong Connector (XXXX) , Speed Sensor (XXX) failure

Use wiring diagrams wich are corresponding to the tractor

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
Wiring	Connector X337, Pin e: Wiring Colour white / blue X337 Pin F: Colour blue EDC Control Unit, Pin A1: Wiring Colour white / blue, Pin A13: Colour blue  <b>Failure Conditions:</b> Lower Speed Threshold: 500 Rpm. Up- per Speed Threshold: 1500 Rpm	- Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS - Check again with FENDIAS - Connect Correctly cables - falls Fehler immer noch vorhanden, Drehzahlgeber erneuern

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**EDC Control Module, Monitoring Module (m-Controller) A021 (Test 48)****Failure Code (Fendt):**

1.2.96

**Failure location (MAN):**

96

**Failure display:**

Message on Dashpanel

**Failure path:**

m-Controller on EDC Control Unit

**Consequences:**

Engine stops

**Possible Origin:**

EDC Control Module failure

**Remark 1:**

Before Replacing any Pump or Control Module, failure Codes must I be analyzed and then deleted.  
In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
Control Unit	Failure conditions: No Indications available	<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with FENDIAS</li> <li>- If failure Persists, Replace EDC Control Unit</li> </ul>

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**Pump Control Module - Initialisation A020 (Test 49)****Failure Code (Fendt):**

1.2.CD

**Failure location (MAN):**

CD

**Failure display:**

Message on Dashpanel

**Failure path:**

Exchange of messages between Pump Control Module and EDC Control Module

**Consequences:**

Max. Speed reduced to 2000 Rpm

Torque reduction by 25-40%

**Function:**

During Autodiagnostic, Messages between Pump Control Module and EDC Control Module are monitored. If Time Delay becomes to long then Failure Code emission.

**Possible Origin:**

Pumpensteuergerät (Einspritzpumpe) defekt oder nicht vorhanden

**Remark 1:**

Grundsätzlich sollte vor jedem Pumpen-bzw. Steuergerätaustausch der Fehlerspeicher gelöscht und der Fehler beobachtet werden.

In case of several Failure Codes, check first the Test procedures wich are not requesting a replacement of the Control Module or of the pump.

**Remark 2:**

If CAN fails completely , Engine speed will be 730 Rpm

Test	Measurement	Trouble shooting
Injection Pump	Check CAN Bus between EDC Control Module and Pump	- Record Failure and ambient Parameters with FENDIAS - Delete Failure Code Memory with FENDIAS
	Failure Conditions: no indications	- Check again with FENDIAS - If Failure persists, Replace Injection Pump.

Date	Version	Page	<b>Trouble shooting program EDC</b>	Capitel	Index	Docu-No.
16.11.2000	<b>b</b>	67/72		<b>2000</b>	<b>B</b>	<b>000001</b>

<b>Fav 900</b>	<b>Engine / Systems Trouble shooting program EDC</b>	<b>B</b>
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**Failure during CAN - Message Transmission (Test 50)****Failure Code (Fendt):**

1.2.E0

**Failure location (MAN):**

E0

**Failure display:**

Message on Dashpanel

**Failure path:**

EDC Control Module (A021)

**Consequences:**

None

**Possible Origin:**

CAN from EDC Control UModule are not connected

**Test condition:**

Adaptor box with adapting connectors connected

Use wiring diagrams wich are corresponding to the tractor

<b>Test</b>	<b>Measurement</b>	<b>Trouble shooting</b>
CAN-Bus EDC Control Module to EST Control Module	<p>Check Voltage with adaptor box with adaptor Connectors between Pin B3/B4 and Pin B1/B2 on Control Module A021, Connector X048 (</p> <p><b>Requested value :</b> U Bat while Ignition is "OFF", As long Relay Time Delay occurs within EST Control Module. Battery main switch will be held from EDC Control Module (Hold Circuit)</p> <p><b>Failure Condition:</b> Relay must come into Rest Position within 5 Seconds.</p>	<p>- Record Failure and ambient Parameters with FENDIAS</p> <p>- Delete Failure Code Memory with FENDIAS</p> <p>- Check again with diagnostic program</p> <p>- Check Wires</p> <p>- Check Connectors</p>

Date	Version	Page	<b>Trouble shooting program EDC</b>	Capitel	Index	Docu-No.
16.11.2000	<b>b</b>	68/72		<b>2000</b>	<b>B</b>	<b>000001</b>

<b>Fav 900</b>	<b>Engine / Systems Trouble shooting program EDC</b>	<b>B</b>
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**Relay Delay Time control could not be carried out (Test 51)**

Failure Code (Fendt):

No display

**Failure location (MAN):****E1****Failure display:**

None

**Failure path:**

Driving Speed , PTO

**Consequences:**

none

**Function:**

After each Engine Stop a Relay Time delay occurs. If this does not happen , this failure will automatically be memorized

**Possible Origin:**

Speed Signal Failure (Collector Shaft (XXX)) or PTO drives the engine.

**Test condition:**

Adaptor box with adapting connectors connected

**Remark:**

This Failure is only a Warning ( Except in case of a Speed Signal failure). If will be stopped whilst tractor is still moving or if still running PTO is driving Engine , (no Free Wheeling), a Failure will be m,emorized. For this reason there is only a Failure memorized in EDC Control Module but not in the Daspanel Display

Test	Measurement	Trouble shooting
Speed Sensor Bewel Pinion (B014)		<ul style="list-style-type: none"> <li>- Record Failure and ambient Parameters with FENDIAS</li> <li>- Delete Failure Code Memory with FENDIAS</li> <li>- Check again with diagnostic program</li> </ul>

Date	Version	Page	<b>Trouble shooting program EDC</b>	Capitel	Index	Docu-No.
16.11.2000	<b>b</b>	69/72		<b>2000</b>	<b>B</b>	<b>000001</b>

<b>Fav 900</b>	<b>Engine / Systems Trouble shooting program EDC</b>	<b>B</b>
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**Exhaust brake (Test 52)**

**Failure Code (Fendt):**

none

**Failure location (MAN):**

None

**Failure display:**

none

**Failure path:**

Exhaust Brake , Exhaust Brake Control Pushbutton

**Consequences:**

No Exhaust brake Function

**Function:**

Control of Exhaust Brake occurs depending on Engine speed via Pin A18 (Output) of EDC Control Module.

Activation occurs by putting Power on Pin B?? (Input) of Side console A004 by pressing Pushbutton (XXXX) of Exhaust brake

**Possible Origin:**

Wiring discontinuity, Short Circuit, Exhaust brake failure

**Test condition:**

Adaptor box with adapting coonectors connected

Use wiring diagrams wich are corresponding to the tractor

Test	Measurement	Trouble shooting
Voltage supply of Exhaust brake Pushbutton (XXX)	Ignition "ON"  Check Voltage with adaptor box with adaptor Connectors between Pin B14 (+) and Pin B1/2 (-) Requested Values: Pusbutton (XXXX) Exhaust brake pressed: UBat Failure Conditions:	- Check Wires  - Check Connectors  - Connecting bridge on ZE (???), Spot 61 inserted? - Replace Pusbutton (XXXX) Exhaust brake
Solenoid Valve Exhaust Brake	Check Voltage with adaptor box with adaptor Connectors between Pin A18 (+) and Pin B1/2 (-) Start engine and run it at approx. 1100 Rpm. <b>Requested Values:</b> Pusbutton (XXX) Exhaust Brake pushed, : U Bat. Exhaust brake must be activated	- Check Wiring  - Check connectors - replace Solenoid Valve Exhaust brake - If no failure can be identified, Replace Control Module

<b>Fav 900</b>	<b>Engine / Systems</b> <b>Trouble shooting program EDC</b>	<b>B</b>
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**Relay "Solenoid Valve Engine Stop" K021 (Safety relay) (Test 53)****Failure Code (Fendt):**

none

**Failure location (MAN):**

none

**Failure display:**

none

**Failure path:**

Safety Relay

**Consequences:**

Engine Stops

Engine does not start

**Function:**

Safety Relay fullfills an important Safety function as an independand and redundant Engine Stop System.

In Certain Emmergency Cases, the Safety relay will take over the Engine Stop if it becomes impossible via" 0 Fuel Flow".

Safety relay interrupts Plus from Voltage supply (Pin B18) to Pump Control Module

**Possible Origin:**

Wiring Discontinuity, Short circuit, Safety relay, Supply of EDC Control Unit Failure

**Test Conditions:**

Adaptor box with adapting connectors connected

Use wiring diagrams wich are corresponding to the tractor

Test	Measurement	Trouble shooting
Function Safety Relay	Start Engine and run it in "High Idle". (Abregeldrehzahl @PVG max) Interrupt Pin B18 Failure Conditions: Engine must Stop within 10 seconds	- Check Wires - Check Connectors - Replace Safety Relay
Voltage Supply	Ignition "ON" Check Voltage with adaptor box with adaptor Connectors between Pin B18 (+) and Pin B2 (-) Requested Value: UBat	- Check Wires - Check Connectors - Replace Safety relay. If no failure can be identified, replace (XXX) Control Module
Resistance of Safety Relay Solenoid	Ignition "OFF" Disconnect (XXX) Control Module Check Resistance with adaptor box with adaptor Connectors between Pin B18 and Pin B2 Requested Value: 58- 72 Ohm	- Check Wires - Check Connectors - Replace Safety Relay

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16.11.2000	<b>b</b>	71/72		<b>2000</b>	<b>B</b>	<b>000001</b>

<b>Fav 900</b>	<b>Engine / Systems Trouble shooting program EDC</b>	<b>B</b>
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### Eventual Failure Codes within EDC Control Module Memory but without consequences (Test 54)

**Failure Code (Fendt):**

none

**Failure location (MAN):**

15, 1d, 94, 88, e9, 1c, 24, ce, cf, d1, d2, d3, d4, d5, d7, d8, d9, da, 83, db, dc, dd u. df

**Failure display:**

none

**Failure path:**

none

**Consequence:**

none

**Function:**

**Not attributed inputs can generate described failures when Input voltages become to high**

**Possible Origin:**

high voltages on non attributed inputs

**Test condition:**

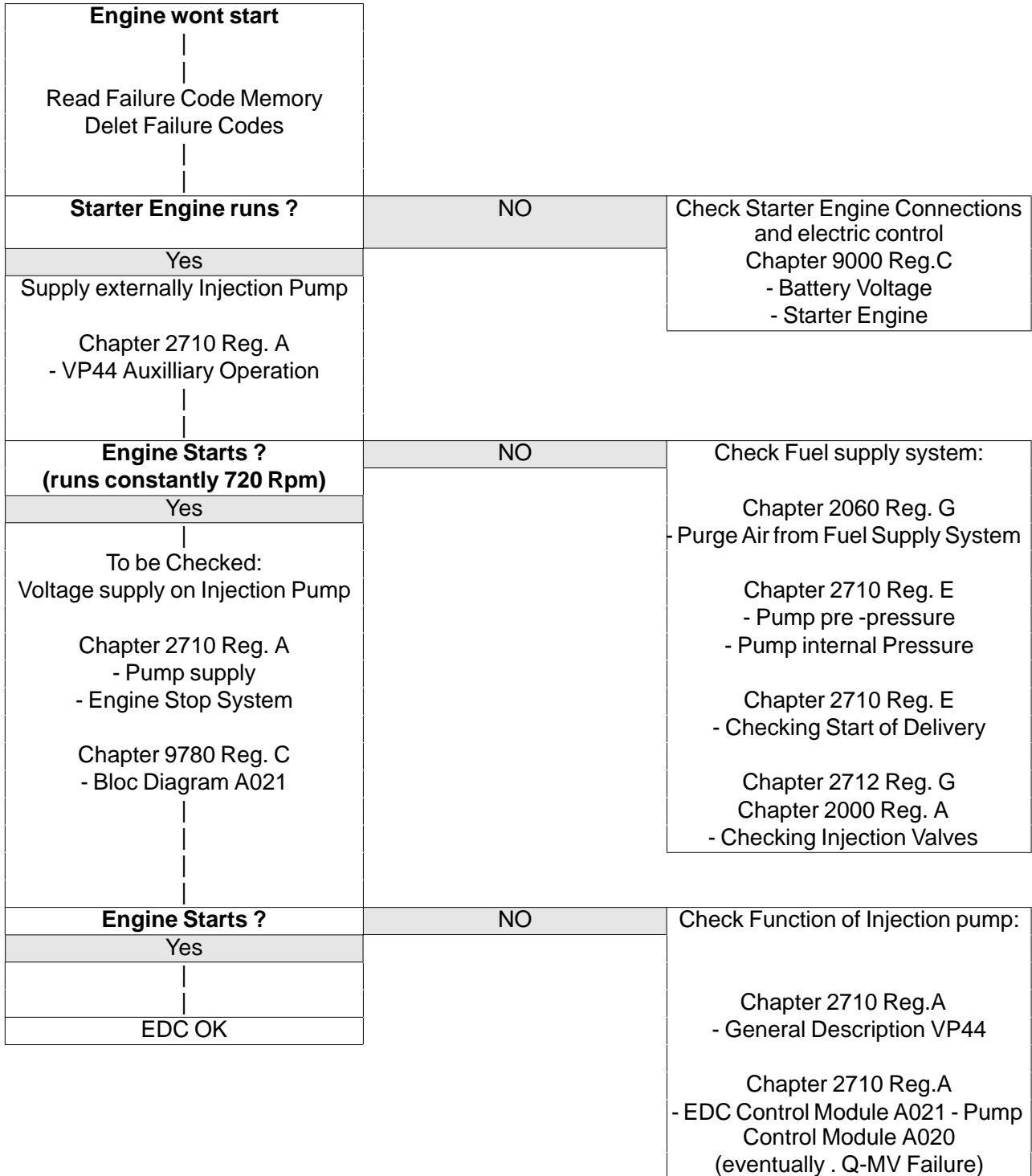
Adaptor box with adapting connectors connected

Use wiring diagrams wich are corresponding to the tractor

Test	Measurement	Trouble shooting
All non attributed In-puts/Outputs		- Remove wrongly connected wire

<b>Fav 900</b>	<b>Engine / General system</b> <b>Diagnostic Method EDC</b>	<b>B</b>
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**Diagnostic Method: Engine wont start**





<b>Fav 900</b>	<b>Engine / General system</b> <b>Turbocharger, troubleshooting</b>	<b>B</b>
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### Before replacing the turbocharger, check the following:

Excessive engine oil consumption, lack of power and abnormal intake or exhaust noises are a frequent cause of unnecessary turbocharger replacement.

Examination of the allegedly defective parts by the manufacturer often shows the turbocharger to be in perfectly good working order.

To avoid this situation, the following checks must be performed :

### Excessive oil consumption

- Check air filter contamination
- Check intake pipe for restricted cross section (e.g. damage, dirt)

Either are possible causes for increased oil consumption due to the higher pressure.

- Check turbocharger for external traces of oil

Excessive oil consumption of the turbocharger is due to bearing wear, quickly resulting in mechanical damage.

### Lack of power

For satisfactory power, observe correct settings for:

- start of fuel delivery
- valves clearance
- engine control (at full load)
- exhaust brake (must open fully).

Also check:

- Cylinder compression
- air filter contamination
- intake system for restricted cross sections and leaks
- exhaust system for damage and leaks.

If none of these checks reveal the cause of poor performance, the turbocharger has to be also checked for:

- Coking of turbine impedes easy rotation. (Axial movement may release coking.)
- Dirt within compressor
- Damage by foreign objects
- Turbine wheel in contact with housing

Remove visible contamination of compressor side and check bearing clearance.

#### **Note:**

**Do not damage the compressor fan wheel.**

### Abnormal intake and exhaust noises

- Check intake and exhaust system adjacent to the turbocharger assembly. Damaged gaskets must be replaced (can mislead to failure diagnostic of turbocharger).
- If this does not eliminate the abnormal noises, the turbocharger is to be replaced. (A turbocharger in good condition does not generate noise!)

Date	Version	Page	Capitel	Index	Docu-No.	
15.2.2001	a	1/2	<b>Turbocharger, troubleshooting</b>	<b>2000</b>	<b>B</b>	<b>000003</b>

<b>Fav 900</b>	<b>Engine / General system Turbocharger, troubleshooting</b>	<b>B</b>
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### Oil in intake pipes and intercooler

Oilspray within the intake system is necessary. It lubricates inlet valve seats.

If too much oil is encountered to such an extent that puddles can be found within the air box of the intercooler, there is a serious risk of engine "runaway", an uncontrolled increase of engine speed . Leaks must immediately be removed.

Possible origins:

- Engine oil level too high - Check whether proper dipstick is used -
- Inadequate engine oil, check "Lubricants " schedule.
- Operation on not allowed high slanting angles
- High pressure within crankcase, e. g. Oil release valve failure (Crank case venting) or worn piston rings

### Turbocharger compressor coking

Can occur by excessive intake air temperature, e.g. during constant full load operation.

Coking may result in reduced intake air pressure, there will not be a noticeable power reduction or a diminished acceleration behavior. Coking may result in exhaust turbidity.

If Turbocharger compressor coking occurs:

- Disassemble compressor housing. Avoid compressor fan wheel damage which could result in balancing problems and strong vibrations until complete destruction of the turbocharger.
- Use a solvent to remove coking from the compressor housing



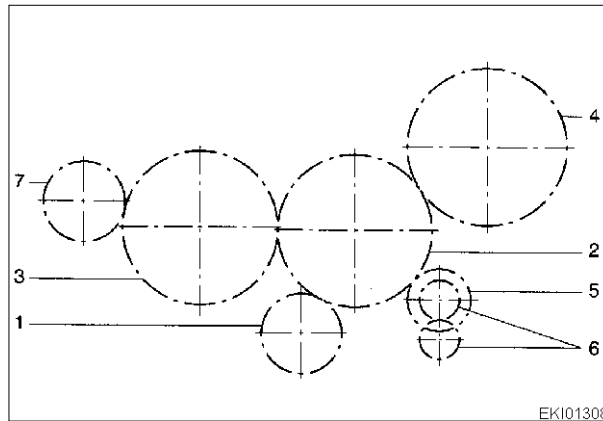
**Warning:**

**Never inject solvent spray while the engine is running - Accident Hazard !!! -**

- In severe cases, use special oil with low coking risk.

Date	Version	Page	Capitel	Index	Docu-No.
15.2.2001	a	2/2	Turbocharger, troubleshooting	2000	B 000003

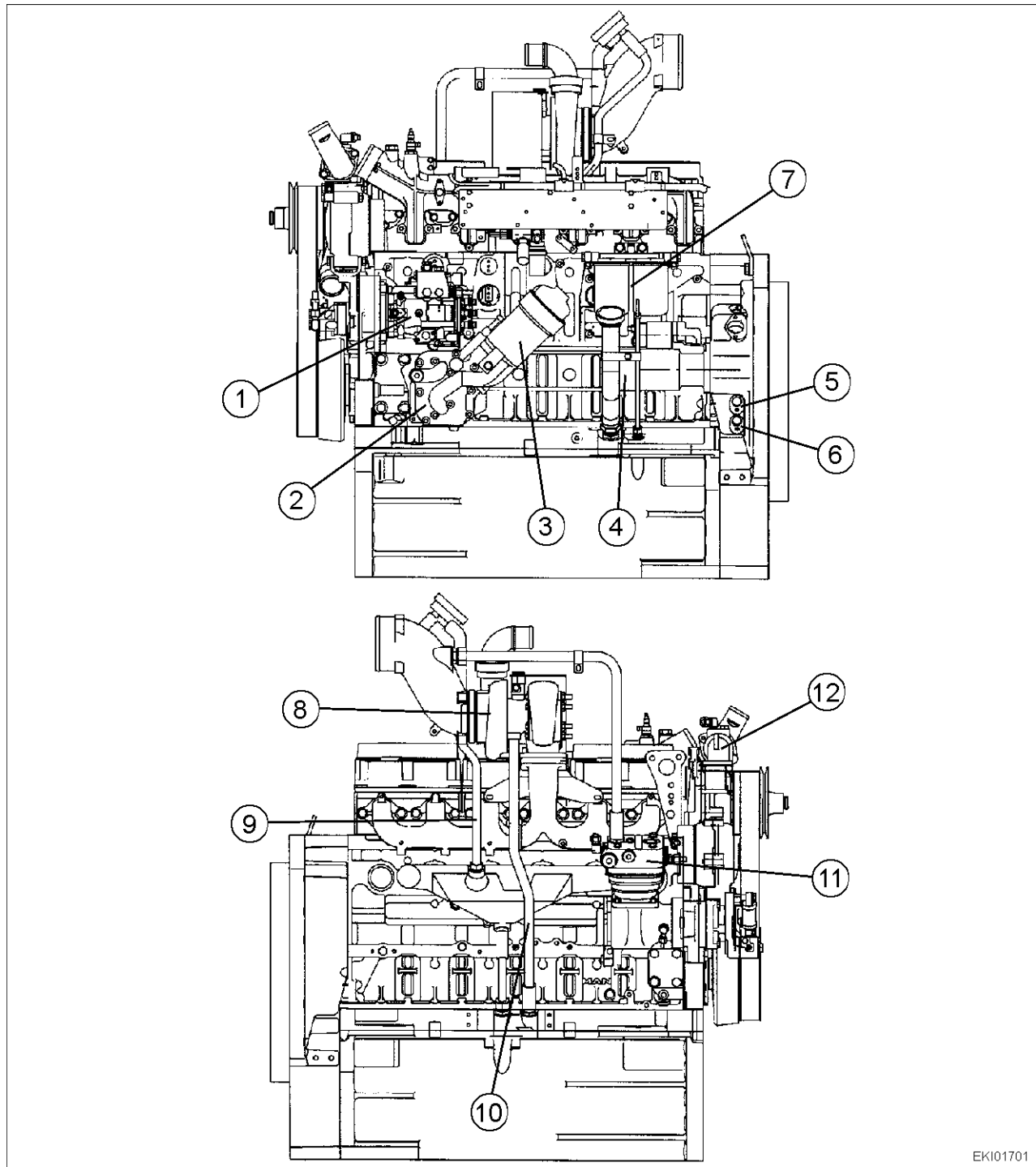
<b>Fav 900</b>	<b>Engine Engine control</b>	<b>C</b>
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1. Crankshaft gear
2. Idler gear
3. Camshaft
4. Injector pump gear
5. Oil pump driving gear
6. Oil pump gears
7. Gear for auxiliary drive

Date	Version	Page	Capitel	Index	Docu-No.
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<b>Fav 900</b>	<b>Engine / Generalities</b> <b>View of engine D 0836 LE 501</b>	<b>D</b>
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EKI01701

1 Fuel injection pump (VP44)	7 Fuel filters
2 Lubricant cooler	8 Turbocharger
3 Lubricant filter	9 Lubrication oil turbocharger (pressure)
4 Oil filling socket, Oil level indicator	10 Lubrication oil return from turbocharger
5 B10 - Sensor, Engine 1	11 Air compressor
6 B11 - Sensor, Engine 2	12 Thermostat

Date	Version	Page	<b>View of engine D 0836 LE 501</b>	Capitel	Index	Docu-No.
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	<b>Fitting instructions</b> Repair	
<b>Fav 900</b>	Engine / total system <b>Fitting instructions for air filter ejector nozzle</b>	<b>G</b>

## CONTENTS

### 1. Version from pilot production to manufacturing date of 31.12.2000

up to serial nos. 916.23.3056, 920.23.3078, 924.23.3094, 926.24.3222

### 2. Version from manufacturing date 01.01.2001 to 05.2001

from serial nos. 916.230.3057, 920.230.3079, 924.230.3095, 926.240.3223

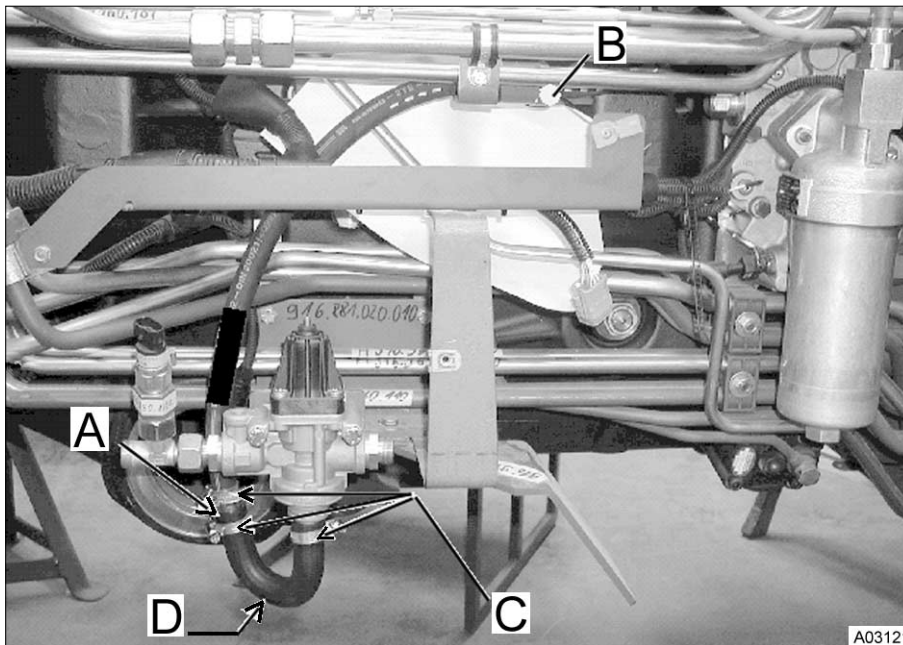
### 3. Version from 05.2001 to mid-09.2001

from serial nos. 916.23.3118, 920.23.3136, 924.23.3167, 926.23.3437

In all three versions the installed air filter remains in place; only the ejector is retrofitted.

### 1. Version from pilot production to manufacturing date of 31.12.2000

Refurbishment of dust discharge, straight socket on left



- A = Reducer 916.201.091.040
- B = Cable tie (see photo below)
- C = 3x hose clip X458.650.600
- D = Hose bow 192.204.900.010

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 Johann-Georg-Fendt-Str. 4 D-87616 Marktobendorf

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27.07.2001		1/8	<b>Fitting instructions for air filter ejector nozzle</b>	<b>2000</b>	<b>G</b>	<b>000005</b>



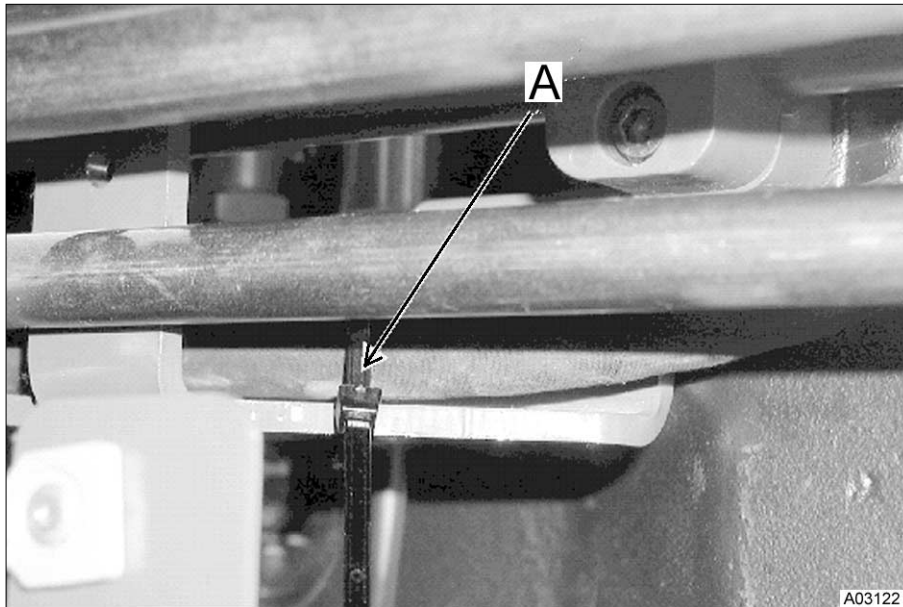
# Fitting instructions

Repair

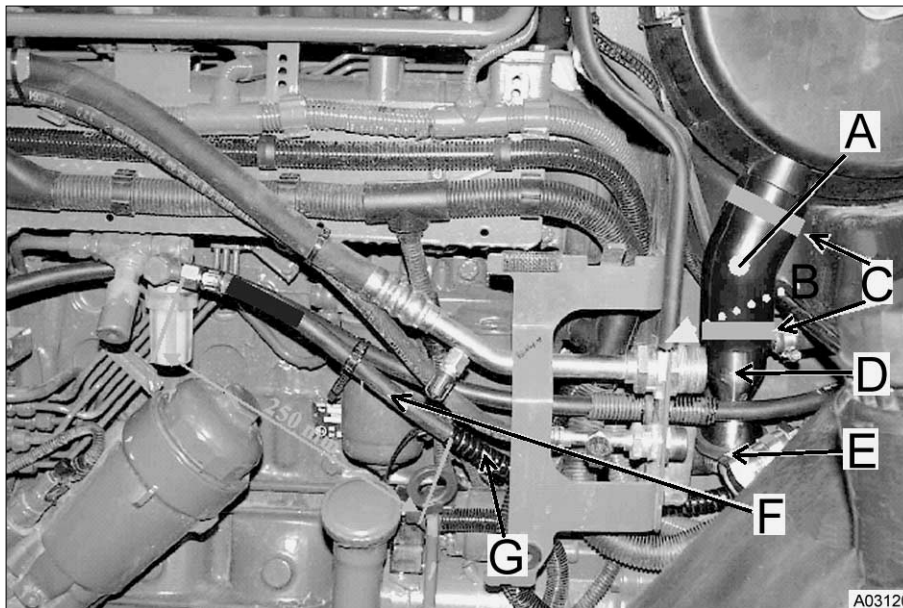
Fav 900

Engine / total system  
**Fitting instructions for air filter ejector nozzle**

**G**



A = Cable tie X668.980.522



- A = Rubber bend 916.201.091.070
- B = Seal bore with plug X499.504.295.
- C = Hose clip X458.648.000
- D = Nozzle G916.201.092.010
- E = V-seal 50x58x8 X548.388.500
- F = New hose length 1540 mm, shorten 1630-mm-long series H916.201.061.161 fuel line.
- G = Wrap hose protection X591.494.000 round for 600 mm.

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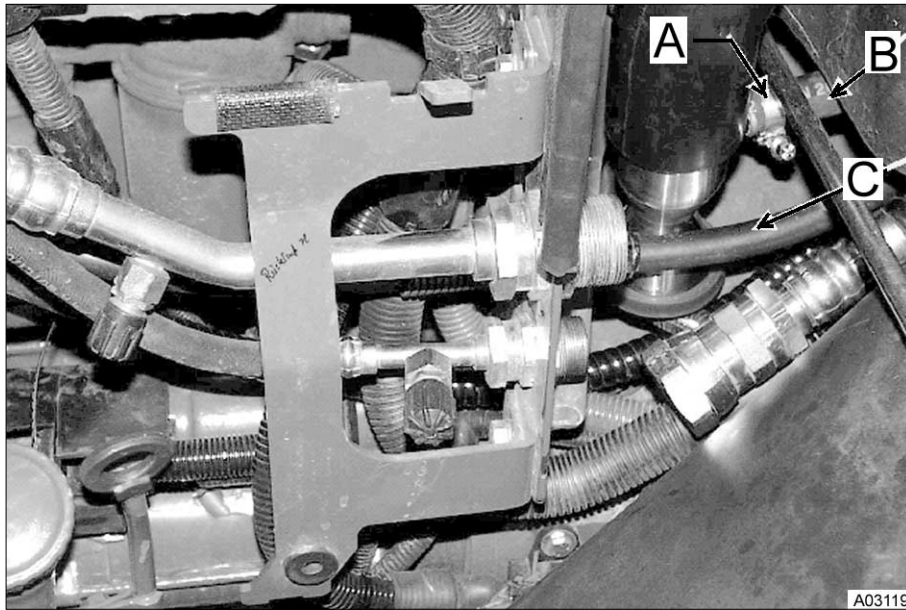
# Fitting instructions

Repair

Fav 900

Engine / total system  
**Fitting instructions for air filter ejector nozzle**

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- A = Hose clip X458.650.600
- B = Compressed-air hose
- C = Return flow series



- A = Pressure hose X604.178.000, length 1880 mm

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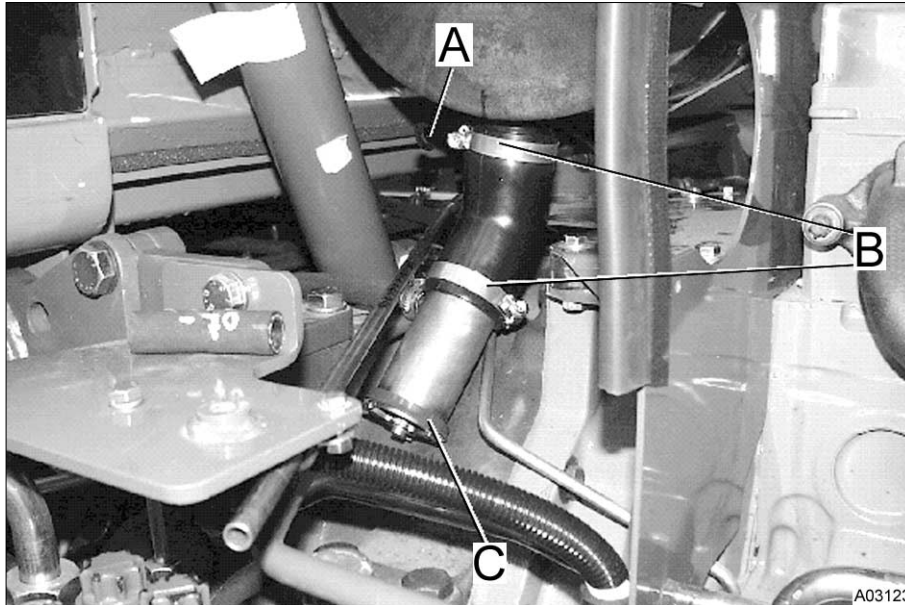
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Engine / total system  
**Fitting instructions for air filter ejector nozzle**

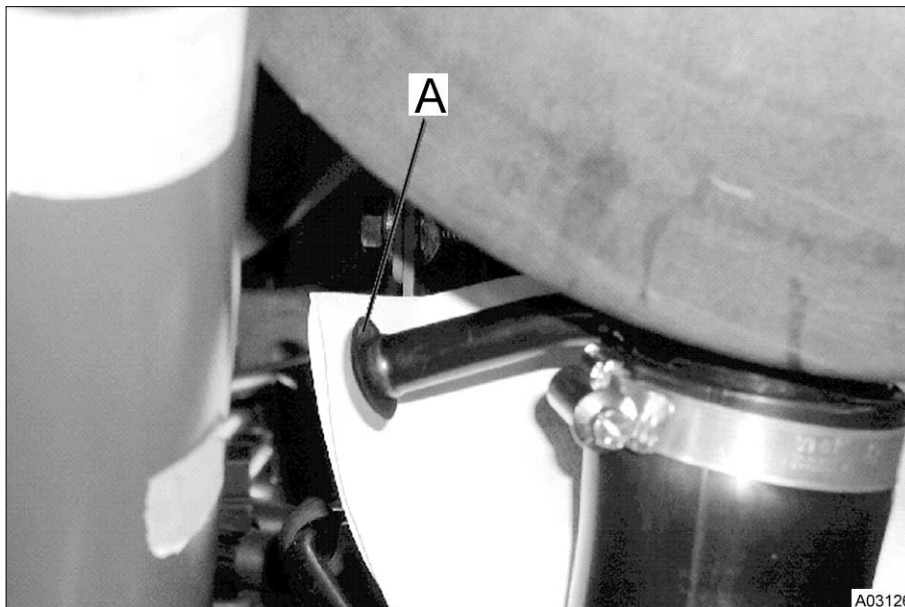
**G**

## 2. Version from manufacturing date 01.01.2001 to 05.2001

Compressed-air-driven ejector, refurbishment of dust discharge on right, straight socket



- A = Seal socket (see next photo)
- B = 2x hose clip X458.648.000
- C = V-seal 50x58x8 X548.388.500



**Note:** Seal Ø12 air pipe with plastic plug (A).

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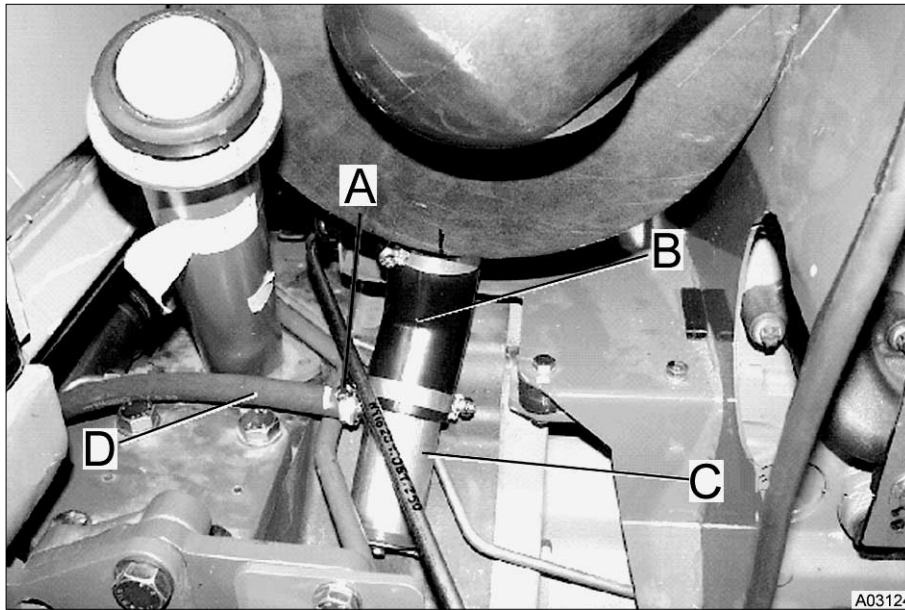




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Engine / total system  
**Fitting instructions for air filter ejector nozzle**

**G**

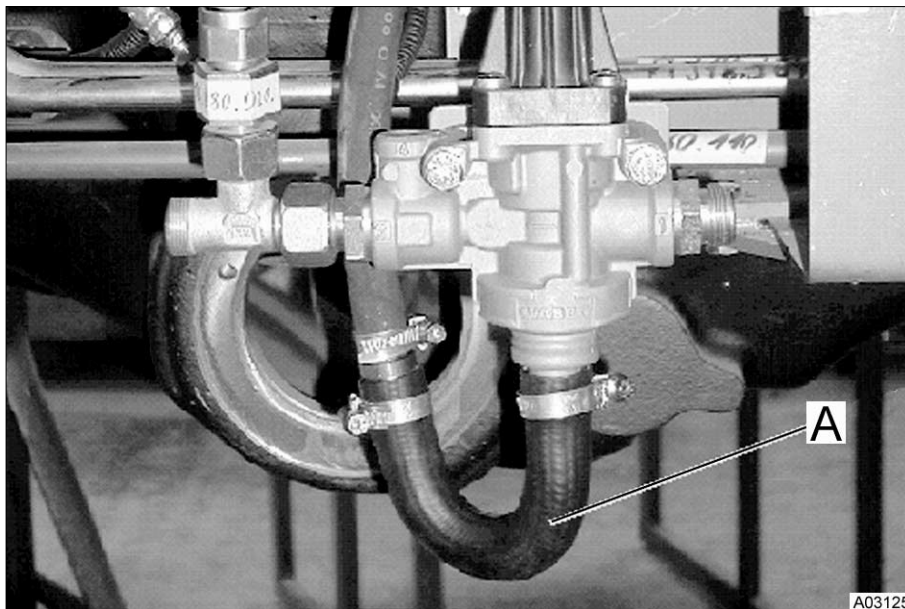


**Note:** Ensure clearance between hose clip (A) and lines

B = Rubber bend 916.201.091.070

C = Nozzle G916.201.092.010

D = Shorten existing hose by 60-70 mm.



A = Hose bow 192.204.900.010 (without hole)

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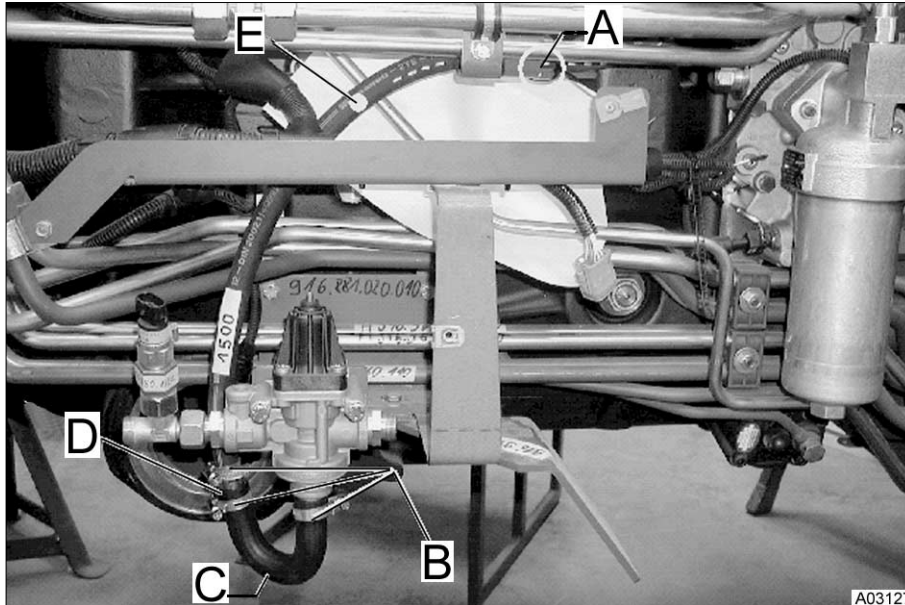
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Engine / total system  
**Fitting instructions for air filter ejector nozzle**

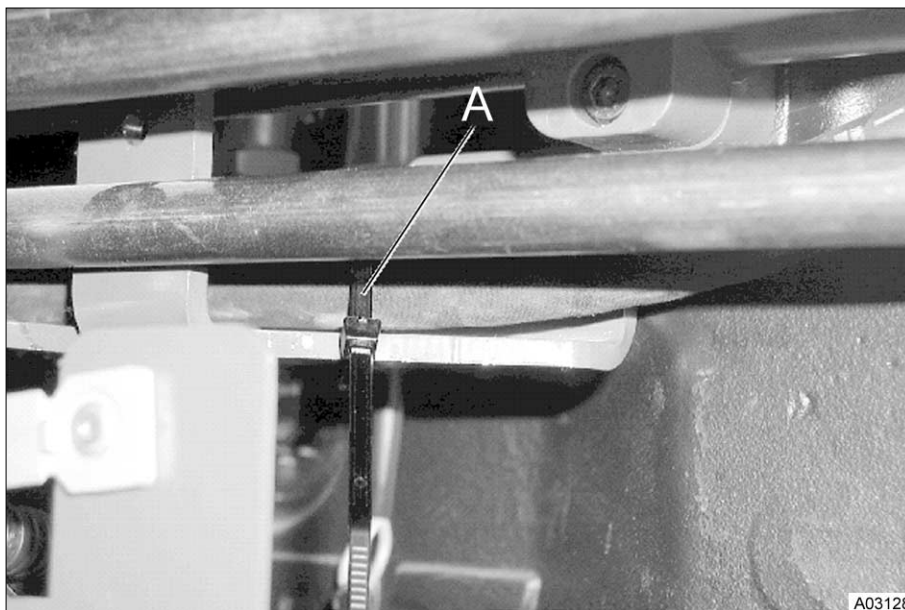
**G**

### 3. Version from 05.2001 to mid-09.2001

Compressed-air-driven ejector, refurbishment of dust discharge on right, angular socket



- A = Cable tie (see photo below)
- B = 3x clip X458.650.600
- C = Hose bow 192.204.900.010
- D = Reducer 916.201.091.040
- E = Pressure hose X604.178.000 (1500 mm)



- A = Cable tie X668.980.522

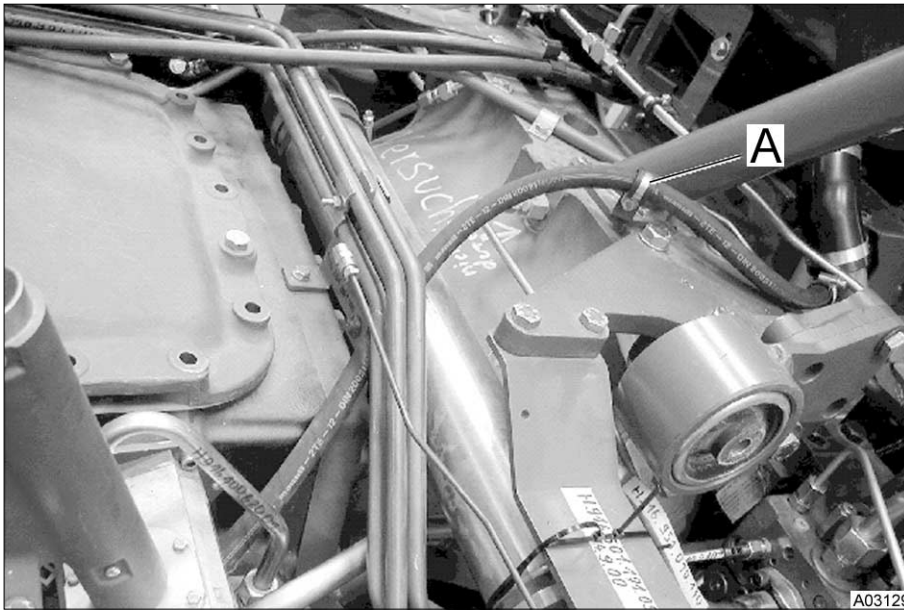


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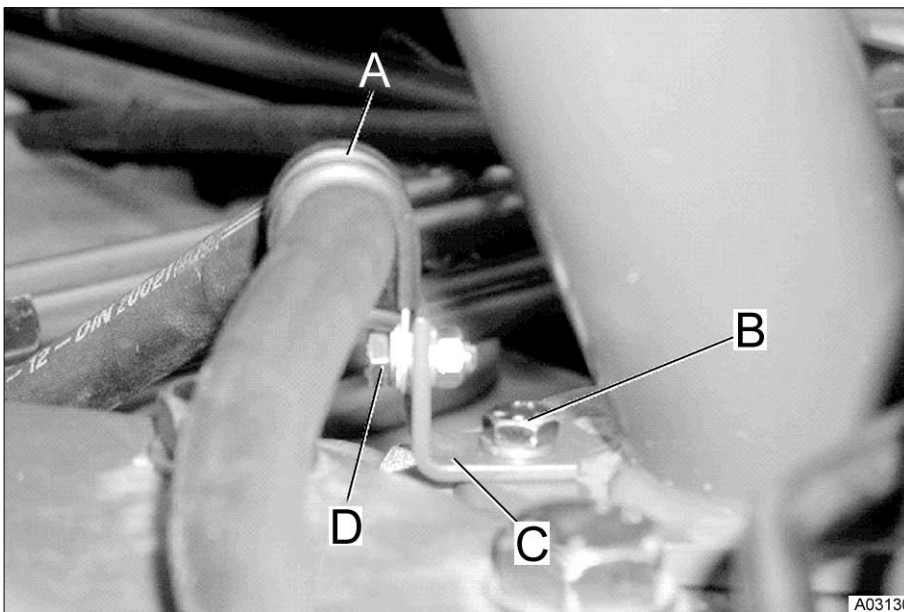
Engine / total system  
**Fitting instructions for air filter ejector nozzle**

**G**

### Hose path



A = Clip (see photo below)



- A = Clip RSGu 22/15 X459.075.800
- B = Existing screw
- C = Angle 345.101.070.140
- D = M6x16 screw, nut, spring washer

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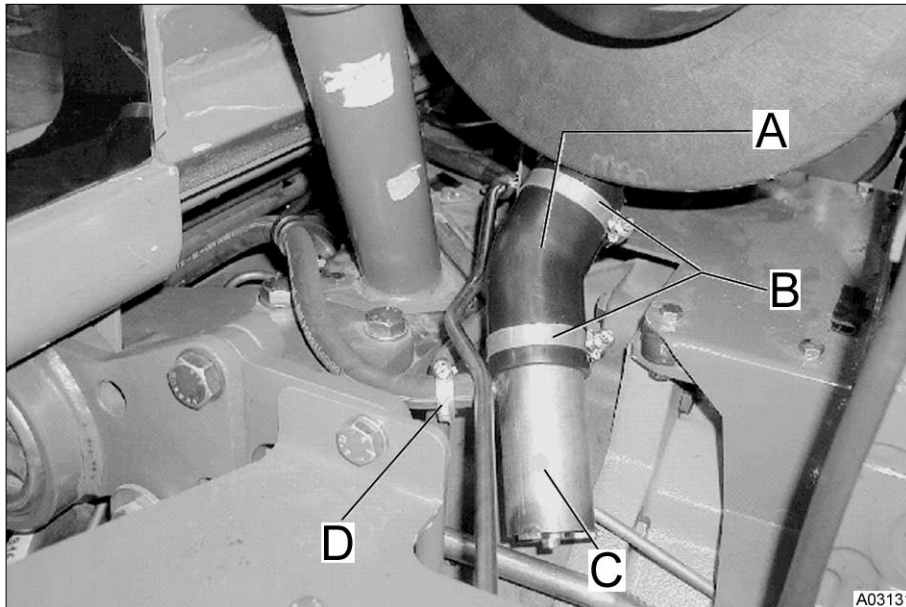
# Fitting instructions

Repair

Fav 900

Engine / total system  
**Fitting instructions for air filter ejector nozzle**

**G**



- A = Existing rubber bend
- B = 2x clip X458.648.000
- C = Nozzle G916.201.092.010
- D = Clip X458.650.600

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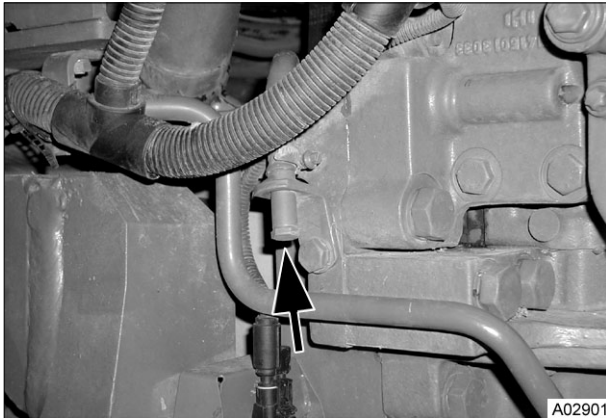
Fav 900

Engine / General systems  
**Engine Periphery**

**G**

### Preliminary operations

- Clean thoroughly the tractor ( Engine Periphery and Radiator assembly).
- Evacuate air conditioning system.
- Disconnect battery.
- Dismantle Right and left cabin access.
- Dismantle rear covering panel.
- Lower rear power lift and tilt cabin to the Maximum.
- Dismantle the muffler and its protection linings.
- Remove right and left side panels.

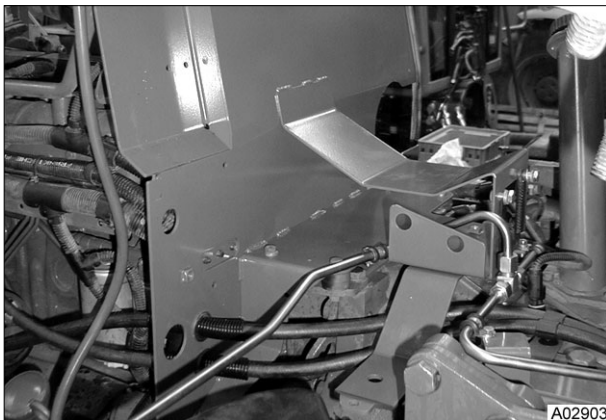


### Dismantling and Reassembly procedure

- Drain coolant (10Liters).



- Dismantle Intake air filter.
- Disconnect airconditioning "connectors".
- Dismantle Partition wall including Water tank and vent lines from the fuel tank.



- Assemble replacement partition wall, brackets for water tank and intake air Filter.

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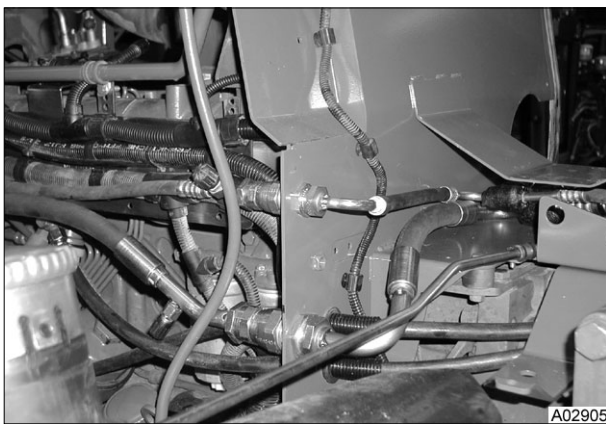
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Engine / General systems  
**Engine Periphery**

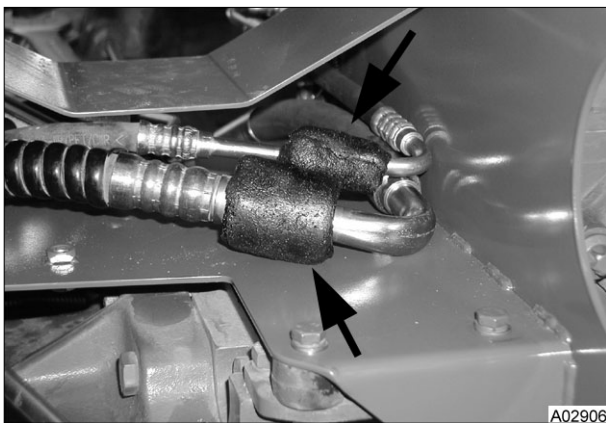
**G**



- Fit replacement vent lines and panel on the left side of the fuel tank.
- Put new tubes with corrugated protection tube into place.
- Replace aspiration tube of the fuel tank.



- Replace the connectors from the air conditioning tubes on both, cabin and engine side .
- Replace air conditioning tubes , 2 short ones, 1 long one.



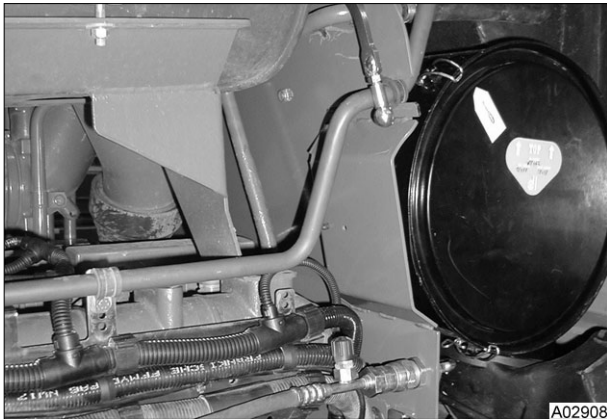
- Wrap fitting through the partition wall with tape.



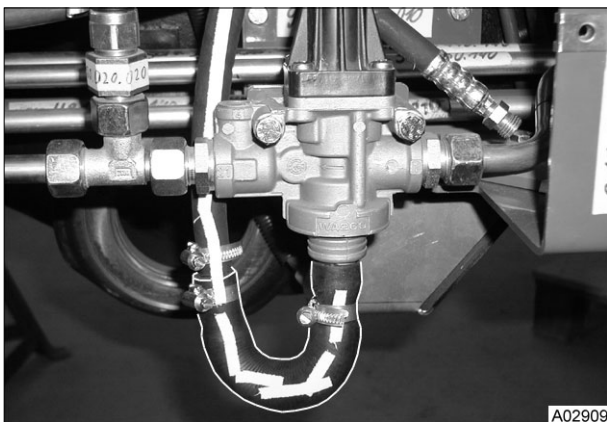
- Fix new brackets for air conditioning tubes onto the front maintaining mechanism of the side panel.
- Fit the air conditioning tubes with 2 cable ties.

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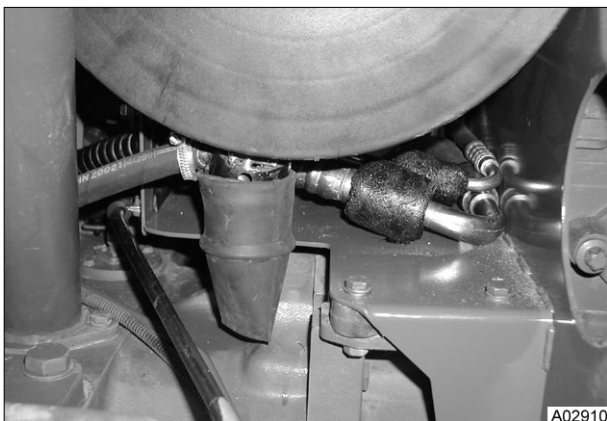
Fav 900	Engine / General systems <b>Engine Periphery</b>	<b>G</b>
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- Install new Air Filter with collector manifold.



- Install pipe and reducing unions onto the pressure controller.



- Install the tube of the pressure controller behind the tank toward the air Filter.

**Finishing operations**

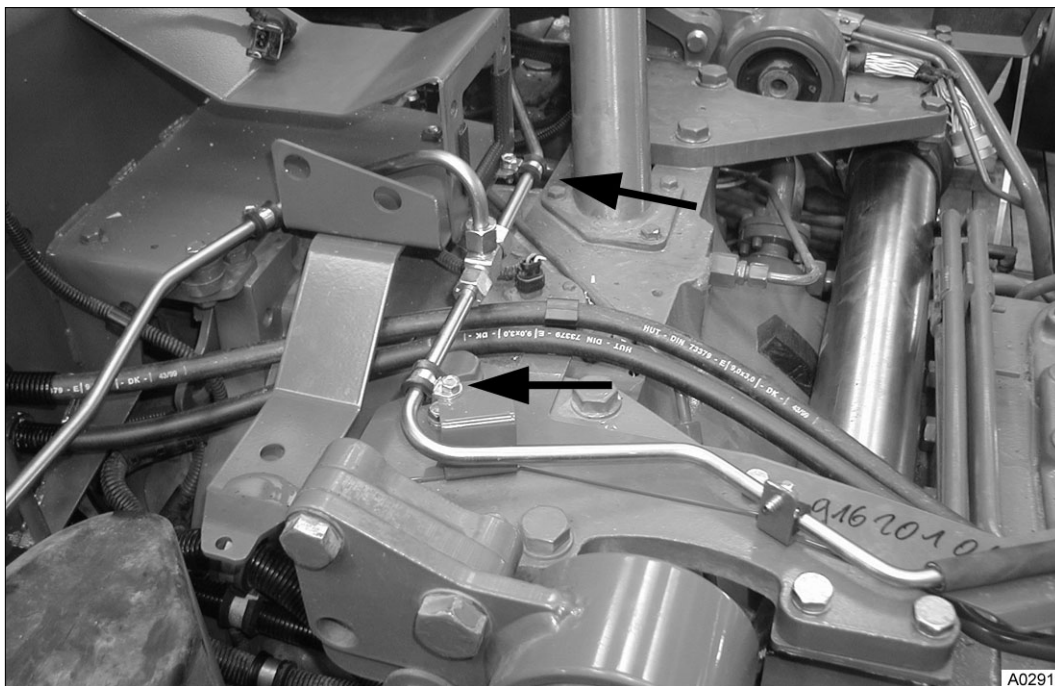
- Lower cabin, complet all connectors and put all screws for the cabin suspension into place .
- Install side panels ,Muffler, Air Intake Pipe as well as right and left cabin accesses.
- Complete coolant . Refill air conditioning system.
- Start engine and check all systems for eventual leaks.

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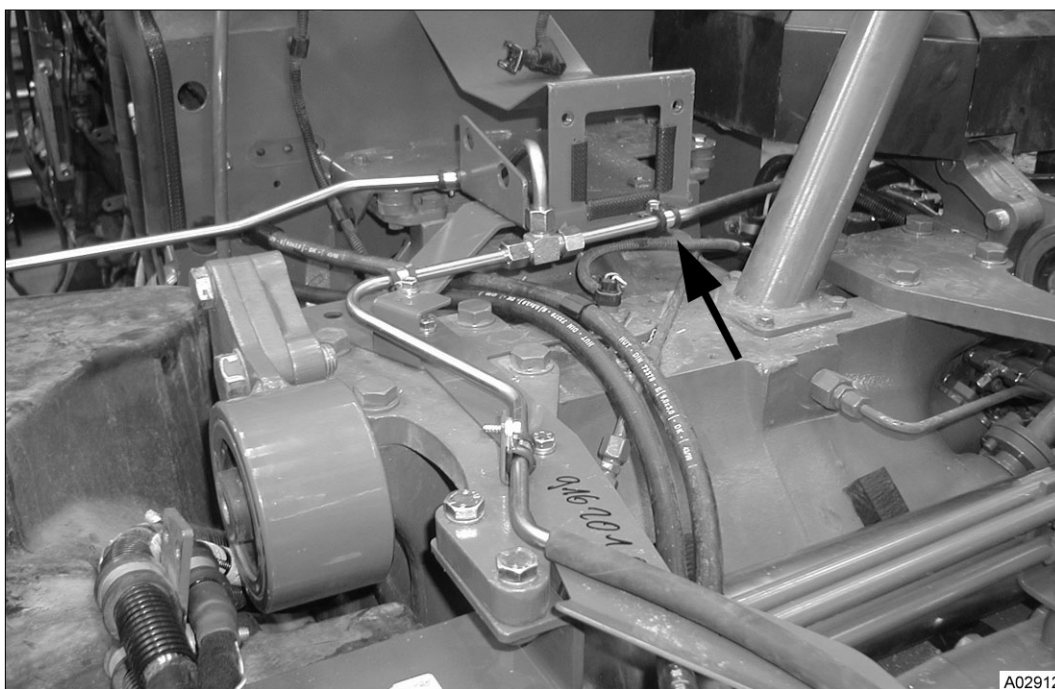
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Engine / General systems  
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11.12.2000	a	4/4	2000	G	000001



	<b>Service Information</b> <b>Cleaning specifications for casing fans</b>	<b>Group</b> <b>2</b>	<b>KDM</b> <b>12/01</b>	
<b>Farmer 400, Favorit 700, Favorit 900</b>		<b>Chapters</b> <b>2000</b>	<b>Reg.</b> <b>H</b>	<b>Docu-No.</b> <b>000002</b>

Under difficult operating conditions (severe dirt accumulation) etc., it is possible that as well as soiling the cooling system, the casing of the cooling fan will also be soiled. Deposits on the inside of the casing can occasionally lead to imbalance. It is therefore necessary to check the cooling fan for accumulated dirt and clean as required.

**Machines concerned:** Farmer 400  
Favorit 700  
Favorit 900 from veh.no. 400 - 1000 and from 3001

**Cleaning Specifications:**



If the fan is cleaned whilst fitted, using a high-pressure cleaner, the lance should be directed onto the fan from both the right and left sides of the tractor.

The high pressure of the cleaner will cause the fan to turn so that the entire inner surface of the fan casing and the impellers can be cleaned on both sides.

Ensure that the fan is carefully cleaned as incomplete cleaning can again lead to an imbalance.

Marktoberdorf, 06.2001  
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Johann-Georg-Fendt-Str.4  
D-87616 Marktoberdorf

	<b>Service Information</b> <b>Setting and checking the start of delivery</b>	<b>Group</b> <b>2</b>	<b>KDM</b> <b>17/01</b>	
<b>Favorit 900</b>		<b>Chapter No</b> <b>2000</b>	<b>Reg.</b> <b>H</b>	<b>Doc-No.</b> <b>000003</b>

Machines affected:      916/23/.... 916/24/....  
                                   920/23/.... 920/24/....  
                                   924/23/.... 924/24/....  
                                   926/23/.... 926/24/....

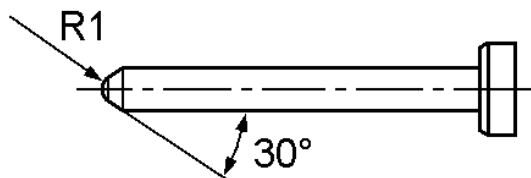
In order to be able to set the start of delivery correctly (refer to the training document or workshop manual), the measuring tip of the dial gauge must have a radius of 1 mm. If this radius is greater than 1 mm, exact calibration is impossible.

The start of delivery is set to **O.T.** (+- 0.5 degree).

If the start of delivery differs by more than 3 degrees, the EDC goes into fault mode and fault code **1.2.CA** is displayed.

A measuring pin with a radius of 1 mm can be ordered from our parts department.



Part number:                    X 899.980.245.101 Measuring pin FB-VP44



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	<b>Service Information</b> <b>Dustproof Starter or Starter with Reduction Gearing</b>	<b>Group</b> <b>2</b>	<b>KDM</b> <b>20/01</b>	
<b>Farmer 300, 300C, 400, Favorit 500, 700, 800, 900, Xylon</b>		<b>Chapter No.</b> <b>2000</b>	<b>Reg.</b> <b>H</b>	<b>Doc. No.</b> <b>000005</b>

### 1. Dustproof Starter for Water-cooled Deutz Engines

A dustproof starter is now standard fitment on Farmer 400 and Favorit 700 series with engine numbers above BF4M2013C 628445 (Farmer 409 - 411), BF6M2013C 629293 (Favorit 711 - 716), It is available as a spare part No. **F 716.900.060.060** and supersedes part no. F 716.900.060.010.

This starter may also be fitted to Farmer 300C, model F307 (117/./.....), F308 (118/./.....), F309 (119/./.....).

### 2. Starter with reduction gearing for MWM Engines

A (Magneton) starter with epicyclic reduction gearing, which improves engine starting, is now available for Farmer 300 and Favorit 500 equipped with MWM engines.

**Part No. C 514.900.060.100**

Bosch Starter - G 514.900.060.100 is still available.

### 3. Dustproof starter for MAN Engines

A dustproof starter is now also available for Favorit 800, 900 and Xylon.



The part numbers are given in the table below.

Serial No.	Old starter - part No.	Dustproof starter - part No.
816/21/2422	F926.900.060.040	F926.900.060.041
818/21/2548	F926.900.060.040	F926.900.060.041
822/21/2238	F926.900.060.040	F926.900.060.041
824/21/2586	F926.900.060.040	F926.900.060.041
916/21/1001	F926.900.060.040	F926.900.060.041
920/21/1001	F926.900.060.040	F926.900.060.041
924/21/1001	F926.900.060.040	F926.900.060.041
926/21/1264	F926.900.060.040	F926.900.060.041
520/24/0101	F926.900.060.040	F926.900.060.041
522/24/0101	F926.900.060.040	F926.900.060.041
524/24/0101	F926.900.060.040	F926.900.060.041
916/23/0101 *	F926.900.060.040	F926.900.060.041
920/23/0101 *	F926.900.060.040	F926.900.060.041
924/23/0101 *	F926.900.060.040	F926.900.060.041
926/23/0101 *	F926.900.060.040	F926.900.060.041

\* Fitted as standard equipment from engine D0836LE501 9867596.

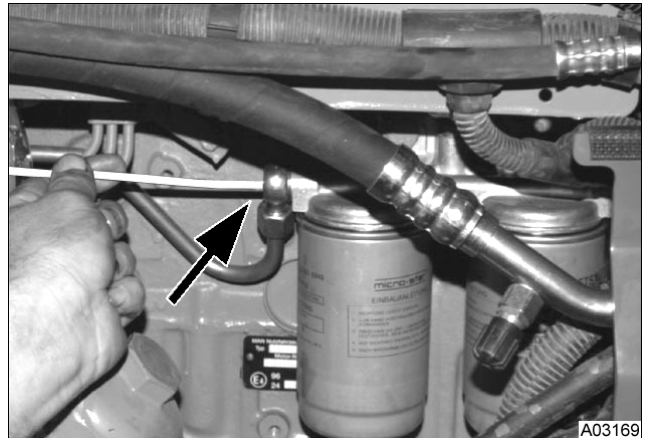
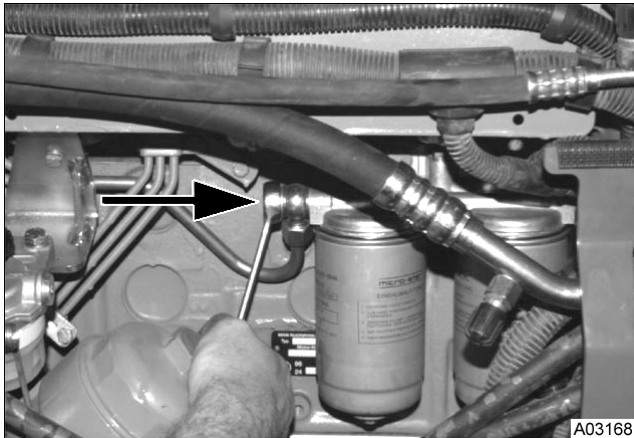
Marktobendorf, 09.2001  
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	<b>Service Information</b> <b>Checking Fuel Filter Housing</b>	<b>Group</b> <b>2</b>	<b>KDM</b> <b>23/01</b>	

During the next service of Favorit 900 series tractors, please check the fuel filter housing.

Tractor serial numbers concerned: 916.23....., 920.23....., 924.23....., 926.23.....



For the workshop

**Preliminary work:**

- Unscrew banjo bolt on filter housing.

**Checking:**

- Push a cable tie into hole.

If the cable tie can be pushed less than 55 mm into the hole, the filter housing does **not require changing**.

If the cable tie can be pushed more than 55 mm into the hole, parallel filter **F 824.200.710.580 must be changed**.

If the fuel filter housing needs to be changed, please complete the details below and fax it to number **+49(0)8342 / 77222** as soon as it is discovered. Then order the part and carry out the remedial work.

Veh. No.: .....

Filter housing changed

Read out fault memory and record fault codes here: .....

**Procedure:**

Replacing the fuel filter assy **F 824.200.710.580**, and a labour allowance of 1.5 hrs may be claimed under warranty

For rapid processing, please complete the fields (HG, causal part no., description, damage code, page/item no. and time) on the warranty claim form as shown below.

HG	Verursacherteil-Nr.	Bezeichnung	Bildtafel/Pos.-Nr.	Schadenscodes	KD-T-Einsatz	ja	nein
99820	F 824.200.710.580	Parallel filter	2210/1	361	Arb.-Nr.	Std.	1.5
Fehlercodes im BordInformator:						z.B. 6.1.04	
Stück	Eingebaute Teile		Preis				

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Marktoberdorf, 10.2001  
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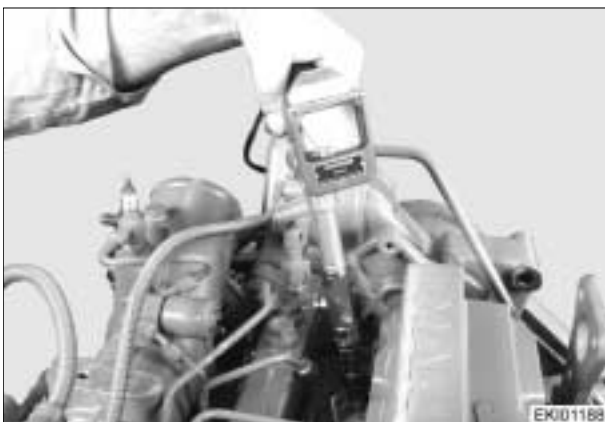
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<b>Fav 900</b>	<b>Engine / Cylinder head</b> <b>Checking compression</b>	<b>E</b>
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- Warm up engine until coolant temperature reaches 60 to 80°C (140 - 176°F).
- Check valves clearance and adjust.
- Remove all injectors and injector holders.
- See values of compression in chapter "Service Data".

Starting with the 1st cylinder, fit new seal and tighten. Install test adaptor of compression recorder with threaded union and tighten.



Screw compression recorder onto test adaptor and insert test sheet.

Using the starter motor, turn engine until the indicator no longer deflects.

Connect compression recorder with test adapter to the other cylinders and proceed as above.



Depending on the design of the compression recorder, the engine can also be cranked directly from the compression recorder.

To do this, the starter has to be connected to the appropriate electrical leads.



Compare data and remove compression recorder and test adapter. Apply "Never Seeze" to contact faces of injector holders.

Fit injector holder and injectors using a new seal. Screw on union nut and tighten to specified torque.

Re-connect injection and leak-oil lines.

**Note:**

**The union nut can be tightened with an open end wrench without removing the injection pipe.**

Date	Version	Page	Checking compression	Capitel	Index	Docu-No.
20.2.2001	a	1/1		2010	E	000001

<b>Fav 900</b>	<b>Engine / Cylinder head Checking valve timing</b>	<b>F</b>
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## Checking valve timing

Shifting of the camshaft drive gear can result in severe engine damage.

It is therefore necessary to ensure a correct fit by checking the valve timing after repair.

The above takes into consideration that tappet push rods are not distorted!

Proceed as follows:

- Fit engine actuation device to flywheel housing.
- Remove crankcase venting pipe.
- Accurately set valve play of 1st cylinder.
- Actuate engine against rotating direction to approx. 40°C before TDP.
- Set dial gauge onto intake valve spring retainer of 1st cylinder and set at "0".
- Slowly turn crankshaft in rotating direction and watch the pointer:
- Immediately when the pointer moves, the intake valve opens.
- Take reading from graded scale on flywheel and compare with valve timing.

### **Note:**

**By fitting a dial gauge to both intake and exhaust valve spring retainers of the 1st cylinder, it is possible to check all valve timings and the valve stroke by continued turning of the engine. Valve stroke desired value: 5,0 to 5,7 mm (.197 - .224").**

Date	Version	Page	Capitel	Index	Docu-No.	
20.2.2001	<b>a</b>	1/1	<b>Checking valve timing</b>	<b>2010</b>	<b>F</b>	<b>000002</b>

<b>Fav 900</b>	<b>Engine / Cylinder head Setting valve clearance</b>	<b>F</b>
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Engine must be cold for adjusting valve clearance.  
(max. coolant temperature 50° C (122°F))  
Setting valve clearance.

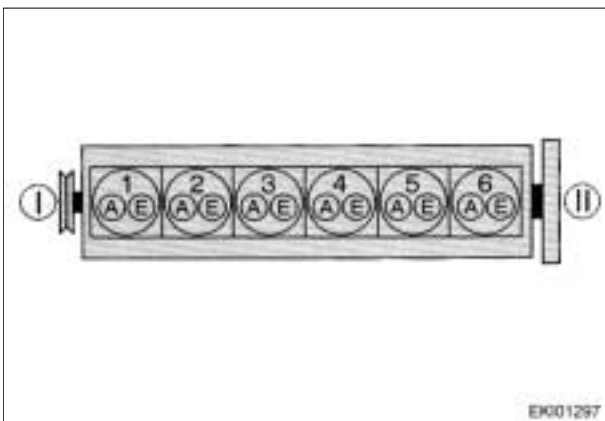


Rotate crankshaft using turning device until the piston of the cylinder to be set is at top dead centre ( TDC ) and the rocker arms are not loaded.  
The valves of the synchronous cylinder are now overlapping.

Setting valves clearance:

1	5	3	6	2	4
6	2	4	1	5	3

Valves overlap on cylinder:



Layout of cylinder sequence and position of valves  
I Fan end  
II Flywheel end  
A Exhaust valve  
E Intake valve

<b>Fav 900</b>	<b>Engine / Cylinder head Setting valve clearance</b>	<b>F</b>
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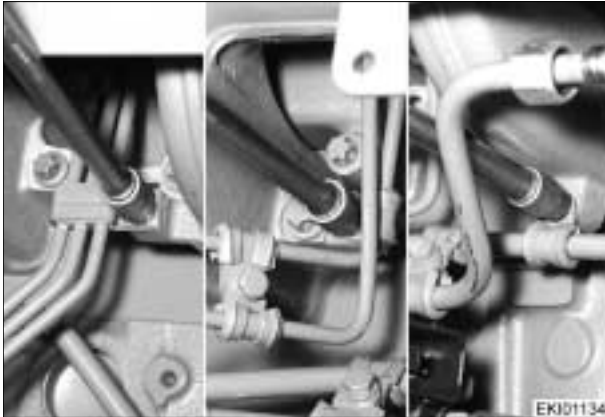


- Insert gauge between valve shaft and rocker .
- With valve setting tool loosen lock nut and turn setting screw until gauge can be moved with a slight resistance.
- Tighten lock nut.
- Check clearance again.
- Refit cylinder head covers.
- Tighten screws and bolts to adequate torque.

Date	Version	Page	<b>Setting valve clearance</b>	Capitel	Index	Docu-No.
15.2.2001	<b>a</b>	2/2		<b>2010</b>	<b>F</b>	<b>000003</b>



<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Cylinder head</b> <b>Reassembling and refitting intake pipe</b></p>	<p align="center"><b>G</b></p>
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**Removing intake pipe**

**Note:**

**To avoid engine damage, always ensure clean conditions when working on intake system.**

- Disconnect pressure sensor for intercooler
- Disconnect wiring to flame booster plug, to solenoid switch and to the temperature sensors.
- Remove fuel lines to flame booster plug and to solenoid valve.
- Remove wiring harness.
- Remove fuel filter.
- Remove fuel pre filter with manual lifting pump
- Remove collars of the injection lines and of the fuel lines which are fitted onto the intake manifold.

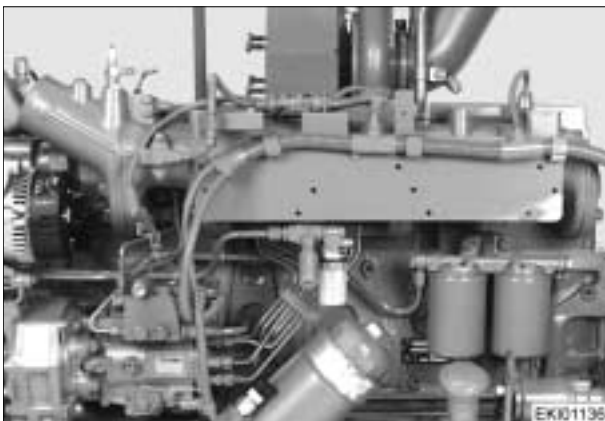


Loose and remove intake pipe fixing bolts on the cylinder head.

Detach intake pipe, remove traces of gasket residue from sealing faces of intake pipe and cylinder head.

**Note:**

**Do not allow dirt particles to enter the inlet ports.**



**Refitting intake pipe**

Position intake pipe using new gaskets.

Insert fixing bolts.

Watch proper positioning of the gasket.

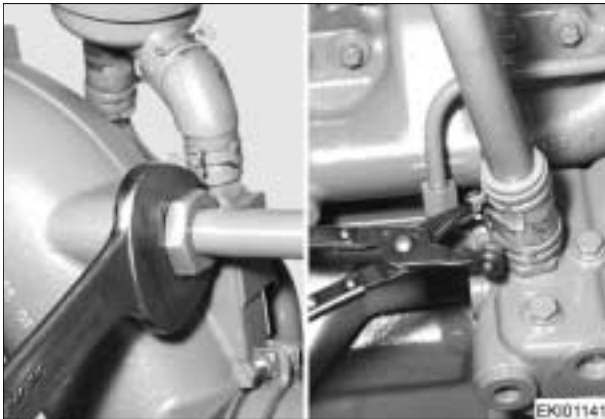
Tighten to specified torque.

replace all parts which have been removed before

Purge fuel system.

Date	Version	Page	Reassembling and refitting intake pipe	Capitel	Index	Docu-No.
15.2.2001	a	1/1		2010	G	000002

<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Cylinder head</b> <b>Removing and refitting turbocharger</b></p>	<p align="center"><b>G</b></p>
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**Removing turbocharger**

Remove crankcase venting (pressure control valve).

Remove air intake pipe from compressor to intake manifold.

Remove air intake manifold.



Remove oil return line and feed line.



Remove heat protection panel



Unscrew the turbocharger.

Remove turbocharger.

**Note:**

**Shut all inlet and outlet ports in order to prevent particle contamination.**

Date	Version	Page	Removing and refitting turbocharger	Capitel	Index	Docu-No.
15.02.2001	a	1/2		2010	G	000004

<b>Fav 900</b>	<b>Engine / Cylinder head</b> <b>Removing and refitting turbocharger</b>	<b>G</b>
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**Refitting the turbocharger**

Check intake pipe and exhaust manifold for eventual foreign objects.

Examine oil feed and return lines for eventual damage, jamming and leaks.

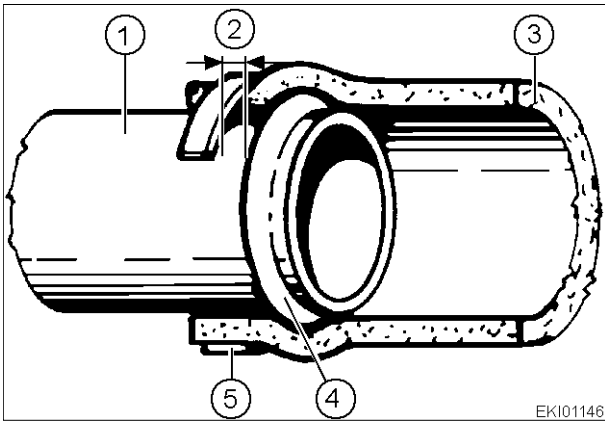
Replace all gaskets.

Refitting the turbocharger occurs in the inversed sequence as the removing

For refitting use new gaskets and new locking nuts.

Before connecting oil feed line, fill bearing case with clean engine oil.

Check all connection for tightness and absence of mechanical stress.



**Note:**

**The clamped section of the hose must always be behind the collar of the hose.**

- 1. Pipe
- 2. Gap
- 3. Hose
- 4. Collar
- 5. Hose clip

**Note:**

**Use only clean water as a lubricant.**

Date	Version	Page	Removing and refitting turbocharger	Capitel	Index	Docu-No.
15.02.2001	a	2/2		2010	G	000004

<b>Fav 900</b>	<b>Engine / Cylinder head</b> <b>Removing and refitting exhaust manifold</b>	<b>G</b>
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**Removing the exhaust manifold**

Remove turbocharger.

**Note:**

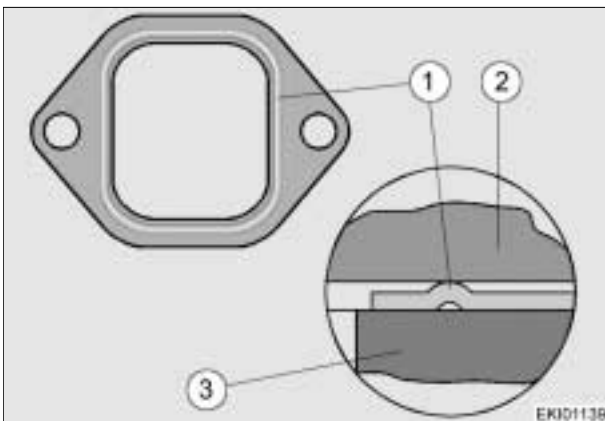
**Protect exhaust port on turbocharger from contamination.**

Unscrew and remove nuts from exhaust manifold.



Guidance pins (visible on photograph) may be used.

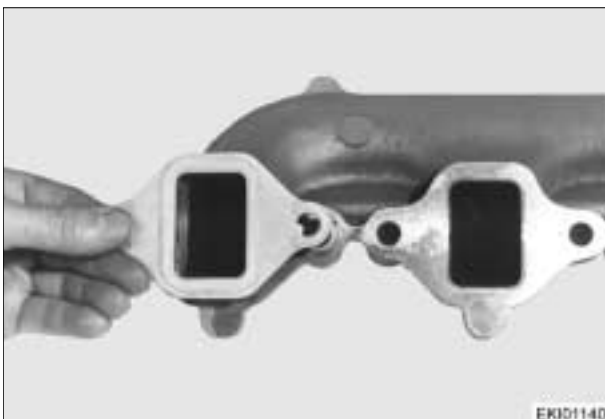
Remove manifold.



**Refitting the exhaust manifold**

Clean sealing faces of both, cylinder head and manifold.

Bumped side (1) of gasket facing the cylinderhead (2), depression facing the manifold (3).



Insert screws and tighten to adequate torque.

Refit the turbocharger.

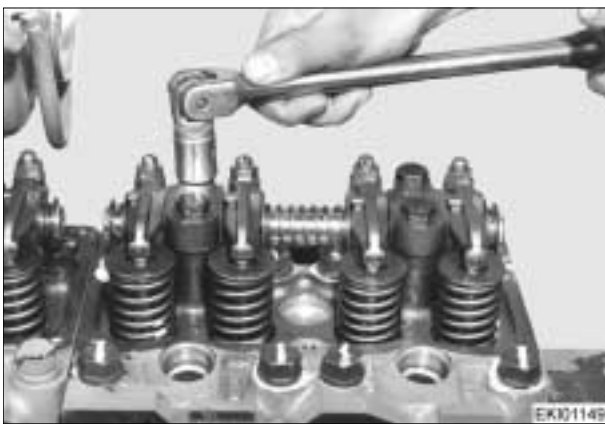
Date	Version	Page	<b>Removing and refitting exhaust manifold</b>	Capitel	Index	Docu-No.
15.02.2001	<b>a</b>	1/1		<b>2010</b>	<b>G</b>	<b>000003</b>

<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Cylinder head</b> <b>Removing and refitting cylinder head</b></p>	<p align="center"><b>G</b></p>
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**Removing the rocker**

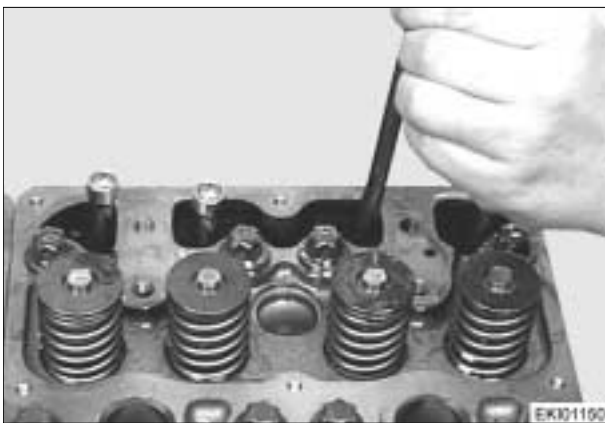
Remove cylinder head cover.



Loosen clamping bolts and remove rocker arm. Dismantling, overhauling and reassembling rocker assembly.

**Removing the cylinder head**

- Drain coolant,
- remove lines from injection nozzles,
- Remove intake pipe,
- Remove exhaust manifold,
- Remove coolant pipe.



Remove push rods.



Loosen cylinder head bolts in reverse sequence of tightening (for tightening torque values refer to chap 2000 Reg A).

**Note:**

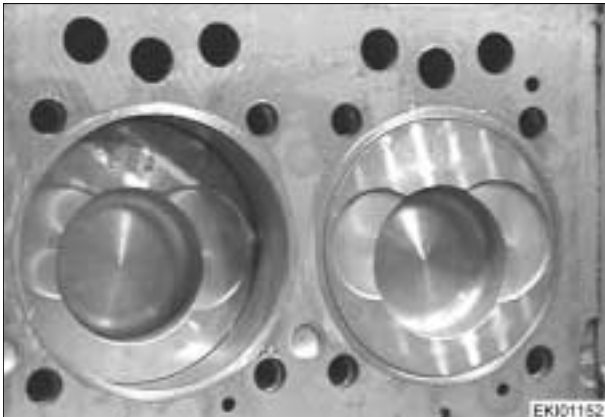
**Cylinder head bolts must not be re-used.**

Remove cylinder head and lay down in such way to prevent damage.

Remove cylinder head gasket.

Date	Version	Page	Removing and refitting cylinder head	Capitel	Index	Docu-No.
16.02.2001	a	1/4		2010	G	000006

<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Cylinder head</b> <b>Removing and refitting cylinder head</b></p>	<p align="center"><b>G</b></p>
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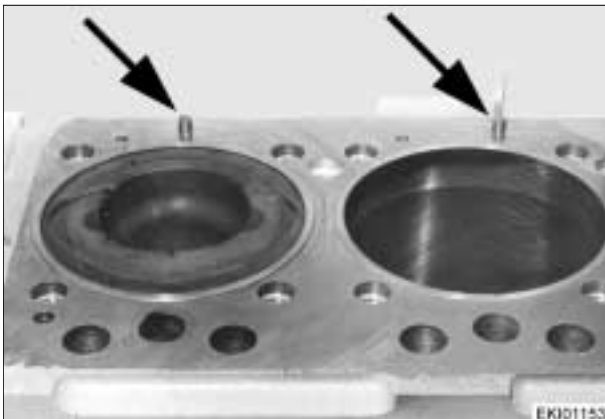


**Before refitting the cylinder head :**

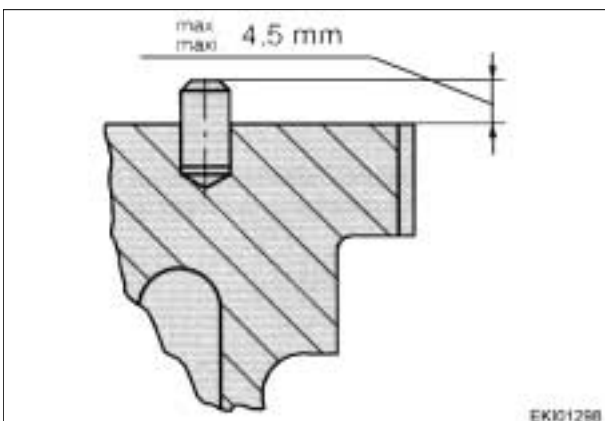
- Clean all the parts which have been removed.
- Clean sealing faces of cylinder head and crankcase, and blow out tapped holes in crankcase.
- In the event of repeated leaking, use the straight edge to check the sealing faces of crankcase and cylinder head for distortion.
- Uneven cylinder heads can be surface ground by up to 1 mm.
- Remachined sealing surfaces are measured in relation to the bore centre of the crankshaft bearing.

**Note:**

**Sealing surface of the cylinder head and crankcase may only be cleaned manually by scraper and slight sandpaper on a polishing block.**



Insert two 6h 8x10 DIN 7 straight pins per head into the leading surface of the crankshaft housing to locate the cylinder heads



If these straight pins need replacing, observe the max. projection of 4,5mm.

Date	Version	Page	Removing and refitting cylinder head	Capitel	Index	Docu-No.
16.02.2001	a	2/4		2010	G	000006

<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Cylinder head</b> <b>Removing and refitting cylinder head</b></p>	<p align="center"><b>G</b></p>
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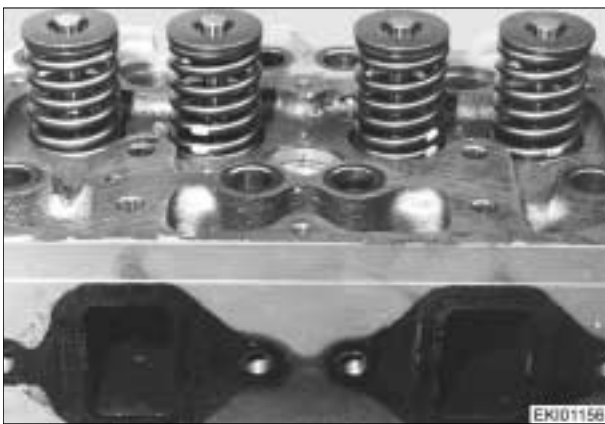


**Refitting the cylinder head**

**Note:**

**Cylinder head gasket must always be replaced.**

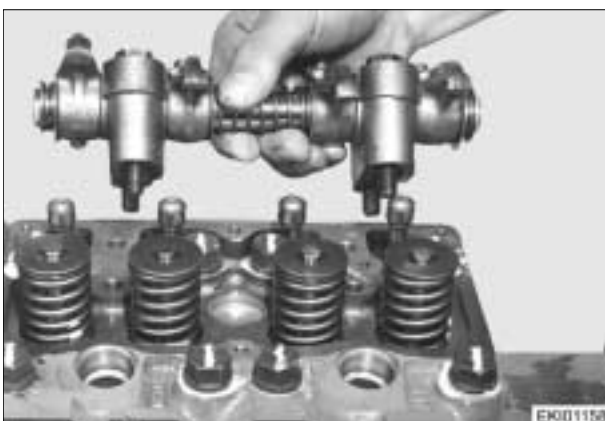
Install a dry new gasket carefully positioned according to the hole pattern . Fit cylinder head.



**Note:**

**To prevent distortion between cylinder heads and manifolds, we recommend the following steps :**

- Refit cylinder heads using guidance bolts.
- Oil the new cylinder head bolts and their rest surface with "Optimoly Withe T" paste.
- Hand tighten new cylinder head bolts.
- Mount rectified ruler (Special tool) onto the exhaust side. Tighten screws at 20 Nm. If no ruler is available, fit exhaust pipe and tighten at 20 Nm.
- Tighten progressively cylinder head bolts in the indicated sequence at the prescribed torque.
- Remove the rectified ruler.



**Refitting the rocker assembly**

Check push rods for distortion and wear in the ball sockets.

When inserting the push rods ensure correct fit in the socket of the valve tappets.

Fit rocker arm bracket.

Date	Version	Page	Removing and refitting cylinder head	Capitel	Index	Docu-No.
16.02.2001	a	3/4		2010	G	000006

**Fav 900**

**Engine / Cylinder head**  
**Removing and refitting cylinder head**

**G**

Tighten bolts slightly and align rocker arms with valves.

Subsequently tighten bolts to specified torque.



- Set valve clearance, chap 2010 Reg F
- Refit coolant pipe,
- Refit exhaust manifold,
- Refit intake pipe,
- Refit the injectors lines.



Refit cylinder head cover with a dry new gasket. Insert screws and tighten.

Fill up with coolant.

Tighten cylinder head bolts once more.

Date	Version	Page	Capitel	Index	Docu-No.	
16.02.2001	<b>a</b>	4/4	<b>Removing and refitting cylinder head</b>	<b>2010</b>	<b>G</b>	<b>000006</b>



Fav 900	<p align="center">Engine / Cylinder head</p> <p align="center"><b>Dismantling and reassembling the rocker arm assembly</b></p>	<p><b>G</b></p>
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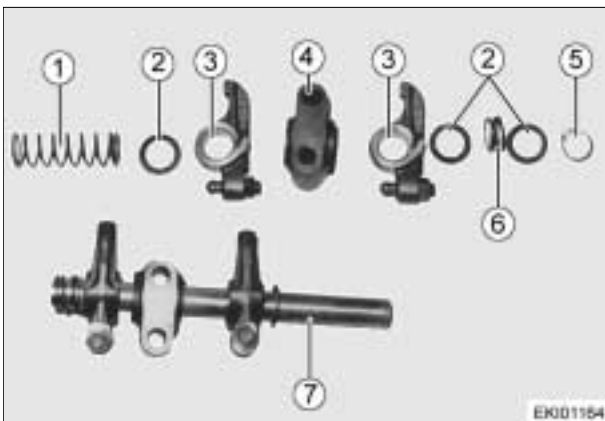


**Dismantling the rocker arm assembly**

Remove rocker arm assembly  
 Clamp rocker bearing bracket in a vise (use non-metallic jaws).



Remove circlip.



Remove parts separately from the rocker shaft.

- 1 Central spring
- 2 Stop washer
- 3 Rocker arm
- 4 Rocker bearing bracket
- 5 Circlip
- 6 Outside spring
- 7 Rocker shaft

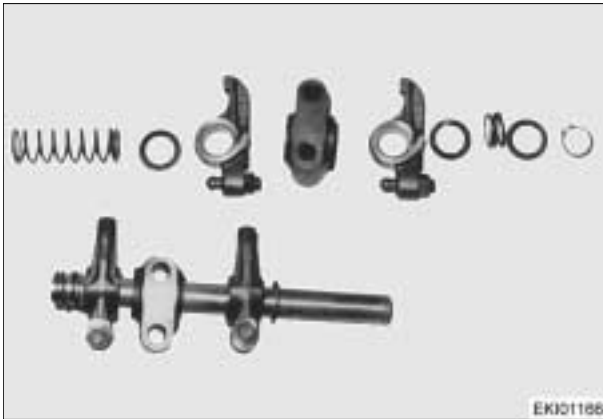


**Note:**

**If the rocker bearing bushes need replacing, use new or reconditioned ready-to-install rocker arms.**

Date	Version	Page	Capitel	Index	Docu-No.
19.02.2001	a	1/2	Dismantling and reassembling the rocker arm assembly	2010	G 000007

<b>Fav 900</b>	<b>Engine / Cylinder head</b> <b>Dismantling and reassembling the rocker arm assembly</b>	<b>G</b>
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**Reassembling the rocker arm assembly**

Coat rocker bushes with "Optimol White T"paste.

Refit circlip on the rocker shaft.

Coat rockershaft and bearing bracket bore with "Optimol White T" paste.

Slide stop washer, outer spring, stop washer, rocker arm (end flush with bushing facing the bearing bracket) and bearing bracket into the rocker shaft.

When clamping the assembled rocker shaft into the bearing bracket, ensure that the shaft end is supported. (Use non-metallic jaws).

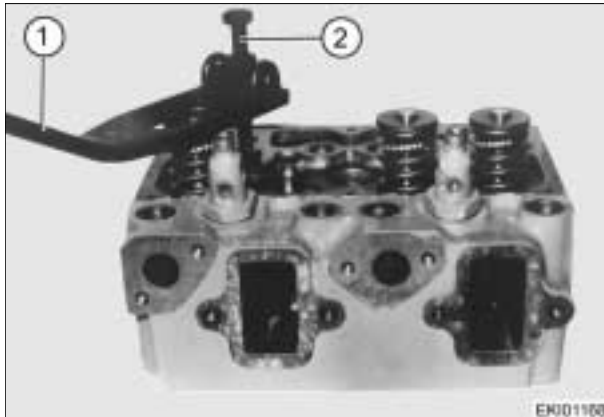


Fit parts in the sequence shown, compressing springs, and insert circlip.

Refit rocker arm assembly, see chapter 2010 Reg G - Cylinder head removing and refitting.

Date	Version	Page	Capitel	Index	Docu-No.
19.02.2001	a	2/2	<b>2010</b>	<b>G</b>	<b>000007</b>

<b>Fav 900</b>	<b>Engine / Cylinder head</b> <b>Removing and refitting valves</b>	<b>G</b>
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**Removing valves**

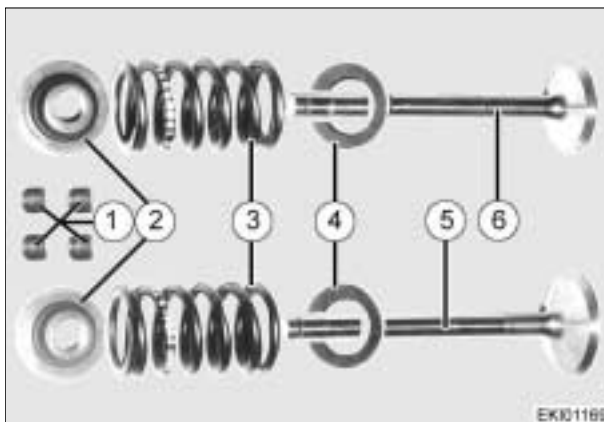
Remove rocker arm assembly and cylinder head (Chapter 2010 Reg G).

**Note:**

**Valve springs and spring plates can be replaced without removing the cylinder head. This requires the appropriate piston to be at TDC.**

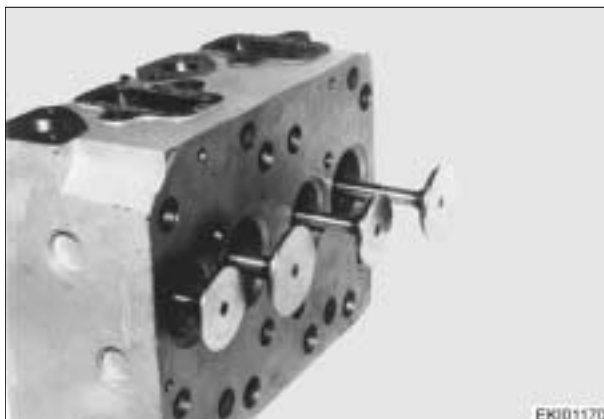
**The use of a valve fitting tool is necessary.**

- Place fitting lever to cylinder head.
- Turn screw (1) until the lever (2) is slightly raised.

**Note:**

**If a valve bench is available, this can be used for the above operations.**

- Push valve fitting lever down and remove valve collets.
- Lift lever and swing to one side **Caution: Beware of spring tension. Danger of injury !**
- Remove upper spring plate (2), valve spring (3) and washer (4).
- Turn cylinder head over and extract intake (5) exhaust (6) valve.
- Check valves for damage and replace weak springs.
- Measure valve spring and replace weak springs.
- Check valve stem and guides for scoring and wear; if necessary, measure guides with a plug gauge.
- Check valve seats for severe wear and signs of burning, if necessary reseal valves or replace the insert.
- Remachine valve seat (following grinding machine manufacturer's instructions), or replace.

**Refitting valves**

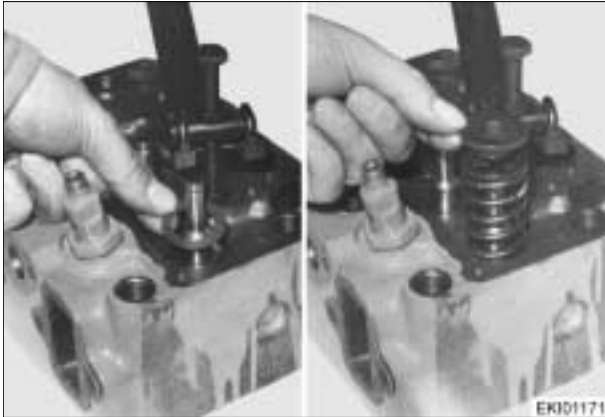
Lubricate valve stems and insert into valve guides.

**Note:**

**Minor valve seating damage can be removed by reseating using a valve grinding paste. When fitting new valves these must be reseated so that uniform seating is attained, if necessary machine the valve seat insert.**

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Fav 900	<p align="center">Engine / Cylinder head  <b>Removing and refitting valves</b></p>	<p align="center"><b>G</b></p>
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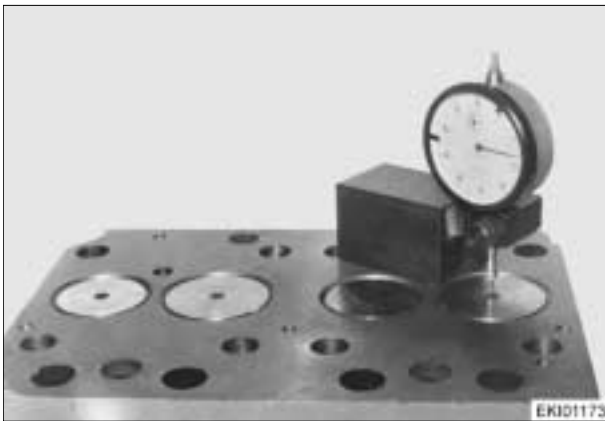


Turn cylinder head over.  
 Place valve fitting lever.  
 Fit washer, valve spring and upper spring plate.



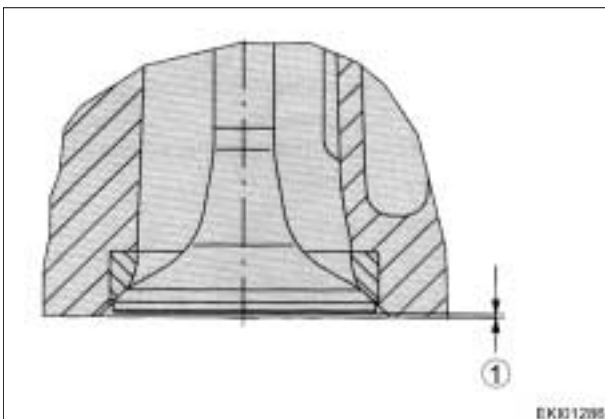
Compress spring with fitting lever and insert collets.

**Note:**  
**Make sure collets fit properly: they can cause severe damage by springing out.**



**Measuring valve recess**

- Position gauge holder with dial gauge at the cylinder head.
- Press tip of gauge onto cylinder head.
- Set dial gauge at "0".
- Swing gauge towards valve head and read recess.



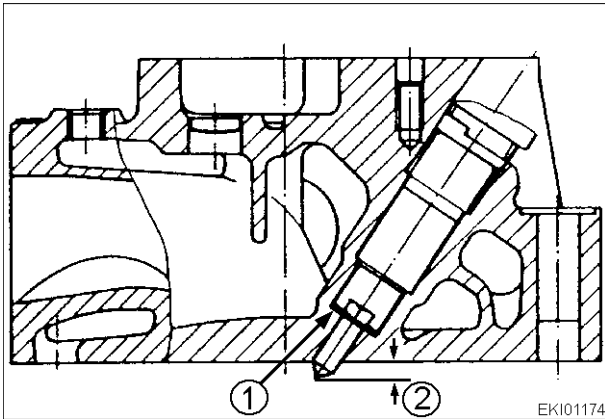
If after skimming the cylinder head faces, valve recess is inadequate or valve projection is excessive, the valve seat insert must be re-ground.

1 Valve recess

**Note:**  
 - When skimming the cylinder head sealing face, the max. dimension must not exceed 1 mm (0.039").  
 - After skimming, observe injection nozzle projection. Replace standard - copper sealing ring with a thicker one.

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<b>Fav 900</b>	<b>Engine / Cylinder head</b> <b>Removing and refitting valves</b>	<b>G</b>
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1= Copper - Sealing ring

2 = Injection nozzle projection (2,68 - 3,47mm).

Available sealing ring thicknesses : 0,5 / 1,0 / 1,5 / 2,0 / 2,5 / 3,0 mm (.020 / .039 / .059 / .079 / .098 / .118")

Date 19.02.2001	Version <b>a</b>	Page 3/3	<b>Removing and refitting valves</b>	Capitel <b>2010</b>	Index <b>G</b>	Docu-No. <b>000008</b>

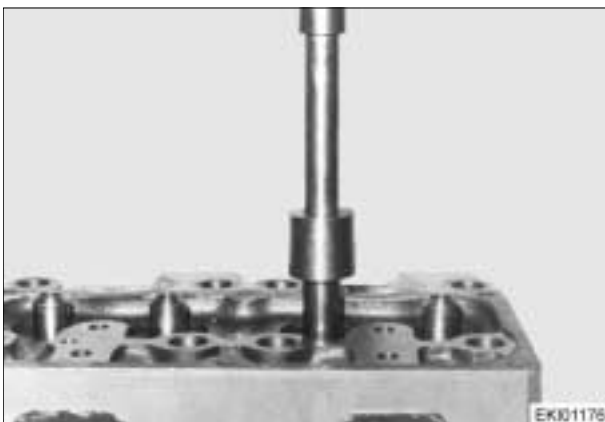
<b>Fav 900</b>	<b>Engine / Cylinder head</b> <b>Removing and refitting valve guides.</b>	<b>G</b>
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**Removing the valve guide**

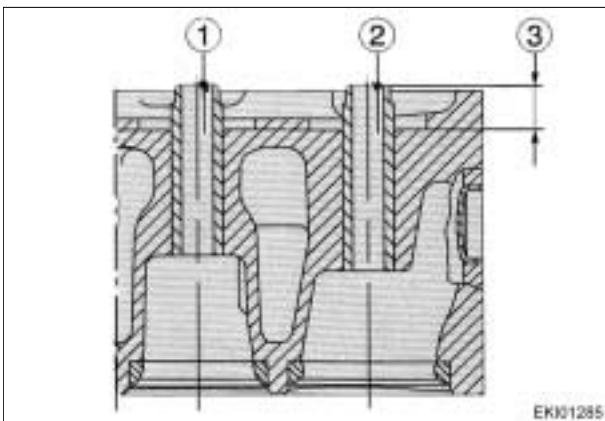
Removing and refitting the cylinder head.  
Removing and refitting the valves.

Position cylinder head on a press with the combustion chamber side facing upwards. Use a mandrel to press out the valve guide.



**Refitting the valve guide**

Lubricate new valve guides and using a mandrel and spacer sleeve, press in from the rocker arm side.



Valve guides differ in length only.

1 Exhaust = shorter guide

2 Intake = longer guide

3 Press-in depth (see Servicing Data)

Press-in depth is governed by the spacer sleeve.

**Note:**

**After replacing the valve guides it is necessary to re-grind the valve seats ( see Servicing Data and instructions by the manufacturer of the valve lathe used in your workshop).**

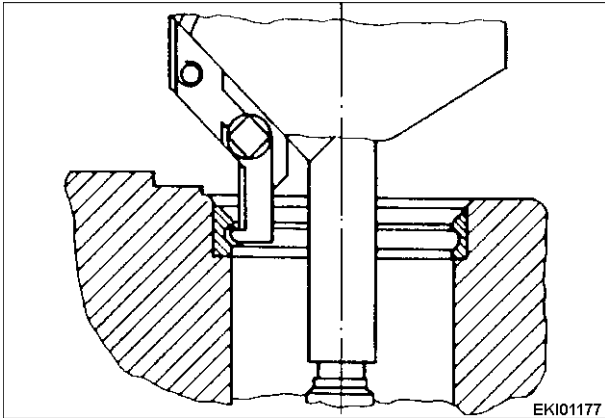
Fav 900	Engine / Cylinder head Replacing valve seat insert	G
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**Remove valve seat insert**

**Note:**

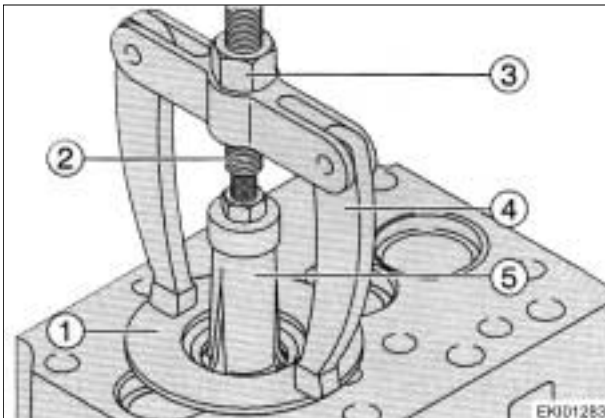
When replacing valve seat inserts, it is advisable to replace valve guides, since this is the only way to guarantee precise reseating of the new inserts.

A tool was therefore designed with which valve guidance and valve seat inserts can only be replaced together, or alternately the valve guides alone.



Using a valve lathe machine a 3 - 4 mm (.118-.157") wide groove in the valve valve seat inserts.

Insert internal extractor claw in the machined groove and tighten.

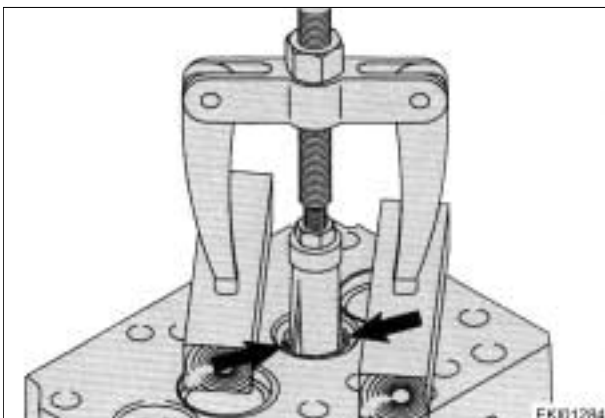


**Note:**

To prevent damage to the cylinder head face, insert a washer (1) or other suitable object underneath the feet (4) of the support legs.

Screw spindle (2) into extractor (5), align support legs (4) and extract valve seat insert by turning the nut (3).

Clean contact surface of insert in the cylinder head.

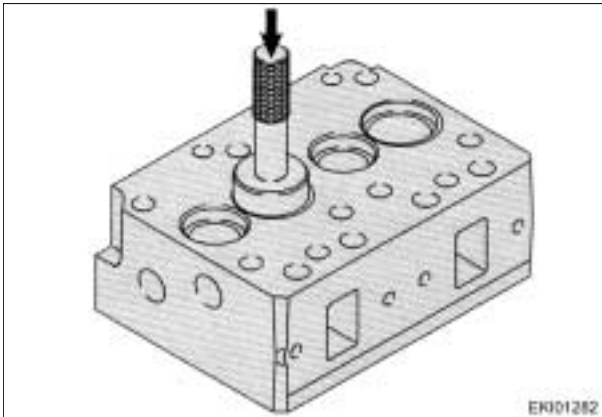


If a valve lathe is not available, proceed as follows:

- Using an arc-welder, apply two welding beads to the valve seat (arrowed).
- Extract valve seat insert.
- Clean insert contact surface in the cylinder head.

Date	Version	Page	Replacing valve seat insert	Capitel	Index	Docu-No.
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<b>Fav 900</b>	<b>Engine / Cylinder head</b> <b>Replacing valve seat insert</b>	<b>G</b>
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**Replacing valve seat insert**

Immerse cylinder head in a hot water bath and heat up to approx. 80°C (176°F).

Supercool new insert to approx -200°C (-328°F) and insert into the cylinder head.

When the temperature has equalized, check by pressing in a mandrel to the end position.

Refit valve guides.

**Note:**

**When replacing the valve seat inserts, it is necessary to re-machine valve seats.**

**Note:**

**After cooling down: re-machine valve seats.**

**After re-machining: clean cylinder head and check for leaks with a cylinder detector.**

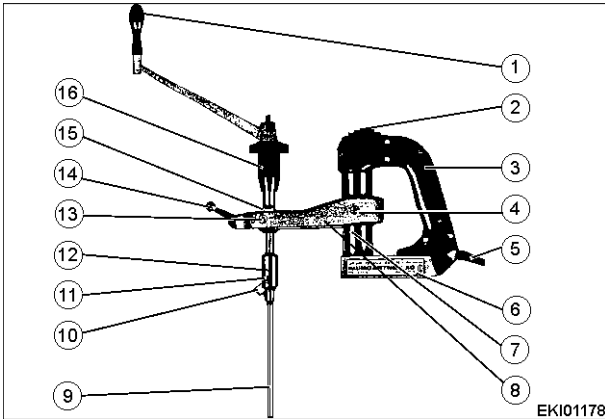
**Overheating of the cylinder head (above +200°C / 392°F) causes the core plugs to become loose, and they must be replaced.**

**To do this, clean core holes, blow out ducts and press in new core plugs using a mandrel and "LOCTITE 270".**

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<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Cylinder head</b> <b>Re-machining the valve seats</b></p>	<p align="center"><b>G</b></p>
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**Re-machining the valve seat**

(with Mira-Precision valve seat re-machining tool)

1. Crank
2. Rocker switch
3. Hand grip
4. Lubricating nipple
5. Mains supply
6. Solenoid valve with coil
7. Guide tube
8. Swivel arm
9. Guide mandrel
10. Cutter
11. Allen screw
12. Chuck
13. Lubricating nipple
14. Clamping lever
15. Guide ball
16. Thrust nut with mm-dial

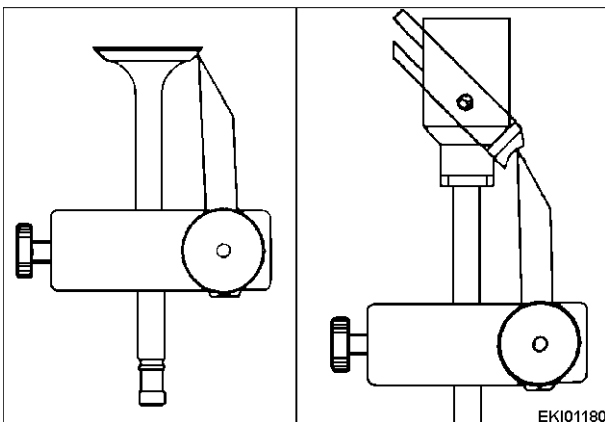


Select suitable guide mandrel, insert with open-end wrench (SW 12) and tighten.

**Note:**

**For maximum precision, the guide mandrel must have a perfect fit.**

Select cutting with appropriate valve face with a seat angle and insert.



Adjust cutter with setting gauge and secure with Allen screw.

Using a guide mandrel insert tool into valve guide.

Date	Version	Page	Re-machining the valve seats	Capitel	Index	Docu-No.
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Fav 900	<p style="text-align: center;">Engine / Cylinder head <b>Re-machining the valve seats</b></p>	<b>G</b>
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Release clamping lever, fit solenoid flange on clamping plate, adjust the height to ensure the cutter is clear of valve seat.

Set rocker switch at position 1.

Tighten clamping lever.



Re-machine valve seat by evenly turning the crank handle in clockwise direction, this moving the thrust nut at the same time.

**Note:**

**Turn the crank firmly and evenly but never in anticlockwise direction since this could cause the carbide cutting edge to break out.**



When the re-machining process is completed, reduce working pressure of the cutter for a further 2-3 turns without thrust.

While still turning, reverse the thrust nut by 2-3-turns.

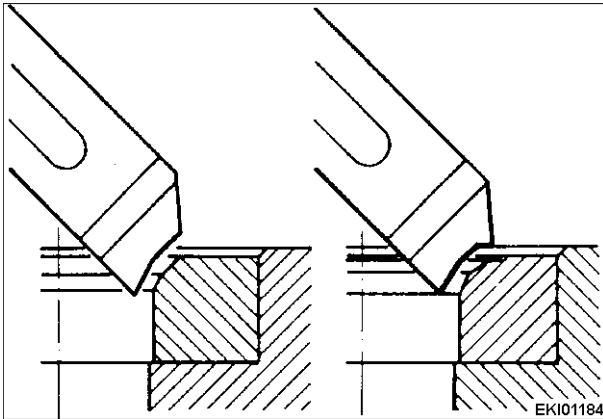
Switch into position 2 : to eliminate magnetic field.

Now pull the entire Mira-tool out and insert into the next valve guide where the centering process is to be repeated.

The cutter setting remains the same for all intake exhaust valve seats.

Date	Version	Page	Re-machining the valve seats	Capitel	Index	Docu-No.
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Fav 900	<p align="center">Engine / Cylinder head <b>Re-machining the valve seats</b></p>	<p align="center"><b>G</b></p>
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Observe specified seat angle.

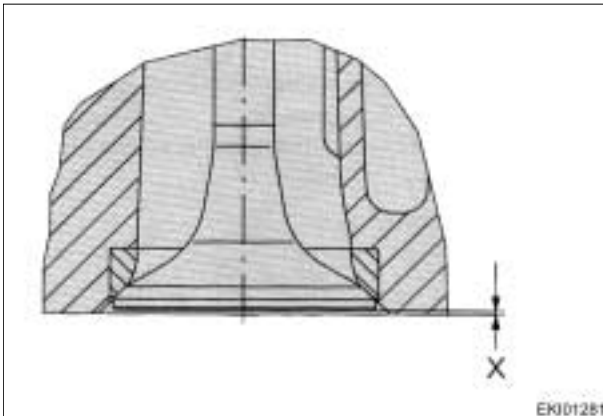


**Note:**

**When re-machining the valve seat inserts, only the minimum of material should be removed. Reference value will be value of valve recess.**

If the cylinder head faces are re-machined (max. 1 mm (.039")), it is necessary also to re-machine the inserts in order to obtain the correct valve recess: When fitting new valves and inserts, machine out cylinder head to amount relative to the skimming of the cylinder head face.

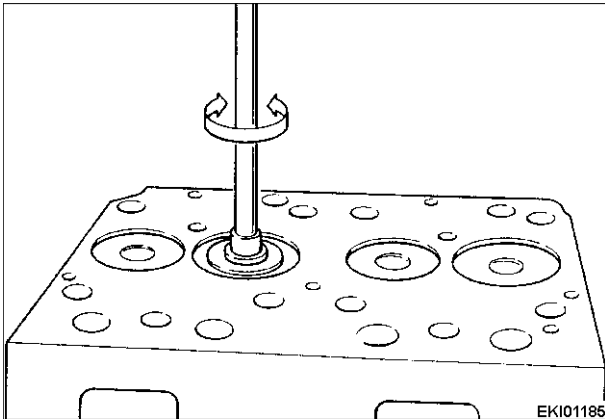
Having skimmed the cylinder head face and machined the valve seat insert, the theoretical valve seat may have become too deep in the cylinder head or the seat surface may be too wide.



In this event the valve seat insert must be replaced.

Always observe the correct value for valve recess.

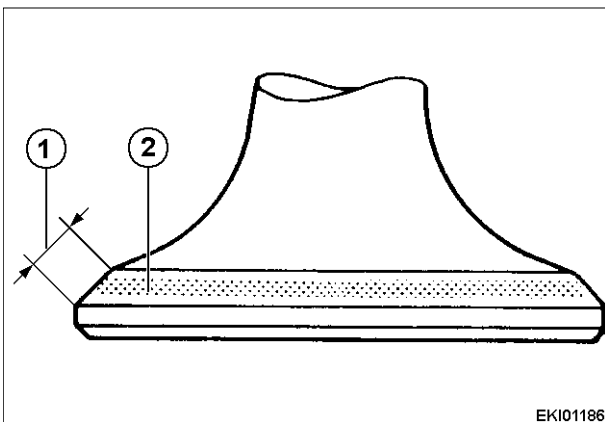
Fav 900	Engine / Cylinder head Reseating valves	G
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**Reseating valves**

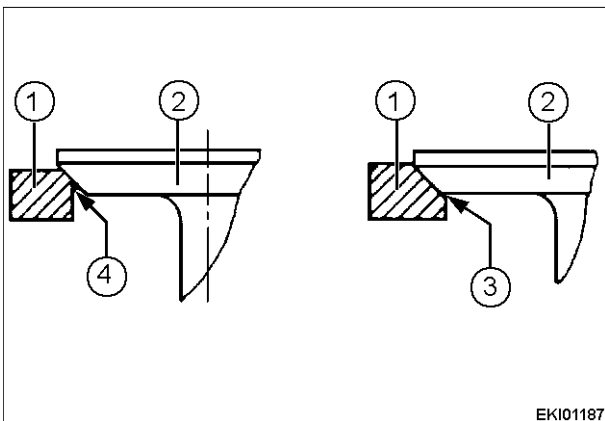
Apply grinding paste to the valve seating face.  
Lubricate valve guide and insert valve.  
With a valve grinding tool, regrind valve seat with spinning movements.

**Note:**  
**Do not allow grinding paste to come into contact with the valve stem and guide.**



The re-grinding process of the valve seat must produce a perfect, closed grinding pattern.  
The width of the grinding pattern is the result of a correctly machined valve seat insert.

1. Valve cone face
2. valve seat



1. Valve seat insert
2. Valve
3. Valve seat - too wide
4. Valve seat - correct

**Note:**  
**Excessively wide valve seats are favoring carbon deposits,**  
**- Valve may leak -**  
**Excessively narrow valve seats prevent rapid heat transfer from the valve to the cylinder head.**  
**- Valves become scorched-**



Fav 900

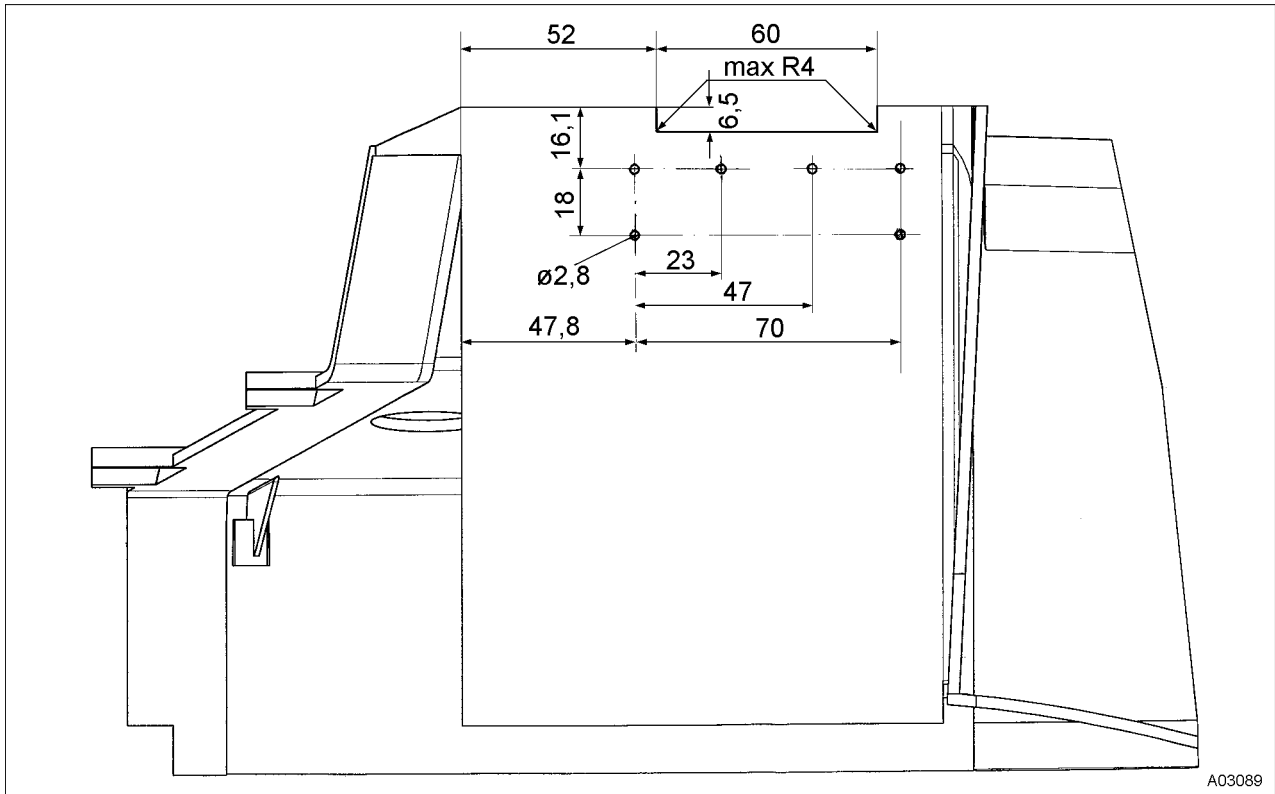
Engine / Speed control

Manual control modification to standard specification

**G**

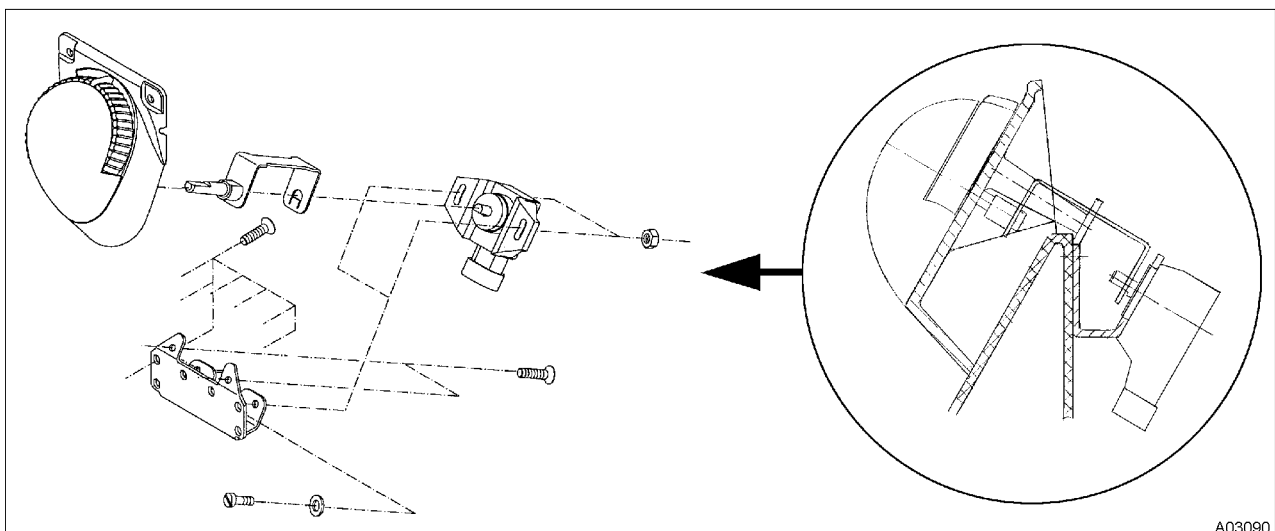
Serial no. 0401 - 0600

View of control console from rear



A03089

- Remove control console
- Rework 6.5 mm x 60 mm groove in accordance with drawing.
- Drill 6 bores of 2.8 mm  $\varnothing$  in accordance with drawing.



A03090

- Fit manual control as shown.

EKI 07.01 Schr en

**AGCO GmbH & Co.**

Johann-Georg-Fendt-Str. 4 D-87616 Marktobendorf

Date	Version	Page	Capitel	Index	Docu-No.
16.07.2001		1/1	Manual control modification to standard specification	2020	<b>G</b> 000004

Fav 900	Engine /Cooling system <b>Replacing engine coolant</b>	<b>G</b>
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## Draining the coolant

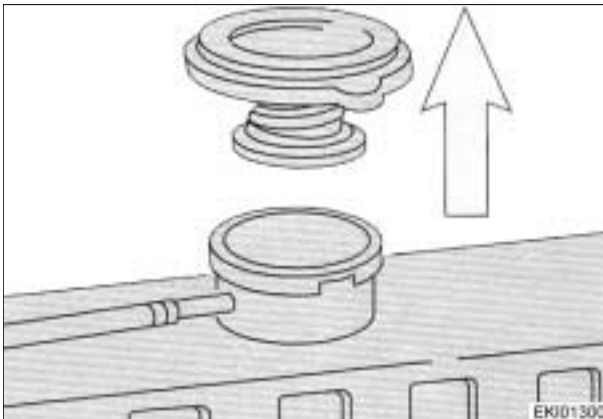


**Caution:**  
Hot coolant may cause severe burns during draining!

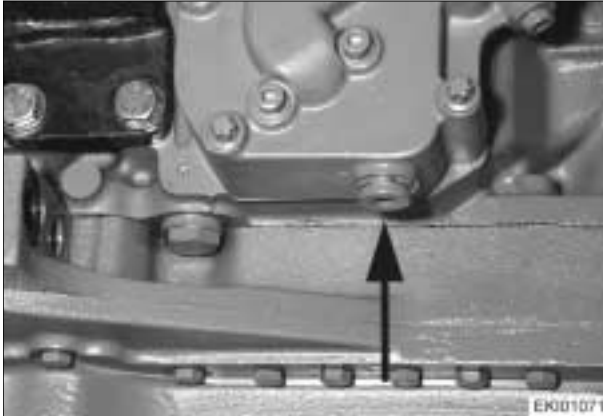
Drain coolant only on a **cooled down** engine as described:

**Note:**

Collect coolant in a pan and dispose of it properly!



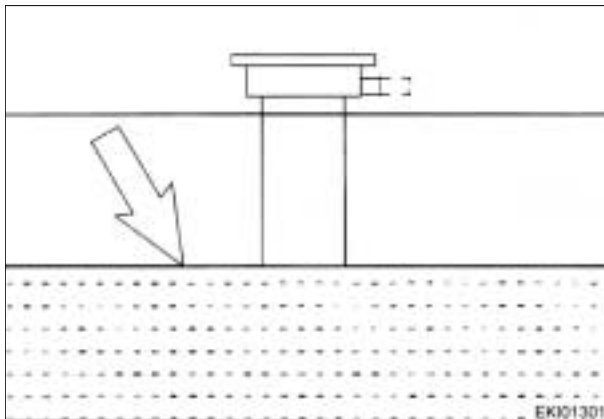
- Open shortly cover from expansion tank in order release pressure.



- Unscrew draining screws from Oil cooler case
- Then unscrew cover
- Drain coolant using a container with sufficient capacity

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**Filling Coolant**

(only on a cooled down engine)

Fill in an adequate mixture of tap water and antifreeze based on Ethylene - Glykol and corrosion preventer.

Refer to Lubricants - Chapter I 0000 Reg. A

Use a proper ratio water / Antifreeze.

- Tighten screw on oil filter body using a new gasket.
- Fill in slowly coolant mixture up to the adequate coolant level
- Put in place screw cap
- After a short engine operation time , check coolant level again



**Caution:**

**If coolant level needs to be checked , the engine being at operating temperature, first open cover with safety valve to release pressure - then open carefully.**

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08.02.2001	a	2/2		2050	G	000001

Fav 900	<p align="center">Engine / Cooling</p> <p align="center"><b>Removing and refitting the thermostatic valve</b></p>	<p align="center"><b>G</b></p>
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**Removing the thermostatic valve**

- Drain coolant, chapter G 2050 Reg G
- Disconnect coolant hose from thermostatic valve.  
Unscrew and remove the two screws (SW) and remove thermostat housing.



Remove thermostatic valve.

**Check correct operation of thermostat as following:**

- Place thermostatic valve in pot filled with water
  - Heat water
  - Measure opening temperature with an adequate thermometer
  - Measure opening distance
- Replace faulty thermostatic valve



**Refitting thermostatic valve**

Fit thermostatic valve with new O-seal "ensuring that the ball valve is pointing upwards" (TOP).

**Note:**

**Never run engine without a thermostatic valve or bypass inserts.**

Fit thermostat housing cover, insert screws and tighten. attach feed hose to radiator. Fill up with coolant.



**Replacing temperature sensor**

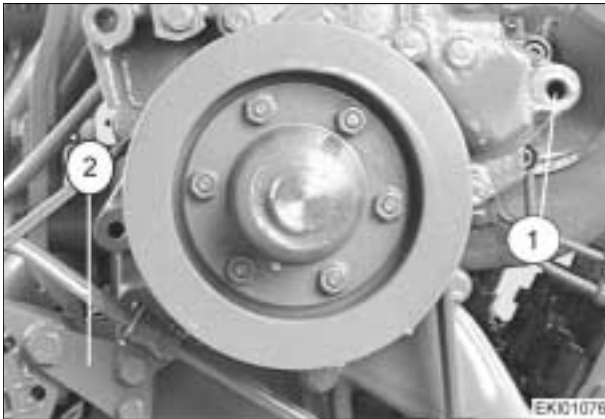
Disconnect connections

Unscrew temperature sensor from coolant pipe.  
Screw in temperature sensor using "Loctite 648" and tighten to specified torque.

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09.02.2001	a	1/1		2050	G	000002

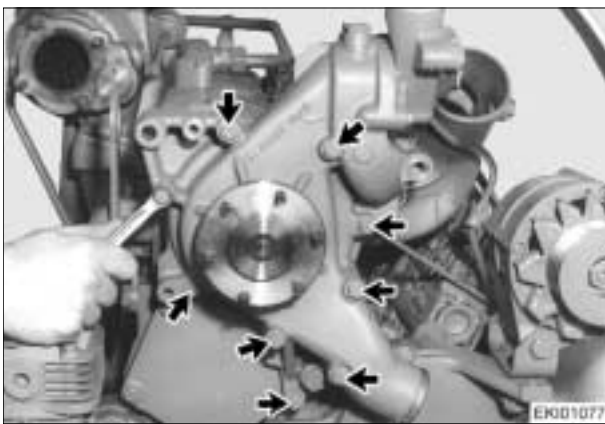


<p><b>Fav 900</b></p>	<p align="center"><b>Engine /Cooling system</b> <b>Removing and refitting water pump</b></p>	<p align="center"><b>G</b></p>
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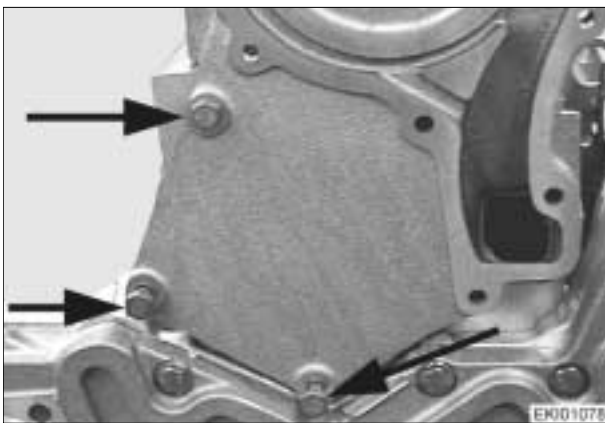


**Removing the pump lift section**

- Drain coolant.
- Unscrew fan
- Remove feed and drain lines.
- Remove V-belt.
- Remove cooling lines to air compressor
- Remove generator belt tensioner screw (1) top left
- Remove generator pod (2) on the top left
- Remove hub of Viscosity clutch



Unscrew and remove pump lift section.  
Clean sealing faces of pump lift- and delivery sections.



**Removing the pump lift section**

Remove three screws (arrows) and remove the pump lift section.



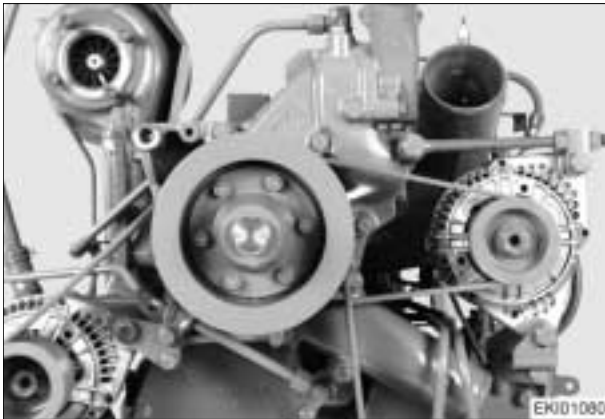
Clean sealing faces of pump lift section and engine block.

**Refitting the water pump lift section**

Install pump lift section with new gasket.  
Tighten screws to specified torque.

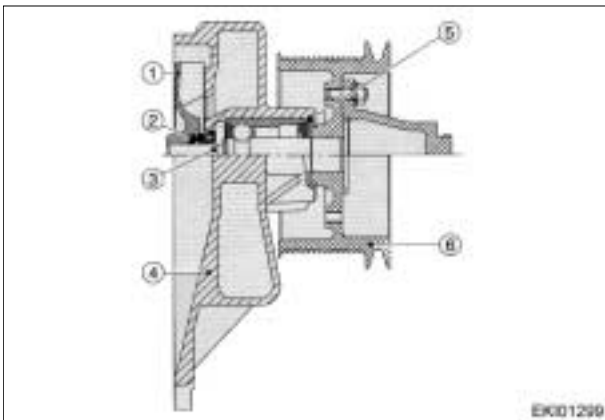
Date	Version	Page	Removing and refitting water pump	Capitel	Index	Docu-No.
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<p><b>Fav 900</b></p>	<p align="center"><b>Engine /Cooling system</b> <b>Removing and refitting water pump</b></p>	<p align="center"><b>G</b></p>
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**Refitting the water pump**

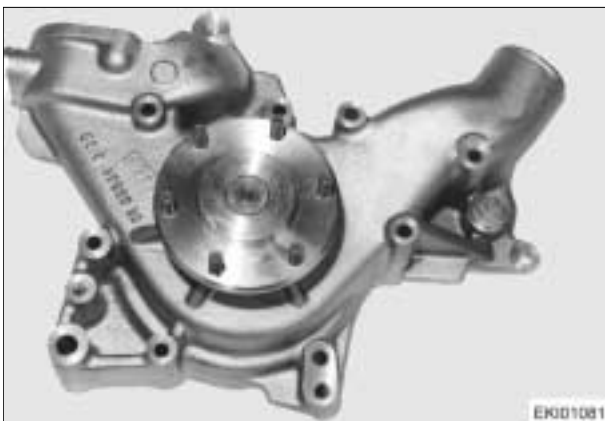
Replace seals on connecting pipe.  
Install water pump with new gasket.  
Tighten fscrews to specified torque.  
Put all removed parts back into place  
Fill up coolant.



Overhauling the water pump.

1. Impeller
2. Sliding ring gasket.
3. Water pump bearing.
4. Pump housing.
5. Circlip
6. V-belt pulley

Remove water pump



Clamp water pump lift section in a vise (use non-metallic jaws).

Remove V-belt pulley with pulling device.

Remove circlip from pump housing.

Invert water pump and fit into hydraulic press

Using a suitable mandrel (same as bearing shaft) press out bearing.

**Note:**

**When the bearing is pressed out, the pump impeller is released.**



Using a suitable mandrel, press out and replace sliding ring gasket.

**Reassambling the water pump**

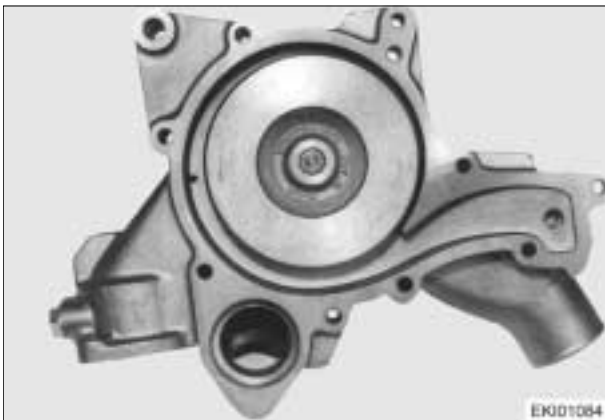
Using pressing bush (special tool) press in a new sliding ring gasket as far as possible. See notes on fitting gasket !

Date	Version	Page	Removing and refitting water pump	Capitel	Index	Docu-No.
14.2.2001	a	2/4		2050	G	000003

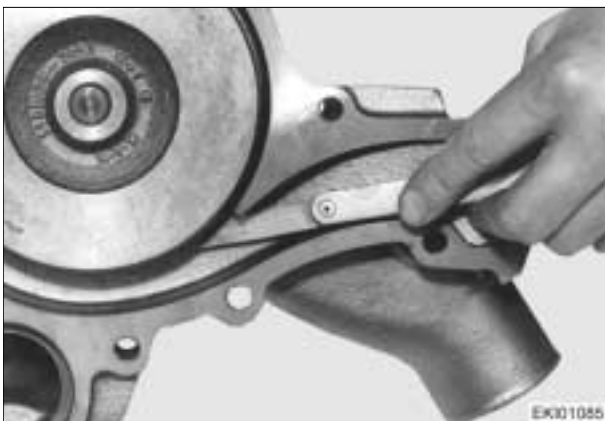
<b>Fav 900</b>	<b>Engine /Cooling system</b> <b>Removing and refitting water pump</b>	<b>G</b>
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Using a pressinf bush, press bearing into pump housing until contact is made.  
Insert circlip.  
Press pulley into shaft flush with the plate



Invert water pump and let it rest on hub and bearing shaft.  
Fit impeller to bearing shaft.



Gradually press impeller onto bearing shaft, using gauge to check for correct clearance.  
Rotate impeller and check clearance at several points.

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<b>Fav 900</b>	<b>Engine /Cooling system</b> <b>Removing and refitting water pump</b>	<b>G</b>
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**When repairing do not replace pump unless a leak has been found.**

Depending on design, the sliding ring gasket of the water pump may allow small amounts of coolant to leak which may lead to water marks underneath the drain hole.

This does not call for a pump replacement.

It is advisable to check out the following points before replacing or repairing the pump:

- Is there a visible and repeated loss of water from the coolant on the circuit.
- Whether the loss is caused by discharge from the expansion tank (e.g. too full) or by leakages from the hoses, radiators etc.

Water pump needs to be replaced only if water is dripping while the engine is running or after it is switched off.

**Fitting instructions for sliding ring gasket :**

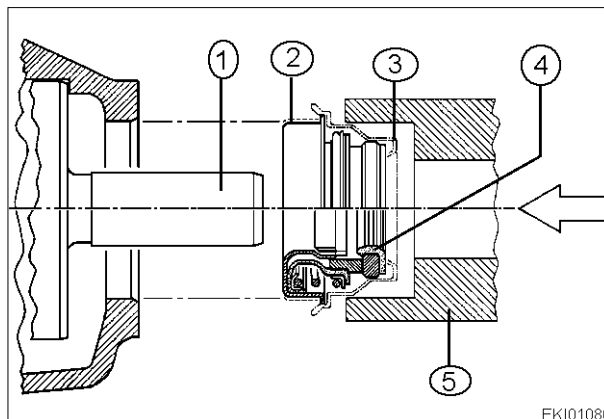
The ring gasket must be mounted "wet". Coat the shaft and sleeve (4) with a mixture of 50 % Water und 50 % alcohol or 35 % to 50 % antifreeze.

**Do not use any other lubricant**

Fit gasket "wet", i.e. coat retaining collar (1) and pump shaft (2) with a mixture of 50% water and 50% alcohol or a mixture of water and 35 to 50 % antifreeze to MAN in-house standard 324.

If there are any signs of scoring however slight, or other minor damage, apply a bead of Dirko Transparent sealing agent.

Position gasket with plastic cap (3) on shaft (1) and using assembly tool, press into housing until tool makes contact with the housing. Remove plastic cap.



**Note:**

Investigations have shown that in most cases pump damage is caused by the use of unsuitable coolants.

For trouble free operation use only radiator anti-corrosives by Fendt .

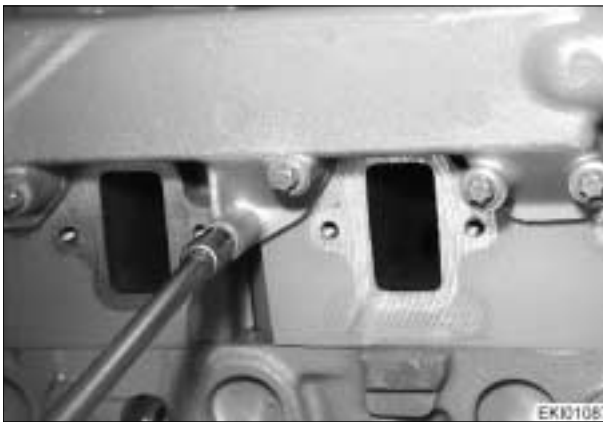
Date	Version	Page	Capitel	Index	Docu-No.
14.2.2001	a	4/4	2050	G	000003

<b>Fav 900</b>	<b>Engine / Cooling system</b> <b>Removing and refitting coolant pipe</b>	<b>G</b>
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**Removing the coolant pipe**

Drain coolant while engine is cold. Use a clean pan with sufficient capacity

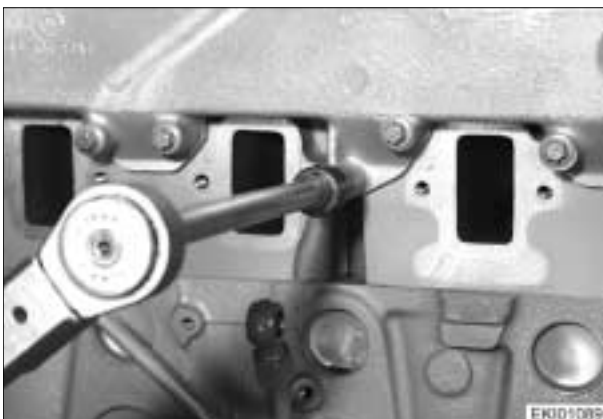
- Remove injection lines
- Remove intake pipe
- Disconnect temperature sensor



Unscrew and remove coolant pipe.  
Remove gasket and clean all sealing faces.

**Refitting the coolant pipe**

Replace O-Rings of connecting pipe. Fit coolant pipe using new gaskets.



Insert screws and tighten to specified torque.

**Note:**

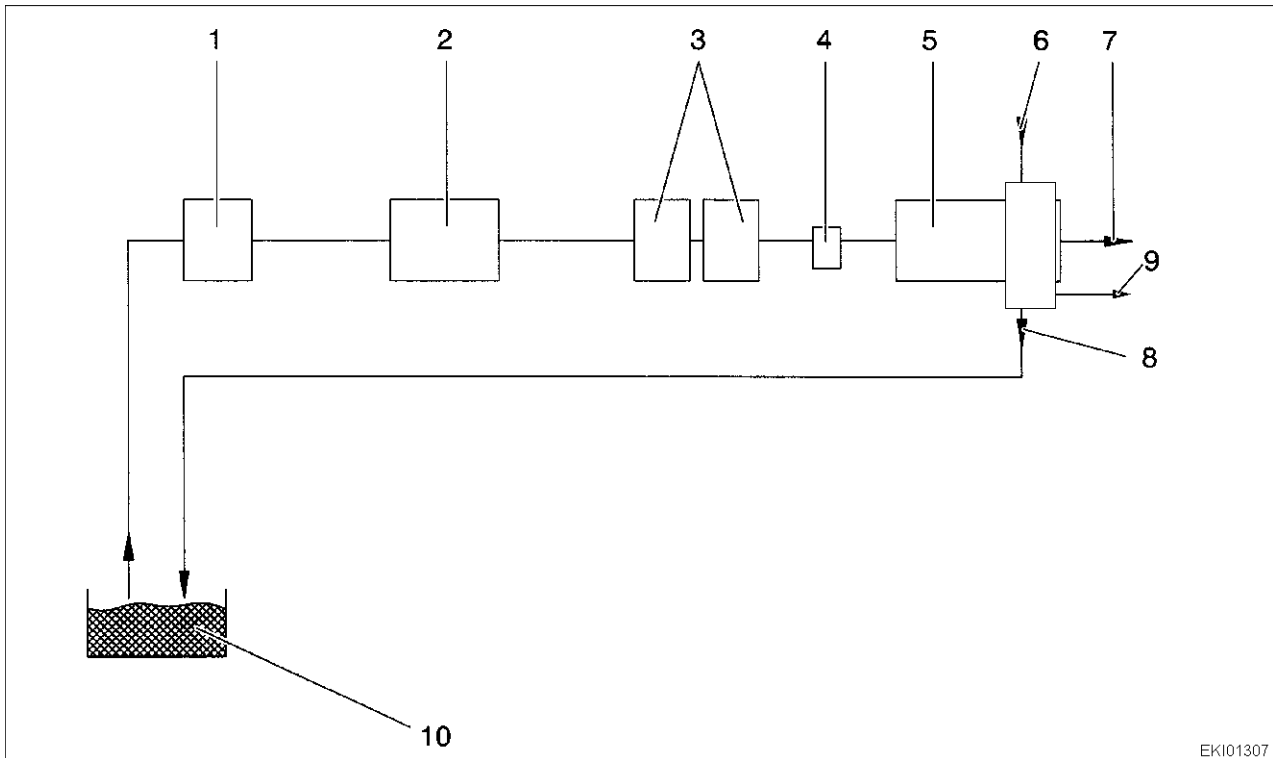
**Insert the longer screws into the brackets for injectors.**

- Reconnect temperature sensor,
- Refit intake pipe.
- Refit injection lines.
- Fill up with coolant.

Date	Version	Page	<b>Removing and refitting coolant pipe</b>	Capitel	Index	Docu-No.
14.02.2001	<b>a</b>	1/1		<b>2050</b>	<b>G</b>	<b>000004</b>

**Fav 900**

**Engine / Fuel system**  
**Layout of fuel system**

**C**

EKI01307

1. Pre-filter with manual fuel lift pump
2. Fuel lift pump
3. Fuel filter
4. Measuring point for fuel pressure.
5. Injection pump
6. Return line from injection pump
7. Line to injector
8. Return tank
9. Line to heater plug
10. Fuel tank

Date	Version	Page	Capitel	Index	Docu-No.
09.03.2001	a	1/1	Layout of fuel system	2060	C 000002

**Fav 900**

**Engine / Fuel supply system**  
**Fuel pre filter / Cartridge**

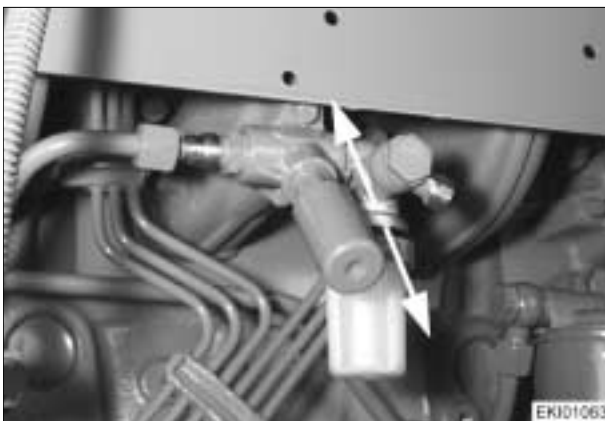
**G****Cleaning pre - filter**

Disassemble pre - filter:

- Unscrew filter body



- Clean Filter body (1) and Sieve (2) with clean diesel fuel and dry it with compressed air
- Re - assemble with a new gasket
- Tighten filter body



- Actuate manual pump until overflow valve toward injection pump opens audibly.
- Start engine
- Check Pre - filter for eventual leaks

**Note:**

**Purge air from fuel supply system - Chapter 2060 Reg. G**

Date	Version	Page	Capitel	Index	Docu-No.
08.02.2001	a	1/2	<b>Fuel pre filter / Cartridge</b>	<b>2060</b>	<b>G</b>
				<b>G</b>	<b>000002</b>

<b>Fav 900</b>	<b>Engine / Fuel supply system</b> <b>Fuel pre filter / Cartridge</b>	<b>G</b>
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**Removing and refitting main fuel filter**

Disconnect fuel lines (1) .  
Remove screws (2) and take off fuel filter.  
Reassemble in reversed order and connect fuel lines with new sealing rings.  
Purge air from fuel supply system.



**Replace filter element**

- Loosen filter element with chocking wrench and unscrew element manually
- Wet gaskets of replacement element with fuel.
- Screw in replacement element and tighten firmly by hand.
- Purge air from fuel supply system - Chapter 2060 Reg. G



**Note:**  
**Used fuel filters are hazardous waste**

Date	Version	Page	<b>Fuel pre filter / Cartridge</b>	Capitel	Index	Docu-No.
08.02.2001	<b>a</b>	2/2		<b>2060</b>	<b>G</b>	<b>000002</b>

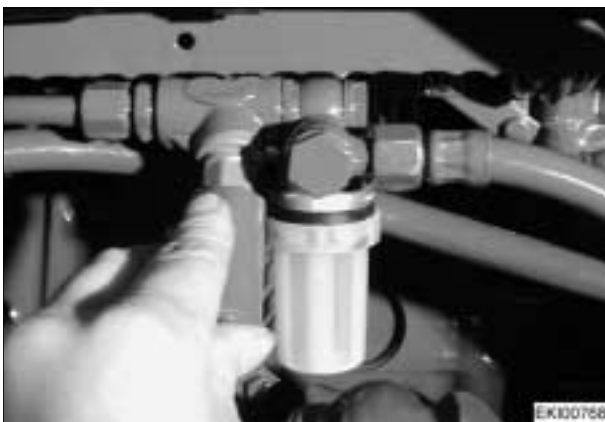


Fav 900	<p align="center"><b>Engine / Fuel Supply System</b></p> <p align="center"><b>Purging Air from Fuel Supply System</b></p>	<p align="center"><b>G</b></p>
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**For Operating EDC Injection System, careful purging of the fuel Supply system is compulsory!**

Unscrew purging screw of the fuel filter by one to two turns.



Actuate manual fuel lifting pump until fuel flows without any bubbles.

Repeat this procedure on the second purging screw

Check for leaks within the fuel supply system.



**If air reaches the high pressure section of the injection pump (Type VP 44), a further purging step is to be carried out:**

Purging the high pressure system becomes necessary when the engine does not start any more or if the tank went dry.

On steep slopes and with little fuel in the tank, air may be aspirated by the injection pump eventually. (Failure Code)

or after repairs on the fuel supply system.

Following steps must be carried out on at least 3 following cylinders :

- Loosen nut of the injection line on the injection valve approx 1/2 turn.
- Crank engine with starter motor until fuel runs out of .
- Tighten Nut (10 Nm) then for 60° angle.

**Important:**

**Start engine and run it idle for approx. 30 sec in order to allow the complete system to purge residual air.**

**Caution:**

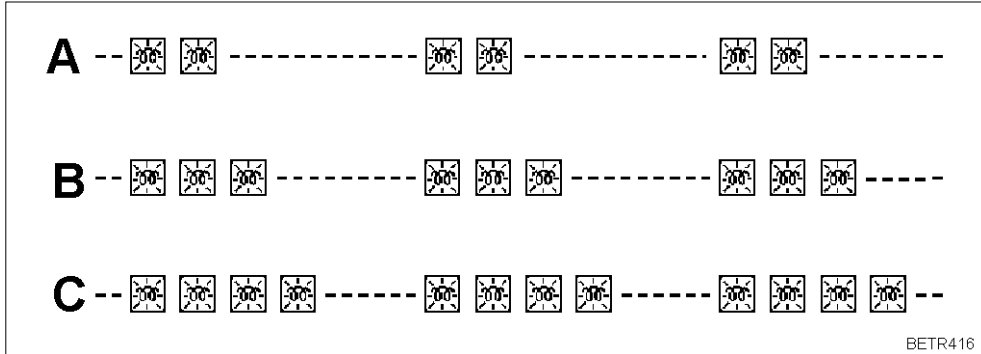
**Fuel runs within the lines! Any fuel spill must be cleaned up with rags . Be aware of safety and environmental regulations!**

Date	Version	Page	Purging Air from Fuel Supply System	Capitel	Index	Docu-No.
02.11.2000	a	1/1		2060	G	000001

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Engine / Cold-start system</b> <b>Faults in cold-start aid</b>	<b>B</b>
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The A012 - ECU detects faults in the cold-start aid and indicates them by flashing the heater-plug indicator using various flashing codes.

The indicator flashes for approx. 60 seconds.



The following are detected as faults:

**Fault code A**

- Interruption in R001 - heater-plug coil or its supply lead.

**Fault code B**

- Defective FU fuse in A012 - ECU, or absence of supply voltage (B+).

**Fault code C**

- Interruption in line to Y025 - valve, or in its coil.

In all these faults only the telltale flashes. Y025 - valve and R001 - heater plug remain switched off.

**Note:**

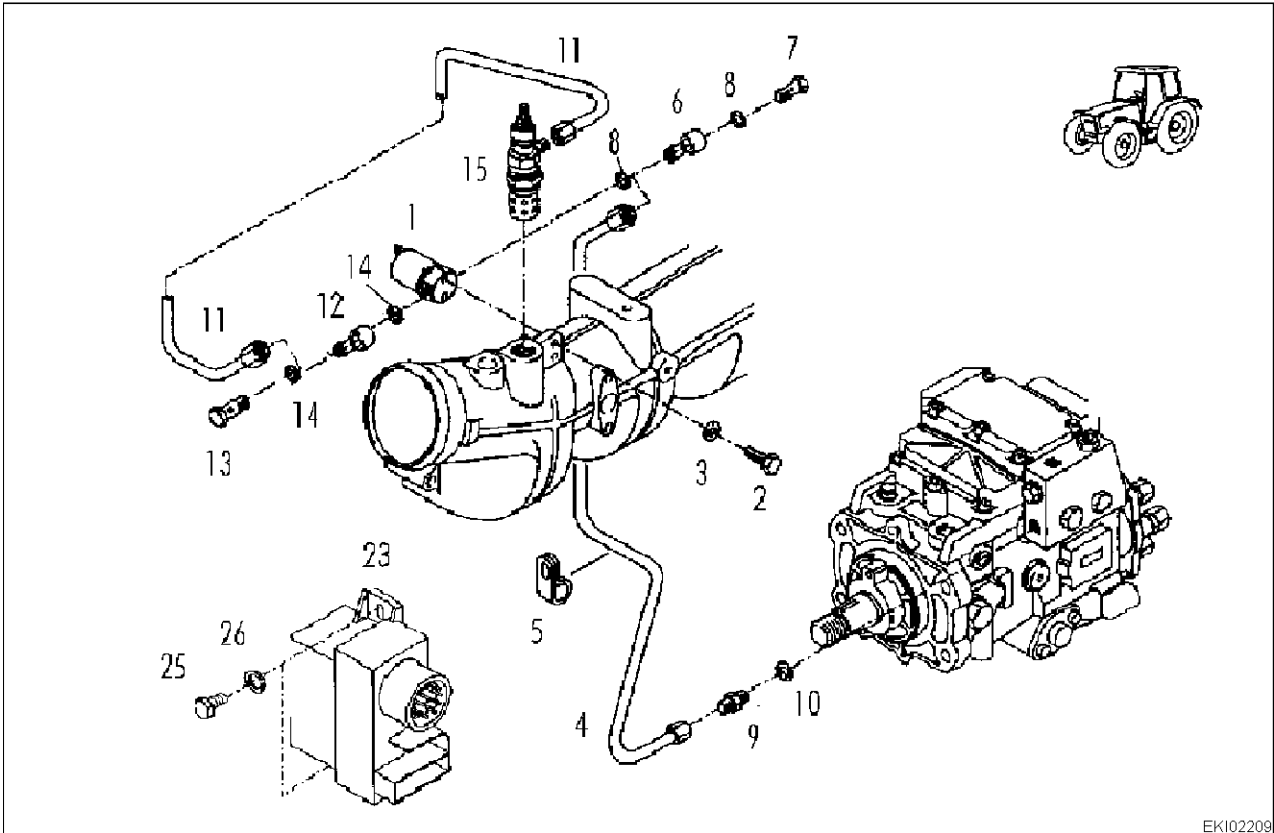
For details of measuring and testing cold-start aid see:

Chapter 9000 Reg. E - A012 - ECU, cold-start aid

Chapter 9000 Reg. E - Y025 / R001 - valve / heater plug

Date	Version	Page	Faults in cold-start aid	Capitel	Index	Docu-No.
30.08.2001	a	1/1		2180	B	000001

<b>Fav 900</b>	<b>Engine / Cold-start system Cold-start system connection plan</b>	<b>C</b>
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EK102209

Item	Designation	Item	Designation
1	Y025 - valve, cold-start aid	10	Usit ring
2	Hexagon screw	11	Fuel line
3	Washer	12	Banjo union
4	Fuel line	13	Hollow-core screw
5	Clip	14	Usit ring
6	Banjo union	15	R001 - heater plug
7	Hollow-core screw	23	A012 - ECU, cold-start aid
8	Usit ring	25	Hexagon screw
9	GE union	26	Washer

**Note:**

For details of measuring and testing cold-start aid see:  
 Chapter 9000 Reg. E - A012 - ECU, cold-start aid  
 Chapter 9000 Reg. E - Y025 / R001 - valve / heater plug

Date	Version	Page	<b>Cold-start system connection plan</b>	Capitel	Index	Docu-No.
30.08.2001	<b>a</b>	1/1		<b>2180</b>	<b>C</b>	<b>000001</b>

**Fav 900**

## Engine / Cold start booster Removing and refitting heater plug

**G****Remove heater plug**

Disconnect the heater plug.

Unscrew threaded union of fuel line.

Release lock nut of heater plug and remove plug.

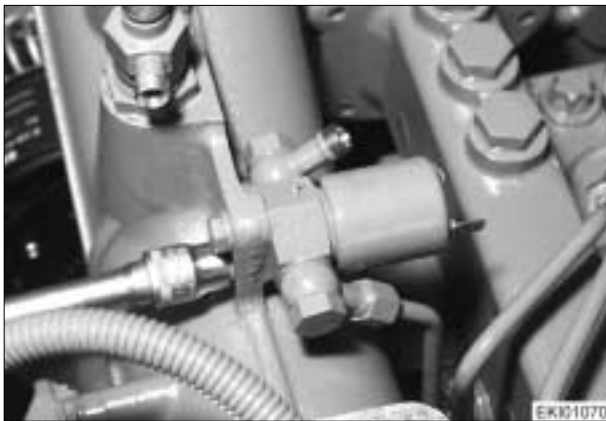
**Refitting heater plug**

Unscrew the lock nut on the heater plug as far as possible. Wetten threads with "Curil T" sealant

Screw in heater plug to the end position of the lock nut and align with fuel line.

Reconnect fuel line and electrical connections.

Tighten lock nut.

**Checking solenoid valve for leaks**

Remove fuel line from heater plug: Make sure there are no fuel leaks when the engine is running and warm.

**Removing the solenoid valve**

- Remove fuel line.
- Remove electrical connection from valve.
- Unscrew both screws and remove solenoid valve

The valve cannot be repaired.

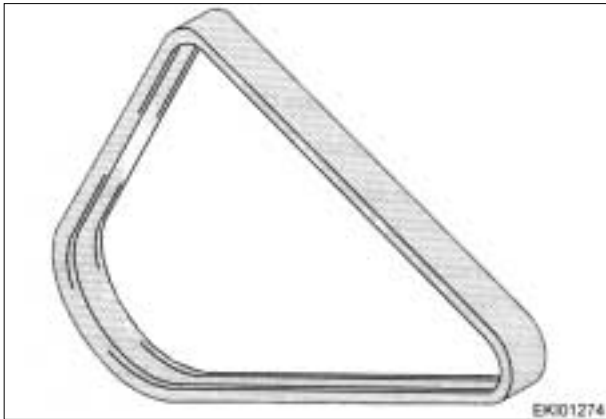
Damaged valves must be replaced.

**Refitting the solenoid valve**

- Fit valve bracket.
- Connect fuel lines using new seals.
- Re- connect solenoid valve.

Date	Version	Page	Capitel	Index	Docu-No.
08.02.2001	a	1/1	2180	G	000001

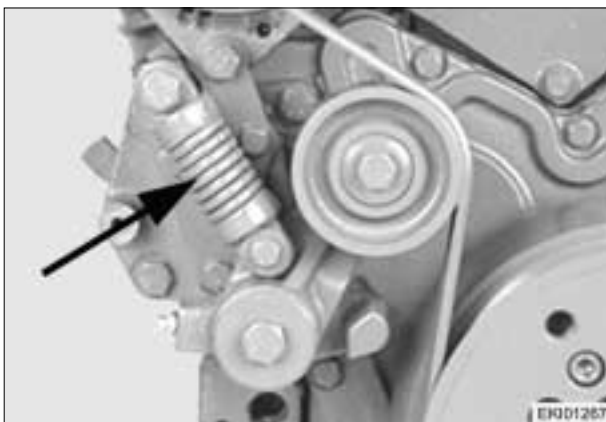
<b>Fav 900</b>	<b>Engine / Short block</b> <b>Power - belts</b>	<b>G</b>
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**Generator right**  
**Checking condition**

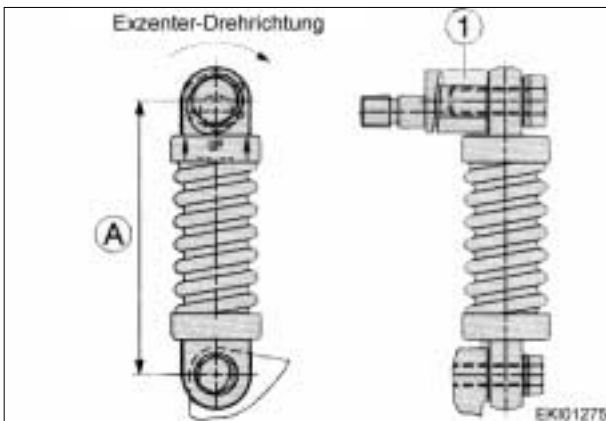
Power belt is maintenance free

- Check belts for cracks, oiling-up, and signs of overheating and wear.
- Replace damaged belt.



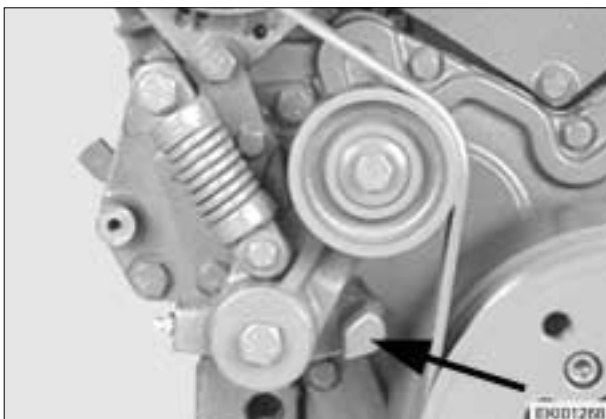
**Checking tension**

Tensioning device (arrow) keeps permanently a constant tension on the power belt.



**Tensioner must be adjusted as follows:**

1. New tensioner: distance (A) = 92 ± 1 mm (3.62" ±.04").
2. If distance (A) = 100 mm (3.94"), turn excenter to right to reach a distance of (A) = 92 ± 1 mm (3.62" ±.04"), at least that the excenter (1) allows a reduction of A down to min 92 mm (3.62").
3. If the distance reaches (A) = 100 mm (3.94") and the excenter (1) is at the end position, the power belt must be replaced. Adjust a new power belt according to Point 1.



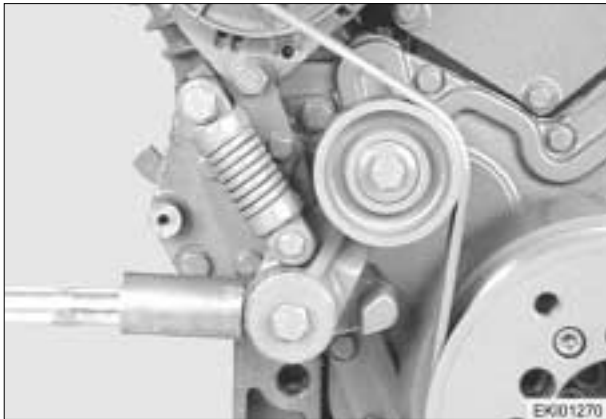
The replacement of the powerbelt becomes necessary if the tensioning lever comes to rest on console (Arrow).

**Note:**

**Distance of 100 mm (3.94") may cause a total failure of the belt drive because of insufficient tension.**

Date	Version	Page	Power - belts	Capitel	Index	Docu-No.
26.02.2001	a	1/3		2210	G	000016

<b>Fav 900</b>	<b>Engine / Short block</b> <b>Power - belts</b>	<b>G</b>
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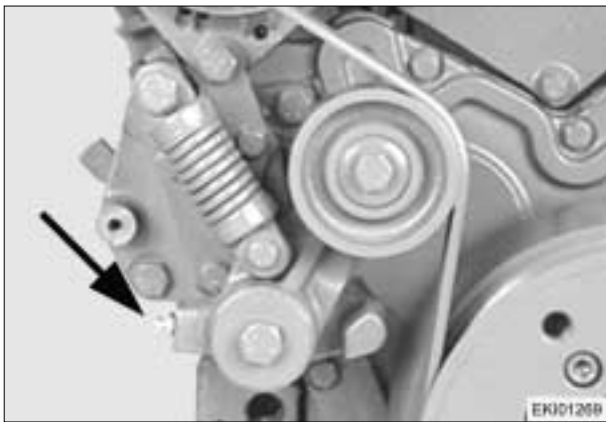


**Replacing the powerbelt**

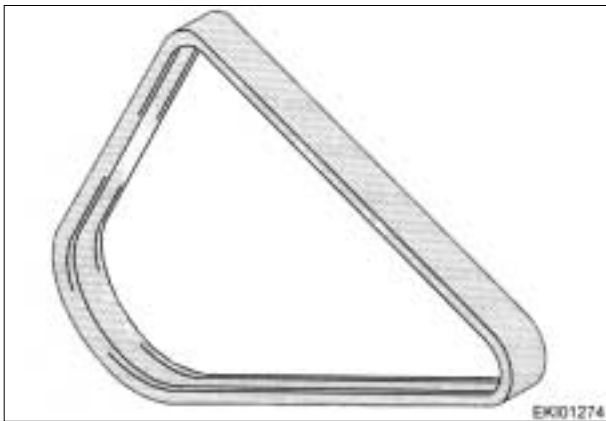
- Place adequate tool onto square shaft.
- Release tension from tensioner
- and remove powerbelt from the pulley .

**Refitting :**

- Place powerbelt onto pulleys of crankshaft , generator and coolant pump.
- Set tensioner completely back.
- Place powerbelt onto pulley , release tensioner, remove special tool.



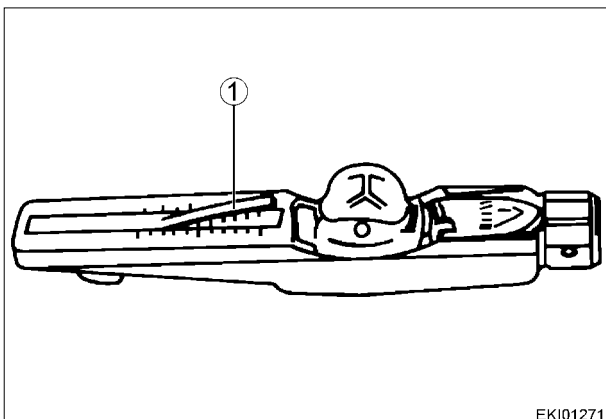
Grease the greasing point.



**Alternator left**

**Checking Powerbelt condition**

- Check belts for cracks, oiling-up, and signs of overheating and wear.
- Replace damaged belt.

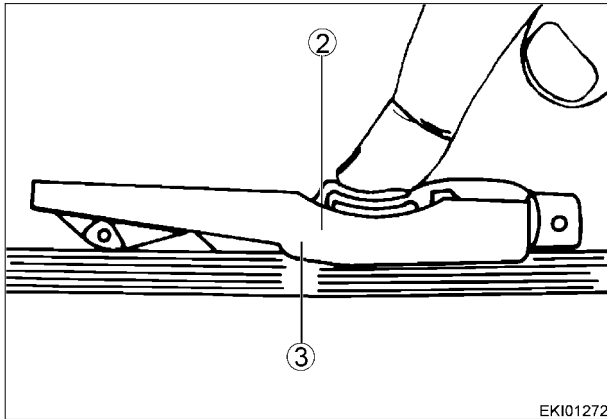


**Checking tension**

For checking V-belt tension, use V-belt tension gauge.

- Press indicator arm (1) in the scale.

<b>Fav 900</b>	<b>Engine / Short block</b> <b>Power - belts</b>	<b>G</b>
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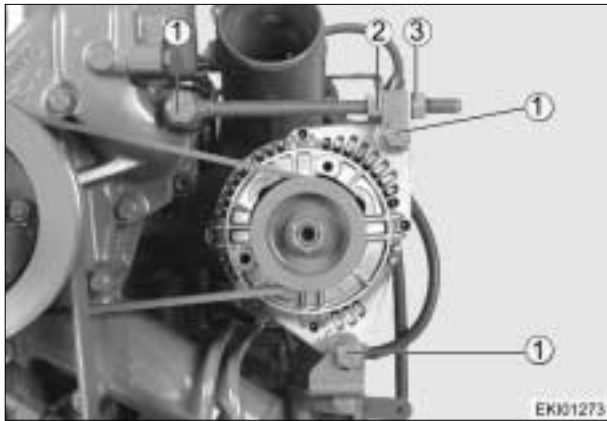


- Position tension gauge (2) in the center between the generator pulleys and the crankshaft.
  - Slowly push pressure pad (3) down until the spring snaps out audibly and the indicator arm moves upwards.
- Continued pressing after the spring has snapped out will result in an incorrect reading!

**Determining the span force**

Span forces measured on the kg-scale of instrument	
Belt width	Poly V 790 K 4
Newly fitted	
When fitting	60
After 10 minutes running	45-50
Minimal span force	30
Re adjust tension if minimum tension is reached.	40

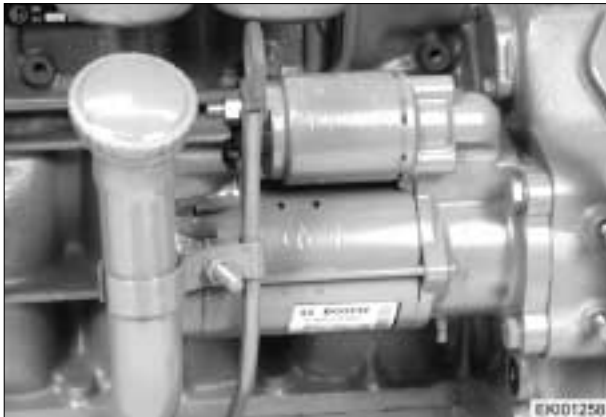
- Read tension force at the point of intersection of the upper side of the indicator arm (1) and the scale.
  - Before reading the values make sure that the indicator arm remains in its position.
- If the value does not agree with the specified setting, the Powerbelt tension must be reajusted.



**Tensioning / replacing powerbelt**

- Release clamping bolts(1).
  - Loosen counternut (3).
  - Adjust checking nut (2) for correct powerbelt tension.
  - Retighten counternut and clamping bolts.
- When replacing powerbelts, slacken checking nut (3) and swing alternator inwards.

<b>Fav 900</b>	<b>Engine / Short block</b> <b>Removing and refitting the starter engine</b>	<b>G</b>
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**Removing the starter**

Disconnect earth terminal from battery.  
Remove cables terminal 30 (thick cable) and terminal 50 from the starter.



Unscrew the screws and a nut from the starter motor flange and remove the starter motor.  
Clean exterior of starter engine and check for damage.

Check flywheel ring gear for wear and damage by actuating the crankshaft by hand.  
Check in particular the points which final engine oscillations occur ; i.e. when turned off, there are points where the engine comes to rest.  
The starter engine pinion engages in these positions during start up.  
On 6-cylinder engines these points are staggered by 180° ; i.e. there are 3 points.  
To replace the starter ring gear see chapter 2000 Reg G.

**Refitting the starter**

Refit the starter in reverse order of removing, making sure cables are connected correctly.  
Observe torque values.  
Reconnect battery.  
On completion, check starter for correct functioning.

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26.02.2001	a	1/1	2210	G	000014



<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Short block</b> <b>Removing and refitting generator</b></p>	<p align="center"><b>G</b></p>
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**Generator right**  
**Removing generator**

Disconnect earth cable from the battery.  
Remove connections B+, D+ and W from the generator.



Remove V-belts.  
Unscrew bolts (arrows).  
Remove generator.



**Refitting generator.**

- Refit the generator.
- Check, and if necessary, correct cable connections.
- Tighten fixing bolts to specified torque.
- Tension V-belt.
- Fixing cables on generator.

After completion check generator for correct functioning.

Check voltage and charging current .

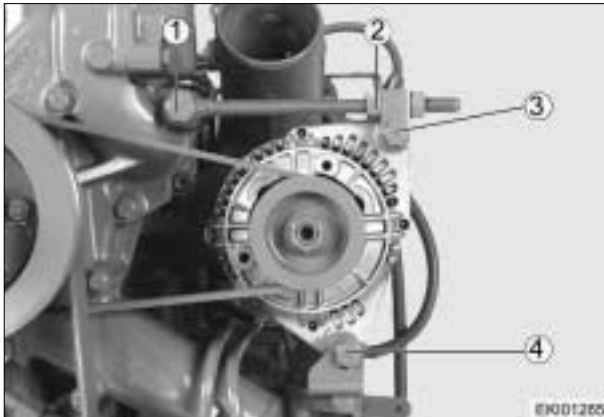


**Remove generator, left**  
**Remove generator**

Disconnect earth cable from the battery.  
Remove connections B+, D+ and W from the generator.

Date	Version	Page	Removing and refitting generator	Capitel	Index	Docu-No.
26.02.2001	a	1/2		2210	G	000015

<b>Fav 900</b>	<b>Engine / Short block</b> <b>Removing and refitting generator</b>	<b>G</b>
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Loosen bolts(1), (3) and (4) from the generator and unscrew tensioning nut (2).

- Push generator toward the engine and take off the power belt.
- Unscrew the upper screws(3).
- Unscrew the lower screws (4).
- Remove generator.
- Check screw and guide for damage (i.e. cracks, bends, etc.) replace if necessary.



#### Refitting generator

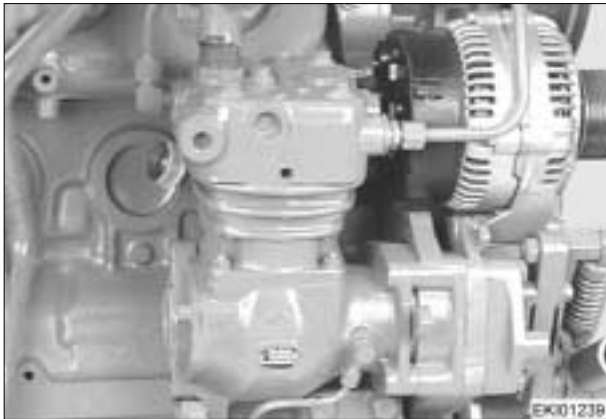
- Refit the generator.
- Check, and if necessary, correct connections.
- Tighten fixing to specified torque.
- Tension V-belt.
- Fixing cables on generator.

After completion check generator for correct functioning.

Check voltage and charging current .

Date	Version	Page	Capitel	Index	Docu-No.
26.02.2001	a	2/2	2210	G	000015

<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Short block</b> <b>Removing and refitting air compressor</b></p>	<p align="center"><b>G</b></p>
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**Removing the compressor**

Remove hydraulic pump or rear end cover,  
Unscrew fan frame support bracket.  
Remove oil feed line, air intake line and  
compressed-air line.

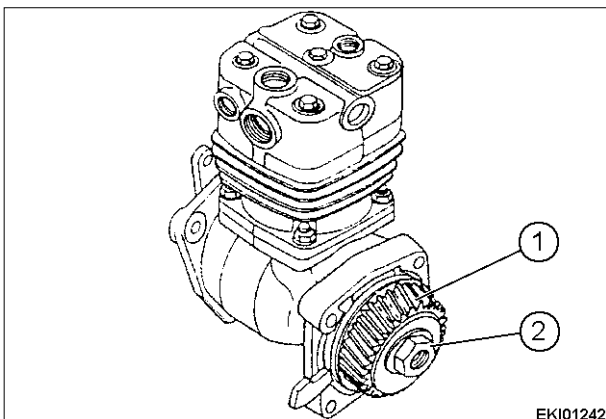
**Note:**  
**For ease of assembly, mark position of  
eccentric bearing support on timing case.**



To remove air compressor :



Unscrew the four screws and remove  
compressor.



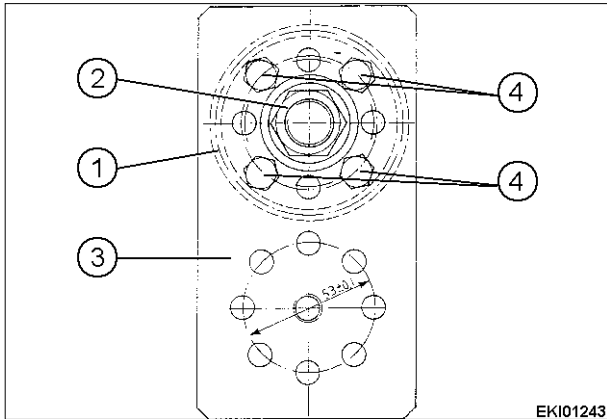
**Replace compressor**

To remove compressor drive gear (1) loosen nuts  
(2).

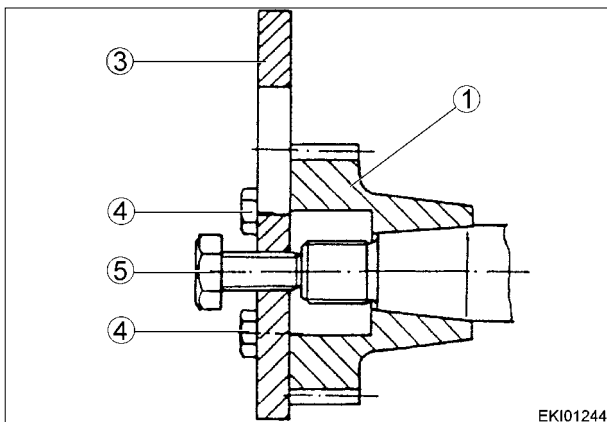
**Note:**  
**Do not swage compressor drive gear into a  
vise (Even with soft jaws) for tightening or  
loosening the nut of the compressor drive  
gear. Risk of damaging drive gear!**  
**For this reason, use mounting plate (3)  
(Special Tool), as shown.**

Date	Version	Page	Removing and refitting air compressor	Capitel	Index	Docu-No.
23.2.2001	a	1/5			2210	G

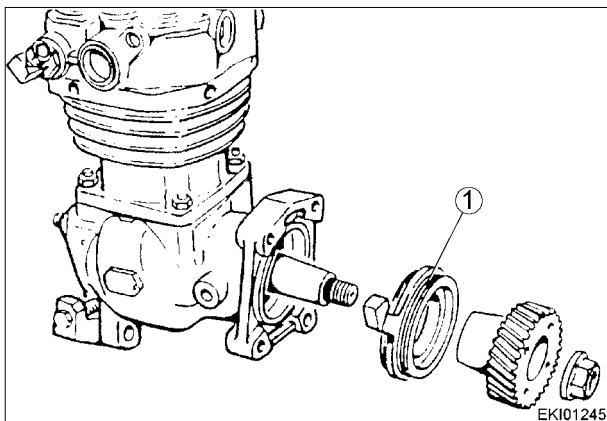
<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Short block</b> <b>Removing and refitting air compressor</b></p>	<p align="center"><b>G</b></p>
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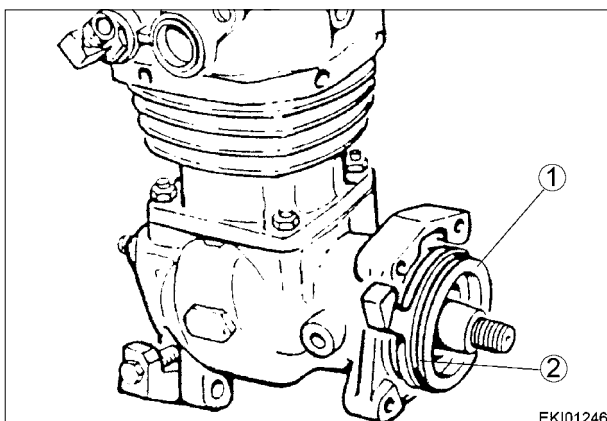
Tighten compressor drive gear (1) with 4 screws (4) on mounting plate (3) to 30 Nm (22.13 lbf-ft).  
Loosen nut (2) .  
Press out drive gear, fit mounting plate (3) with 4 screws (4) at the bottom side of the drive gear (2).



Screw (5) to be screwed into central threaded hole until drive gear comes loose.  
Remove drive gear and mounting plate.



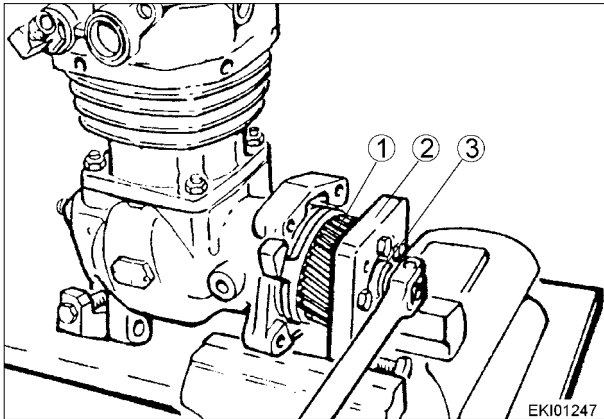
Release eccentric flange (1) from compressor body with a soft hammer.  
Remove flange from body.  
Unscrew connecting fittings of coolant as well as of compressed air.



Clean eccentric flange (1) .  
Replace and put silicon grease on O-Rings (2) .  
Put flange (1) into compressor body.

Date	Version	Page	Capitel	Index	Docu-No.
23.2.2001	a	2/5	<b>2210</b>	<b>G</b>	<b>000013</b>

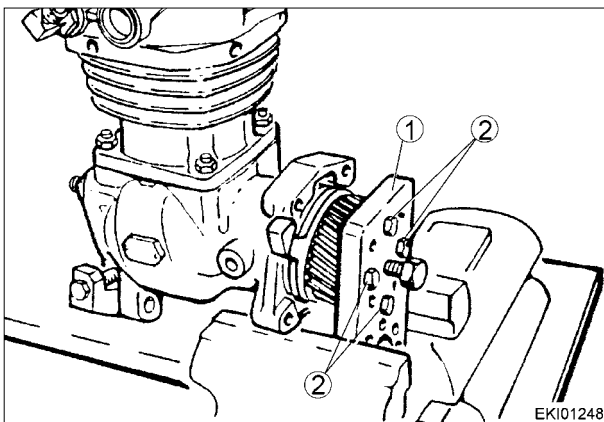
<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Short block</b> <b>Removing and refitting air compressor</b></p>	<p align="center"><b>G</b></p>
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Place compressor drive gear (1) onto compressor crankshaft using mounting plate (2) (Special Tool).

**Note:**  
**Drive gear must be mounted free of grease or oil.**

Tighten drive gear nut (3) at 200-250 Nm (148 - 184 lb-ft.).



Remove screws (2) of mounting plate (1) out of drive gear.

Remove mounting plate.

Screw and tighten connection fittings for coolant and compressed air using new gaskets into the cylinder.



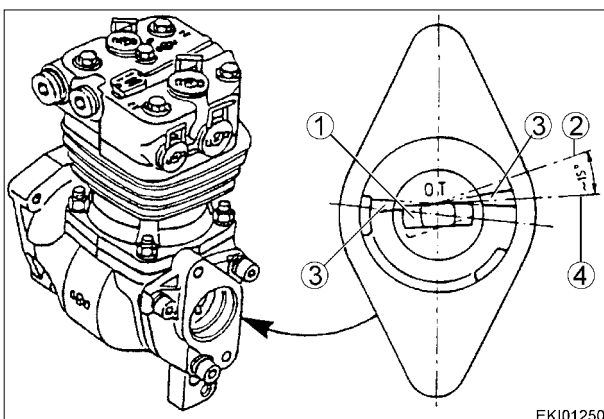
**Refitting the compressor**

Thoroughly clean sealing faces in compressor control timing case cover.

Use new gaskets and Oil O-rings with silicon oil. O-Rings on eccentric flange must be replaced and greased with silicon oil.

Position flywheel into "TDP" position.

Place lever from the compressor excenter flange onto the highest position.

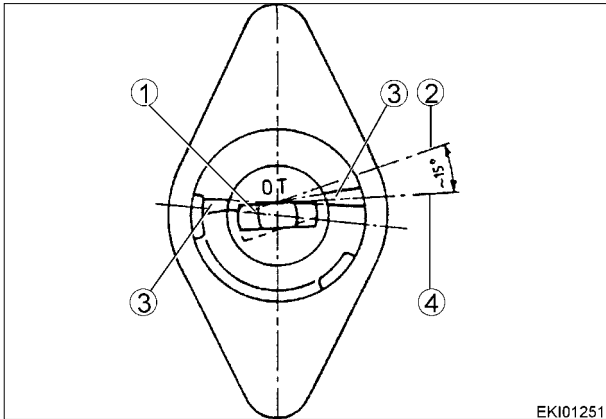


Position compressor crankshaft in such a manner that "TDP" mark on top and the upper edge of the drive fork (1) in position (2) remains about 15° before the unmachined lowlaying part (3) .

Place compressor into timing case using a new O-Ring .

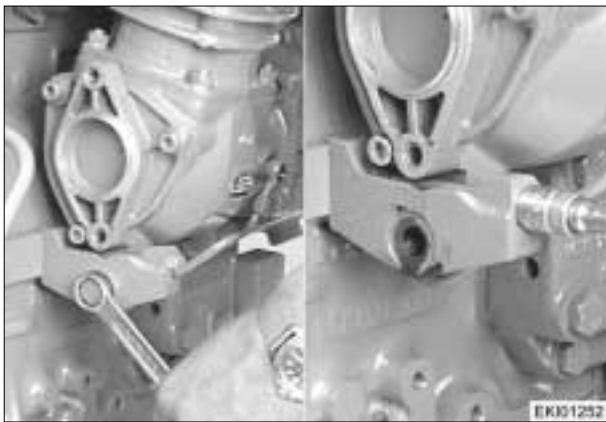
Date	Version	Page	Removing and refitting air compressor	Capitel	Index	Docu-No.
23.2.2001	a	3/5		2210	G	000013

<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Short block</b> <b>Removing and refitting air compressor</b></p>	<p align="center"><b>G</b></p>
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Due to the slanting teeth cut of the drive gear, the crankshaft will turn by approx 15° by placing the compressor into the timing case. In final position, the upper edge of the drive fork (1) must be in position (4) - flush with the unmachined lowlying part (3) .

If this position cannot be reached, the compressor must be removed and the crankshaft must be turned consequently.



Place 4 screws and tighten them in such a manner that the control eccentric can still be moved.

Screw in the screws of the rear side.

Place eccentric into the marked position of the compressor body.

Consult following pages for avoiding high wear by narrow clearance and excessive noise by excessive clearance, pinion clearance must be precisely adjusted.



Tighten in 3 steps the rear screws at the prescribed torque.

Connect coolant tubes.

Connect lubrication line, intake tube and compressed air line.

Complete coolant and check oil level within the engine.

Fit hydraulic pump or place the substitution cover.

Check all connections for leaks.



**Check pinion clearance**

Check can only be performed by completely mounted Timing Gear drive and by cold engine.

- Remove hydraulic pump or substitution cover.

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23.2.2001	a	4/5		2210	G	000013

<b>Fav 900</b>	<b>Engine / Short block</b> <b>Removing and refitting air compressor</b>	<b>G</b>
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- Mount dial gauge onto the rear part of the compressor.
- Place shaft extension with dial gauge lever onto drive fork and tighten it in such a manner that the scanning finger of the dial gauge rests without clearance on the gauge lever.
- Turn softly lever with slight pressure axially toward the compressor shaft from one end to the other.

The pinion clearance can be read on the dial gauge.

If the pinion clearance is not OK , then it needs to be adjusted.



**Checking backlash**

Check backlash between drive wheel and camshaft timing gear by manually turning the knurled collar.

Read off result on the gauge and compare with admissible value.

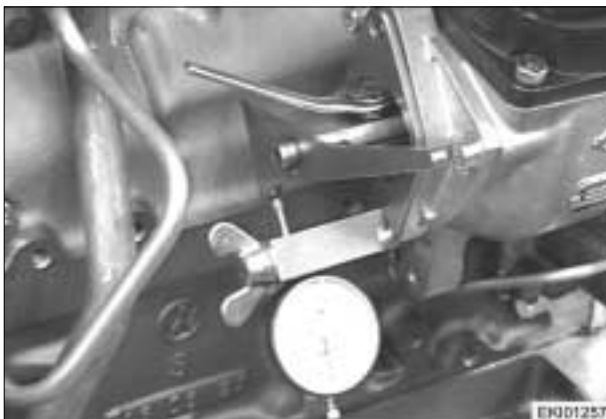
- Unscrew screws as long as the bearing flange and position over drive shaft until the compressor can be actuated easily by turning the flange on the lever .
- By turning the eccentric the pinion clearance must be adjusted between 0,1 - 0,15 mm .

**Note:**

**Position of level**

**upper = max clearance**

**down = minimum clearance**



- Screw in 3 front screws and rear screws in three steps at the specified torque.
- Refit oil feed line, air intake line and compressor air line.

Screw the frame support bracket.

Refit hydraulic pump or rear end cover.

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<b>Fav 900</b>	<b>Engine / Short block</b> <b>Replacing crankshaft front seal</b>	<b>G</b>
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**Removing vibration damper**

Remove fan frame.

Remove power belt.

Unscrew vibration damper, remove vibration damper.

Check vibration damper and washer for damage; replace if necessary.

Remove oil splash ring.

**Replacing crankshaft front seal**

Lever out rotary shafttt with special tool.



Apply multi-purpose grease to sealing lips.

Fit new shaft sealing ring.

**Note:**

**Do not damage sealing lips.**

Use press-in plate to drive shaft sealing ring into timing case until flush with recess .

**Refitting the vibration damper**

With surfaces free of grease and oil, position vibration damper including oil splash ring, insert screws and tighten to specified torque.

Refit power belt.

Place screws and tighten.

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<b>Fav 900</b>	<b>Engine / Short block</b> <b>Removing and refitting flywheel</b>	<b>G</b>
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**Remove flywheel**

Loosen screws, holding starter ring gear in place with a large screwdriver, if necessary.

Unscrew and remove two screws on opposite side, replace with two guide mandrels (special tool).

Unscrew all screws and remove clutch flange.

Using two M10, ease off the flywheel.

Remove clutch flange and disc.

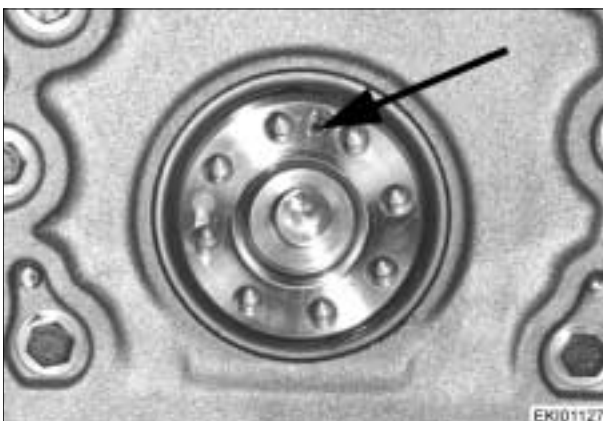
**Danger:**

**The flywheel is very heavy.**

**Use suitable hoisting gear.**



Clean and check flywheel.

**Refitting flywheel.**

Position flywheel on two guide mandrels, observing the correct alignment between centering pin (arrowed) and flywheel bore hole: Refit disc and clutch flange. Push on flywheel to end position.

Apply a small amount of oil to the screws.

Insert and tighten to specified torque, alternating sides.

Date	Version	Page	Capitel	Index	Docu-No.
15.02.2001	a	1/2	2210	G	000004

Fav 900	<p align="center">Engine / Short block</p> <p align="center"><b>Removing and refitting flywheel</b></p>	<p align="center"><b>G</b></p>
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**Replacing the starter ring gear**

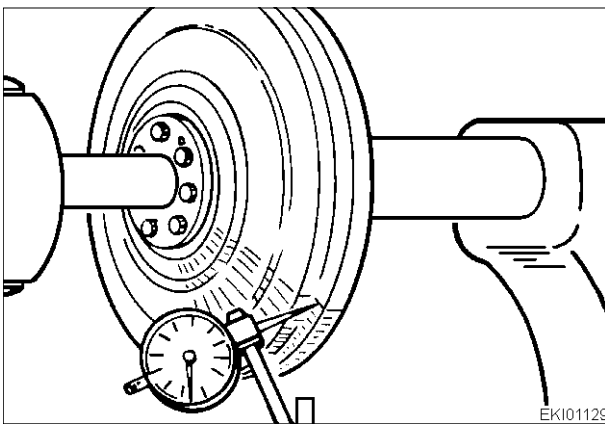
Remove fly wheel.

Drill starter ring gear and force open with a chisel.



**Warning:**

**Do not damage the flywheel.**



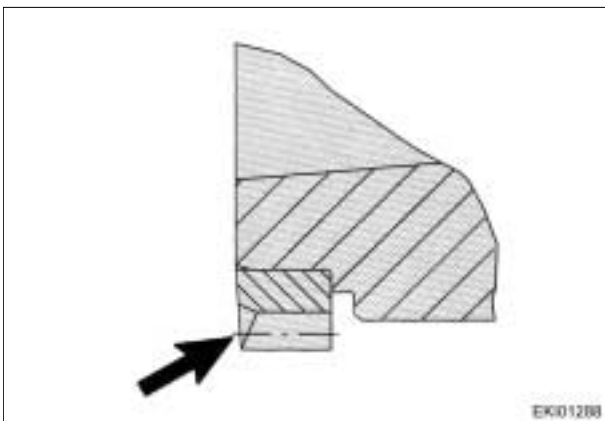
**Note:**

Since the maximal permissible axial run-out of the starter ring gear must not be exceeded, it is advisable to determine flywheel deviation at ring gear contact face, before ring gear is shrunk on. If this is in excess of the specified value, the flywheel must be replaced.

Clamp flywheel to the hub.

Fit dial gauge to contact face of starter ring gear.

Rotate flywheel several turns by hand and observe gauge reading.



Heat new starter ring gear to approx. 220° to 240°C (428° - 464°F) and press on as far as possible.



**Warning:**

**Watch the position of chamfer (arrowed).**

Check maximal deviation.

Date	Version	Page	Removing and refitting flywheel	Capitel	Index	Docu-No.
15.02.2001	a	2/2		2210	G	000004

<b>Fav 900</b>	<p align="center">Engine / Short block</p> <p><b>Removing and refitting crankshshaft seal (flywheel).</b></p>	<b>G</b>
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**Rermoving shaft seal**

Remove flywheel.  
Lever out sealing ring with special tool.

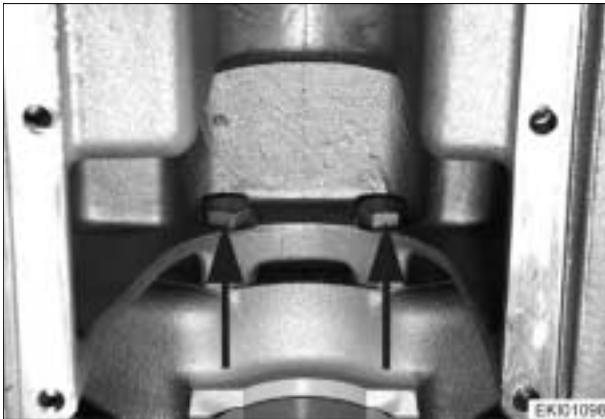


**Refitting the shaft seal**

Apply a thin coat of multi-purpose grease to lips of new sealing ring.  
Fit seal with open side facing the crankshaft using an expanding mandrel - drive in until properly aligned.  
Refit the flywheel.

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15.2.2001	<b>a</b>	1/1	<b>2210</b>	<b>G</b>	<b>000003</b>

<b>Fav 900</b>	<b>Engine / Short block</b> <b>Removing and refitting flywheel housing.</b>	<b>G</b>
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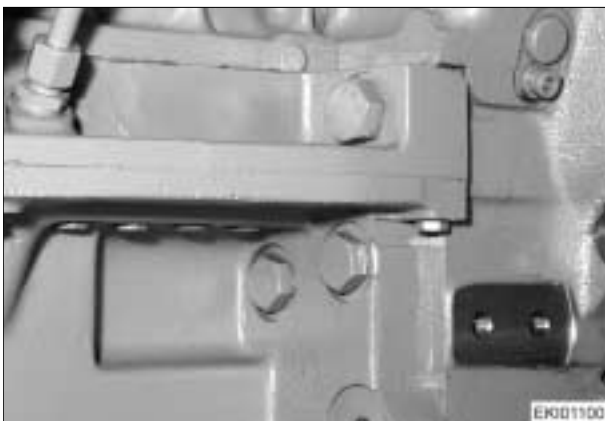


**Removing flywheel housing**

Unscrew and remove the two screws (M16).



Then remove the two screws (M8), screw into the flywheel housing.



Unscrew screws which are fitted right and left on flywheel housing.

Date	Version	Page	Removing and refitting flywheel housing.	Capitel	Index	Docu-No.
15.2.2001	<b>a</b>	1/2			<b>2210</b>	<b>G</b>

<b>Fav 900</b>	<b>Engine / Short block</b> <b>Removing and refitting flywheel housing.</b>	<b>G</b>
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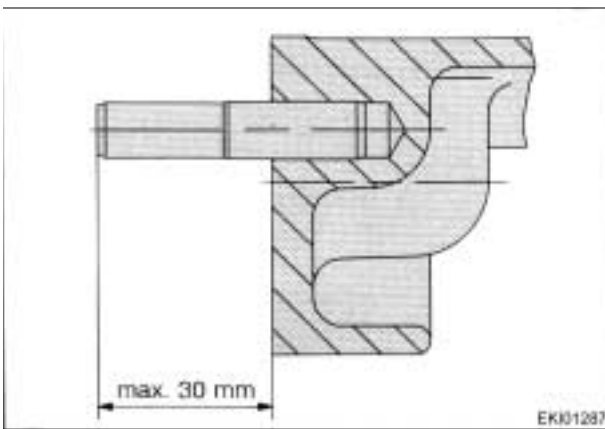
Remove starter.  
Remove flywheel.  
Unscrew and remove the fixing bolts.

**Note:**  
For easy assembly use two fairly long guide pins.

Remove flywheel housing.

**Caution:**  
The flywheel is very heavy.  
Use suitable hoisting gear.

Remove gasket residues from flywheel housing and crankcase.



**Note:**  
If the replacement guide pins are fitted, their projection must not exceed 30 mm: if this is exceeded, they will be in contact to flywheel through the housing.



**Refitting the flywheel housing.**

Coat flywheel sealing face with sealing compound "Terostat 63" and position on crankcase.

Insert screws (including those to the oil pan) and tighten to specified torque.

Refit flywheel.

Refit starter.

Date	Version	Page	Removing and refitting flywheel housing.	Capitel	Index	Docu-No.
15.2.2001	a	2/2		2210	G	000005

<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Short block</b> <b>Removing and refitting the timing case.</b></p>	<p align="center"><b>G</b></p>
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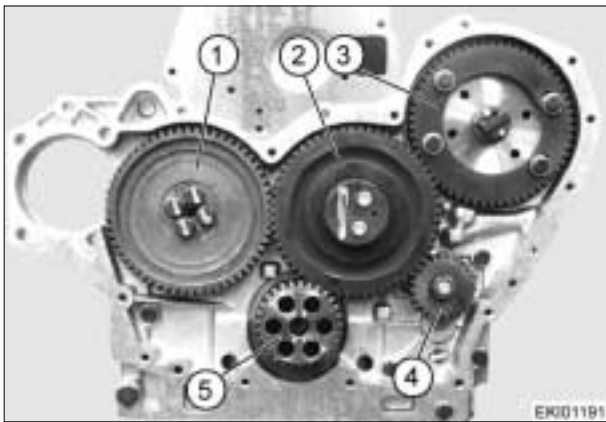


**Removing case cover**

Remove fan frame, vibration damper and air compressor.

Remove screws of timing case cover.

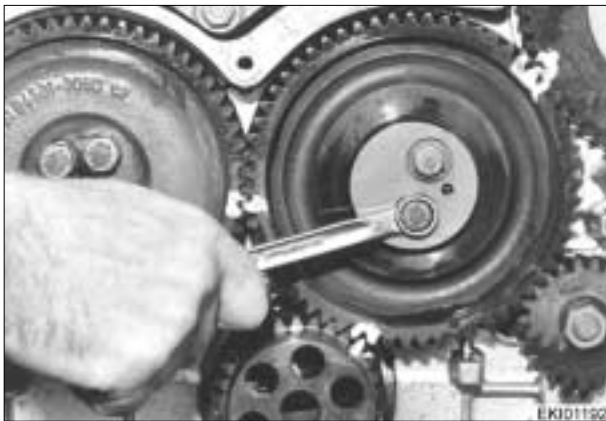
Remove cover.



1. Crankshaft timing gear (observe "2-2-2" on intermediate gear)
2. Intermediate gear
3. Injection pump drive gear.
4. Oil pump drive gear.
5. Crankshaft timing gear (observe "\*-\*-1" on intermediate gear).

**Note:**

**For easy reassembly mark timing gear appropriately before removing.**



**Removing intermediate gear**

Remove injection pump

Unscrew hex screw, remove thrust washer and pull off intermediate gear by hand.

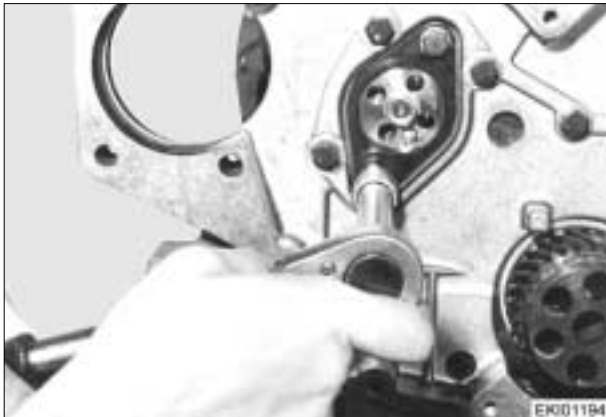


**Removing crankshaft timing gear**

- Lock up gear with a large screw-driver and remove screws. Avoid damage to the tooth flanks.
- Remove crankshaft timing gear.

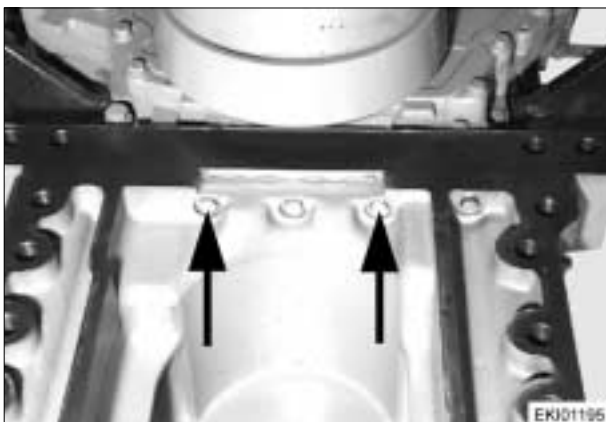
Date	Version	Page	Removing and refitting the timing case.	Capitel	Index	Docu-No.
20.2.2001	a	1/4		2210	G	000006

<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Short block</b> <b>Removing and refitting the timing case.</b></p>	<p align="center"><b>G</b></p>
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**Replacing crankshaft axial stop**

If necessary, replace crankshaft axial stop (thrust washer).

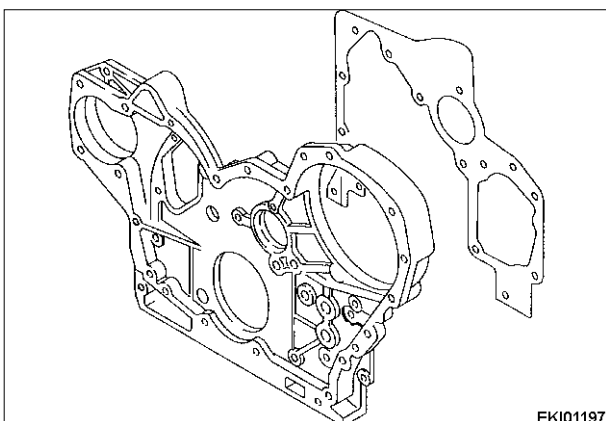


**Removing timing case**

Unscrew and remove screws (SW13) between oil pan and timing case.



Unscrew and remove all other screws.  
Remove timing case.



**Refitting timing case**

Fit new gaskets to crankshaft housing.  
Install timing case

**Note:**  
**Replacement studs of the injection pump must be inserted with "Loctite 648".**

Insert screws and tighten to specified torque.

**Note:**  
**Ensure correct fit of gasket.**

Date	Version	Page	Removing and refitting the timing case.	Capitel	Index	Docu-No.
20.2.2001	a	2/4			2210	G

<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Short block</b> <b>Removing and refitting the timing case.</b></p>	<p align="center"><b>G</b></p>
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**Refitting crankshaft timing gear**

Slide crankshaft timing gear onto the centering pin.

After fitting the intermediate gear tighten screws at the specified torque.



**Refitting intermediate gear**

Position intermediate gear.

Align camshaft and crankshaft with appropriate markings, insert intermediate gear.

**Note:**

**Position of crankshaft timing gear in relation to intermediate gear is marked with "\*-\*1".**

**Position of camshaft timing gear in relation to intermediate gear is marked with "2-2-2".**

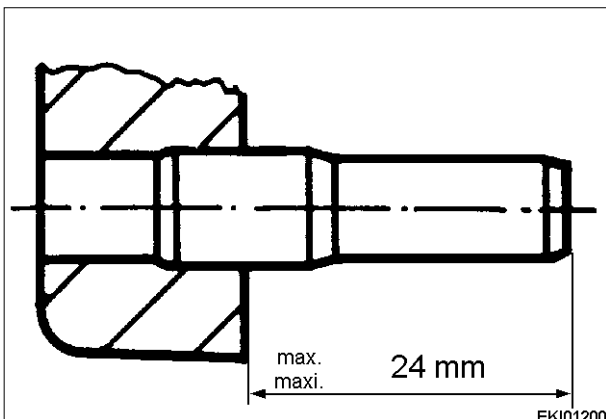


Fit thrust washer and insert screws .

Tighten screws of intermediate gear and camshaft gear at specified torque.

Refit injection pump gear.

Refit injection pump



**Note:**

**Replacement centering pin must be driven in as far as possible; maximal projection is 24 mm. Shorten if necessary.**

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<b>Fav 900</b>	<b>Engine / Short block</b> <b>Removing and refitting the timing case.</b>	<b>G</b>
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- Refit timing case cover with new gasket. Insert screws and tighten.
- Refit vibration damper, Centaflex-coupling, front axle support, trunnion, alternator, Visco-fan and Power-belt.
- Set valve clearance.
- Refit cylinder head cover with a new dry gasket, insert screws and tighten.

Date	Version	Page	Capitel	Index	Docu-No.
20.2.2001	<b>a</b>	4/4	<b>2210</b>	<b>G</b>	<b>000006</b>

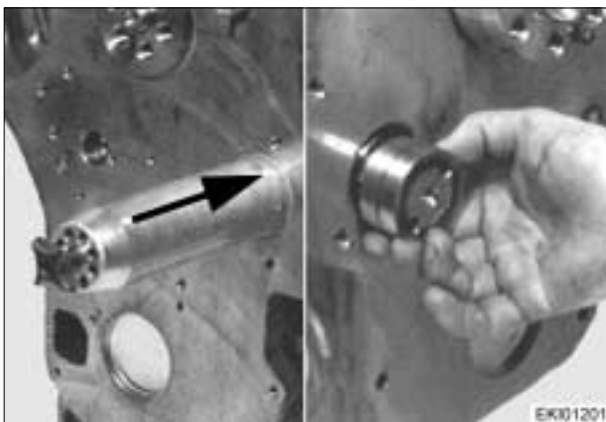
Fav 900	<p style="text-align: center;">Engine / Short block</p> <p style="text-align: center;"><b>Removing and refitting camshaft</b></p>	<b>G</b>
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**Removing camshaft**

- Remove oil pan
  - Remove timing case cover, idler gear and camshaft gear.
  - Remove flywheel housing
  - Remove rocker arm assembly and pushrods.
- Unscrew axial stop screws and remove axial stop.

**Note:**  
**Following photographs show the driving gears and timing case removed. The camshaft can be replaced without removing these parts.**

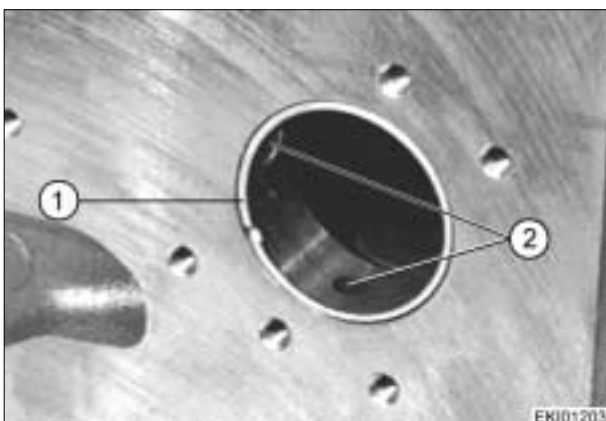


Put engine upside down in order to have the pushrods sliding toward the cylinder head in such a manner that they will not disturb the removing operation of the camshaft!

With a special mandrel push out camshaft from the timing case end, at the same time guiding it at the flywheel end.



Check tappets, replace if necessary.



**Replacing camshaft bearings**

Using a mandrel, drive out camshaft bushes.

**Note:**  
**Crankshaft must be removed.**

**Note:**  
**On the new bushes the notch must be facing the fan end, and the oil channels should be aligned with those in the timing case.**

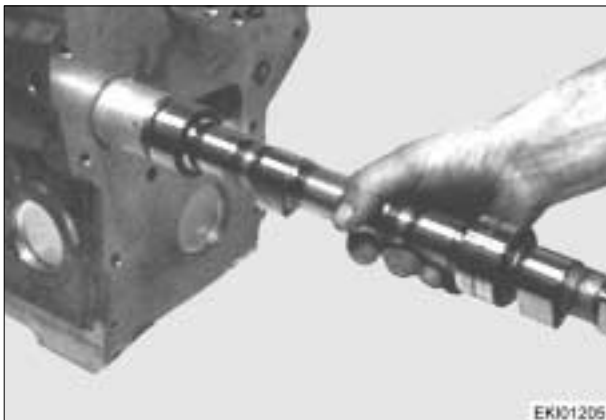
Date	Version	Page	Removing and refitting camshaft	Capitel	Index	Docu-No.
20.2.2001	a	1/2		2210	G	000007

Fav 900	<p style="text-align: center;">Engine / Short block</p> <p style="text-align: center;"><b>Removing and refitting camshaft</b></p>	<b>G</b>
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Using a mandrel and in new bushes towards fan until flush with the crankcase.

**Note:**  
**Bearing bushes must be machined to the required size. The crankcase must be cleaned with compressed air (oil channels) after this operation.**



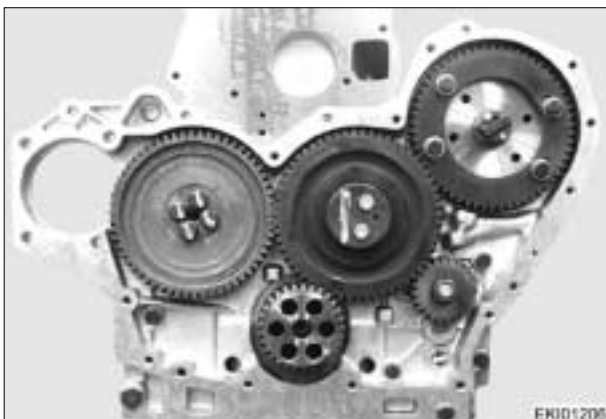
**Refitting the camshaft**

Slide guide mandrel into crankcase, insert camshaft in mandrel and refit camshaft into the crankcase.



Refit axial stop, insert screws and tighten at specified torque.

Measure end clearance; if necessary replace thrust washer.



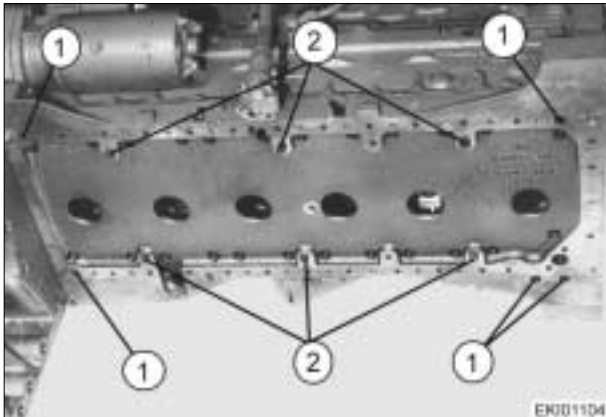
- Refit timing gear.
- Refit timing case.
- Refit oil pan and idler gear.
- Reconnect pushrod and refit rocker arm assembly.

Date	Version	Page	Removing and refitting camshaft	Capitel	Index	Docu-No.
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**Fav 900**

**Removing and refitting intermediate flange**

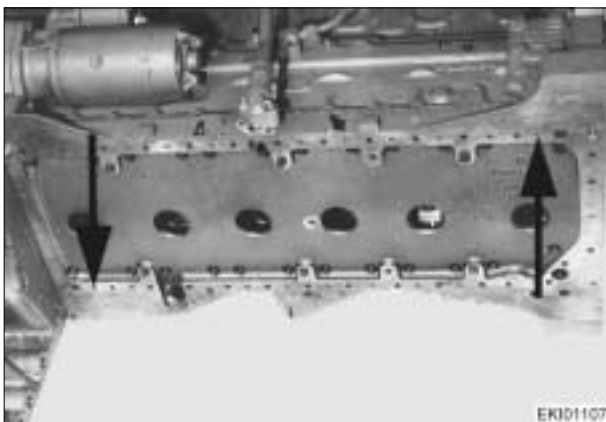
**G**



**Removing intermediate flange**

Unscrew and remove dispstick guide tube and undo oil filter cap.

Place a jack, unscrew and remove screws (1)



Insert 2 (M8x60) screws (arrowed) and carefully separate oil pan and intermediate flange.

Clean flange.

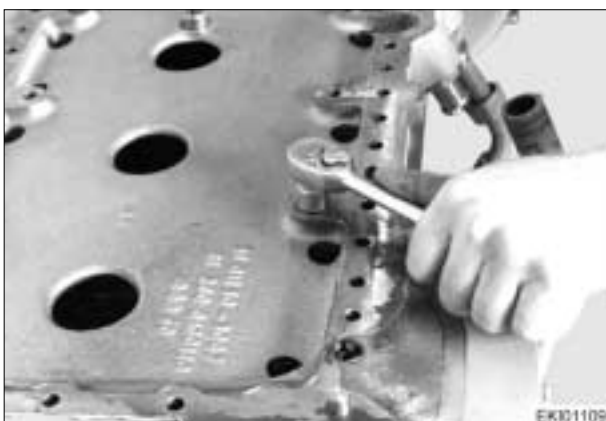
Remove all gasket residue from flange and crankcase.



**Refitting the intermediate flange**

Coat flange sealing surface with sealant Terostat 63.

Using a jack, slowly raise the flange to the crankcase and insert screws.



Tighten screws at the specified torque.

Refit oil pan and oil intake line.

Screw on the flange.

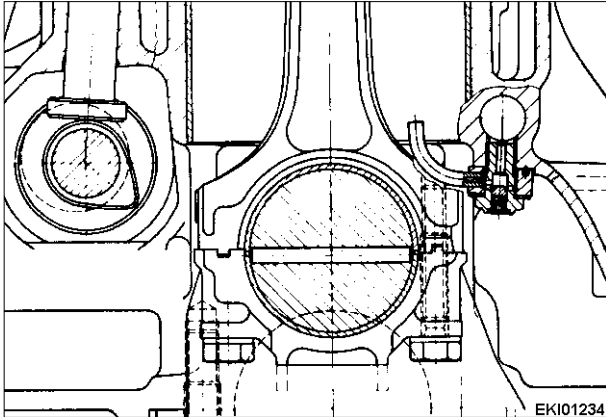
Date	Version	Page	Capitel	Index	Docu-No.
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Fav 900

## Engine / Short block

### Removing and refitting con-rod bearing shells

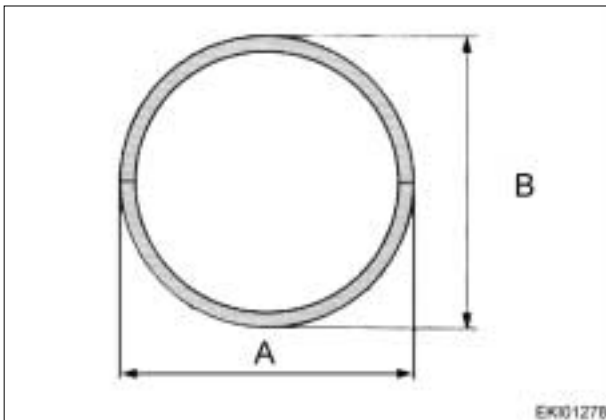
G



Remove piston and con-rod assembly.

**Note:**

**Con-rod bearing shells of open bearings can be used again as long as they produce perfect running.**

**Note:**

**When repairing con-rod bearing journals, use bearing shells of the relevant repair size.**

Check spread of new bearing shells :

Place bearing shells together on a level surface.

Measure and note dimension "A".

Measure and note dimension "B".

Spread= A - B



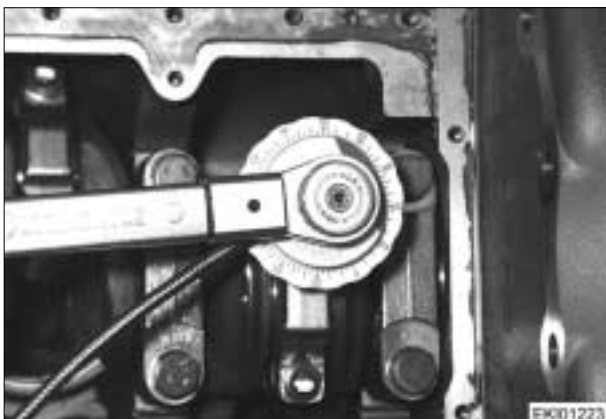
Fit new bearing shells to con-rod big-end and bearing caps.

**Note:**

**Avoid damaging the running-in coating of the shells.**

Apply a thin oil film to running surfaces of bearing shells.

Refit piston and con-rod assembly.

**Note:**

**Never re-use con-rod bolts.**

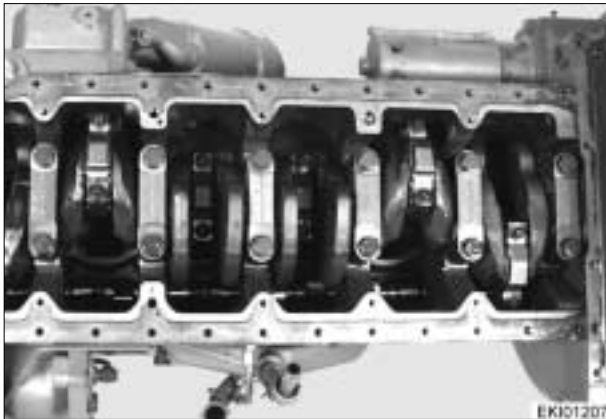
Tighten con-rod bolts only with bearings in place.

Insert new con-rod bolts and gradually tighten to specified torque.

Use torque angle indicator for final tightening process.

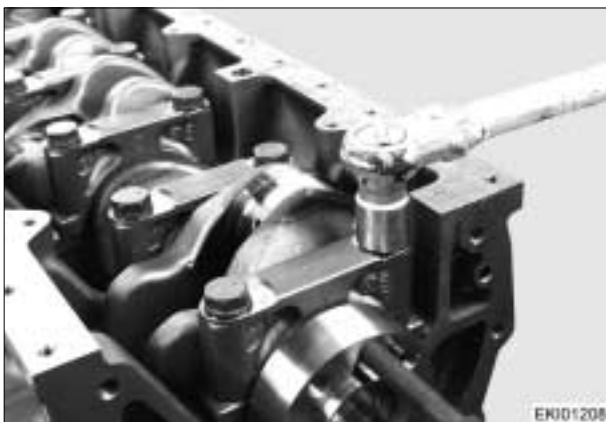
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<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Short block</b> <b>Removing and refitting the crankshaft</b></p>	<p align="center"><b>G</b></p>
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**Removing and refitting the crankshaft**

- Remove oil pan, oil line and idler gear.
- Remove timing case and flywheel housing.
- Remove cylinder head.
- Remove piston and con-rod.



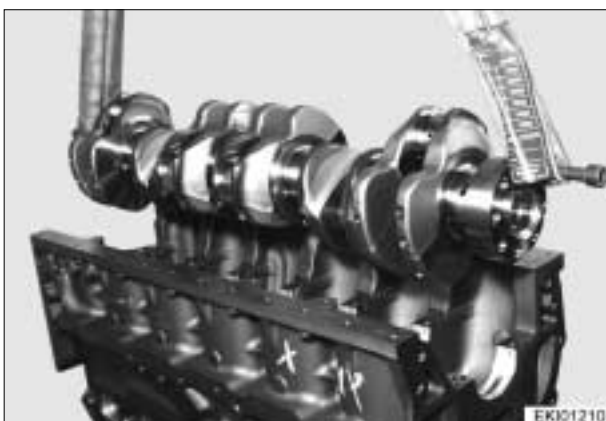
Gradually loosen screws of crankshaft bearing caps from the center outwards and remove: Take off bearing caps and arrange in order of assembly.

**Note:**  
**Bearing cap positions in relation to the crankcase are identified by numbers: bearing number 1 is at the fan end.**

Remove bearing shells from bearing caps. If they have not been marked, identify bearing shells and caps appropriately.



Remove the lower part of the axial stop washer.



Lift crankshaft out of crank case using a rope or leather strap.

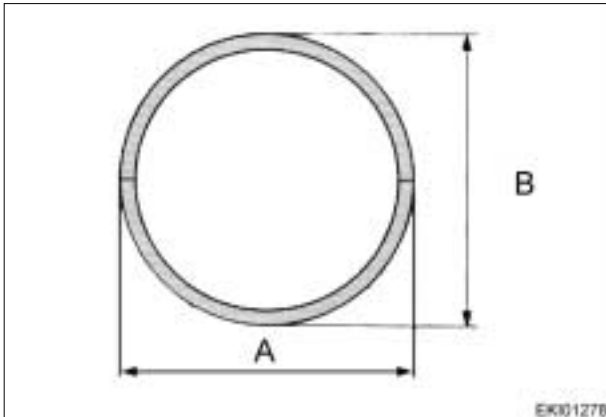
**Note:**  
**Do not use a steel cable as this could damage the bearing faces of the crankshaft journals.**

Remove bearing shells from crankcase. If they have not been marked, identify bearing shells and bearing caps appropriately.

Clean parts and check for wear; replace if necessary.

Date	Version	Page	<p align="center"><b>Removing and refitting the crankshaft</b></p>	Capitel	Index	Docu-No.
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<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Short block</b> <b>Removing and refitting the crankshaft</b></p>	<p align="center"><b>G</b></p>
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**Checking bearing shell spread**

Place bearing shells together on a level surface. Measure and note dimension "A", repeat for "B". Spread= A - B.



**Refitting the cranshaft**

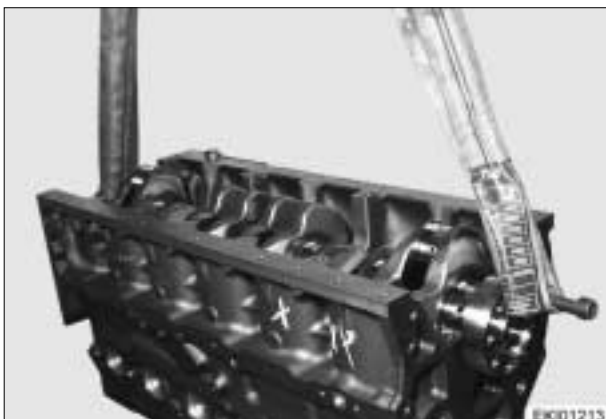
Clean oil ducts in crankcase and camshaft with dry compressed air.



Thoroughly clean bearing shells and journals. Insert bearings shells in crankcase, observing identification numbers.

Stick the upper part of the axial to washer with grease onto crankcase.

**Note:**  
**When using new bearing shells, observe relevant repair size.**



Lubricate running surfaces of bearing shells and fit crankshaft.

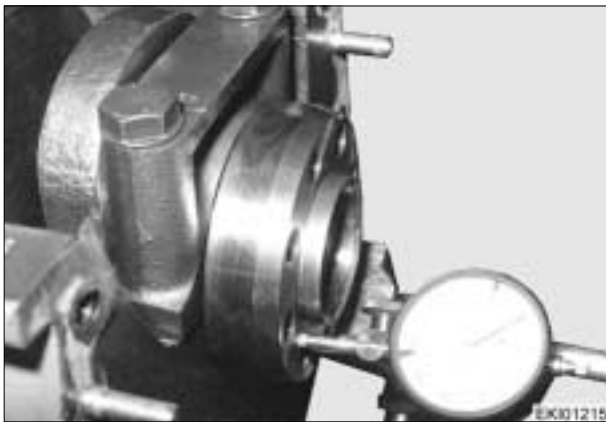
Date	Version	Page	Removing and refitting the crankshaft	Capitel	Index	Docu-No.
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Fav 900	<p align="center">Engine / Short block</p> <p align="center"><b>Removing and refitting the crankshaft</b></p>	<p align="center"><b>G</b></p>
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Match bearing caps to relevant bearing shells.  
 Lubricate running surfaces of bearing shells and fit caps.  
 Insert bearing cap screws and gradually tighten from the center outwards at specified torque.

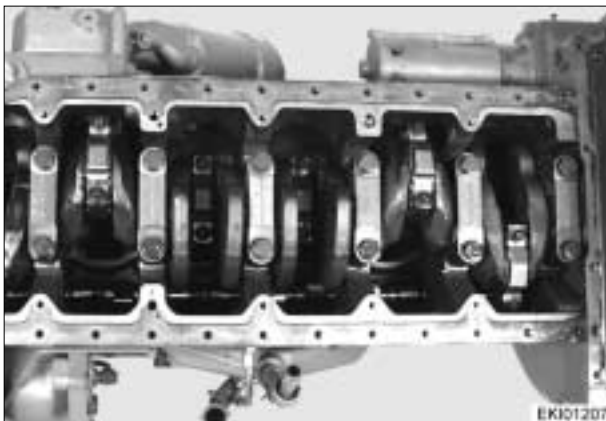
**Note:**  
**Faulty bearing caps cannot be replaced uniquely.**



**Checking end play**

**Note:**  
**The end play of the crankshaft is determined by the condition of the main bearing.**

- Position gauge holder with dial on the crankshaft.
- Press scanning tip of gauge onto flywheel flange or crankshaft.
- Press crankshaft back and forwards and read off end play on the dial gauge.
- If the maximal permissible end play is exceeded, all main bearings must be replaced.



**Assembling the engine**

- Refit piston and con rod assembly
- Check crankshaft for free running.
- Refit cylinder heads.
- Refit timing case, flywheel housing and flywheel.
- Refit oil pan, oil line and balancer gear.

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<b>Fav 900</b>	<b>Engine / Short block</b> <b>Removing and refitting con-rod</b>	<b>G</b>
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**Removing piston from con-rod**

- Remove oil pan, suction line and intermediate flange.
- Remove cylinder head.

Remove con-rod bearing cap bolts.



Remove con-rod bearing caps and bearing shells, applying light knocks with a plastic hammer if necessary.

**Note:**

**Con-rod bearing caps are numbered to match the big-end and crankcase. Arrange in appropriate order.**



Using a piece of hard wood, remove combustion residue (coking) from upper edge of cylinders.

**Note:**

**Do not damage cylinder running surface.**

Push con-rod on piston upwards.

**Note:**

**Do not damage cooling oil - nozzle.**

Place piston and con-rod next to the matching bearing cap. If available, use the special tray.

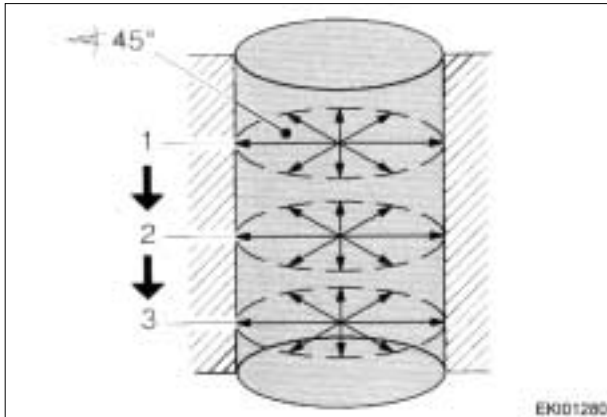
Carry out a visual check on piston and piston rings.

**Note:**

**Repair pistons with a 0,2; 0,4 and 0,6 (.008", .016" and .024") increase in compression height are available for remachined crankcase sealing faces.**

Date	Version	Page	<b>Removing and refitting con-rod</b>	Capitel	Index	Docu-No.
21.2.2001	<b>a</b>	1/5		<b>2210</b>	<b>G</b>	<b>000009</b>

<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Short block</b> <b>Removing and refitting con-rod</b></p>	<p align="center"><b>G</b></p>
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**Determining piston play**

Measure cylinder inside diameter with an internal micrometer at **three** levels (top to bottom) and radially at 45° to each other. make a note of the values. Verify diameter of the new piston from the piston crown. Determine diameter of used pistons with an external micrometer (measured from lower edge of piston at right angles to pistons axis; for dimension see Service data). Make a note, subtract piston diameter from largest measured cylinder diameter.

The resulting value is the piston clearance. If clearance ist excessive cylinder liner and piston must be replaced.



**Refitting piston and con-rod**

**Note:**

**If, for whatever reason, pistons need to be replaced, measure the piston diameter or read dimension on piston crown to find out if replacement pistons were fitted previously. If so, use oversize pistons.**

Apply a thin oil film to cylinder walls and pistons.

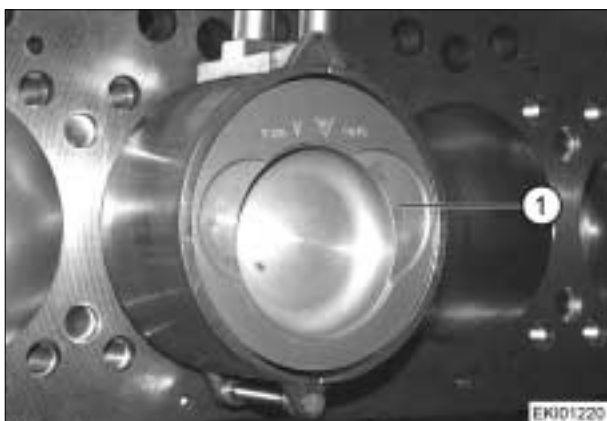
**Note:**

**Use new con-rod shells. Measure spread.**

Thinly oil con-rod bearing shells and insert them into con-rod big end.

Offset piston ring gaps by 120°,

Slide on piston ring clamp and compress piston rings.



Insert piston and con-rod onto the cylinder, making sure that piston, conrod and cooling oil nozzle are assembled correctly.

Date	Version	Page	Removing and refitting con-rod	Capitel	Index	Docu-No.
21.2.2001	a	2/5		2210	G	000009

<p><b>Fav 900</b></p>	<p>Engine / Short block  <b>Removing and refitting con-rod</b></p>	<p><b>G</b></p>
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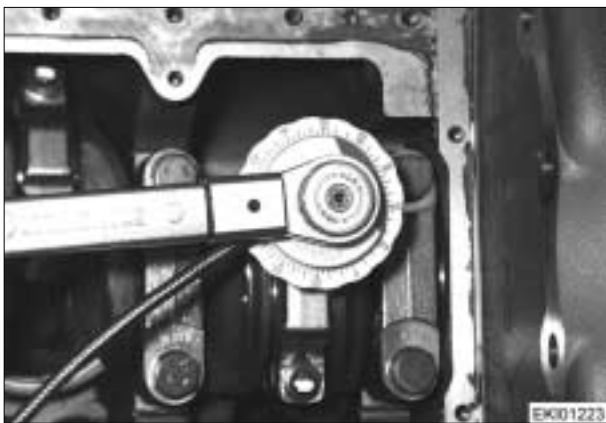


Guide con-rod and insert piston until big end makes contact with the bearing journal.



Fit con-rod bearing shells into bearing caps.  
 Fit bearing caps, making sure the numbers are matching.

**Note:**  
**Numbers on bearing cap and big end must be on the same side.**  
**Chamfered side (Arrow) on con-rod cap must show toward cooling oil nozzle.**



**Note:**  
**Never reuse con-rod bearing bolts .**  
 Insert new con-rod bearing bolts and gradually tighten to specified torque.  
 Use torque angle indicator for final tightening process.



**Removing piston from con-rod**

Remove piston with con-rod.  
 Clamp con-rod in a vise, using non-metallic jaws.  
 Remove piston pin circlips.

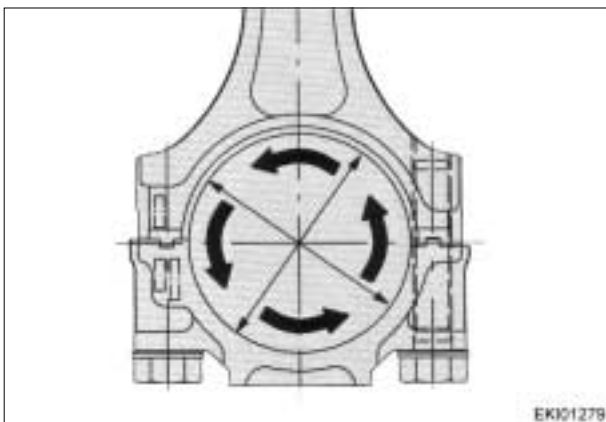
Date	Version	Page	Removing and refitting con-rod	Capitel	Index	Docu-No.
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<b>Fav 900</b>	<b>Engine / Short block</b> <b>Removing and refitting con-rod</b>	<b>G</b>
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Press out piston pin, securely holding the piston. Remove piston and deposit it safely.

**Note:**  
**If the con-rod needs replacing, use ready-to-fit new bush or reconditioned con-rod.**



**Measuring big-end con-rod bore**

Screw on con-rod bearing caps (without bearing shells).

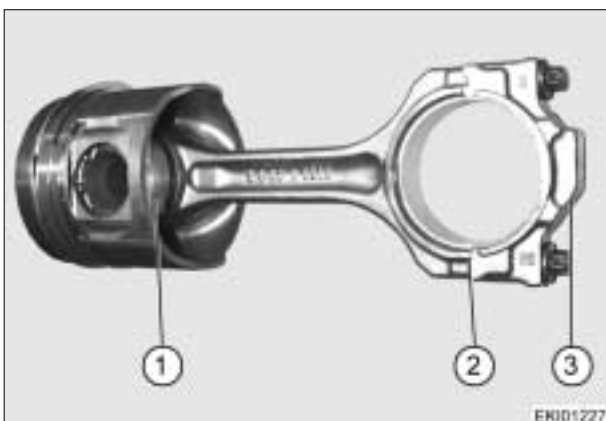
Measure bore diameter with an internal micrometer.

Replace con-rod if this is in excess of the permissible variation.



**Refitting piston to con-rod**

Fit piston to con-rod, inserting piston pin, and fit circlips.



When reassembling, make sure that piston, con-rod and cooling oil nozzles are assembled correctly.

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<b>Fav 900</b>	<b>Engine / Short block</b> <b>Removing and refitting con-rod</b>	<b>G</b>
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**Measuring the piston projection**

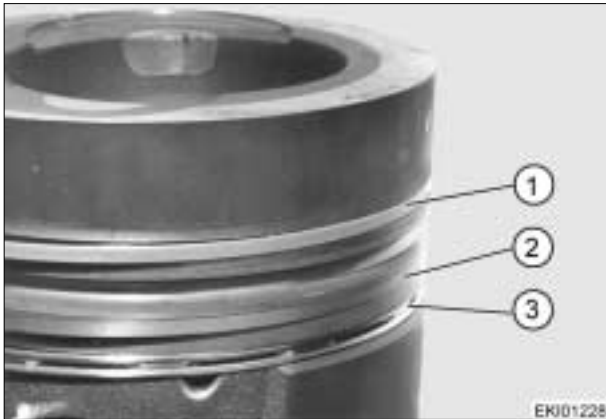
Remove the cylinder heads.  
 Turn relevant piston to TDC.  
 Position gauge holder with dial on crankcase sealing face.  
 Set gauge at "0".



Carefully move dial gauge holder, lifting the gauge tip at the same time.  
 Lower tip onto piston crown and check dial reading for piston projection.

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21.2.2001	<b>a</b>	5/5		<b>2210</b>	<b>G</b>	<b>000009</b>

<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Short block</b> <b>Removing and refitting the piston rings</b></p>	<p align="center"><b>G</b></p>
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**Piston ring arrangement**

1. Compression ring ( keystone ring)
2. Compression ring ( chamfered ring)
3. Oil scraper ring (D-ring)



**Removing piston rings**

Remove piston and con-rod assembly.  
Clamp con-rod in a vise, using non-metallic jaws.  
Set piston ring pliers to piston diameter.



Position pliers at piston ring gap and pry rings out of the piston ring grooves.

**Note:**

**The spring insert of the oil scraper ring causes greater tangential stress.**

Carefully clean piston ring with a small piece of wood.

Avoid damage to piston ring grooves.



**Checking end clearance**

Fit piston rings to respective cylinder and determine end clearance with a feeler gauge.

If this is excessive, piston rings must be replaced.

Date	Version	Page	Removing and refitting the piston rings	Capitel	Index	Docu-No.
22.02.2001	a	1/2		2210	G	000010

<b>Fav 900</b>	<b>Engine / Short block</b> <b>Removing and refitting the piston rings</b>	<b>G</b>
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**Refitting piston rings**

Using piston ring pliers, insert piston rings in relevant groove with "Top" facing upwards.



Using a feeler gauge, determine piston ring end play in the relevant piston ring grooves at several points.

If this is excessive, piston and piston rings must be replaced.

Date	Version	Page	Capitel	Index	Docu-No.
22.02.2001	<b>a</b>	2/2	<b>2210</b>	<b>G</b>	<b>000010</b>

**Fav 900**

**Engine / Short block  
Replacing cylinder liners**

**G**



**Checking cylinder liners**

Measure cylinder inside diameter with an internal micrometer at three different levels (top to bottom) and radially at 45° to each other: Make a note of these values.

Determine piston clearance.

If worn beyond a useful life, both piston and cylinder liners must be replaced.

**Note:**

**For the liner outer diameter an upper deviation of 0,5 mm (.020") is permissible.**

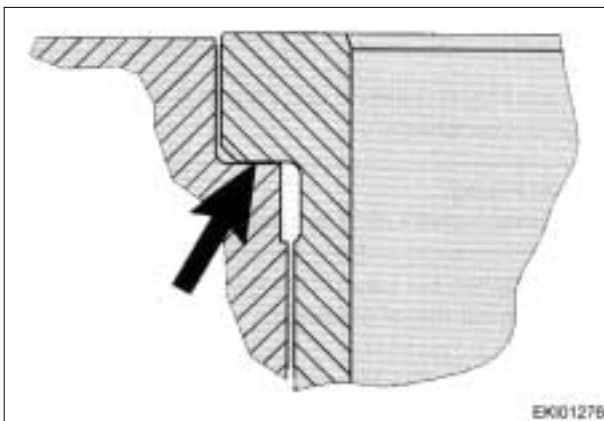


**Removing the cylinder liner**

Removing cooling oil nozzles chapter 2312 Reg G.

Usually the cylinder liner can be removed by hand.

If not loosen slip-fit liner with extractor tool and remove.



**Refitting the cylinder liner**

**Note:**

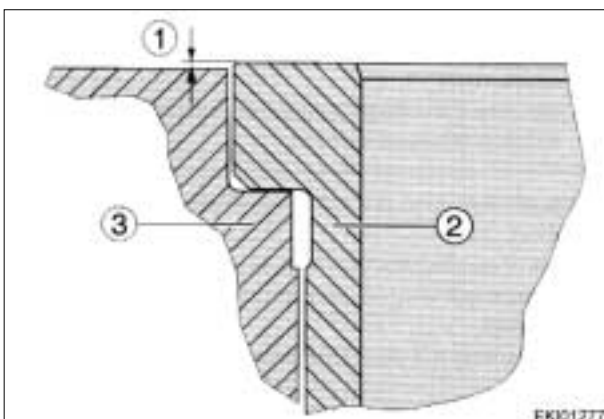
**Before fitting, clean seating.**

Position cylinder liner, making sure it is straight, and press in by hand.

The liner must make contact with the seat (arrowed).

The collar outer diameter should not be in contact with the bore.

Refit oil spray nozzle.



Check projection of liner (2) in relation to the crankcase(3).

Position gauge holder with dial at the crankcase sealing face.

Measuring liner projection (1) at 4 points.

Permissible deviation = 0,01-0,06 mm (.0004 - .0024").

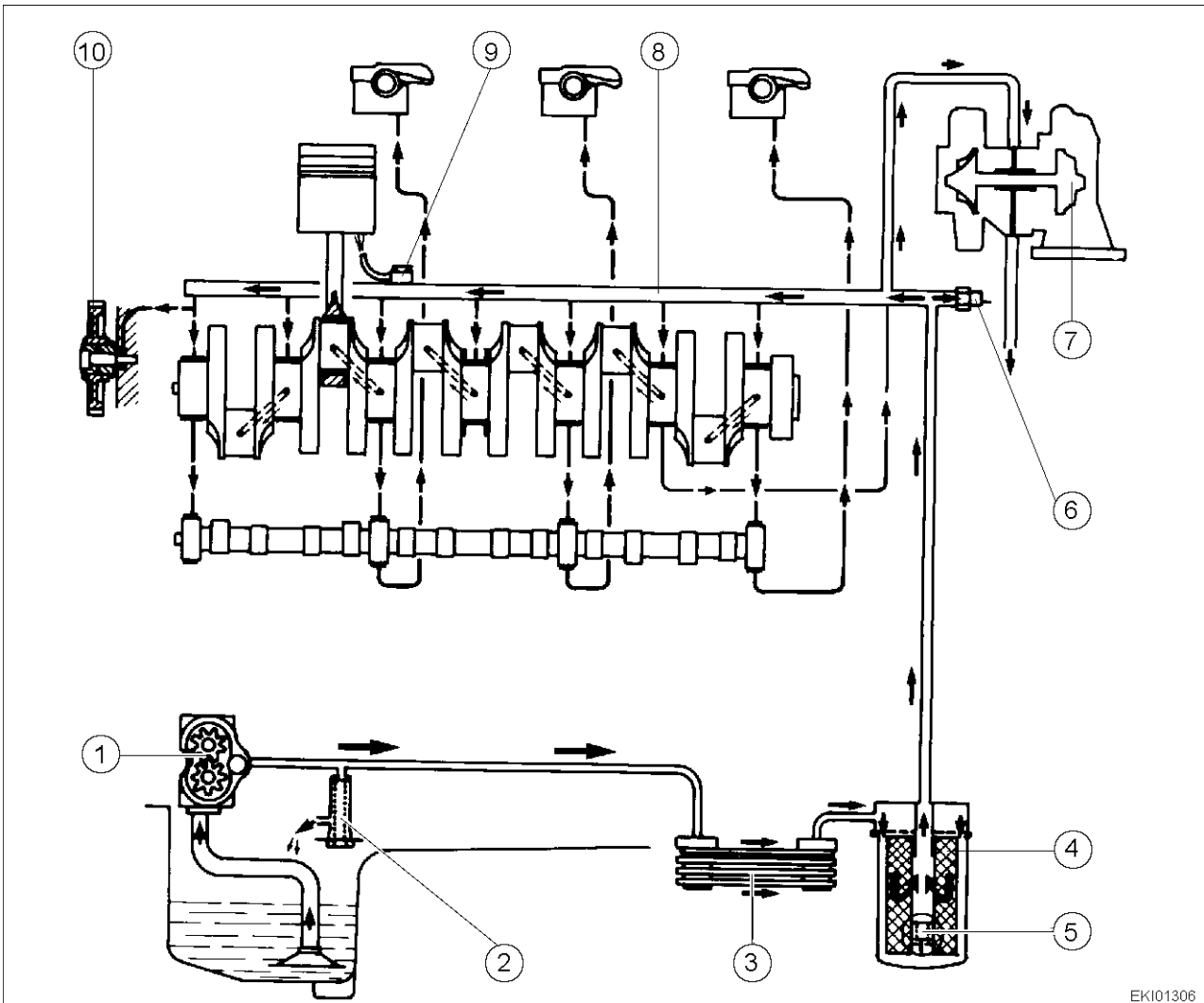
Date	Version	Page	Capitel	Index	Docu-No.
22.02.2001	a	1/1	2210	G	000012



**Fav 900**

**Engine / Lubrication  
Layout of engine lubrication**

**C**



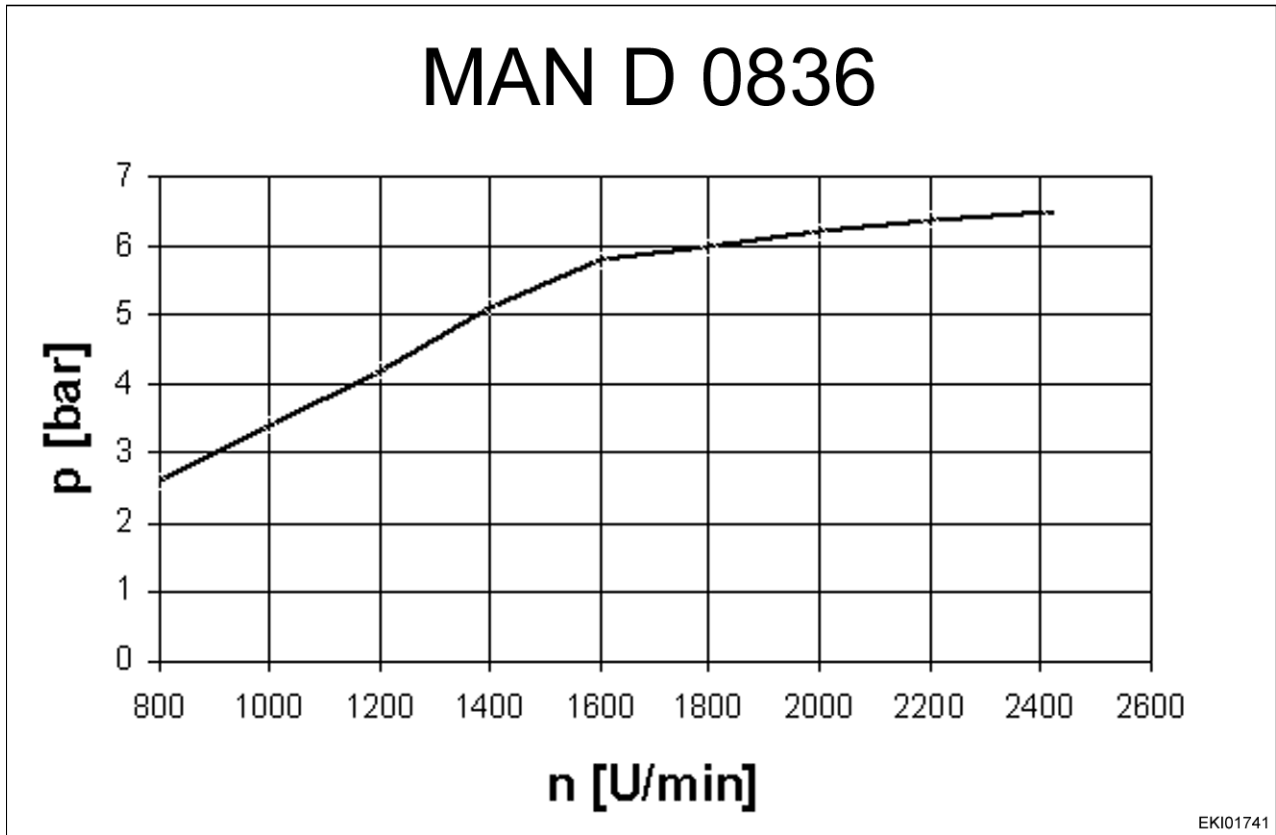
EKI01306

1. Lubrication Gear pump
2. Pressure relief valve
3. Oil cooler
4. Main stream oil filter
5. Oil filter Bypass valve
6. Oil pressure switch
7. Turbocharger
8. Main oil duct
9. Oil cooling nozzle
10. Intermediate timing gear

Date	Version	Page	Capitel	Index	Docu-No.
09/03/2001	a	1/1	2312	C	000001

Fav 900	Engine / Lubrication <b>Lubrication pressure test</b>	<b>E</b>
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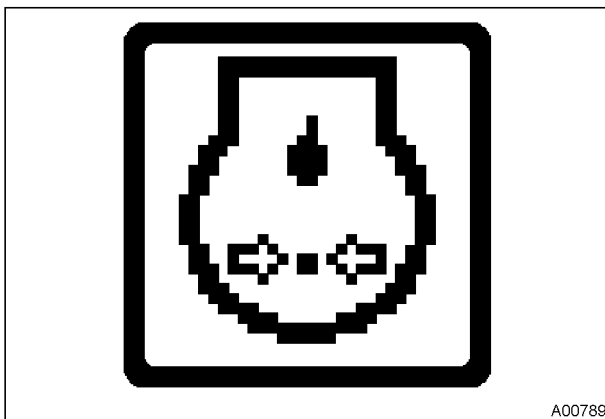
**Engine oil pressure p and engine speed n**



**Conditions for engine oil pressure measurement**

- Check oil level, top up if necessary.
- SHPD engine oil, viscosity 10 W-40
- Engine is at operating temperature (5 to 6 bars on A007 - instrument panel correspond to water temperature of approx. 70 - 80°C).

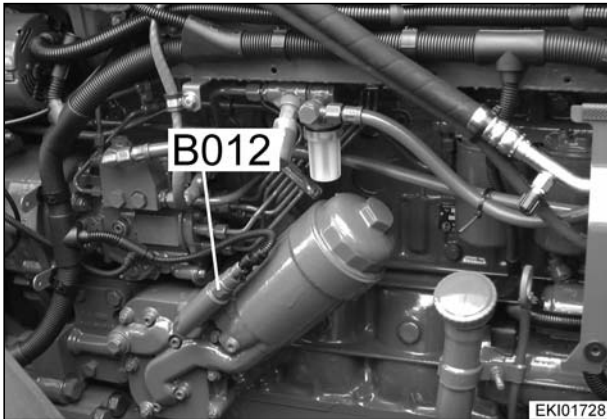
**Note:**  
Oil pressure values in new or overhauled engine



If the required pressures are not achieved at the respective engine speed, this warning display is shown on the A007 - instrument panel.

Date	Version	Page	Lubrication pressure test	Capitel	Index	Docu-No.
19.07.2001	a	1/3		2312	E	000002

<b>Fav 900</b>	<b>Engine / Lubrication</b> <b>Lubrication pressure test</b>	<b>E</b>
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B012 = Engine oil pressure sensor on oil filter bracket

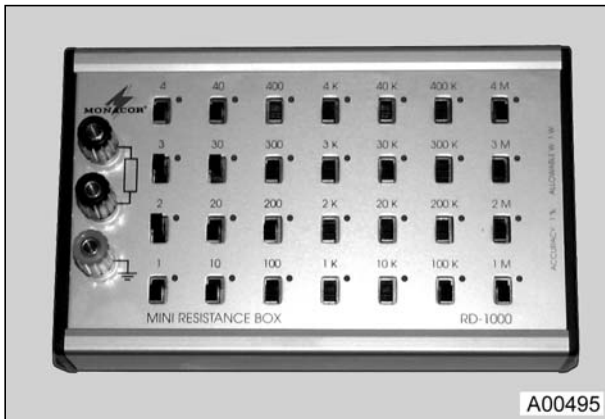


Required measuring equipment:  
 Attach M16x1.5 measurement adapter and pressure gauge to filter bracket.  
 Adapter cable (DIY using plug G 816.900.043.030). Multimeter (voltmeter)  
 Pin 1 = earth  
 Pin 2 = signal voltage  
 Pin 3 = + supply 12 VDC

Measurement	Pin	Target value	Pressure / bar	Note
Supply	3	12 VDC		Check miniature fuse in A013 - fuse (25)
Earth	1			
Signal	2	1.4	2.6	
		1.7	3.4	
		2.1	4.2	
		2.6	5.1	
		2.8	5.8	
		2.9	6.0	
		2.9	6.1	
		3.0	6.4	
		3.0	6.5	

**Note:**  
 All electrical readings +/- 10%

<b>Fav 900</b>	<b>Engine / Lubrication Lubrication pressure test</b>	<b>E</b>
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A00495

**Testing engine oil pressure warning on A007 - instrument panel:**

Disconnect electric cable from B012 - engine oil pressure sensor.

Connect adapter cable and resistor decade X 899.980.224.

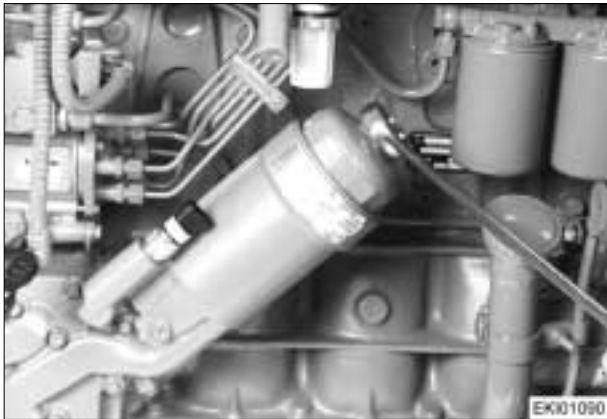
Run engine and actuate appropriate resistance.



EKI01742

Engine speed n rpm	Resistance R Ohm	Warning
800	25	Yes
1000	30	Yes
1200	34	Yes
1400	38	Yes
1600	42	Yes
1800	47	Yes
2000	51	Yes
2200	54	Yes
2420	61	Yes
All readings +/- 10%		

Fav 900	Engine / Lubrication Replacing oil filter	G
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**Replacing oil filter**



**Caution:**

**The cartridge is filled with hot oil.  
Danger of severe burns.**

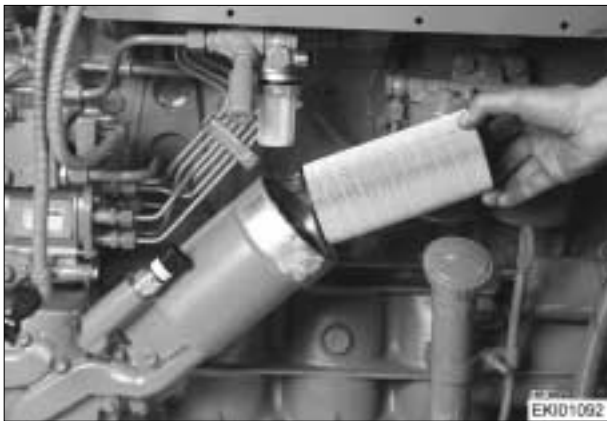
- Loosen filter lid 2 turns, wait about 5 minutes until all the remaining oil has drained from the oil filter housing in the oil pan.
- Remove cover completely .



- Pull out filter cartridge with the central guiding tube.

Collect dripping oil using an appropriate recipient below cartridge.

- Replace cartridge.
- Replace O-Rings of the central tube and on the cover.
- Put cover and filter cartridge in place and tighten at 25 Nm .



Fill up with engine oil and check for eventual leaks.

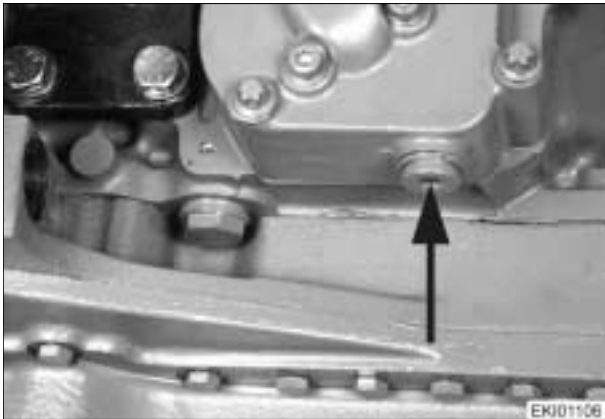
Check oil level.

**Note:**

**Used oil and cartridge are hazardous waste.**

Date	Version	Page	Replacing oil filter	Capitel	Index	Docu-No.
14.02.2001	a	1/1		2312	G	000001

<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Lubrication</b> <b>Removing and refitting oil cooler</b></p>	<p align="center"><b>G</b></p>
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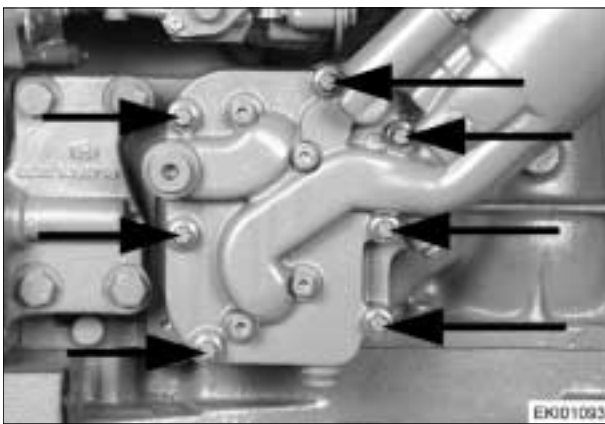
**Removing oil filter**

**Note:**

**Used oils and filter cartridges are hazardous waste! Dispose properly!**

Remove oil filter.

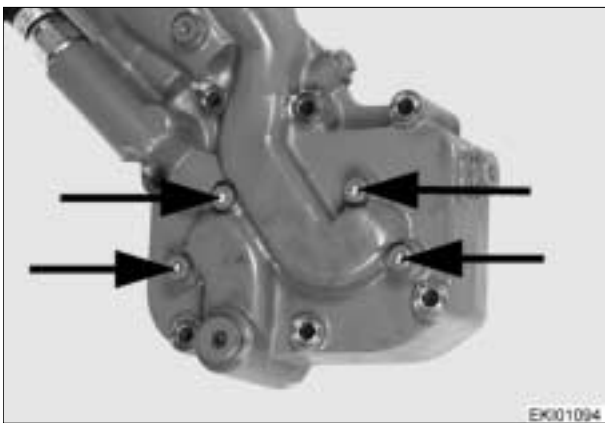
Unscrew drain plug (arrowed) from oil filter head and drain fluid into a container of adequate size.



Disconnect oil pressure sensor.

Remove screws from oil filter head.

Remove gasket residue from the sealing surfaces.



Remove screws from oil cooler.

Check oil cooler for damage; if necessary, replace.

Remove gasket residue from the sealing surfaces.

<b>Fav 900</b>	<b>Engine / Lubrication</b> <b>Removing and refitting oil cooler</b>	<b>G</b>
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**Refit oil cooler**

Fit oil cooler to the oil filter head with new gaskets. Position oil filter head on engine block, using new gasket. Place screws and tighten.



**Warning:**

**Make sure gasket fits properly.**

Refit oil filter:

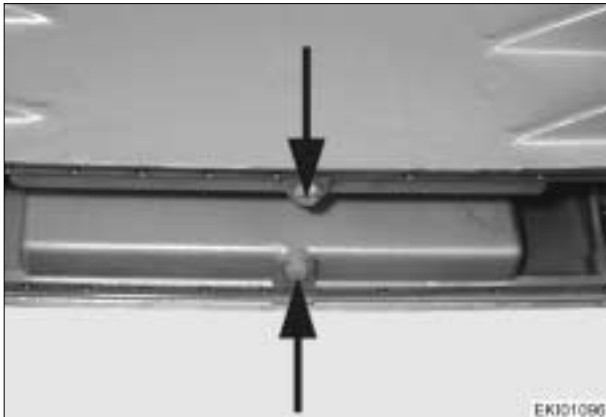
Screw in drain plug for coolant, using a new seal.

Connect sensor.

Check oil and coolant levels; top up if necessary.

Date	Version	Page	<b>Removing and refitting oil cooler</b>	Capitel	Index	Docu-No.
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<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Lubrication</b> <b>Removing and refitting oil pan</b></p>	<p align="center"><b>G</b></p>
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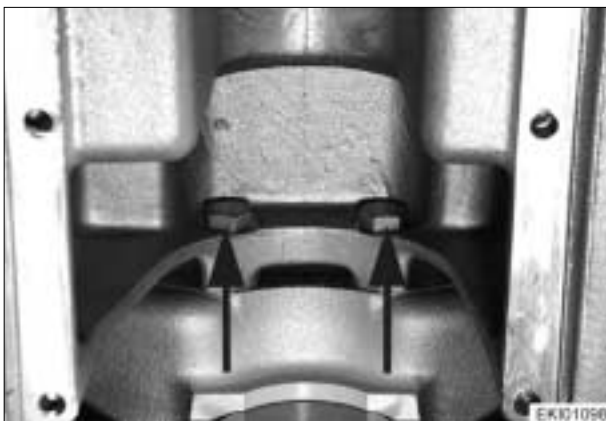


**Removing oil pan**

**Note:**  
**Used oils are hazardous waste. Dispose properly ! Respect safety regulations!**  
 Pull out dipstick and remove filling cover..  
 Remove drain plug (Arrows) and drain oil.  
 Use a recipient with sufficient capacity.



Remove screws (arrowed) at the front of the oil pan (water pump).



Remove two screws as shown.



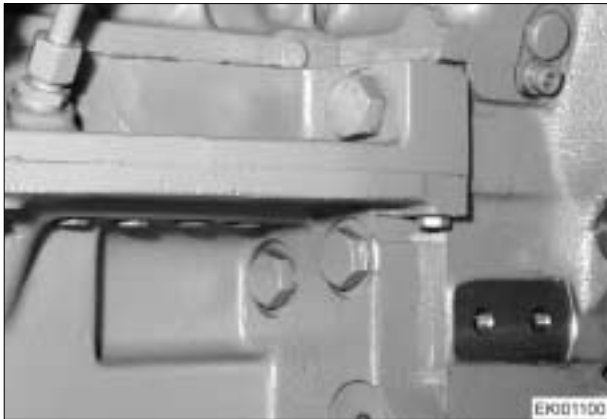
Then remove the two (M8) screws which are fully screwed ( not shown) into the flywheel housing.

**Note:**  
**When removing the oil pan it is essential to use a jack : The oil pan is extremely heavy (approx. 100kg).**

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Fav 900	<p align="center">Engine / Lubrication</p> <p align="center"><b>Removing and refitting oil pan</b></p>	<p align="center"><b>G</b></p>
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Remove screws from flywheel housing ( 3 on each side of engine).

Position jack with cradle inderneath the oil pan and remove all externally accessible screws from the oil pan.

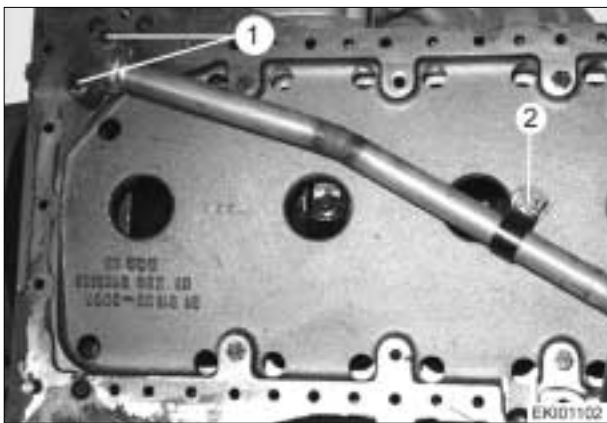
**Note:**

**For ease of reassembling, note the screws sequence (l.e. short / long).**



Insert two (M8\*20)screws at the rear of the oil pan (arrowed) and slowly press down the oil pan.

Clean the oil pan and remove all gasket residue from pan and intermediate flange.



**Removing the oil intake line**

Remove screws from the bracket (2)

Remove screws from intake pipe flange(1).  
Remove intake pipe and gasket.

**Note:**

**Avoid dirt contamination of the oil duct.**



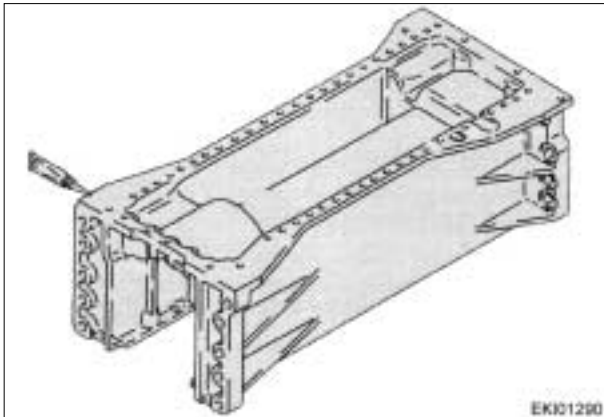
**Refitting oil intake pipe**

Position intake pipe and new gasket and insert screws by hand.

After fitting the bracket, tighten scews to specified torque. Replace O-rings.

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<b>Fav 900</b>	<b>Engine / Lubrication</b> <b>Removing and refitting oil pan</b>	<b>G</b>
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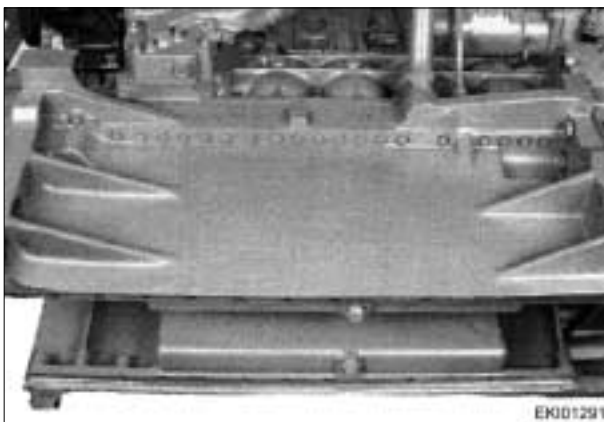


**Refitting the oil pan**

Coat oil pan sealing surface with sealing compound "Terostat 63" avoiding bore holes.

**Note:**

**The length of time between applying "terostat 6" and assembling must not exceed 20 minutes.**



Using a jack, slowly raise the oil pan to the intermediate flange and insert fscrews.

Tighten screws.

Fit clean drain plug together with new seal and tighten to specified torque.

Refill with new engine oil.

Check the oil pan for leaks

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<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Lubrication</b> <b>Removing and refitting oil pump</b></p>	<p align="center"><b>G</b></p>
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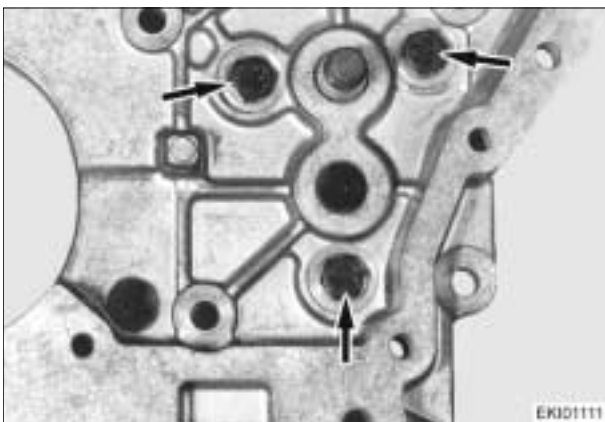
**Removing the oil pump gear wheel**

Remove the fan frame, Power belt, vibration damper, air compressor, generator and the timing case cover.

Unscrew nut of pump gear wheel, holding the crankshaft with a rotating device.

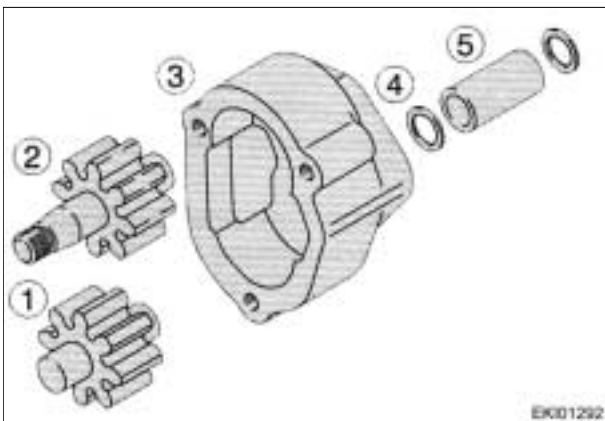
Remove washer and withdraw gear wheel from the cone using a puller.

Remove timing case.



**Removing the oil pump**

Remove screws (arrowed) and withdraw oil pump from the timing case.

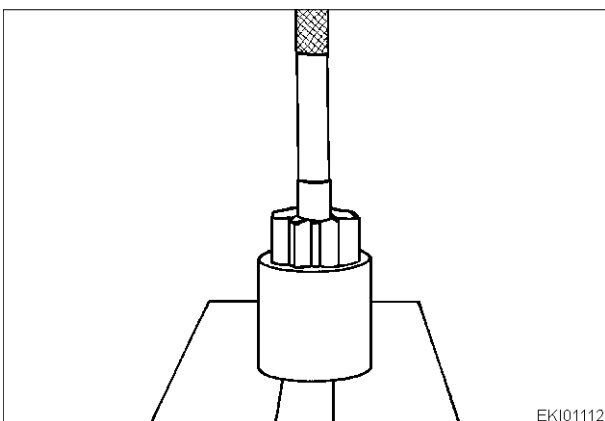


**Dismantling the oil pump**

Withdraw driving and driven gears (1 and 2) together with shafts and oil pipe from the housing (3).

Check gears and pump housing for wear.

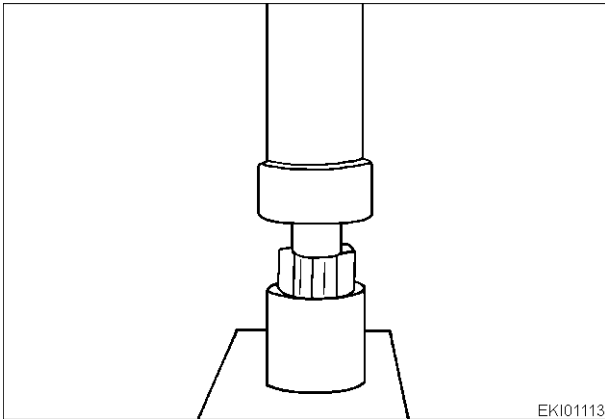
**Note:**  
**Always replace O-Rings (4).**



Insert gear wheel and shaft into the bush and push out with a suitable mandrel.

Date	Version	Page	Removing and refitting oil pump	Capitel	Index	Docu-No.
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Fav 900	<p align="center">Engine / Lubrication</p> <p align="center"><b>Removing and refitting oil pump</b></p>	<p align="center"><b>G</b></p>
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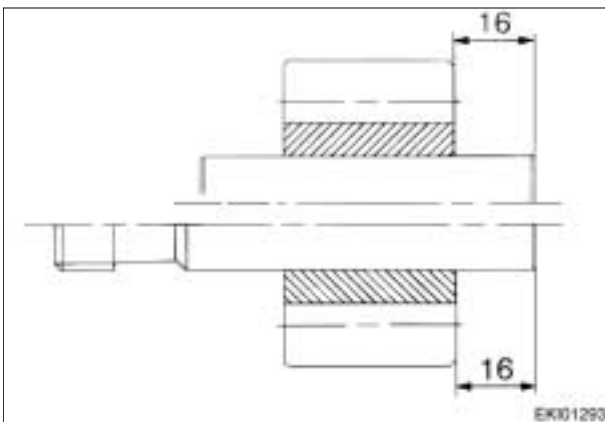


**Reassembling the oil pump**

- Insert gear wheel in bush (2).
- Fit oil shaft.
- Slide on spacer sleeve (1) and press in shaft flush with the edge of the sleeve.

**Note:**

**Bush(1) and spacer sleeve(2) are available as special tools.**



**Note:**

**The press in depth (16 mm) of the driving shaft is determined by the spacer sleeve. Make sure there are no signs of scoring on the shaft after pressing in.**



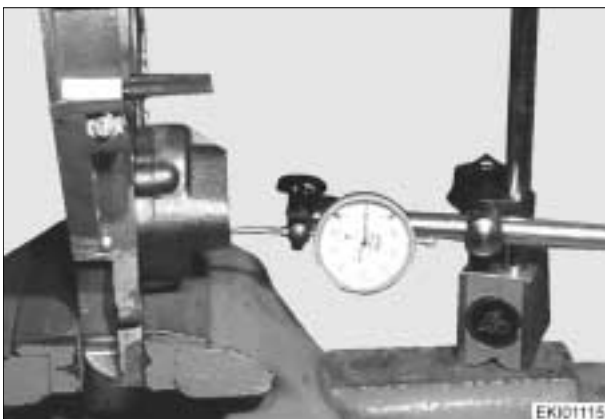
**Refitting the oil pump**

Clean sealing surfaces of timing case and oil pump: Position oil pump on timing case. Insert screws with washers and tighten.



**Warning:**

**Ensure drive shaft rotates easily.**



**checking end play of geared wheels (with oil pump in place)**

Fit dial gauge as illustrated. Turn shaft to the stop position in one direction and set gauge at "0". Press shaft in the opposite direction and take a reading of the movement. Insert oil pipe into oil pump.

Date	Version	Page	Removing and refitting oil pump	Capitel	Index	Docu-No.
14.2.2001	a	2/3		2312	G	000004

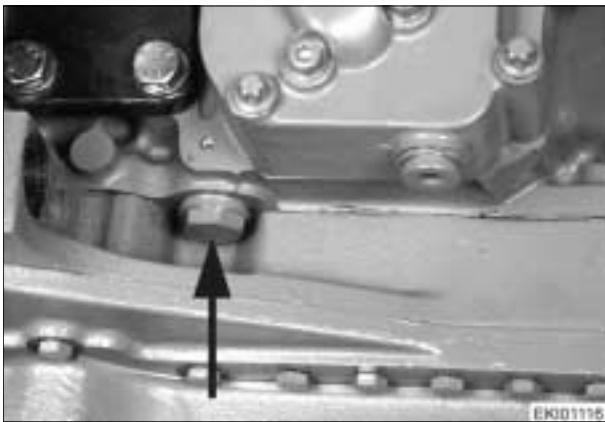
<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Lubrication</b> <b>Removing and refitting oil pump</b></p>	<p align="center"><b>G</b></p>
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**Refitting the oil pump gear.**

With the inner core free of grease, slide oil pump gear onto the ungreased drive shaft cone. Fit washer, screw on nut and tighten to specified torque.

Remove the fan frame, Power-belt, vibration damper, air compressor, alternator and the timing case cover.



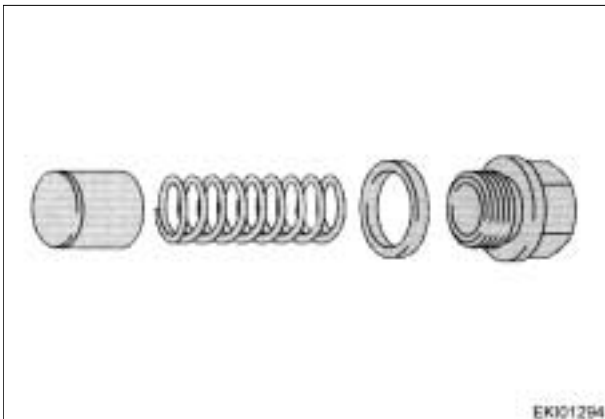
**Removing and refitting the pressure regulating valve**

**Note:**

**The pressure regulating valve is accessible from the outside.**

Unscrew and remove screw plug.

Remove sealing ring, compression spring and piston.



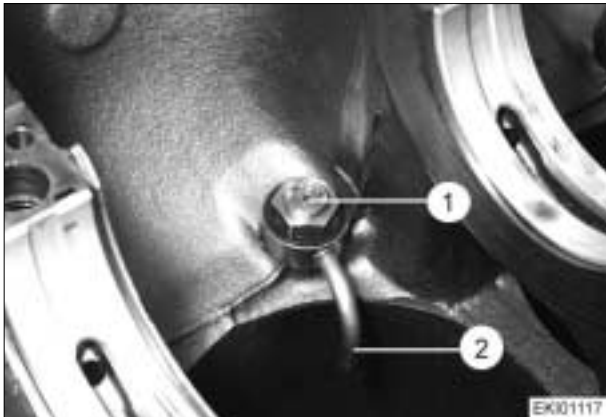
Check valve as illustrated and refit using a new seal.

Assemble valve as illustrated and refit using a new seal.

Tighten screw plug to the specified torque.

Date	Version	Page	Removing and refitting oil pump	Capitel	Index	Docu-No.
14.2.2001	a	3/3		2312	G	000004

<p><b>Fav 900</b></p>	<p style="text-align: center;">Engine / Lubrication <b>Removing and refitting splash nozzle</b></p>	<p style="text-align: center; font-size: 2em;"><b>G</b></p>
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**Removing oil splash nozzle**

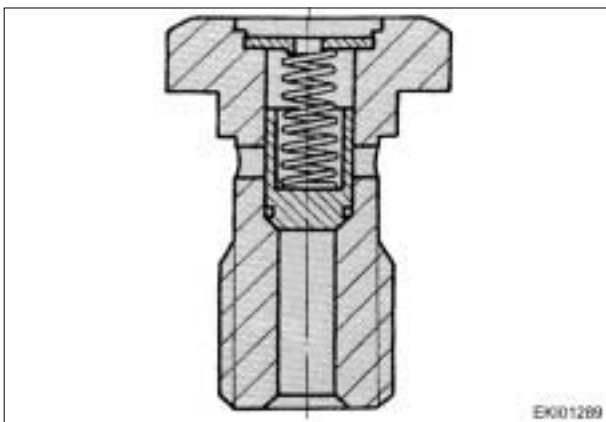
Remove oil pan and intermediate flange.

**Note:**

**the nozzle can be removed and refitted without removing the crankshaft. In the illustration on this page the crankshaft has been removed to allow a clear picture.**

Unscrew and remove oil pressure valve (1) and nozzle (2).

Remove nozzle and valve assembly.



**Check oil splash nozzle valve.**

With a small screwdriver check whether the valve spring pressure is sufficient to push the valve piston onto the valve seat. If necessary, replace nozzle valve.

Observe opening pressure.



**Refitting oil splash nozzle**

Position nozzle, making sure that the adjusting ball (arrowed) on the nozzle body comes to rest in the appropriate hole (arrowed).



Insert oil pressure valve and tighten to specified torque.

Date	Version	Page	Removing and refitting splash nozzle	Capitel	Index	Docu-No.
15.02.2001	a	1/1		2312	G	000005

<b>Fav 900</b>	<b>Engine / Injection Pump EDC - Description</b>	<b>A</b>
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## Injection System Fav 900 VP 44 ( Fav. 900 / 23 / ....)

### Common Injection systems on agricultural tractors

Linear Injection Pump	Pressure approx. 1300 bar
Radial Injection pump	Pressure approx. 1700 bar
Pump- Injector system	Pressure approx. 2100 bar
Common - Rail	Pressure approx. 1400 bar

#### Linear Injection Pump

One pump element per cylinder wich consists of pump cylinder and piston.

The engine drives a pump integrated cam shaft wich moves the pistons of the pump. A spring pushes the piston back ..

The piston course is invariable

Slanting control profile within the pistons allows variable Displacement wich is controlled by a control Rod. The desired displacement will be obtained by adjusting the control rod.

#### Common Rail System :

Generation of fuel pressure and the injection itself are controlled separately.

Injection pressure is generated independantly of engine speed and injection volume. The pressure is permanently available for injection within the "Rail"(storage).

The injection volume and time are determined by the electronic control module. Injection occurs via arespective solenoid valve for each cylinder (Injection unit). The solenoid valve is controlled by the injection control module..

### Injection System Fav. 900 / 23 /..... ( Facelift )

#### Radial piston pump

Die Radial piston pump with integrated spray adjustment are controlled electronically .

A single **High- pressure pump module** for all cylinders.

A **Vane type pump** lifts the fuel.

A **Radial piston pump** with a cam ring and 3 radial pistons generates the jhigh pressure.

A **High pressure solenoid valve** allows a defined injection volume.

**Injection start** and **Spray adjustment** will be controlled by the rotation of the **cam ring**

Two **electronic control modules** (Pump and Engine control module ) are processing various control parameters.

Date	Version	Page	<b>EDC - Description</b>	Capitel	Index	Docu-No.
10/2000	<b>a</b>	1/6		<b>2710</b>	<b>A</b>	<b>000001</b>

<b>Fav 900</b>	<b>Engine / Injection Pump EDC - Description</b>	<b>A</b>
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### **Function of FENDT EDC-Engine Steering :**

The radial piston pump ( VP 44 ) is equipped with 2 control modules for **E**lectronic - **D**iesel - **C**ontrol

**Engine control unit ( A 021 ) processes all external Sensor - parameters.**

- B025 Engine speed indicator
- B026 Needle motion sensor (effective injection start)
- B027 Coolant temperature
- B028 Charge air pressure probe

**Engine control module determines**

- Injection rating ( Injection volume per cam angle )
- Injection volume
- Injection start

**Engine control module ( A 020 ) reads**

- Injection pump speed
- Injection pump setting
- Fuel temperature ( approx. 80-90 °C )

**Engine control module controls**

- High pressure solenoid valve (Q-MV)
- Spray control solenoid valve (SV-MV)

### **EDC BUS-System**

See also : Chapter 9700 Reg. A "Concept of electronics" Fav 900/23/...)

**Data communication between Engine control module MSG (A021) and pump control module PSG (A021) occurs via EDC-CAN-BUS (Diagram chapter 9000 Reg.C Sheet 33 ; EDC Engine control)**

Engine control module communicates via transmission BUS (G-BUS) and via comfort control module (A002) with the Comfort-BUS (K-BUS)

Error codes are displayed on the dashpanel (A007) via BUS System.

(Diagram "Comfort-BUS and Transmission-BUS" ; Chapter 9000 Reg.C ; Sheet 21 and Sheet 26)

**The Engine control module is equipped with a diagnostic connector (X412)**

This connector allows the reading of the parameters from the Engine and Injection pump control modules.

"EDC - Diagnostic"

#### **Note:**

**The Injection pump control module and the injection pump are matched.  
For this reason replace only the complete injection pump.**

**In case of replacement of the engine control module by a module wich does not correspond to the engine type, all parameters (max. torque) will be limited and set for Fav. 916 ( Error Code 1.1.A0 )**

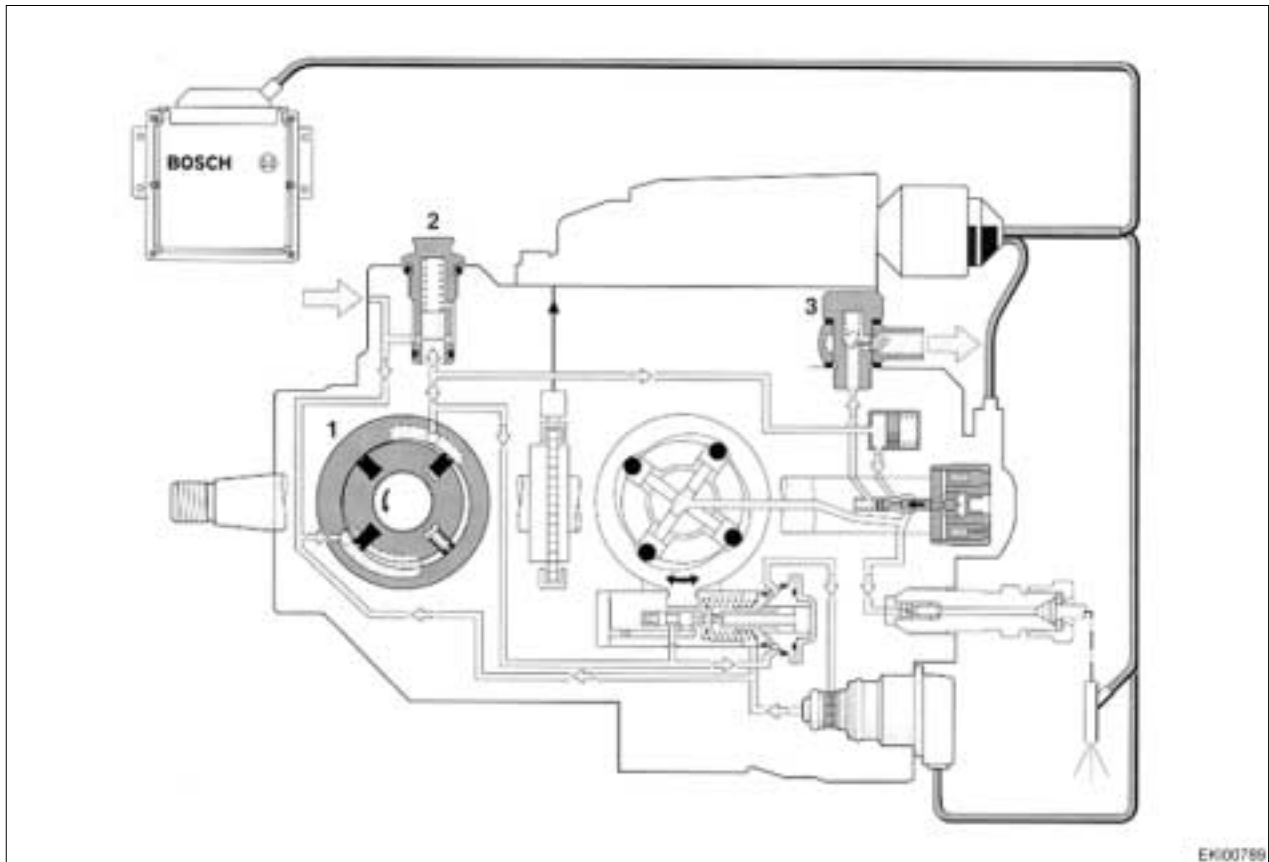
**This equally valid for erroneous End Of Line programming.**

Date	Version	Page	EDC - Description	Capitel	Index	Docu-No.
10/2000	a	2/6		2710	A	000001



Fav 900	Engine / Injection Pump EDC - Description	A
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**Low pressure circuit - Components of VP 44**



1	Vane type fuel lifting pump (rotated by 90°)
2	Pressure control valve (20 bar)
3	Overflow valve

**Vane type fuel lifting pump (1)**

aspirates and conveys fuel by each turn to the radial piston pump in a nearly constant flow. This generates the standby cavity pressure " **Pump internal pressure**" wich is depending on engine speed.

**Pressure control valve (2)**

Controls the Pump internal pressure. Opens in case of over pressure and shuts by "low pressure".

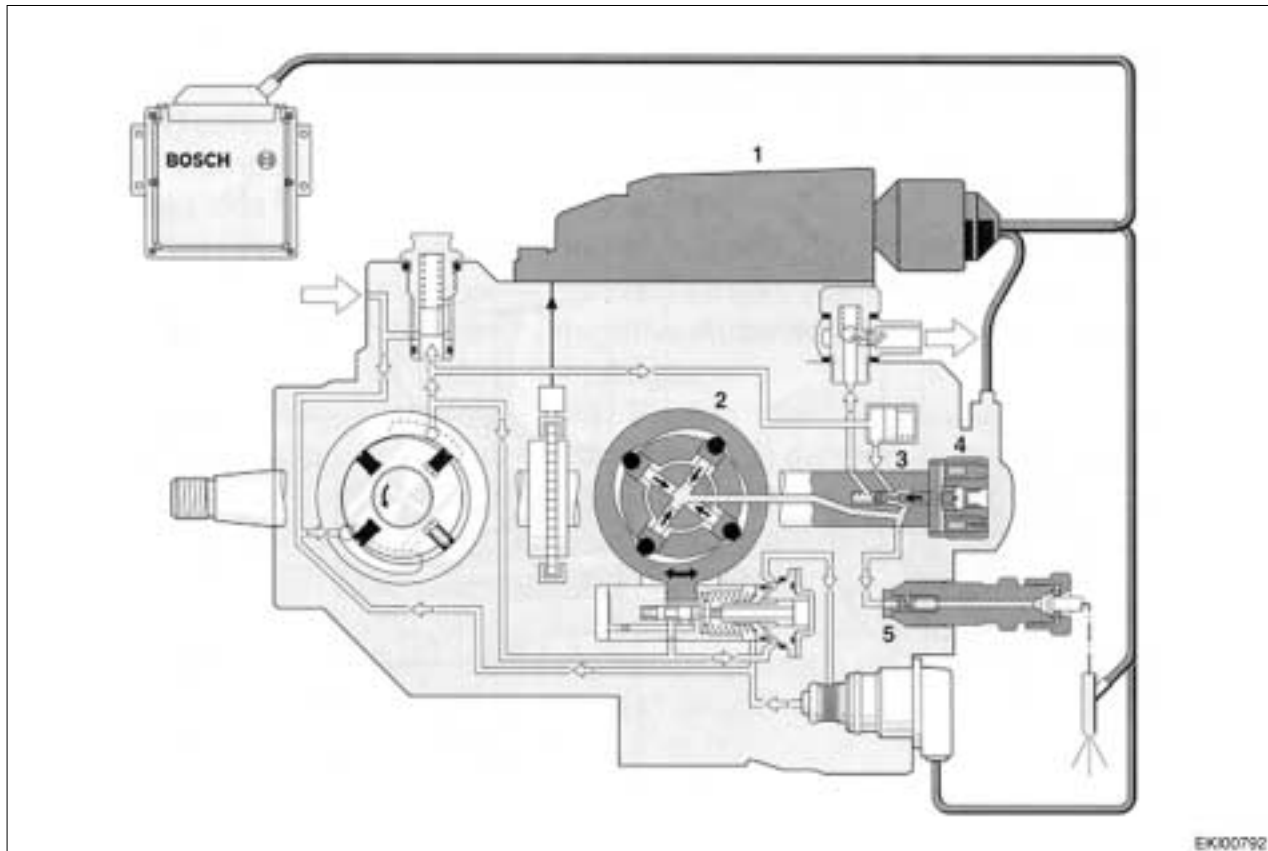
**Overflow valve (3)**

Releases a defined fuel flow toward fuel tank in case of reaching a defined Pump internal pressure.

Pump internal pressure ( bar )	n Engine ( Upm )
approx. 14 - 15	1200
const. 20	>1600

Fav 900	Engine / Injection Pump EDC - Description	A
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### High pressure circuit - Components of VP 44



1	Injection pump control module(A020)
2	Radial piston pump - High pressure pump (rotated by 90°)
3	Distribution body
4	High pressure solenoid valve (Q-MV)
5	Injection line fitting with return flow valve

#### Radial piston pump - High pressure pump (2)

Fuel reaches the piston intakes of the high pressure section via the opened solenoid valve .

The cam ring, due to its elevations, presses the piston radially toward the centre of the pump . It compresses the fuel by every lift for the injection into the respective cylinder.

#### High pressure solenoid valve (4)

Controlled by the pump control module( A020 ), regulates the fuel supply for the high pressure radial piston pump.

The High pressure solenoid valve defines the injection volume and the injection timing (Injection volume per degree of cam setting) for every individual injection.

**The high pressure solenoid is monitored by the pump control module !**

#### Distribution shaft with distribution body (3)

The shaft distributes fuel in such a manner that every cylinder will be supplied once via the injection line fitting for each pump rotation.

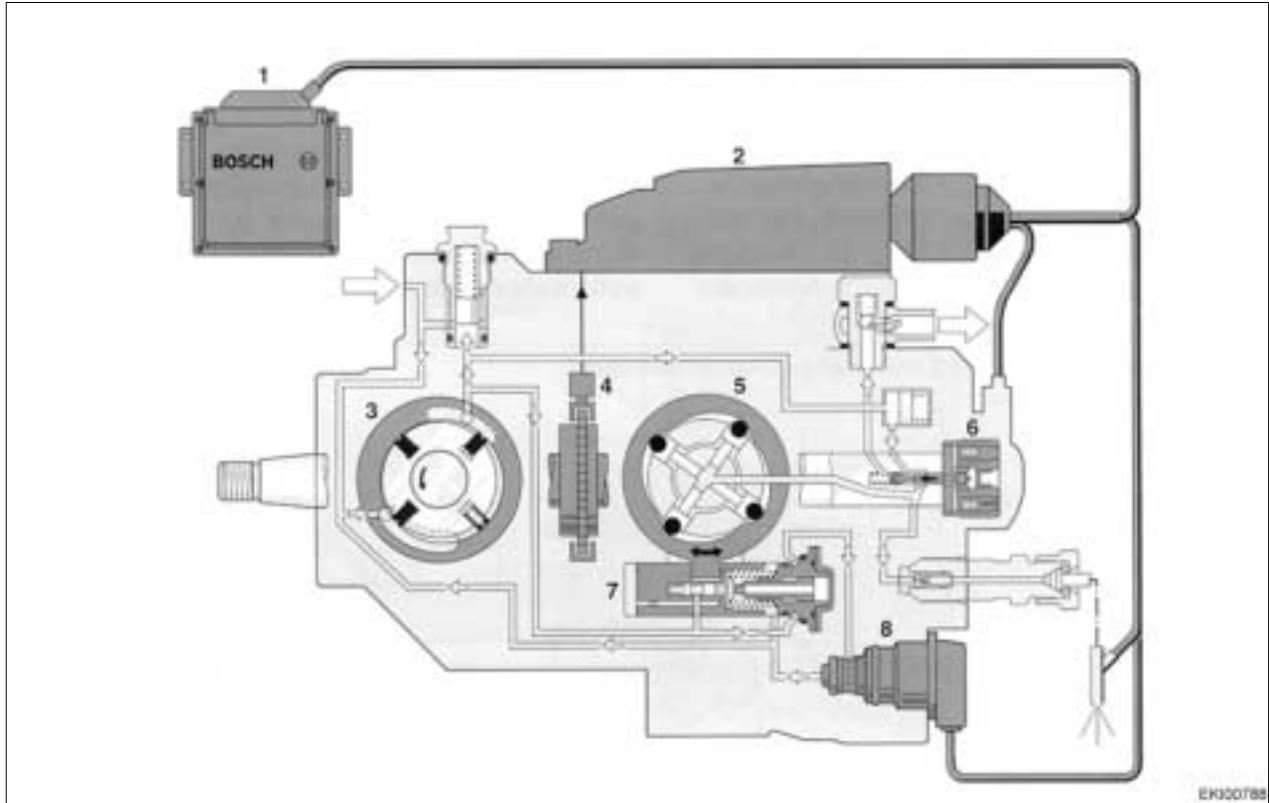
#### return flow valve (integrated in the injector line fitting) (5)

damps the shockwaves which occur by the shutting of the injectors.

Date	Version	Page	EDC - Description	Capitel	Index	Docu-No.
10/2000	a	4/6		2710	A	000001

Fav 900	Engine / Injection Pump EDC - Description	A
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**Sprax adjustment - VP44**



1	Engine control module (A021)
2	Injection pump control module (A020)
3	Vane type fuel lifting pump (rotated by 90°)
4	Angle sensor
5	Radial piston - High pressure pump (rotated by 90°)
6	High pressure solenoid valve (Q-MV)
7	Spray adjuster (rotated by 90°)
8	Spray adjustment valve ("Pacing valve")

**Spray adjuster (7)**

The hydraulic spray adjuster with the pacing valve (8) is mounted on the lower pump body across the pistons and pump alignment.

The spray adjuster moves the cam ring according to the operating conditions, torque and speed, in order to adjust the injection start.

**Note:**

**The pacing valve is not monitored !**

**If electric power is applied onto the injection pump, the pacing valve must "vibrate".**

**Angle sensor (DWS - System ) (4)**

The increment wheel ( Sensor wheel ) and the bracket for the sensor are fitted onto the driving shaft.

The system detects the relative angle between driving shaft and cam ring.

This allows calculate the actual **Engine speed**, the **Spray adjuster position** and the **angular position of the cam shaft**

**Needle motion sensor ( B026 )**

Needle motion sensor to determine the adequate opening time of the injection nozzle.

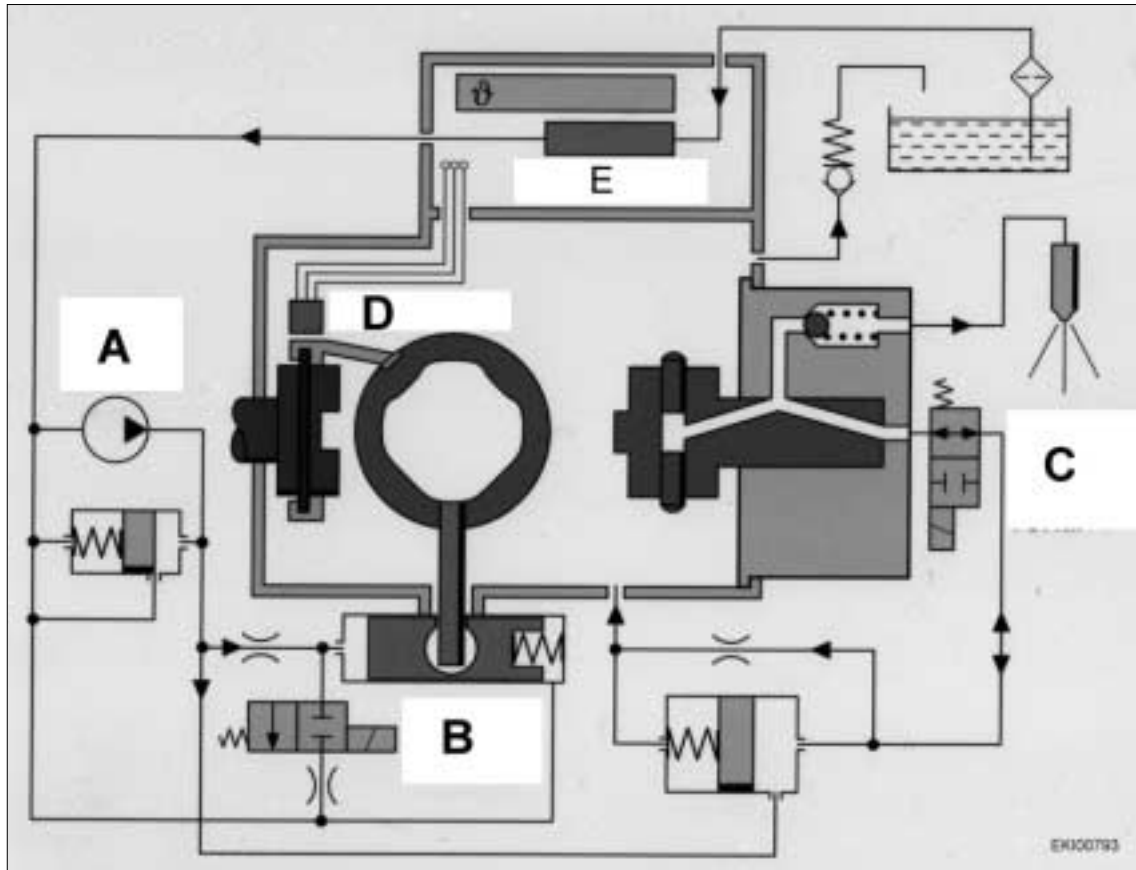
Date	Version	Page	EDC - Description	Capitel	Index	Docu-No.
10/2000	a	5/6		2710	A	000001

Fav 900	Engine / Injection Pump EDC - Description	A
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"real Injection start"

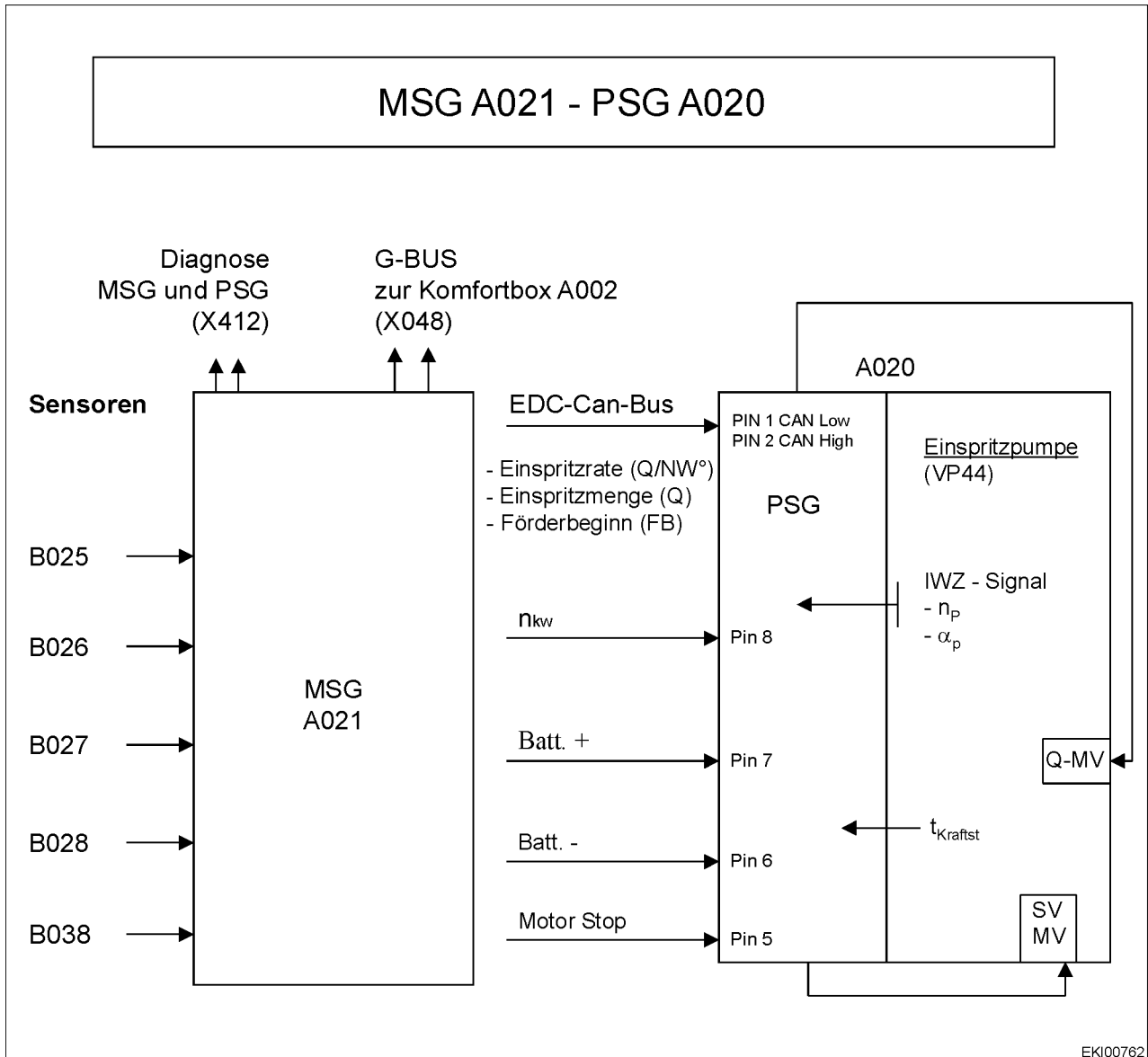
Signal will be processed by Engine Control Unit (1).

**Principle of VP 44 operation**



A	Fuel lifting pump
B	Spray adjustment
C	High Pressure solenoid valve (Q-MV)
D	Position (angle) Sensor (IWZ-Sensor)
E	Pump Control Module (A020)

<b>Fav 900</b>	<b>Engine / Injection Pump</b> <b>MSG A021 - PSG A020</b>	<b>A</b>
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A020	Injection Pump	B038	Accelerator Pedal Position Sensor EDC
PSG	Pump Control Module	Q/°NW	Injection Rate
A021	EDC Control Module (MSG)	Q	Injection Volume
X048	Connection G-BUS	FB	Start of delivery
X412	Diagnostic Interface	nKW	Crankschaft speed
Q-MV	High Pressure Solenoid Valve	Battery +	UB 30 , Battery +
SV-MV	Injection Controller	Sheet. -	31 , Battery +
		Engine Stop	Solenoid Valve Engine stop
B025	Engine Speed Sensor	nP	Pump Speed
B026	Needle Motion Sensor	alphaP	Pump setting
B027	Coolant Temperature	t Fuel	Fuel temperature
B028	Intake Air Pressure Sensor	IWZ	Inkremental - Way - time - System (Pump Position)

Date	Version	Page	<b>MSG A021 - PSG A020</b>	Capitel	Index	Docu-No.
24.10.2000	a	1/1		<b>2710</b>	<b>A</b>	<b>000002</b>

<b>Fav 900</b>	<b>Engine / Injection Pump Speed Control EDC</b>	<b>A</b>
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**Speed Control EDC Injection System via:**

**Possibilities of Speed Control**

- Pedal position Sensor EST (B029)
- Hand Throttle Position Sensor (B035)
- Memory Keys MIN. and MAX. on Joystick A003
- Setting Speed MIN. and MAX. for Memory Keys using Terminal A008

**Speed Control procedure**

Accelerator pedal Position Sensor **B029** as Well as Terminal **A008** are diectly connected to EST Control Module **A002** .

Hand Throttle position Sensor **B035** as Well as Memory Keys on Joystick **A003** are connected to EST Control Module **A002** and Comfort -BUS via Side Console **A004** .

EST Control Module **A002** processes Sensor Signals and leads signals according to priority via Transmission Bus to the EDC Control Module **A021**

EDC Control Module controls the Injection Pump VP44 to rech the required Engine Speed.

**Note:**

**It is possible to fool Speed settings (Priority - Processing within EST Control Module A002)**

**Note:**

**Engine without load:** Actual Engine speed (indicated on dash Panel) runs approx. 30 Rpm below the selected speed on the Terminal.

**Monitoring and securing Speed Control**

- Accelerator Pedal position Sensor EDC (B038)

**Note:**

**Pedal position Sensors B029 and B038 are actuated simultaneously by the accelerator Pedal.**

**Monitoring Speed Control**

Accelerator Pedal position Sensor **B038** is connected to EDC Control Module **A021** .

EDC Control Module **A021** emits "requested Speed " from **B038** onto EST Control Module **A002**

EST Control Module **A002** compares Signals from Pedal position Sensor **B029** with Pedal position Sensor **B038**

In case of Deviations (Plausibility Check) a Failure Code will be displayed on Dashpanel **A007**

**Securing Speed Control**

In Case of EST Control Module Failure A002 or Transmission Bus Failure Speed Control Will occur throug Pedal position Sensor B038. (restricted operation, no Hand Throttle or Memory keys Operation )

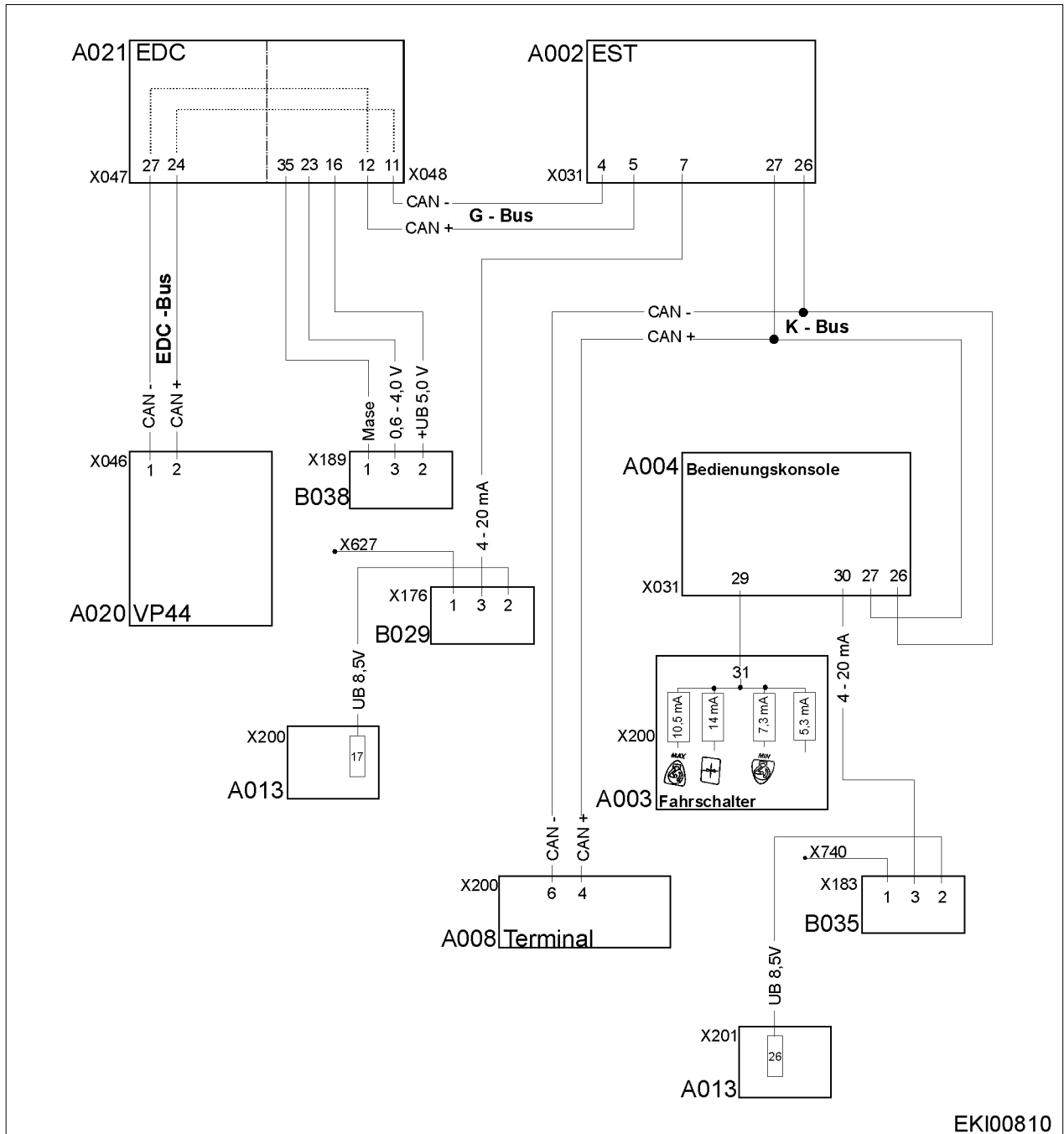
In case of simultaneous Failure of both Pedal position Sensors, Pump Control Module A020 will Automatically set 720 Rpm (Auxilliary Operation)

(Consult : Diagnostic EDC, Chapter 2000 Reg.B)

Date	Version	Page	<b>Speed Control EDC</b>	Capitel	Index	Docu-No.
25.11.2000	<b>a</b>	1/2		<b>2710</b>	<b>A</b>	<b>000006</b>

<b>Fav 900</b>	<b>Engine / Injection Pump Speed Control EDC</b>	<b>A</b>
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**Diagram Speed Control Favorit 900 EDC**



EKI00810

A002	EST Control Module	B029	Pedal position Sensor EST
A003	Joystick	B035	Hand Throttle position Sensor
A004	Side Console	B038	Pedal position Sensor EDC
A008	Terminal	G-BUS	Transmission - BUS
A013	Fuse Board	K-BUS	Comfort - BUS
A020	Injection Pump (PSG)	EDC-BUS	EDC-BUS
A021	EDC Control Module	X627 / X740	Connection Earth Sensorics

**Note:**

**Joystick A003: If no Memory Key is actuated (MIN, MAX or Delete), a current of approx. 5,3 mA is to be measured on Pin 31(Diagram)**

Date	Version	Page	Capitel	Index	Docu-No.
25.11.2000	a	2/2	Speed Control EDC	2710	A 000006

<b>Fav 900</b>	<b>Engine / Injection pump Electronic pump control / Engine stop</b>	<b>A</b>
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## Electronic pump control: Starting process

Chapter 9000 Reg.C Sheet 33 (Diagramm EDC- Engine control)

Chapter 9000 Reg.C Sheet 2 (Diagramm Power supply +UB)

- Ignition lock **S002** connects supply voltage UB 15 to Engine Control module **A021** (Conector X048 ; Pin 15)
- MSG **A021** (Connector X048 ;Pin 27) connects Earth to relay **K020**
- Relay **K020** connects supply UB30 to MSG **A021** (Connector X048 ; Pin 3 and Pin4)
- MSG **A021** (Connector X048 ; Pin 18) connects Voltage onto Relay **K 021**
- Relay **K 021** connects Voltage UB30 onto Engine control module **A020** (Pin 7)

During cranking process, Engine control module A020 sets internally for an engine speed of approx. 720 rpm.

After cranking process, EDC - BUS will be established , and Engine control Module A021 will control engine speed.

## Electronic Pump Control: Engine Stop

Chapter 9000 Reg.C Sheet 33 (Diagram EDC- Engine Control)

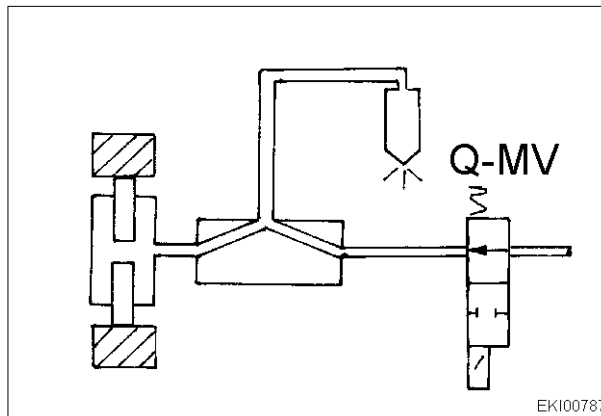
Chapter 9000 Reg.C Sheet 2 (Diagram Voltage supply +UB)

Engine will be stopped by the value "Injected volume set at 0".

High Pressure Solenoid valve Q-MV within injection pump is without power and so fully openend.

High pressure cannot be established.

### Sketch: High pressure stage of the radial piston pump VP44



By setting ignition key into "0" position, Engine control module A021 receives signal: Engine Stop !

The Microprocessor within Engine Control unit A021 defines trough wich process the engine is to be stopped,

### Engine Stop Processes

- Engine Control unit **A021** (Connector X047 : Pin20) supplies Voltage UB to Pump Control Unit **A020** (Pin 5)
- Engine Control unit **A021** (Connector X048 ; Pin18) interrups Voltage supply to Relay **K021** .No Voltage supply UB30 to Pump Control Unit **A020** .
- Engine Control unit **A021** (Connector X048 ; Pin 27) interrups Earth connection to Relay **K020** . No Voltage supply UB30 to Pump Control Unit **A020** .

Date	Version	Page	Capitel	Index	Docu-No.	
14.11.2000	a	1/2	Electronic pump control / Engine stop	2710	A	000004



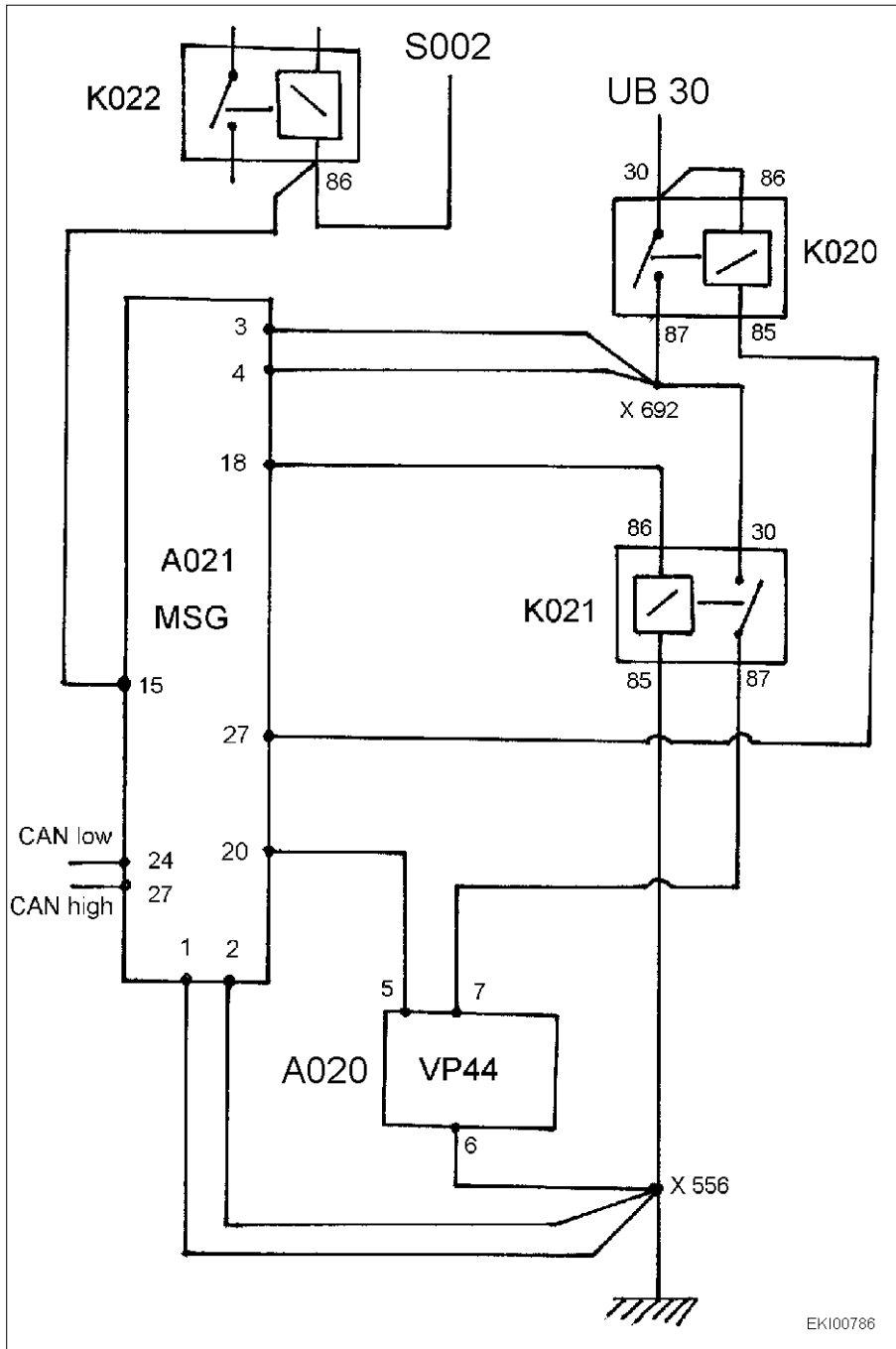
<b>Fav 900</b>	<b>Engine / Injection pump</b> <b>Electronic pump control / Engine stop</b>	<b>A</b>
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- Engine Control unit **A021** (Connector X047 ; Pin 24 / 27) sends signal "Injected volume set at 0" to Pump Control Unit **A020** via EDC CAN -BUS .

**Note:**

Engine Control Unit A021 defines with Engine Shut Down process will occur. This process allows Auto Diagnostic of the EDC Injection system.

**Electric diagramm: Pump control**



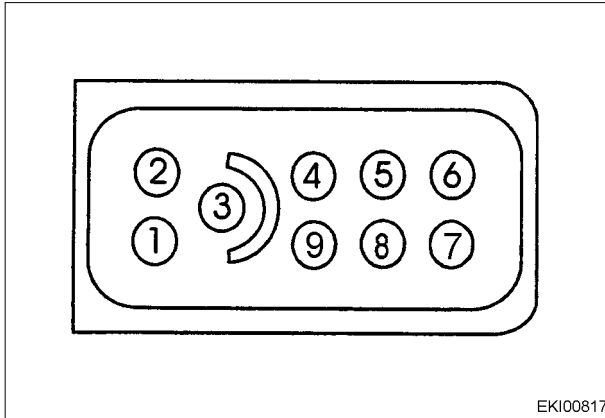
A020	Injection pump VP44	K022	Relay UB 15
A021	Engine control module	S002	Ignition lock
K020	Relay UB 30 EDC	X692	Connector UB 30 EDC
K021	Relay Solenoid valve "Engine stop"	X556	Earth point Cabin / EDC

Date	Version	Page	Capitel	Index	Docu-No.
14.11.2000	a	2/2	<b>Electronic pump control / Engine stop</b>	<b>2710</b>	<b>A</b>

<b>Fav 900</b>	<b>Engine / Injection System</b> <b>Injection Pump - Auxilliary Operation</b>	<b>A</b>
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### Auxilliary Operation Of EDC Injection Pump VP 44 (A020)

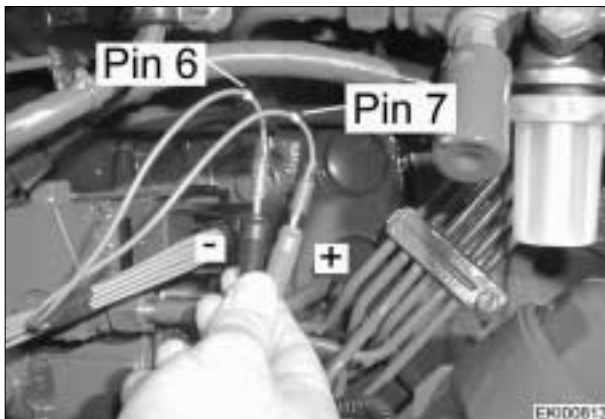
Injection Pump can be used in auxilliary operation if the electronic control becomes impossible due to Failure Codes.



Injection Pump A020 on:  
Pin 7 (Battery +) and on  
Supply externally 12 VDC with Adapting  
Connector on Pin 6 (Battery -) .

#### Pin attribution on Pump Control module

Pin	Wire.-Nr./ Colour	Attribution
1	white / green	CAN Low
2	green	CAN High
3	--	not attributed
4	--	not attributed
5	60303	Engine Stop via Solenoid Valve
6	31000 / white / red	Earth
7	60017 / red	+ U Battery
8	60357	Speed Input Signal
9	--	not attributed



**Adapting Connector X 899.980.251.101**  
Connect Compact Conector with Injection pump.

**Connect Insertion Cable with:**  
**+ UB Kontakt (red) with Cable Nr. 7**  
**Earth Contact (black) with Cable Nr. 6**

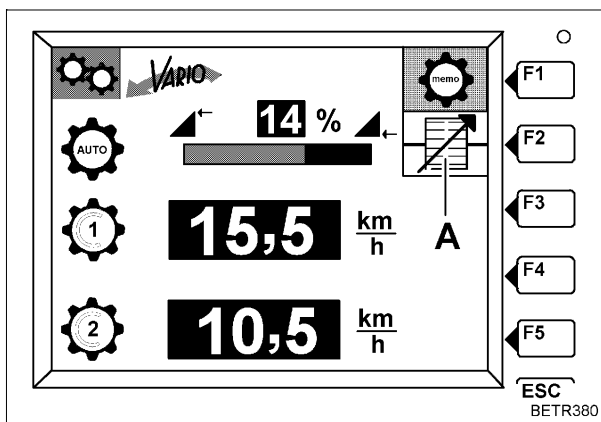
<b>Fav 900</b>	<b>Engine / Injection System</b> <b>Injection Pump - Auxilliary Operation</b>	<b>A</b>
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Connect **Insertion Cable** (Arrow) with Permanent socket 25 A (UB 30) .  
 Start engine via Ignition key



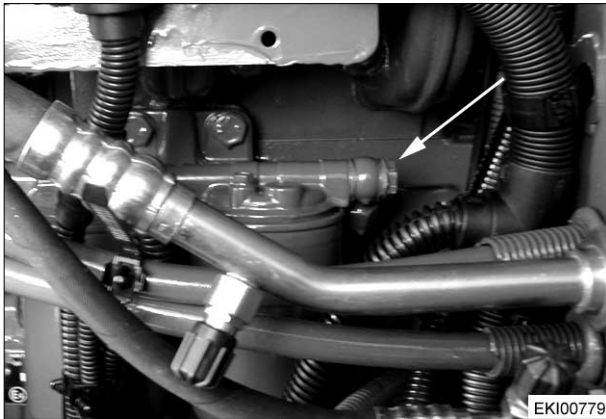
**Warning:**  
 Remove connection Adapting Connector to - 25 A Socket !!



**Note:**  
 In Auxilliary operation, engine runs 720 U/ Rpm.  
 Deactivate Turboclutch function within Terminal A008 for driving tractor.  
 (Consult Operating Manual Fav 900 / 7. Operation Vario Transmission).

Date	Version	Page	Injection Pump - Auxilliary Operation	Capitel	Index	Docu-No.
06.11.2000	a	2/2		2710	A	000003

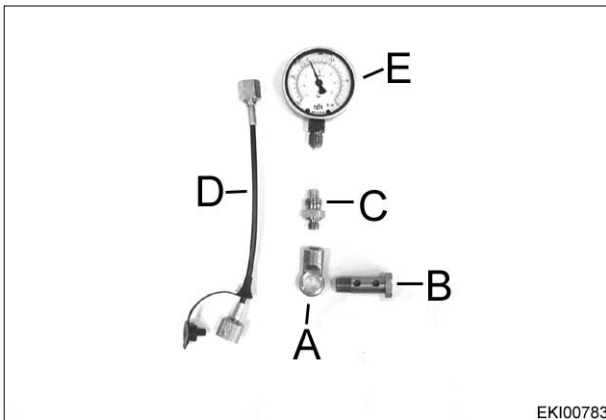
<b>Fav 900</b>	<b>Engine / Injection Pump Pre - Pressure / Internal Pressure</b>	<b>E</b>
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EKI00779

**Checking Pump Pressure of injection Pump VP 44 prüfen.**

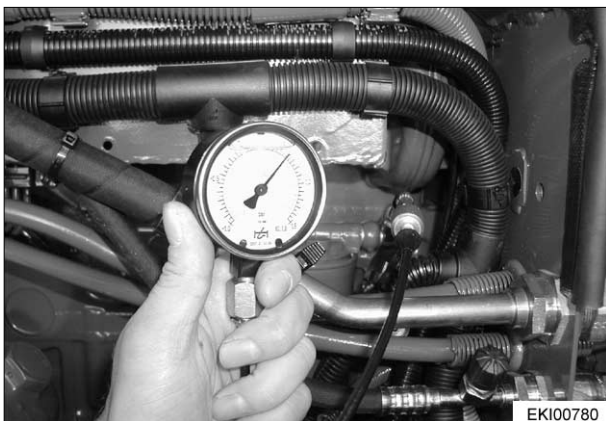
Loosen Hollow screw on Filter Body.



EKI00783

**Measuring Case X 899.980.217.000**

- A = Ring stub 14 mm
- B = Hollow screw M 14 x 1,5
- C = Test Connection M 10 x 1
- D = Test Hose
- E = Pressure Gauge (Range : 0 bar Absolute - 1,5 bar Relative)



EKI00780

Start Engine and run it through complete speed range.

Read Pressure on Pressure Gauge.

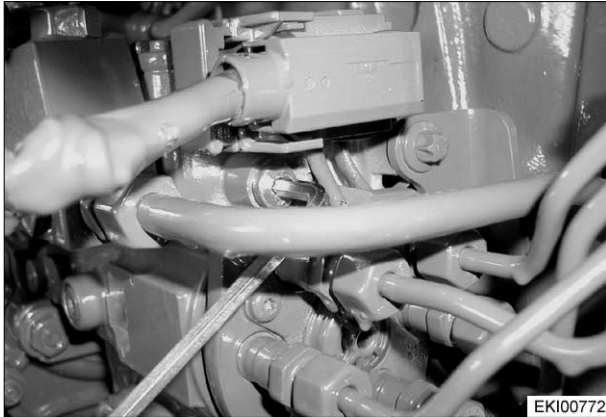
**Requested pressure downstream of filter and upstream of Pump:**

**0,1 bar - 0,8 bar**

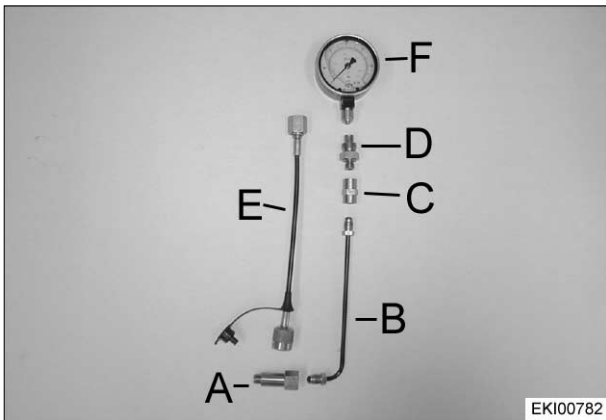
If this value cannot be reached **Filter may be contaminated**

Date	Version	Page	<b>Pre - Pressure / Internal Pressure</b>	Capitel	Index	Docu-No.
6.11.2000	a	1/2		2710	E	000002

<b>Fav 900</b>	<b>Engine / Injection Pump Pre - Pressure / Internal Pressure</b>	<b>E</b>
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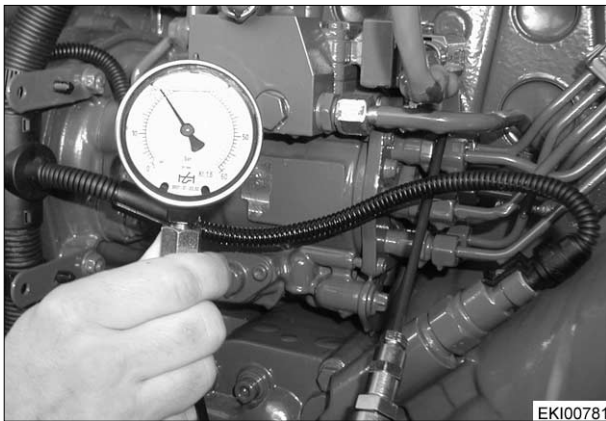


**Checking Internal Pressure of VP 44 prüfen.**  
Remove sealing Screw.



**Measuring Case X 899.980.217.000**

- A = Adapter M 10 x 1 (X 596.135.000.000)
- B = Tube (X 596.340.400.000)
- C = Insertion Part (395.100.070.650)
- D = Test Connection M 10 x 1
- E = Test hose
- F = Pressure Gauge (Range until 60 bar)



Start Engine - Read Pressure on Pressure Gauge.

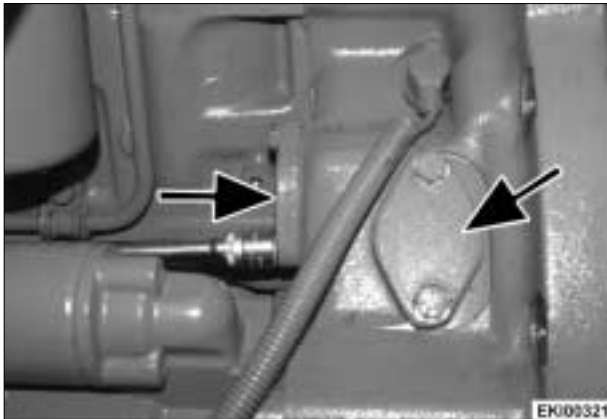
**If Values cannot be reached (Table) :**

- Pre Pressure to low (Check Pre pressure)
- Vane Pump within injection pump worn out
- VE - Pump pump worn .

**Requested Value Internal Pressure VP 44**

<b>Internal Pressure</b>	<b>n Engine</b>
approx. 14 - 15 bar	1200 Rpm
const. approx. 20 bar	>1600 Rpm

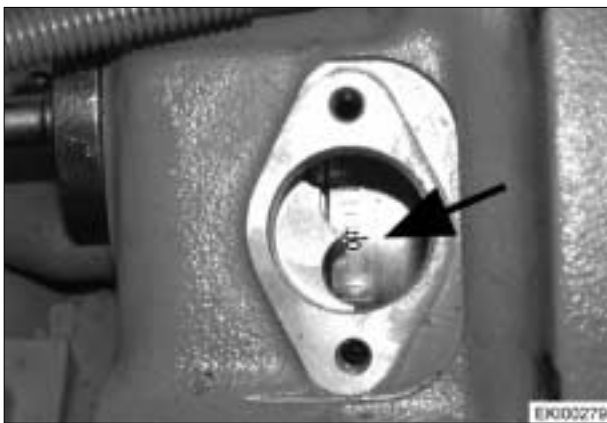
<b>Fav 900</b>	<b>Engine / Injection Pump Checking Start of Delivery VP 44</b>	<b>E</b>
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Remove cover (Arrows).



Set actuation tool (X 899.980.220.000).



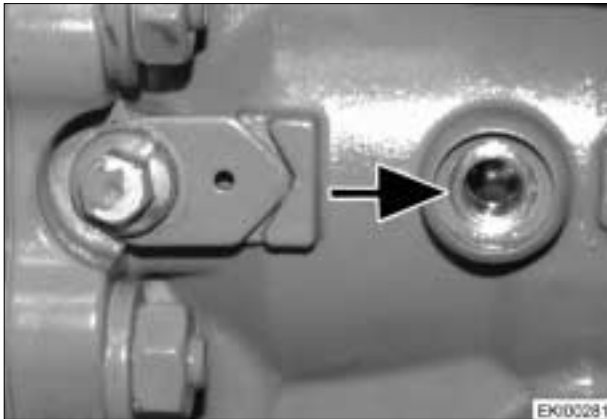
Set 1st Cylinder in Top Dead Point (TDP) position (arrow).



Remove sealing screw of TDP measuring point.

Date	Version	Page	Capitel	Index	Docu-No.
01/2000	<b>b</b>	1/7	<b>2710</b>	<b>E</b>	<b>000003</b>

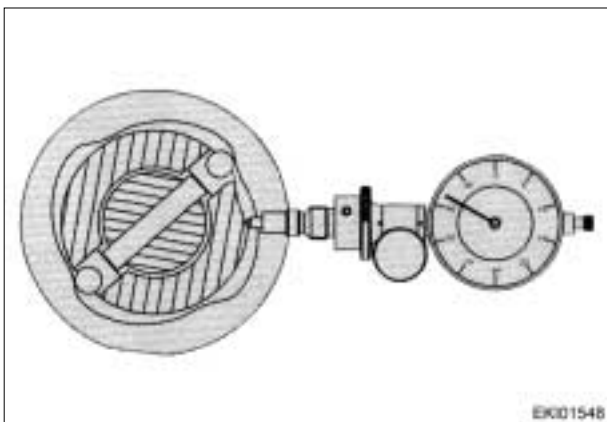
Fav 900	<p align="center">Engine / Injection Pump  <b>Checking Start of Delivery VP 44</b></p>	<p align="center"><b>E</b></p>
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**Important:**  
 1. Cylinder (fan side) is in TDP Position, when the flat part of the control shaft can be recognized through the TDP measuring hole.

If the flat part cannot be recognized, turn the crank shaft further 360° with the actuation tool in order to place the flat part of the control shaft in front of the measuring hole.

Valves of the 6th cylinder (flywheel side) are in middle position.

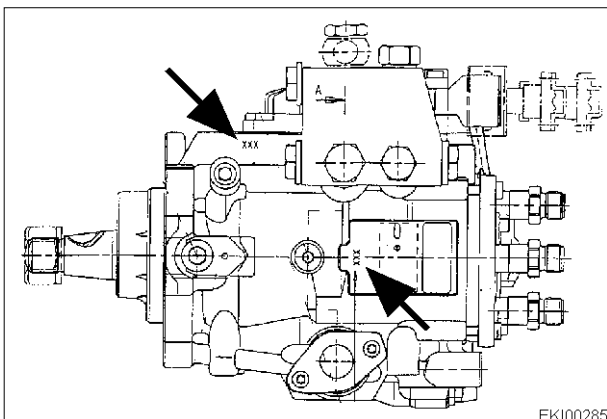


Turn crank shaft back by at least 20° before TDP and then set dial gauge with adaptor (X 899.980.245.000) into the TDP measuring Hole .

**Note:**  
 Use dial gauge with ball tip R=1 mm (0.039").



Set dial gauge into "0" display position.



3 - Digit Number: Identification (arrows) possible on following locations.

Date	Version	Page	Checking Start of Delivery VP 44	Capitel	Index	Docu-No.
01/2000	<b>b</b>	2/7		<b>2710</b>	<b>E</b>	<b>000003</b>

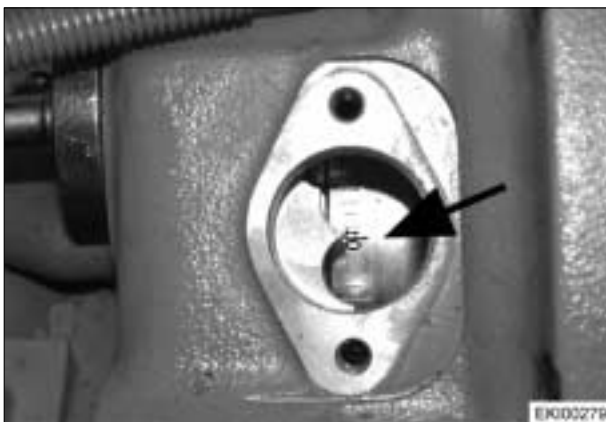
Fav 900	<p align="center">Engine / Injection Pump  <b>Checking Start of Delivery VP 44</b></p>	<p align="center"><b>E</b></p>
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Turn crankshaft back toward TDP until displacement (X . XX) which is indicated on the injection pump will be reached .

E.g.: Indicated Value on Injection Pump: 0.79  
 Consequently: Adjust TDP to reach 0,79 mm on dial gauge

**Note:**  
 Scanning head of dial gauge runs into slanted surface of the control shaft.  
 Do not turn crankshaft any further , risk of shearing the scanning head of the dial gauge.



TDP is correctly set when flywheel is in TDP position ( $\pm 0,5^\circ$ ).

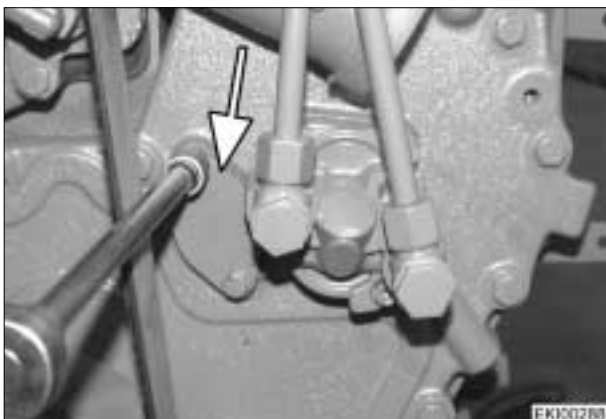
**Note:**  
 The effective start of delivery, approx.  $6^\circ$  vor O.T. (under full load) will be set automatically by the injection controller .

If the flywheel is in wrong position, start of delivery will not be correct ( adjust start of delivery ).



**Adjusting start of delivery**

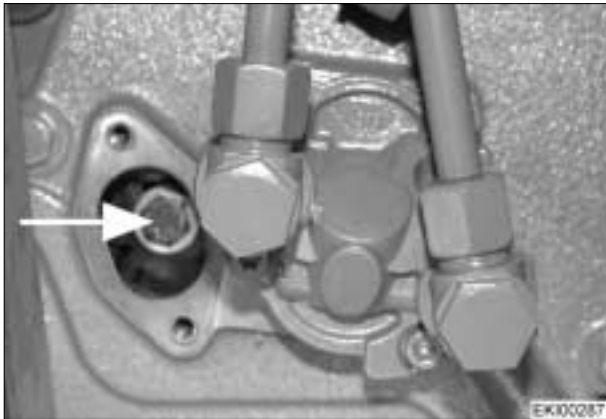
Remove dial gauge and adaptor.



Remove cover (M8)



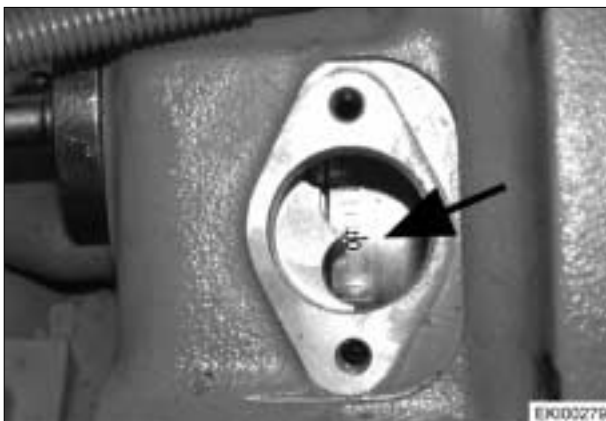
Fav 900	<p align="center">Engine / Injection Pump  <b>Checking Start of Delivery VP 44</b></p>	<p align="center"><b>E</b></p>
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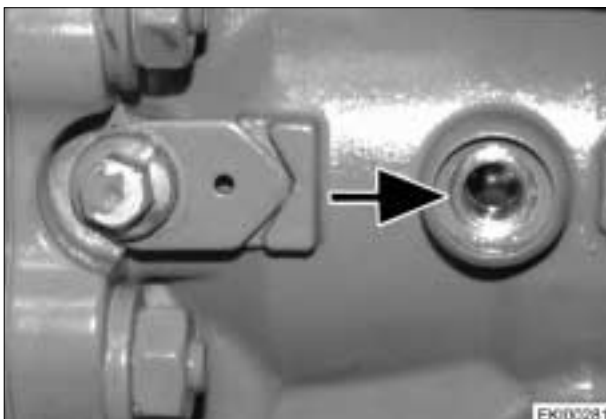
**Important:**  
 Do not loosen first visible screw (M8) (TDP Screw).



Turn crankshaft using the actuation tool and loosen the visible screws 2,3 and 4 .



Set first cylinder (fan side) using the actuation tool onto TDP (arrow).



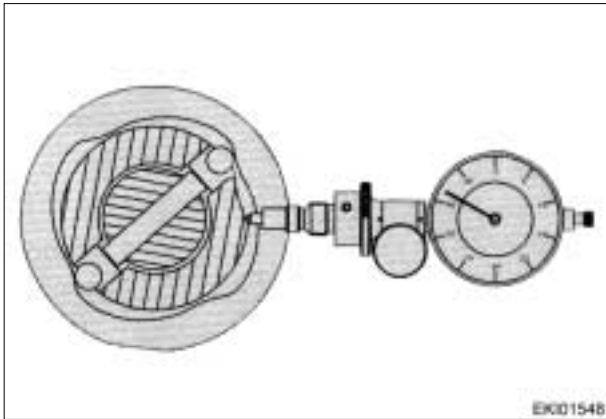
**Important:**  
 1. Cylinder (fan side) is in TDP Position, when the flat part of the control shaft can be recognized through the TDP measuring hole.

If the flat part cannot be recognized , turn the crank shaft further 360° with the actuation tool in order to place the flat part of the control shaft in frontt of the measuring hole.

Valves of the 6th cylinder (flywheel side) are in middle position.

Date	Version	Page	Checking Start of Delivery VP 44	Capitel	Index	Docu-No.
01/2000	b	4/7		2710	E	000003

Fav 900	<p style="text-align: center;">Engine / Injection Pump <b>Checking Start of Delivery VP 44</b></p>	<b>E</b>
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Turn crank shaft back by at least 20° before TDP and then set dial gauge with adaptor (X 899.980.245.000) into the TDP measuring hole.

**Note:**  
Use dial gauge with ball tip R=1 mm (0.039").



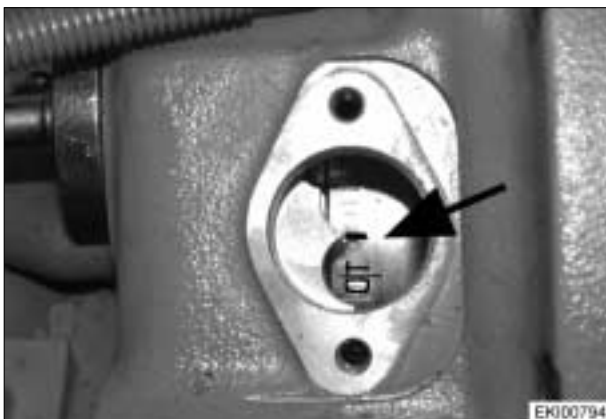
Set dial gauge into "0" display position.



Turn crankshaft back toward TDP until displacement (X . XX) which is indicated on the injection pump will be reached .

E.g. : Indicated value on injection pump: 0.79  
Consequently : Adjust TDP to reach 0,79 mm on dial gauge

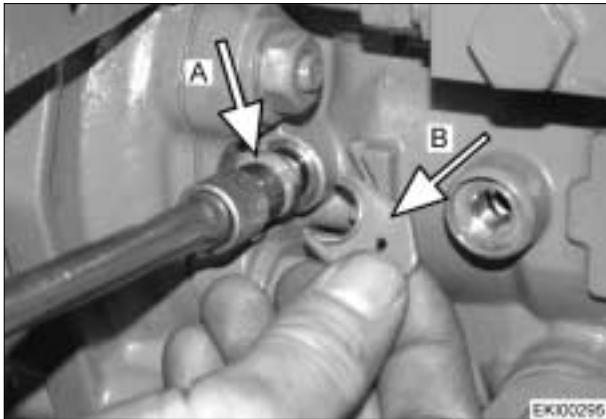
**Note:**  
**Scanning head of dial gauge runs into slanted surface of the control shaft.**  
**Do not turn crankshaft any further , risk of shearing the scanning head of the dial gauge.**



**Start of Delivery point is wrong!**  
Requested value start of delivery: TDP (+/- 0,5°)

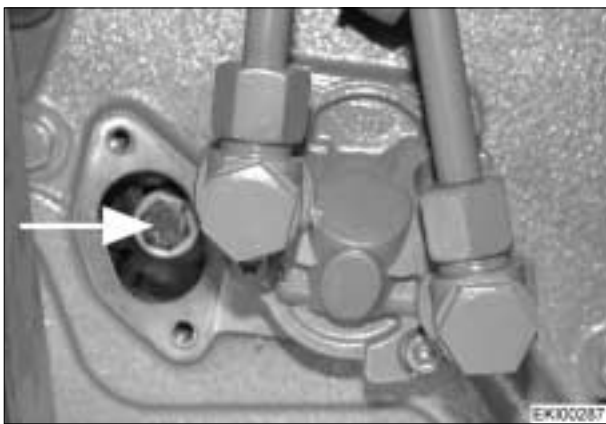
Date	Version	Page	Checking Start of Delivery VP 44	Capitel	Index	Docu-No.
01/2000	b	5/7		2710	E	000003

Fav 900	<p style="text-align: center;">Engine / Injection Pump  <b>Checking Start of Delivery VP 44</b></p>	<b>E</b>
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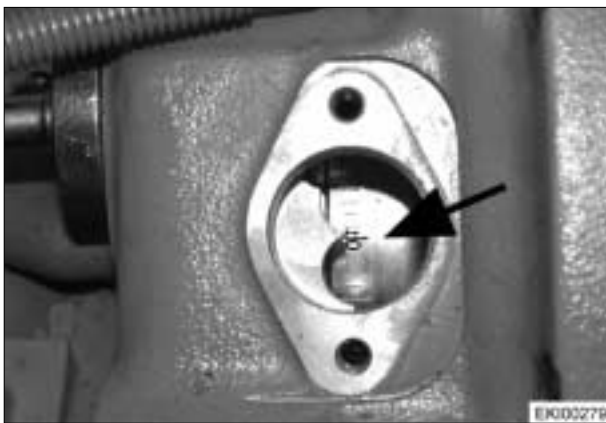


**Important:**  
 Bock injection pump. (Note sequence!)

- Loosen locking screw (Pos. A).
- Remove spacer washer (Pos. B).
- Tighten locking screw (Pos. A) .

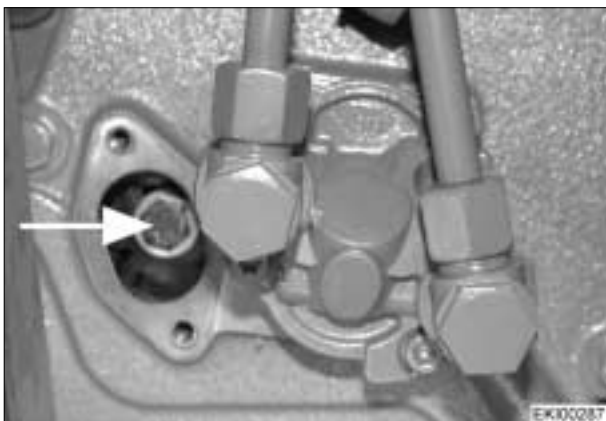


Loosen TDP screw.



Turn cankshaft further until start of delivery , TDP (+/- 0,5°) is reached.

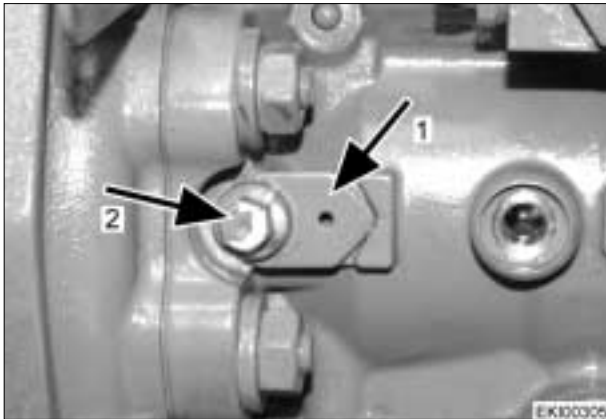
**Note:**  
 If this position cannot be reached, the injection pump drive pinion must be shifted by one tooth.  
 Chapter 2700 Reg.G (Injection pump VP44 - Replacement)



Tighten "TDP screw" at 25 Nm .

Date	Version	Page	Checking Start of Delivery VP 44	Capitel	Index	Docu-No.
01/2000	b	6/7		2710	E	000003

Fav 900	<p align="center"><b>Engine / Injection Pump</b>  <b>Checking Start of Delivery VP 44</b></p>	<p align="center"><b>E</b></p>
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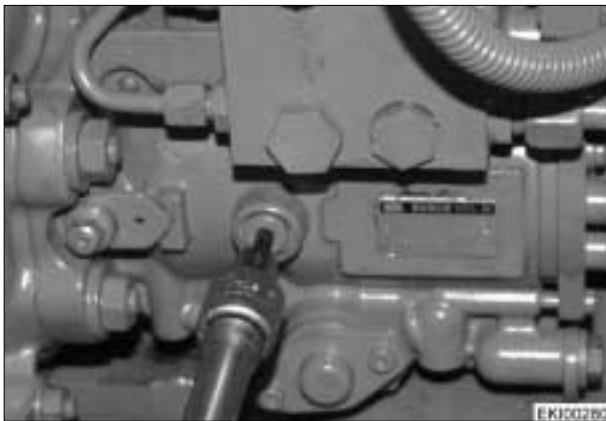


- Loosen locking screw (Pos..2)
- Put spacing washer (Pos. 1) into place
- Tighten locking screw (Pos.2) .

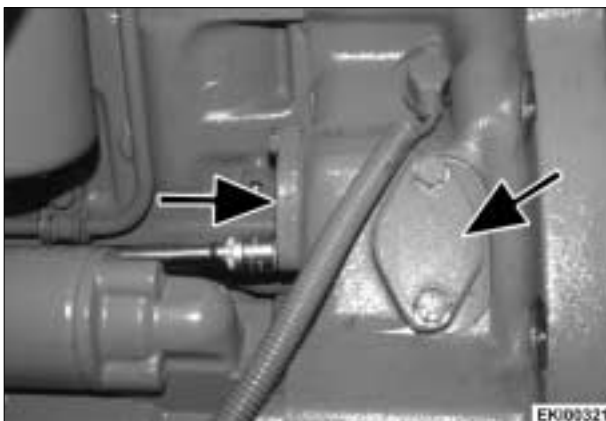
**Check start of delivery as described.**



Turn crankshaft with the actuation tool and tighten the visible screws 2,3 and 4 at 25 Nm. Put cover back in place.



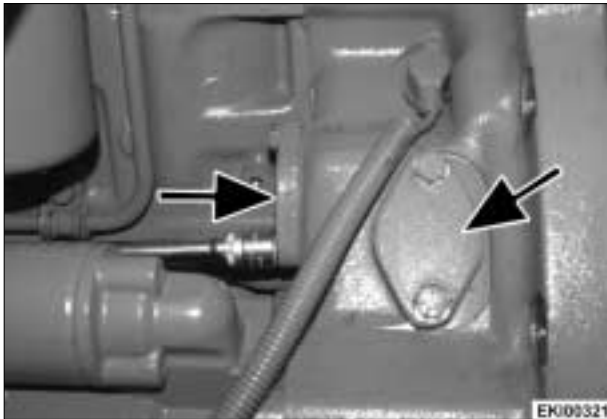
Put sealing screw TDP back into place.



Put cover (arrows) back into place.

Date	Version	Page	Checking Start of Delivery VP 44	Capitel	Index	Docu-No.
01/2000	b	7/7		2710	E	000003

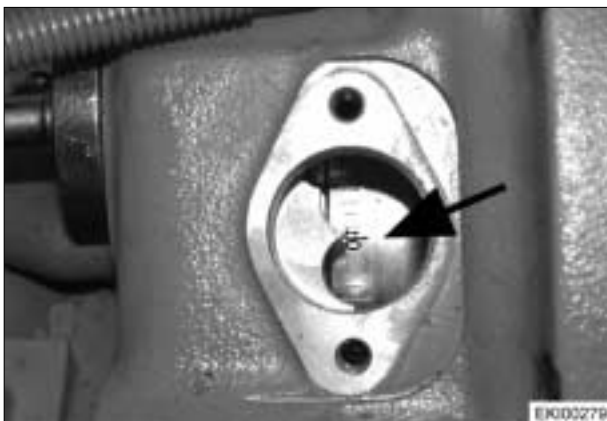
<b>Fav 900</b>	<b>Engine / Injection Pump</b> <b>Fuel Injection Pump VP 44 - Mounting - Dismounting</b>	<b>G</b>
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Remove cover (arrows - left engine side).



Put actuation tool (X 899.980.220.000) into place



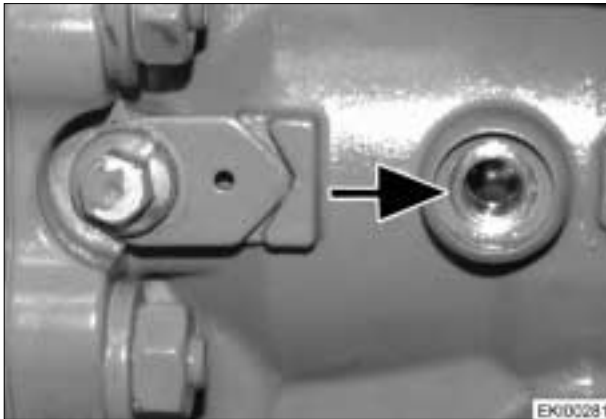
Set first cylinder into Top Dead Point position (TDP) (Arrow ) using actuation tool.



Remove screw TDP Measuring Point.

Date	Version	Page	Capitel	Index	Docu-No.	
01/2000	<b>b</b>	1/10	<b>Fuel Injection Pump VP 44 - Mounting - Dismounting</b>	<b>2710</b>	<b>G</b>	<b>000002</b>

<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Injection Pump</b>  <b>Fuel Injection Pump VP 44 - Mounting - Dismounting</b></p>	<p align="center"><b>G</b></p>
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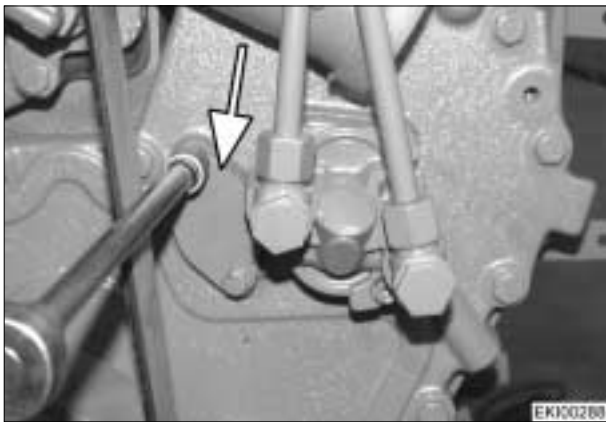


**Important:**

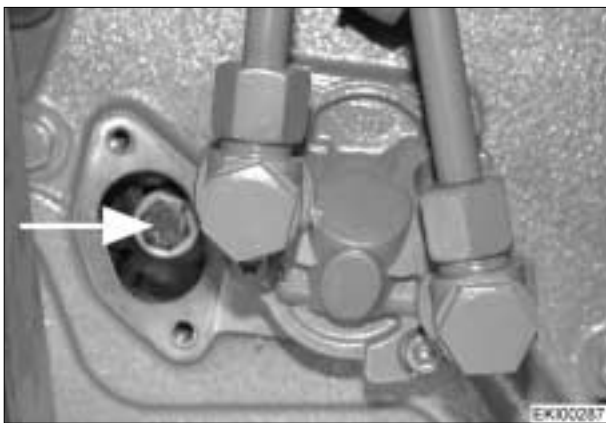
1. Cylinder will be in TDP Position, if the flat section of the control shaft appears in the TDP hole.

If the flat section does not appear on the control shaft, rotate the engine for another 360° into TDP position.

Valves of cylinder 6 (Flywheel side ) are in central position.



Remove cover



**Important:**

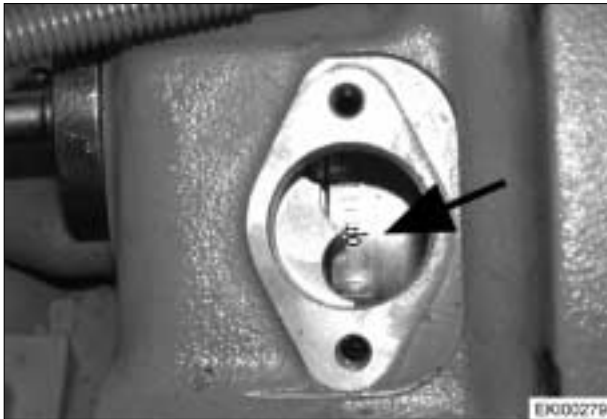
Do not loosen first visible screw M8 (TDP screw)



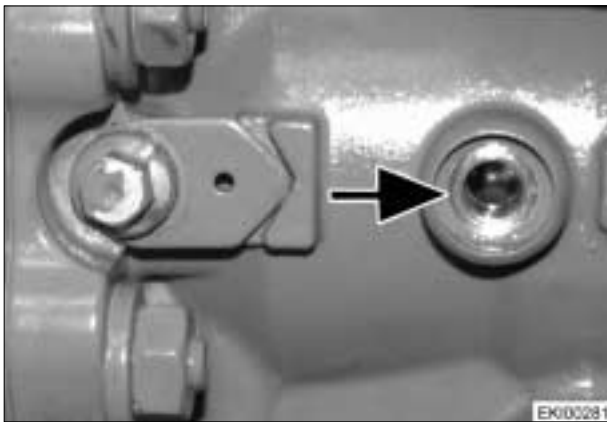
Rotate crank shaft in order to enable loosening of visible screws 2,3 and 4. (Necessary for the slantcut injection pump drive pinion)

Date	Version	Page	Fuel Injection Pump VP 44 - Mounting - Dismounting	Capitel	Index	Docu-No.
01/2000	<b>b</b>	2/10		<b>2710</b>	<b>G</b>	<b>000002</b>

Fav 900	<p align="center">Engine / Injection Pump</p> <p align="center"><b>Fuel Injection Pump VP 44 - Mounting - Dismounting</b></p>	<b>G</b>
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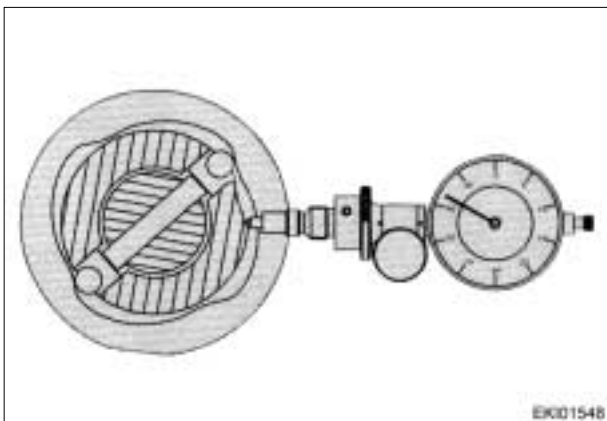
Put first cylinder into TDP position (Arrow) using the actuation tool.



**Important:**  
 1. Cylinder will be in TDP Position, if the flat section of the control shaft appears in the TDP hole

If the flat section does not appear on the control shaft, rotate the engine for another 360° into TDP position.

Valves of cylinder 6 (Flywheel side ) are in central position.



Turn back the crank shaft by at least 20° before TDP and put dial gauge with adaptor (X 899.980.245.000) into the hole of TDP.

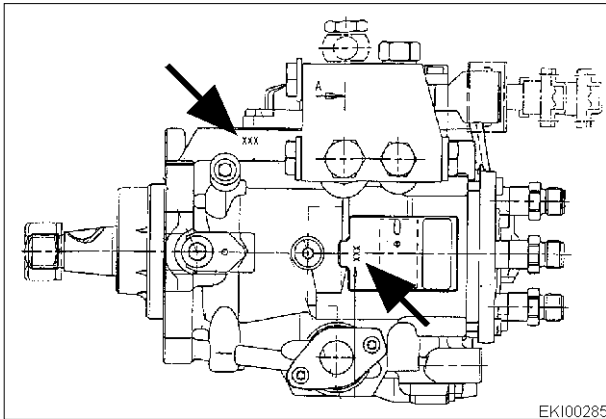
**Note:**  
 Use dial gauge with ball tip R=1mm (0.039").



Set Dial gauge onto "0".

Date	Version	Page	Capitel	Index	Docu-No.
01/2000	b	3/10	Fuel Injection Pump VP 44 - Mounting - Dismounting	2710	G 000002

Fav 900	<p align="center">Engine / Injection Pump</p> <p align="center"><b>Fuel Injection Pump VP 44 - Mounting - Dismounting</b></p>	<p align="center"><b>G</b></p>
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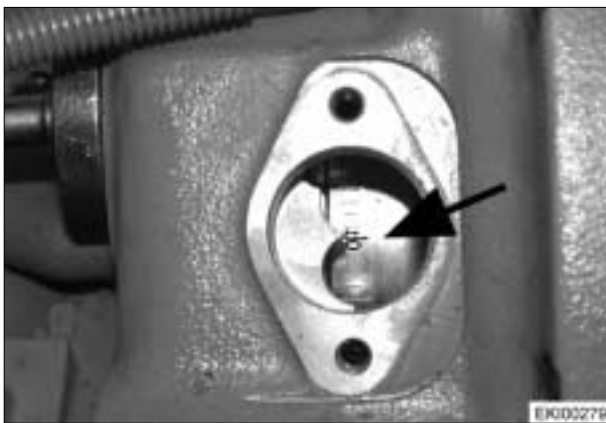


3 - digit Number. Marking (arrows) is possible on following positions.



Move crank shaft again into TDP Position until the marked displacement (X . XX) will be reached.  
 e.G.: Displacement on injection pump 0.79 means 0,79 mm (0.0311") displacement on dial gauge

**Note:**  
**Scanning rod of dial gauge reaches the flat section of the control shaft.**  
**Do not move the crank shaft any more , in order to avoid the sheering of the scanning rod.**



Start of delivery will be adequate if the flywheel is in position TDO ( $\pm 0,5^\circ$ ).  
 If this position is not correct, start of delivery point will not be correct.  
 (Check start of delivery, Chapter 2710 Reg.E)

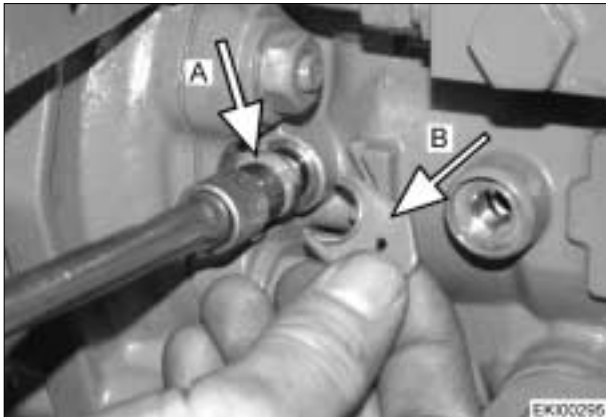


Remove dial gauge and adaptor.

Date	Version	Page	Capitel	Index	Docu-No.	
01/2000	<b>b</b>	4/10	<b>Fuel Injection Pump VP 44 - Mounting - Dismounting</b>	<b>2710</b>	<b>G</b>	<b>000002</b>

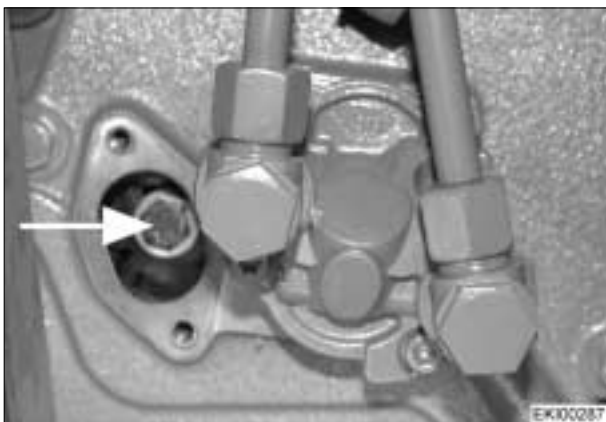


<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Injection Pump</b>  <b>Fuel Injection Pump VP 44 - Mounting - Dismounting</b></p>	<p align="center"><b>G</b></p>
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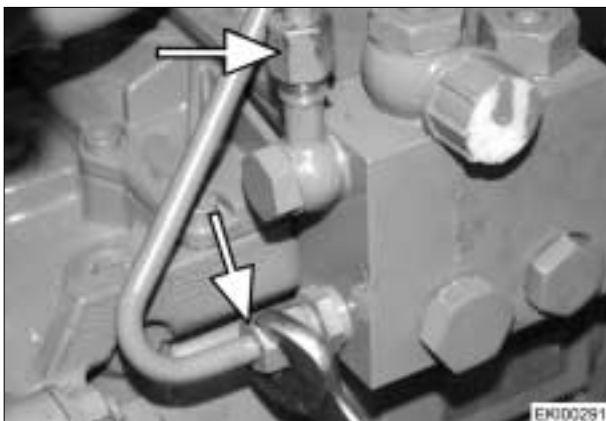


**Important:**  
**Block injection pump (follow sequence)**

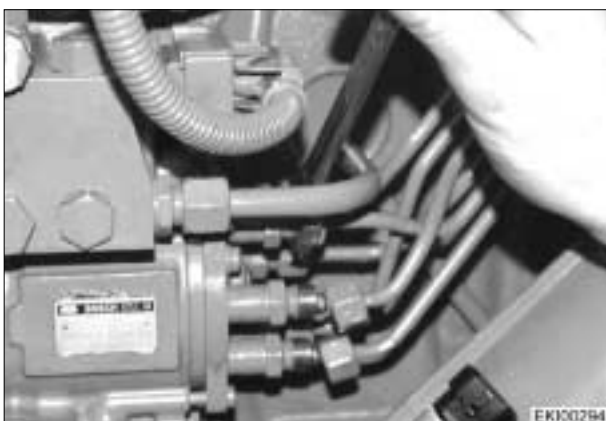
- Loosen locking screw (Pos. A).
- Remove spacing washer ( Pos. B ).
- Tighten locking screw ( Pos. A ).



Loosen "TDP screw"



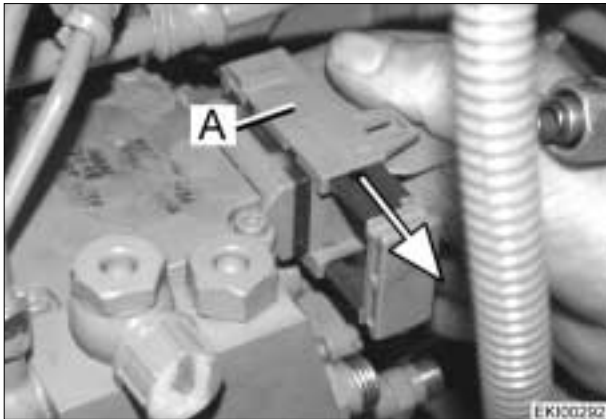
Loosen and remove "Cold Start tubing"



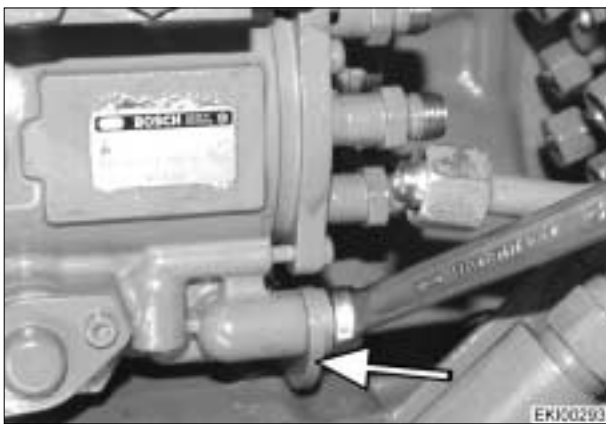
Loosen and remove injection lines.

Date	Version	Page	Capitel	Index	Docu-No.	
01/2000	<b>b</b>	5/10	<b>Fuel Injection Pump VP 44 - Mounting - Dismounting</b>	<b>2710</b>	<b>G</b>	<b>000002</b>

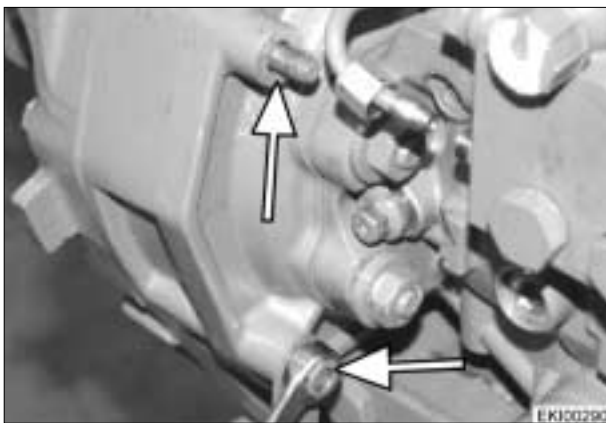
<b>Fav 900</b>	<b>Engine / Injection Pump</b> <b>Fuel Injection Pump VP 44 - Mounting - Dismounting</b>	<b>G</b>
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Pull out connector lock into arrow direction and then remove connector X046 (Pos. A) from injection pump.



Remove rear pump bracket



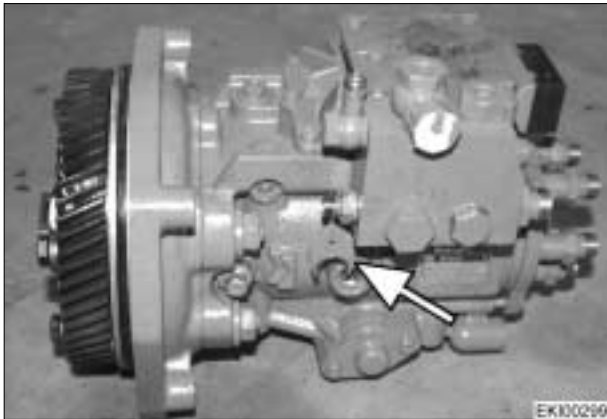
Remove 4 xnuts (M8) from pump flange (Arrows) .



Remove injection pump.

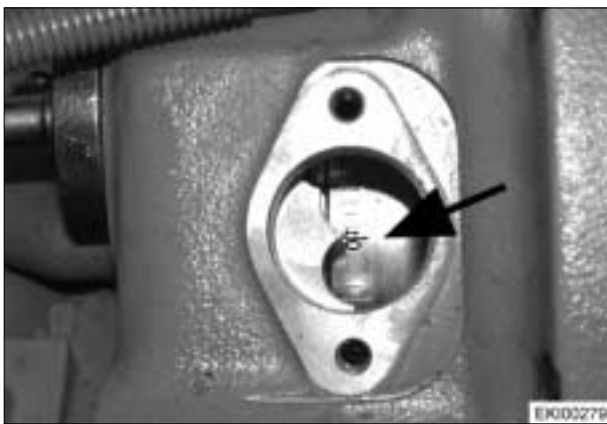
Date	Version	Page	Capitel	Index	Docu-No.	
01/2000	<b>b</b>	6/10	<b>Fuel Injection Pump VP 44 - Mounting - Dismounting</b>	<b>2710</b>	<b>G</b>	<b>000002</b>

<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Injection Pump</b>  <b>Fuel Injection Pump VP 44 - Mounting - Dismounting</b></p>	<p align="center"><b>G</b></p>
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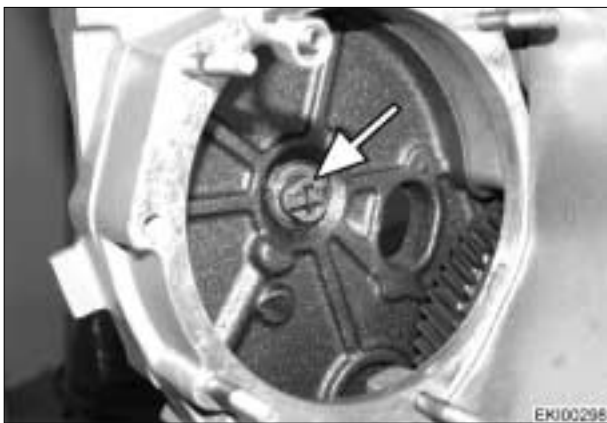


Settings of a new injection pump VP 44.

- Start of delivery from TDP of first cylinder (Fan Side) .
- Screws of injection pump drive pinion ( 4 x M8 ) are loose.
- Blocking screw is tightened without spacing washer.
- Spacing washer is tied on pump body.



Check TDP of the first cylinder.



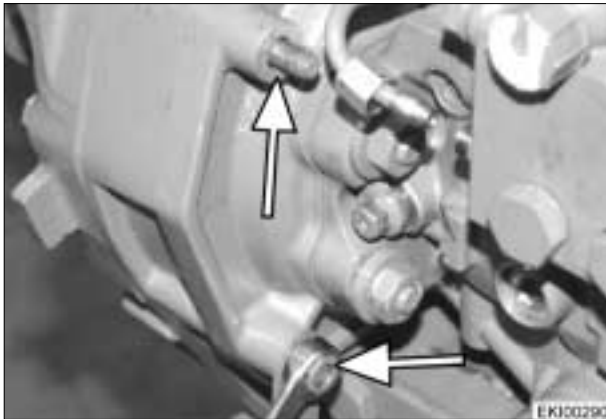
Adjust fuel lifting pump drive (arrow) as well as the injection pump drive (arrow).



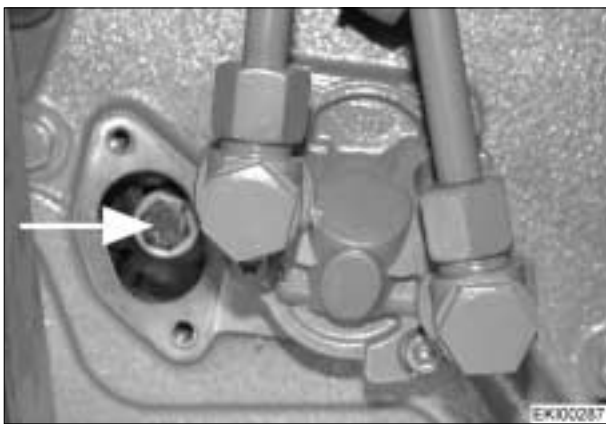
Put injection pump into place.

Date	Version	Page	Capitel	Index	Docu-No.	
01/2000	<b>b</b>	7/10	<b>Fuel Injection Pump VP 44 - Mounting - Dismounting</b>	<b>2710</b>	<b>G</b>	<b>000002</b>

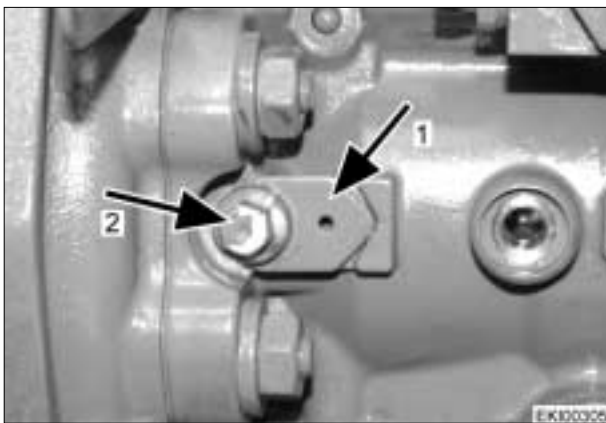
<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Injection Pump</b>  <b>Fuel Injection Pump VP 44 - Mounting - Dismounting</b></p>	<p align="center"><b>G</b></p>
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Tighten 4 x nuts (M8) from pump flange (arrows) at 25 Nm .



Tighten first visible screw (M8) at 25 Nm .



- Loosen blocking screw ( Pos. 2 ).
- Put spacing washer (Pos. 1) into place.
- Tighten blocking screw (Pos. 2).

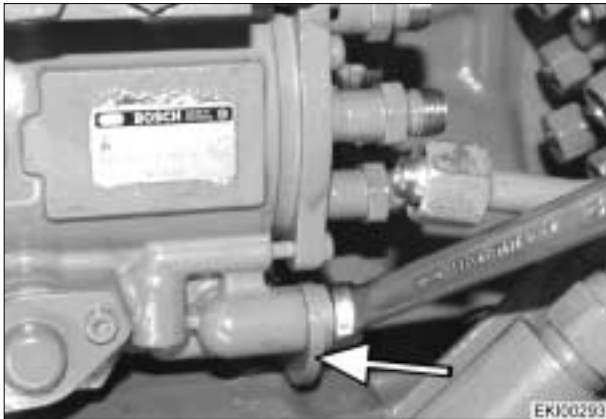


Turn crank shaft with the actuation tool and tighten visible screws 2,3 and 4 at 25 Nm . Put cover into place.

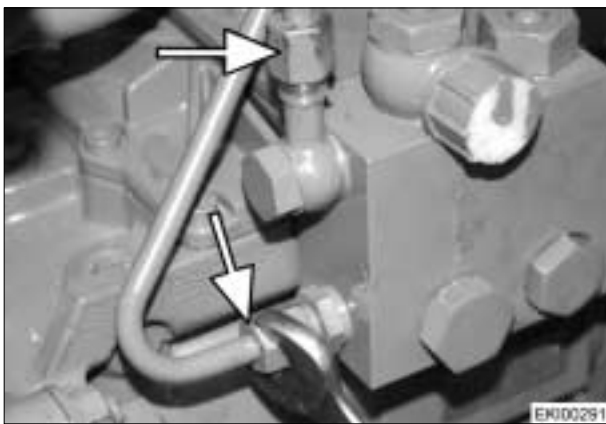
**Note:**  
**Check start of delivery point.**

Date	Version	Page	Fuel Injection Pump VP 44 - Mounting - Dismounting	Capitel	Index	Docu-No.
01/2000	<b>b</b>	8/10		<b>2710</b>	<b>G</b>	<b>000002</b>

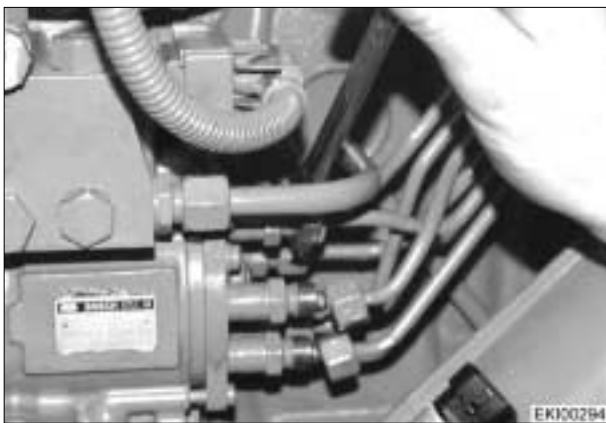
<b>Fav 900</b>	<b>Engine / Injection Pump</b> <b>Fuel Injection Pump VP 44 - Mounting - Dismounting</b>	<b>G</b>
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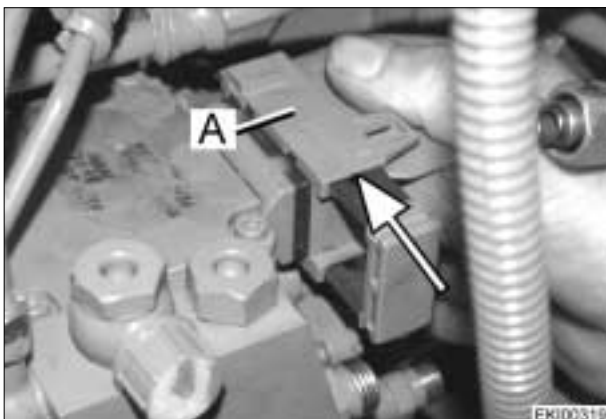
Put rear pump bracket into place.



Put cold start lines into place



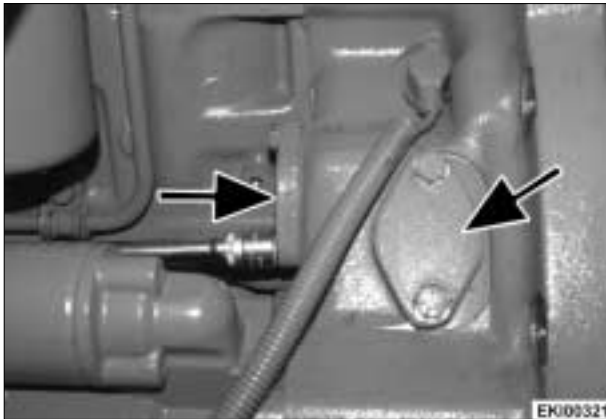
Put Injection lines into place.



Connect connector X046 (Pos. A) onto injection pump and put locking pin into place (arrow).

Date	Version	Page	Capitel	Index	Docu-No.	
01/2000	<b>b</b>	9/10	<b>Fuel Injection Pump VP 44 - Mounting - Dismounting</b>	<b>2710</b>	<b>G</b>	<b>000002</b>

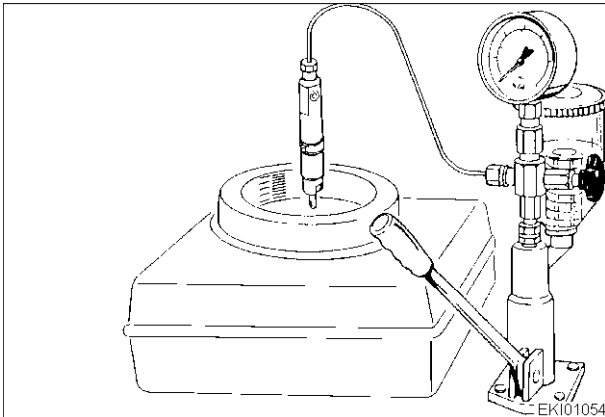
<b>Fav 900</b>	<p align="center">Engine / Injection Pump</p> <p><b>Fuel Injection Pump VP 44 - Mounting - Dismounting</b></p>	<b>G</b>
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**Note:**  
 Purge air from the fuel supply system.  
 Chapter 2060 Reg. G

Date	Version	Page	Capitel	Index	Docu-No.	
01/2000	<b>b</b>	10/10	<b>Fuel Injection Pump VP 44 - Mounting - Dismounting</b>	<b>2710</b>	<b>G</b>	<b>000002</b>

<b>Fav 900</b>	<b>Engine / Injection valves</b> <b>Checking injection nozzles</b>	<b>E</b>
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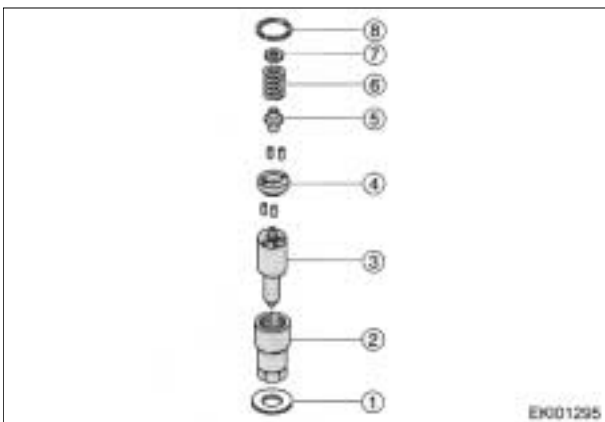
**Checking injection nozzles**

With injection nozzle tester (manual test appliance) check nozzle for :

- - opening pressure (spray pressure)
- - leak tightness and
- - spray pattern.

Use clean test oil or diesel fuel.

Before testing, clean nozzle and check for wear.



- 1 = Seal
- 2 = Nozzle tensioning nut
- 3 = Injection nozzle
- 4 = Intermediate washer
- 5 = Pressure pin
- 6 = Compression spring
- 7 = Compensating washer
- 8 = Circlip

Check nozzle and its holder

Fit nozzle inlet connection to pressure line of test appliance

**Warning:**  

**The high injection pressure may cause severe injury.**  
**Never touch the spray pattern!**  
**Wear safety goggles!**

1. Check opening pressure :

Connect pressure gauge , push hand lever down slowly until the nozzle ejects spray, vibrating slightly. Read off **Opening pressure** on the pressure gauge. If necessary, insert new washer.

If the pressure is too low, use a thinner washer (7), for excessive pressure use a thicker one.

High operating hours cause a reduction in the tension of the spring(6).

Which in turn slightly reduces the injection pressure. When repairing nozzles, always set opening pressure at the upper limit (+8bars).

**Note:**

**Washers with 0,01mm (.0004") increments are available from 1,0 to 1,99 mm (.039" to .78").**

2. Check for leaks :

Operate the hand lever.

At 20 bar (290 PSI) below the specified opening pressure the nozzle must be free from droplets for 10 secs.

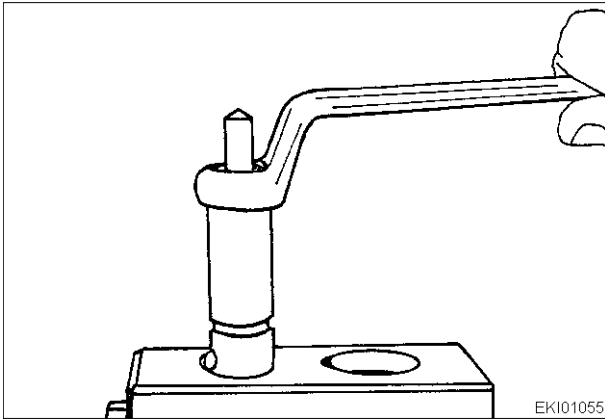
3. Check jet :

With the pressure gauge **switched off** apply fast pumping movements: The nozzle should vibrate audibly and/or have even spray pattern.

Date	Version	Page	Checking injection nozzles	Capitel	Index	Docu-No.
05.02.2001	a	1/3		2712	E	000001

Fav 900	<p align="center"><b>Engine / Injection valves</b> <b>Checking injection nozzles</b></p>	<p align="center"><b>E</b></p>
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Nozzles meeting these three requirements may be used again.

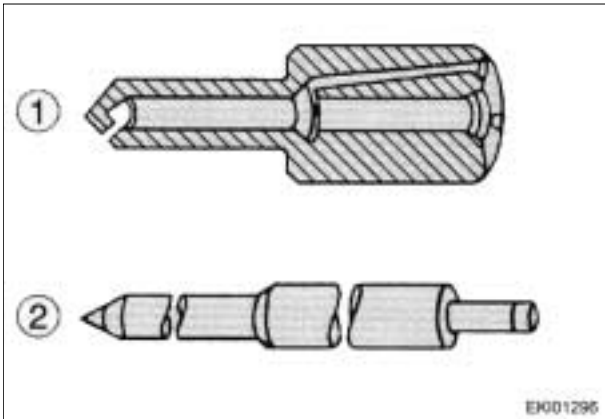


**Dismantling injection nozzle**

With the inlet opening facing downwards, fit nozzle holder and nozzle assembly into the holding device and clamp unit into the vise.

Unscrew threaded union, remove nozzle body, intermediate washer, pressure screw, compression spring and adjusting washer.

Remove the pressure pipe from the vise.



**Overhauling injection nozzles**

using a small piece of wood and petroleum or diesel fuel, clean interior of nozzle (1).

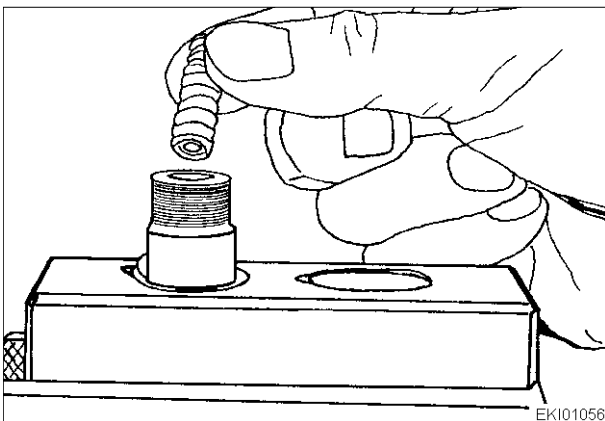
With a clean rag remove dirt from needle valve (2). Coked up needle sections can be placed on a lathe and cleaned with a soft wooden stick dipped in oil.

**Note:**

**To prevent corrosion, do not touch rectified surfaces of the needle valve.**

**Needles and nozzles are paired and must not be interchanged.**

Check clean components for wear and damage ; replace if necessary. Degrease all new parts.

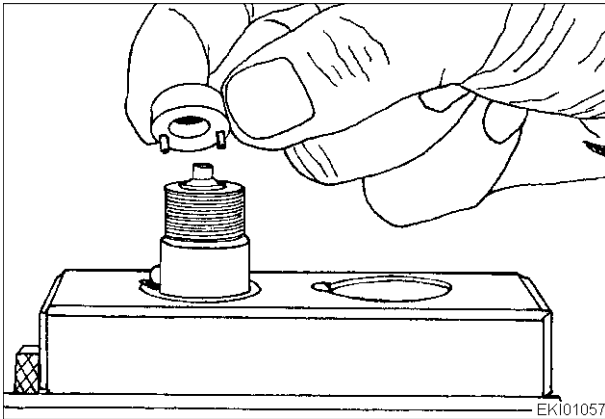


**Reassembling injection nozzle**

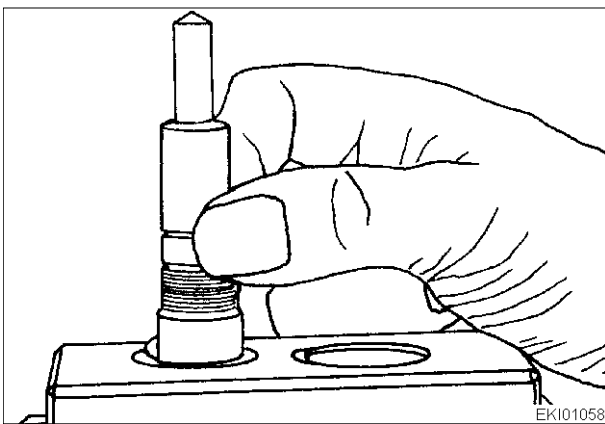
Remove pressure pipe connector from the vise and refit compression spring and adjusting washer.



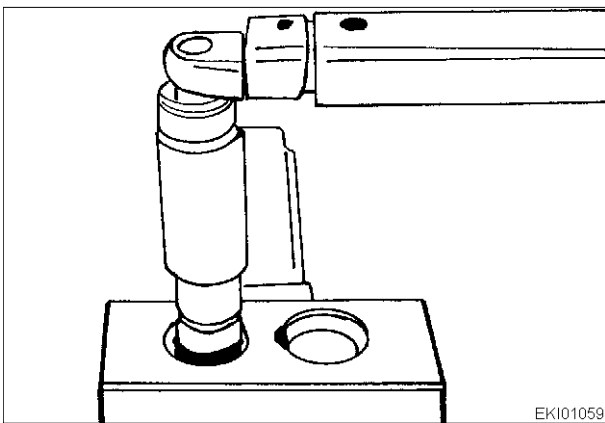
Fav 900	<p align="center">Engine / Injection valves <b>Checking injection nozzles</b></p>	<p align="center"><b>E</b></p>
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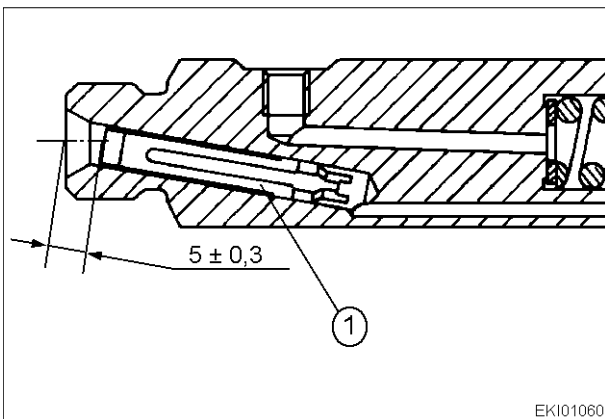
Test intermediate washer for wear.  
Fit pressure pin and intermediate washer.



Dip nozzle and needle separately into filtered diesel fuel, and check slide resistance.  
When the needle is withdrawn from the nozzle body by one third and released, it must drop back into the position by its own weight.  
Fit injection nozzle observing the location of pins.



Screw on threaded union and tighten to specified torque.  
Check injection nozzle on the test appliance.



**Observe correct seating of filter in the nozzle holder.**

The cause for these problems may well be due to an off-center filter in the nozzle holder. The injection flow is throttled and slowed down, leading to engine problems.

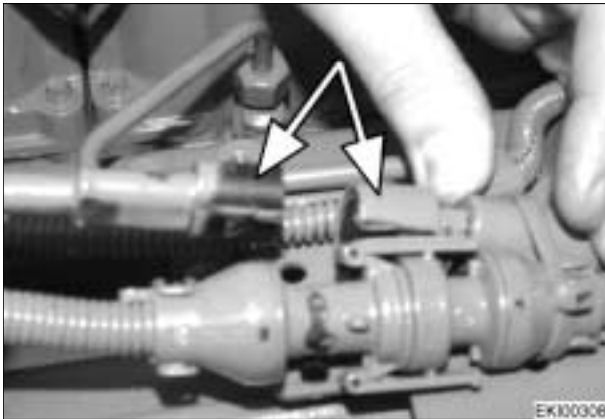
Always measure the press-in depth of the filter in the nozzle holder inlet.

The permissible press-in depth is approx. 5 mm (.197").

If the filter can be inserted further, the nozzle holder must be replaced.

Date	Version	Page	Checking injection nozzles	Capitel	Index	Docu-No.
05.02.2001	a	3/3		2712	E	000001

<p><b>Fav 900</b></p>	<p align="center"><b>Engine / Injetion valves</b>  <b>Replacing Injection valve with needle Motion sensor</b></p>	<p align="center"><b>G</b></p>
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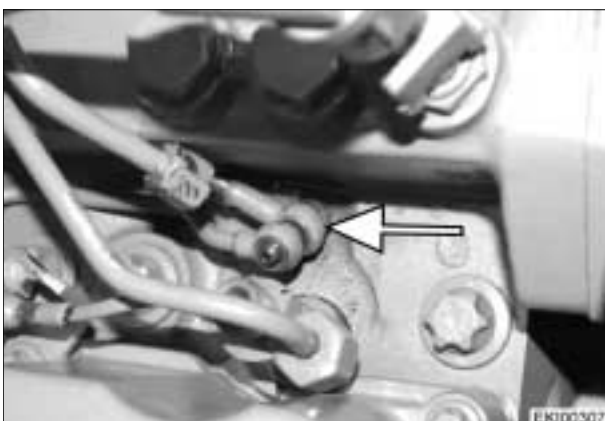
Disconnect connector X173 ( Needle motion sensor EDC ).



Disconnect fuel line from injector



Disconnect return lines from **all** Injectors.



Push return line in the direction of arrow.

Date	Version	Page	Capitel	Index	Docu-No.	
01/2000	<b>a</b>	1/3	<b>Replacing Injection valve with needle Motion sensor</b>	<b>2712</b>	<b>G</b>	<b>000002</b>

<b>Fav 900</b>	<b>Engine / Injetion valves</b> <b>Replacing Injection valve with needle Motion sensor</b>	<b>G</b>
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Lead Cable through special tool ( MAN 80996030246 ), Place special tool and unscrew the injector.



New Injector and Needle Motion Sensor



Place a new copper gasket.  
Grease an put new gasket into place.

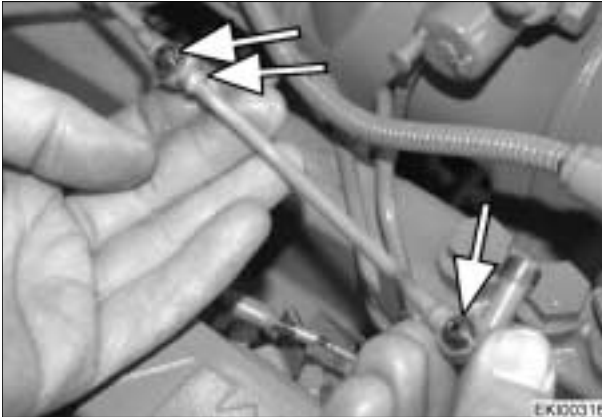


Lead Cable through special tool ( MAN 80996030246 ), Place special tool and tighten the injector.

Date	Version	Page	Capitel	Index	Docu-No.
01/2000	<b>a</b>	2/3	<b>2712</b>	<b>G</b>	<b>000002</b>

Fav 900

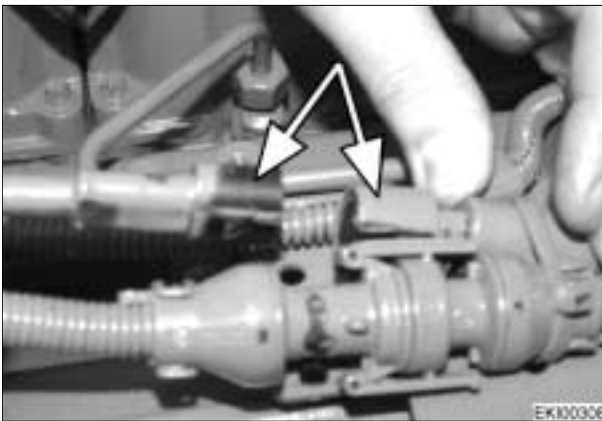
Engine / Injection valves  
**Replacing Injection valve with needle Motion sensor**

**G**

Put new "usit" gaskets on the hollow screw on both sides of the return line .



Put return Linmes back into place.



Connect connector X173 ( Needle motion sensor EDC ).



Put fuel line from injector into place.

**Important:**  
**Purge air from the fuel supply system using the manual pump.**

Date	Version	Page	Capitel	Index	Docu-No.	
01/2000	a	3/3	Replacing Injection valve with needle Motion sensor	2712	G	000002

# FENDT

**WERKSTATTHANDBUCH  
WORKSHOPMANUAL  
MANUEL D'ATELIER  
MANUAL DE TALLER  
MANUALE PER L'OFFICINA**

## ***FAVORIT 900***

**916** chassis no. 23/3001 and up

**920** chassis no. 23/3001 and up

**924** chassis no. 23/3001 and up

**926** chassis no. 23/3001 and up

**Note:**

**If not noted otherwise, is the document valid for the North-America version also (chassis no. 9xx/24/xxxx)**

Ausgabe 12/2001 Edition

# 2

**Xaver FENDT GmbH & CO.**

Ein Unternehmen der AGCO-Corp.

Maschinen- und Schlepperfabrik, Marktoberdorf / Bayern Germany

Postfachadresse: D-87609 Marktoberdorf, Postfach 1155

Telefon (0 83 42) 77-0      Telefax (0 83 42) 77-2 22 (Kundendienst)

Bestell-Nr. / order no. / no. De comande / no. Die ordinazione

X 990.005.040.010 en

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Front axle / Suspension  <b>Control system function charts</b></p>	<p><b>A</b></p>
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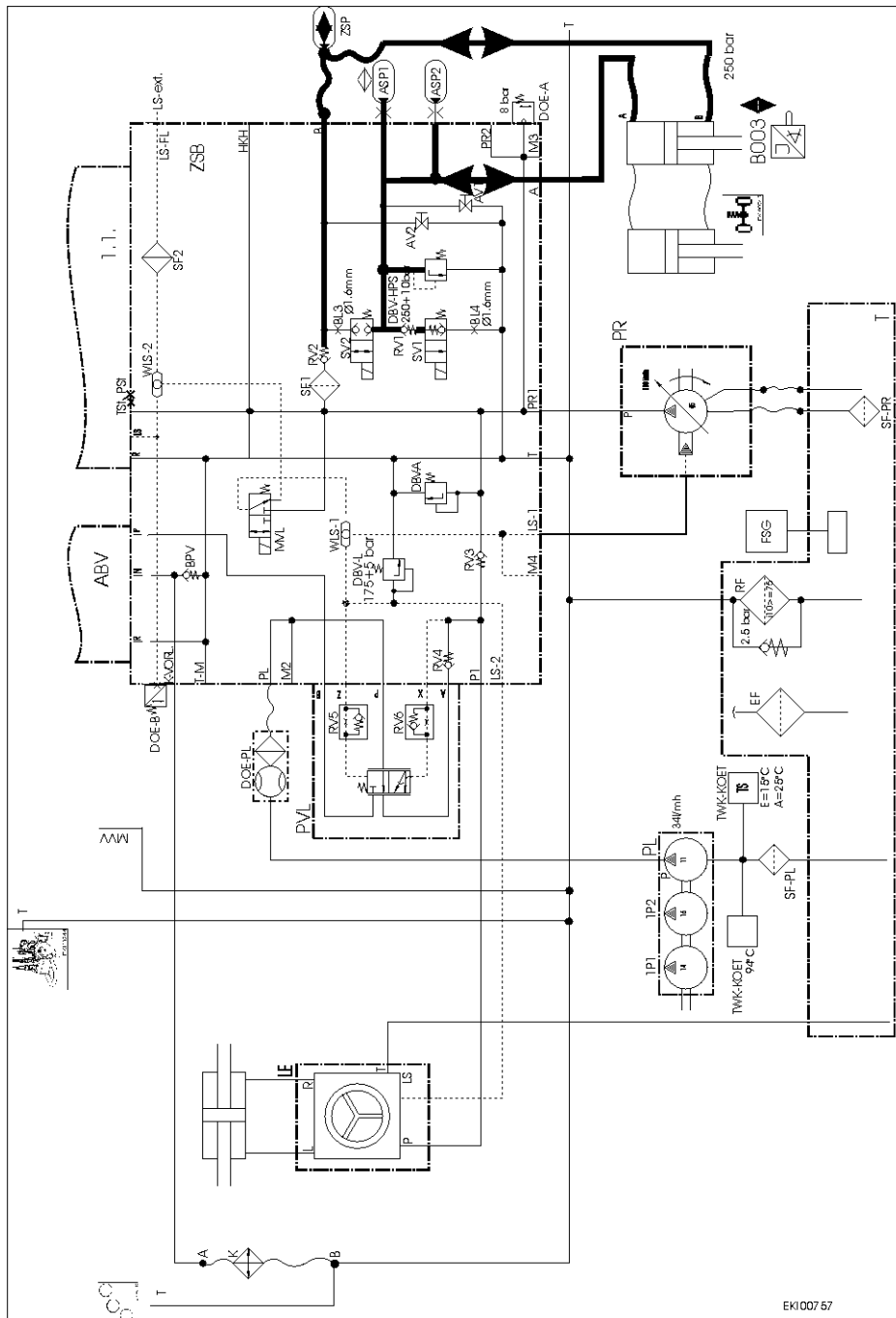
**Operational status: Tractor suspension operational**

Key: The active position of the relevant valves is marked.

Note: The FARMER 400 has just one suspension cylinder, and thus only one accumulator, ASP1, is available.

**Function**

- Springing = oil passes between cylinder and nitrogen diaphragm accumulator
- Peak pressures are limited to 250 bar by pressure-relief valve DBV-HPS.
- Relevant e-box continuously determines average of all movements (position sensor B003).
- Any deviations (longer than 1.5 seconds) from level-controlled mid-position trigger correction (=raise).



Date	Version	Page	Control system function charts	Capitel	Index	Docu-No.
28.11.2000	a	1/5		3050	A	000001

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Front axle / Suspension  <b>Control system function charts</b></p>	<p><b>A</b></p>
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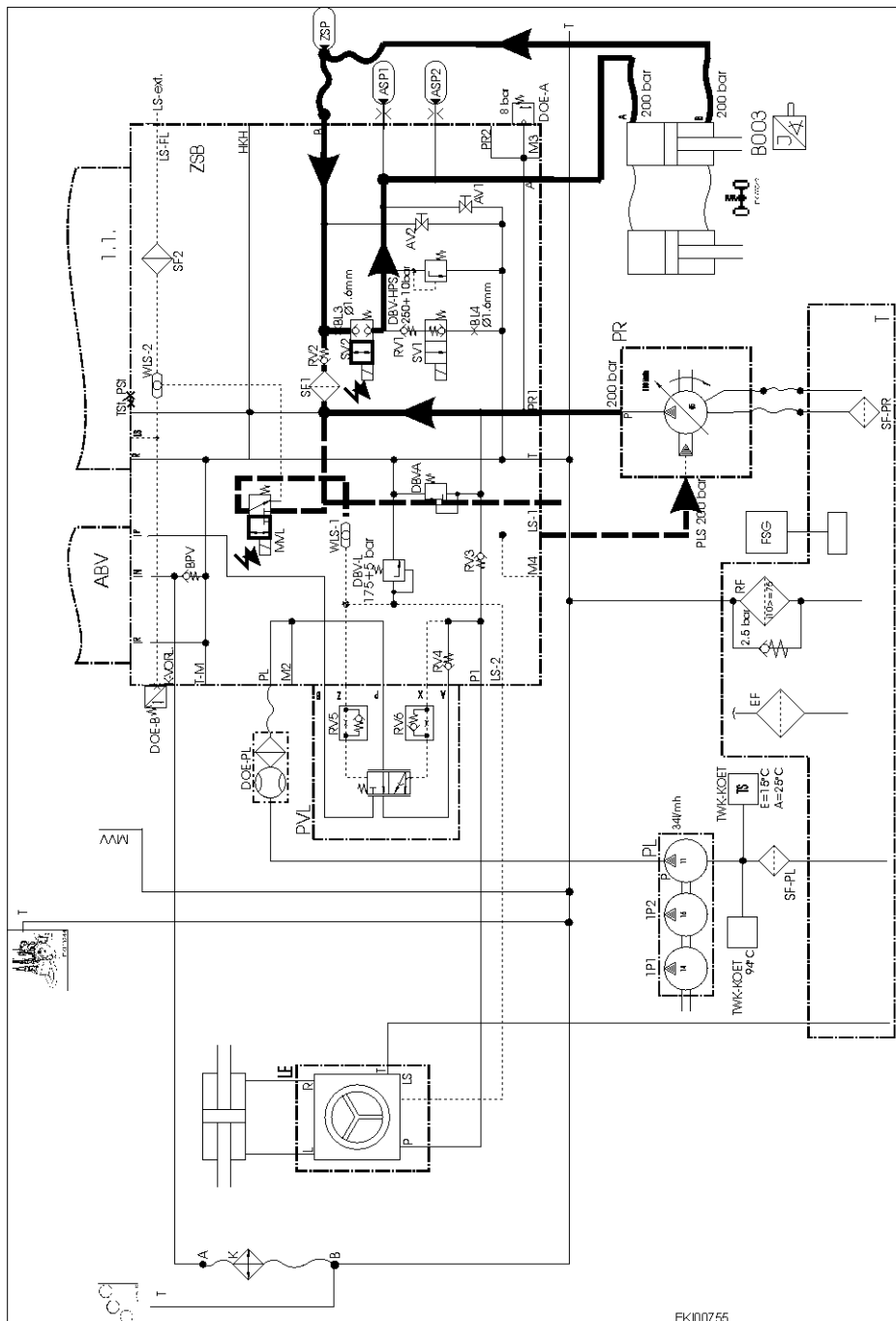
**Operational status: "Raise"**

Key: The active position of the relevant valves is marked.

Note: The FARMER 400 has just one suspension cylinder, and thus only one accumulator, ASP1, is available.

**Function.**

- Charge valve MVL/Y012 activates LS pump PR.
- Fast-motion system when raising suspension ensures that oil displaced on rod side is fed back into shutoff valve RV2.
- Flow rate through aperture BL 3 determines lifting speed.



Date	Version	Page	Control system function charts	Capitel	Index	Docu-No.
28.11.2000	a	2/5		3050	A	000001

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Front axle / Suspension  <b>Control system function charts</b></p>	<p><b>A</b></p>
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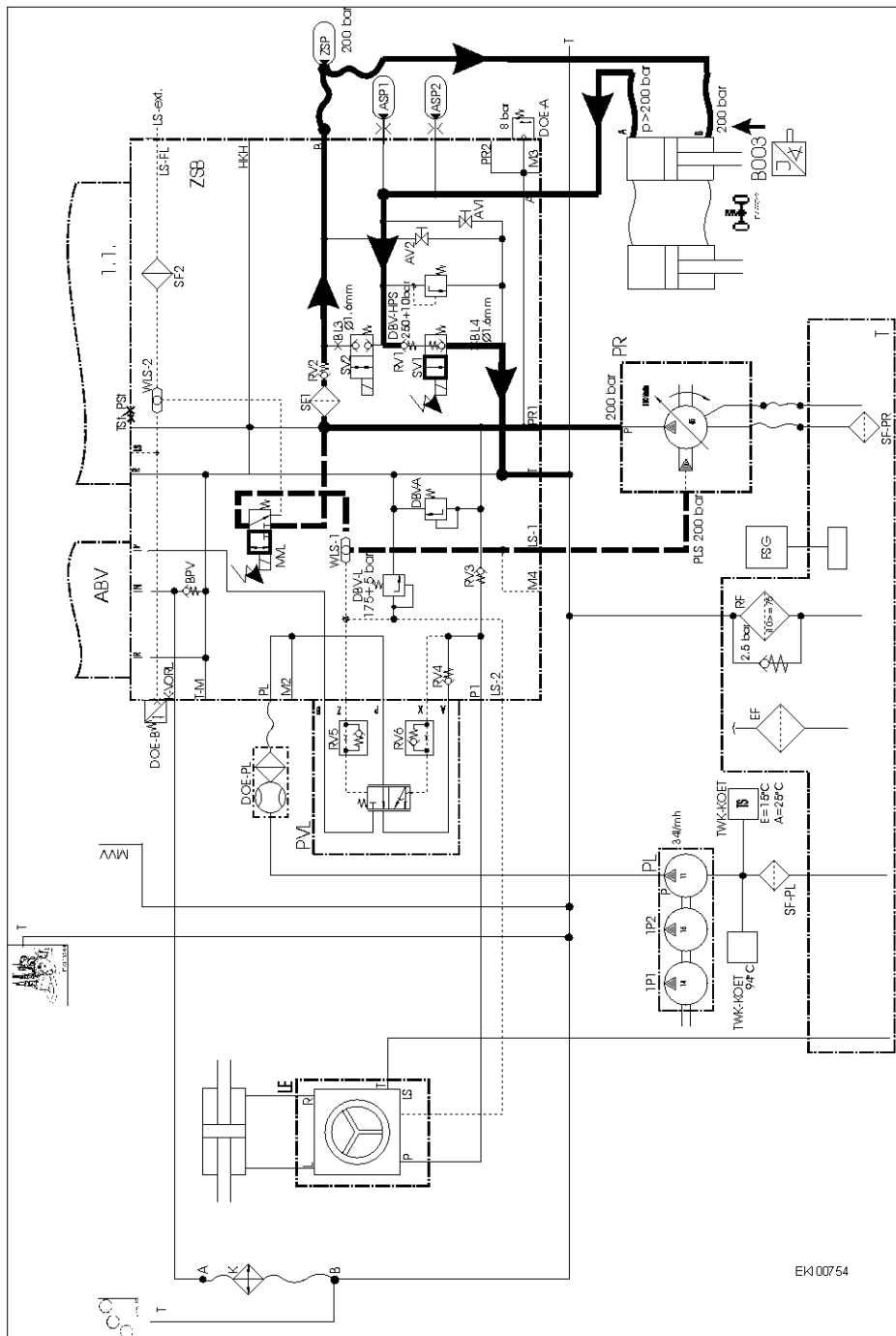
**Operational status: "Lower"**

Key: The active position of the relevant valves is marked.

Note: The FARMER 400 has just one suspension cylinder, and thus only one accumulator, ASP1, is available.

**Function**

- Lower suspension (=lock) means "Draw axle in hydraulically".
- Charge valve MVL/Y012 activates LS pump PR.
- Flow rate through aperture BL 4 determines lowering speed.



EK100754

Date	Version	Page	Control system function charts	Capitel	Index	Docu-No.
28.11.2000	a	3/5		3050	A	000001



<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Front axle / Suspension  <b>Control system function charts</b></p>	<p>A</p>
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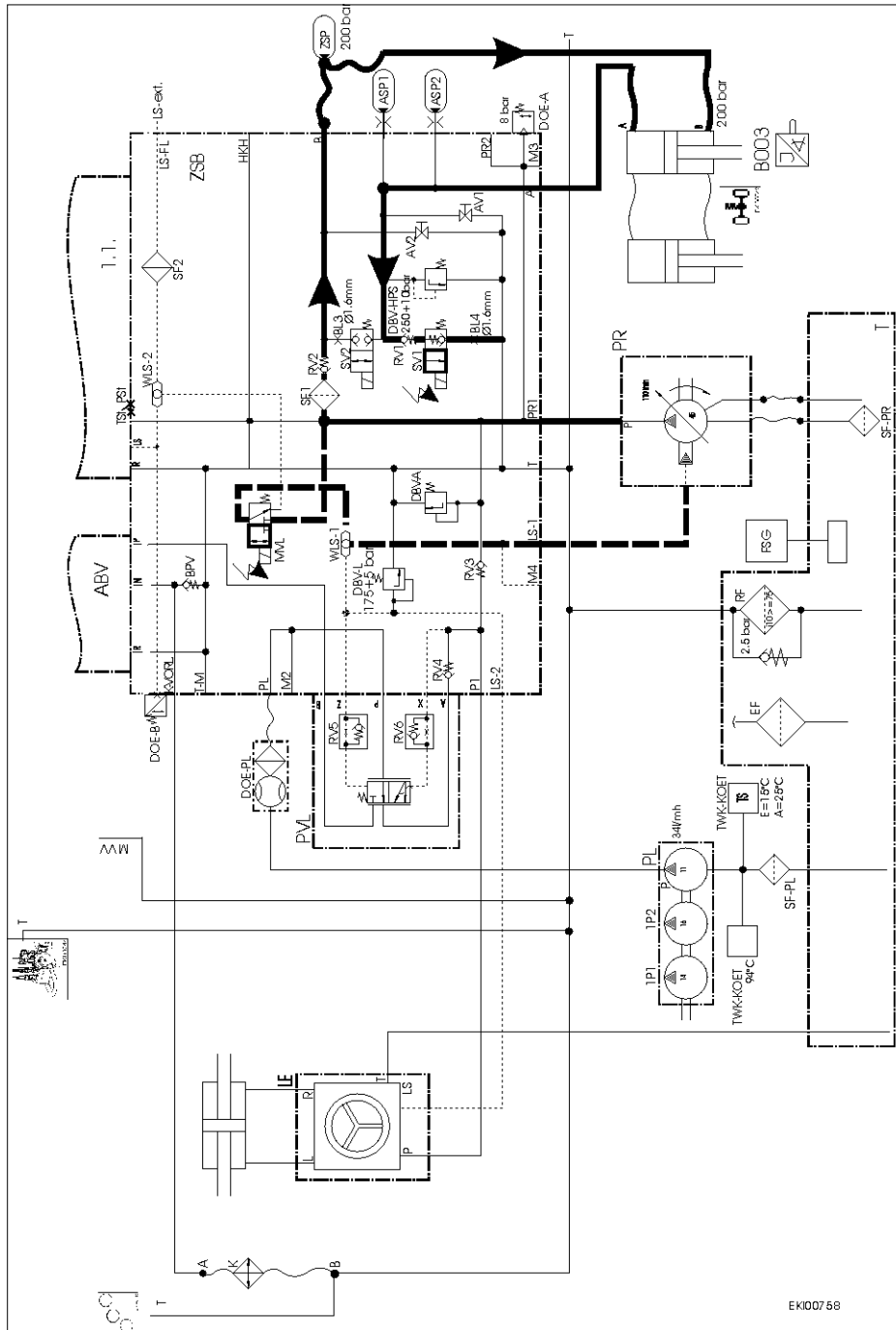
**Operational status: "Locking suspension at end position"**

Key: The active position of the relevant valves is marked.

Note: The FARMER 400 has just one suspension cylinder, and thus only one accumulator, ASP1, is available.

**Function**

- "Lower" command remains active for 2 more seconds on reaching end position, i.e. axle is hydraulically locked with suspension cylinder.



Date	Version	Page	Control system function charts	Capitel	Index	Docu-No.
28.11.2000	a	4/5		3050	A	000001

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Front axle / Suspension  <b>Control system function charts</b></p>	<p><b>A</b></p>
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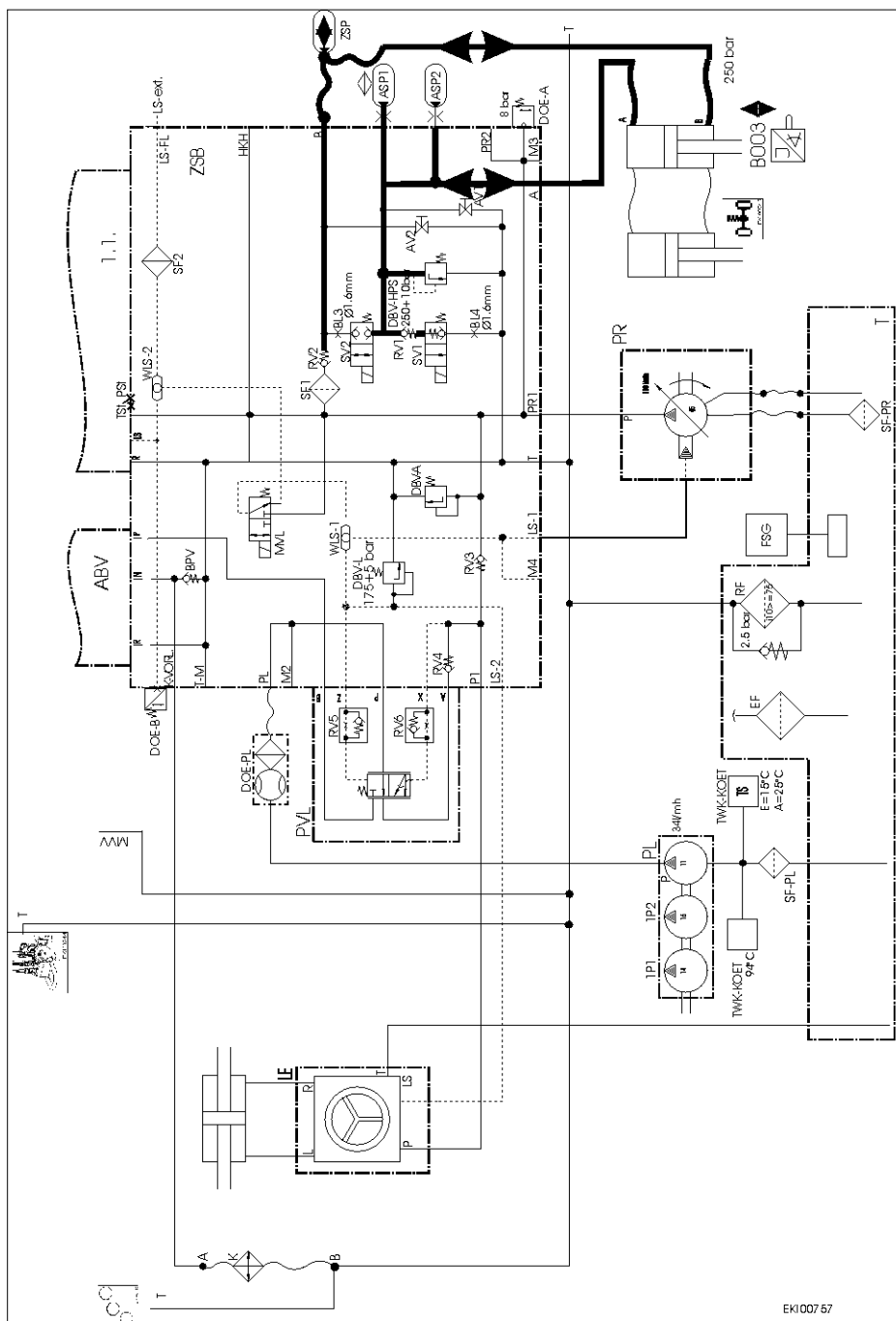
**Operational status: "Suspension locked" = "Suspension OFF"**

Key: The active position of the relevant valves is marked.

Note: The FARMER 400 has just one suspension cylinder, and thus only one accumulator, ASP1, is available.

**Function**

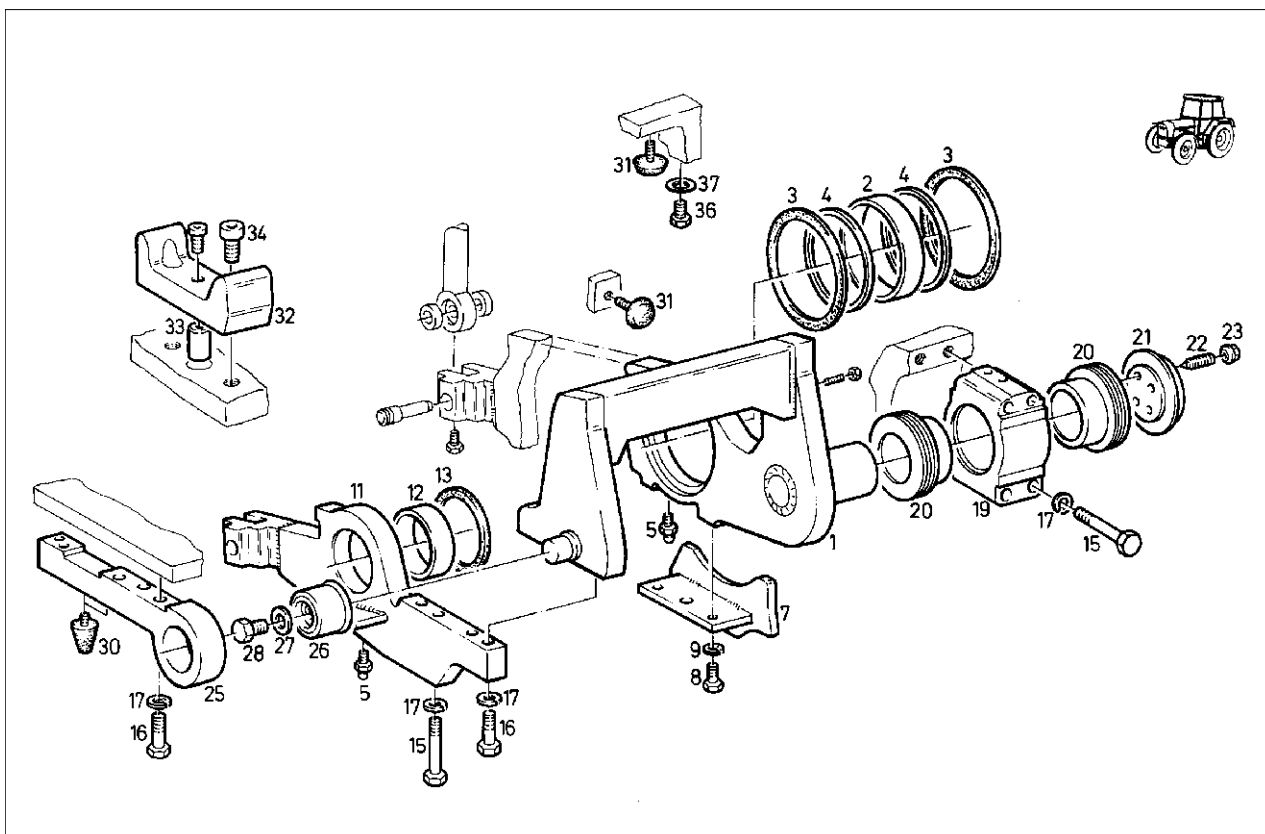
- Axle is hydraulically locked, there is a constant pressure of 200 bar on rod side.
- This pressure cannot be relieved by key command or by switching engine off.
- This 200 bar pressure with accumulator volume ZSP (=energy!) must always be relieved when repair work is carried out between front-axle suspension and central control block ZSB!
- To do so, open stopcocks AV1 and AV2. This causes pressure in central control block to be discharged to tank.
- See also "Safety instructions" - Chapter 0000 Index A



Date	Version	Page	Control system function charts	Capitel	Index	Docu-No.
28.11.2000	a	5/5		3050	A	000001

Fav 800  
Fav 900Front axle / Suspension  
Installation and removal of cross-member

G

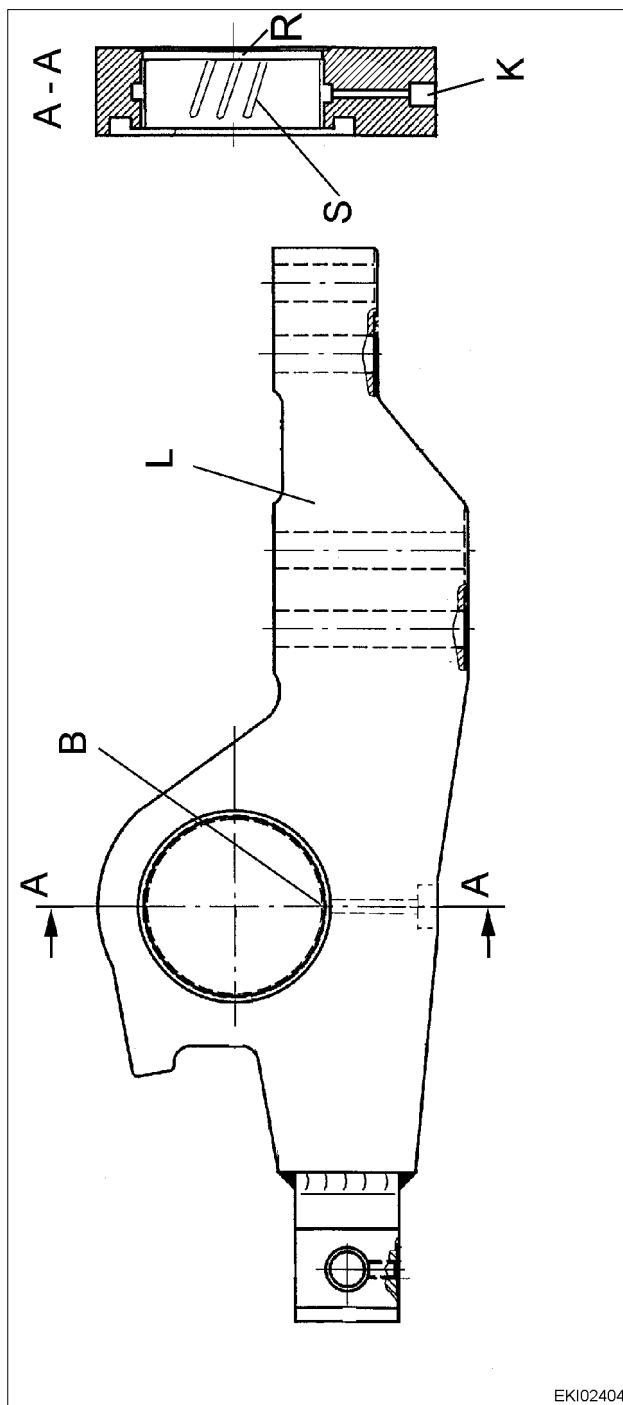


Item	Designation	Item	Designation
1	Cross-member	20	Flanged bush
2	Bush	21	Washer
3	Sealing ring	22	Stud bolt
4	Thrust ring	23	Wheel nut
5	Lubricator	25	Support
7	Cardan shaft guard	26	Bush
8	M12x40-8.8 hexagon screw	27	Washer
9	Spring washer	28	M16x50-8.8 hexagon screw
11	Bearing plate	30	Snubber
12	Bush	31	Snubber
13	Sealing ring	32	Stop
15	M20x150-10.9 hexagon screw	33	Pin
16	M20x90-10.9 hexagon screw	34	M20x50-10.9 socket head cap screw
17	Spring washer	36	M20x30-8.8 hexagon screw
19	Bearing block	37	Washer

Date	Version	Page	Capitel	Index	Docu-No.
06.10.2001		1/3	3050	G	000002

Fav 800  
Fav 900Front axle / Suspension  
Installation and removal of cross-member

G

**Note:**

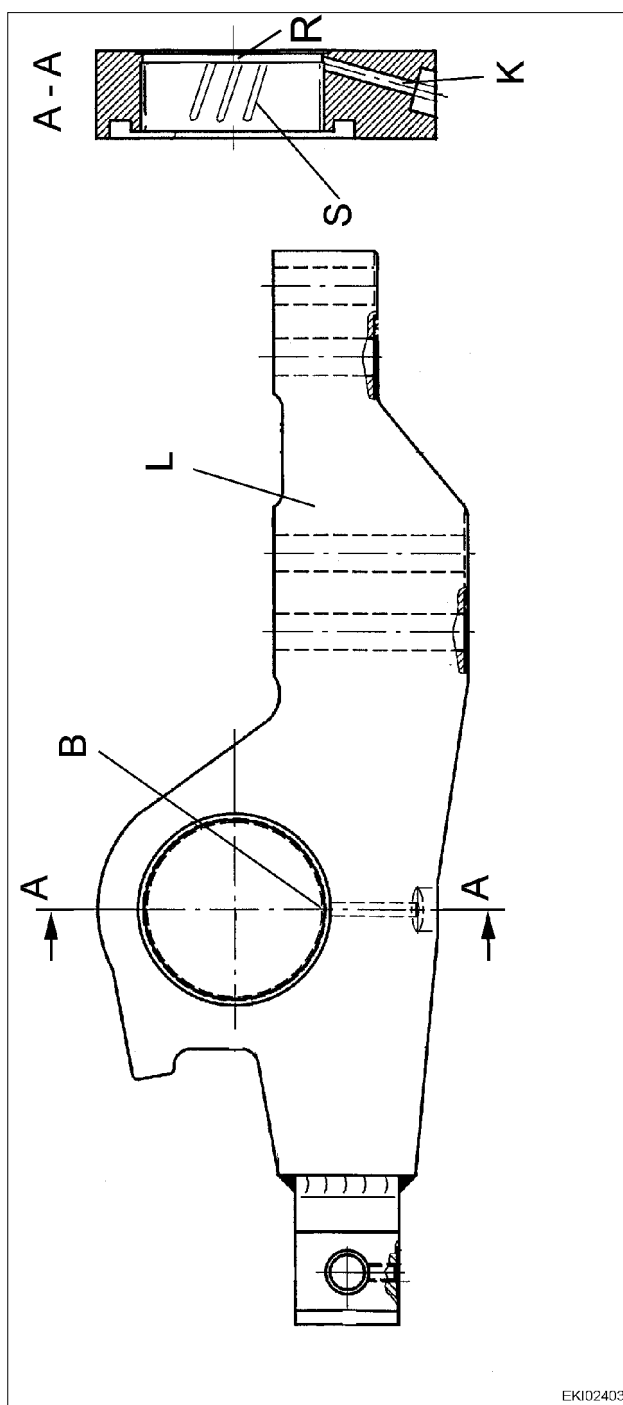
When fitting "version A" bearing plate (L) installation position of bush (B) must be noted!

Item	Designation	Fitting tip
L	Bearing plate	
B	Bush	Gap at joint of bush (B) lies above lubrication channel (K) Open side of oil grooves (S) faces lubricant chamber (R)

Date	Version	Page	Capitel	Index	Docu-No.
06.10.2001		2/3	3050	G	000002

Fav 800  
Fav 900Front axle / Suspension  
Installation and removal of cross-member

G

**Note:**

When fitting "version B" bearing plate (L) installation position of bush (B) must be noted!

Item	Designation	Fitting tip
L	Bearing plate	
B	Bush	Gap at joint of bush (B) lies above lubrication channel (K) Open side of oil grooves (S) faces lubricant chamber (R)

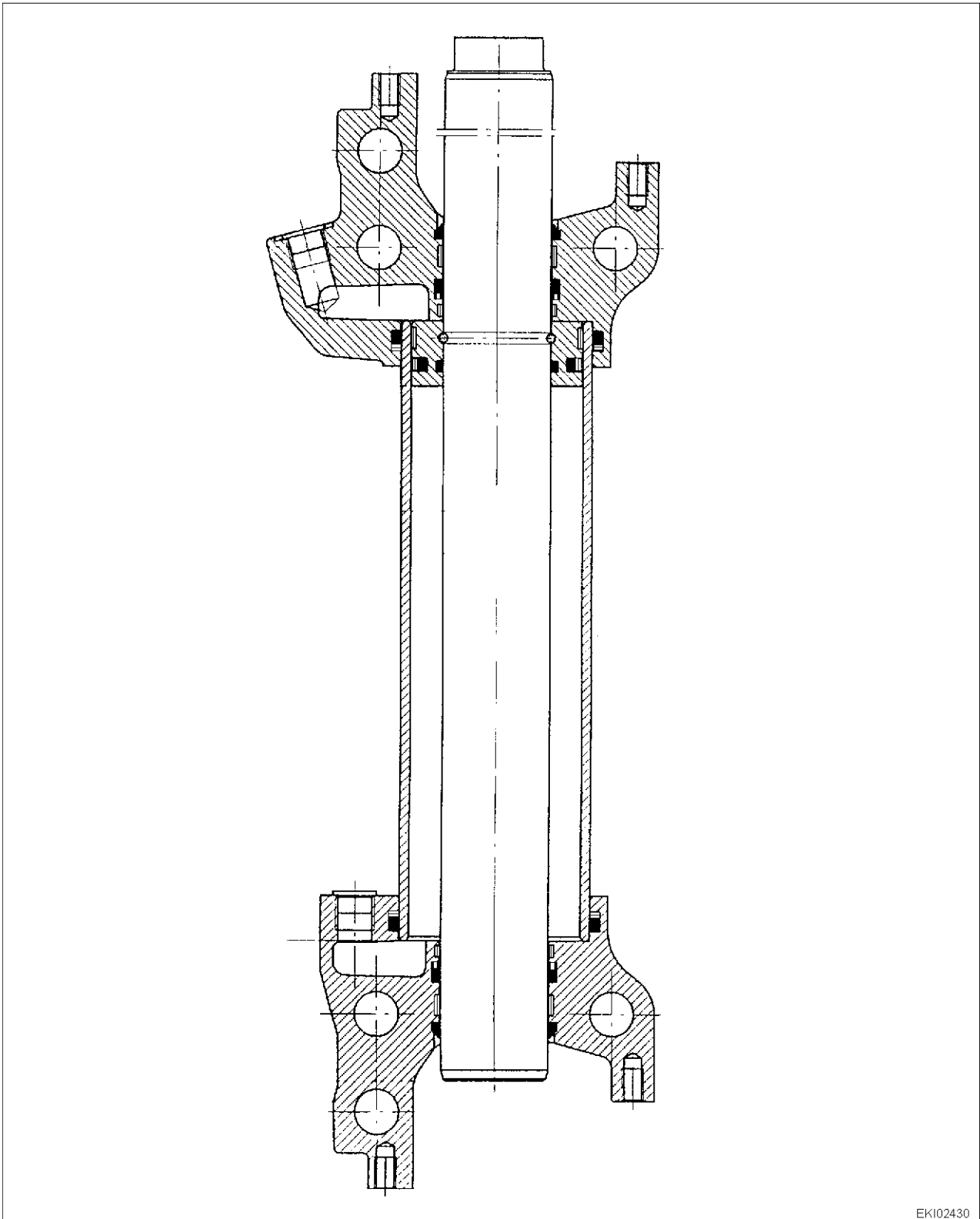
Date	Version	Page	Capitel	Index	Docu-No.
06.10.2001		3/3	3050	G	000002

Fav 900

Front axle / Steering cylinder  
Technical drawing of steering cylinder

C

## Steering cylinder - "version A"



EKI02430

Date	Version	Page	Capitel	Index	Docu-No.
17.10.2001	a	1/3	3120	C	000001

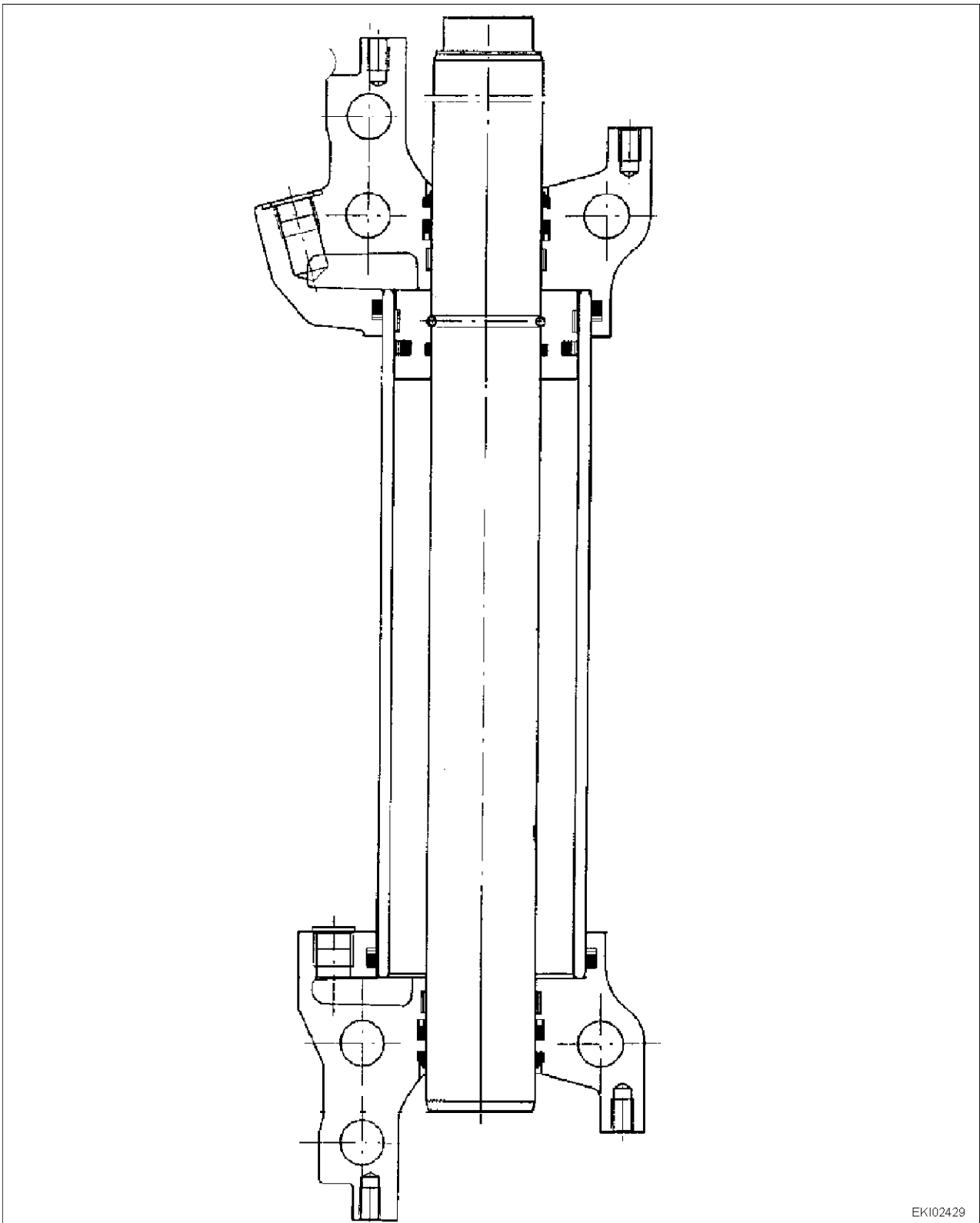
Technical drawing of steering cylinder

Fav 900

Front axle / Steering cylinder  
Technical drawing of steering cylinder

C

## Steering cylinder "version B"



EKI02429

Date	Version	Page	Capitel	Index	Docu-No.
17.10.2001	a	2/3	3120	C	000001

<i>Fav 900</i>	Front axle / Steering cylinder <b>Technical drawing of steering cylinder</b>	<b>C</b>
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**Note:**

Chapter 3120 Reg. G - Sealing steering cylinder

Installation and removal of steering cylinder, see:

- front axle FENDT 060 F ( X990.005.036.000)
- or FENDOC CD-ROM

Date	Version	Page	Capitel	Index	Docu-No.
17.10.2001	<b>a</b>	3/3	<b>3120</b>	<b>C</b>	<b>000001</b>

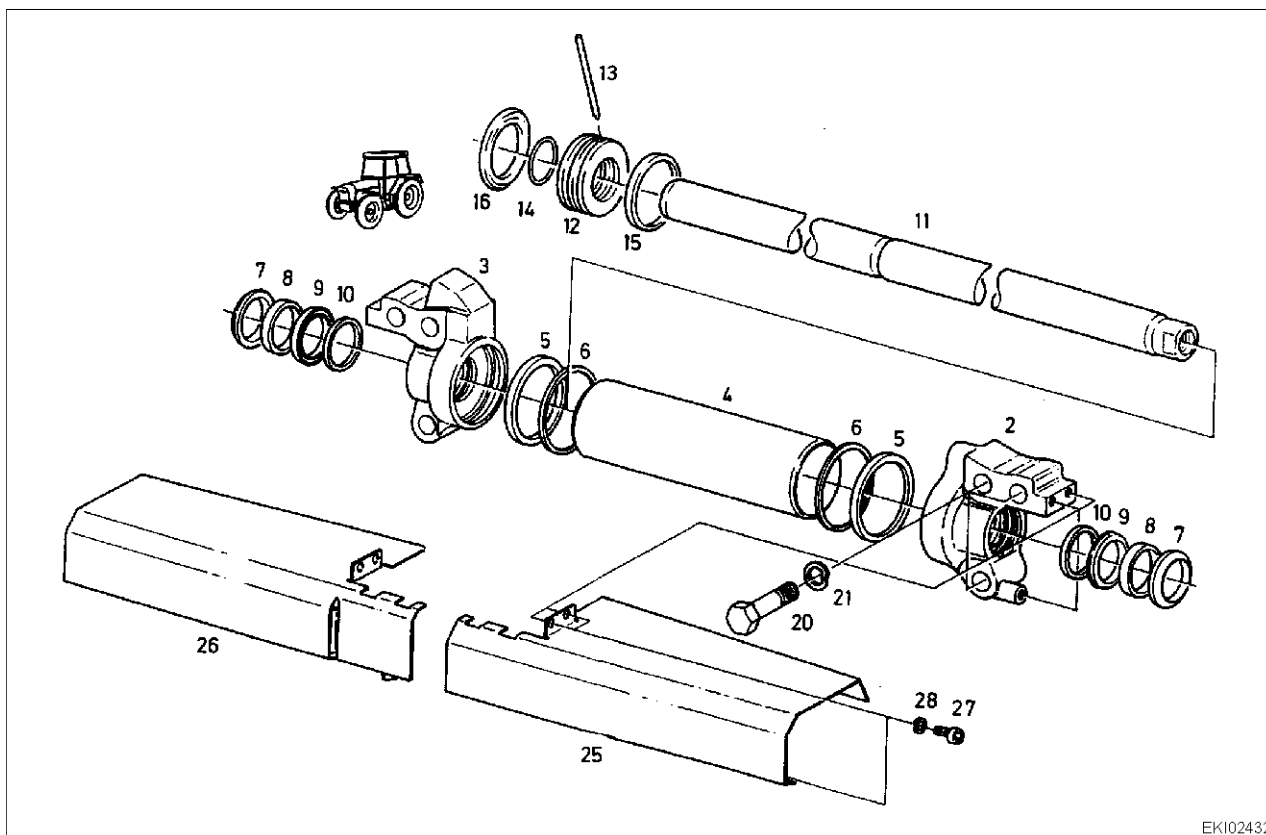


Fav 900

Front axle / Steering cylinder  
Sealing steering cylinder

G

## Steering cylinder - "version A" (up to Fav 900 /21/ ... )



EKI02432

Item	Designation	Item	Designation
1	Steering cylinder	12	Piston (not available individually)
1	Seal set	13	Locking wire (not available individually)
2	Bearing bush	14	Sealing ring (not available individually)
3	Bearing bush	15	Guide ring
4	Cylindrical tube	16	Form seal
5	Sealing ring	20	M20x80-10.9 hexagon screw
6	Locating ring	21	Spring washer
7	Oil scraper ring	25	Guard
8	Guide bush	26	Guard
9	V-seal	27	Socket head cap screw
10	Guide bush	28	Spring washer
11	Piston rod		

**Note:****Installation position of sealing rings:**

Chapter 3120 Reg. C - Technical drawing of steering cylinder

**Installation and removal of steering cylinder, see:**

- front axle FENDT 060 F ( X990.005.036.000)
- or FENDOC CD-ROM

Date	Version	Page	Capitel	Index	Docu-No.
17.10.2001	a	1/3	3120	G	00001

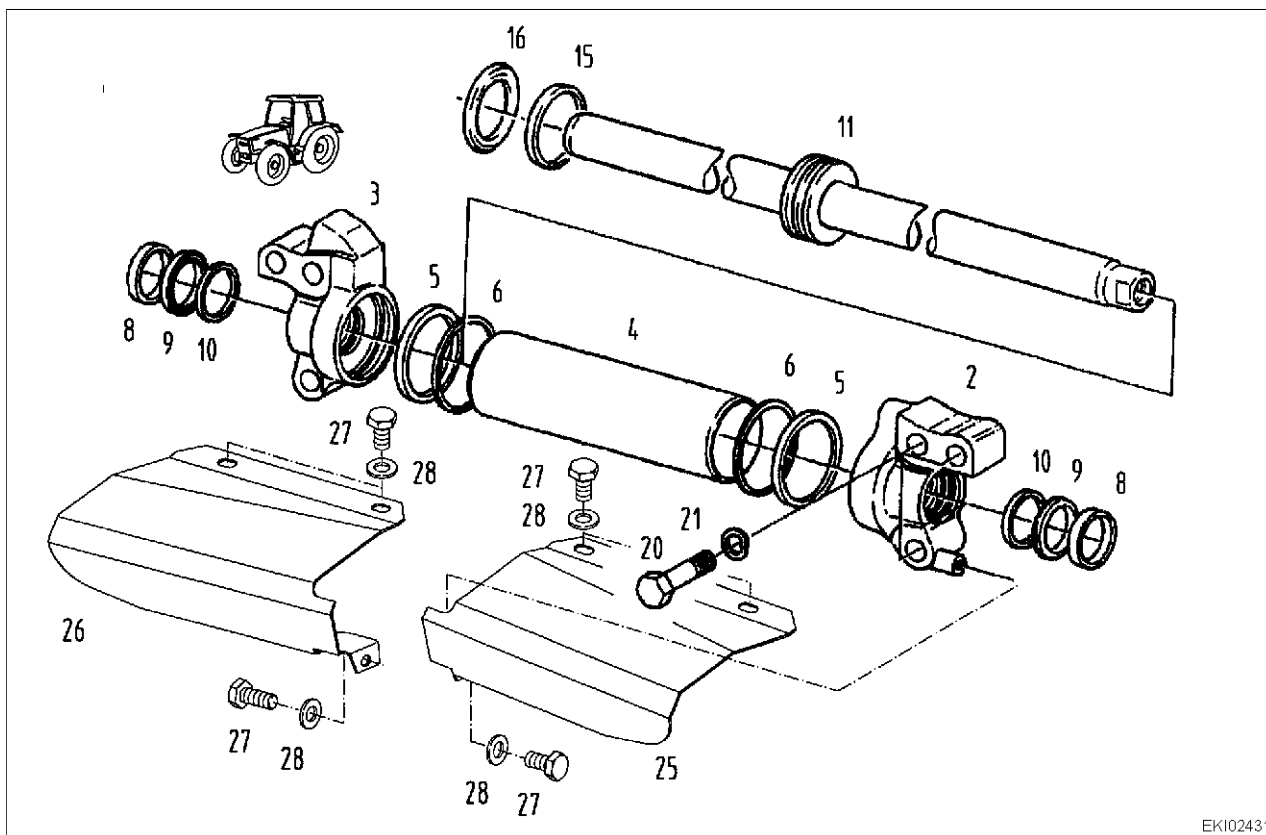
Sealing steering cylinder

Fav 900

Front axle / Steering cylinder  
Sealing steering cylinder

G

## Steering cylinder - "version B" (from Fav 900 /23/3001)



Item	Designation	Item	Designation
1	Steering cylinder	11	Piston rod
1	Seal set	15	Guide ring
2	Bearing bush	16	Form seal
3	Bearing bush	20	M20x80-10.9 hexagon screw
4	Cylindrical tube	21	Spring washer
5	Sealing ring	25	Guard
6	Locating ring	26	Guard
8	Oil scraper ring	27	Hexagon screw
9	V-seal	28	Washer
10	Guide ring		

**Note:****Installation position of sealing rings:**

Chapter 3120 Reg. C - Technical drawing of steering cylinder

**Installation and removal of steering cylinder, see:**

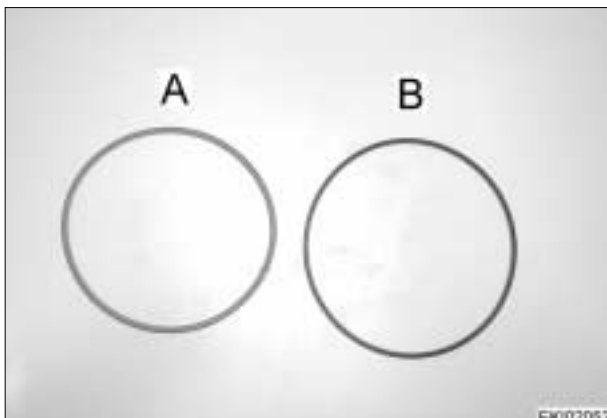
- front axle FENDT 060 F ( X990.005.036.000)
- or FENDOC CD-ROM

Date	Version	Page	Capitel	Index	Docu-No.
17.10.2001	a	2/3	3120	G	000001

Sealing steering cylinder

Fav 900

Front axle / Steering cylinder  
**Sealing steering cylinder**

**G**

**Form seal (16) consists of:**

- O-ring (A)
- Sealing ring (B)



Warm sealing ring up carefully with hot-air blower.

**Note:**

**Take care not to burn sealing ring.**



**Caution:**

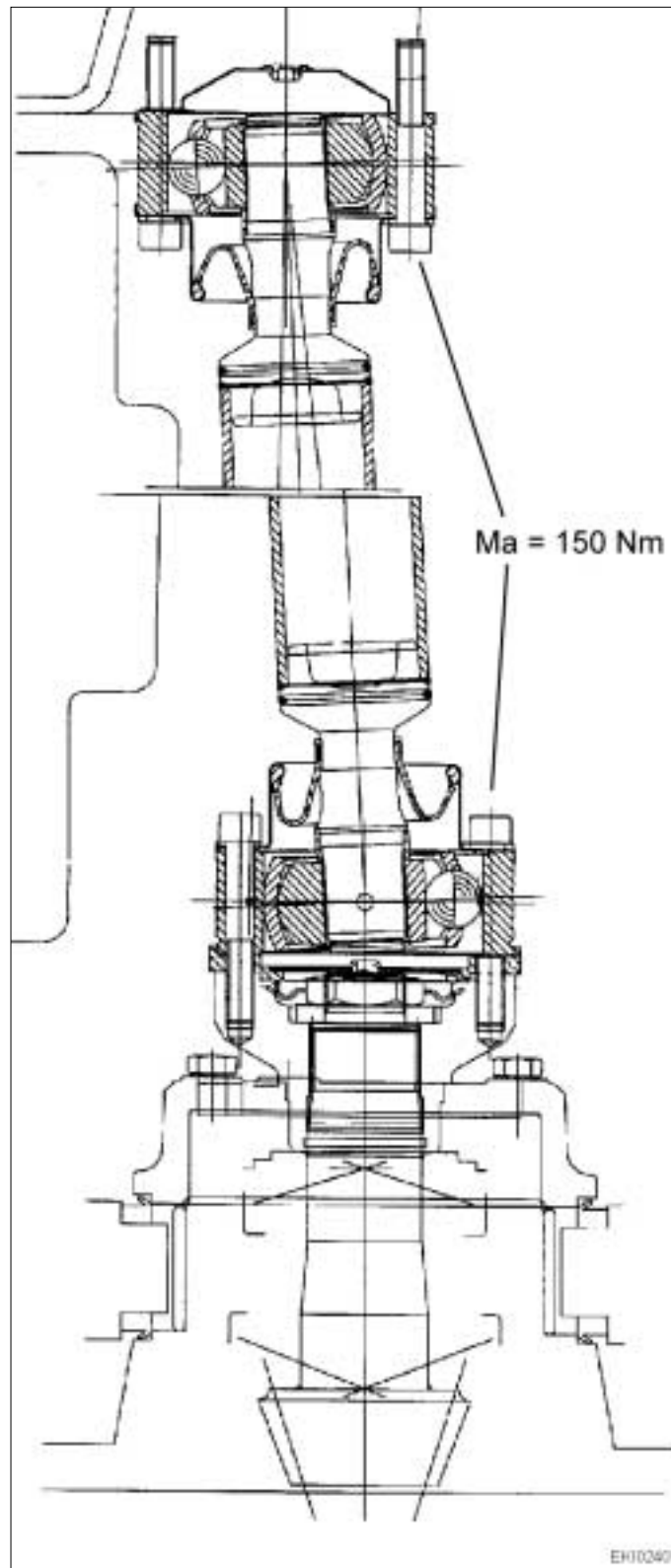
**Beware of hot surfaces!**

Date	Version	Page	Capitel	Index	Docu-No.
17.10.2001	a	3/3	3120	G	000001

Fav 800  
Fav 900

Front axle / Cardan shaft  
Technical drawing of cardan shaft

C



**Fitting tip for cardan shaft**

Do not offset cardan shaft by more than 15°.

**Note:**

**Chapter 3180 Reg. G - Installation and removal of cardan shaft**

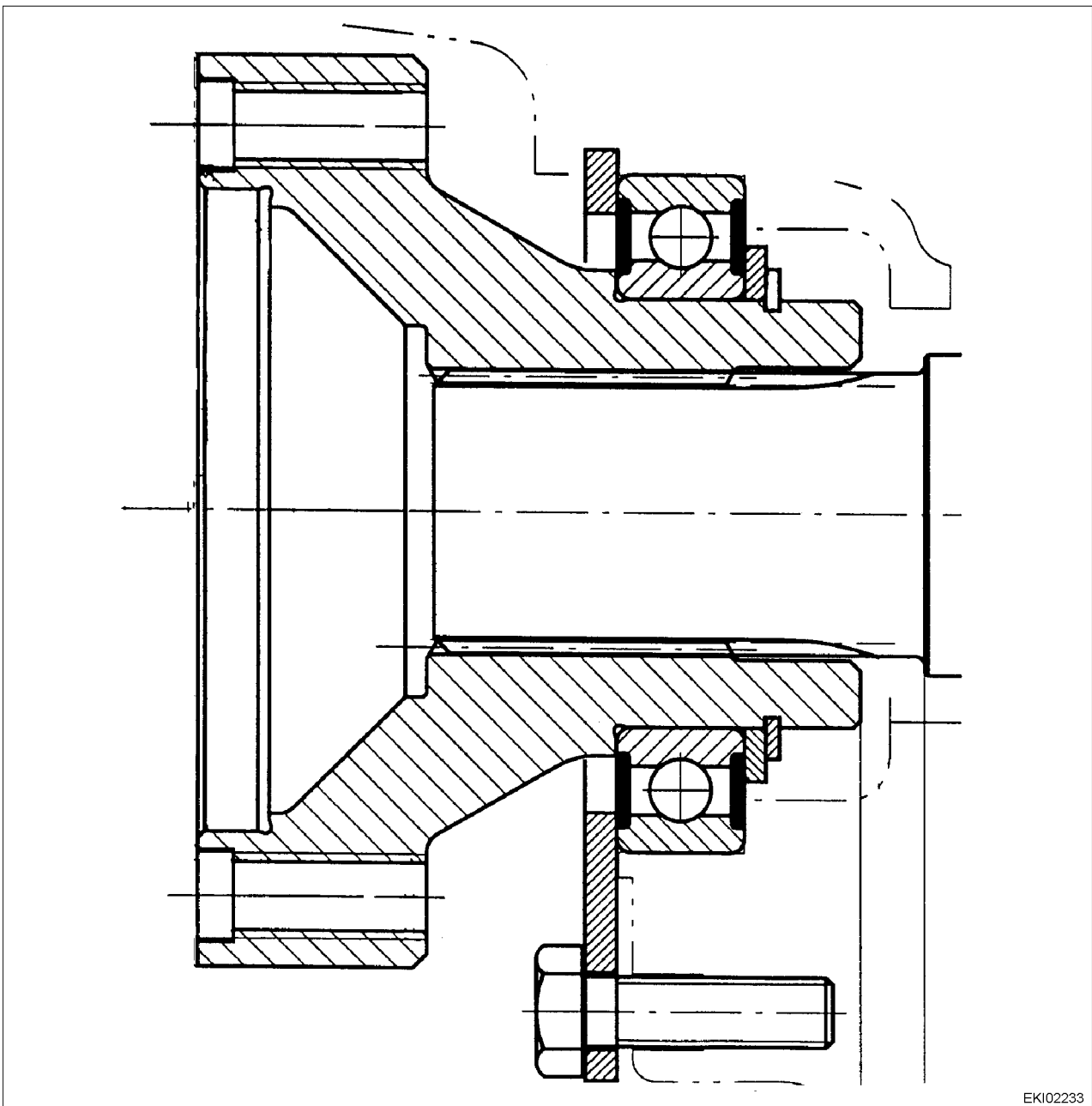
Date	Version	Page	Capitel	Index	Docu-No.
05.10.2001	a	1/1	3180	C	000004

Fav 900  
Favorit 800

Front axle / Cardan shaft  
Technical drawing of front-wheel drive

C

Front-wheel drive - "version A"



**Note:**

We recommend no longer fitting "version A" bearing during repairs but instead converting to "version B" bearing.

Corresponding conversion kits for Fav 800 and Fav 900 are listed in "FENDOS spare parts catalogue".

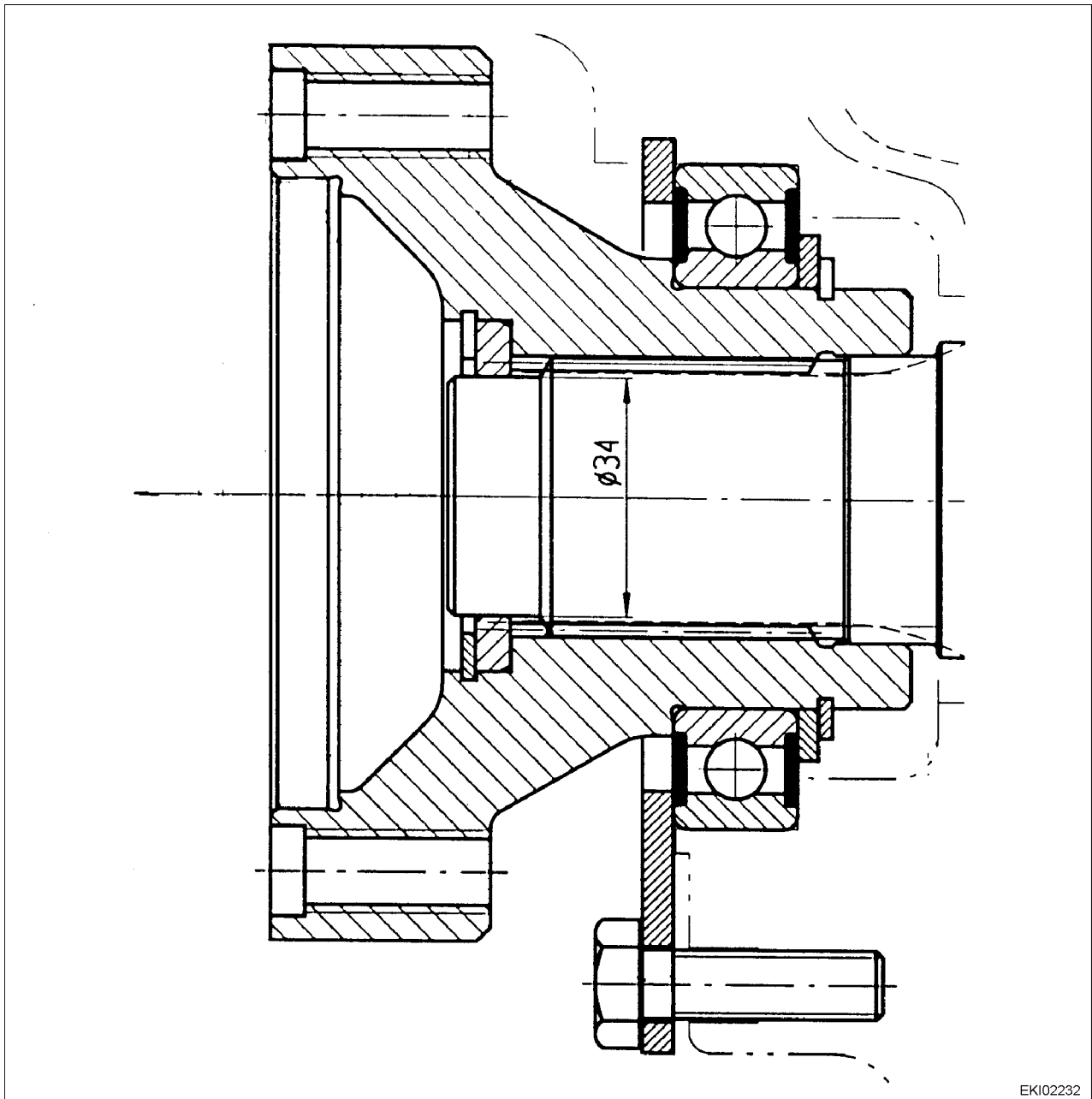
Date	Version	Page	Capitel	Index	Docu-No.
04.09.2001	a	1/2	3180	C	000003

Fav 900  
Favorit 800

Front axle / Cardan shaft  
Technical drawing of front-wheel drive

C

Front-wheel drive - "version B"

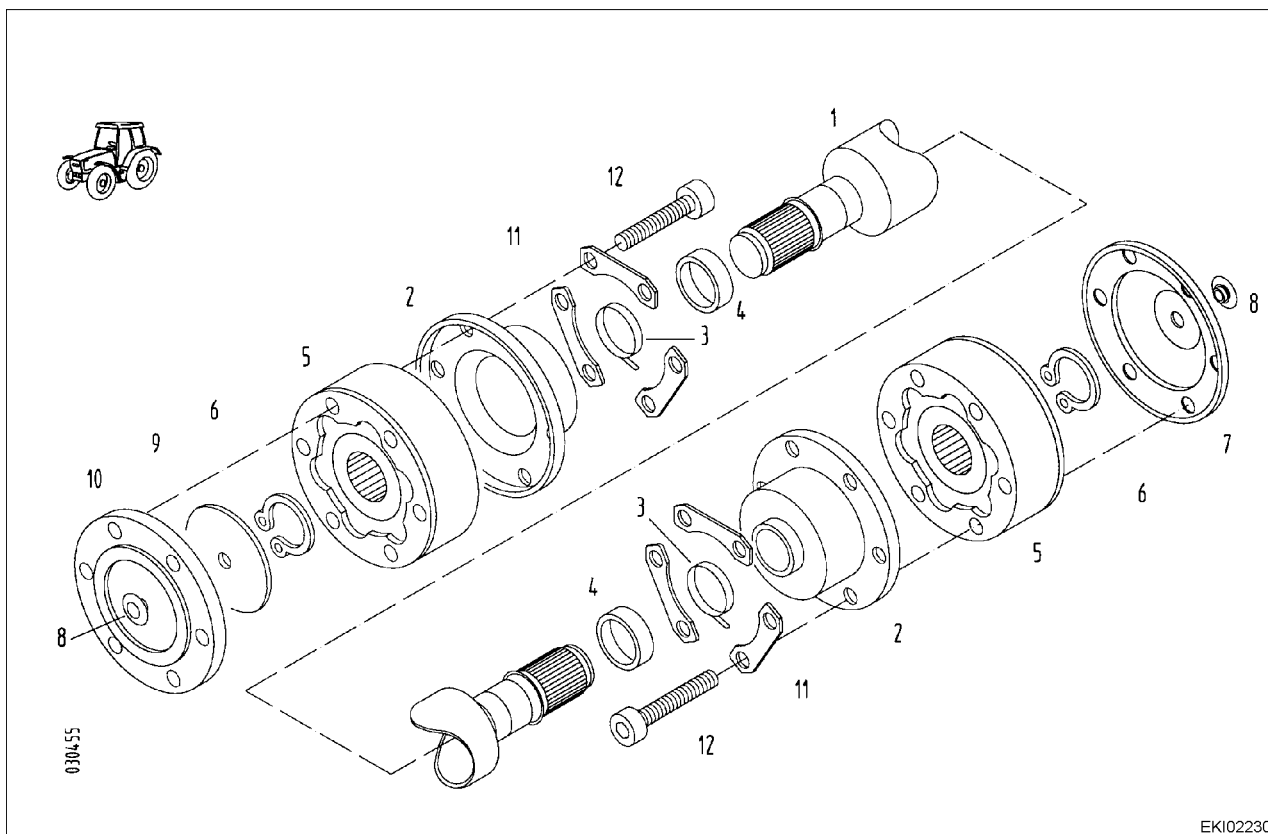


Date	Version	Page	Capitel	Index	Docu-No.
04.09.2001	a	2/2	3180	C	000003

Technical drawing of front-wheel drive

Fav 900

## Front axle / Cardan shaft Removing and fitting the cardan shaft

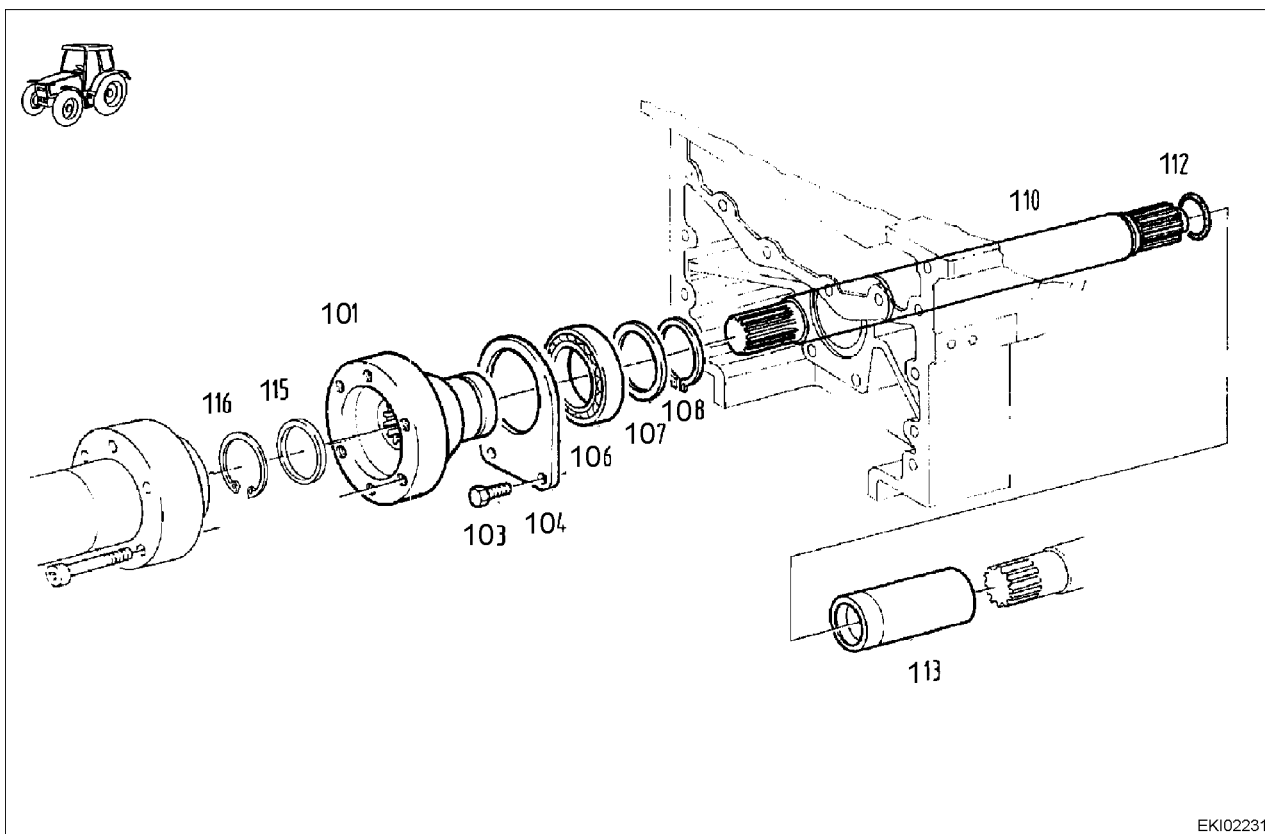
**G**

Item	Designation	Item	Designation
1	Cardan shaft	8	Rubber plug
2	Cap	9	Washer
3	Hose clamp band	10	Intermediate flange
4	Ring	11	Shim
5	CV joint	12	Socket head cap screw
6	Circlip	13	High-pressure grease X 902.002.473
7	Screw cap		

Date	Version	Page	Capitel	Index	Docu-No.
03.09.2001	a	1/6	3180	G	000002

Fav 900

## Front axle / Cardan shaft Removing and fitting the cardan shaft

**G**

EKI02231

Item	Designation	Item	Designation
101	Flange	110	Shaft
103	Hexagon screw	112	O-ring
104	Tab washer	113	Splined bush
106	Deep-groove ball bearing	115	Ring
107	Locating ring	116	Circlip
108	Circlip		

Date	Version	Page	Capitel	Index	Docu-No.
03.09.2001	a	2/6	3180	G	000002



Fav 900

## Front axle / Cardan shaft Removing and fitting the cardan shaft

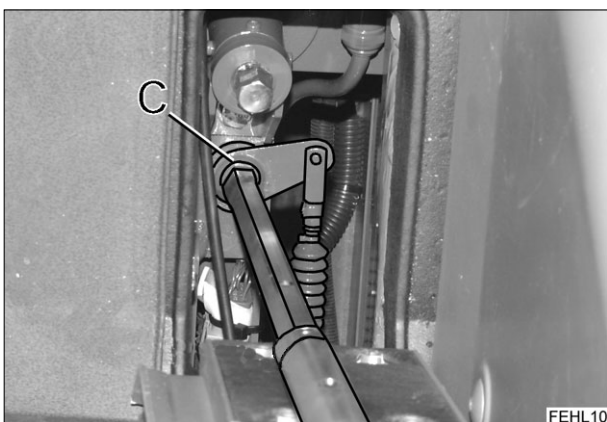
G



EKI02212

**Removing cardan shaft (1)**

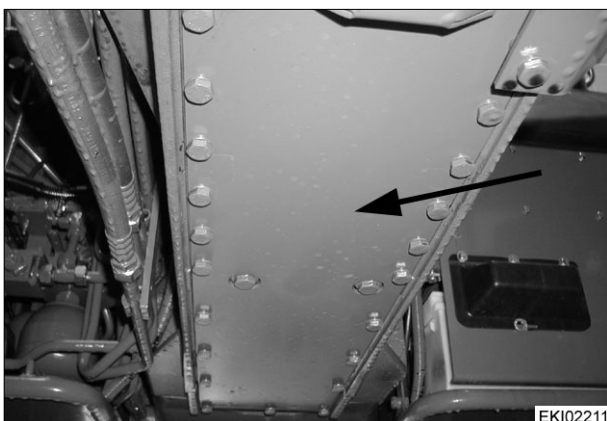
- Raise suspension.
- Jack up one wheel from front axle and one from rear, taking appropriate safety precautions.



FEHL10

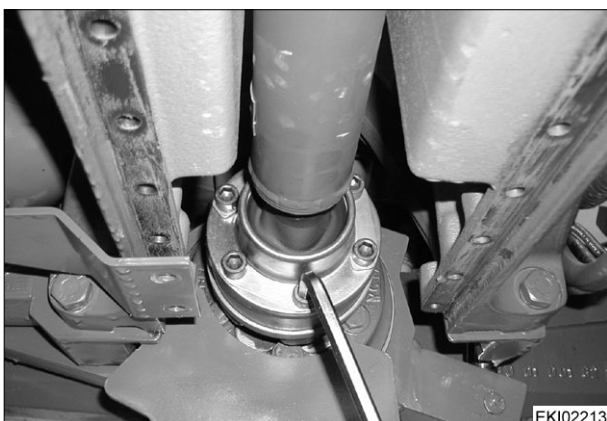
Open cover in cab floor.

Attach auxiliary lever to range control (C).  
Shift transmission to neutral (mid-position)  
(to turn cardan shaft (1)).



EKI02211

Unscrew cover plate (arrowed) under oil pan.



EKI02213

Loosen socket head cap screws on front- and rear-axle side.

**Note:**  
**Secure cardan shaft against turning by using handbrake.**

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Fav 900

## Front axle / Cardan shaft Removing and fitting the cardan shaft

**G****Front-axle side**

Prop cardan shaft up with trestle.

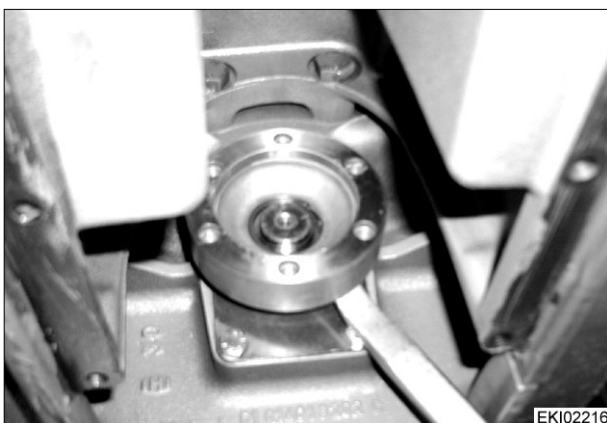
Remove CV joint (5) and intermediate flange (10).

**Note:**

**Do not offset cardan shaft (1) by more than 15°.**

**Transmission site**

Remove CV joint (5).

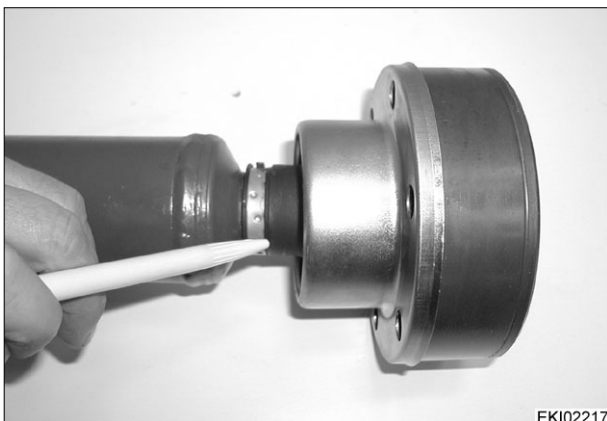
**Fitting cardan shaft (1)**

Check play in deep-groove ball bearing (106).

If necessary, fit new deep-groove ball bearing (106).

**Note:**

**Chapter 3180 Reg. C - Technical drawing of front-wheel drive**



Check cap (2) (with bellows) for damage.

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Fav 900

## Front axle / Cardan shaft Removing and fitting the cardan shaft

G



Grease CV joint (5).

**Quantity: approx. 150g**

**High-pressure grease X 902.002.473.000**

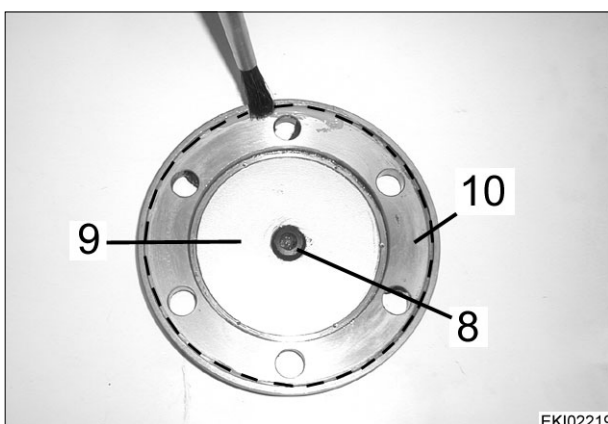
**Note:**

Any grease which accumulates in and expands bellows during lubrication should be pushed towards joint using finger or smooth, blunt object.

**Bellows must not be allowed to twist.**

**Note:**

With new cardan shaft (1) CV joints (5) are lubricated with high-pressure grease.



Seal washer (9) with Fermatex X 903.050.801 sealant (non-curing).

Seal intermediate flange (10) with Fermatex X 903.050.801 sealant (non-curing).

Check rubber plug (8) for damage and fit new one, if necessary.



### Transmission side

Locate CV joint (5).

**Note:**

For ease of fitting prop cardan shaft up with trestle on front axle.

**Note:**

Do not offset cardan shaft (1) by more than 15°.



### Front-axle side

Locate CV joint (5) and intermediate flange (10) with washer (9).

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Fav 900

## Front axle / Cardan shaft Removing and fitting the cardan shaft

**G**

EKI02220

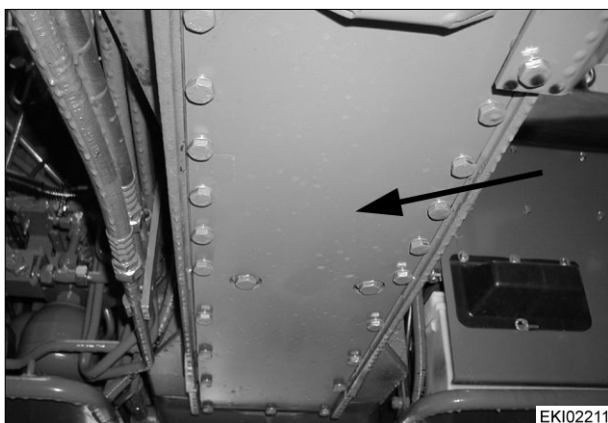
Place shim (11) under socket head cap screws (12) and then tighten as far as stop.



EKI02220

Tighten all socket head cap screws (12) to **150 Nm**.

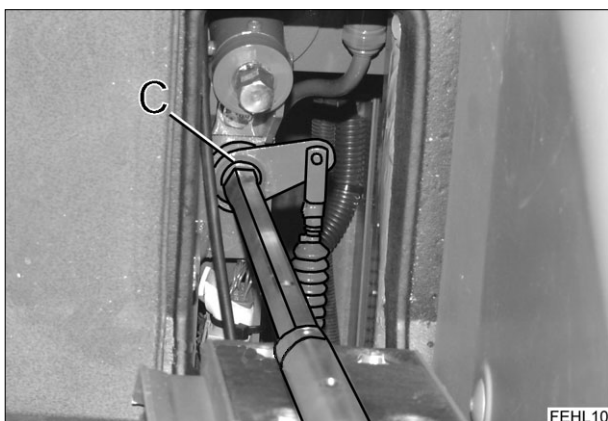
**Note:**  
Secure cardan shaft against turning by using handbrake.



EKI02211

Screw cover plate (arrowed) in place under oil pan.

Tighten M10x35 - 10.9 hexagon screws to **69 Nm**.



FEHL10

Unjack tractor.

Shift range control to stage I or stage II using auxiliary lever.

Test-drive tractor.

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Steering / General system <b>Functional description</b>	<b>A</b>
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## Comparison with Fav 500, Xylon, Fav 800 etc.:

### Unchanged:

- Same function
- Same pressure values
- Same principle
- First priority in hydraulic system and immediate operational readiness when engine is running (i.e. independently of other systems)

### New:

- All the main control components are now flange-mounted on the central control block ZSB (e.g. priority valve, see Fig. 1) or incorporated internally.
- The pressure-relief system for the auxiliary pump DBV-L (see Fig. 2) is generally no longer in the steering unit LE nor provided in the form of a separate external valve, but is incorporated in the central control block ZSB.

### Test instructions / cross-references:

- The hydraulic function of the steering system must not be viewed in isolation, see general test instructions "Test instructions and log for general hydraulic functions" 9600/E/-----
- The "Performance test / Overview" 4000/E/----- sheet provides an initial guide.
- The "Auxiliary pump PL and priority valve" 4000/E/----- special test instructions can be used to connect the auxiliary pump to the circuit.
- Please see "Control system function charts" for the different operational statuses when steering.

### Available pumps:

- The steering system has two pumps available to it, with the LS pump PR (=inclined-disc axial-flow piston pump) servicing the steering system in the "normal scenario".
- Both pumps are isolated from each other in terms of both pressure and volume by the non-return valves RV3 and RV4, i.e. the auxiliary pump PL does not feed into the LS pump PR and the LS pump PR does not feed into the auxiliary pump PL. The non-return valves RV3 and RV4 are integral components of the central control block ZSB
- LS pump PR (=inclined-disc axial-flow piston pump):
- The maximum working pressure of the LS pump PR is fixed at the pump controller; this pressure must never be increased (rise in oil temperature, consequential damage and voiding of warranty)
- Auxiliary pump PL (= gear pump = fixed-displacement pump)
- The auxiliary pump PL pumps oil constantly, independently of the engine speed; it is therefore part of the hydraulic system's cooling circuit.
- The auxiliary pump PL only takes over responsibility for steering in the "need scenario". If the tractor also has a hydraulic trailer brake, the auxiliary pump generates the instantaneous pressure in the trailer brake.
- The commonly used name "steering pump" is therefore not appropriate; the term "auxiliary pump" is better and will be used in future.
- Pressure relief for the auxiliary pump PL is provided by the DBV-L valve in the central control block ZSB (see Fig. 2).

### Steering / "normal scenario"

- The LS pump PR normally services the steering system.
- The LS pump makes its maximum working pressure (=200 bar) available to the steering system.

### Steering / "need scenario"

- A need only arises if the LS pump PR is exhausted by the current oil demand, and the steering system still requires a higher pressure.
- The priority valve PVL ensures that the auxiliary pump PL is automatically connected to the circuit.

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Steering / General system <b>Functional description</b>	<b>A</b>
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- In the need scenario, i.e. when the priority valve PVL has connected the auxiliary pump PL, a maximum of 190 bar is reached in the steering cylinder.
- The need scenario has to be simulated to check that connection of the pump functions properly and to test the maximum pressure.

**Monitoring (possible fault codes 5.1.98; 5.1.99; 5.1.9A; 5.1.9B)**

- The hydraulic oil level in the Fav 700 and Fav 900 is monitored by means of the level switch FSG / S036.
- The maximum temperature of the entire hydraulic system is monitored by thermostat TWK-KOET / B013 (warning message only).
- The pressure-operated switch DOE-A / S025 monitors the operation of the LS pump PR to ensure the minimum pressure.
- The flow monitor DOE-PL / S026 monitors the function of the auxiliary pump PL to ensure the minimum flow (note: in FENDOS this part can be found under "High-pressure filter".)
- The electrical operational readiness of both switches is monitored separately, although both components are connected to the same contact in the e-box.
- In FENDIAS the joint signal can be found under "Enhanced control / steering monitor".

**Appendix:**

The photos below are merely a guide for the different components. Please refer to the chapters "Tractor / General system 0000/D/-----" and "Electrics / General system 9000/D/-----" for precise details of the current installation locations.

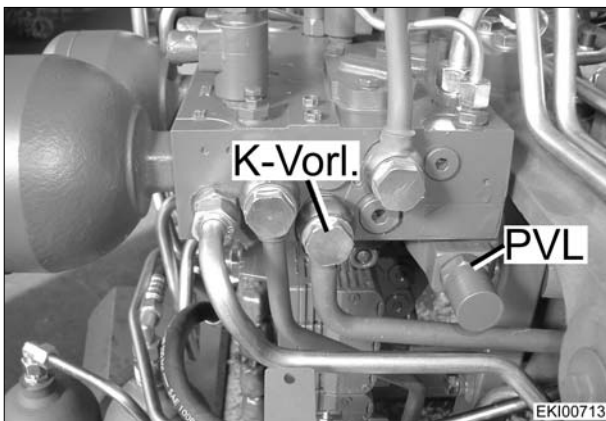


Fig. 1  
Central control block ZSB and flange-mounted priority valve PVL

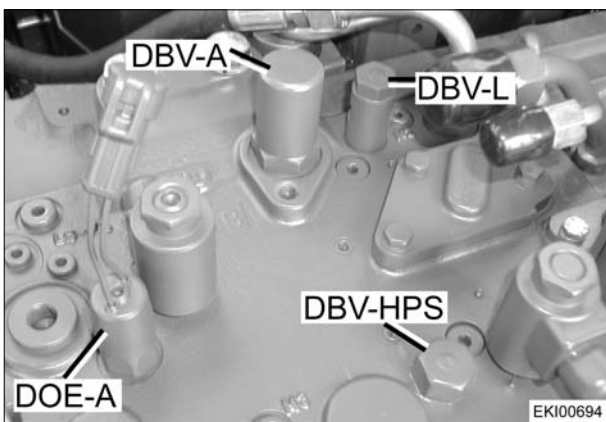


Fig. 2  
Top of central control block ZSB with pressure-operated switch DOE-A / S025, pressure-relief valve for the auxiliary pump DBV-L and max. pressure-relief valve (=safety valve) DBV-A

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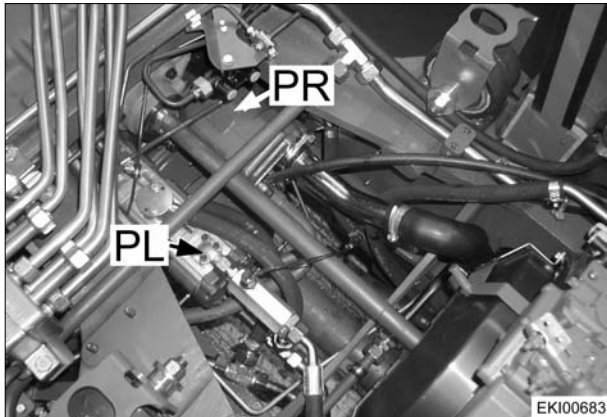


Fig. 3  
 Installation location of LS pump PR and auxiliary pump PL in Fav 700 and Farmer 400

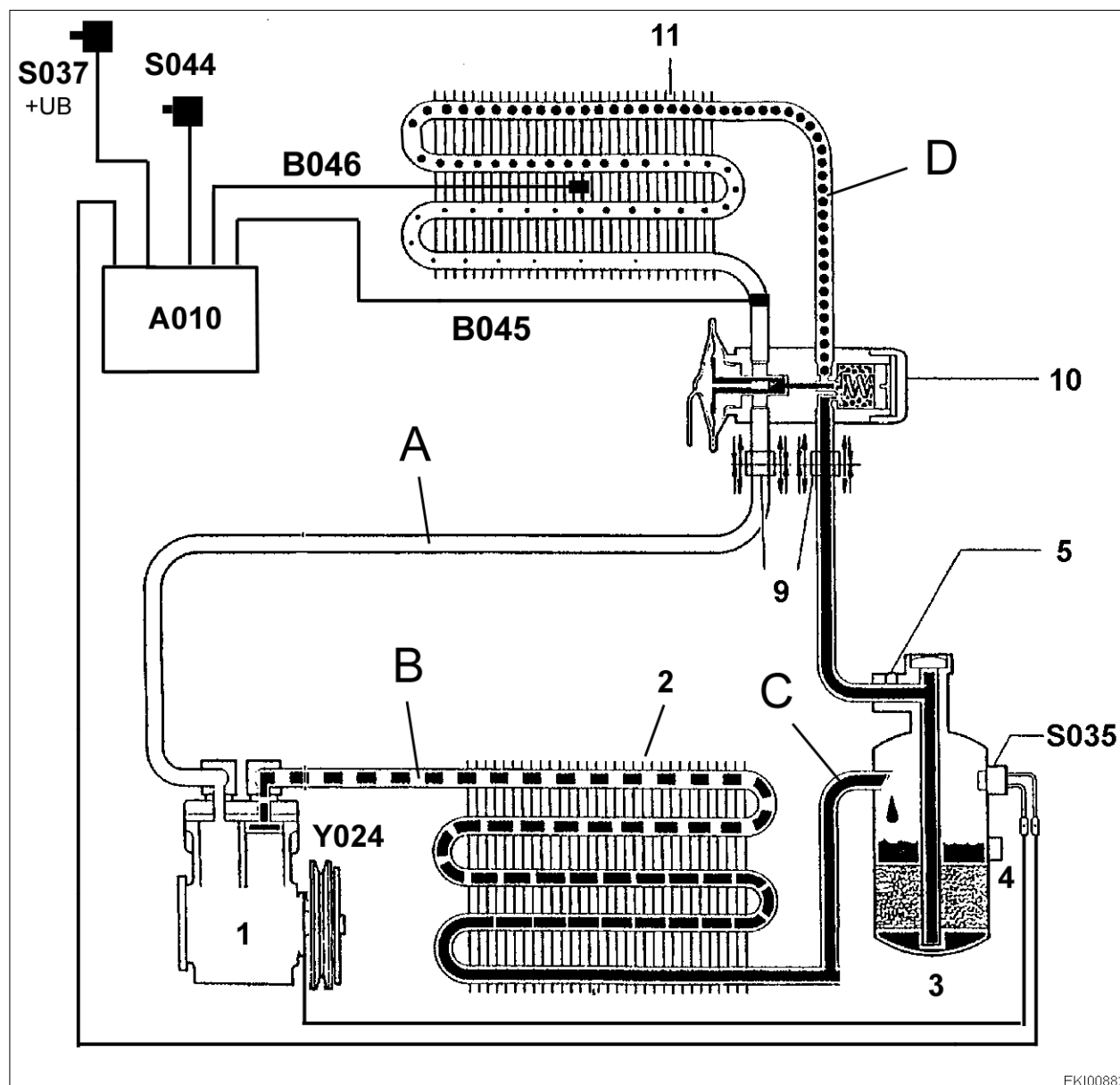
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Farmer 400  
Fav 700  
Fav 900

Air-conditioning / General system  
Function

**A**

### Refrigerant circuit



1	Compressor	B046	Temp. sensor 1
2	Condenser	S035	High-/low-pressure switch
3	Reservoir	S037	Fan switch
4	Inspection glass	S044	AC potentiometer
5	Fuse	Y024	Magnetic clutch
9	Connector		
10	Expansion valve	A	Intake pressure, gaseous
11	Evaporator	B	High pressure, gaseous
		C	High pressure, liquid
A010	Thermostat, electronic	D	Intake pressure, liquid
B045	Temp. sensor 2		

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Air-conditioning / General system  <b>Function</b>	<b>A</b>
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### Functional description of refrigerant circuit

The **compressor** (1) entrains gaseous refrigerant and compresses it.

The **condenser** (2) liquefies the gaseous refrigerant.

The **reservoir** (3), also termed "drier", serves as the storage vessel and absorbs any moisture from the refrigerant.

The **expansion valve** (10), also termed the injector, is a regulator which injects the optimum volume of refrigerant into the evaporator.

The refrigerant which is injected in liquid form is evaporated in the **evaporator** (11). The coldness generated is directed into the cab on the air current from the fan.

### Functional description of climate-control system

The air current temperature is selected using potentiometer **S044** .

Temperature sensor **B046** measures the temperature in the fan's air current.

Temperature sensor **B045** measures the temperature in the intake pipe area (danger of icing).

Thermostat **A010** switches +UB to the magnetic clutch **Y024** of the AC compressor.

**Thermostat A010 interrupts the power supply to the magnetic clutch Y024 if:**

- temp. sensor **B046** indicates the set air current temperature.

or

- temp. sensor **B045** indicates icing of the intake pipe.

**+UB supply** to thermostat **A010** : from fusebox **X050 fan 17** via fan switch **S037**.

### System temperature monitor (overheating)

The **fuse** is fitted at the top of the reservoir for safety reasons. It melts at temperatures above 112°C, and the refrigerant escapes. The reservoir and refrigerant must be replaced.

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Air-conditioning / General system <b>Function</b>	<b>A</b>
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## AC system pressure monitor

The high-pressure/low-pressure switch **S035** is mounted on the reservoir (drier) (see refrigerant circuit drawing).

Switch **S035** monitors the compression in the reservoir.

### Operating points: high-pressure/low-pressure switch S035

	(High pressure)	(Low pressure)
	maximum pressure (bar)	minimum pressure (bar)
Switch open	28 +/- 2	< 2
Switch closed	22 +/- 2	> 2

If the compression in the system becomes too high (>28 bar), switch **S035** interrupts the power supply to the magnetic clutch **Y024**.

#### Possible causes of an excessive pressure in the system are:

- Overheating (condenser soiled)
- Expansion valve iced up
- System overfilled (too much refrigerant)

If the compression in the system becomes too low (<2 bar), switch **S035** interrupts the power supply to the magnetic clutch **Y024**.

#### Possible causes of an inadequate pressure in the system are:

- Leaks in the system
- System inadequately filled (too little refrigerant)

## Maintenance of the air-conditioning (see also tractor operating manual)

- Refrigerant 134 a
- With the compressor running, the white ball must be floating in the upper half of the inspection glass (on the reservoir). (If necessary, top up with refrigerant.)
- If the blue ball turns pink, this is an indication of moisture in the system.
- Various manufacturers offer filling units for evacuating and filling the air-conditioning system. (For details of how to fill the air-conditioning system, please refer to the filling-unit operating manual.)
- Even in winter the air-conditioning system should be switched on for approx. 10 min every month, with ventilation set to recirculation mode. (**Note:** If the system remains unused for too long, the low-temperature oil (compressor lubricant) and the refrigerant can separate!)
- Air-conditioning compressor v-belt: v-belt tension (strand force) measured in the centre between the pulleys with an "Optibelt tension gauge", strand force 400+50 N (40+5 Kp) - profile 13mm

## Power consumption of air-conditioning system

- When first switched on approx. 6 kW (= 8 bhp)
- In operation approx. 4 kW (= 5 bhp)

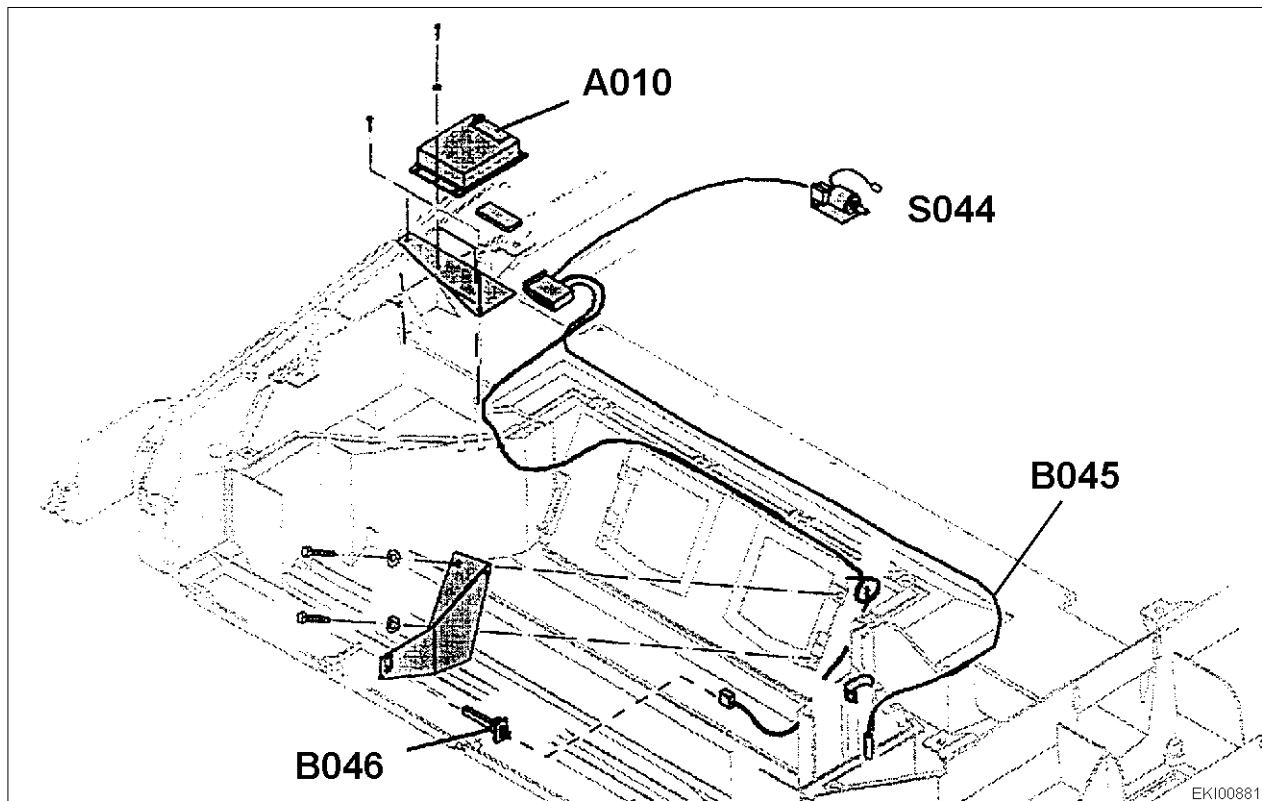
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Farmer 400  
Fav 700  
Fav 900

Air-conditioning / Electric cables  
Checking air-conditioning electrics

E

Component locations: air-conditioning control system



A010 = Thermostat, electronic  
B045 = Temperature sensor 2  
B046 = Temperature sensor 1  
S044 = AC potentiometer

**Preliminary work:**

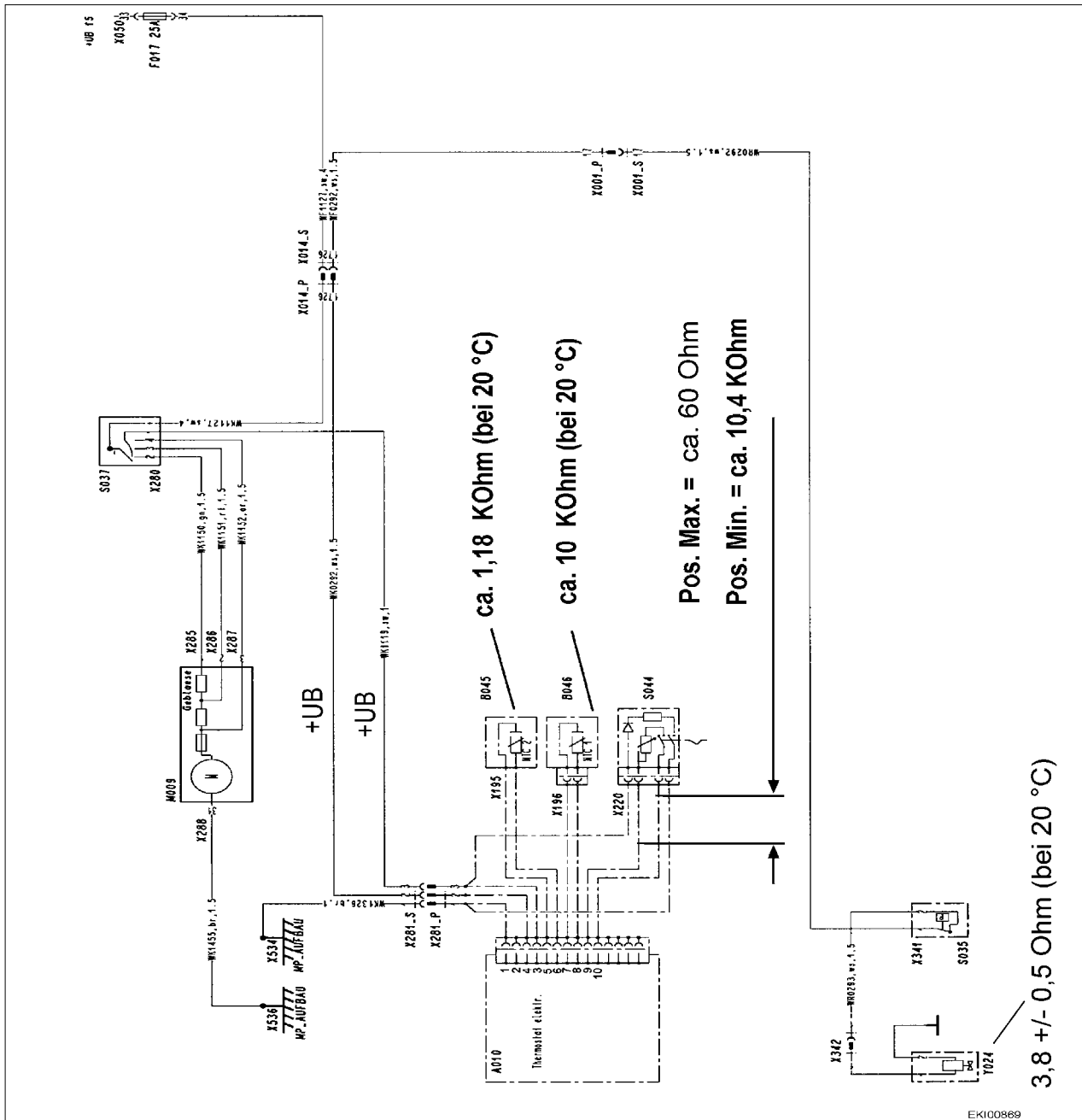
- Remove roof
- Detach ventilation system Bowden cable
- Remove panels

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Farmer 400  
Fav 700  
Fav 900

Air-conditioning / Electric cables  
Checking air-conditioning electrics

E



**Note:**  
All readings +/- 10%

A010	Thermostat, electronic	S035	High-pressure/low-pressure switch
B045	Temp. sensor 2 (NTC)	S037	Fan switch
B046	Temp. sensor 1 (NTC)	S044	Potentiometer
M009	Fan	Y024	Magnetic clutch

**Note:**  
NTC = Negative Temperature Coefficient  
in other words, the sensor resistance decreases with increasing ambient temperature.

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Air-conditioning / Electric cables</b> <b>Checking air-conditioning electrics</b>	<b>E</b>
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**Pin assignment: A010 - electronic thermostat**

Pin	Wire no./colour	Function
1	brown	Earth
2	-	Not assigned
3	red	S037 - fan switch (+UB)
4	black/yellow	Y024 - magnetic clutch
5	blue	B045 - temp. sensor 2 (NTC)
6	brown	B045 - temp. sensor 2 (NTC)
7	white	B045 - temp. sensor 1 (NTC)
8	white	B045 - temp. sensor 1 (NTC)
9	brown/yellow	S044 - AC potentiometer
10	brown/yellow	S044 - AC potentiometer

**Note:****Chapter 5500 Index A - Functional description****Chapter 9000 Index E - A010 - Electronic thermostat****Chapter 9000 Index E - B045 - Temperature sensor 2****Chapter 9000 Index E - B046 - Temperature sensor 1****Chapter 9000 Index E - S044 - AC potentiometer**

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Fav 900	Cab / General system Raising cab	G
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**Equipment required:**

- Hoist (cab approx. 700 kg)
- Hoisting sling
- Trestles (8000 kg)

**Preliminary work:**

- Lower rear power lift.
- Prop tractor, taking appropriate safety precautions, and remove both rear wheels.
- Remove panels on right side.
- Remove exhaust and air intake!



Raise side sections and remove cover panel.



Remove left and right support plates.



Carefully open coolant-water cap.



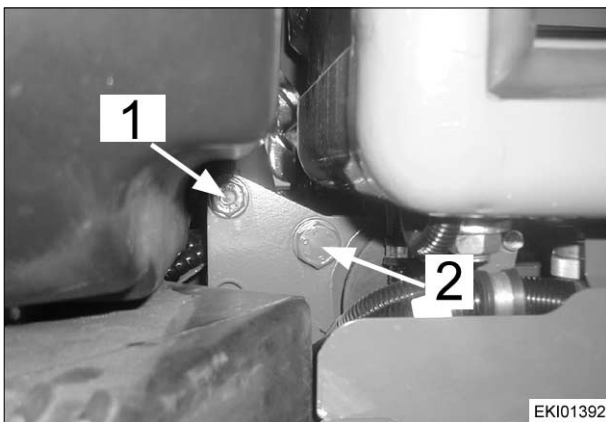
**Caution:**  
When engine is hot - danger of scalding injury!

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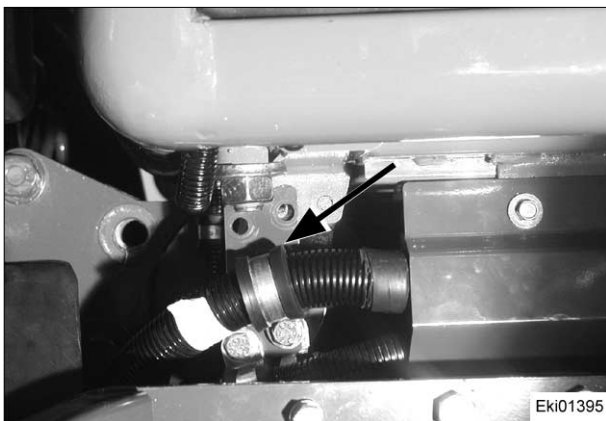
<p><b>Fav 900</b></p>	<p>Cab / General system <b>Raising cab</b></p>	<p><b>G</b></p>
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Disconnect heating system water hoses.  
**Note:**  
Connect water hoses together and tighten using hose clips.  
Coolant-water circuit is now closed. Engine can be operated if required!



Left cab mount:  
Screw (1) = loosen  
Screw (2) = remove



Remove left cable loom bracket, seen in direction of travel.



Remove cover panel and exhaust panel and loosen right cab mount. Repeat in same manner on other side.

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<b>Fav 900</b>	<b>Cab / General system</b> <b>Raising cab</b>	<b>G</b>
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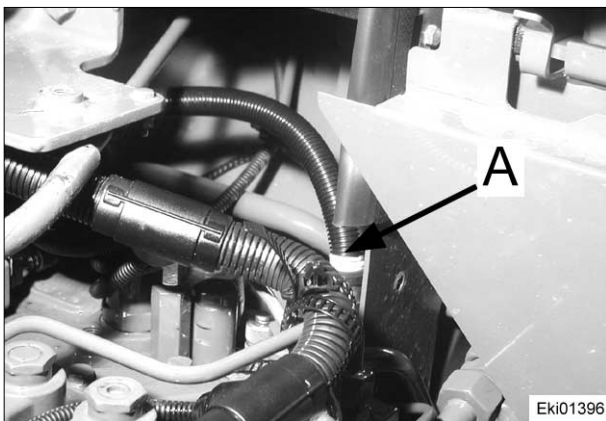
Eki01394

Remove cover on EPC/DA switchover.



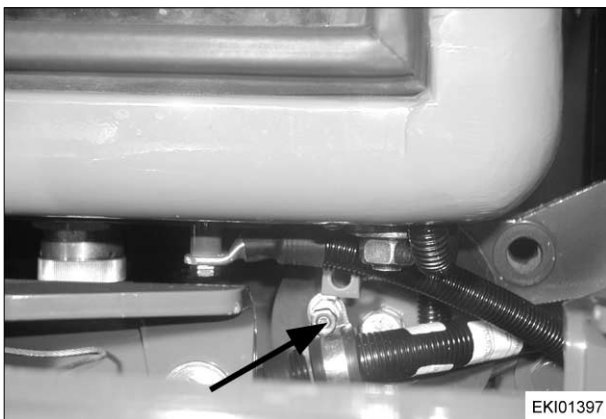
Eki00435

Remove support at rear left and right and fit in tilted position (arrowed).



Eki01396

Remove earthing point on left, seen in direction of travel (item A).



Eki01397

Remove right cable loom bracket, seen in direction of travel.

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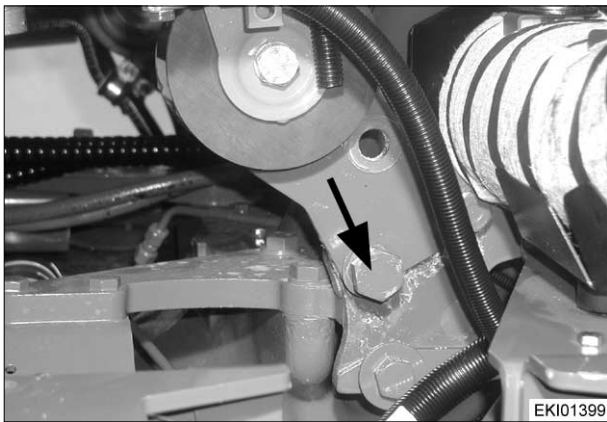


Fav 900	Cab / General system <b>Raising cab</b>	<b>G</b>
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EKI01398

Attach cab to hoist by front mirror bracket, taking appropriate safety precautions!



EKI01399

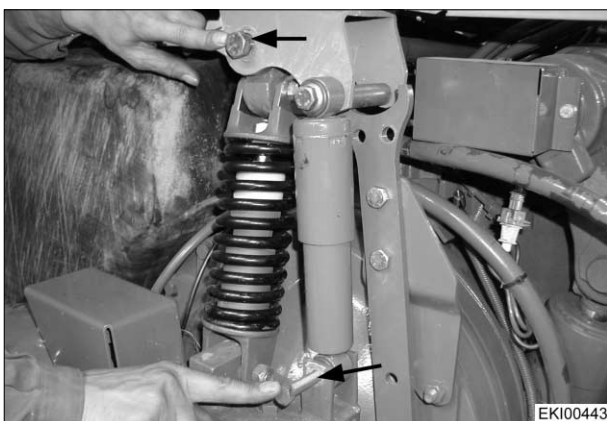
Raise cab, then peg cab mount left and right with M20 screw (arrowed).

**Note:**  
When raising, ensure clearance of all components.



EKI00444

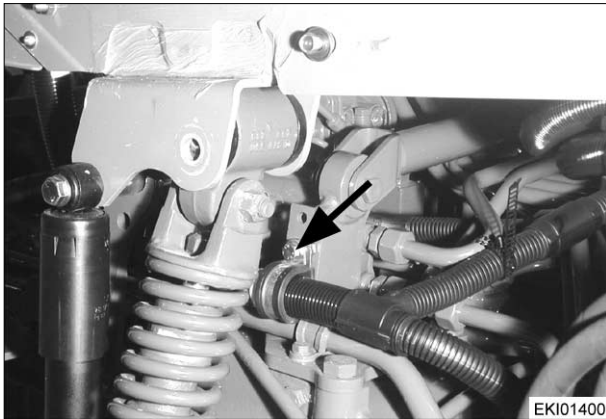
Raise cab at rear. Attach cab at rear to hoist, taking appropriate safety precautions.



EKI00443

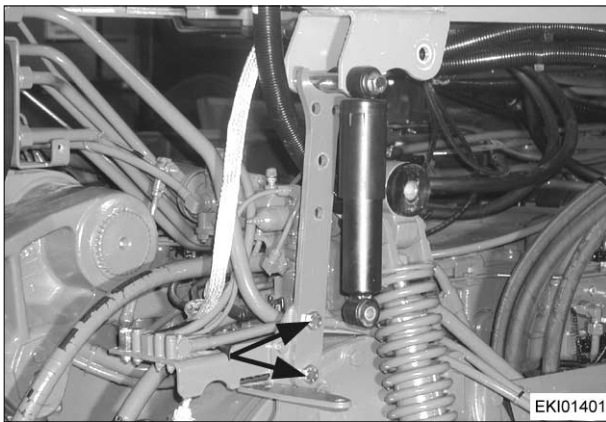
Unscrew rear left and right cab mount fastening screws (arrowed) and left and right damper fastening screws.

<b>Fav 900</b>	<b>Cab / General system</b> <b>Raising cab</b>	<b>G</b>
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EKI01400

Remove cable loom bracket (arrowed) on right in direction of travel and also remove earthing point if necessary.



EKI01401

Raise cab.

**Note:**

**When raising, ensure clearance of all components.**

**Fit support at rear right and left, see arrow for position.**

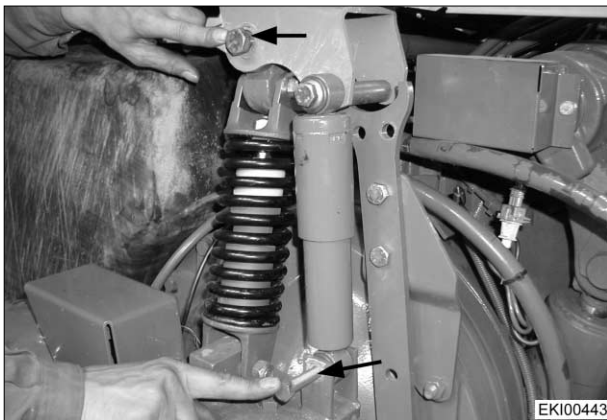
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<p><b>Fav 900</b></p>	<p><b>Cab / General system</b> <b>Lowering cab</b></p>	<p><b>G</b></p>
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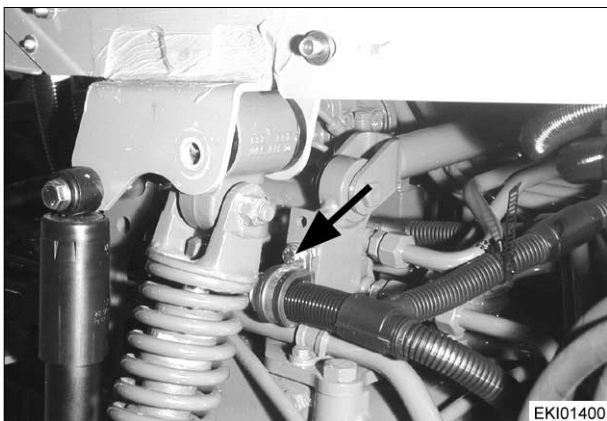
EKI00444

Attach cab at rear to hoist, taking appropriate safety precautions.  
Remove support at rear right and left.  
Lower cab carefully.  
Ensure clearance of all components.



EKI00443

Tighten cab mount rear left and right and also damper fastening screws.  
Fit support (see photo).



EKI01400

Fit cable loom bracket (arrowed), and also fit earthing point if this was removed earlier.

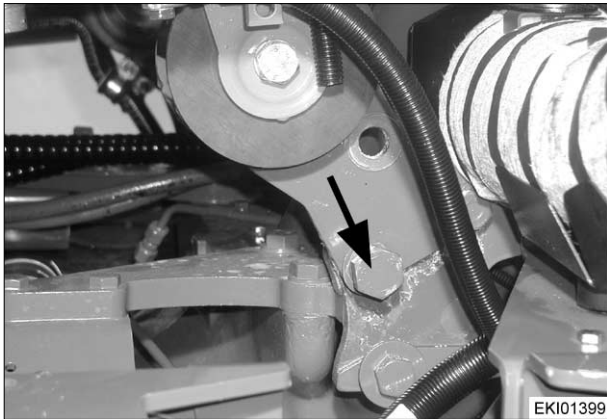


EKI01398

Attach cab to hoist under front mirror bracket, taking appropriate safety precautions!

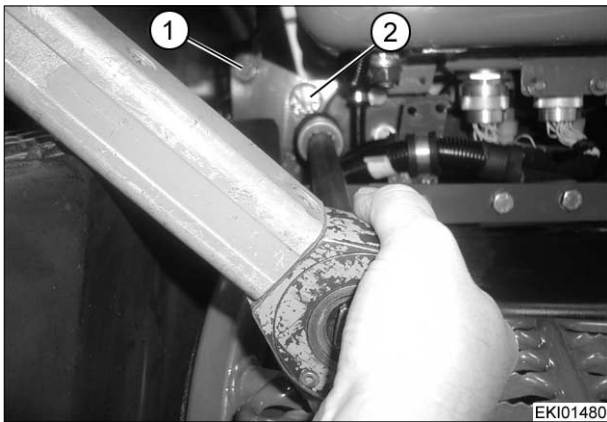
<p>Date 21.05.2001</p>	<p>Version a</p>	<p>Page 1/4</p>	<p><b>Lowering cab</b></p>	<p>Capitel <b>8100</b></p>	<p>Index <b>G</b></p>	<p>Docu-No. <b>000007</b></p>
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<b>Fav 900</b>	<b>Cab / General system</b> <b>Lowering cab</b>	<b>G</b>
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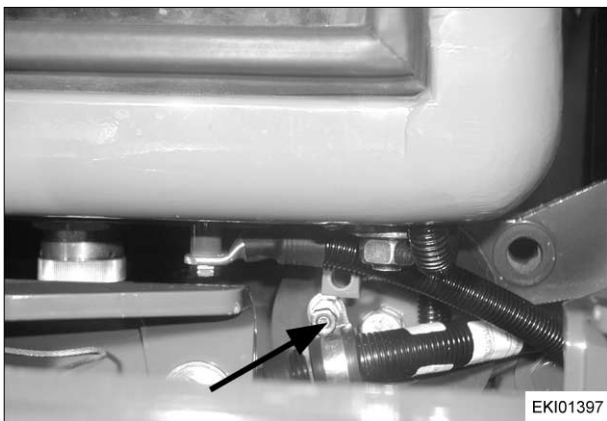
EKI01399

Remove M20 screw (arrowed) on left and right.  
Lower cab.  
Ensure clearance of all components.



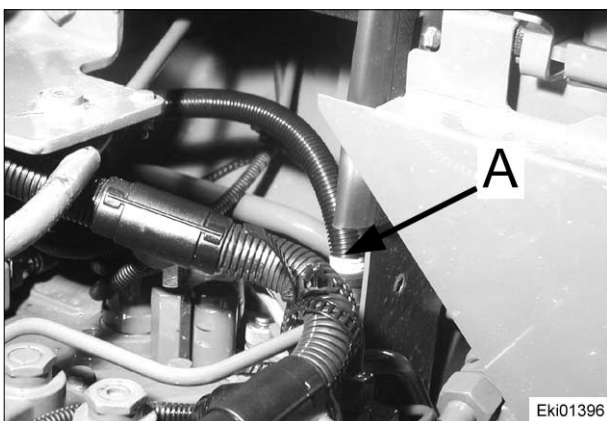
EKI01480

Coat thread of hexagon screws with synthetic bonding agent X903.050.084.  
Tighten M20 hexagon screws (2) to 402 Nm and M16 (1) to 210 Nm.



EKI01397

Fit right cable loom bracket, seen in direction of travel.



Eki01396

Fit bracket of earthing point on right (item A).

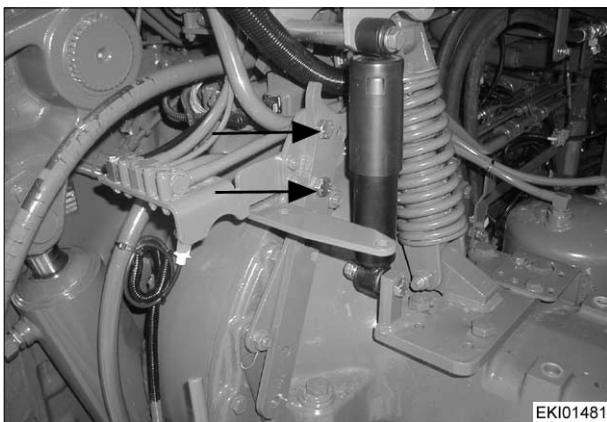
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<b>Fav 900</b>	<b>Cab / General system</b> <b>Lowering cab</b>	<b>G</b>
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Eki01393

Fit cover panel and exhaust cover.



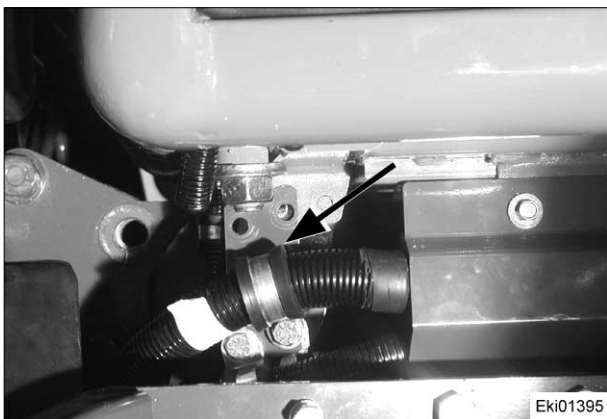
EKI01481

Move support at rear left and right from tilted position to driving position (arrowed).



Eki01394

Fit cover to EPC/DA switchover.

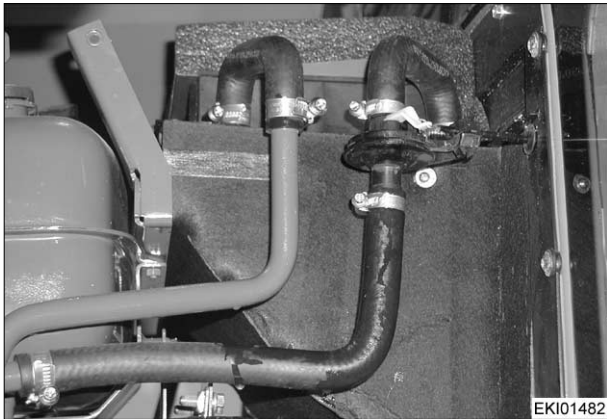


Eki01395

Fit left cable loom bracket, seen in direction of travel.

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<b>Fav 900</b>	<b>Cab / General system</b> <b>Lowering cab</b>	<b>G</b>
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EKI01482

Fit heating system water hoses.  
Check coolant. Top up if necessary.



EKI01389

Fit left and right support plates.



EKI01388

Fit cover panel and side sections.

**Concluding work :**

Fit exhaust and air intake.

Fit panels on right side.

Fit rear wheels.

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<p><b>Fav 900</b></p>	<p style="text-align: center;"><b>Cab / General system</b> <b>Removing cab</b></p>	<p style="text-align: center; font-size: 2em;"><b>G</b></p>
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**Equipment required:**

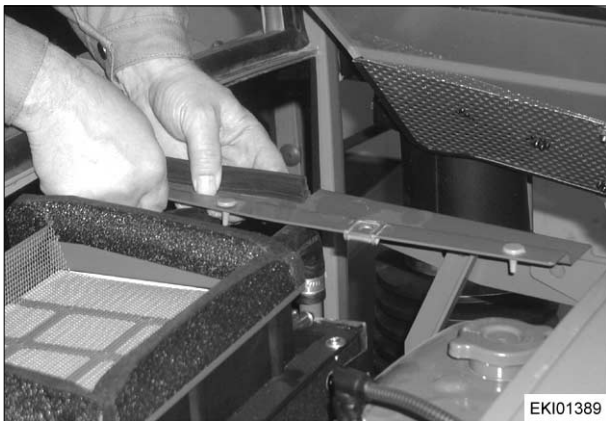
- Hoist (cab approx. 700 kg)
- Hoisting yoke (DIY, see Chapter 9920 Reg. A)
- Trestles (800 kg)

**Preliminary work:**

- Lower rear power lift.
- Prop tractor, taking appropriate safety precautions, and remove both rear wheels.
- Remove panels on right side.
- Remove exhaust and air intake.



Raise side sections and remove cover panel.



Remove left and right support plates.



Carefully open coolant water drain plug.



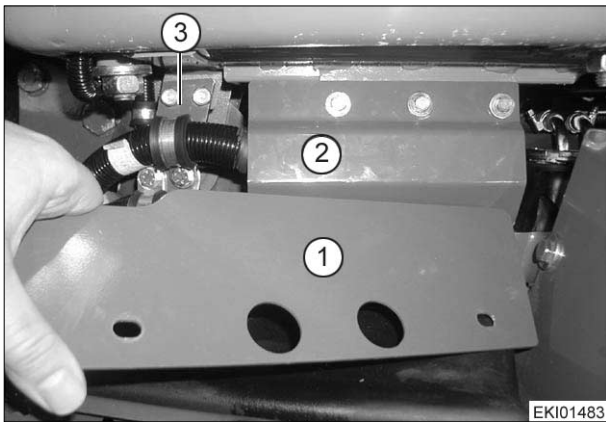
**Caution:**  
When engine is hot - danger of scalding injury!

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Fav 900	Cab / General system Removing cab	G
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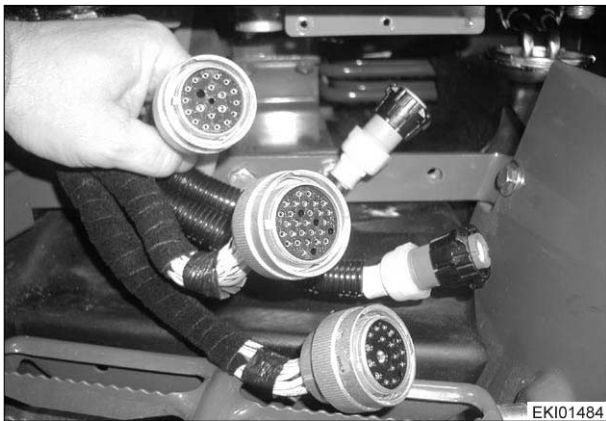


Disconnect heating system water hoses.



**Left side**

Remove cover panel (1), cover of cable coupler (2) and cable loom bracket (3).



Disconnect cable couplers.



Remove engine cover and coolant hoses of air-conditioning system.

**Note:**  
Only disconnect coolant hoses at these screw couplings. Internal valves prevent refrigerant from escaping.

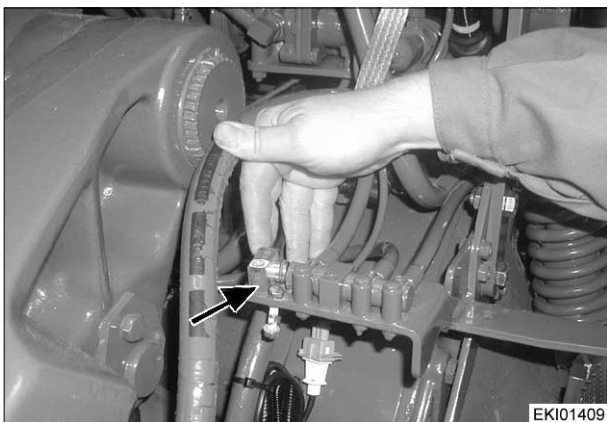
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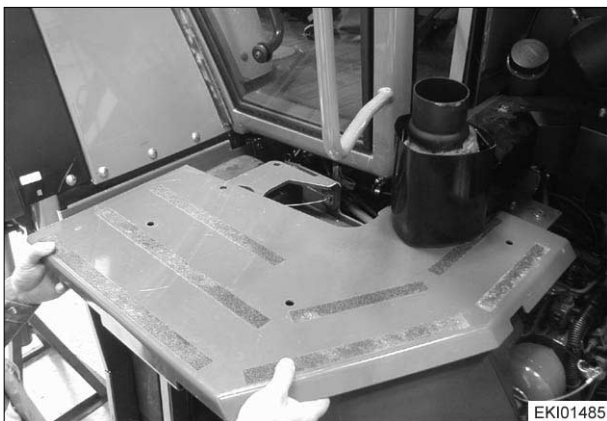
<p><b>Fav 900</b></p>	<p><b>Cab / General system</b> <b>Removing cab</b></p>	<p><b>G</b></p>
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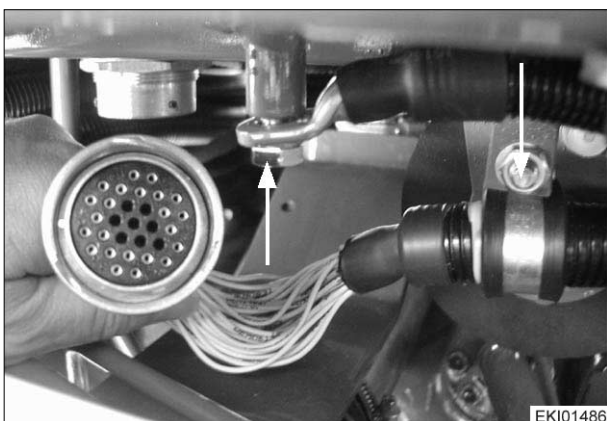
Remove panel  
Disconnect electric cable couplers.  
Remove cable clips and earth cable.



**Right side**  
Empty air compressor at drain valve and disconnect pipe.



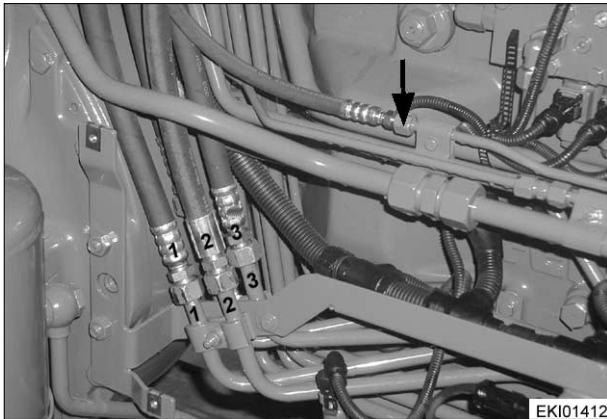
Remove footplate.



Disconnect cable coupler.  
Remove cable loom bracket (arrowed) and earth cable (arrowed).

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<p><b>Fav 900</b></p>	<p><b>Cab / General system</b> <b>Removing cab</b></p>	<p><b>G</b></p>
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Label and disconnect steering system hydraulic lines.  
Seal with sealing plugs.  
Disconnect LS line (arrowed).



Remove plugs on right and left B-pillars of cab.



Screw lift arms of hoisting yoke to B-pillar on left and right.



Fit hoisting yoke and attach cab, taking appropriate safety precautions.

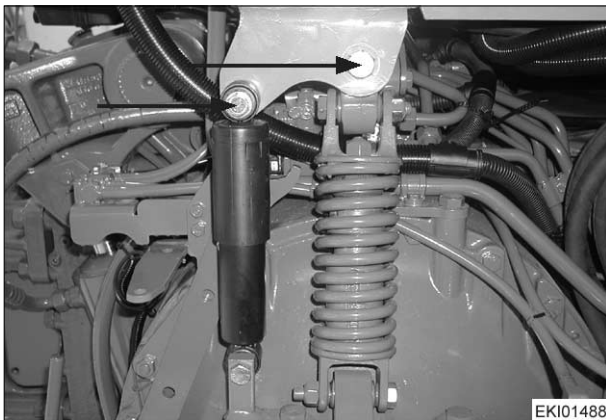
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<b>Fav 900</b>	<b>Cab / General system</b> <b>Removing cab</b>	<b>G</b>
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EKI01487

Remove hexagon screw from cab mount.  
Remove other side in same manner.



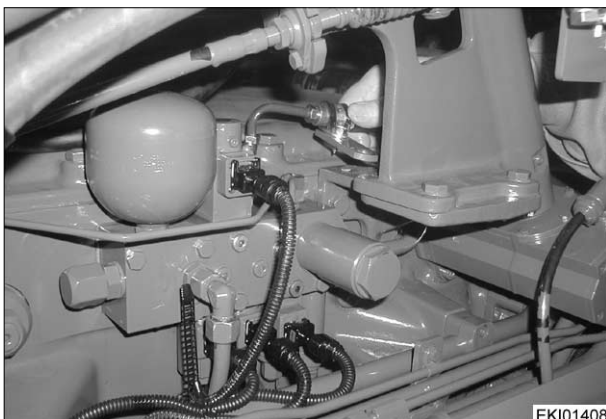
EKI01488

Remove two hexagon screws from rear cab mount (arrowed).  
Remove other side in same manner.



EKI01407

Raise cab slightly.  
Disconnect hydraulic lines from 5V6 selector valve.  
Collect any draining Pentosin (oil).

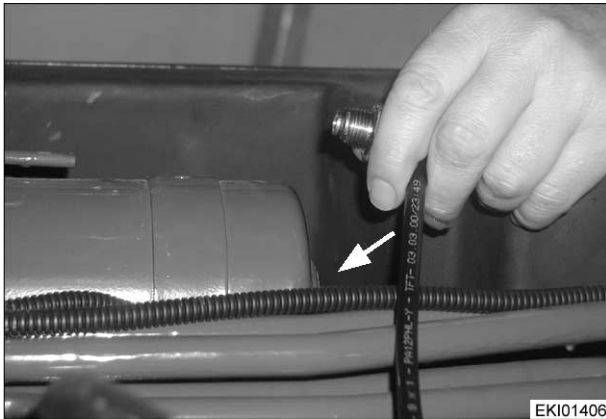


EKI01408

Remove hydraulic line from 4V5 pressure-relief valve, coupling with bracket.  
Collect any draining Pentosin (oil).

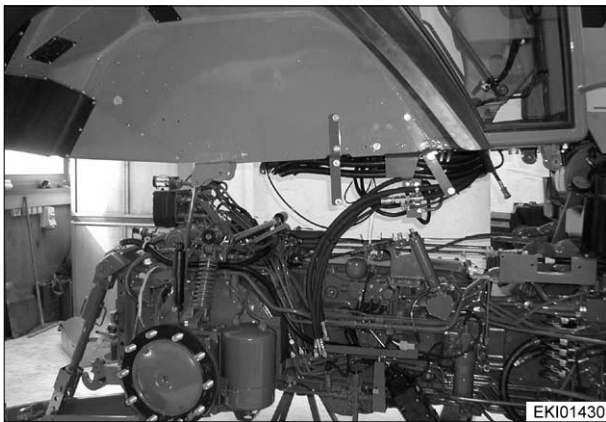
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<b>Fav 900</b>	<b>Cab / General system</b> <b>Removing cab</b>	<b>G</b>
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EKI01406

Disconnect compressed-air line from handbrake cylinder.



EKI01430

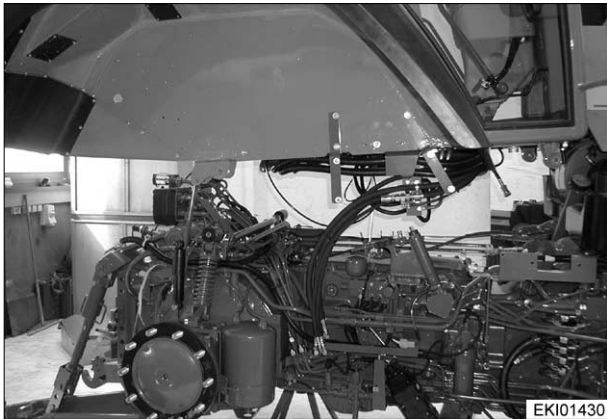
**Note:**  
**Raise cab.**  
**Ensure clearance for all components.**



**Danger:**  
**Do not walk or stand under**  
**suspended loads!**

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<p><b>Fav 900</b></p>	<p><b>Cab / General system</b> <b>Fitting cab</b></p>	<p><b>G</b></p>
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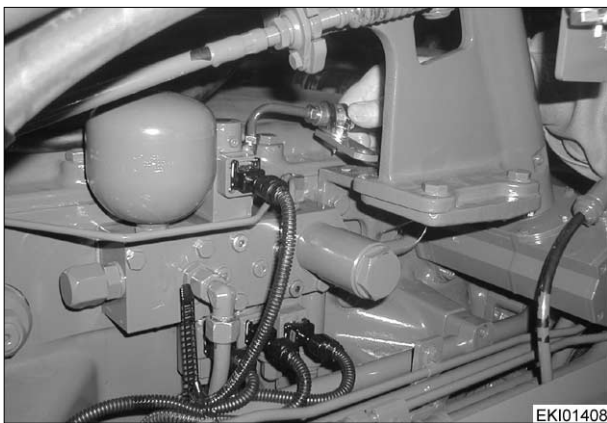
Attach cab to hoist, taking appropriate safety precautions and raise above transmission. Ensure clearance of all components.



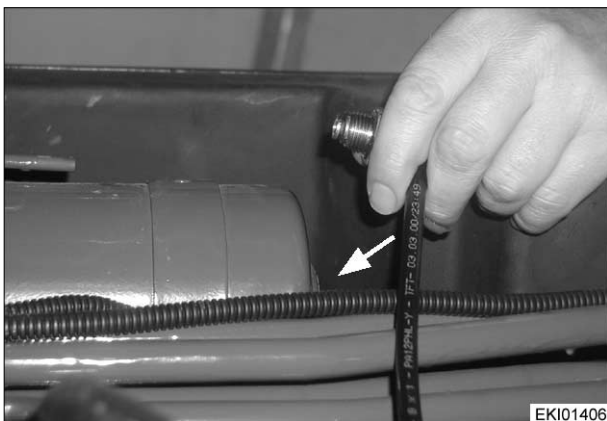
**Danger:**  
**Do not walk or stand under suspended loads!**



Fit hydraulic lines to 5V6 selector valve.



Fit hydraulic line to 4V5 pressure-relief valve with bracket.



Fit pressure pipe to brake cylinder.

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<b>Fav 900</b>	<b>Cab / General system</b> <b>Fitting cab</b>	<b>G</b>
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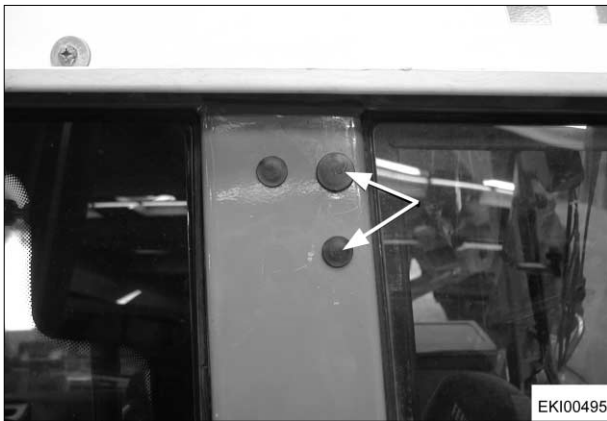
EKI01490

Lower cab fully.  
Fit hexagon screw to cab mount on both left and right.  
Tighten M16 hexagon screw to 210 Nm.



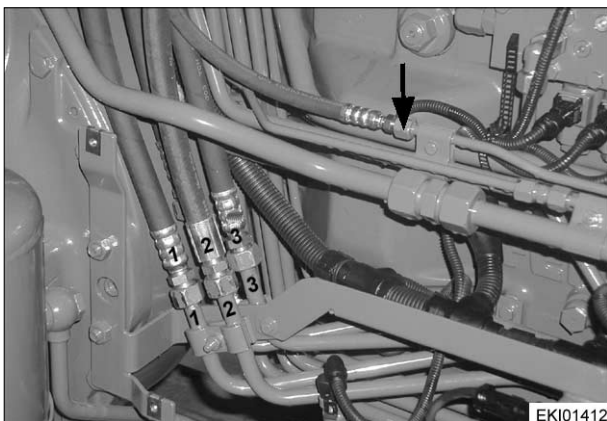
EKI01489

Fit two hexagon screws and spacer sleeve.  
Tighten M12 to 86 Nm.  
Tighten M16 to 210 Nm.  
Fit opposite side in same manner.



EKI00495

Remove complete hoisting yoke.  
Fit sealing plugs to left and right B-pillars.

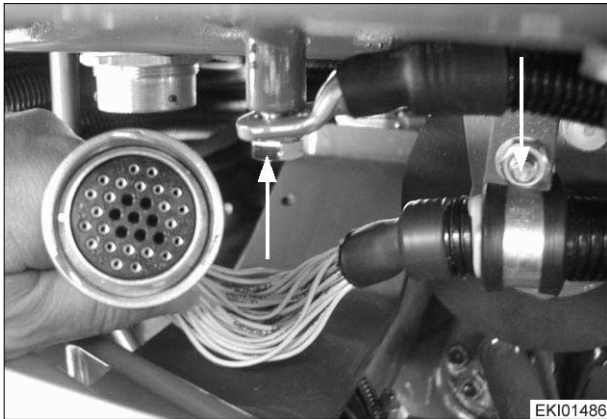


EKI01412

Connect steering system hydraulic lines as per labels.  
Fit LS line (arrowed).

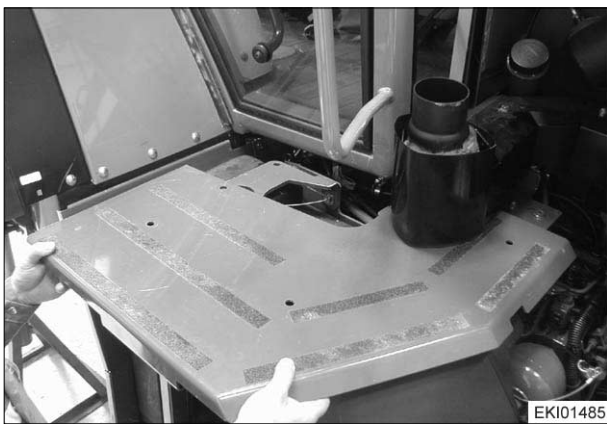
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<b>Fav 900</b>	<b>Cab / General system</b> <b>Fitting cab</b>	<b>G</b>
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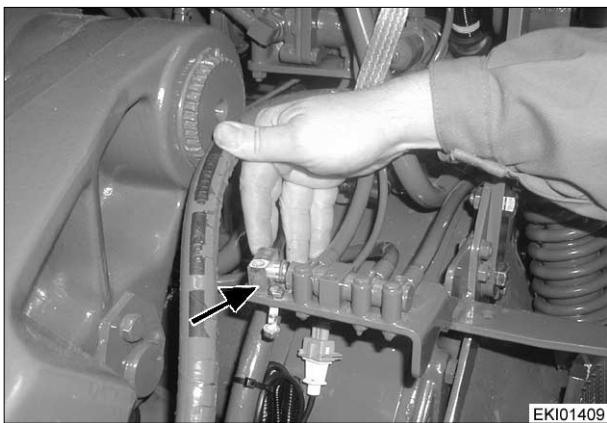
EKI01486

Connect cable coupler.  
Fit cable loom bracket (arrowed) and earth cable.



EKI01485

Fit cover panel.



EKI01409

Connect compressed-air line to distributor.

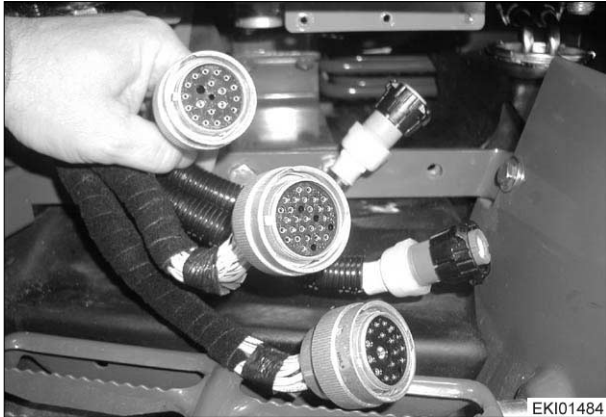


EKI01410

Connect cable couplers.  
Fit cable clip and earth cable.  
Fit panel.

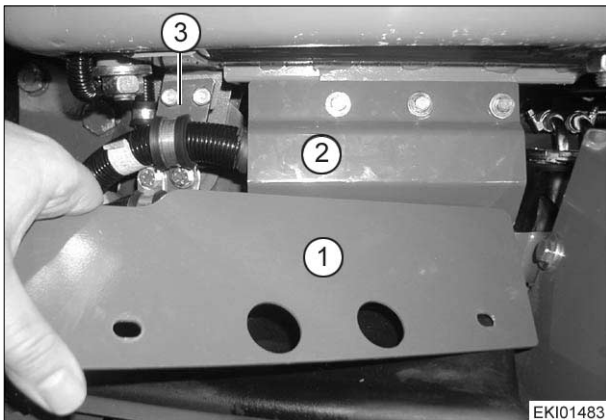
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<b>Fav 900</b>	<b>Cab / General system</b> <b>Fitting cab</b>	<b>G</b>
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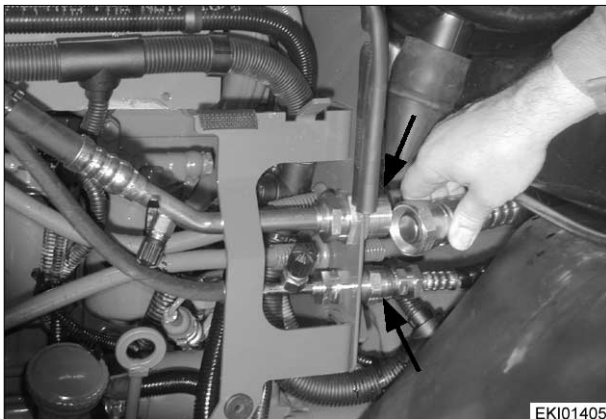
EKI01484

Connect cable couplers.



EKI01483

Fit cover panel (1), cover of cable coupler (2) and cable loom bracket (3).



EKI01405

Fit air-conditioning coolant hoses.  
Fit engine cover.



EKI01482

Fit heating system water hoses.  
Check coolant. Top up if necessary.

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Fav 900	Cab / General system <b>Fitting cab</b>	<b>G</b>
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EKI01389

Fit left and right support plates.



EKI01388

Fit cover panel and side sections.

- Concluding work:**  
**Fit exhaust and air intake.**  
**Fit panels on right side.**  
**Fit rear wheels.**



EKI00703

- Bleeding brake hydraulic system, see Chapter 1070 Reg. G.**  
**Bleeding clutch hydraulic system, see Chapter 1100 Reg. G.**

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Power lift / Electrohydraulic control EPC</b> <b>Rear power lift - functional description</b>	<b>A</b>
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### Comparison with Fav 500, Xylon, Fav 800 etc. (in brief):

Unchanged:

- Operating principle
- EPC-DA switchover via twin-block ball valve
- 230 bar pressure-relief valve in EPC valve
- Possible danger when switching from EPC to DA as a result of pressure equalisation between different consumers (gravity-loaded)
- Safety measures

New:

- Location of EPC valve between first and second control valves
- EPC valve with two separate main pistons
- "Lower" valve with integral oil-leakage shutoff valve
- No specific floating position required in valve
- Automatic activation of shock load damping system with option of setting closing speed on terminal
- Only the "actual" signal lines are included in the relevant electrical circuit diagram; the bus messages to the terminal, to the ECU A002, to the electrohydraulic control valve and to the terminal A008 cannot be seen in the circuit diagram.

### Following movements are possible for rear power lift:

1. "EPC lift"
2. "EPC lower / regulate"
3. "EPC transport"
4. "DA lift"
5. "DA lower"

### Other operational statuses are:

6. Floating position
7. Shock load damping
8. Electrohydraulic remote control

### Safety precautions

- In all modes EPC box is only activated at minimum engine speed of 400 rpm, i.e. it must always be guaranteed that even automatically induced movement - e.g. lowering implement - can quickly be corrected by driver with active LS pump (speed figure is delivered to EPC box via K-bus).
- Switch S048 on EPC-DA multiway valve prevents possibility of dual operation.

#### 1. "EPC lift"

The "Lift" command can be triggered by

- rapid lift control on control console with "Lift" command, or
- depth setting (= setpoint potentiometer), or
- "END" rocker switch on joystick, when in automatic mode, or
- automatic correction with active shock load damping, or
- external buttons (S027 and S029) at cab on right and left
- Any external commands immediately lock all other EPC functions.

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29.11.2000	a	1/8	Rear power lift - functional description	8610	A 000001

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Power lift / Electrohydraulic control EPC</b> <b>Rear power lift - functional description</b>	<b>A</b>
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Explanation of functions:

a) Electrical

- Block multiway valve, consisting of AV3 and AV4, is in "EPC" position
- This position is detected by solenoid switch S048 and transmitted to EPC box A005 pin 12, i.e. EPC box is active.
- "Lift" solenoid Y021 of EPC valve is supplied with power by EPC box A005 pin 55 (12 volts).

b) Hydraulically

- Load power/load-sensing system connection is active when "Lift" valve is active.
- If LS pump PR is not yet active, current load pressure (= standby pressure of LS pump) is transmitted as maximum pressure to LS pump as a command via shuttle valves (EPC valve, 1.1 valve, WLS-2, WLS-1).
- LS pump PR then goes automatically to pumping and pressure regulation, i.e. it pumps required volume at required pressure.
- Should LS pump already be active elsewhere with higher pressure demand, "surplus" pressure at EPC valve's pressure governor is limited to power lift load level.
- Max. lifting speed is defined as cross-section (= fixed aperture) in EPC valve.
- Hydraulic oil then comes from EPC valve output directly to lift side of power lift cylinders.
- Displaced oil returns to tank via multiway valve AV4.

c) Mechano-hydraulically

- Lifting of largest possible implement to full height is primarily limited by three-point linkage setting (top link length and coupling point) and,
- for maximum safety, by working pressure of LS pump PR (this pressure is fixed and must never be increased!).

Safety system:

- Max. pressure protection of LS pump with pressure-relief valve DBV-A in central control block
- During every lift operation - except with external buttons S027 and S029 - max. height is activated by safety end shutoff, i.e. "Lift" process is automatically shut off.

## 2. "EPC lower / regulate"

The "Lower" command can be triggered by

- rapid lift control at control console with command "Lower = regulate", or
- depth setting (= setpoint potentiometer), or
- "END" rocker switch on joystick, when in automatic mode, or
- external buttons (S028 and S030) at cab on right and left
- Any external commands immediately lock all other EPC functions.

Explanation of functions:

a) Electrical

- Block multiway valve, consisting of AV3 and AV4, is in "EPC" position.
- This position is detected by solenoid switch S048 and transmitted to EPC box A005 pin 12, i.e. EPC box is active.
- "Lower" solenoid Y022 of EPC valve is supplied with power by EPC box A005 pin 19 (12 volts).
- Lowering speed is set as infinitely variable setpoint in terminal's "Rear power lift" control menu and
- transmitted by EPC box as pulse-width-modulated (PWM) power signal to electrically proportional "Lower" valve.

b) Hydraulically

- "EPC lower" works without LS command and without active intervention of LS pump PR.
- Displaced oil from lift cylinder moves to open "Lower" valve.
- "Lower" valve opens its cross-section in accordance with setpoint flow rate.
- If lowering is activated by external button S028 or S030, "Lower" valve automatically moves to medium lowering speed, i.e. to medium flow rate.

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Power lift / Electrohydraulic control EPC</b> <b>Rear power lift - functional description</b>	<b>A</b>
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c) Mechano-hydraulically

- Theoretical depth of power lift is determined by setpoint specification and regulated, i.e. adapted as function of hybrid control system.
- Lowering speed actually achieved, however, depends on implement weight and oil viscosity, i.e. it is impossible to lower three-point linkage in EPC mode without implement and with cold oil.

### 3. "EPC transport"

"EPC transport" setting is automatically reached when

- power lift has reached end position with "Lift = END" (detected by rear position sensor B030)

Explanation of functions:

a) Electrical

- Block multiway valve, consisting of AV3 and AV4, is in "EPC" position
- This position is detected by solenoid switch S048 and transmitted to EPC box A005 pin 12, i.e. EPC box is active.
- Actual position is detected by rear power lift position sensor B030 and transmitted as voltage signal to EPC box A005.

b) Hydraulically

- Without LS command and without active intervention of LS pump PR
- Implement weight generates hydraulic counterpressure in lift cylinder.
- Dynamic peak pressures while driving are brought under control by 230 bar pressure-relief valve in EPC valve.
- Leak-free integrity of system is ensured by integral control valve in "Lower" valve (i.e. with this EPC valve fitted, no separate, hydraulically resettable non-return valve is needed any longer).

### 4. "DA lift"

### 5. "DA lower" (pressing downwards)

The "DA lift" and "DA lower" commands can only be activated by

- analogue setpoint command of second valve (normally "blue" at crossgate lever)

Explanation of functions:

General:

- For power lift DA function second control valve 1.2/Y016 with A and B connections (corresponding to - and +) is used instead of EPC valve.

a) Electrical

- Block multiway valve, consisting of AV3 and AV4, is in "DA" position.
- This position is detected by solenoid switch S048 and transmitted to EPC box A005 pin 12, i.e. EPC box is no longer active in supplying power to control valve.
- "Lift" or "Lower" command from external buttons (S027-S030) is transmitted from EPC box via K-bus to ECU A002.
- Set lift height limit at terminal is not active, and EPC end shutoff is also ignored.

Fav 700 single ECU

- The single ECU A002 is responsible for actuating the electrohydraulic control valves (and for the transmission); the command for the valve comes via the transmission bus (=G-bus).

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Power lift / Electrohydraulic control EPC</b> <b>Rear power lift - functional description</b>	<b>A</b>
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### Fav 700 twin ECU

- The ECU A002 is responsible for actuating the electrohydraulic control valves; the command to the valve comes via the special valve bus (=V-bus).
- b) Hydraulically

- Load power / LS connection is active when main piston is deflected to lift or lower.
- If LS pump PR is not yet active, current LS pressure (= standby pressure of LS pump) is transmitted as maximum pressure to LS pump as a command via shuttle valves (1.2 valve, EPC valve, 1.1 valve, WLS-2, WLS-1).
- LS pump PR then goes automatically to pumping and pressure regulation, i.e. it pumps required volume at required pressure.
- Should LS pump already be active elsewhere with higher pressure demand, "surplus" pressure at electrohydraulic control valve's pressure governor is limited to power lift load level.
- Lifting and lowering speed (flow rate) is taken from currently set value of second valve at terminal.
- Hydraulic oil for lifting or lowering then goes directly to lift system cylinders from electrohydraulic control valve 1.2 output.
- Displaced oil returns to tank via multiway valve AV3 and AV4.

c) Mechano-hydraulically

- Power lift moves to mechanical end stop in lift cylinder with external command "Lift" or "Lower" and generates 200 bar there (= max. standby pressure).

Safety systems:

- Max. pressure protection of LS pump with pressure-relief valve DBV-A in central control block

## Operational statuses

### 6. Floating position

- EPC valve has no special floating position.

Explanation of functions:

a) General

- Floating position is activated - as previously - by max. depth setting.
- However, "floating" is also active at higher power lift position as soon as no more weight is available for lowering or if implement is on ground before lowest position is reached.

b) Electrically:

- ECU A005 receives voltage of 10 scale graduations setting from depth-setting potentiometer.
- Any control commands, e.g. to lift slightly, are suppressed, i.e.
- "Lower" valve receives constant power.

c) Hydraulically

- With "Lower" valve active and "Lift" valve inactive (i.e. in neutral), connection is made between both load powers and tank line - as with previous floating position.

### 7. Shock load damping

- This is automatically active after upper end position (B030) has been reached when lifting implement.
- Speed at which shock load damping is enabled can be set at terminal in rear power lift menu (see Operating Manual).

Background:

Oscillation of mounted implement while driving results in pressure peaks which cannot be brought smoothly under control in 230 bar pressure-relief valve of EPC valve.

Function / principle of shock load damping system:

Based on draft-sensing pin signals (B030 / B031), downward oscillations of implement are damped by specific opening and closing of "Lower" valve. This prevents further escalation.

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29.11.2000	<b>a</b>	4/8	<b>Rear power lift - functional description</b>	<b>8610</b>	<b>A</b>	<b>000001</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Power lift / Electrohydraulic control EPC</b> <b>Rear power lift - functional description</b>	<b>A</b>
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## 9. Electrohydraulic remote control (optional extra)

For more details please see also "Electrohydraulic remote control" Chapter 8618 Index A and Index E Reason / use:

Some implements - e.g. sugar beet topper-lifter - have their own position sensor (component designation not available). This mode is sometimes referred to as "momentary-contact control".

Connection / required adaptation:

Relevant circuit diagram: "Electrohydraulic control"

External sensor is connected to white socket X015 at rear of tractor. This works from EPC box A005 with same 9.5 V supply voltage at same pin 39 and with same earth at same pin 20 as tractor sensor B030. Specific contact - pin 48 - is available for signal from external sensor.

EPC box itself detects any connected external sensor and then continues to work with this signal, i.e. no further action is necessary.

Diagnostics:

Because it has its own contact, external sensor can also be checked by diagnostics system in event of electrical signal faults (fault code 8.3.26).

Faults in the earth power supply (common terminal; socket X015 not available = sensor not connected) are not self-testing and may be confusing.

### Appendix:

For a guide to various components / current and precise installation position see "Tractor / General system", Chapter 0000 Index D and "Electrics / General system" Chapter 9000 Index D

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<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift / Electrohydraulic control EPC  <b>Rear power lift - functional description</b></p>	<p><b>A</b></p>
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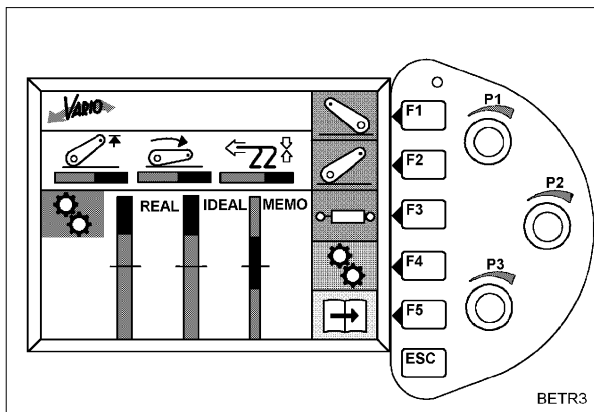


Fig. 1  
 Terminal A008  
**First main menu level**

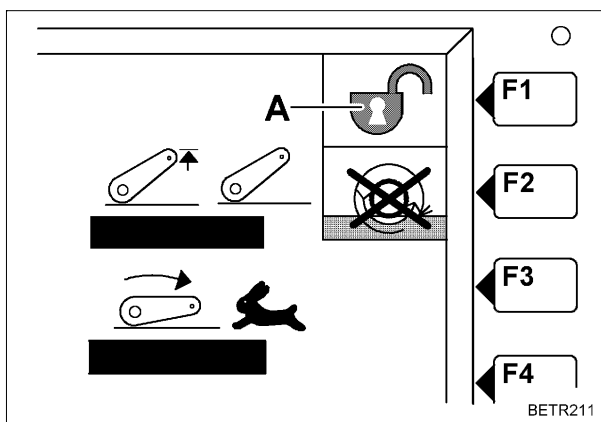


Fig. 2  
**Power lift lock pictogram**  
 Lock can be opened:  
 Key F1 or  
 operate rapid lift control.  
 Lock is automatically locked:  
 when actuating external buttons (Lift / Lower)

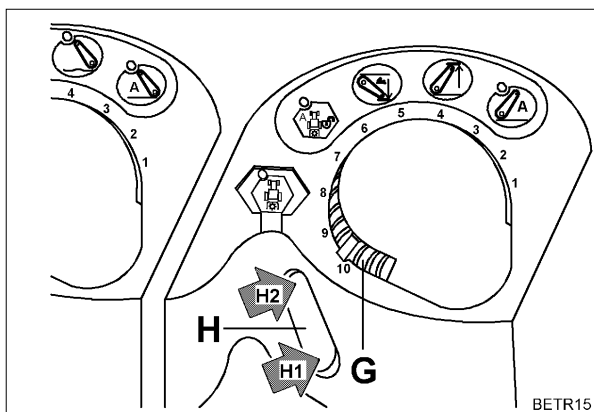


Fig. 3  
 Rear power lift  
**Control console A004**  
 H = rapid lift control  
 H1 = lower and regulate  
 H2 = lift  
 G = depth control



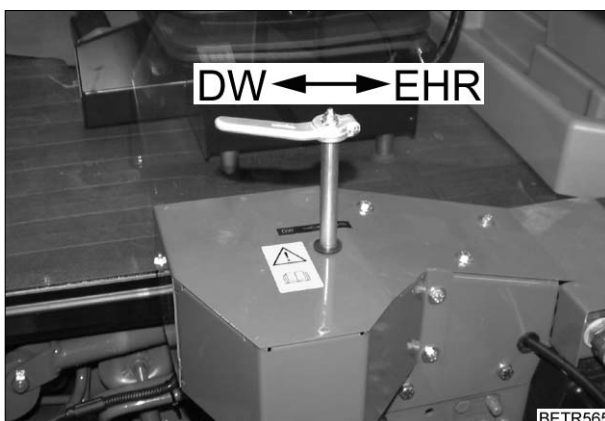
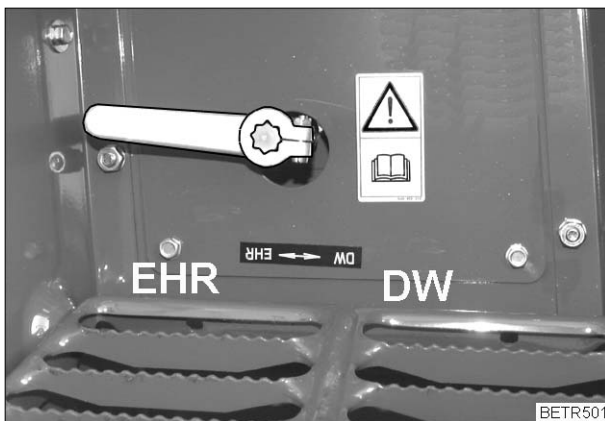
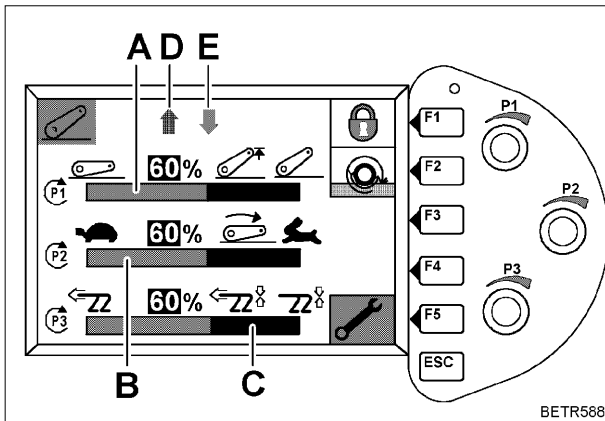
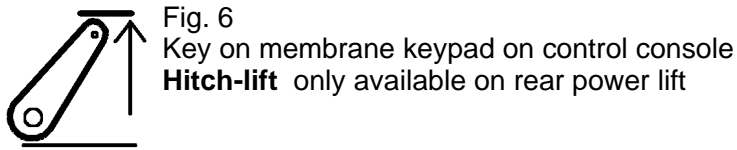
Fig. 4  
 Key on membrane keypad with "Active" LED on control console  
**Rapid lowering system** only available on rear power lift



Fig. 5  
 Key on membrane keypad with "Active" LED on control console  
**Rapid lowering system** only available on rear power lift

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29.11.2000	a	6/8	<b>8610</b>	<b>A</b>	<b>000001</b>

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift / Electrohydraulic control EPC  <b>Rear power lift - functional description</b></p>	<p><b>A</b></p>
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<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift / Electrohydraulic control EPC  <b>Rear power lift - functional description</b></p>	<p><b>A</b></p>
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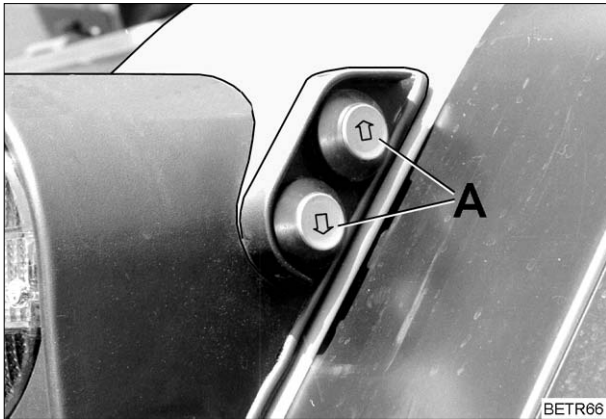


Fig. 10

**External buttons S027-S030**

for lifting and lowering, left and right  
 (in photo on right)

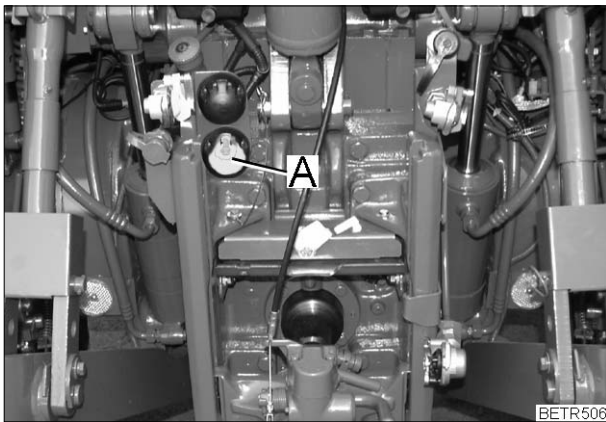


Fig. 11

**Remote control**

Item A = socket X015 for connecting external position sensor

Socket and contact labelling is same as with 7-pin trailer socket X018, though with different meaning:

L = free

54g = signal to EPC box pin 48

31 = EPC box earth pin 20

R = free

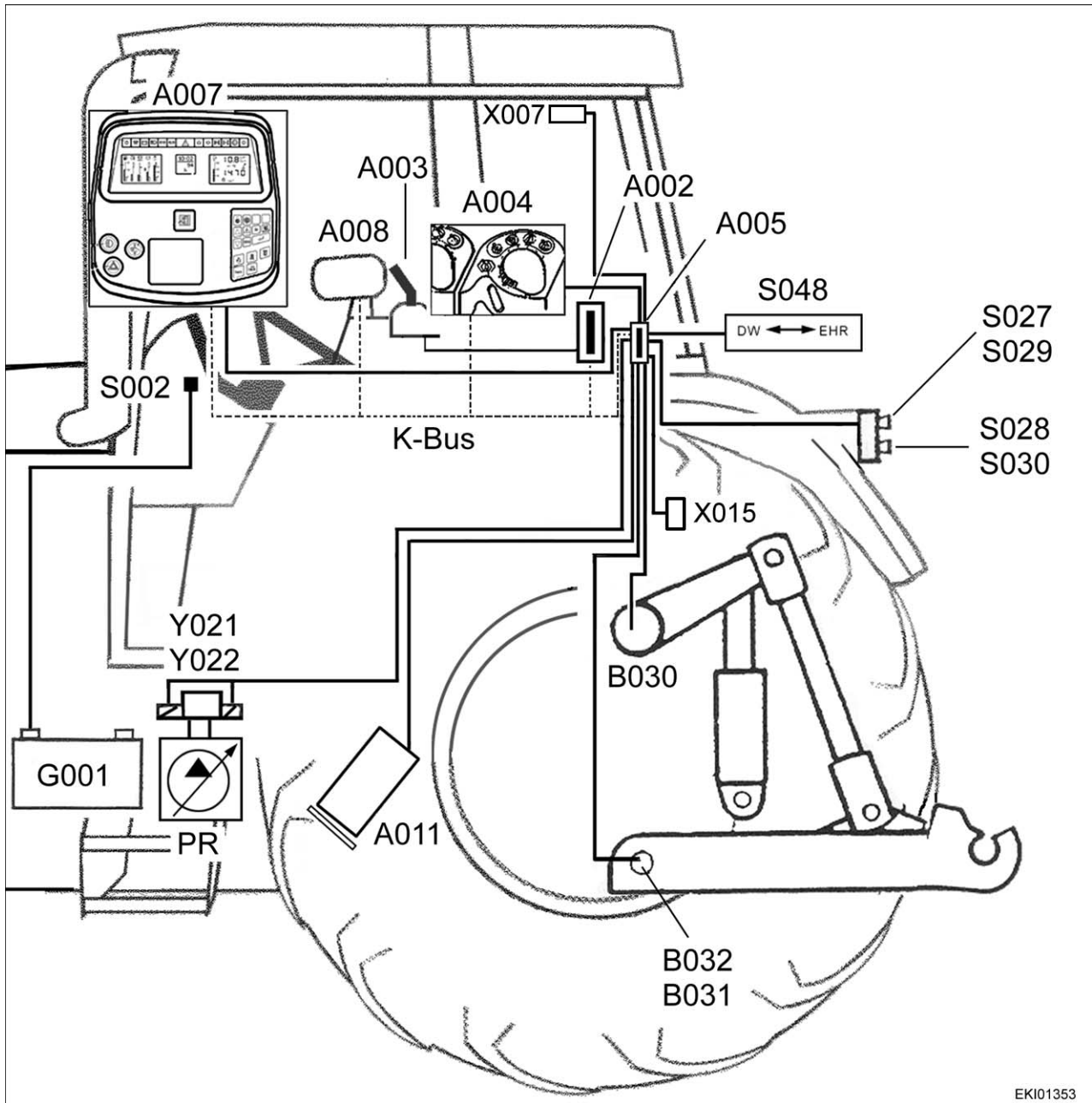
58R = 9.5 V supply for EPC box 39

54L = free

58L = free

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<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift / Electrohydraulic control  <b>Rear power lift EPC-C</b></p>	<p><b>A</b></p>
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A002	Enhanced controls e-box	K-bus	Enhanced controls bus
A003	Joystick	PR	LS pump
A004	Control console	S002	Ignition-starter switch
A005	EPC e-box	S027	External EPC "Lift" button, right
A007	Instrument panel	S028	External EPC "Lower" button, right
A008	Vario terminal	S029	External EPC "Lift" button, left
A011	Radar sensor	S030	External EPC "Lower" button, left
B030	Rear EPC position sensor	S048	EPC/DA switchover solenoid switch
B031	Rear EPC right draft-sensing pin	X007	Implement socket cable coupler
B032	Rear EPC left draft-sensing pin	X015	Cable coupler for remote control socket
G001	Battery	Y021	"EPC lift" solenoid valve
		Y022	"EPC lower" solenoid valve

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Power lift / Electrohydraulic control EPC</b> <b>Operation and control conditions of EPC-C</b>	<b>A</b>
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## Working with EPC-C ECU (A005)

### Position control

The controlled variable is the position of the lift assembly relative to the tractor and thus the working depth of the mounted implements.

The "Position" sensor **B030** , which monitors the position of the lifting shaft, supplies the actual value.

### Draft force control

The controlled variable is the draft force at the bottom link. If this is kept constant, the tractor power is used to the optimum extent, for example when ploughing on rolling terrain and in non-homogeneous soil.

The actual value of the "KMB" draft-sensing pin **B031 / B032** is the change in the voltage in the signal line. This is caused by the change in the magnetic field in the draft-sensing pin when subjected to tensile or compressive loads by the bottom links in a horizontal plane.

The draft force is corrected by changing the working depth of the mounted implement (e.g. plough).

### Hybrid control

The actual value of the position and draft force is mixed in an adjustable ratio at the Vario terminal **A008** and processed as the controlled variable.

The hybrid control enables changes in the working depth resulting from varying soil resistances, as occur when using pure draft control, to be reduced.

### Floating position

In this the setpoint working depth is set to the max. working depth (item 10) on the control console **A004** .

The position and draft force actual values are not processed as controlled variables. The height of the lift arms is maintained by the self-supporting implement.

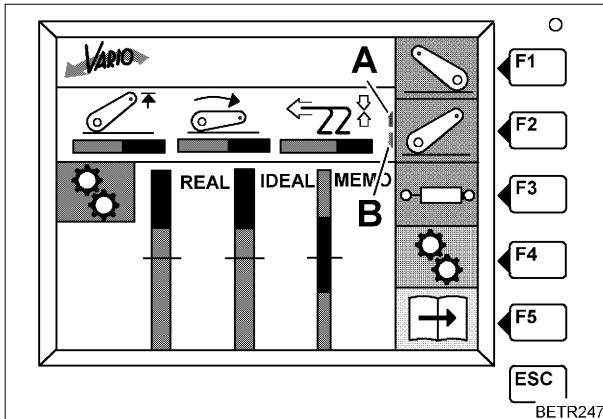
Date	Version	Page	Capitel	Index	Docu-No.
11.04.2001	a	1/5	8610	A	000003

Farmer 400  
Fav 700  
Fav 900

Power lift / Electrohydraulic control EPC  
Operation and control conditions of EPC-C

A

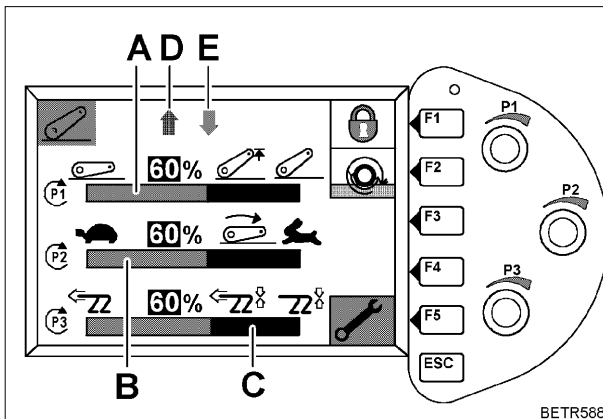
## Electronic power lift control (EPC) settings



Press F2 to display rear EPC submenu.

A = power lift rises

B = power lift lowers



Current settings are shown by three bar displays (A, B, C).

Arrow symbols (D, E) are displayed when power lift is being raised or lowered.

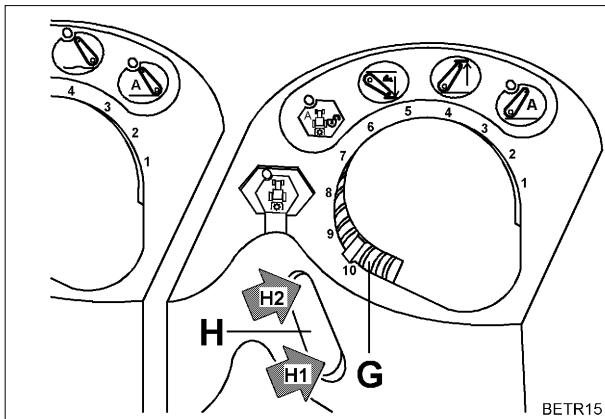
Adjustments can be made using three rotary controls (P1, P2, P3).

### Settings at Vario terminal A008

- A = **Lift height limit** (as % of maximum lift height)
- B = **Lowering speed** "lowering throttle valve" (as % of maximum lowering speed)  
100% setting ("Hare") = max. lowering speed  
0% setting ("Tortoise") = power lift does not lower  
Lowering speed is infinitely adjustable between these two positions.
- C = **Position/draft force hybrid control**  
0% corresponds to pure draft force control (e.g. plough)  
100% corresponds to pure position control (e.g. fertiliser distributor)  
**E.g. 60% setting means: 60% position control and 40% draft force control**
- F1 = **Unlock lift control** (- or operate rapid lift control at control console A004 -)  
**Lock is automatically closed when external Raise / Lower S029 / S030 switches are operated.**

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<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift / Electrohydraulic control EPC  <b>Operation and control conditions of EPC-C</b></p>	<p><b>A</b></p>
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**Operation at control console A004**

G = **Setpoint / depth control** (item 10 on setting scale = floating position)

H = **Rapid lift control with transport lock**

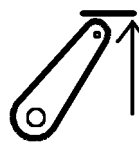
"**Stop**" **mid-position** = Electronic systems disabled (no correction)

**End "Raise" position (H2)** = Transport position with shock load damping for mounted implement

**Go "Control" position (H1)** = Lower or implement is moved to setpoint depth.



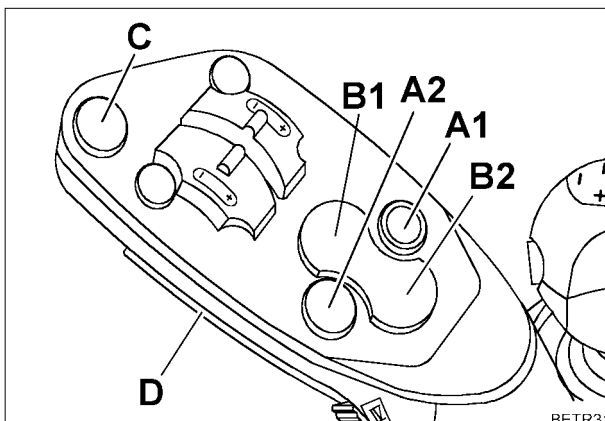
Rapid lowering system, power lift moves to floating position and then regulates to setpoint depth (e.g. plough at headland)



Hitch lift, locking of hitch



Rear power lift "Automatic" pressed, rapid lift control toggle switch is transferred to rear EPC rocker switch on joystick.



**Operation at joystick A003**

A1 / A2 = **Front enhanced power lift switch** (position control) (optional extra)

B1 = **Go "Control" position** = lower or implement is moved to setpoint depth.

B2 = **End "Raise" position** = raise rear power lift (as far as lift height limit "stop")

D = **Activating control** must be pressed when actuating rocker switch (B1 and B2) and switches A1 and A2 (front enhanced power lift, optional extra).

C = **Stop key**, lift assembly (front / rear) remains in current position.  
**(Emergency OFF)**

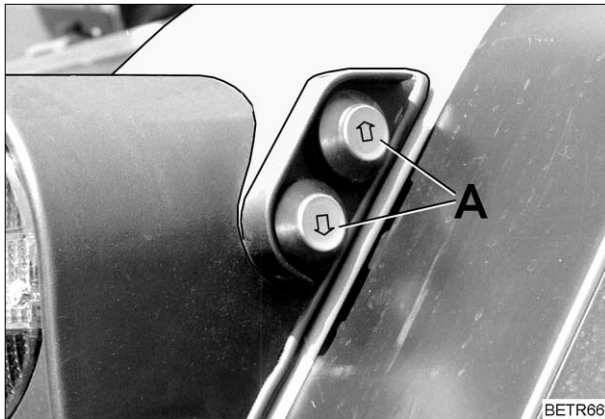
Date	Version	Page	Operation and control conditions of EPC-C	Capitel	Index	Docu-No.
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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Power lift / Electrohydraulic control EPC</b> <b>Operation and control conditions of EPC-C</b>	<b>A</b>
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## Rear control of power lift

The power lift can be operated externally (without control system) using control (**S029 / S030**) on rear mudguard.

Lift is raised and lowered as long as control is pressed; this is used for mounting and detaching implements from the outside. The fail-safe circuit is then initiated, and the EPC-C must be re-activated when operated from inside the cab.



The pushbuttons on the right or left at the rear light cluster are used to raise or lower the lift. The fail-safe circuit is initiated (power lift locks). External operation is possible at any position of the rapid lift control.

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Farmer 400  
Fav 700  
Fav 900

Power lift / Electrohydraulic control EPC  
**Operation and control conditions of EPC-C**

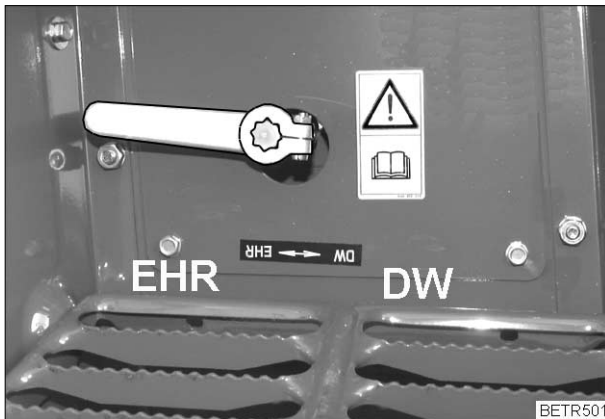
**A**

### Actuation by means of auxiliary control unit (EPC-DA switchover)

If the three-way valve **AV3 / AV4** is switched, the EPC ECU **A005** and the **EPC-C** control valve are disabled.

The rear power lift is operated via the auxiliary control unit 1.2 ("blue") in DA mode.

The rear power lift can be used to press (no control action).



**Danger:**

**Lower all mounted implements at front and rear!**

**Before switching to DA mode, disconnect implements from auxiliary control unit 1.2 blue at rear connection and multi-coupling. Unintended movements of the implements, front loader and rear power lift could otherwise occur.**

**The tractor must be propped if the power lift is used for repair purposes (pressing mode) e.g. for changing a tyre!**

#### Switching from EPC to DA

- Lower lift assembly (with implemented mounted).
- Switch crossgate lever to **floating position** .
- Switch lever to **DA** position (forwards)

#### Switching back from DA to EPC

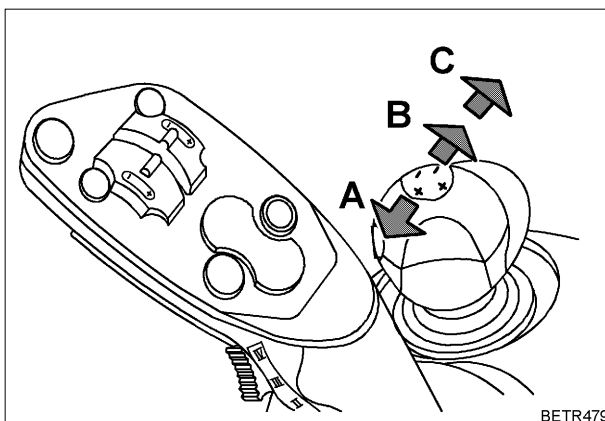
- Lower lift assembly completely.
- Switch crossgate lever to **floating position** .
- Switch lever to **EPC** position (backwards).
- Unlock EPC (operate rapid lift control).

#### Operating power lift in DA mode (auxiliary control unit 1.2 "blue" )

- A = Raise
- B = Lower or Press
- C = Floating position

**Note:**

**Ground-following implements may only be operated in floating position.**



**Note:**

**Rear power lift operation, see also tractor operating manual**

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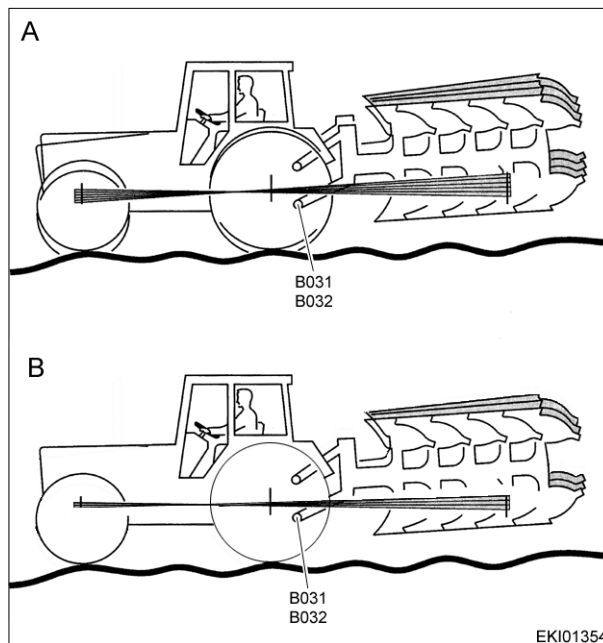
<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Power lift / Electrohydraulic control EPC</b> <b>Operation and function of shock load damping system</b>	<b>A</b>
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## Functional description of shock load damping system

Pitching can be induced in tractors with heavy mounted implements by uneven tracks and roads. The draft-sensing pins (**B031 / B032**) are used to measure lower-link loads in order to reduce front-axle load changes when transporting heavy mounted implements and thus to increase steerability.

The draft-sensing pin signals are evaluated via the EPC ECU **A005**

The EPC ECU **A005** feeds electronic signals to the **EPC** controller. **The signals trigger a lowering motion which has a damping effect.**



### A: without shock load damping

Front axle and implement oscillate.

### B: with shock load damping

Damping lowering motions initiated by the draft-sensing pins ( B031/B032 ) reduce the oscillations.

Result: smooth roadability, safe driving

### Benefits of shock load damping

- Pitching is reduced.
- Steerability increases (front wheels do not lift so easily).
- Travel speed can be increased.
- Ride comfort is improved.
- Dynamic loads are reduced.
- Stabilisation of the absolute lift height above ground

### Note:

If the shock load damping system is faulty:

Check for clearance of mounted implement (note bottom link category).

If implement coupling is faulty, draft-sensing pins (B031/B032) feed incorrect signals to EPC ECU A005.

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<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift / Electrohydraulic control EPC  <b>Operation and function of shock load damping system</b></p>	<p><b>A</b></p>
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### When is shock load damping actuated?

Shock load damping is actuated if the following criteria are met:

**The EPC must be unlocked** (open lock in Vario terminal or operate rapid lift control on control console).

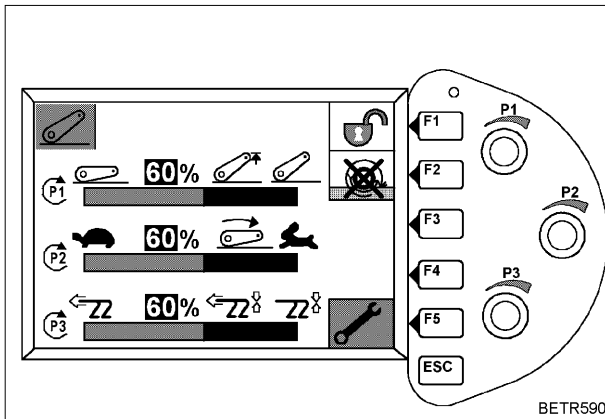
The **rapid lift control** on the control console must be in the **transport position** ("Raise" position).

The tractor must be driving faster than the **shock load damping actuation speed** (setting on Vario terminal A008).

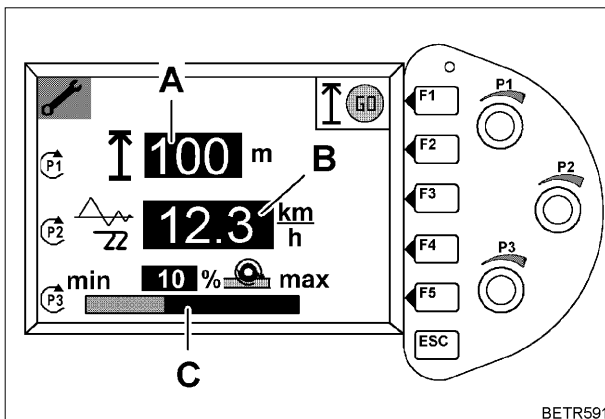
If the shock load damping actuation speed is exceeded, the lift assembly lowers by approx. 3% to the mean oscillation axis.

If the speed is 25% less than the shock load damping actuation speed, the lift assembly is raised by approx. 3%.

### Adjusting the actuation speed for shock load damping



Press F5 and this submenu is displayed.



Use rotary control (P2) to set display (B) to desired actuation speed.

Adjustment range 0 - 30 km/h

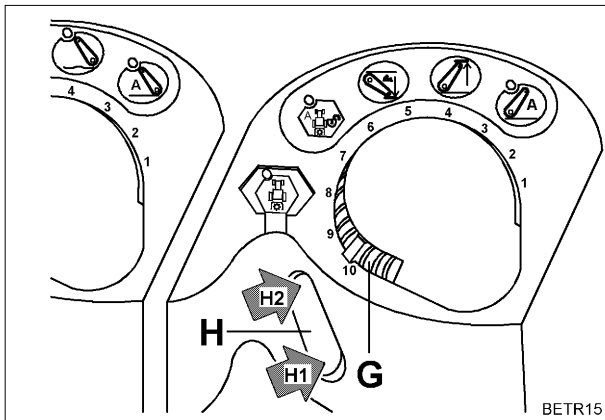
A = Calibration of radar sensor A011 (see tractor operating manual)

C = Setpoint wheel slip for slip control of rear power lift (see tractor operating manual)

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**Driving on road (shock load damping and transport lock)**



**Operate rapid lift control (H) (lift assembly unlocked) and set to Raise position (H2).** Shock load damping is activated and is engaged if actuating speed is exceeded.

**Set depth control (G) fully to right (position 0) (transport lock).**

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Farmer 400  
Fav 700  
Fav 900

Power lift / Electrohydraulic control EPC  
Operation and function of electronic slip control

A

## Functional description of electronic slip control (radar)

(Optional extra)



**Caution:**

The tractor is fitted with a radar sensor. Do not look into the radar sensor's radiation range (microwaves).

A relatively large degree of slip by the drive wheels is physically unavoidable if optimum use of the tractor's draft force is to be made in the field.

If, however, slip exceeds 25 - 30%, unacceptable disadvantages ensue.

In order to monitor slip, the **actual travel speed** is determined via a **radar sensor A011** and compared with the **bevel pinion speed sensor B015** (travel speed display).

The speed signals from the radar sensor **A011** and the bevel pinion speed sensor **B015** are processed in the EPC ECU **A005**.

Increasing slip acts on the EPC ECU A005 in just the same way as increasing draft force.

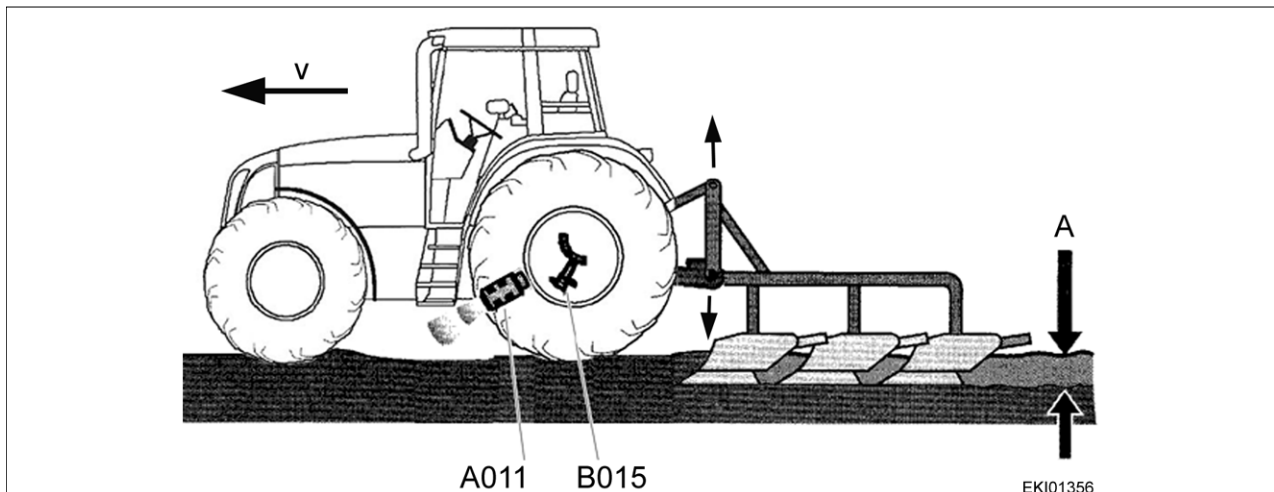
**The rear power lift rises if slip increases and therefore reduces the draft force of the mounted implement by reducing the working depth.**

### Slip control offers the following benefits:

- Time and fuel inputs are reduced.
- Tyre wear is reduced.
- Soil impact is reduced.
- Demands on the driver are reduced.
- The chance of becoming stuck is avoided.

### Wheel slip calculation formula (%)

Wheel slip % =  $(\text{speed B015} - \text{speed A011}) / (\text{speed B015}) \times 100\%$



A011 = Radar sensor

B015 = Bevel pinion speed sensor

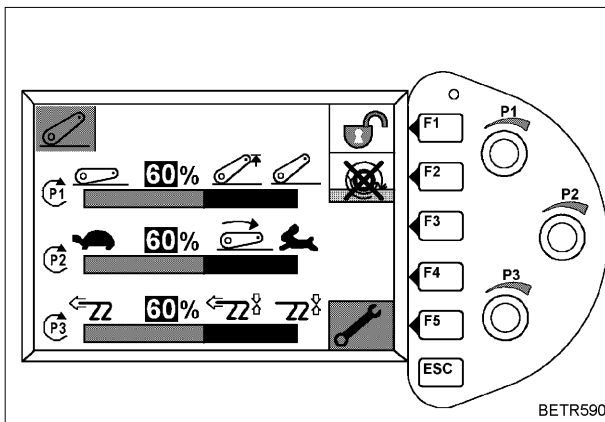
A = Working depth

v = Travel speed

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11.04.2001	a	1/5	8610	A	000006

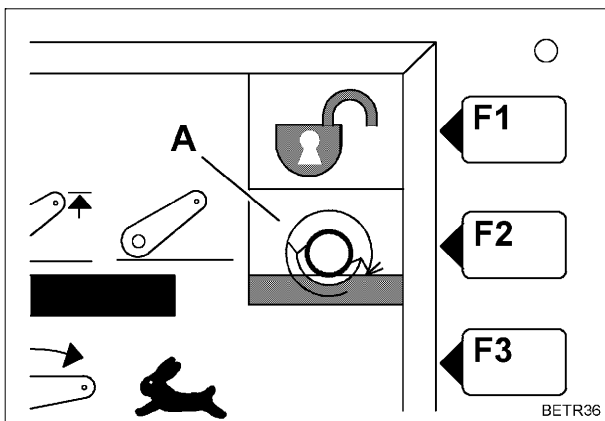
<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift / Electrohydraulic control EPC  <b>Operation and function of electronic slip control</b></p>	<p><b>A</b></p>
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**Electronic slip control settings**



**Switching electronic slip control on and off**

Call up rear power lift submenu.

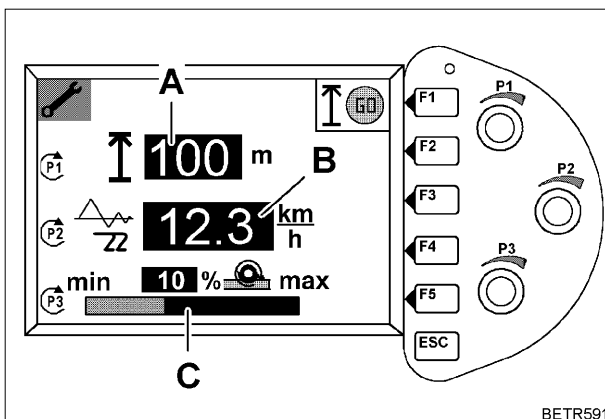


A = Electronic slip control is switched on and off by pressing F2.

Slip control remains activated as long as tractor is moving. If it is stationary for longer than 30 sec, slip control switches off automatically.

Press F2 again to reactivate slip control.

Slip control does not operate in floating position or position control mode.



**Setting wheel slip**

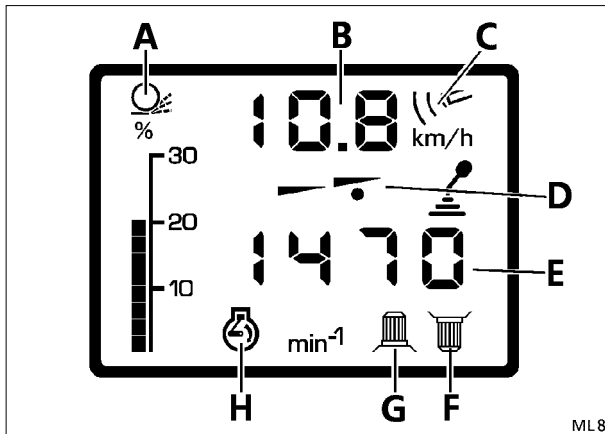
C = Use rotary control P3 to set display showing percentage wheel slip at which lift assembly is raised. **Setting range from 3% to 60% wheel slip**


A = Gauge length for radar sensor calibration

B = Shock load damping actuation speed (see Chapter 8610 Reg.A - Operation and function of shock load damping)

Date	Version	Page	Capitel	Index	Docu-No.
11.04.2001	a	2/5	<b>8610</b>	<b>A</b>	<b>000006</b>

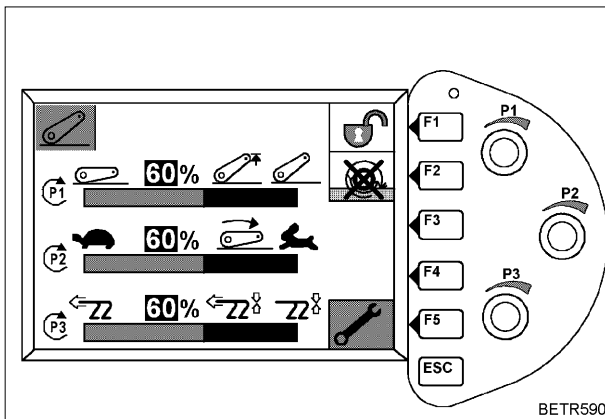
<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift / Electrohydraulic control EPC  <b>Operation and function of electronic slip control</b></p>	<p><b>A</b></p>
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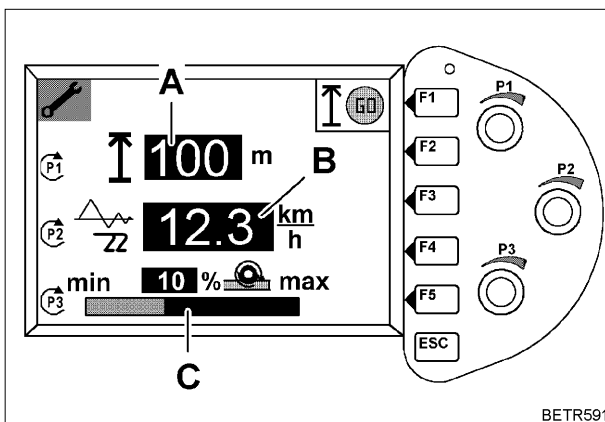
- A = Display: current slip (%)
- B = Speed display in km/h  
 based on theoretical speed measurement from transmission speed, signal from bevel pinion speed sensor B015
-  based on actual speed measurement from signals from radar sensor A011, pictogram (C) is displayed. Above 15 km/h the system automatically switches to theoretical speed measurement. Slip display (A) and pictogram (C) disappear.
- D = Display for speed range (I, II)
- H, G, F = Preset display for engine, front PTO, rear PTO
- E = Speed display (rpm) for engine, front PTO, rear PTO

**Calibrating radar sensor A011**

Accurately measure and mark out gauge length of between 30 m and 100 m (e.g. 100). Position tractor front wheel precisely on start mark.



Press F5 and this submenu is displayed.

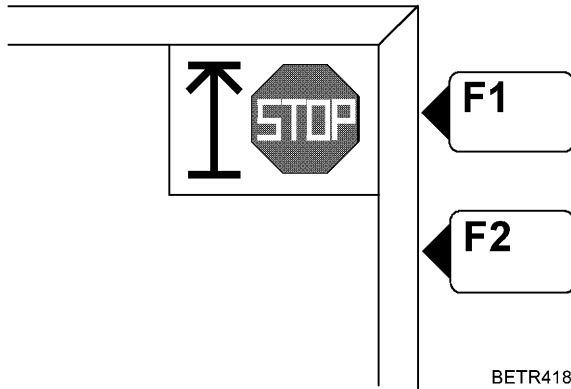


- A = Using rotary control (P) set display to measured distance (e.g. 100 m). Press F1.

Date	Version	Page	Operation and function of electronic slip control	Capitel	Index	Docu-No.
11.04.2001	a	3/5		8610	A	000006

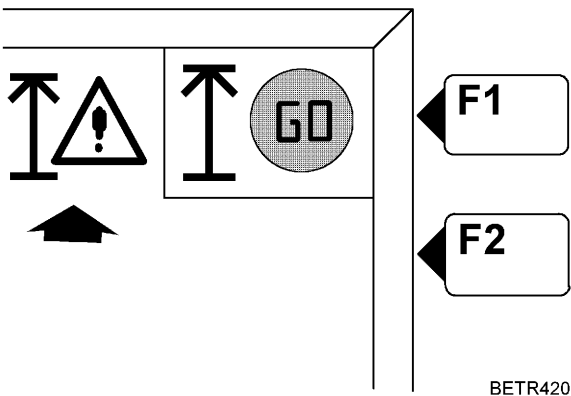
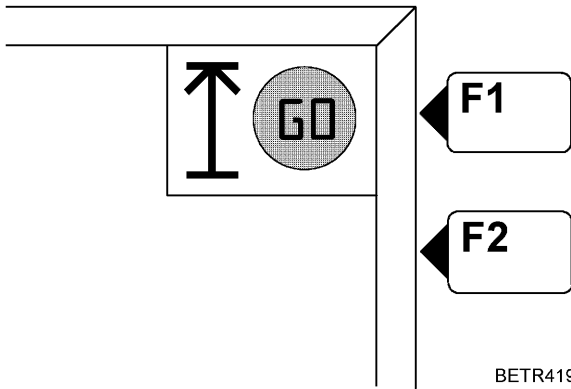
Farmer 400 Fav 700 Fav 900	Power lift / Electrohydraulic control EPC <b>Operation and function of electronic slip control</b>	<b>A</b>
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Display changes from "GO" to "STOP".



Pull away in tractor and stop with front wheel on end mark of gauge length.  
Press F1.

If instructions have been followed correctly, "GO" is displayed again.



If warning symbol (arrowed) is also displayed, calibration procedure must be repeated. Check whether input distance matches measured distance. Repeat calibration process.

**Note:**  
"Wheel slip setting" and "Radar calibration" are always displayed on terminal A008.  
If no radar sensor A011 is connected, display is meaningless.

**Note:**  
If radar sensor A011 is retrofitted, this must be input into end-of-line program (Fendias).

Date	Version	Page	Capitel	Index	Docu-No.
11.04.2001	a	4/5	8610	A	000006

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Power lift / Electrohydraulic control EPC</b> <b>Operation and function of electronic slip control</b>	<b>A</b>
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## Radars sensor technical specifications

Two signals are needed to determine slip: one for the actual speed and one for the theoretical. A bevel pinion speed sensor B015 (Hall-effect sensor) is used to measure the theoretical speed.

A radar sensor A011 is used to measure the actual speed.

The radar sensor A011 works on the Doppler principle.

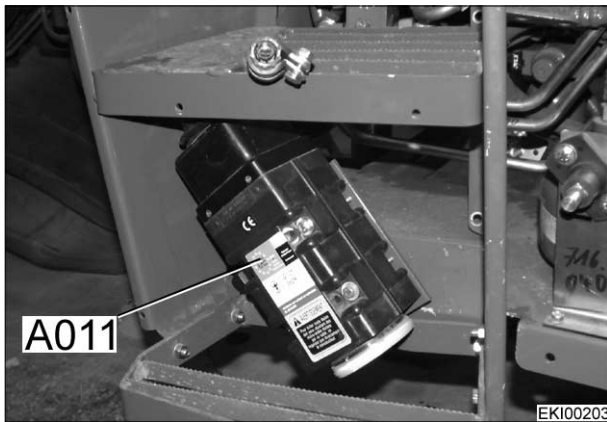
It supplies a pulse frequency which is proportional to the actual speed.

**The pulse frequency depends on the mounting angle of the radar sensor A011 on the tractor.**

**On Fendt tractors the radar sensor A011 is mounted at an angle of 53° to the road surface.**

**With this mounting angle the radar sensor A011 has a pulse frequency of approx. 95 pulses/m.**

**The EPC ECU A005 converts the pulse frequency of 95 pulses/m to the standardised signal of 130 pulses/m and transmits it to the implement socket X007.**



**Photo shows Fav 700.**

A011 = Radar sensor (optional extra)

<b>Technical specifications, radar sensor A011</b>	
Supply voltage Ub15, fuse F048 in X051	12.0 VDC to 14.0 VDC
Speed range	0.4 - 70 km/h
Accuracy	+/- 1%
Mounting angle	53° to road surface
Transmission angle	15°
Output signal	95 +/- 10% pulses/m
Transmission frequency	24.125 GHz

### **Note:**

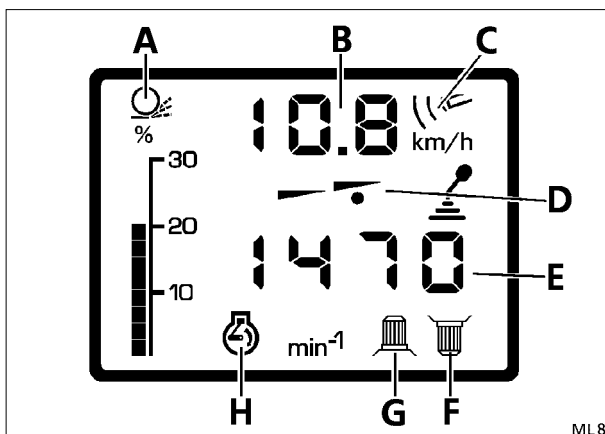
**Chapter 9000 Reg.E - Measuring and testing radar sensor A011**

Date	Version	Page	Capitel	Index	Docu-No.
11.04.2001	a	5/5	8610	A	000006

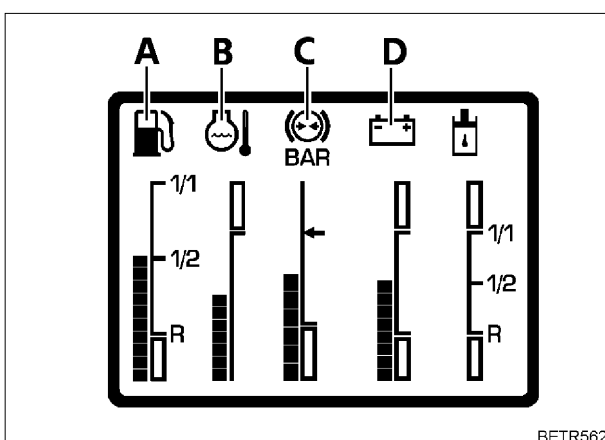
Farmer 400  
Fav 700  
Fav 900

Power lift / Electrohydraulic control EPC  
Activating LCD display for radar sensor A011 and compressed air

**A**



Display for radar sensor A011 (A)



Display for compressed air tank pressure (C)

**If a radar sensor A011 or an air compressor is retrofitted, the LCD display on the instrument panel A007 must be activated.**

- Activating LCD display with EOL program (with notebook).

**Note:**

EOL = end of line

or

- Activating LCD display in instrument panel A007

Date	Version	Page	Capitel	Index	Docu-No.
18.06.2001	a	1/2	8610	A	000007



Farmer 400  
Fav 700  
Fav 900

Power lift / Electrohydraulic control EPC  
Activating LCD display for radar sensor A011 and compressed air

**A**

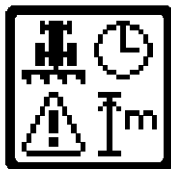
## Activating LCD display in instrument panel A007



A00454

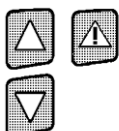
Ignition ON  
Press key (BI).

Function selection is displayed.



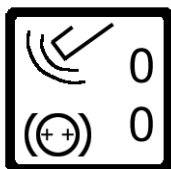
EKI01626

Press 3 keys simultaneously.



EKI01628

Function selection is displayed.



EKI01627

Press one key until pictogram for radar sensor A011 flashes.



A00461

Press key.  
Pictogram changes from 0 to I.  
I => display for radar sensor A011 is activated.



A00462



A00456

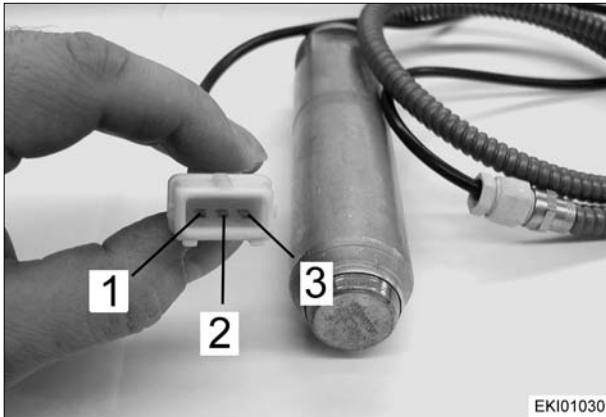
Press key  
LCD display is active, and time and operating hours are shown on multi-display.

### Note:

Activate display for compressed air tank pressure in same manner.

Date	Version	Page	Capitel	Index	Docu-No.	
18.06.2001	a	2/2	Activating LCD display for radar sensor A011 and compressed air	8610	A	000007

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift / EPC electrohydraulic power lift control  <b>B031/B032 - draft-sensing pin, functional description</b></p>	<p><b>A</b></p>
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**B031 / B032** - draft-sensing pin

The draft-sensing pin is in the form of the bearing pin for the bottom links which can electrically detect the forces in a given direction at the articulation point.

A transformer is mounted in a bore in the pin symmetrically to the shear plane of the bearing points to measure the shear forces acting on the pin. Together with the pin enclosing it, this transformer forms a magnetic circuit.

The draft-sensing pin B031/B032 is fed with a 9.5 VDC supply voltage at contacts 1 (-) 3 (+).

The supply voltage is converted into an alternating voltage in draft-sensing pin B031/B032.

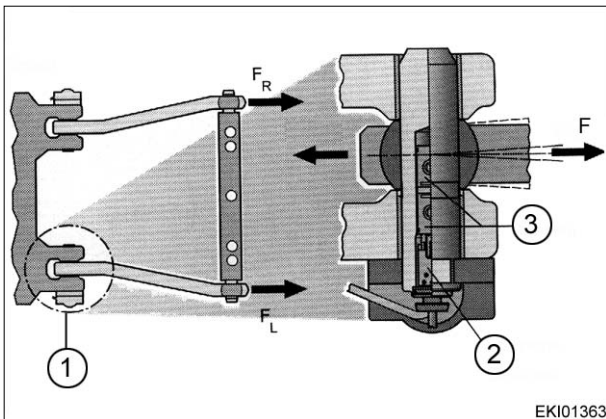
If draft-sensing pin B031/B032 is subjected to a shear load by tensile and compressive forces between the bearing points, the pin's magnetic properties change.

As a result of this change, the voltage at the signal line changes, contact 2.

When not subjected to a load (neutral) there is a voltage of approx. 4.75 VDC at the signal line.

This changes when there is a load.

The change is proportional to the load  $F$  and is a function of the direction. Account must be taken of the installation position.



Tensile and compressive forces  $F$  on draft-sensing pin B031/B032

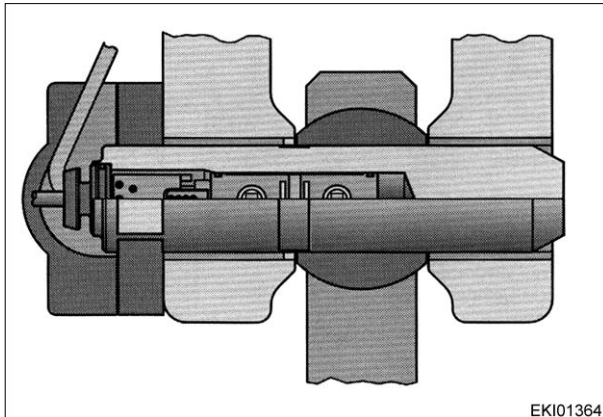
- $F$  = Tensile or compressive force
- $F_R$  = Forces acting on right bottom link
- $F_L$  = Forces acting on left bottom link
- 1 = Bottom link bearing
- 2 = Integrated electronics
- 3 = Coils, transformer

Date	Version	Page	Capitel	Index	Docu-No.
19.04.2001	a	1/2	<b>B031/B032 - draft-sensing pin, functional description</b>	<b>8610</b>	<b>A</b>
					<b>000008</b>

**Farmer 400**  
**Fav 700**  
**Fav 900**

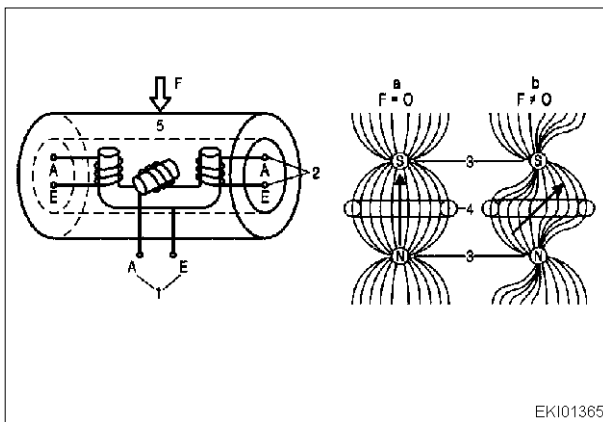
**Power lift / EPC electrohydraulic power lift control**  
**B031/B032 - draft-sensing pin, functional description**

**A**



EKI01364

Design of draft-sensing pin B031/B032



EKI01365

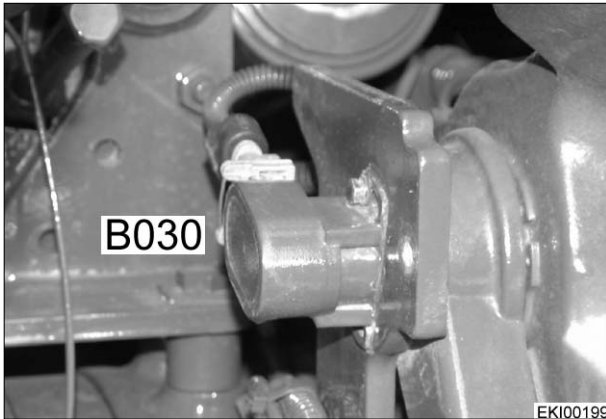
Operating principle of draft-sensing pin B031/B032

- 1 = Primary coil
- 2 = Secondary coil
- 3 = Primary pole face
- 4 = Secondary pole face
- 5 = Steel sleeve
- F = Tensile or compressive force
- a = Symmetrical magnetic field
- B = Asymmetrical magnetic field

**Technical specifications of draft-sensing pin B031/B032**

Supply voltage	9.5 VDC
Signal:	
Tensile / compressive load	2.5 VDC / 7.5 VDC
Neutral	4.7 VDC
Rated load	
Farmer 400	60 kN (6.0 t)
Fav. 700	90 kN (9.0 t)
Fav. 900	90 kN (9.0 t)
Overload limit	120 kN (12 t)

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift / EPC electrohydraulic power lift control  <b>B030 - position sensor, functional description</b></p>	<p><b>A</b></p>
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**B030** - position sensor

The role of the inductive position sensor B030 is to record angular information.

The mechanical angular information is transmitted via a shaft to the rotor which is made of magnetically soft material.

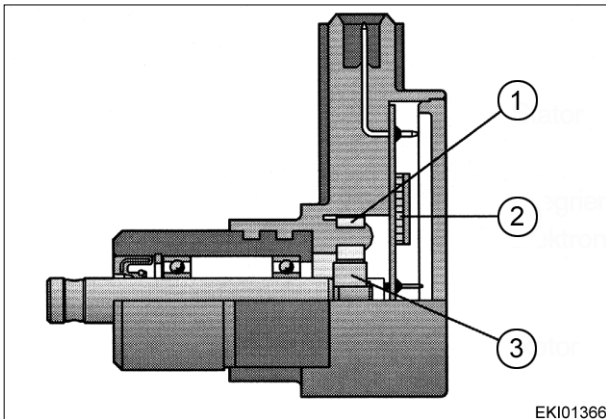
The induction in the two spools changes as a function of the angular position, because of the eccentricity of the rotor.

The position sensor B030 works on the inductive voltage divider principle.

An integral electronic system generates an alternating voltage to supply the inductive voltage divider. The output signal is demodulated (rectified) in turn and is then available as a voltage signal for further processing in the EPC e-box A005.

**Features of position sensor B030**

- Inductive position sensor measuring element
- Shaft can be rotated mechanically.
- Integrated electronics with temperature compensation
- Output angle proportional to angle
- Neutral point and sensitivity calibrated.

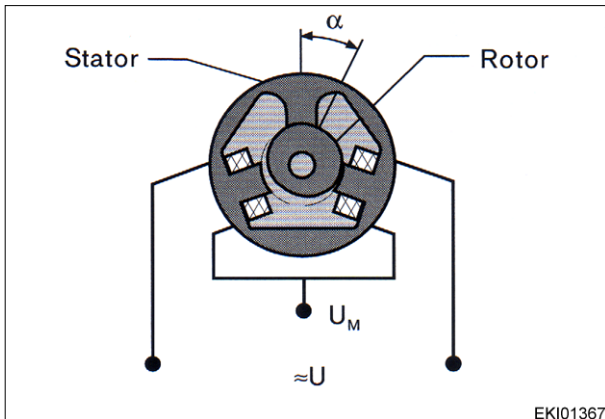


**Design of position sensor B030**

- 1 = Stator
- 2 = Integrated electronics
- 3 = Rotor (eccentric)

Date	Version	Page	B030 - position sensor, functional description	Capitel	Index	Docu-No.
19.04.2001	a	1/2		8610	A	000009

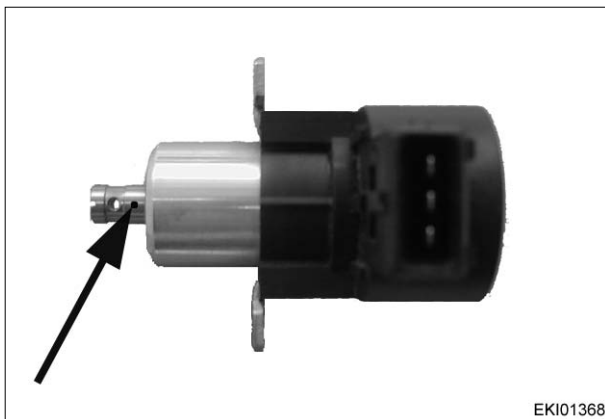
<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Power lift / EPC electrohydraulic power lift control <b>B030 - position sensor, functional description</b>	<b>A</b>
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alpha = Rotational angle  
 U = + supply  
 U<sub>M</sub> = Signal voltage

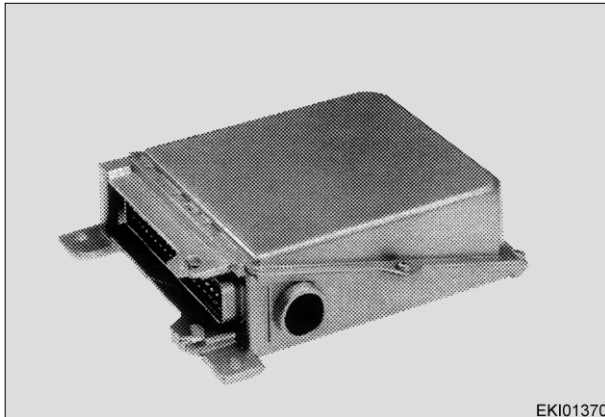
### Technical specifications for position sensor B030

Supply voltage	9.5 VDC
Signal:	
Lift assembly lowered	approx. 2.3 VDC
Lift assembly raised	approx. 7.4 VDC
Standard route of position sensor	+/- 40°



**Note:**  
 When installed, the notch (arrowed) in the actuating shaft points to the electrical connection.

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Power lift / EPC electrohydraulic power lift control <b>A005 - EPC e-box, functional description</b>	<b>A</b>
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A005 - EPC e-box

The EPC's "brain" is the EPC e-box - A005.

**The EPC e-box - A005 compares the target values** (depth control, lift height, lowering speed, transport position and power lift control) **with the actual values** ( position sensor B030, draft-sensing pin B031/B032, external position sensor).

The EPC e-box - A005 provides power for the "Lift" solenoid valve Y021 and the "Lower" solenoid valve Y022 of control valve EHR 23 - LS.

**In the slip control system (optional extra)** the EPC e-box - A005 compares the transmission speed signal (speed sensor B015) with the radar speed signal (A011). In the event of a difference between the two signals, the EPV e-box - A005 takes responsibility for slip control.

The EPC e-box - A005 receives a speed signal (pin 23) from the radar sensor A011. This signal is converted into a standardised signal and transmitted to the **implement socket X007** via pin 17.

### Technical specifications of EPC e-box - A005

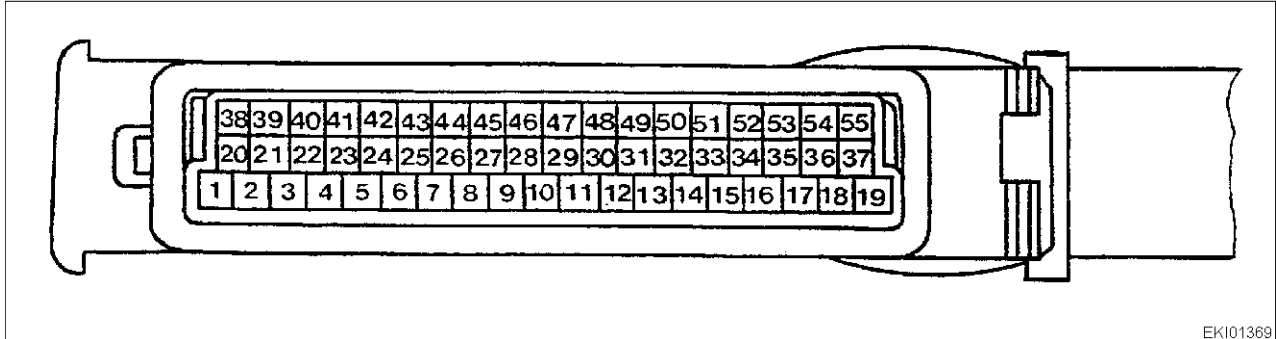
Operating voltage (battery)	12 -15 VDC
Power consumption:	
Lift assembly at rest	Approx. 0.2 A
Lift assembly in motion	Max. 3.8 A
Ambient temperature	-30°C to +65°C

Date	Version	Page	A005 - EPC e-box, functional description	Capitel	Index	Docu-No.
21.04.2001	a	1/2		8610	A	000010

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Power lift / EPC electrohydraulic power lift control <b>A005 - EPC e-box, functional description</b>	<b>A</b>
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### Pin assignment for EPC e-box - A005

#### Plan view of handle recess (plug)



EKI01369

1	Depth control earth	29	Not assigned
2	Depth control supply	30	Not assigned
3	Not assigned	31	Signal from right "Lift" button S027
4	Not assigned	32	Not assigned
5	Not assigned	33	K-bus
6	UB 15 EPC e-box A005	34	Not assigned
7	Position sensor B030 signal	35	Not assigned
8	Depth control signal	36	Not assigned
9	EPC e-box earth A005	37	Not assigned
10	UB 30 EPC e-box A005	38	Draft-sensing pin B031/B032 earth
11	Not assigned	39	Supply for position sensor B030 and external sensor at X015
12	EPC-DA solenoid switch	40	Draft-sensing pin B031/B032 supply
13	Signal to implement socket GSD X007 and at instrument panel A007	41	Not assigned
14	K-bus	42	Not assigned
15	Not assigned	43	Draft-sensing pin B032 signal
16	Not assigned	44	Not assigned
17	Actual travel speed (radar) at GSD X007	45	EPC e-box earth A005
18	Not assigned	46	Not assigned
19	"Lower" solenoid valve (EPC control valve) Y022	47	UB 30 at EPC e-box A005
20	Earth for position sensor B030 and for external control sensor	48	External sensor signal at X015 (electrohydraulic remote control)
21	Not assigned	49	Not assigned
22	Not assigned	50	Signal from left "Lower" button S030
23	Radar sensor A011 signal at EPC e-box A005 and instrument panel A007	51	Signal from right "Lower" button S028
24	Not assigned	52	Signal from left "Lift" button S029
25	Right draft-sensing pin signal B031	53	Earth for "Lift" and "Lower" solenoid valves at control valves Y021, Y022
26	Not assigned	54	Not assigned
27	Not assigned	55	"Lift" solenoid valve (EPC control valve) Y021
28	Supply to external lift buttons S027, S028, S029, S030		

#### Note:

For electrical readings at contacts please see Chapter 9000 Index E - Measuring and testing

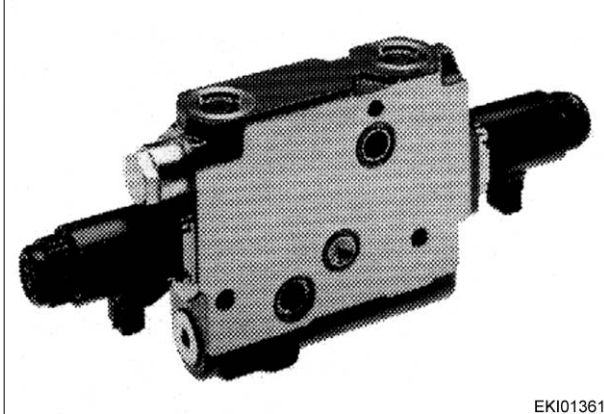
Date	Version	Page	Capitel	Index	Docu-No.
21.04.2001	a	2/2	A005 - EPC e-box, functional description	8610	A 000010

**Farmer 400**  
**Fav 700**  
**Fav 900**

Power lift / EPC electrohydraulic power lift control  
**Control valve EHR 23 - LS**

**A**

## Control valve EHR 23 - LS, functional description



EKI01361

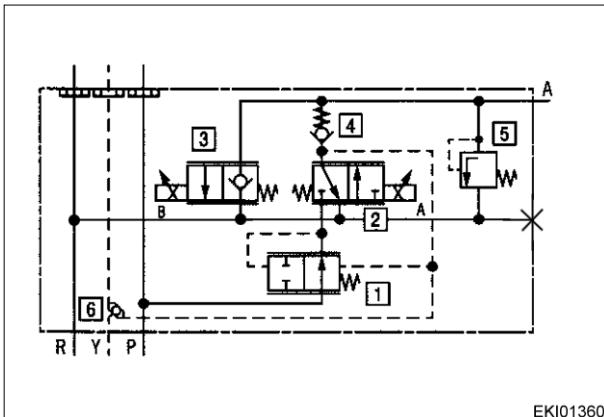
Control valve EHR 23 - LS

The valve has been designed in disc mode so that it can be incorporated in series SB 23 LS directional control valve units.

The control valve is the actuating element in the closed-loop control circuit and therefore the link between the hydraulics and electrics/electronics.

It consists of one main valve and two flange-mounted proportional magnets.

The control valve has 3 switching statuses which are assigned to the functions "Neutral", "Lift" and "Lower". The control valve's proportional magnets ensure that the coil current is transformed into a proportional oil flow, thereby generating a lifting or lowering speed which is proportional to the system deviation.



EKI01360

Control valve EHR 23 - LS (hydr. circuit diagram)

1	3-way pressure governor	A	To hydraulic cylinder
2	3/2 proportional directional control valve, "Lift"	R	To return flow
3	Proportional throttle valve, "Lower"	P	From variable-displacement pump PR
4	Non-return valve	Y	Control connection for variable-displacement pump (LS line)
5	Secondary pressure-relief valve		
6	"LS pressure" shuttle valve		

Date	Version	Page	Capitel	Index	Docu-No.
19.04.2001	a	1/2	Control valve EHR 23 - LS	8610	A 000011



<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Power lift / EPC electrohydraulic power lift control <b>Control valve EHR 23 - LS</b>	<b>A</b>
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### Description of control valve (hydr. circuit diagram)

The control EHR valve 23 - LS is divided into three sections:

**Section (1) is a 3-way pressure governor for:**

neutral operation

and load compensation (3-way flow controller in "Lift" direction).

Load compensation means: The proportional magnet (A) deflects the valve slide (2). The slide deflection is a measure of the flow rate. If the load-sensing pressure (LS pressure) now rises, the variable-displacement pump PR is deflected further, and the working pressure increases.

The 3-way pressure governor (1) maintains the valve's flow rate at a constant level, irrespective of the working pressure.

**Section (2) is a 3/2 proportional directional control valve:**

for controlling the "Lift" function.

**Section (3) is a proportional throttle valve in the form of a control valve:**

for controlling the "Lower" function.

**Non-return valve (4):**

disconnects the Lift and Lower valve.

**Secondary pressure-relief valve (5):**

to protect the consumer against overload (max. pressure = 230 +19 bar).

**Shuttle valve (6):**

to pick up the respective maximum load-sensing pressure of the consumers and to transmit it to the LS terminal plate.

### Technical specifications of control valve EHR - 23 - LS

Technical specifications	EPC C
Rated flow	80 l/min
Max. permissible pressure, ducts Y and P	250 bar
Max. permissible pressure, duct R	30 bar, though less than load-sensing pressure
Control principle	Load-sensing (LS pressure)
Voltage	12 VDC
Actuation system	Electromagnetically controlled
Set pressure	230 +19 bar

**Note:**

EPC control valve for Fav 700 and Fav 900 with control-pressure bore for electrohydraulic control valve.

EPC control valve for Farmer 400 without control-pressure bore for electrohydraulic control valve.

Date	Version	Page	Control valve EHR 23 - LS	Capitel	Index	Docu-No.
19.04.2001	a	2/2		8610	A	000011

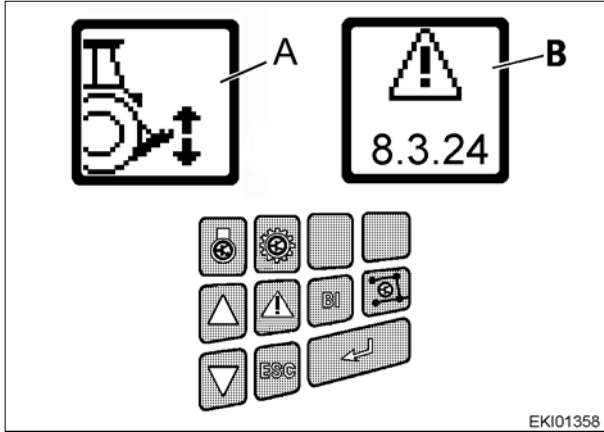
<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Power lift / EPC electrohydraulic power lift control</b> <b>Power lift and service hydraulics (hydraulic section) troubleshooting table</b>	<b>B</b>
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<b>Power lift and service hydraulics (hydraulic section) troubleshooting table</b>		
<b>Fault</b>	<b>Cause</b>	<b>Remedy</b>
1. Power lift switched to DA auxiliary control unit. Power lift does not lift and lower.	1. No or too little oil in hydraulic tank	1. Check oil level / top up.
2. Power lift switched to EPC. Operate control valve manually, power lift does not lift and lower.	2. Fault in control valve.	2. Replace control valve.
3. Power lift switched to EPC. Operate control valve manually. Power lift lifts and lowers. However, cannot be operated electrically/ electronically.	3. Fault in electrics / electronics	3. See Faults in electrical / electronic systems, Chapter 8610 Index B
4. Power lift and/or external cylinder, e.g. front loader, lifts too little when hydraulic oil is warm	4a. Min. hydraulic pressure of 200 bar is not being reached. Measure pressure.	4a. Check pressure-relief valve DBV-A. Setpoint: 230 bar
	4b. Fault in LS pump PR.	4b. Test LS pump PR with flow-rate meter. Replace LS pump PR if necessary.
	4c. Mounted implement too heavy.	4c. Connect mounted implement differently. If necessary, mount lighter implement.
5. Power lift does not go to end shutoff	5a. No overtravel at lift arms	5a. Set power lift end shutoff. Chapter 8610 Index F
	5b. Position sensor B030 gives incorrect signal values	5b. Position sensor B030, Measuring and testing - Chapter 9000 Index E
	5c. Mounted implement non-standard (too wide), or category not correctly set, or implement too heavy.	5c. Adapt mounted implement to standard, set category in line with standard, reduce implement weight.
6. Power lift lowers load a little and then lifts it again (approx. every 20 sec).	6a. Internal leak in lift cylinder.	6a. Seal pressure pipe at lift cylinder and subject lift assembly to load. - If lift assembly lowers, replace lift cylinder, seal lift cylinder.
	6b. Internal leak in control valve.	6b. Seal pressure pipes at lift cylinder and subject lift assembly to load. - If lift assembly does not lower, replace control valve.
7. Hydraulic oil becomes too warm	7. Oil flow setting at relevant auxiliary control unit too high	7. Check oil flow setting.
8. Power lift lowers and lifts in floating position setting	8. Mounted implement	8. Mounted implement not in accordance with correct standard. Check mounted implement for lateral clearance.

Date	Version	Page	Capitel	Index	Docu-No.
17.04.2001	a	1/1	8610	B	000001

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift / EPC electrohydraulic power lift control  <b>Faults in electrical/electronic systems</b></p>	<p><b>B</b></p>
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**EPC - C fault warning**



In event of faults in EPC - C, "rear power lift" pictogram (A) appears on multi-display, and warning light also flashes.



A00458

Press key, relevant fault code (B) is displayed, i.e. rear power lift fault code (see fault code table - Chapter 0000 Index B )

**Clear fault warning.**

Clearing a fault warning does not eliminate fault, it is merely no longer displayed.



A00462

Press key and hold



A00458

then press key ---> displayed fault code is no longer displayed.

**Note:**

**Each current fault warning must be individually confirmed.**

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Power lift / EPC electrohydraulic power lift control <b>Faults in electrical/electronic systems</b>	<b>B</b>
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**Apart from EPC faults, the EPC e-box A005 also detects faults in the control console A004 (EPC control module) and joystick A003 (automatic operation). These faults are displayed on the instrument panel A007.**

If such a fault occurs, the EPC - C goes to "STOP" and halts automatic operation.



EPC control module on the control console A004. The control console A004 is connected to the EPC e-box A005 via the K-bus.



Automatic operation of the rear power lift via the joystick A003. The joystick A003 is connected to the ECU A002. The ECU A002 is connected to the EPC e-box A005 via the K-bus.

**Note:**

See also electronics concept for Vario 700 - Chapter 9700 Index A

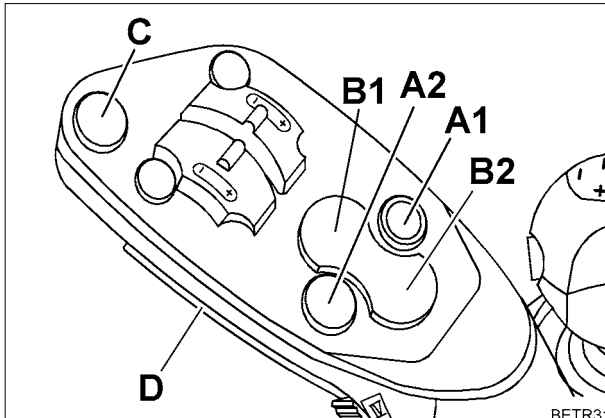
Date	Version	Page	Faults in electrical/electronic systems	Capitel	Index	Docu-No.
17.04.2001	a	2/5		8610	B	000002

Farmer 400 Fav 700 Fav 900	Power lift / EPC electrohydraulic power lift control <b>Faults in electrical/electronic systems</b>	<b>B</b>
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**Effects of faults: buttons for automatic operation**

After fault warnings from following buttons,

EPC - automatic (control console)



- C = Lift assembly stop button (front/rear)
- B1 = Position: GO, "Regulate"
- B2 = Position: end, "Lift"
- A1 , A2 , D = no fault detection by EPC e-box A005

it is only possible to return to automatic operation once EPC e-box A005 has received fault-free message from relevant button.

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Power lift / EPC electrohydraulic power lift control</b> <b>Faults in electrical/electronic systems</b>	<b>B</b>
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**Fault classification by EPC e-box A005**

<b>Diagnostics function in EPC e-box A005</b>		
	Detect fault	
	Store fault	
	Fault weighting	
<b>Serious faults</b>	<b>Intermediate faults</b>	<b>Minor faults</b>
- control stops - restart only possible via ignition switch	- control stops - restart by unlocking systems	- control continues

<b>Serious faults at EPC e-box A005</b>			
<b>Fault code</b>	<b>Brief description</b>	<b>Pin no. on A005</b>	<b>Possible cause of fault</b>
8.3.11	EPC e-box A005, "Lift" output	55	- +supply short-circuit - earth short-circuit - solenoid Y021 short-circuit - cable break in solenoid lead or fault in solenoid - fault in EPC e-box A005
8.3.12	EPC e-box A005, "Lower" output	19	- +supply short-circuit - earth short-circuit - solenoid short-circuit - cable break in solenoid lead or fault in solenoid - fault in EPC e-box A005
8.3.14	External left "Raise" button S029	52	- +supply short-circuit - earth short-circuit (only for button operation) - earth short-circuit at pin 28
8.3.15	External left "Lower" button S030	50	- +supply short-circuit - earth short-circuit (only for button operation) - earth short-circuit at pin 28
8.3.16	UB 9.5 VDC	2, 39, 40	- UB 9.5 VDC less than 1 VDC
8.3.17	+UB 30 battery voltage	10, 47	- UB 30 greater than 18 VDC
8.3.18	External right "Lift" button S027	31	- +supply short-circuit - earth short-circuit (only for button operation) - earth short-circuit at pin 28
8.3.19	External right "Lower" button S028	51	- +supply short-circuit - earth short-circuit (only for button operation) - earth short-circuit at pin 28

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Power lift / EPC electrohydraulic power lift control</b> <b>Faults in electrical/electronic systems</b>	<b>B</b>
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<b>Intermediate faults at EPC e-box A005</b>			
<b>Fault code</b>	<b>Brief description</b>	<b>Pin no. on A005</b>	<b>Possible cause of fault</b>
8.3.22	Position sensor B030	7	- +supply short-circuit - earth short-circuit - +supply cable break - earth cable break - signal line cable break
8.3.23	EPC depth control	8	- +supply short-circuit - earth short-circuit - earth cable break - signal line cable break
8.3.26	External sensor (external controller)	48	- +supply short-circuit - earth cable break

### Note on diagnostics for external sensor (see also Chapter 8618)

The EPC - C switches to electrohydraulic remote control when a proper external sensor signal is detected. If the sensor is missing, the electrohydraulic remote control is switched off. Absence of an external sensor is a normal operating scenario. Because there is no "Electrohydraulic remote control" switch position, the EPC - C does not know when it may diagnose or indicate the absence of the external sensor. For this reason comprehensive external sensor diagnostics is not possible.

Every time the external sensor is connected or disconnected, or in the case of a fault which has the same effect, the EPC - C locks.

<b>Minor faults at EPC e-box A005</b>			
<b>Fault code</b>	<b>Brief description</b>	<b>Pin no. on A005</b>	<b>Possible cause of fault</b>
8.3.31	Right draft-sensing pin B031	25	- +supply short-circuit - earth short-circuit - +supply cable break - earth cable break - signal line cable break
8.3.32	Left draft-sensing pin B032	43	- +supply short-circuit - earth short-circuit - +supply cable break - earth cable break - signal line cable break
8.3.33	UB 30 battery voltage	10, 47	UB 30 less than 11.2 VDC

### Note on diagnostics for draft-sensing pins B031 / B032

In the event of a draft-sensing pin B031 / B032 failing, the current signal value is frozen after the response time to prevent unwanted upward/downward movements, e.g. because of a loose contact. The relevant movement is therefore only possible to a limited extent or not at all.

#### Note:

#### See also

Chapter 0000 Index B - Fault code table for Vario tractors

Chapter 9000 Index E - A005 - EPC box

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Power lift / Electrohydraulic control EPC <b>Rear power lift troubleshooting flowchart</b>	<b>B</b>
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Cause:

**Rear power lift cannot be raised or lowered.**

**Jerky motion when rear power lift is raised or lowered.**

		EPC/DA switchover	No	Switch to EPC
		Yes		
Correct settings in terminal A008	Yes	Correct settings in terminal A008 (lowering throttle valve).		
		No		
		Operate EPC control valve manually.		
		Rear power lift OK	No	Three-point linkage: Check cat. 2, cat. 3 setting. Sluggish movement in lift cylinder. Hydraulics: Check oil level. Internal leak in hydraulic cylinder. EPC control valve defective
		Yes		
		Check pin 12, EPC-DA switchover at EPC ECU A005.		
		Note: switch S048 open (0VDC) = EPC ON switch S048 closed (+UB) = EPC OFF		
		Check + supply, power consumption and resistance at solenoid valve Y021/Y022 (Chapter 9000 Reg. E)		
EPC/DA solenoid switch S048 does not open.	No	Electrical reading OK		
		Yes		
+ supply from EPC ECU A005 Raise, pin 55; Lower, pin 19; earth, pin 53 Short-circuit in solenoid Y021/Y022  Break in cable		Calibrate position sensor B030 (Chapter 0000 Reg.A) Check position sensor B030 (Chapter 9000 Reg.A)		



<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p align="center"><b>Power lift / Electrohydraulic control EPC</b>  <b>Rear power lift troubleshooting flowchart</b></p>	<p align="center"><b>B</b></p>
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	<p>Draft-sensing pin                  B031/B032                  (Chapter 9000 Reg. E)</p> <p align="center">   </p>	
	<p>Electrical reading OK</p>	<p align="center"><b>No</b></p> <p>+supply and earth from EPC ECU A005 (if draft-sensing pins B031/B032 are overloaded, A005 shuts down)</p>
	<p align="center"><b>Yes</b></p> <p align="center">   </p>	<p>Break in cable</p>
	<p>Check EPC ECU A005.                  (Chapter 9000 Reg. E and Chapter 8610 Reg. E)                  Depth control signal (pin 8) defective, (signal comes from control console A004)                  (Chapter 9000 Reg. E and Chapter 8610 Reg. E)                  Rapid lift control on control console A004 defective. (Signal comes from control console A004 and runs via K-bus to EPC ECU A005.)                  Note: Arrows in terminal A008 are shown when rapid lift control switch signal is correct.</p> <p align="center">   </p>	
	<p>Electrical reading OK</p>	
	<p align="center"><b>No</b></p> <p align="center">   </p> <p>Check K-bus                  (Chapter 9000 Reg. E)</p>	

Farmer 400 Fav 700 Fav 900	Power lift / Electrohydraulic control EPC <b>Rear power lift troubleshooting flowchart</b>	B
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**Note:**

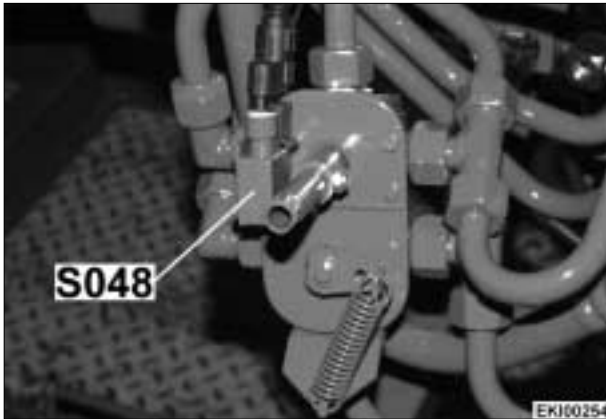
Electric circuit diagrams.

Farmer 400, Fav 700

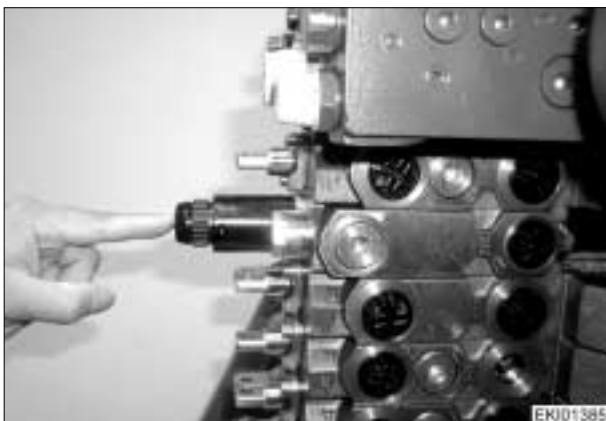
Chapter 9000 Reg. C - Electrohydraulic power lift control - Sheet 22

Fav 900 chassis number 23/3001 and up

Chapter 9000 Reg. C - Electrohydraulic power lift control - Sheet 23



**S048** = EPC/DA switchover solenoid switch



Operate EPC control valve manually.

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Power lift / Electrohydraulic control EPC <b>Faults in slip control (radar A011)</b>	<b>B</b>
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Slip control troubleshooting table		
Fault	Cause	Remedy
Slip control switches off by itself	Not a fault: automatic shutdown after tractor is stationary for more than 30 sec	Activating slip control, Chapter 8610 Reg.A
Displayed speed is incorrect	Tractor's longitudinal tilt has changed following tyre change. In other words, nominal mounting angle of radar sensor A011 has changed.	Calibrating radar sensor A011; Chapter 8610 Reg.A
	Configuration of radar sensor A01, i.e. mounting angle has changed.	Check attachment, calibrate radar sensor A011.
	Scanning area is too smooth / too even (e.g. water)	

**Note:**

The radar sensor A011 is not monitored, i.e. there is no fault code display on the instrument panel A007.

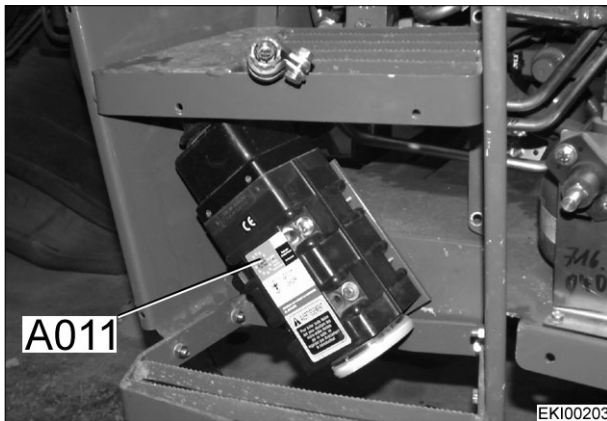


Photo shows Fav 700.

A011 = Radar sensor

Technical specifications and settings for radar sensor A011		
Mounting angle	53 degrees to road surface	Necessary for correct reflection
Transmission angle	15 degrees	There must not be any other components within this transmission angle
+ supply	12 VDC to 14 VDC	Fuse F048 in X051
	Working range 9 - 16 VDC	
Power consumption	approx. 0.5 A	

**Note:**

See also:

Chapter 8610 Reg. A - EPC-C rear power lift

Chapter 8610 Reg. A - Operation and function of electronic slip control

Chapter 9000 Reg. E - A005 - EPC ECU

Chapter 8610 Reg. E - Slip control performance test

Chapter 9000 Reg. E - A011 - radar sensor

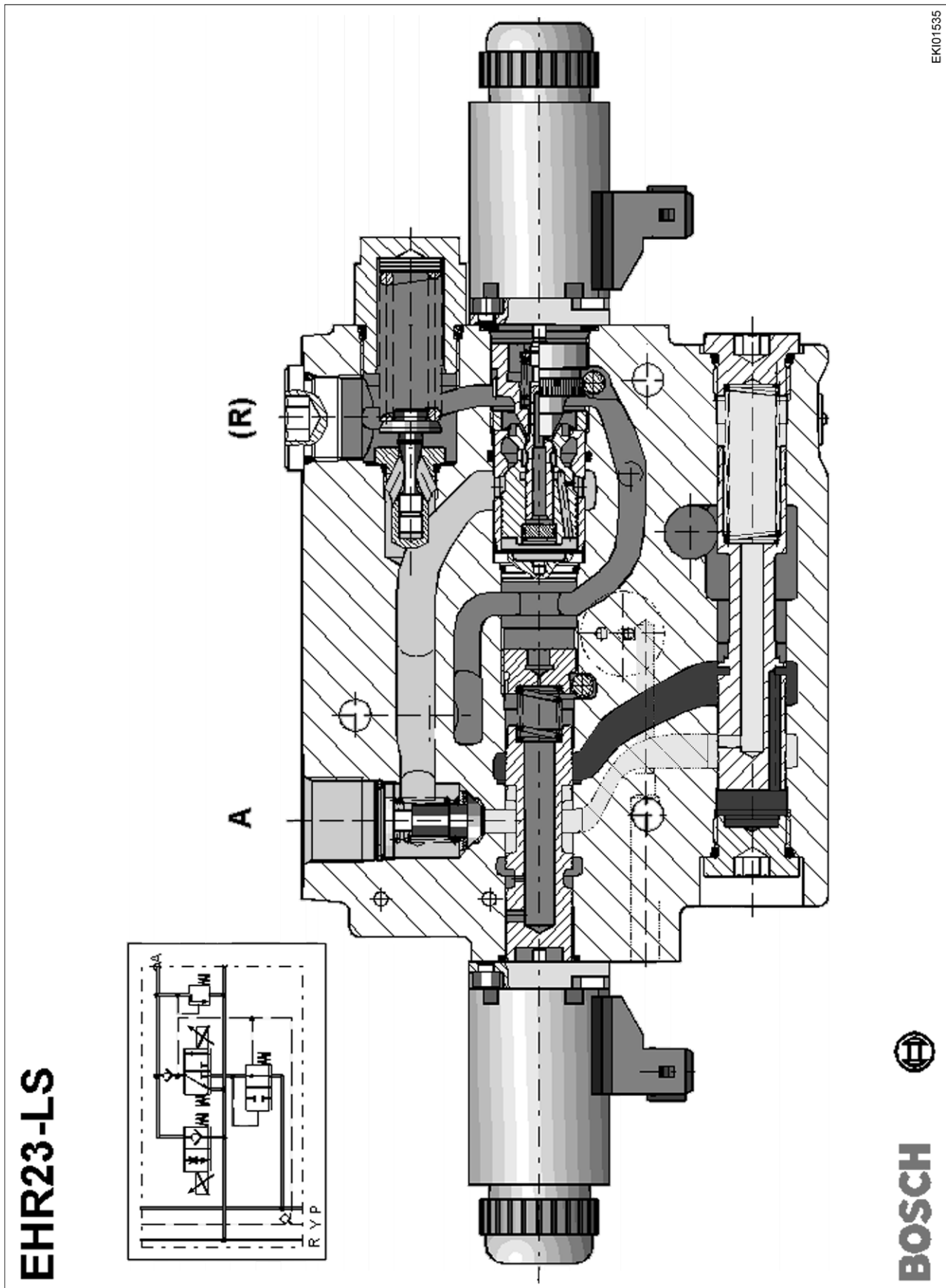
Date	Version	Page	Faults in slip control (radar A011)	Capitel	Index	Docu-No.
09.05.01	a	1/1		8610	B	000004

**Farmer 400**  
**Fav 700**  
**Fav 900**

**Power lift / EPC electrohydraulic power lift control**  
**Sectional view and circuit diagram of EHR 23 - LS**

**C**

**Neutral position**



EK01535

**EHR23-LS**



**BOSCH**

Date	Version	Page	Capitel	Index	Docu-No.
24.04.2001	a	1/3	<b>8610</b>	<b>C</b>	<b>000006</b>

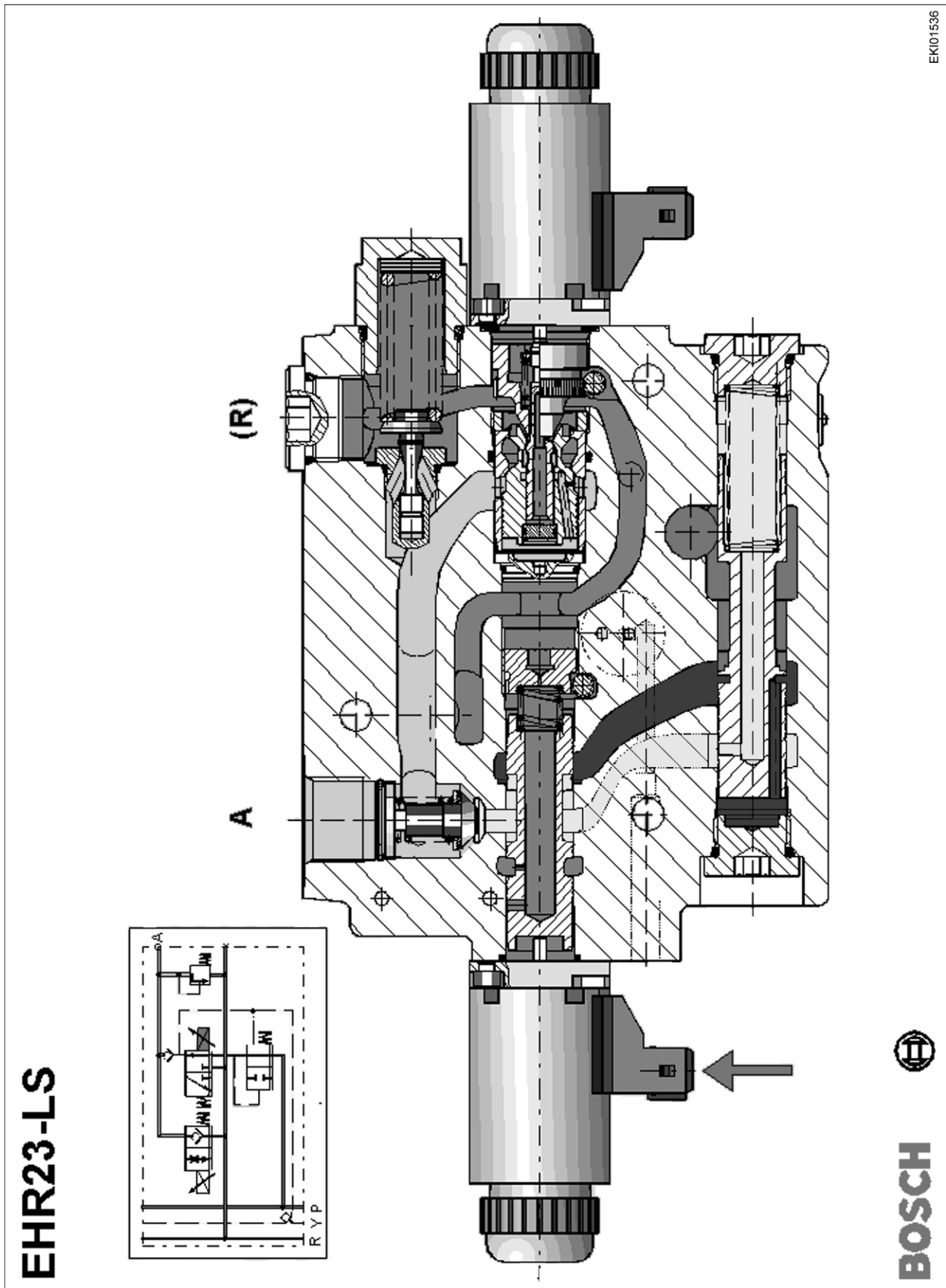
**Sectional view and circuit diagram of EHR 23 - LS**

**Farmer 400**  
**Fav 700**  
**Fav 900**

Power lift / EPC electrohydraulic power lift control  
**Sectional view and circuit diagram of EHR 23 - LS**

**C**

**Lift position**



Date	Version	Page	Capitel	Index	Docu-No.
24.04.2001	a	2/3	8610	C	000006

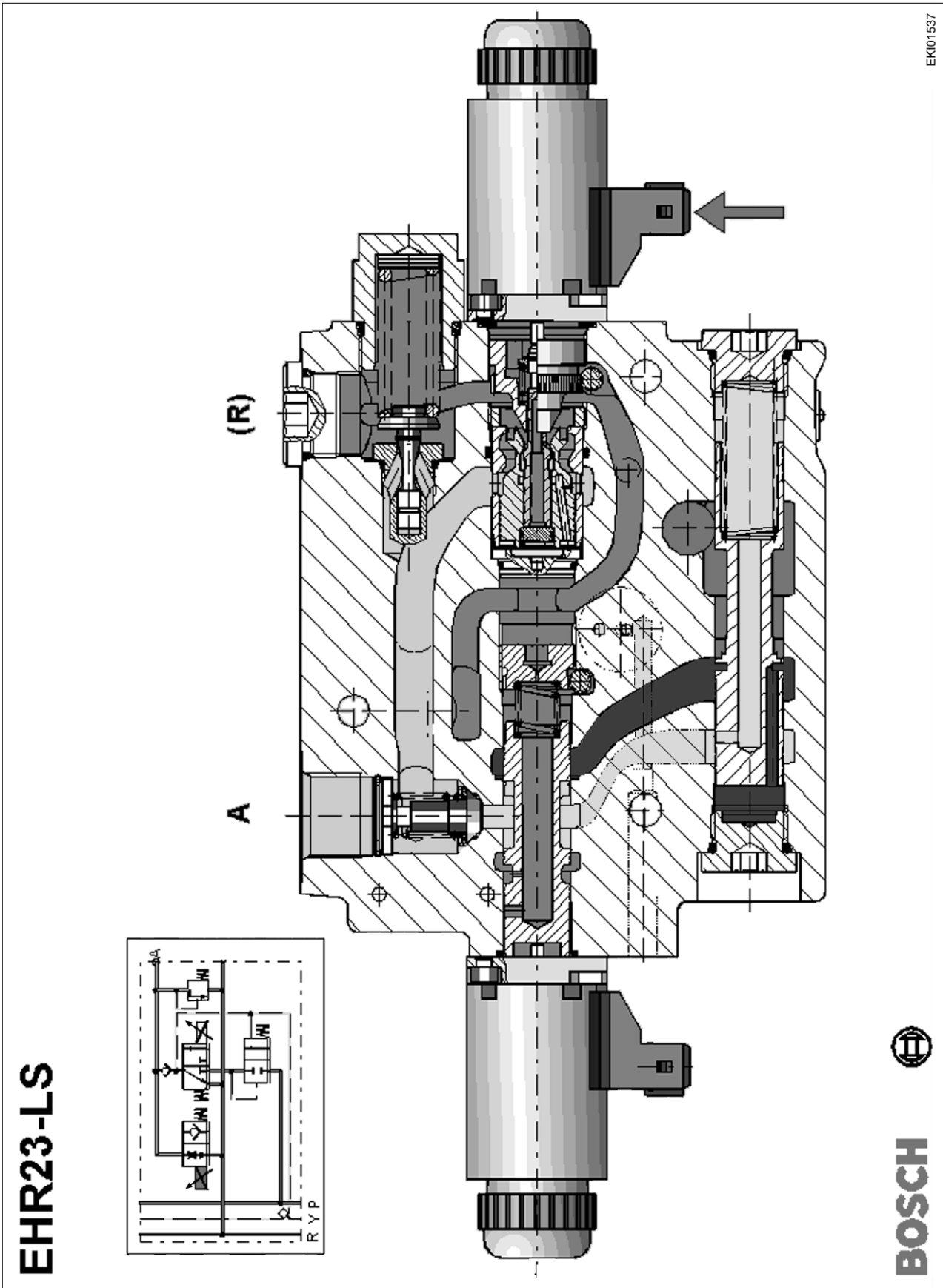
Sectional view and circuit diagram of EHR 23 - LS

**Farmer 400**  
**Fav 700**  
**Fav 900**

Power lift / EPC electrohydraulic power lift control  
**Sectional view and circuit diagram of EHR 23 - LS**

**C**

Lower position



EK101537

**EHR23-LS**

**BOSCH**

Date	Version	Page	Capitel	Index	Docu-No.
24.04.2001	a	3/3	8610	C	000006

Sectional view and circuit diagram of EHR 23 - LS

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Power lift / Electrohydraulic control <b>Rear power lift control system function charts</b>	<b>C</b>
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Date	Version	Page		Capitel	Index	Docu-No.
25.04.2001	<b>b</b>	1/9	<b>Rear power lift control system function charts</b>	<b>8610</b>	<b>C</b>	<b>000007</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Power lift / Electrohydraulic control</b> <b>Rear power lift control system function charts</b>	<b>C</b>
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1st operational status:

### EPC lift

- Block multiway valve, consisting of AV3 and AV4, is in "EPC" position
- In this EPC position relevant solenoid switch S048 is open; EPC ECU A005 is therefore active.
- "Lift" solenoid Y021 of EPC control valve receives power from EPC ECU A005.
- Load line/load-sensing system connection is active when "Lift" valve is active.
- If LS pump PR is not yet active, current load pressure (= standby pressure of LS pump) is transmitted as maximum pressure to LS pump as a command via shuttle valves (EPC valve, 1.1 valve, WLS-2, WLS-1).
- LS pump PR then goes automatically to pump flow rate and pressure control.
- Should LS pump already be active elsewhere with higher pressure demand, "surplus" pressure at EPC valve's pressure governor is limited to power lift load level.
- Hydraulic oil comes from EPC valve output directly to lift side of power lift cylinders.
- Displaced oil returns to tank via multiway valve AV4.

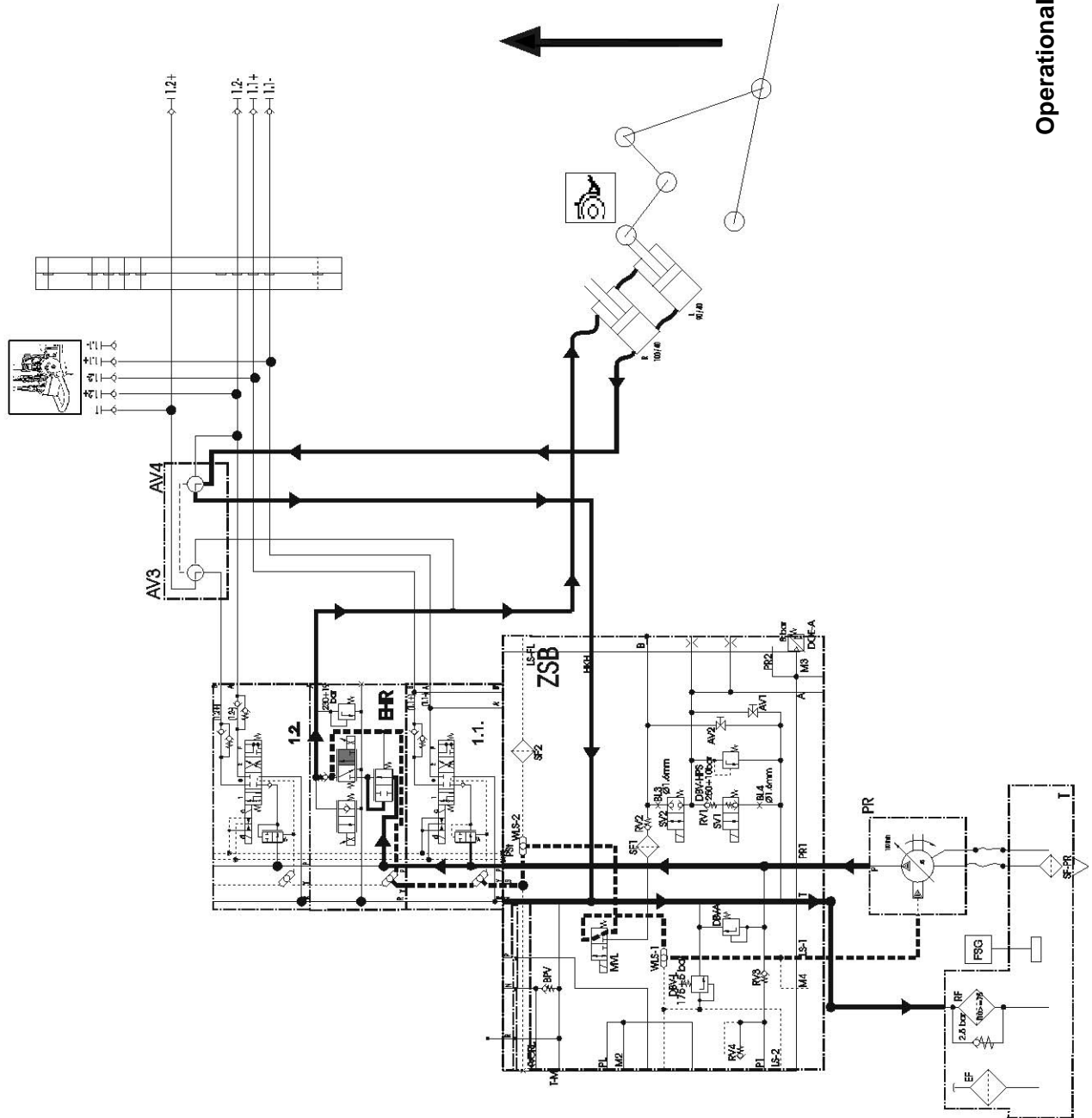
Date	Version	Page	Capitel	Index	Docu-No.
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					<b>000007</b>



**Farmer 400**  
**Fav 700**  
**Fav 900**

**Power lift / Electrohydraulic control**  
**Rear power lift control system function charts**

**C**



**Operational status: EPC lift**

EKI01717

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25.04.2001	<b>b</b>	3/9	<b>8610</b>	<b>C</b>	<b>000007</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Power lift / Electrohydraulic control <b>Rear power lift control system function charts</b>	<b>C</b>
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2nd operational status:

### **EPC lower / regulate**

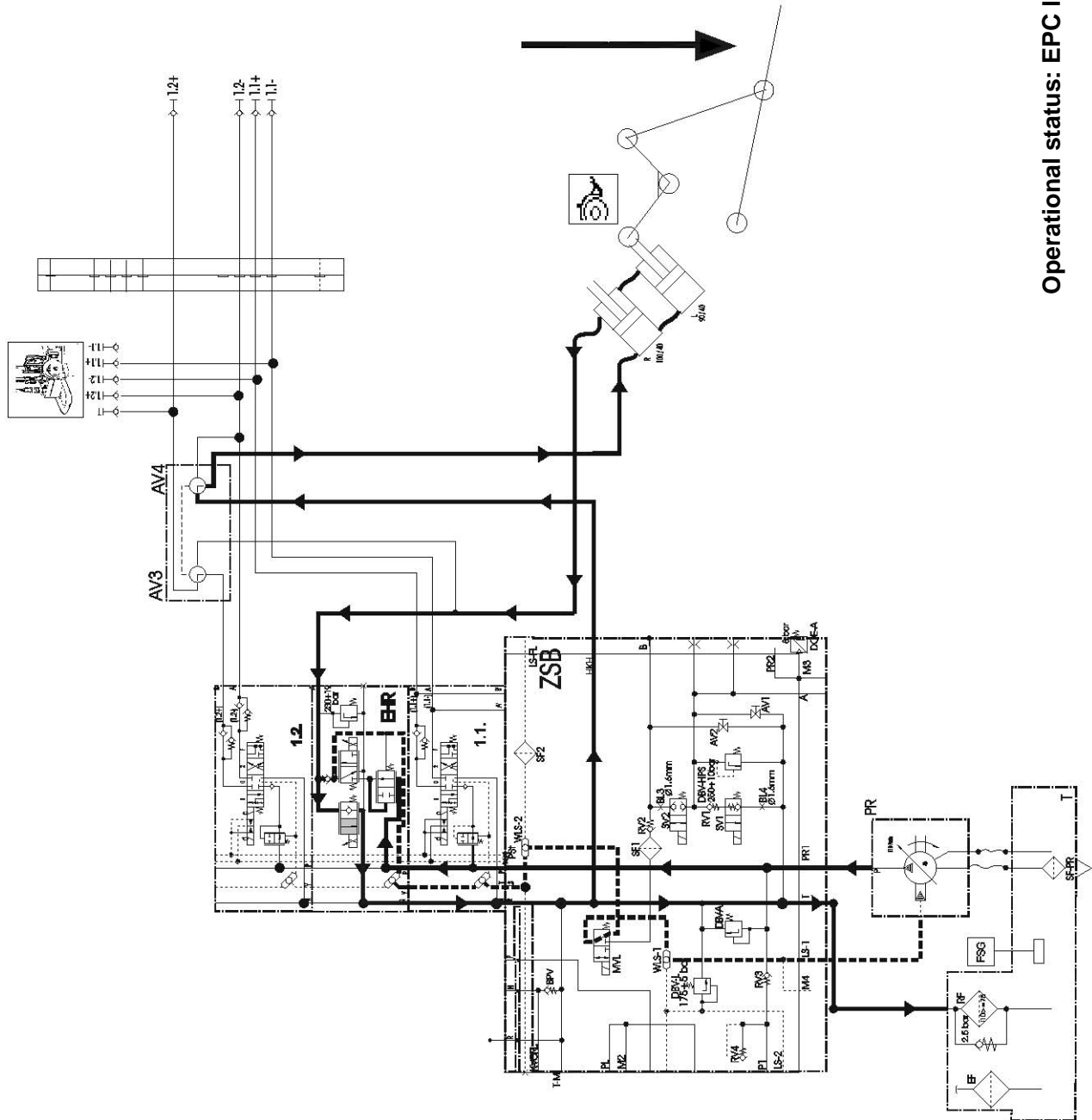
- Block multiway valve, consisting of AV3 and AV4, is in "EPC" position
- In this EPC position relevant solenoid switch S048 is open; EPC ECU A005 is therefore active.
- "Lower" solenoid Y022 of EPC control valve receives power from EPC ECU A005.
- "EPC lower" could also function without LS pump, but active LS pump (=minimum engine speed) is necessary for safety reasons.
- "EPC lower" functions without LS command.
- Displaced oil from lift cylinder moves to open "Lower" valve.

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**Farmer 400**  
**Fav 700**  
**Fav 900**

**Power lift / Electrohydraulic control**  
**Rear power lift control system function charts**

**C**



Operational status: EPC lower / regulate

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Power lift / Electrohydraulic control</b> <b>Rear power lift control system function charts</b>	<b>C</b>
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3rd operational status:

#### DA lift

- Control valve 1.2 is used for DA functions.
- Block multiway valve, consisting of AV3 and AV4, is in "DA" position.
- In this DA position relevant solenoid switch S048 is closed; EPC ECU A005 is therefore disabled.
- When main piston is moved in lifting direction, load line / LS connection is activated.
- If LS pump PR is not yet active, current load pressure = LS pressure (= standby pressure of LS pump) is transmitted as maximum pressure to LS pump as a command via shuttle valves (1.2 valve, EPC valve, 1.1 valve, WLS-2, WLS-1).
- LS pump PR then goes automatically to pump flow rate and pressure control.
- Hydraulic oil for lifting is then delivered directly to lift side of power lift cylinders from electrohydraulic control valve 1.2 output.
- Displaced oil returns to tank via multiway valve AV3 and AV4.

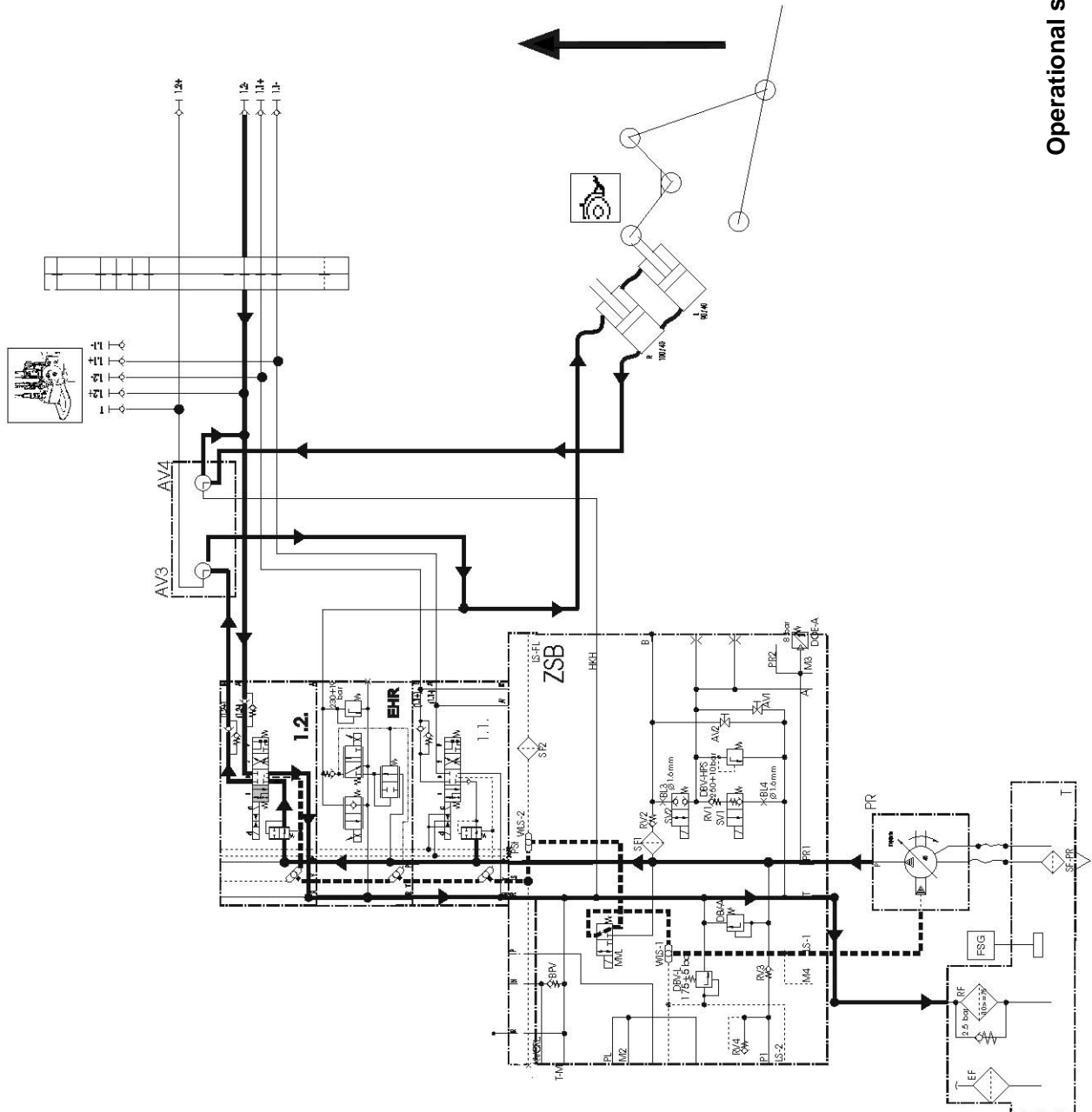
Date	Version	Page	Capitel	Index	Docu-No.	
25.04.2001	<b>b</b>	6/9	<b>Rear power lift control system function charts</b>	<b>8610</b>	<b>C</b>	<b>000007</b>

**Farmer 400**  
**Fav 700**  
**Fav 900**

**Power lift / Electrohydraulic control**  
**Rear power lift control system function charts**

**C**

**Operational status: DA lift**



EKI01724

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**Rear power lift control system function charts**

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Power lift / Electrohydraulic control</b> <b>Rear power lift control system function charts</b>	<b>C</b>
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4th operational status:

#### DA lower

- Control valve 1.2 is used for DA functions.
- Block multiway valve, consisting of AV3 and AV4, is in "DA" position.
- In this DA position relevant solenoid switch S048 is closed; EPC ECU A005 is therefore disabled.
- When main piston of valve 1.2 is moved in lowering direction, load line/LS connection is activated.
- If LS pump PR is not yet active, current load pressure = LS pressure (= standby pressure of LS pump) is transmitted as maximum pressure to LS pump as a command via shuttle valves (1.2 valve, EPC valve, 1.1 valve, WLS-2, WLS-1).
- LS pump PR then goes automatically to pump flow rate and pressure control.
- Hydraulic oil for lowering is then delivered directly to lowering side of power lift cylinders from electrohydraulic control valve 1.2 output.
- Displaced oil returns to tank via multiway valve AV3 and AV4.

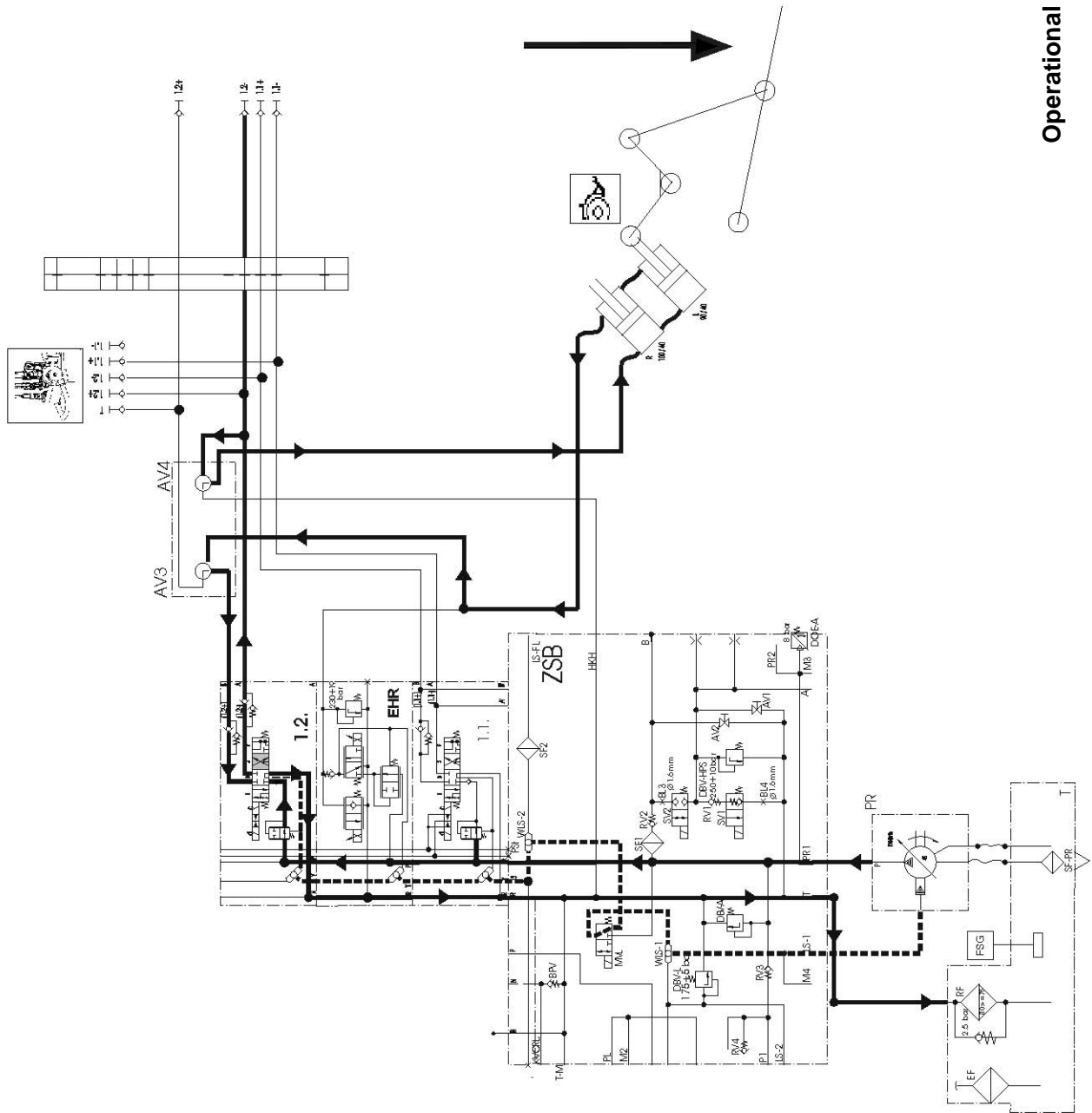
Date	Version	Page	Capitel	Index	Docu-No.
25.04.2001	<b>b</b>	8/9	<b>Rear power lift control system function charts</b>	<b>8610</b>	<b>C</b>
					<b>000007</b>

**Farmer 400**  
**Fav 700**  
**Fav 900**

**Power lift / Electrohydraulic control**  
**Rear power lift control system function charts**

**C**

**Operational status: DA lower**



EKI01722

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25.04.2001	<b>b</b>	9/9	<b>8610</b>	<b>C</b>	<b>000007</b>
<b>Rear power lift control system function charts</b>					

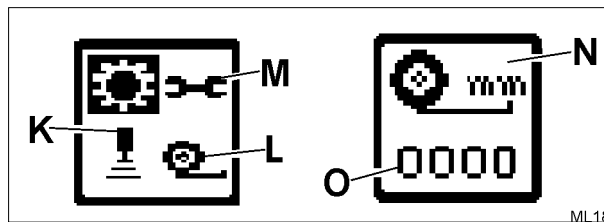
<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Power lift / Electrohydraulic control EPC <b>Slip control performance test</b>	<b>E</b>
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### Slip control performance test (radar sensor A011)

**Prerequisites:**

- **Calibrating radar sensor - Chapter 8610 Reg. A - Operation and function of electronic slip control**

- **Enter circumference of rear tyres in mm.**



**Note:**

**Tyre circumference can vary depending on particular tyres fitted. Note tyre manufacturer's specifications.**



A00457

Press key, screen as shown (K) appears, pictogram (L) flashes.

L = Enter tyre size

M = Calibration function of rear/front PTO clutch



A00462

Press key, screen as shown (N) appears, 1st digit (O) flashes.



A00461

Press one key repeatedly until desired figure is displayed.



A00462

Press key. Set remaining three digits as per 1st digit.



A00456

Press key

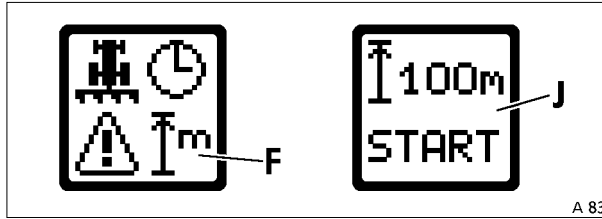
- Switch ignition OFF and ON (reset).  
The new input is saved.

Date	Version	Page	Slip control performance test	Capitel	Index	Docu-No.
07.05.0001	a	1/6		8610	E	000003



<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift / Electrohydraulic control EPC  <b>Slip control performance test</b></p>	<p><b>E</b></p>
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**- Calibrating speed display**



**Note:**

During the calibration process the tractor may only be driven using the clutch pedal.

If the joystick A003 is used, the ACTIVE pictogram which is displayed deletes the calibration process menu when the tractor stops at the gauge points.

- Accurately measure and mark out gauge length of between 30 m (minimum) and 100 m (maximum).



A00454

Press key (BI) to display function selection.



A00461

Press one key repeatedly until "Calibrating speed display" pictogram (F) flashes.



A00462

Press key, screen as shown (J) appears, 1st digit of distance flashes.

Distance must now be set to length of measured distance, e.g. 50 m.



A00461

Press one key repeatedly until desired figure is displayed, e.g. 0..



A00462

Press key. Set remaining two digits as per 1st digit, e.g. 050.

Once last digit has been confirmed, "START" flashes.

- Position tractor front wheel precisely on start mark.



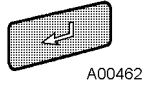
A00462

Press key, display changes from "START" to "STOP".

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07.05.0001	a	2/6		8610	E	000003

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Power lift / Electrohydraulic control EPC <b>Slip control performance test</b>	<b>E</b>
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- Pull away in tractor and stop with front wheel on end mark of gauge length. Press key. If process is carried out correctly, "OK" is displayed.



A00462

Press key. Time and operating hours are displayed.



A00454

If "ERROR" is displayed, calibration must be repeated as follows:



A00456

Press key, measured distance input screen is displayed.

- Check whether input distance matches measured distance.
- If necessary, set input distance to measured distance as described above and repeat calibration process.



A00454

Press key. Time and operating hours are displayed.

**- Test section should be as dry and rough as possible.**

Testing slip control in motion		
	Test stages	Meaning / explanation
1.	Engine running / tractor stationary	
2.	Unlock rear EPC	
3.	Set position/draft force hybrid control to 30% draft force ratio at terminal A008	
4.	Set wheel slip to approx. 5% at terminal A008	
5.	Set setpoint depth control to 6 on scale.	
6.	Rapid lift control to Lower = control action	Power lift goes to mid-height in controlled state
7.	Activate radar sensor A011 on terminal A008	Rear power lift responds to this and rises briefly
8.	Pull away in straight line at approx. 5-6 km/h and then .....	
9.	make a tight right turn	Slight speed difference occurs (= slip) between radar sensor A011 path on inside of arc and theoretical path in centre of tractor (bevel pinion speed sensor B015)
10.	Required reaction: rear power lift rises briefly and "Raise" arrow is displayed on terminal A008	
11.	Drive straight on again	
12.	Required reaction: rear power lift lowers briefly again and "Lower" arrow is displayed on terminal A008	

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Power lift / Electrohydraulic control EPC</b> <b>Slip control performance test</b>	<b>E</b>
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**Danger:**

**During the slip control performance test (stationary test) please ensure that all 4 wheels of the tractor are jacked up because of the risk of an accident!**

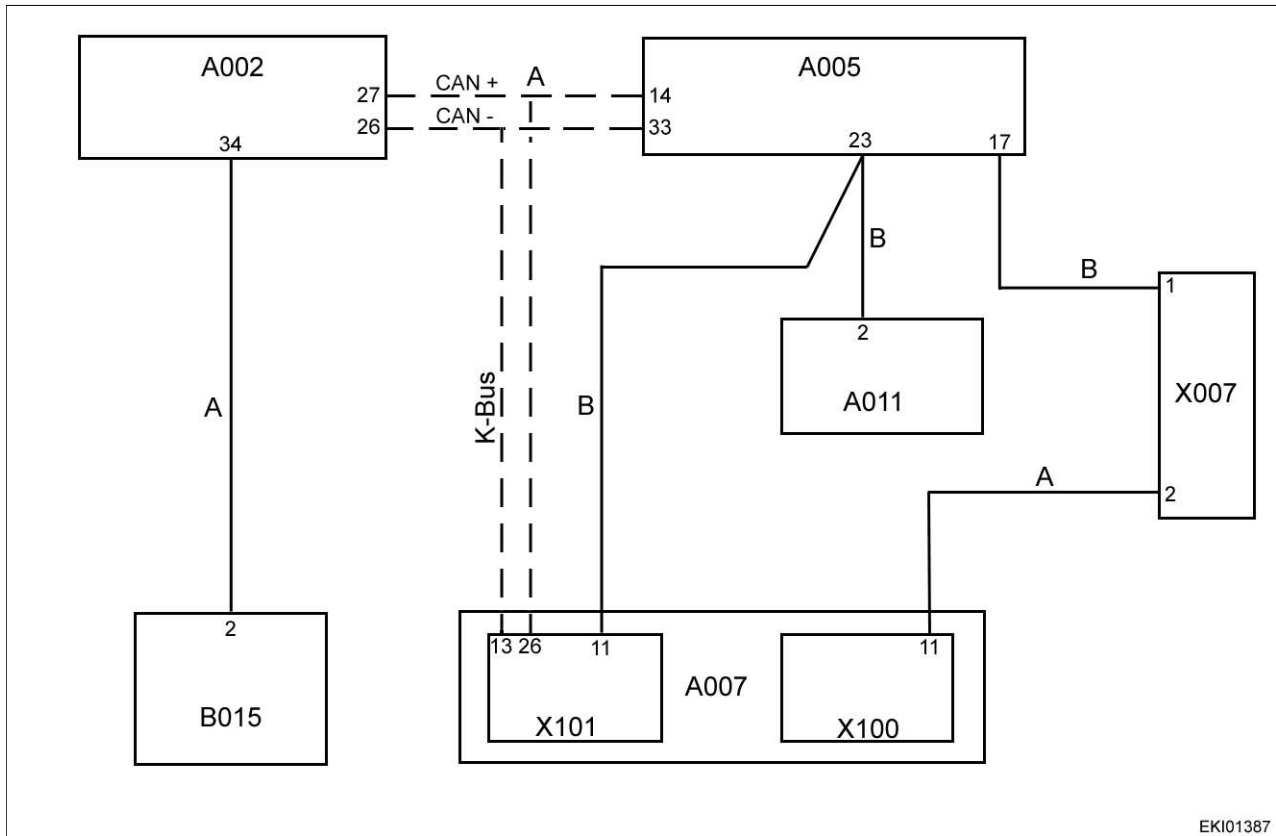
**Engage 4WD when tractor is jacked up.**

<b>Slip control test when stationary</b>		
<b>Test stages</b>		<b>Meaning / explanation</b>
1.	Load bottom link	
2.	Jack tractor up (all 4 wheels)	
3.	Engine running / tractor stationary	
4.	Set position/draft force hybrid control to 30% draft force ratio at terminal A008	
5.	Unlock rear EPC	
6.	Rapid lift control to Lower = control action	
7.	Set depth control such that load weight is just above ground	
8.	Pull away at approx. 5-6 km/h	
9.	Required reaction: rear power lift remains in set position.	
10.	Activate radar sensor A011 on terminal A008	
11.	Required reaction: rear power lift rises and "Raise" arrow is displayed on terminal A008	Bevel pinion speed sensor B015 displays a speed. Radar sensor A011 shows speed of 0 km/h (slip).

Date	Version	Page	<b>Slip control performance test</b>	Capitel	Index	Docu-No.
07.05.0001	a	4/6		<b>8610</b>	<b>E</b>	<b>000003</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Power lift / Electrohydraulic control EPC</b> <b>Slip control performance test</b>	<b>E</b>
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**Control loop of slip control**



Item	Designation	Item	Designation
A002	ECU	X007	Implement socket
A005	EPC ECU	X100	Instrument panel plug (blue)
A007	Instrument panel	X101	Instrument panel plug (yellow)
A011	Radar sensor		
		A	"Theoretical speed" signal
B015	Bevel pinion speed sensor	B	"Actual speed" signal

The bevel pinion speed sensor B015 transmits the "theoretical speed" (A) to the ECU A002. The radar sensor A011 transmits the "actual speed" (B) to the EPC ECU A005 and to the instrument panel A007.

The ECU A002 is connected to the EPC ECU A005 and the instrument panel A007 via the K-bus. The "theoretical speed" (A) is transmitted to the EPC ECU A005 and the instrument panel A007 via the K-bus.

EPC ECU A005 ---> slip control (see also: Chapter 8610 Reg.A - Operation and function of electronic slip control)

Instrument panel A007 ---> speed and slip display

**Note:**

**Above 15 km/h the system automatically switches to theoretical speed display. The slip and speed display are cleared. Below 15 km/h the actual speed is displayed again on the instrument panel A007.**

**The slip control in the EPC ECU A005 remains active irrespective of the speed.**

Implement socket X007 ---> implement control system (e.g. spraying computer)

Date	Version	Page	Slip control performance test	Capitel	Index	Docu-No.
07.05.0001	a	5/6		8610	E	000003

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Power lift / Electrohydraulic control EPC <b>Slip control performance test</b>	<b>E</b>
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The accuracy of the "theoretical speed" signal (A) from the bevel pinion speed sensor B015 is a function of the tractor speed

- Speed < 15 km/h (maximum display accuracy)  
- Calibrating speed display

The ECU A002 counts the pulses per metre. The instrument panel A007 then calculates the "theoretical speed" (A) from the number of pulses.

- 15 km/h < speed < 20 km/h  
- Enter tyre size.

The ECU A002 counts the revolutions of the bevel pinion shaft. The instrument panel A007 calculates the "theoretical speed" (A) from the number of bevel pinion shaft revolutions and the input tyre circumference.

- Speed > 20 km/h  
Specified (maximum) tyre circumference in EOL program  
(EOL = end of line)

The ECU A002 counts the revolutions of the bevel pinion shaft. The instrument panel A007 calculates the "theoretical speed" (A) from the number of bevel pinion shaft revolutions and the maximum tyre circumference specified in the EOL program.

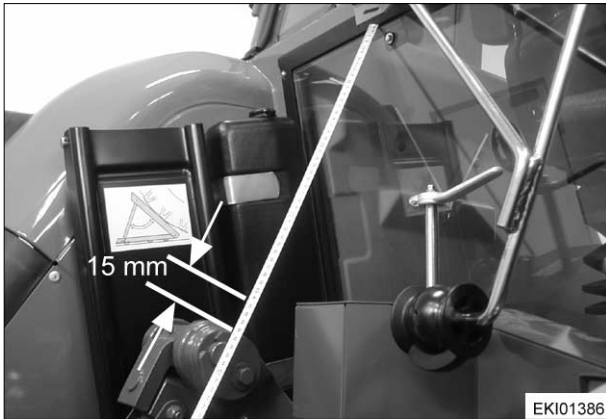
The maximum tyre circumference specified in the EOL program limits the ultimate maximum speed.

**Note:**

The transitions between the speed ranges < 15 km/h, < 20 km/h and > 20 km/h are fluid. In other words the calculation of the theoretical speed (A) becomes similar.

Date	Version	Page	Capitel	Index	Docu-No.
07.05.0001	a	6/6	8610	E	000003

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Power lift / Electrohydraulic control EPC <b>Setting power lift end shutoff</b>	F
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Overtravel of rear power lift = 15 mm

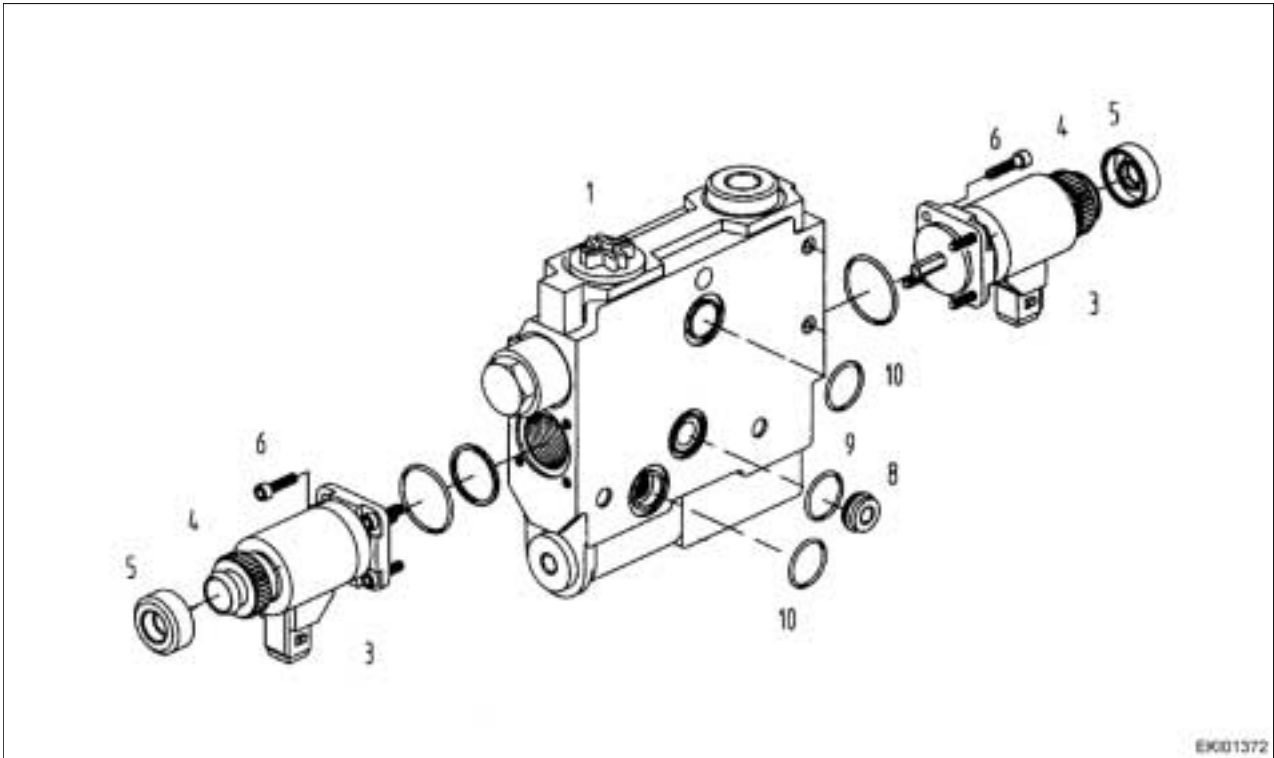
**Note:**

The overtravel is set by means of the position sensor B030.

For setting, see Chapter 8610 Reg.G - Installing and removing position sensor B030.

Date	Version	Page	<b>Setting power lift end shutoff</b>	Capitel	Index	Docu-No.
14.05.01	a	1/1		<b>8610</b>	<b>F</b>	<b>000001</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Power lift / Electrohydraulic control EPC EPC control valve - replacing graduable magnet valves Y021/Y022	<b>G</b>
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Item	Designation	Item	Designation
1	Control valve EHR 23 - LS	6	Socket head cap screw
1	Seal set	8	Shuttle valve
3	Graduable magnet valve Y021/Y022	9	O-ring
4	Solenoid	10	O-ring
5	Protective cap		

**Note:**

The work was carried out on a control valve which had been removed from the tractor for greater clarity.

**Important:**

Retrofitting and repair work on the service hydraulics must be carried out with very great attention to cleanliness. The smallest particles of dirt in the control circuit can prevent the control motion or cause automatic deflection.

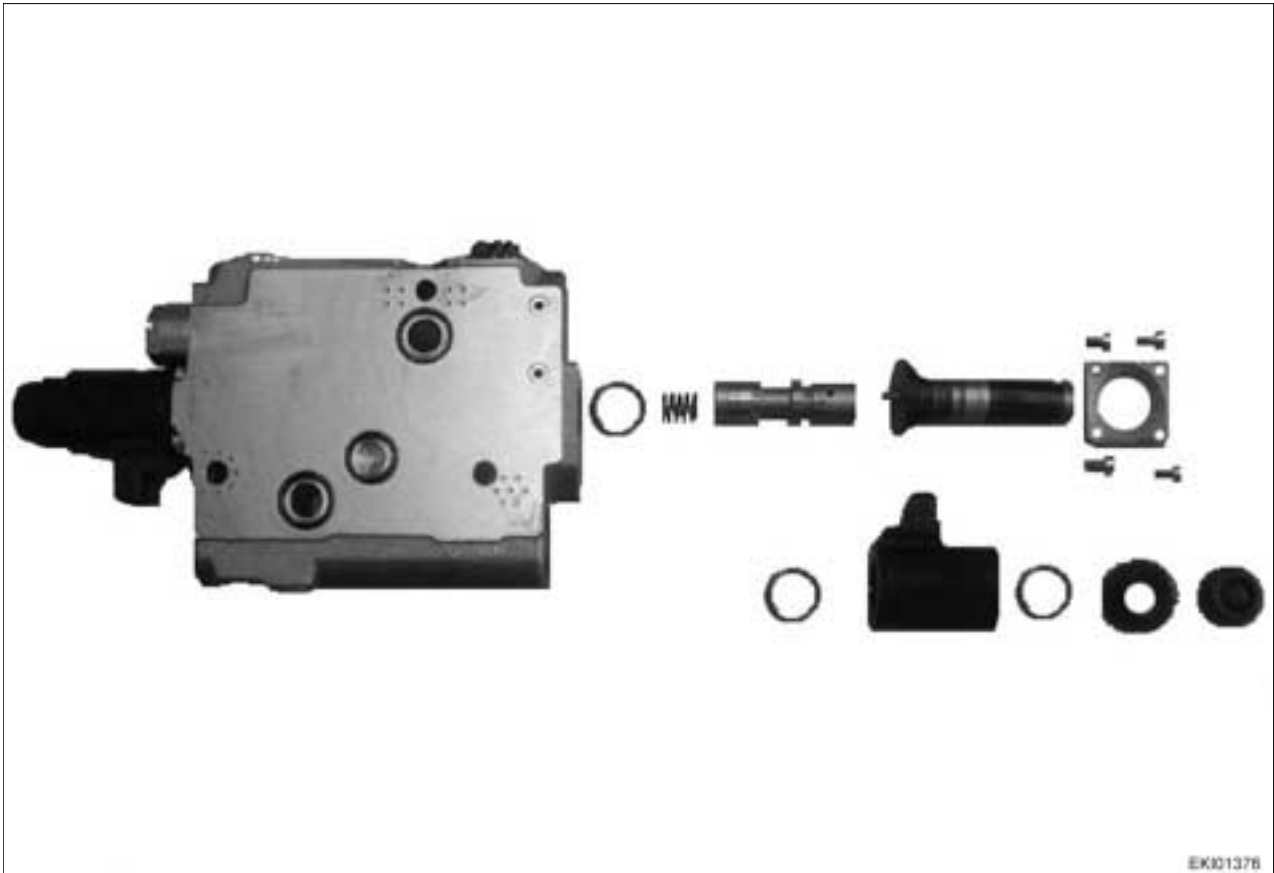
If the EPC control valve is removed, the hydraulic oil must be drained (to prevent the hydraulic system from being emptied via the return flow ).

**Hydraulic oil quantities**

- Farmer 400 = approx. 42 l
- Fav 700 = approx. 50 l
- Fav 900 = approx. 70 l

Date	Version	Page	Capitel	Index	Docu-No.
25.04.2001	a	1/4	EPC control valve - replacing graduable magnet valves Y021/Y022 <b>8610</b>	<b>G</b>	<b>000001</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Power lift / Electrohydraulic control EPC</b> <b>EPC control valve - replacing graduable magnet valves Y021/Y022</b>	<b>G</b>
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EK01378

### Removing "Raise" graduable magnet valve Y021

Unscrew knurled nut with protective cap (5).

Loosen socket head cap screws (6) and remove graduable magnet valve Y021 (magnet core) (3).

### Installing "Raise" graduable magnet valve Y021

Insert new O-ring into EPC control valve housing.

Check graduable magnet valve Y021 (magnet core) (3) for ease of movement and install.

Tighten flange using 4 socket head cap screws (6) crosswise in stages.

Locate new O-ring on graduable magnet valve Y021 (magnet core).

Locate solenoid.

Insert new O-ring into knurled nut.

Tighten knurled nut. **Tightening torque = 3.5 +1 Nm**

Locate protective cap (5).

Date	Version	Page	Capitel	Index	Docu-No.	
25.04.2001	a	2/4	EPC control valve - replacing graduable magnet valves Y021/Y022	8610	G	000001



<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift / Electrohydraulic control EPC                  EPC control valve - replacing graduable magnet valves Y021/Y022</p>	<p><b>G</b></p>
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**Removing "Lower" graduable magnet valve Y022**

Unscrew knurled nut with protective cap (5).  
 Loosen socket head cap screws (6) and remove graduable magnet valve Y022 (magnet core) (3).

**Fitting "Lower" graduable magnet valve Y022**

Insert new O-ring into EPC control valve housing.  
 Check graduable magnet valve Y022 (magnet core) (3) for ease of movement and install.  
 Tighten flange using 4 socket head cap screws (6) crosswise in stages.  
 Locate new O-ring on graduable magnet valve Y022 (magnet core).  
 Locate solenoid.  
 Insert new O-ring into knurled nut.  
 Tighten knurled nut. **Tightening torque = 3.5 +1 Nm**  
 Locate protective cap (5).



**Note:**  
 If EPC control valve was removed from valve array:  
**Assembly of valve array, see also Chapter 9620 Reg.G - Control valves SB 23 LS - EHS**  
**Tighten M8-10.9 DIN 934 hexagon screws to 30 +3 Nm.**

Date	Version	Page	Capitel	Index	Docu-No.
25.04.2001	a	3/4	EPC control valve - replacing graduable magnet valves Y021/Y022	<b>8610</b>	<b>G</b> <b>000001</b>

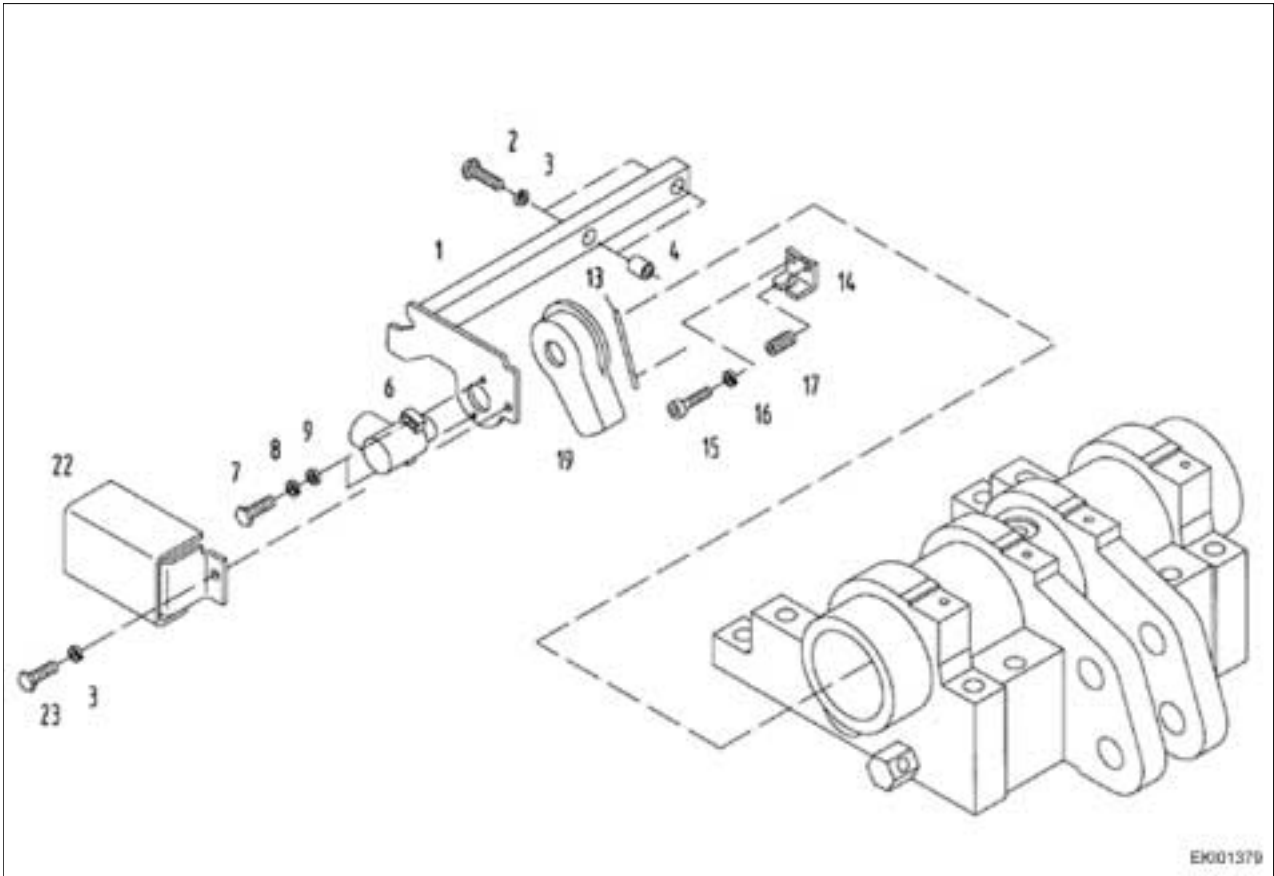
<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Power lift / Electrohydraulic control EPC EPC control valve - replacing graduable magnet valves Y021/Y022	<b>G</b>
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Date	Version	Page		Capitel	Index	Docu-No.
25.04.2001	<b>a</b>	4/4	EPC control valve - replacing graduable magnet valves Y021/Y022	<b>8610</b>	<b>G</b>	<b>000001</b>

**Farmer 400**  
**Fav 700**  
**Fav 900**

**Power lift / Electrohydraulic control EPC**  
**Installation and removal of position sensor B030**

**G**



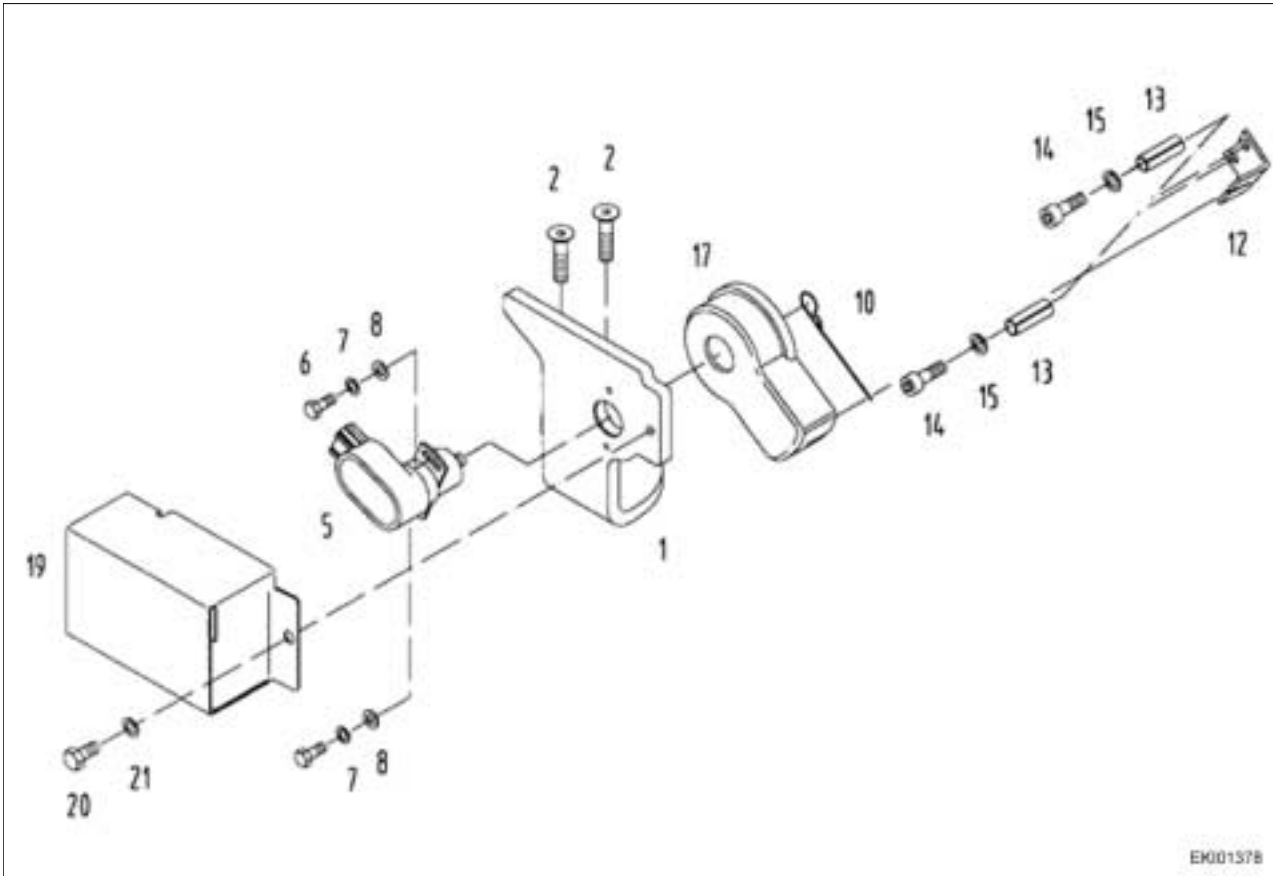
**Fav 900 chassis number 23/3001 and up**

Item	Designation	Item	Designation
1	Bracket	13	Spring wire
2	Hexagon screw	14	Angle bracket
3	Spring washer	15	Socket head cap screw
4	Sleeve	16	Spring washer
6	Position sensor B030	17	Dowel pin
7	Hexagon screw	19	Cover
8	Spring washer	22	Guard
9	Washer	23	Hexagon screw

**Farmer 400**  
**Fav 700**  
**Fav 900**

Power lift / Electrohydraulic control EPC  
**Installation and removal of position sensor B030**

**G**



EK001378

**Fav 700, Farmer 400**

Item	Designation	Item	Designation
1	Bracket	13	Dowel pin
2	Countersunk screw	14	Socket head cap screw
5	Position sensor B030	15	Spring washer
6	Hexagon screw	17	Cover
7	Spring washer	19	Guard
8	Washer	20	Hexagon screw
10	Spring wire	21	Spring washer
12	Angle bracket		

**Note:**

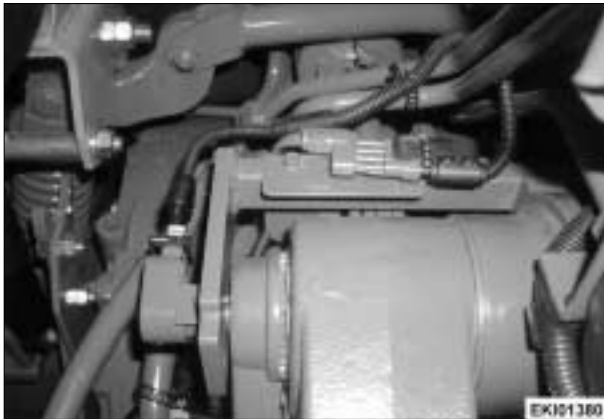
The work shown was carried out on a Fav 900 chassis no. 23/3001 or above.  
 Carry out installation and removal of position sensor B030 in Farmer 400, Fav 700 in same manner.

Date	Version	Page	Capitel	Index	Docu-No.
26.04.2001	a	2/5	8610	G	000002

**Farmer 400**  
**Fav 700**  
**Fav 900**

**Power lift / Electrohydraulic control EPC**  
**Installation and removal of position sensor B030**

**G**



Release bracket (1).



Disconnect electrical connections for position sensor B030 and for handbrake solenoid switch S015.

Remove bracket (1) complete with position sensor B030.



Remove guard (19) and release position sensor B030.



**Installing position sensor B030**

**Default setting for Fav 900 chassis number 23/3001 and up:** screw position sensor B030 exactly in centre of slots (position of lift arms is unimportant).

**Default setting for Fav 700, Farmer 400:** position sensor B030 can only be mounted in one position.

Date	Version	Page	Capitel	Index	Docu-No.
26.04.2001	a	3/5	8610	G	000002

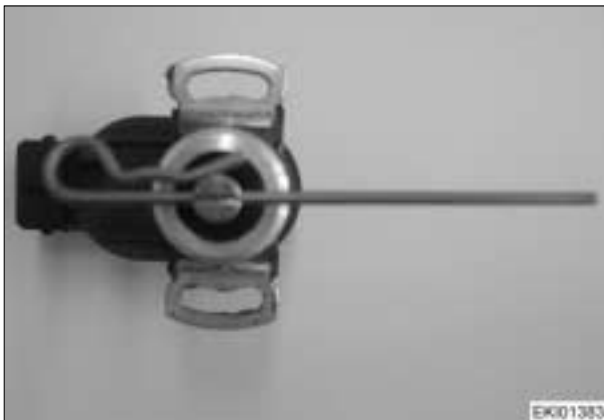
**Farmer 400**  
**Fav 700**  
**Fav 900**

**Power lift / Electrohydraulic control EPC**  
**Installation and removal of position sensor B030**

**G**



Notch (arrowed) in actuating shaft faces electrical connection.



Spring wire (13) must project opposite notch (arrowed) (notch faces short end of spring wire).



Locate guard (19).



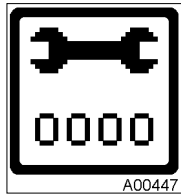
Fit bracket (1) complete with position sensor B030.

Spring wire (13) must extend into angle bracket (14).

Connect electrical connections for position sensor B030 and for handbrake solenoid switch S015.

Date	Version	Page	Capitel	Index	Docu-No.
26.04.2001	a	4/5	8610	G	000002

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift / Electrohydraulic control EPC  <b>Installation and removal of position sensor B030</b></p>	<p><b>G</b></p>
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Calibrate position sensor B030.

Calibration of rear EPC, code 8001 (depth control) and 8002 (position sensor B030)

For calibration procedure see Chapter 0000 Reg.F

**Note:**

In event of "ERROR" message:

Move rear power lift against mechanical stop using switch S027/S029.

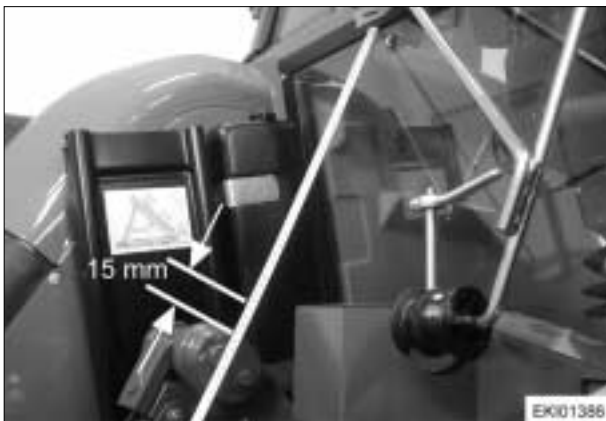
Connect adapter cable (DIY) to position sensor B030.

Connect multimeter to pins 1 and 2.

Loosen hexagon screws and adjust position sensor B030 in slots until signal voltage of approx. 7.1 VDC is displayed.

Screw position sensor B030 tight in slots and repeat calibration process 8002.

(See also Chapter 9000 Reg.E)



**Check: overtravel of rear power lift**

Fully raise lift arms (set lift height limit to 100%)

Press switch (S029 / S027) at rear. Lift arms rise approx. 15 mm further against mechanical stop.

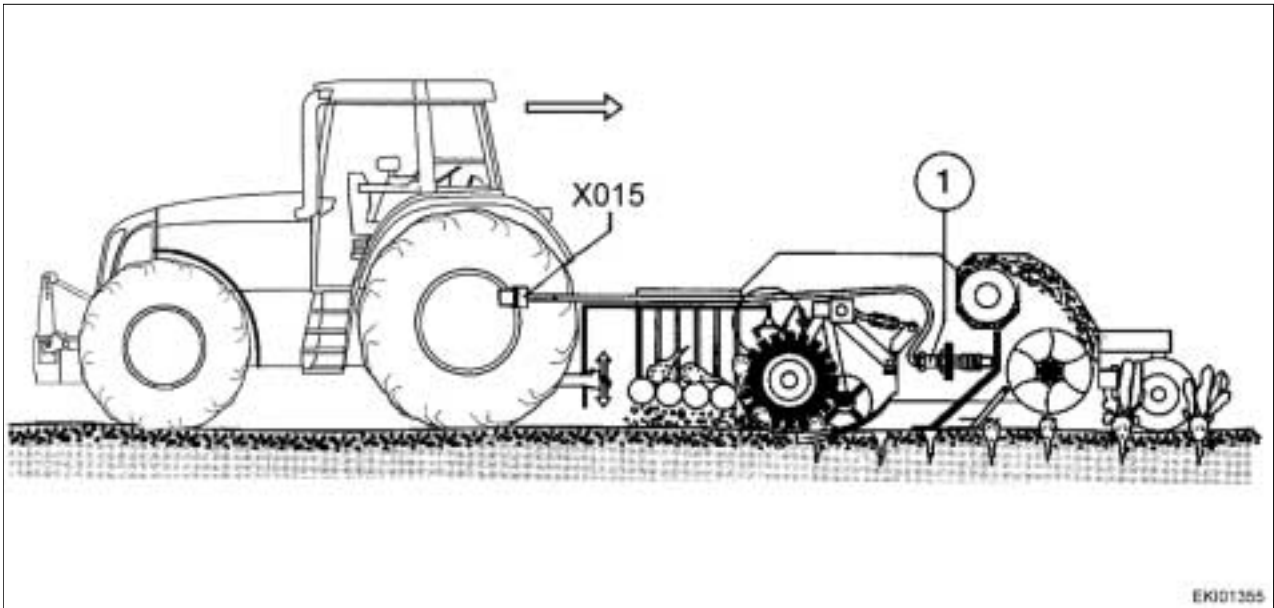
**Note:**

Overtravel of approx. 15 mm can also be smaller, though a slight overtravel must be available.

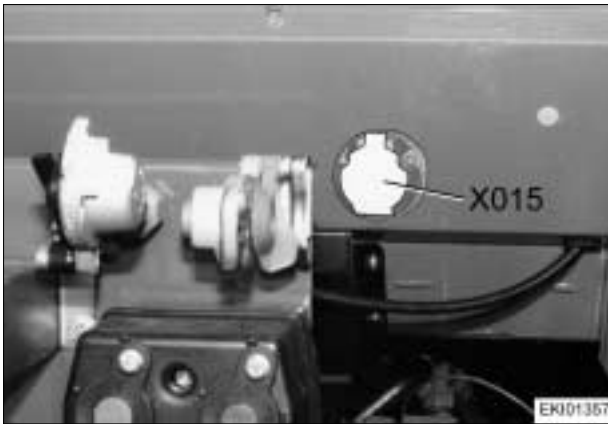
Date	Version	Page	Capitel	Index	Docu-No.
26.04.2001	a	5/5	8610	G	000002

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift/Electrohydraulic remote control  <b>Operation and function of electrohydraulic remote control</b></p>	<p><b>A</b></p>
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**Electrohydraulic remote control**



The electrohydraulic remote control is used with mounted implements which have to be held at a preset distance from the ground. The photo shows the example of a beet lifter. In this the position of the implement frame relative to the soil surface is measured and maintained at a constant height via the EPC by means of a sliding skid (feeler control) which is connected to the inductive position sensor (1).



This type of control is automatically switched on when the feeler sensor is electrically connected to the EPC system via socket X015 (see photo).

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17/04/2001	a	1/2	8618	A	000001

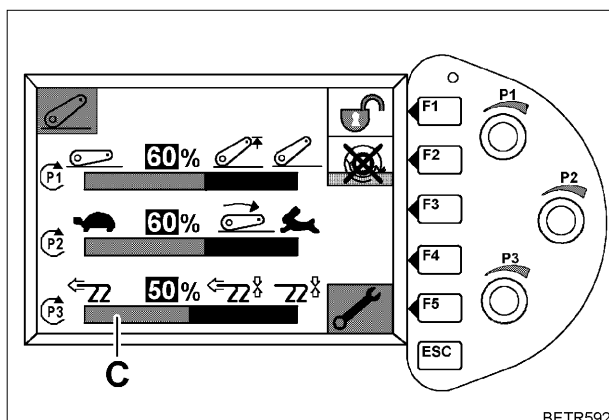


Farmer 400  
Fav 700  
Fav 900 chassis num-

Power lift/Electrohydraulic remote control  
Operation and function of electrohydraulic remote control

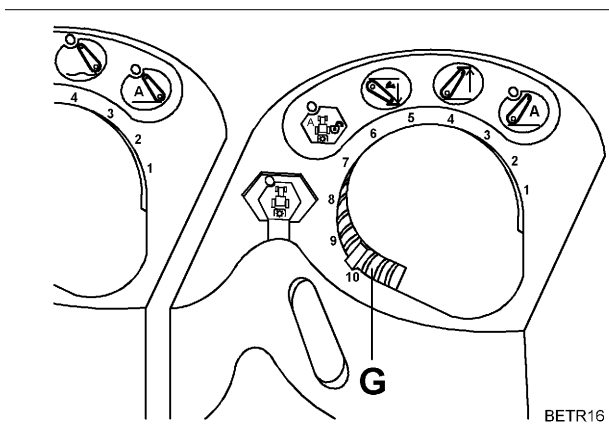
**A**

### Setting working depth



The working depth must be set on a level field.

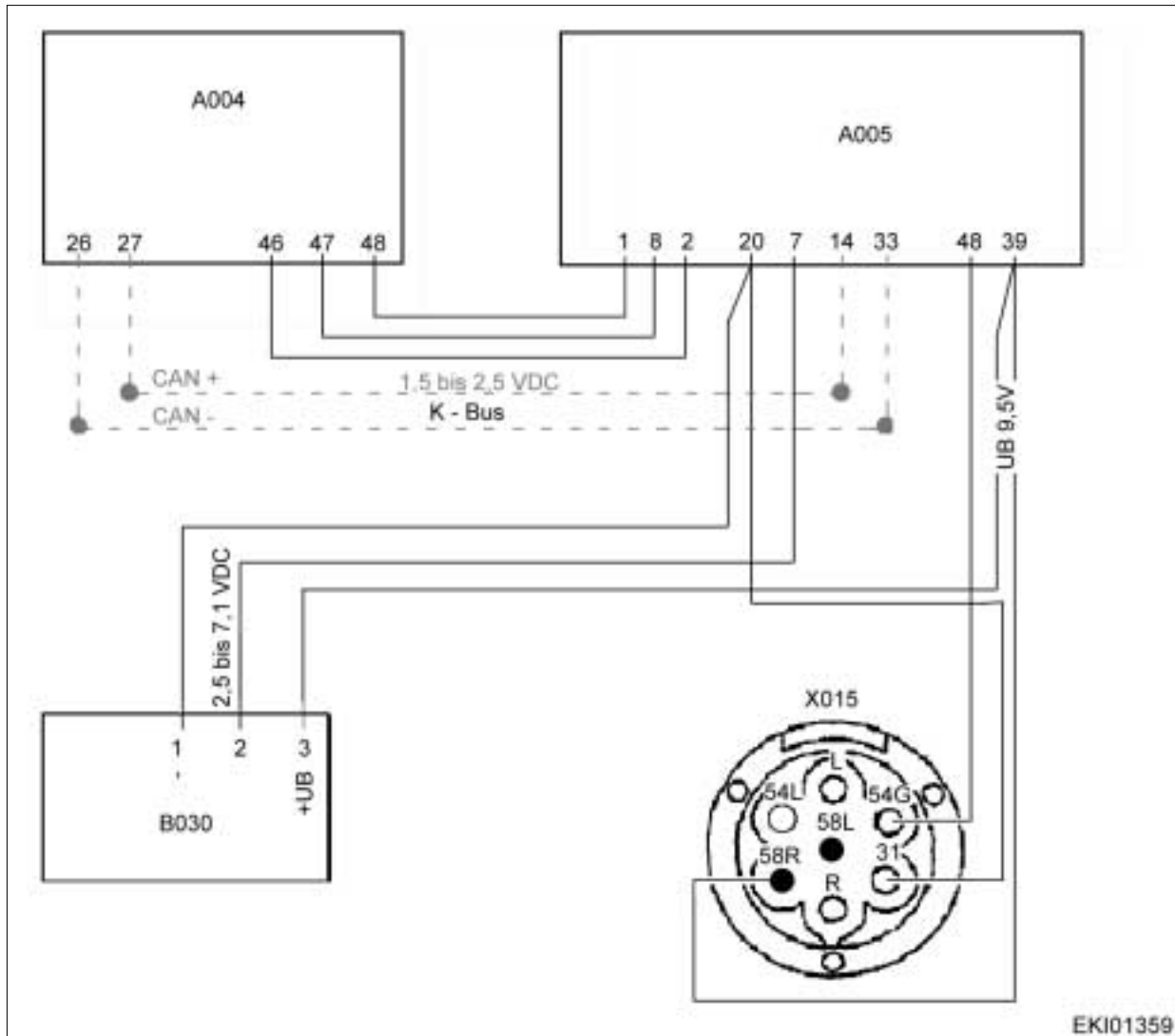
- Set mid-position (hybrid control) approximately (bar display C) using rotary control (P3).
- Raise feeler sensor on implement using crank handle.



- Stop tractor.
- Lower feeler sensor until first lift pulse occurs.
- Start work, check working depth, correct feeler sensor such that depth control (G) in mid-position (position 5) reaches desired working depth.
- Correct draft force/position ratio using rotary control (P3) if system deviations on implement are too large or too small.

Date	Version	Page	Capitel	Index	Docu-No.	
17/04/2001	a	2/2	Operation and function of electrohydraulic remote control	8618	A	000001

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Power lift / Electrohydraulic remote control <b>Electrohydraulic remote control / terminal diagram</b>	<b>A</b>
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A004	Control console
46	Depth control supply 9.5 VDC
47	Depth control signal 1.2 to 8.5 VDC
48	Depth control earth
A005	EPC ECU
1	Depth control earth
2	Depth control supply 9.5 VDC
7	External position gauge signal 2.5 to 7.1 VDC
8	Depth control signal 1.2 to 8.5 VDC
20	Earth
39	External position gauge signal 9.5 VDC
48	External signal
B030	Rear EPC position sensor
X015	Electrohydraulic remote control socket cable coupler

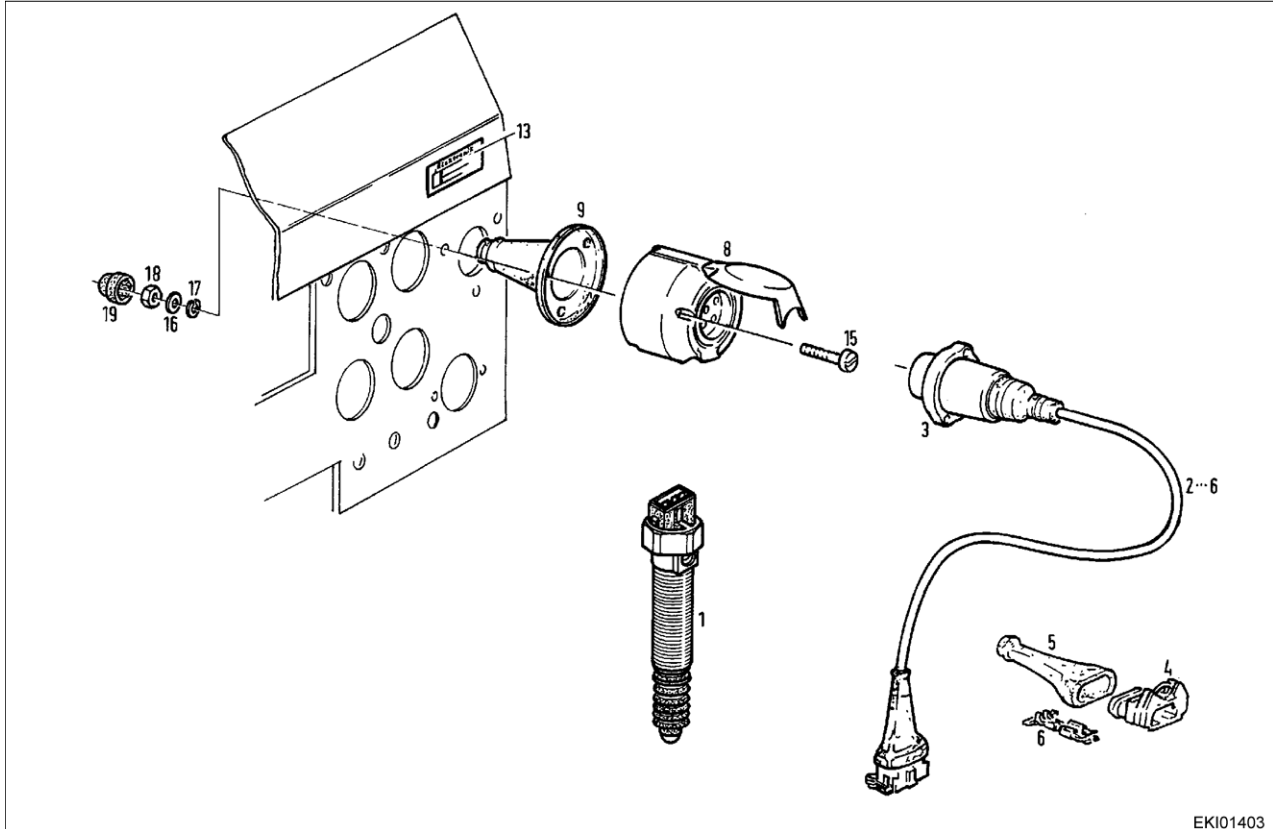
Date	Version	Page	Capitel	Index	Docu-No.
18/04/2001	a	1/1	8618	A	000002

**Farmer 400**  
**Fav 700**  
**Fav 900**

Power lift/Electrohydraulic remote control  
**External position gauge - functional description**

**A**

**External position gauge (MWL ext.)**



EKI01403

Item	Designation	Item	Designation
1	External position gauge	13	Instruction plate
2	Extension cable	15	Self-tapping screw
3	7-pin plug	15	Socket head cap screw
4	Plug housing	16	Washer
5	Protective cap	17	Spring washer
6	Timer contact	18	Hexagon nut
8	Socket X015	19	Hexagon protective cap
9	Cap		

The position of the mounted implement is detected by an external position gauge via a sliding skid and converted to an electrical signal.

The external position gauge works on the inductive voltage divider principle.

The external position gauge consists essentially of two coils and a moving ferrite core which is moved by the sliding skid of the mounted implement.

An a.c. voltage is generated via an integrated electronic system to supply the inductive voltage divider. The output signal in turn is demodulated (rectified) and fed to socket X015.

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09.05.0001	a	1/2	8618	A	000003

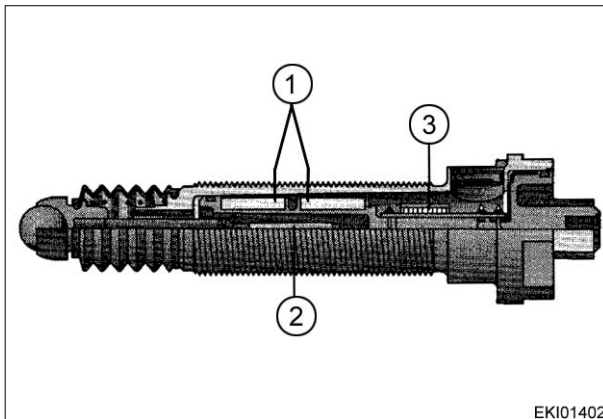
**Farmer 400**  
**Fav 700**  
**Fav 900**

Power lift/Electrohydraulic remote control  
**External position gauge - functional description**

**A**

**Features of the external position gauge**

- Axially movable feeler with spring bias
- Inductive gauge (MWL)
- Integrated electronic system with temperature compensation
- Output signal proportional to travel
- Neutral point and sensitivity are calibrated.



- 1 = coils  
 2 = ferrite core  
 3 = integrated electronics

**Technical specifications of external position gauge ( MWL ext )**

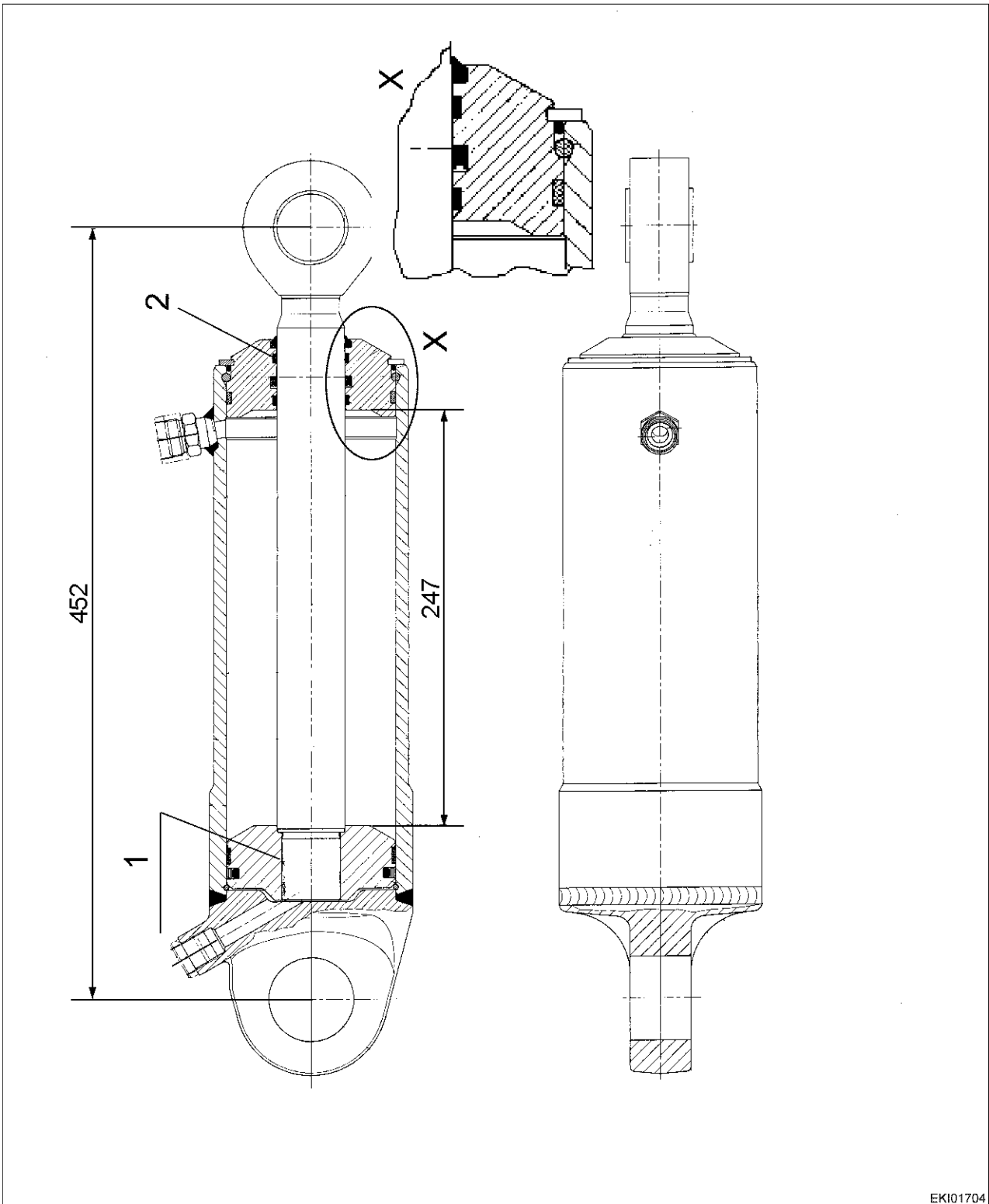
+ supply	9.5 VDC
Signal voltage	2.4 VDC - 7.1 VDC
Mechanical feeler stroke	13 mm
Principal dimensions	33 mm, 147 mm long with external thread for calibration
Electrical measurement range	10 mm

Date	Version	Page	Capitel	Index	Docu-No.
09.05.0001	a	2/2	8618	A	000003

Fav 900

Power lift / Controlled power lift  
Lift cylinder 40/100, 247/452

C



EKI01704

Item	Fitting tip
1	Secured with synthetic bonding agent X 903.050.084
2	Immerse in oil

Date	Version	Page	Lift cylinder 40/100, 247/452		
12.07.2001	a	1/2	Capitel	Index	Docu-No.
			8631	C	000003

<b>Fav 900</b>	<b>Power lift / Controlled power lift Lift cylinder 40/100, 247/452</b>	<b>C</b>
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**40/100** = piston rod diameter / piston diameter

**247/452** = cylinder stroke / mounting dimension

**Note:**

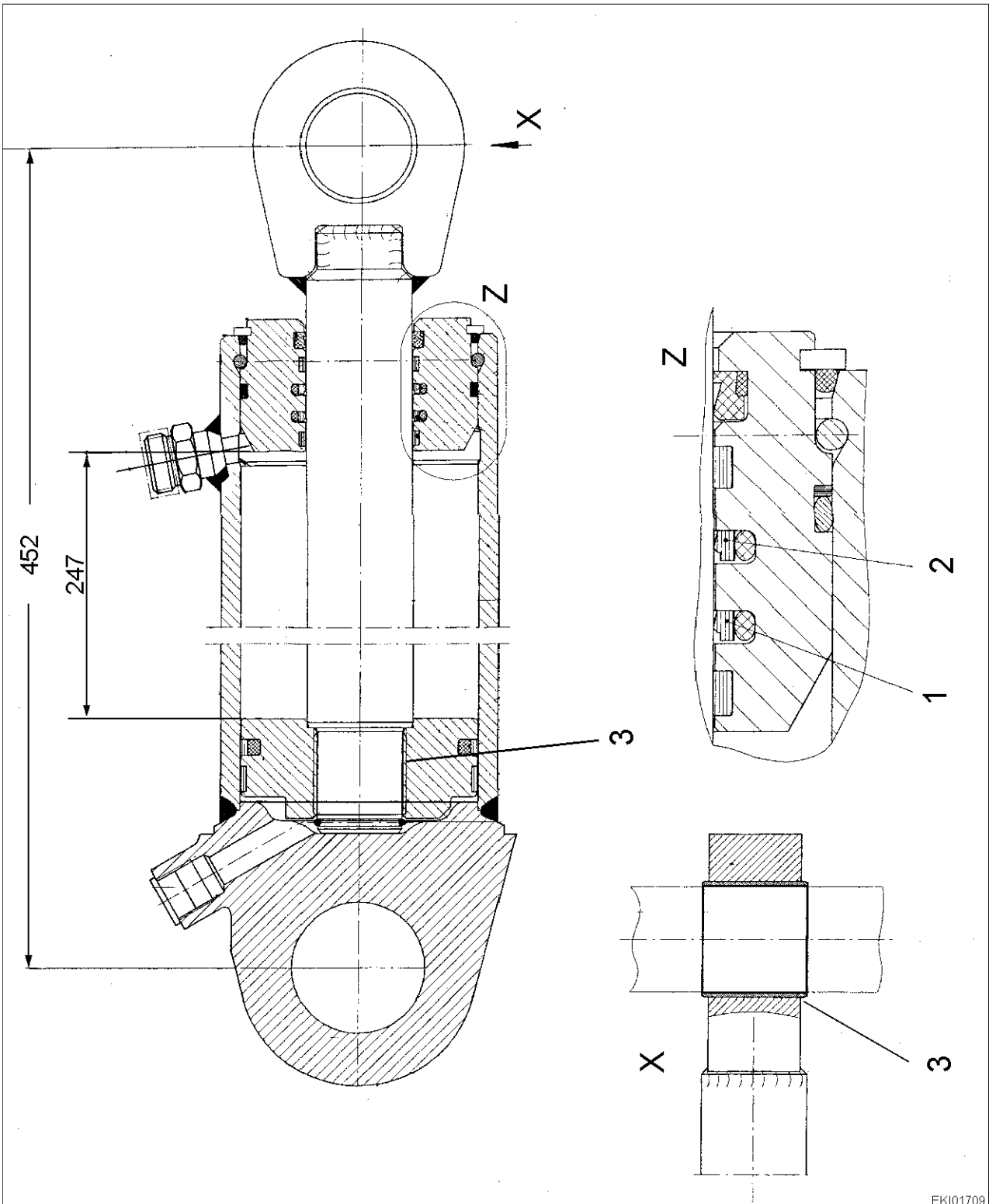
**See also Chapter 8631 Reg. G - Repairing lift cylinder**

Date	Version	Page	Capitel	Index	Docu-No.
12.07.2001	<b>a</b>	2/2	<b>8631</b>	<b>C</b>	<b>000003</b>

Fav 900

Power lift / Controlled power lift  
Lift cylinder 40/90, 257/452

C



EK101709

Item	Fitting tip
1	Material PTFE filled with bronze, (colour: grey)
2	Material PU, (colour: yellow)
3	Contact surfaces secured with synthetic bonding agent X 903.050.084

Date	Version	Page	Lift cylinder 40/90, 257/452	Capitel	Index	Docu-No.
12.07.2001	a	1/2		8631	C	000004

<b>Fav 900</b>	<b>Power lift / Controlled power lift Lift cylinder 40/90, 257/452</b>	<b>C</b>
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**40/90** = piston rod diameter / piston diameter

**247/452** = cylinder stroke / mounting dimension

**Note:**

**See also:**

**Chapter 8631 Reg. G - Repairing lift cylinder**

Date	Version	Page	Capitel	Index	Docu-No.
12.07.2001	<b>a</b>	2/2	<b>8631</b>	<b>C</b>	<b>000004</b>



Fav 900

Power lift / Controlled power lift  
Repairing lift cylinder

G

**Lift cylinder Fav 900 / 21 / .....**

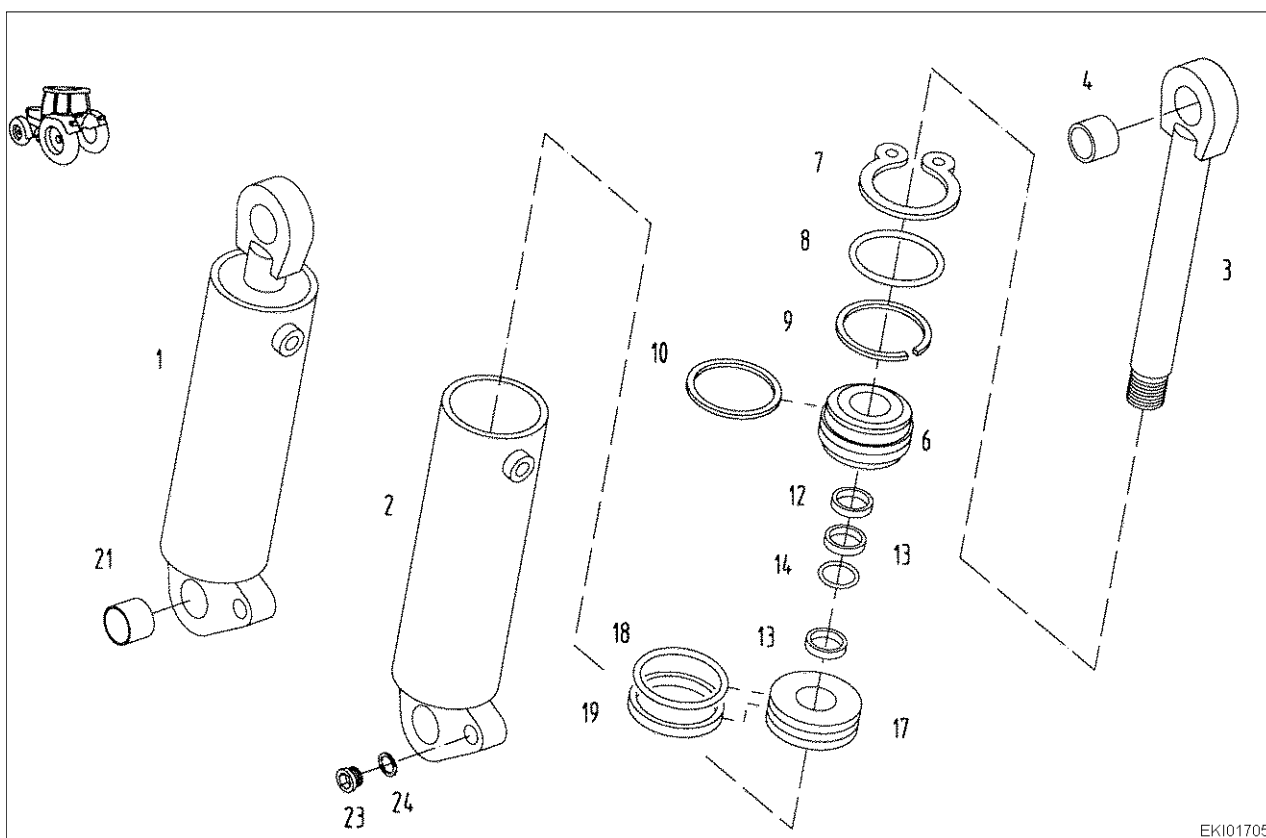
The following are installed, depending on chassis number:

Lift cylinder 40/90, 247/452

Lift cylinder 40/100, 247/452

**Note:****See also Fendos spare parts catalogue****Lift cylinders for Fav 900 chassis number 23/3001 and up**

Lift cylinder 40/100, 247/452

**Lift cylinder 40/100, 247/452****Note:****Fit lift cylinder 40/90, 247/452 in same manner.**

Item	Designation	Item	Designation
1	Lift cylinder, double-acting	12	Oil scraper ring
1	Seal set	13	Guide ring
2	Cylindrical tube (not available individually)	14	V-seal
3	Piston rod	17	Piston
4	Bearing bush	18	Guide ring
6	Guide bush	19	Form seal
7	Circlip	21	Bearing bush
8	O-ring	23	Drain plug
9	Snap ring	24	Sealing ring
10	Form seal		


Date	Version	Page	Capitel	Index	Docu-No.
12.07.2001	a	1/2	8631	G	00002

<i>Fav 900</i>	Power lift / Controlled power lift <b>Repairing lift cylinder</b>	<b>G</b>
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**Note:****See also:****Chapter 8631 Reg. C - Lift cylinder 40/100, 247/452****Chapter 8631 Reg. C - Lift cylinder 40/90, 247/452**

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<b>All types</b>	Air compressor / General system <b>Troubleshooting flowchart, air compressor</b>	<b>B</b>
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**Warning:**  
Always disconnect the red coupling head (storage tank) first when unhitching the trailer or trailed vehicle.  
(Only then is the trailer or trailed vehicle secured against rolling away!)

**Pressure regulator vents too frequently without the brake being operated**

<b>Pressure regulator vents too frequently without the brake being operated</b>		
Check operating range (pressure) of pressure regulator	Not OK	Set pressure regulator (fit new one if necessary)
OK		
Check air compressor for leaks - screw couplings - drain valve - non-return valve in pressure regulator		

**Tank pressure incorrect**

<b>Tank pressure not OK</b>		
Check B019-sensor, compressed-air volume (Chapter 9000 Reg. E)	Display incorrect	Fit new B019-sensor, compressed-air volume
to do so, connect test pressure gauge to storage tank coupling head (red) and compare with display on A007-display unit.		
Display correct		
Check air compressor for leaks	Leak found	Repair leak(s)
No leak		
See "Air compressor filling time too long" fault scenario		

<b>All types</b>	Air compressor / General system <b>Troubleshooting flowchart, air compressor</b>	<b>B</b>
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**Air compressor filling time is too long**

<b>Air compressor filling time is too long</b>	
Is the pressure regulator cut-out pressure reached? To check, connect test pressure gauge to storage tank coupling head (red) and compare with display on A007-display unit.	

<b>Cut-out pressure is reached</b>		
Check air compressor for leaks in braked and unbraked mode	Leak found	Repair leak(s)
No leak		
Dirt in pressure regulator  Check condition of pressure regulator. - Remove pressure pipes from air compressor to pressure regulator, check that they are clear, fit new ones if necessary		
Filling time still too long		
Yes		
Check air compressor and fit new one if necessary		

<b>Cut-out pressure is not reached</b>		
Leaks in pressure regulator in filling phase at vent point	No	Check brake system for leaks in braked and unbraked mode
Yes		
Fit new pressure regulator		
Filling time still too long		
Yes		
Check brake system for leaks in braked and unbraked mode		

<b>All types</b>	<b>Air compressor / General system</b> <b>Troubleshooting flowchart, air compressor</b>	<b>B</b>
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**Residual pressure at yellow coupling head, with brake not actuated**

<b>Residual pressure at yellow coupling head, with brake not actuated</b>		
Ignition ON		
Handbrake fully released? (Detach linkage from trailer valve if necessary.)	No	Set handbrake linkage
Yes		
Set master brake cylinder (Chapter 1070 Reg. E)		
Pressure drops	No	Compressed-air advance control system setting
Yes		Chapter 1070 Reg. E (Setting of magnet for solenoid switch S005/S006)
Air compressor OK		

<b>All types</b>	Air compressor / General system <b>Troubleshooting flowchart, air compressor</b>	<b>B</b>
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**Dual-line trailer advances on tractor when braking**

<b>Dual-line trailer advances on tractor when braking</b>		
<b>Check pressure at tractor coupling heads</b>		

<b>Pressures at coupling heads match</b>		
Measure braking force at trailer brake cylinders; note proportioning valve setting		
Pressure (braking force) OK?	No	Set trailer proportioning valve, check trailer brake system
Yes		
Check trailer brake cylinders, check trailer's mechanical wheel brake		

<b>Storage pressure (red coupling head) is incorrect</b>		
Check tank pressure		
Tank pressure (8.1 bar)	No	See "Tank pressure incorrect" fault scenario
Yes		
Check braking force at trailer brake cylinders; note proportioning valve setting		

<b>Braking force (yellow coupling head) not OK</b>		
- compressed-air advance control system Chapter 1070 Reg. E (Setting of magnet for solenoid switch S005/S006)		
- check trailer valve, fit new one if necessary		

<b>All types</b>	<b>Air compressor / General system</b> <b>Troubleshooting flowchart, air compressor</b>	<b>B</b>
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**Trailer does not brake (single-line brake system) (optional extra)**

Trailer does not brake (single-line brake system)		
Check pressure at coupling head (black) (approx. 5.0 - 5.5 bar).	No	Check tractor brake system
Yes		Chapter 8800 Reg. C - Air compressor plan
Pressure drop when braking (pressure drop in trailer control line to 0 bar)		
Check pressure drop with foot-brake and handbrake	Pressure drop not OK	Check tractor brake system
Pressure drop OK		Chapter 8800 Reg. C - Air compressor plan
Check pressure at trailer brake cylinder and in air tank.	Pressure not OK	Check trailer brake valve, proportioning valve, lines and hoses. Fit new items if necessary
Bear proportioning valve setting in mind!		
Guidelines: empty approx. 1.5 bar; half load approx. 3.0 bar; full load > 4.5 bar		
Pressure OK		
Check mechanical wheel brakes and brake pads, set trailer brake cylinders		

<b>All types</b>	<b>Air compressor / General system</b> <b>Troubleshooting flowchart, air compressor</b>	<b>B</b>
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**Trailer does not brake (dual-line brake system)**

<b>Trailer does not brake (dual-line brake system)</b>		
Storage pressure (7.0 to 8.1 bar)	No	Check tractor brake system
Yes		
Check pressure in trailer control line (yellow) approx. 7.0 to 8.0 bar Check pressure build-up with footbrake and handbrake	Pressure not OK	Check tractor brake system
Pressure OK		
Check pressure at trailer brake cylinder and in air tank.	Pressure not OK	Check trailer brake valve, proportioning valve, lines and hoses. Fit new items if necessary
Bear proportioning valve setting in mind!		
Guidelines: empty approx. 2.0 bar; half load approx. 4.0 bar; full load > 6.0 bar		
Pressure OK		
Check mechanical wheel brakes and brake pads, set trailer brake cylinders		



<b>All types</b>	Air compressor / General system <b>Troubleshooting flowchart, air compressor</b>	<b>B</b>
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**Leak(s) in tractor air compressor**

<b>Leak(s) in tractor air compressor</b>		
Fill air compressor until pressure regulator vents		
Switch engine off, ignition ON		
Connect test pressure gauge to storage tank coupling head (red). Reduce pressure to 7.0 bar. Read off pressure at test pressure gauge and do not actuate brake any more		
Pressure change is more than 0.1 bar after 5 minutes	No	Press brake down fully and lock
Yes		
Locate and repair leak Coupling heads, trailer control valve, pressure regulator, drain valve, screw couplings	Yes	No
Start engine and fill air compressor completely (8.1 bar). Switch engine off , brake not actuated		
Check pressure regulator for leaks		

**Note:**

- Chapter 8800 Reg. C - Air compressor plan
- Chapter 8800 Reg. E - Overview of air compressors
- Chapter 8800 Reg. E - Checking dual-line brake system in tractor
- Chapter 8800 Reg. E - Checking single-line brake system in tractor
- Chapter 8820 Reg. F - Setting pressure regulator (8.1 bar)
- Chapter 8820 Reg. F - Trailer control valve (single-line)

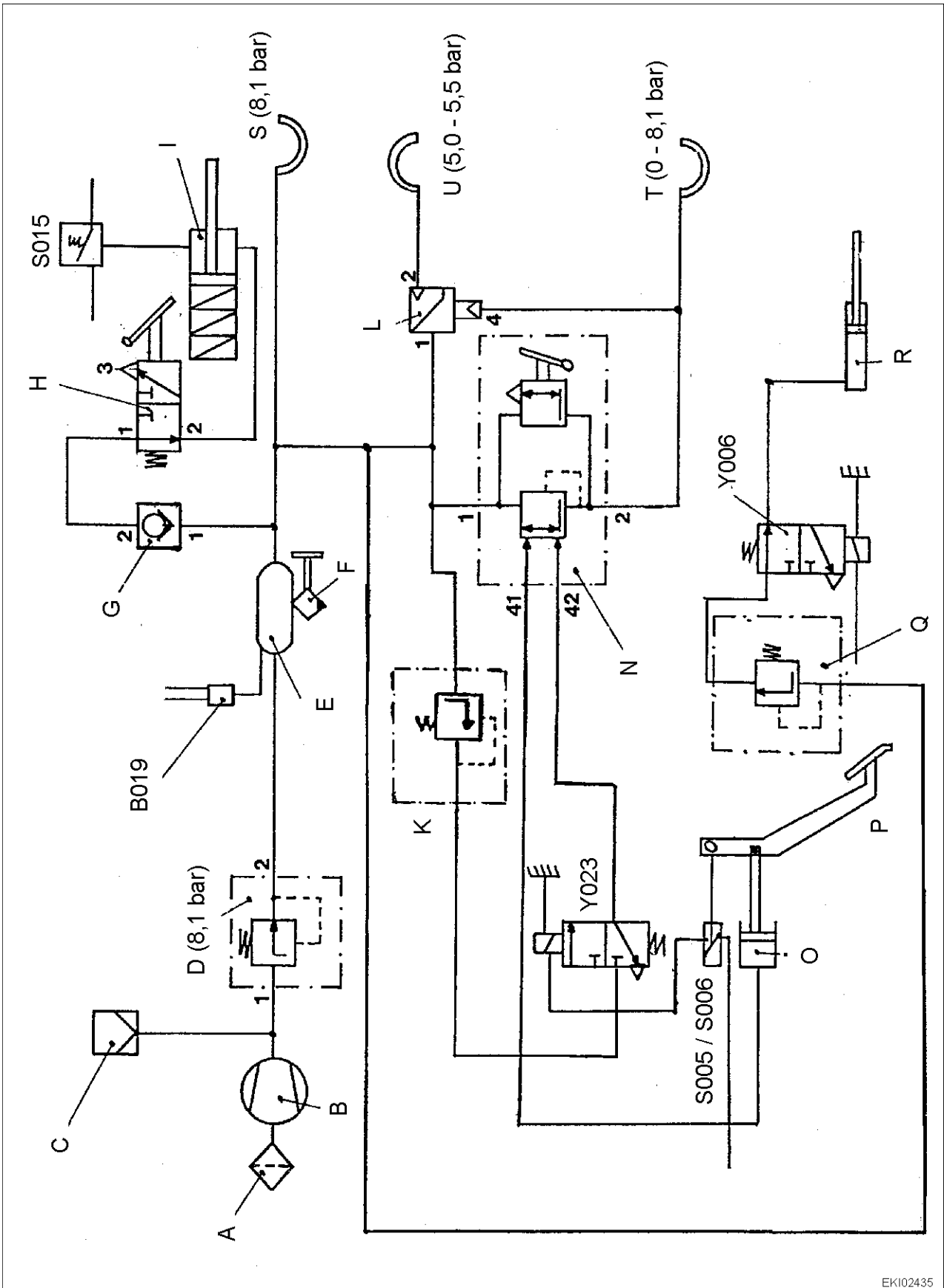
<i>Fav 900</i>	Air compressor / General system <b>Air compressor plan</b>	<b>C</b>
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Fav 900

Air compressor / General system  
Air compressor plan

C



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Date	Version	Page	Capitel	Index	Docu-No.
19.10.2001	a	2/3	8800	C	000001

<b>Fav 900</b>	<b>Air compressor / General system</b> <b>Air compressor plan</b>	<b>C</b>
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Item	Designation	Item	Designation
A	Air filter	Y023	3-way directional control valve (pilot valve)
B	Compressor	N	Trailer control valve
C	Antifreeze pump	S005	Switch, right brake
D	Pressure regulator 8.1 bar	S006	Switch, left brake
E	Air tank Standard: two tanks (each 10 l) connected in parallel Optional extra: four tanks (each 10 l) connected in parallel	O	Service brake
		P	Brake pedal
		Q	Spill valve
F	Drain valve	Y006	Valve, exhaust brake
B019	Pressure sensor, compressed air	R	Exhaust brake
G	Non-return valve	S	Coupling head, red 8.1 bar (storage tank)
H	Handbrake valve		
I	Accumulator (handbrake)	T	Coupling head, yellow 0 - 8.1 bar (brake)
S015	Switch, handbrake		
K	Pressure regulator, advance control	U	Coupling head, black 5.0 - 5.5 bar (single-line brake)
L	Trailer control valve (single-line brake)		

**Note:****Chapter 8800 Reg. B - Troubleshooting flowchart, compressed air****Chapter 8800 Reg. D - Position of components, air compressor****Chapter 8800 Reg. E - Overview of air compressors****Chapter 8800 Reg. E - Checking dual-line brake system in tractor****Chapter 8800 Reg. E - Checking single-line brake system in tractor****Chapter 8820 Reg. F - Setting pressure regulator (8.1 bar)****Chapter 8820 Reg. F - Trailer control valve (single-line)**

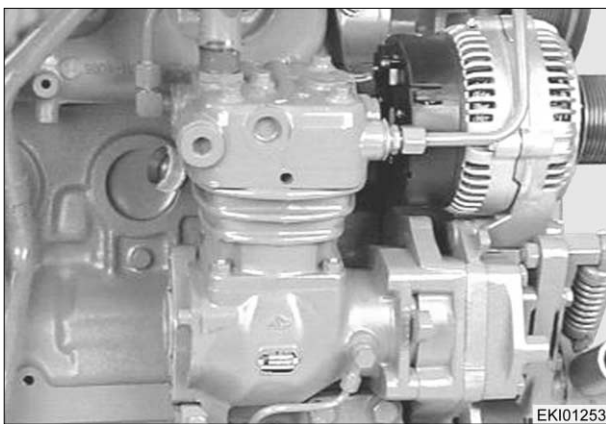
Date	Version	Page	Air compressor plan	Capitel	Index	Docu-No.
19.10.2001	a	3/3		8800	C	000001

<b>Fav 900</b>	<b>Air compressor / General system</b> <b>Position of components, air compressor</b>	<b>D</b>
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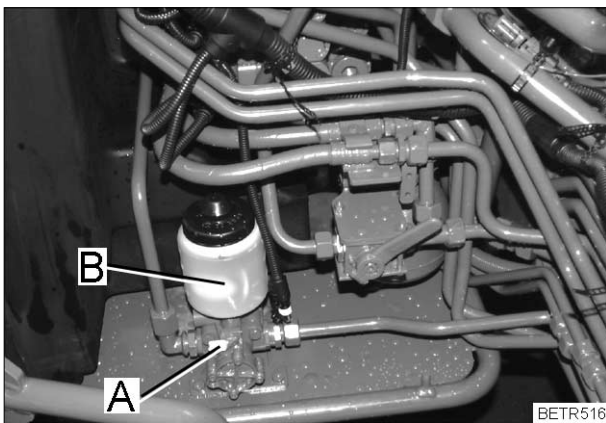
**Air filter**

On engine bulkhead



**Compressor**

Right side of engine



**Antifreeze pump**

**When there is a risk of frost**

- Move lever of antifreeze pump (A) to I = open.
- Fill antifreeze tank (B) with ethyl alcohol (X 902.015.003).

**At end of winter operation**

- Move lever to 0 = closed.

Remove panel at right entrance step.



**Pressure regulator (8.1 bar)**

Right side of tractor



Date	Version	Page	Position of components, air compressor	Capitel	Index	Docu-No.
08.11.2001	a	1/5		8800	D	000002

<b>Fav 900</b>	<b>Air compressor / General system</b> <b>Position of components, air compressor</b>	<b>D</b>
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**Air tank and drain valve**

Standard: 2 air tanks (20 l)

Optional extra: 4 air tanks (40 l)

Left and right sides of tractor

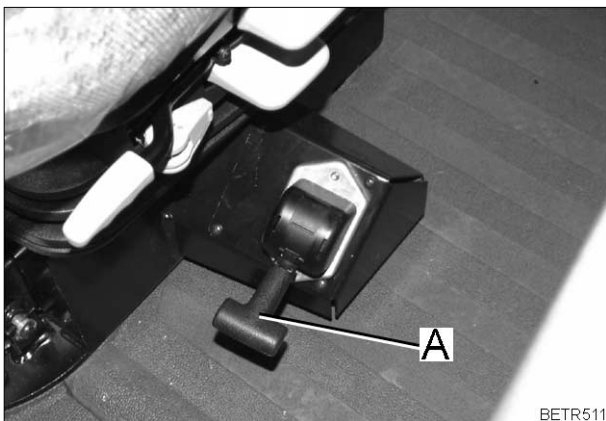


**Spill valve (to exhaust brake)**

On left air tank

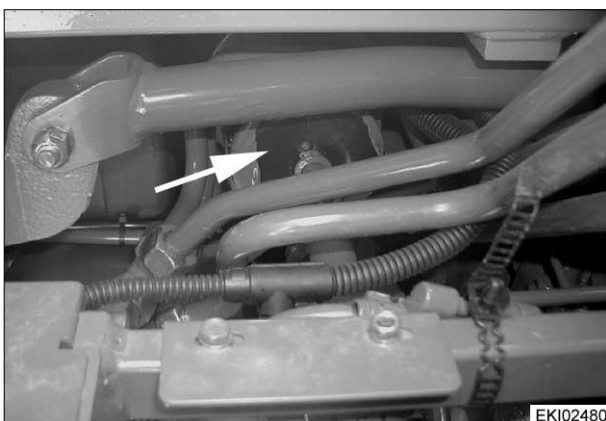


Remove guard.



**Pneumatic handbrake valve**

On left in cab



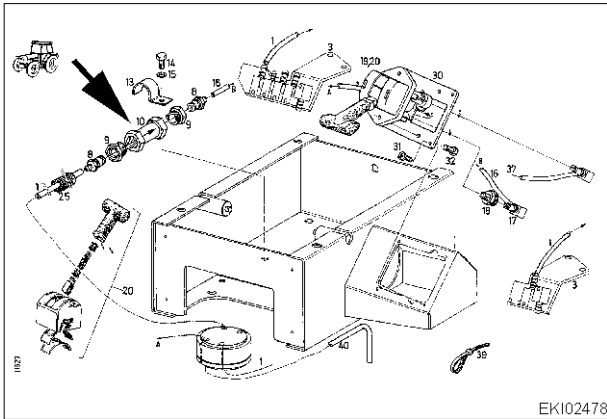
**Accumulator (handbrake)**

On left at rear of tractor



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<p><b>Fav 900</b></p>	<p align="center"><b>Air compressor / General system</b> <b>Position of components, air compressor</b></p>	<p align="center"><b>D</b></p>
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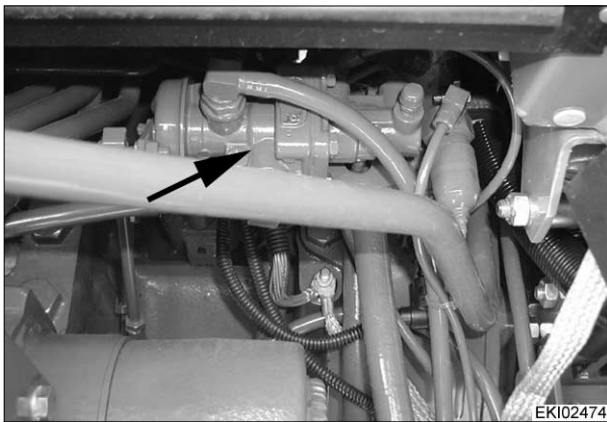


**Non-return valve (note fitting direction of non-return valve)**

In cab under seat bracket

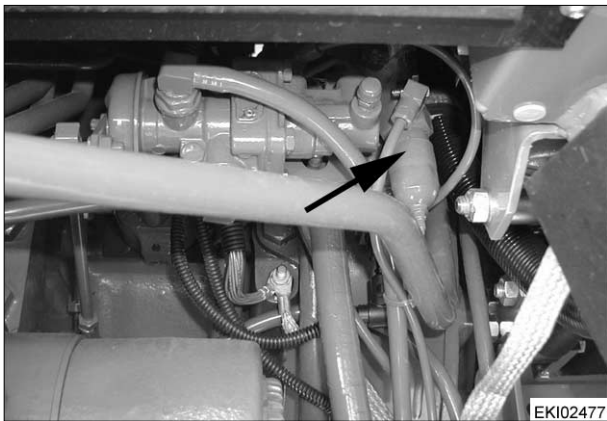


Remove panel.



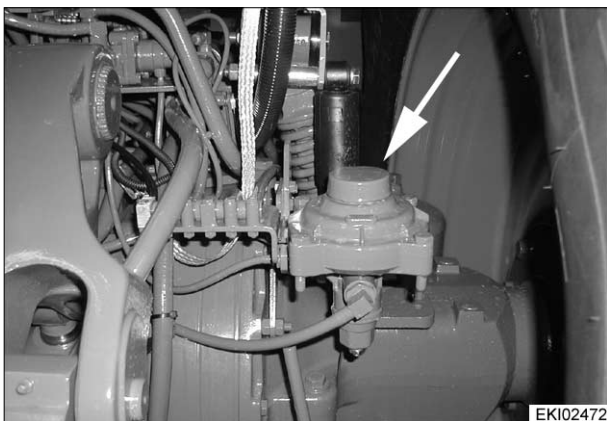
**Trailer control valve (dual-line brake)**

On right at rear of tractor



**Pressure regulator (advance control)**

On right at rear of tractor



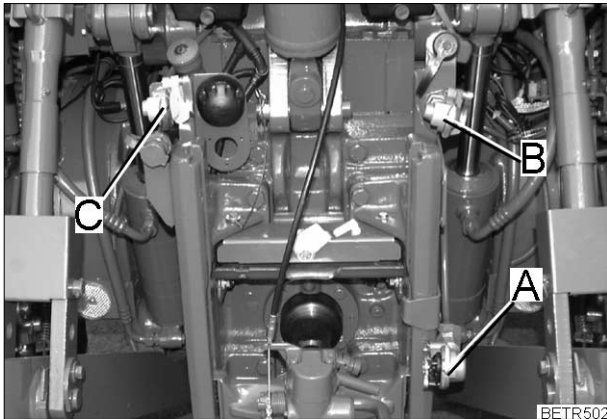
**Trailer control valve (single-line brake)**

On right at rear of tractor

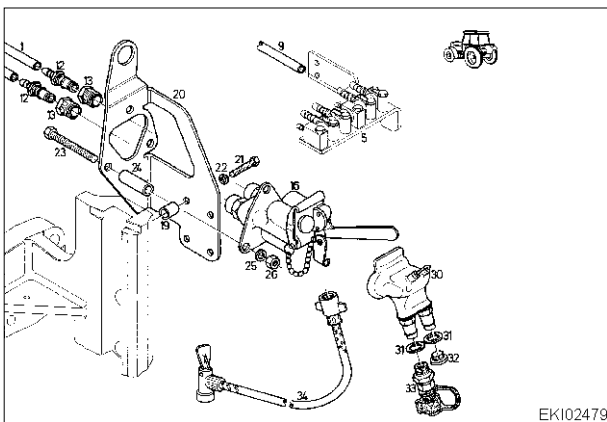


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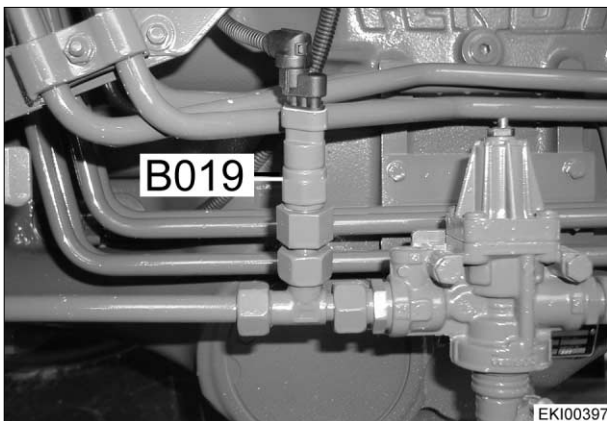
<b>Fav 900</b>	<b>Air compressor / General system</b> <b>Position of components, air compressor</b>	<b>D</b>
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- A = Coupling head (black), single-line brake system connection
- B = Coupling head (red), dual-line system, storage tank
- C = Coupling head (yellow), dual-line system, brakes

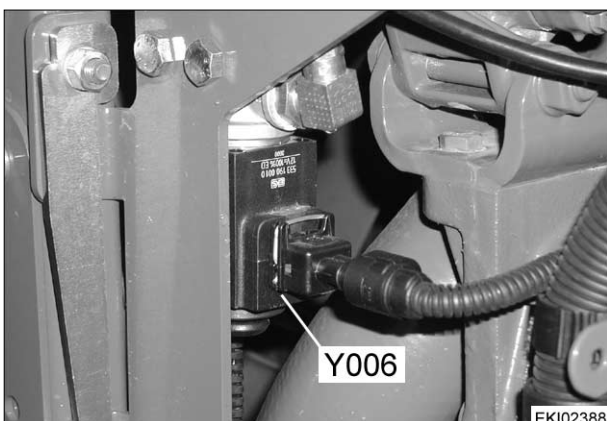


**Coupling head (Italy)**



**B019 - pressure sensor, compressed air**

**Note:**  
Chapter 9000 Reg. E - Measuring and testing  
Right side of tractor



**Y006 - valve, exhaust brake**

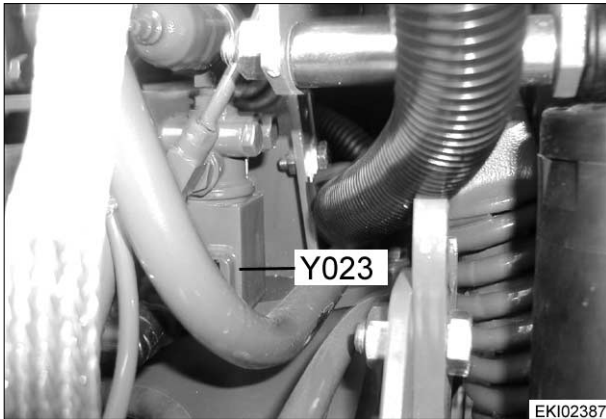
Front left on radiator



Date	Version	Page	<b>Position of components, air compressor</b>	Capitel	Index	Docu-No.
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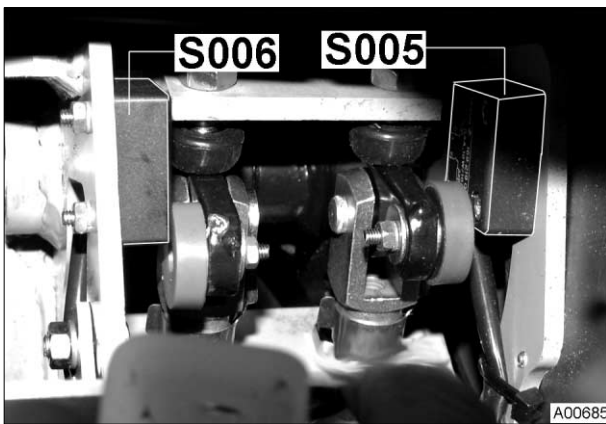
Fav 900	Air compressor / General system Position of components, air compressor	D
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**Y023 - 3-way directional control valve (pilot valve)**

**Note:**  
Chapter 9000 Reg. E - Measuring and testing

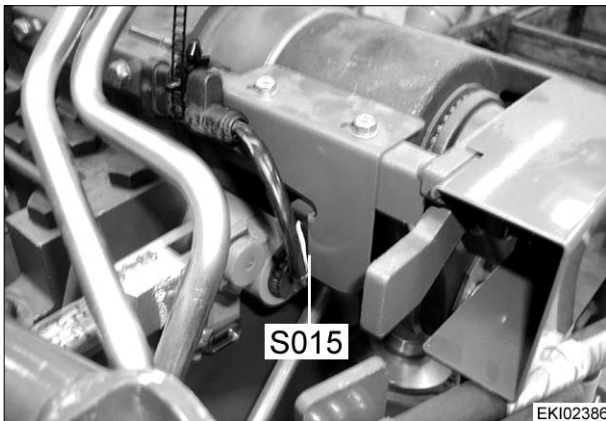
On right at rear of tractor



**S005 / S006 - switch, brake**

**Note:**  
Chapter 9000 Reg. E - Measuring and testing  
Chapter 1070 Reg. E - Setting magnet for solenoid switch S005/S006

At top of steering column



**S015 - handbrake switch**

**Note:**  
Chapter 9000 Reg. E - Measuring and testing  
Vario transmission goes to "Neutral" when handbrake is operated

On left at rear of tractor



**Note:**  
Chapter 8800 Reg. C - Air compressor plan  
Chapter 8800 Reg. E - Overview of air compressors  
Chapter 8800 Reg. E - Checking dual-line brake system in tractor  
Chapter 8800 Reg. E - Checking single-line brake system in tractor  
Chapter 8820 Reg. F - Setting pressure regulator (8.1 bar)  
Chapter 8820 Reg. F - Trailer control valve (single-line)

Date	Version	Page	Position of components, air compressor	Capitel	Index	Docu-No.
08.11.2001	a	5/5		8800	D	000002

Farmer 400 Fav 700 Fav 900	Air compressor / General system <b>Overview of air compressors</b>	<b>E</b>
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## Overview of air compressors

Model	Cubic capacity [ccm]	Tank pressure [bar]	Tank volume [l]
Farmer 400	159	8.1	15
Fav 700	229	8.1	20
Fav 900	213	8.1	20 (optional extra 40 l)

## Filling times (at rated speed)

Operating pressure [bar]	Cubic capacity [ccm]	Tank volume [l]	Time [sec]
8.1	159	15	approx. 30
8.1	229 (Fav 700)	20	approx. 30
8.1	213 (Fav 900)	20	approx. 35

## 13. Performance test and checking for leaks

### Venting pressure

Pressure regulator must vent at approx. 8.1 bar (8 bars on LCD display).

In event of discrepancies, adjust pressure regulator on air tank.

### Tightness against leaks

Weekly checks with engine off:

Pressure drop with full system may not exceed 0.5 bar in 2 hours.

### Check trailer advance-braking control system.

- Fill air compressor until pressure regulator vents
- With footbrake not actuated and handbrake released, yellow coupling head must be unpressurised.
- After 20 mm footbrake pedal travel there must be pressure of 0.5 - 1 bar acting on yellow coupling head.

In event of discrepancies, adjust solenoid switch (S005 / S006) on footbrake pedal (see Favorit 700 Workshop Manual, Chapter 1070 Reg. F).

### Check trailer control line (single-line system).

- With brake released, pressure at black coupling head must be 5.1 - 5.5.
- When footbrake or handbrake is actuated, pressure must drop to 0 bar.

Setting at trailer control valve (single-line system)

### Setting handbrake

- Set such that there is no pressure at yellow coupling head with handbrake released.
- With 50% handbrake handle travel, pressure should rise to 7.0 - 7.8 bar.

Setting at linkage between trailer control valve (dual-line system) and brake cylinder.

Date	Version	Page	Capitel	Index	Docu-No.
29.10.2001	a	1/2	8800	E	000001

<i>Farmer 400</i> <i>Fav 700</i> <i>Fav 900</i>	Air compressor / General system <b>Overview of air compressors</b>	<b>E</b>
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## Test pressures in bar

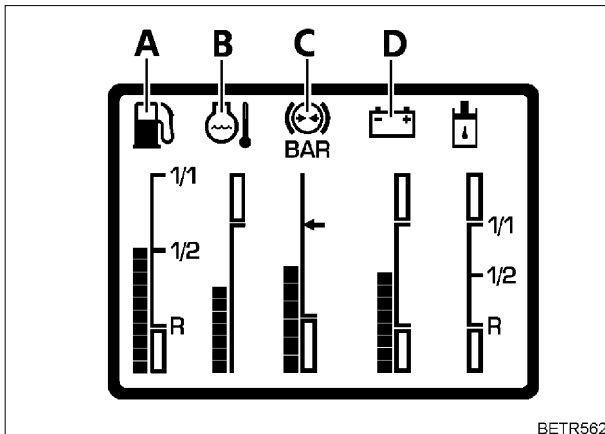
Brake not actuated	Brake actuated approx. 20 mm	Brake fully actuated	Connection
8.1	7.8 - 8.1	7.0 - 8.0	Red (A Italian version)
5.1 - 5.5	3.9 - 4.5	0	Black
0	0.5 - 1.0	7.0 - 7.8	Yellow (M Italian version)

Date	Version	Page	Overview of air compressors	Capitel	Index	Docu-No.
29.10.2001	a	2/2		8800	E	000001

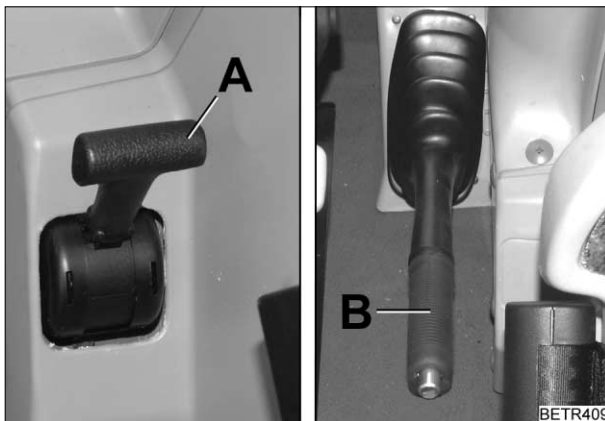
All types

Air compressor / General system  
**Checking single-line brake system in tractor**

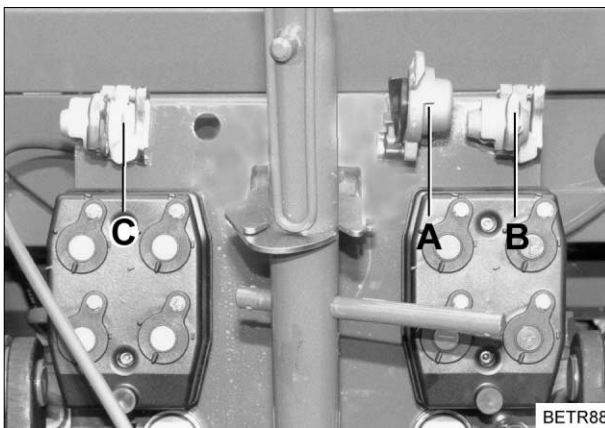
**E**



**C** = Compressed-air volume  
 Fill air compressor until cut-out pressure is reached.



**A** = Pneumatic handbrake  
**B** = Mechanical handbrake (optional extra)  
 Release handbrake.



**A** = Coupling head (black), single-line brake system connection  
**B** = Coupling head (red), dual-line system, storage tank  
**C** = Coupling head (yellow), dual-line system, brakes  
 Connect test pressure gauge to coupling head (black).  
**Target value: 5.0 - 5.5 bar**

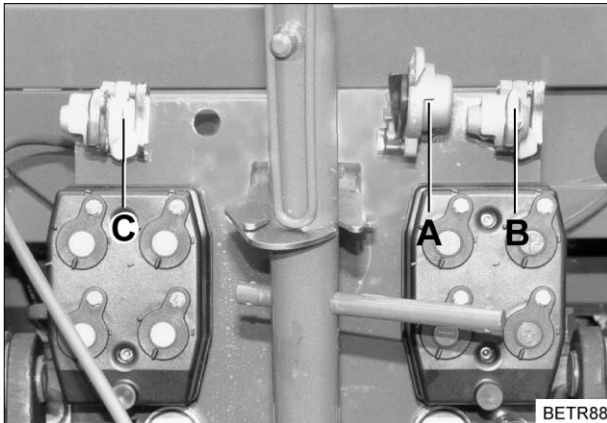


Actuate footbrake.

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All types

Air compressor / General system  
**Checking single-line brake system in tractor**

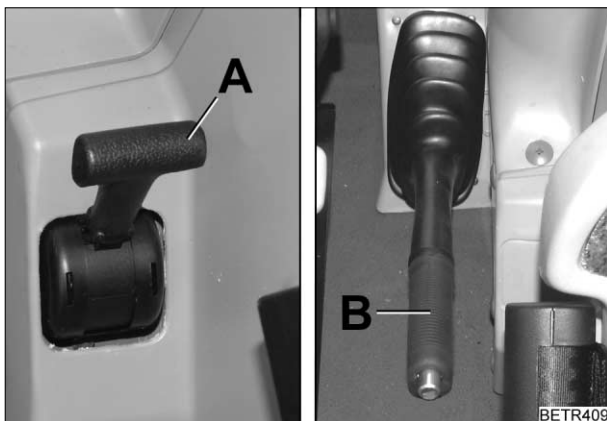
**E**

Note pressure drop while operating carefully until brake pedal is fully depressed.

- Partial braking of 1.0 bar (measurable at yellow coupling head). Pressure drop at black coupling head of 1.3 - 2.5 bar
- Full braking. Pressure at black coupling head, target value: 0 bar



Release footbrake again.



Actuate handbrake

Pressure at black coupling head, target value: 0 bar

**Note:**

Chapter 8800 Reg. B - Troubleshooting flowchart, air compressor

Chapter 8800 Reg. C - Air compressor plan

Chapter 8800 Reg. E - Overview of air compressors

Chapter 8820 Reg. F - Setting pressure regulator (8.1 bar)

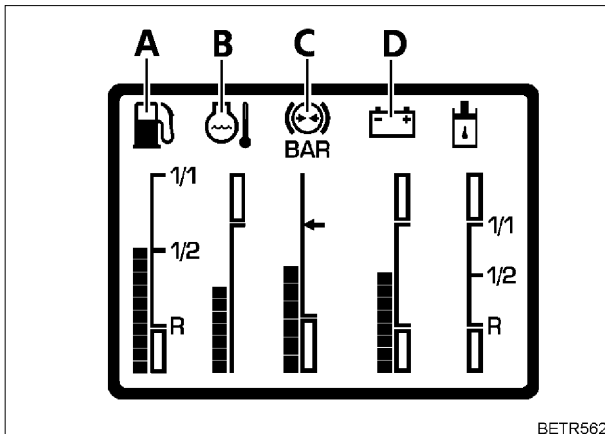
Chapter 8820 Reg. F - Trailer control valve (single-line)

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06.11.2001	a	2/2	8800	E	000002

All types

Air compressor / General system  
**Checking dual-line brake system in tractor**

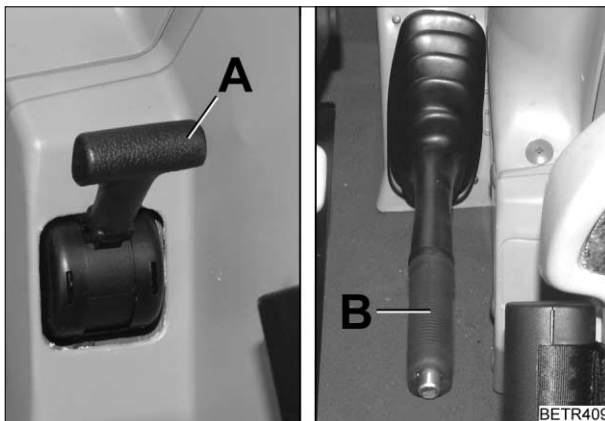
**E**



BETR562

**C** = Compressed-air volume

Fill air compressor until cut-out pressure is reached.

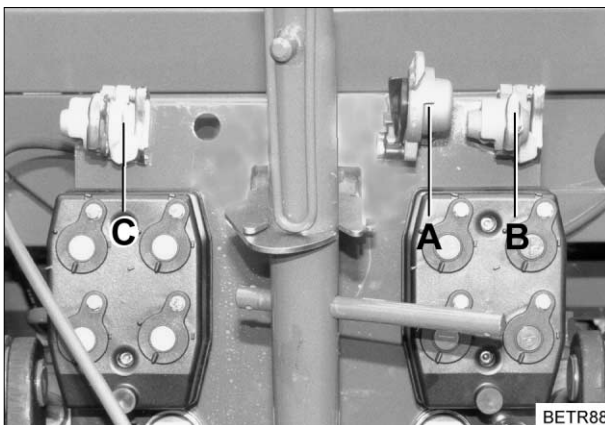


BETR409

**A** = Pneumatic handbrake

**B** = Mechanical handbrake (optional extra)

Release handbrake.



BETR88

**A** = Coupling head (black), single-line brake system connection

**B** = Coupling head (red), dual-line system, storage tank

**C** = Coupling head (yellow), dual-line system, brakes

Connect test pressure gauge to coupling head (yellow).

**Target value: 0 bar**



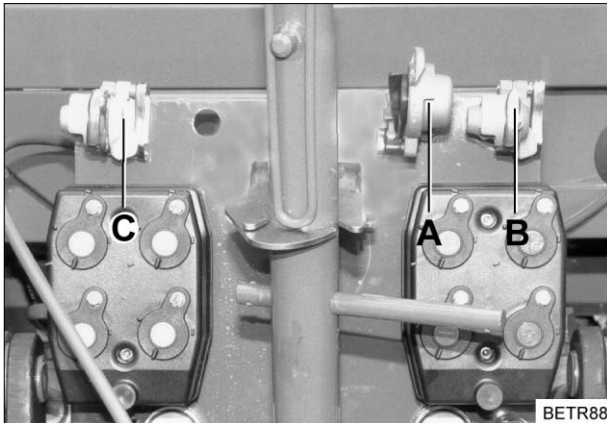
BETR61

Actuate footbrake.

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All types

Air compressor / General system  
**Checking dual-line brake system in tractor**

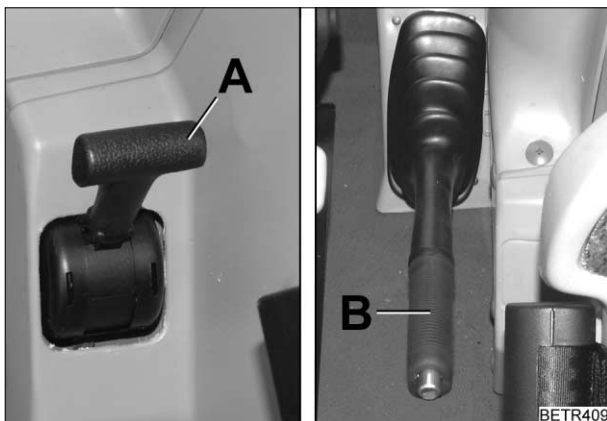
**E**

Note steady pressure increase while operating carefully until brake pedal is fully depressed.

- Full braking. Pressure at yellow coupling head, target value: 7.0 - 8.1 bar



Release footbrake again.



Actuate handbrake.

Pressure at yellow coupling head  
 Rapid pressure rise to 7.0 - 8.1 bar

**Note:**

Chapter 8800 Reg. B - Troubleshooting flowchart, air compressor

Chapter 8800 Reg. C - Air compressor plan

Chapter 8800 Reg. E - Overview of air compressors

Chapter 8820 Reg. F - Setting pressure regulator (8.1 bar)

Chapter 8820 Reg. F - Trailer control valve (single-line)

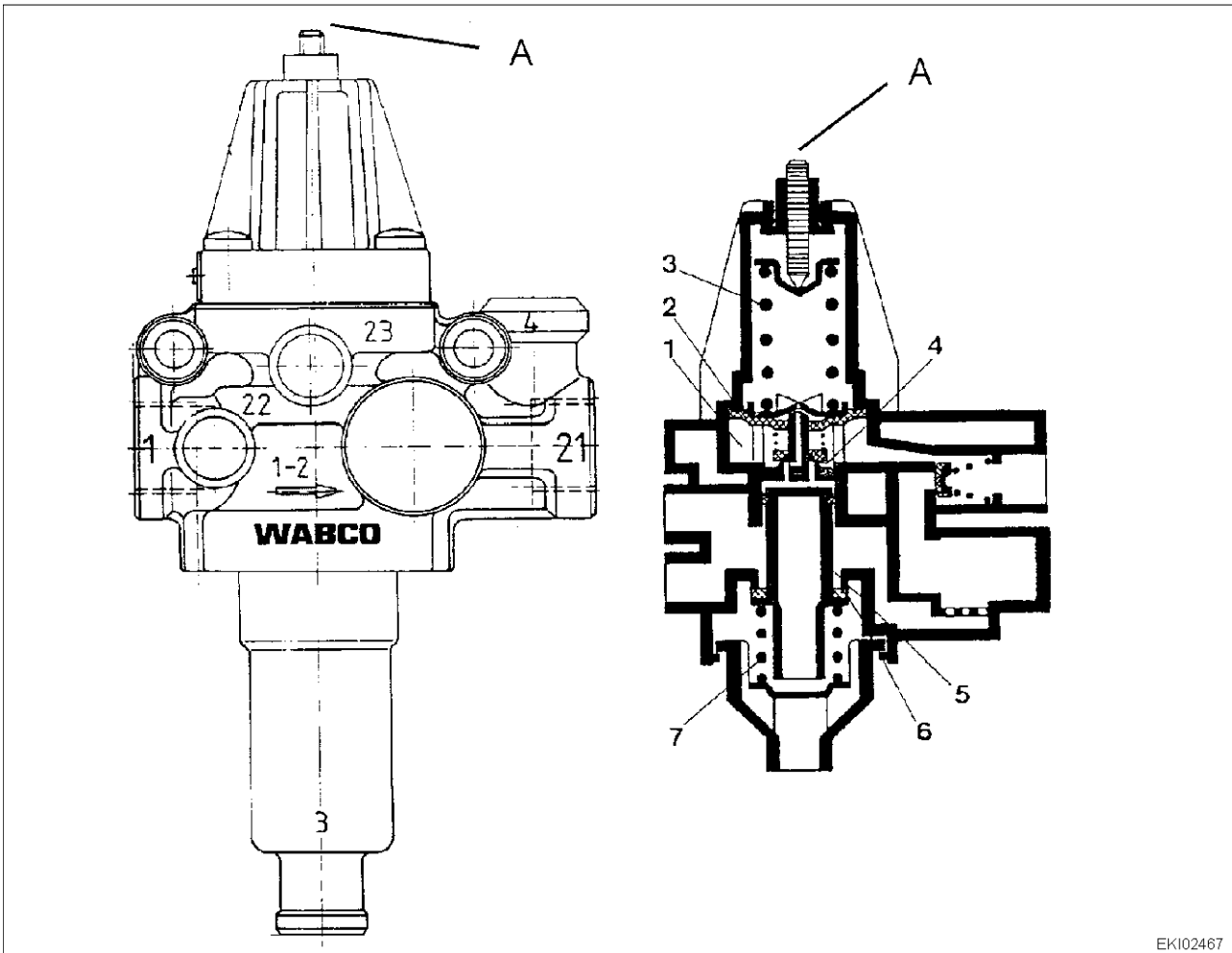
Date	Version	Page	Capitel	Index	Docu-No.
06.11.2001	a	2/2	8800	E	000003

All types	Air compressor / Brake fittings Setting pressure regulator (8.1 bar)	F
-----------	---	---

**Setting pressure regulator (8.1 bar)**

**Warning:**  
The brake system may only be set by a specialist workshop!

**Note:**  
Before adjustment of the pressure regulators, see also:  
Chapter 8800 Reg. B - Troubleshooting flowchart, air compressor



EKI02467

Item	Designation	Item	Designation
A	Stud bolt	4	Inlet seat
1	Chamber	5	Cut-out piston
2	Membrane	6	Outlet seat
3	Regulator spring	7	Spring

Turn stud bolt (A) to left (regulator spring is relaxed). = Pressure is reduced.  
Turn stud bolt (A) to right (regulator spring is tensioned). = Pressure is increased.

Date	Version	Page	Setting pressure regulator (8.1 bar)	Capitel	Index	Docu-No.
06.11.2001	a	1/1		8820	F	000001

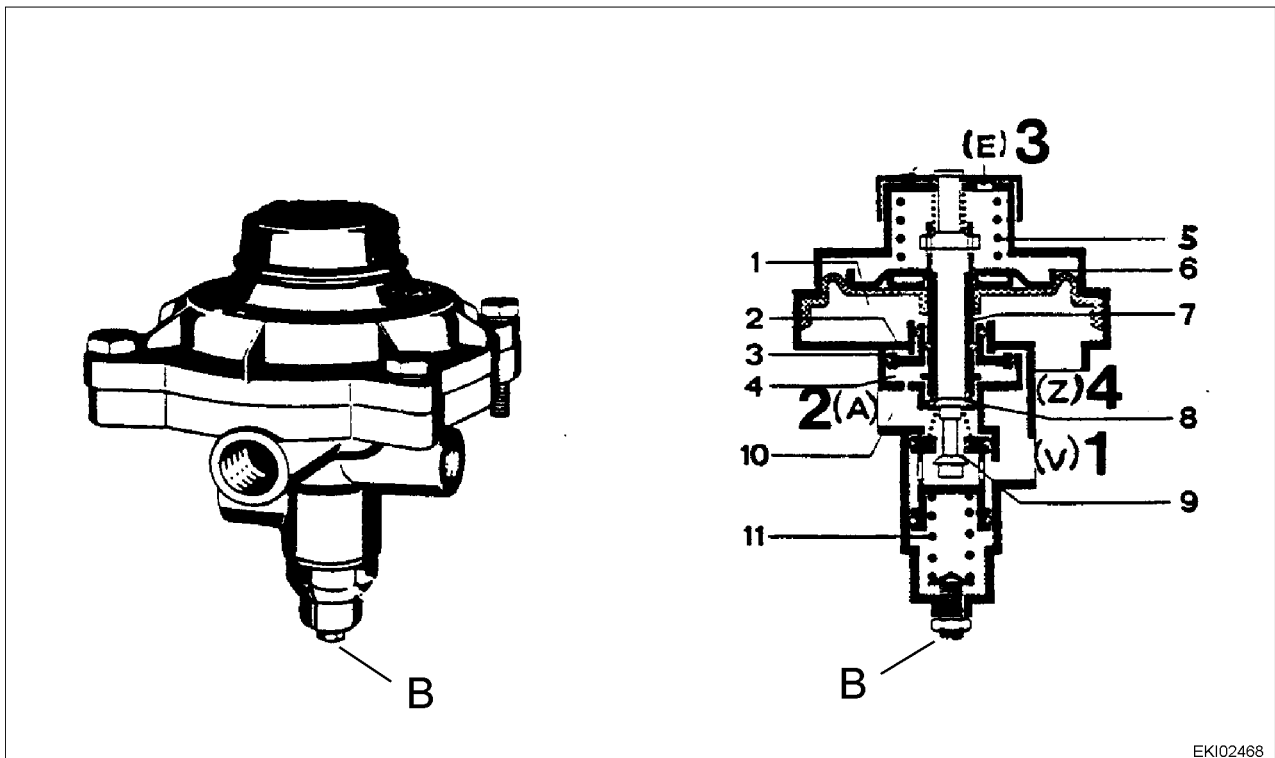


All types	Air compressor / Brake fittings Trailer control valve (single-line)	F
-----------	--	---

**Trailer control valve (single-line brake system) (optional extra)**

**Warning:**  
The brake system may only be set by a specialist workshop!

**Note:**  
Before adjusting trailer control valve (single-line), see also:  
Chapter 8800 Reg. B - Troubleshooting flowchart, air compressor



EKI02468

Item	Designation	Item	Designation
A	Stud bolt	6	Diaphragm piston
1	Chamber	7	Valve sleeve
2	Chamber	8	Outlet (double plug valve)
3	Graduated piston	9	Inlet (double plug valve)
4	Chamber	10	Chamber
5	Compression spring	11	Compression spring

Item	Designation	Item	Designation
1 (V)	Feed (from supply line)	3 (E)	Vent point
2 (A)	Connection to trailer control line (single-line, black)	4 (Z)	Connection of trailer brake line

Turn stud bolt (B) to left (regulator spring is relaxed). = **Pressure is reduced.**  
Turn stud bolt (B) to right (regulator spring is tensioned). = **Pressure is increased.**

Date	Version	Page	Trailer control valve (single-line)	Capitel	Index	Docu-No.
06.11.2001	a	1/2		8820	F	00002

<b>All types</b>	<b>Air compressor / Brake fittings Trailer control valve (single-line)</b>	<b>F</b>
------------------	--	----------

<b>Set pressure with brake not actuated at connection 2(A) ---&gt; 5.0 - 5.5 bar</b>	
<b>Test values</b>	
<b>Regulated pressure at connection 4 (Z)</b>	<b>Pressure at connection 2 (A)</b>
0.4 bar	1.1 - 1.3 bar pressure drop
5.5-6.0 bar	0 bar

**Note:**

Chapter 8800 Reg. C - Air compressor plan

Date	Version	Page	Capitel	Index	Docu-No.
06.11.2001	<b>a</b>	2/2	<b>8820</b>	<b>F</b>	<b>000002</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / General system</b> <b>Labelling of electrical cables and connectors</b>	<b>A</b>
---	---	----------

## Labelling of electrical cables

### Cable label:

<b>Cable label</b>	
<b>For example:</b>	
W	Wire
F	Cable loom
0204	Sequential number
ws	Colour
1	Cross-section (mm <sup>2</sup> )

### Cable looms (selection):

Label	Designation	Cable loom
WR	Wire, chassis	Chassis cable loom
WF	Wire, cab base	Cab base cable loom
WK	Wire, cab	Cab cable loom
WA	Wire, starter	Starter wiring
WWK	Wire , cab wiper	Wiper motor wiring (windscreen)

### Cable colours:

Designation	Cable colour
General	White (ws), black printing
+UB 30 (battery +)	Red (rt)
+UB 15 (switched +)	Black (sw)
+UB 58 (lighting)	Grey (gr), basic colour for lighting
+UB 58 lighting left	Grey/black (gr_sw)
+UB 58 lighting right	Grey/red (gr_rt)
+UB supply to sensor systems	Yellow (ge)
Vehicle earth	Brown (br)
Electronics earth	Brown/white (br_ws)
Sensor system earth	Brown/yellow (br_ge)

## Labelling of connectors

In general the connector name is printed on the cable loom.

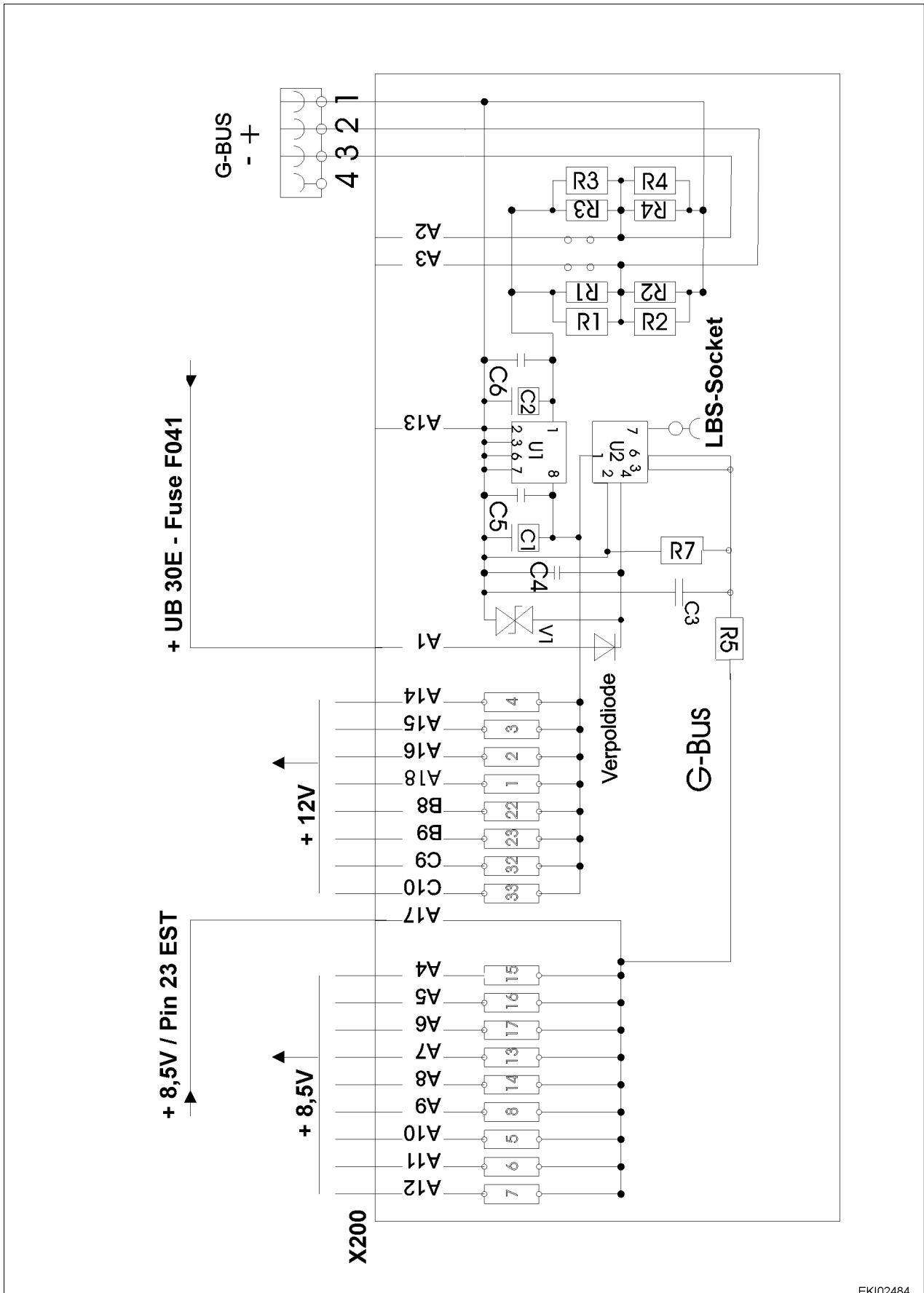
Connector	Designation
X000 - X499	Component connector and cable loom connectors
X500 - X599	Vehicle earthing point
X600 - X899	Connector

Date	Version	Page	Capitel	Index	Docu-No.
05.09.2001	a	1/1	9000	A	000002

Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
A013 - fuse board, detail drawing from X200

A



Date	Version	Page	Capitel	Index	Docu-No.
06/2000	a	1/1	9000	A	000001

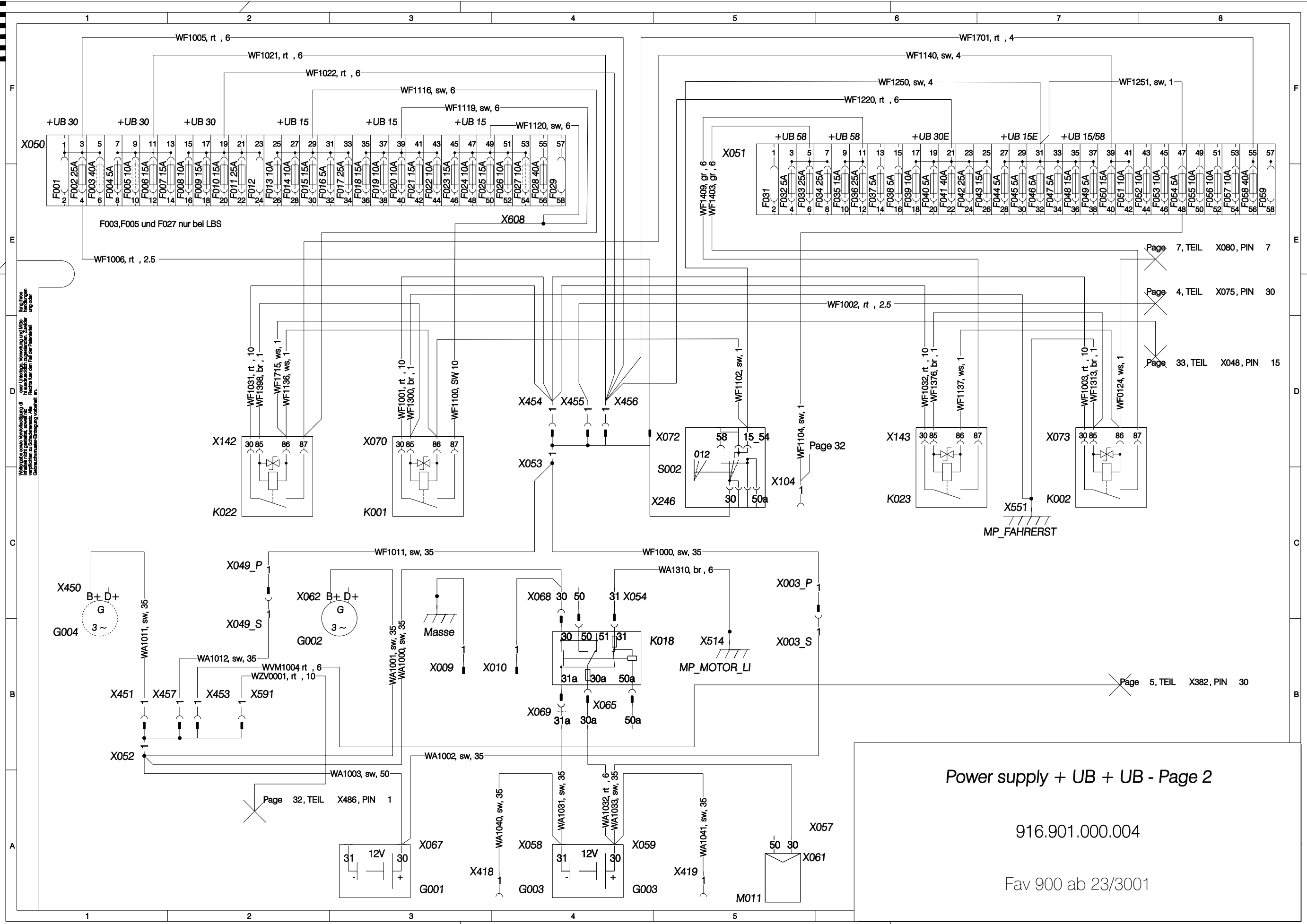
A013 - fuse board, detail drawing from X200

<b>Fav 900</b>	<b>Electrics / General system</b> <b>Circuit diagram overview for Favorit 900</b>	<b>C</b>
----------------	--	----------

## Contents of circuit diagrams

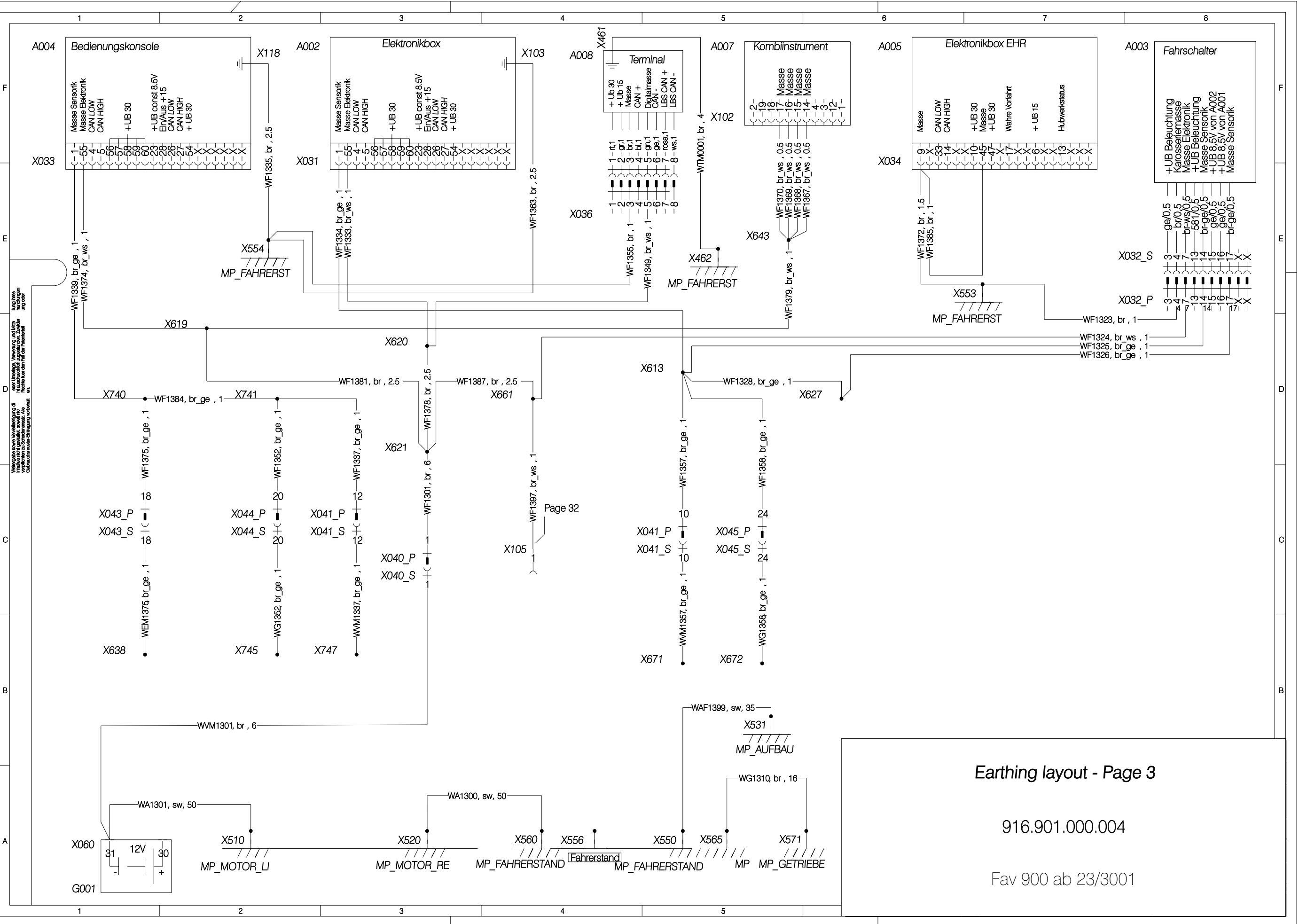
Sheet 2	= Power supply + UB
Sheet 3	= Earthing system
Sheet 4	= Starter control
Sheet 5	= Cold-start system
Sheet 6	= Exhaust brake and engine stop
Sheet 7	= Lighting STVZO (German specifications) plan 1 <b>(EU - version)</b>
Sheet 7	= Lighting plan 1 <b>(NA - version)</b>
Sheet 8	= Lighting with horn STVZO (German specifications) plan 2 <b>(EU - version)</b>
Sheet 9	= Lighting with horn STVZO plan 2 <b>(NA - version)</b>
Sheet 9	= Indicators <b>(EU - version)</b>
Sheet 9	= Indicators <b>(NA - version)</b>
Sheet 10	= Brake lights, compressed-air advance control system
Sheet 11	= Wipers and revolving signal light
Sheet 12	= Front working lights, EPC light
Sheet 13	= Rear working lights
Sheet 14	= Lighting, cab and radio <b>(EU - version)</b>
Sheet 14	= Lighting, cab and radio <b>(NA - version)</b>
Sheet 15	= Ventilation and air-conditioning
Sheet 16	= Heater
Sheet 17	= Heated rear window, electric mirrors
Sheet 18	= Socket and open line couplings <b>(EU - version)</b>
Sheet 18	= Socket and open line couplings <b>(NA - version)</b>
Sheet 19	= Implement socket, event counter socket
Sheet 20	= Power supply to electronic systems
Sheet 21	= Enhanced control bus (K-bus)
Sheet 22	= Instrument panel
Sheet 23	= Electrohydraulic power lift control
Sheet 24	= Electric valves 1 (+UB valves, valve bus, hydraulics monitoring system)
Sheet 25	= Spool valves 2 (front power lift, 3rd hydraulic circuit, valve operation)
Sheet 26	= Transmission bus (G-bus)
Sheet 27	= Transmission control unit
Sheet 28	= Transmission emergency control
Sheet 29	= Suspension
Sheet 30	= PTO <b>(EU - version)</b>
Sheet 30	= PTO <b>(NA - version)</b>
Sheet 31	= 4WD and diff. lock
Sheet 32	= LBS (agricultural bus system)
Sheet 33	= EDC control unit

Date	Version	Page	Capitel	Index	Docu-No.	
12/2000	<b>b</b>	1/1	<b>Circuit diagram overview for Favorit 900</b>	<b>9000</b>	<b>C</b>	<b>000034</b>



Power supply + UB + UB - Page 2

916.901.000.004  
Fav 900 ab 23/3001



Alle Daten sind ohne Gewähr. Die Firma ist nicht verantwortlich für Schäden an den Fahrzeugen. Die Firma ist nicht verantwortlich für Schäden an den Fahrzeugen. Die Firma ist nicht verantwortlich für Schäden an den Fahrzeugen.

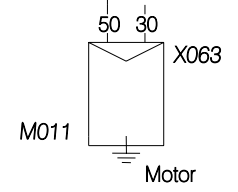
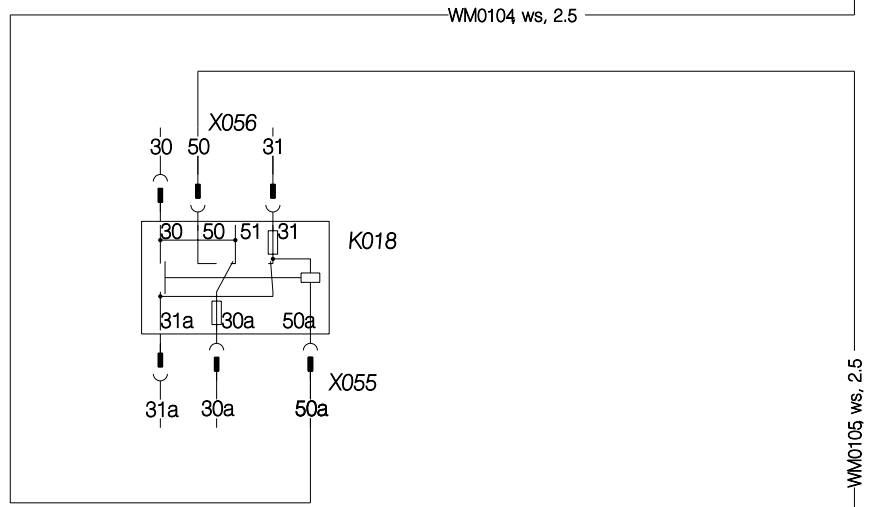
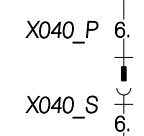
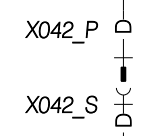
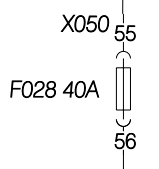
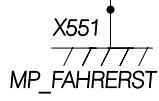
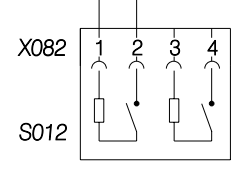
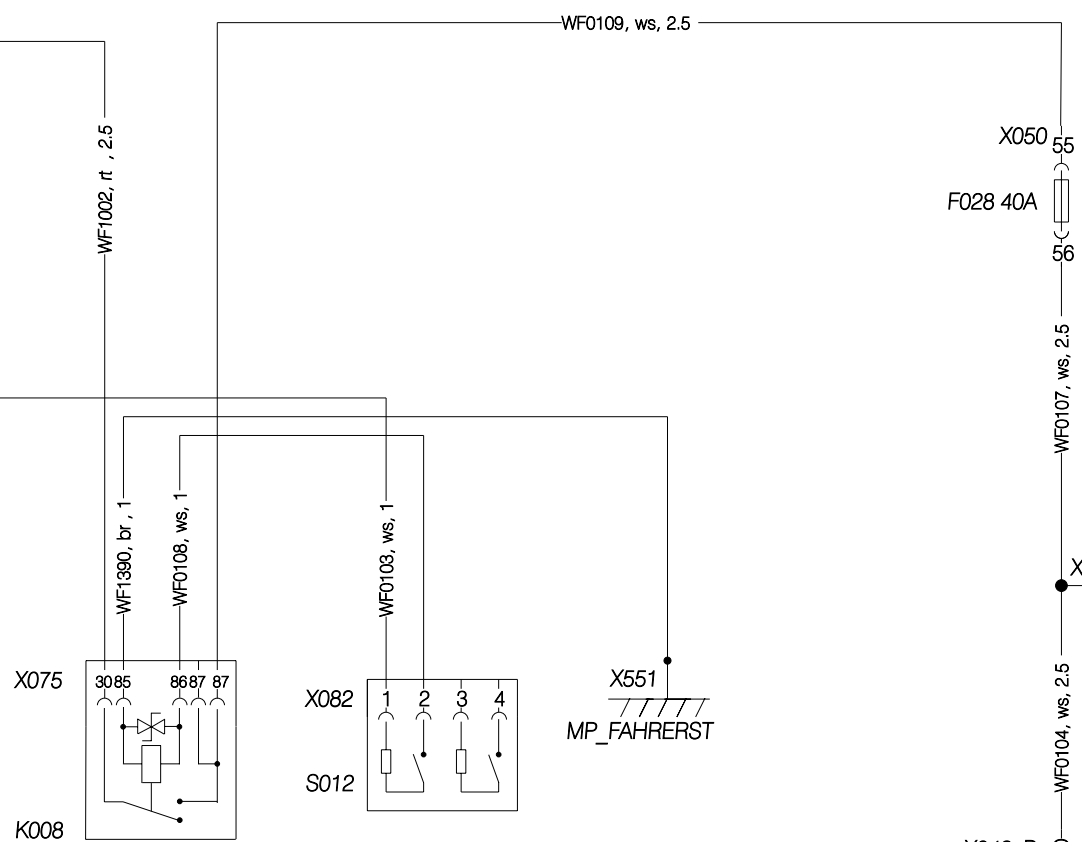
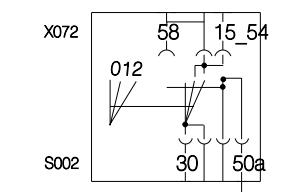
Page 32

Earthing layout - Page 3

916.901.000.004

Fav 900 ab 23/3001

Page 2, TEIL X455, PIN 1



Page 5, TEIL X081, PIN K

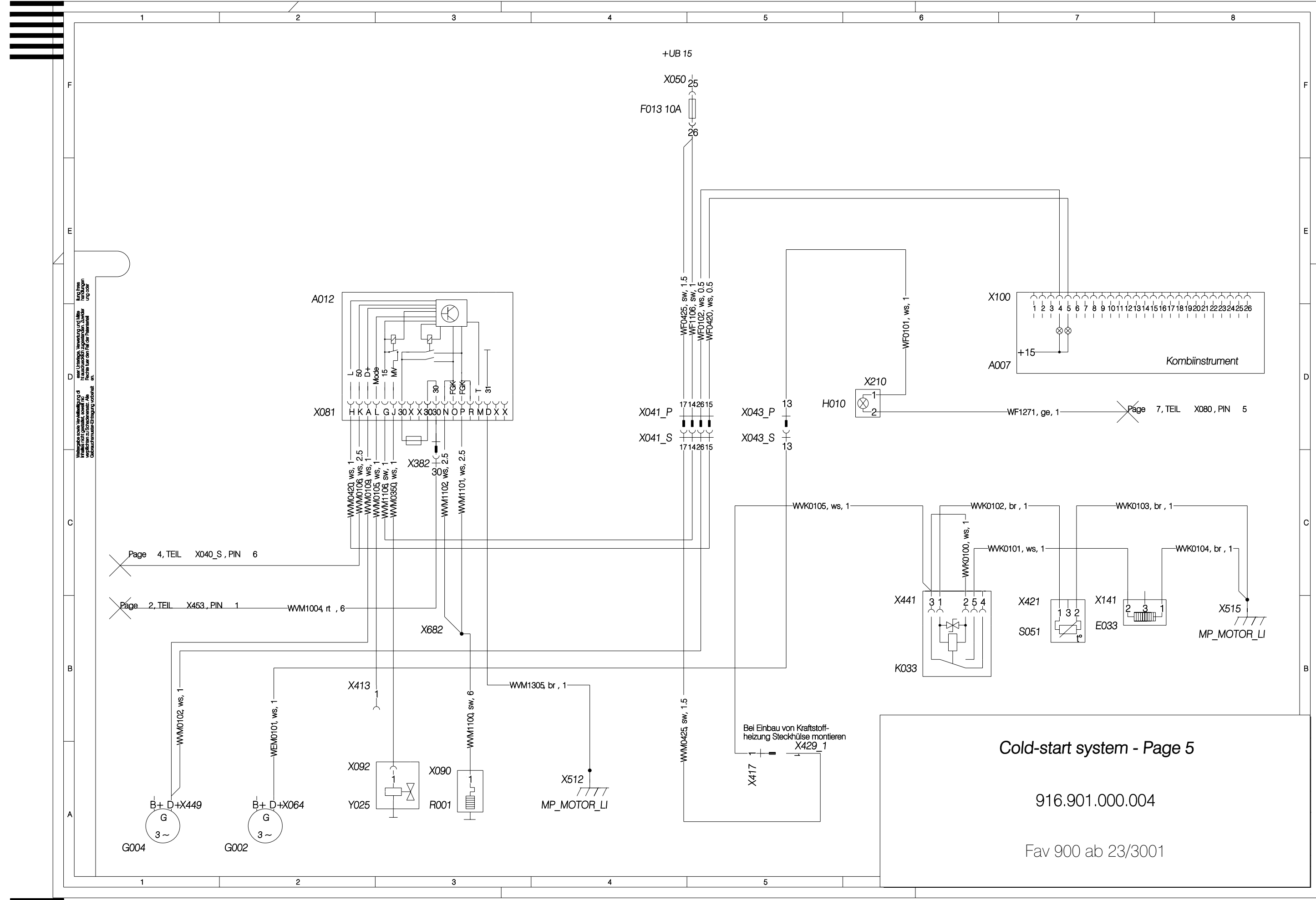
**Starter control - Page 4**

916.901.000.004

Fav 900 ab 23/3001

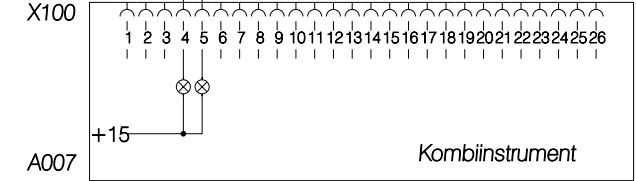
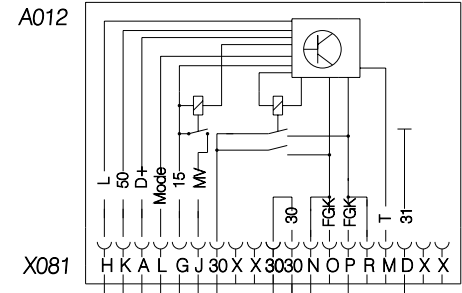
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+UB 15

X050 25  
F013 10A 26



Page 7, TEIL X080, PIN 5

Page 4, TEIL X040\_S, PIN 6

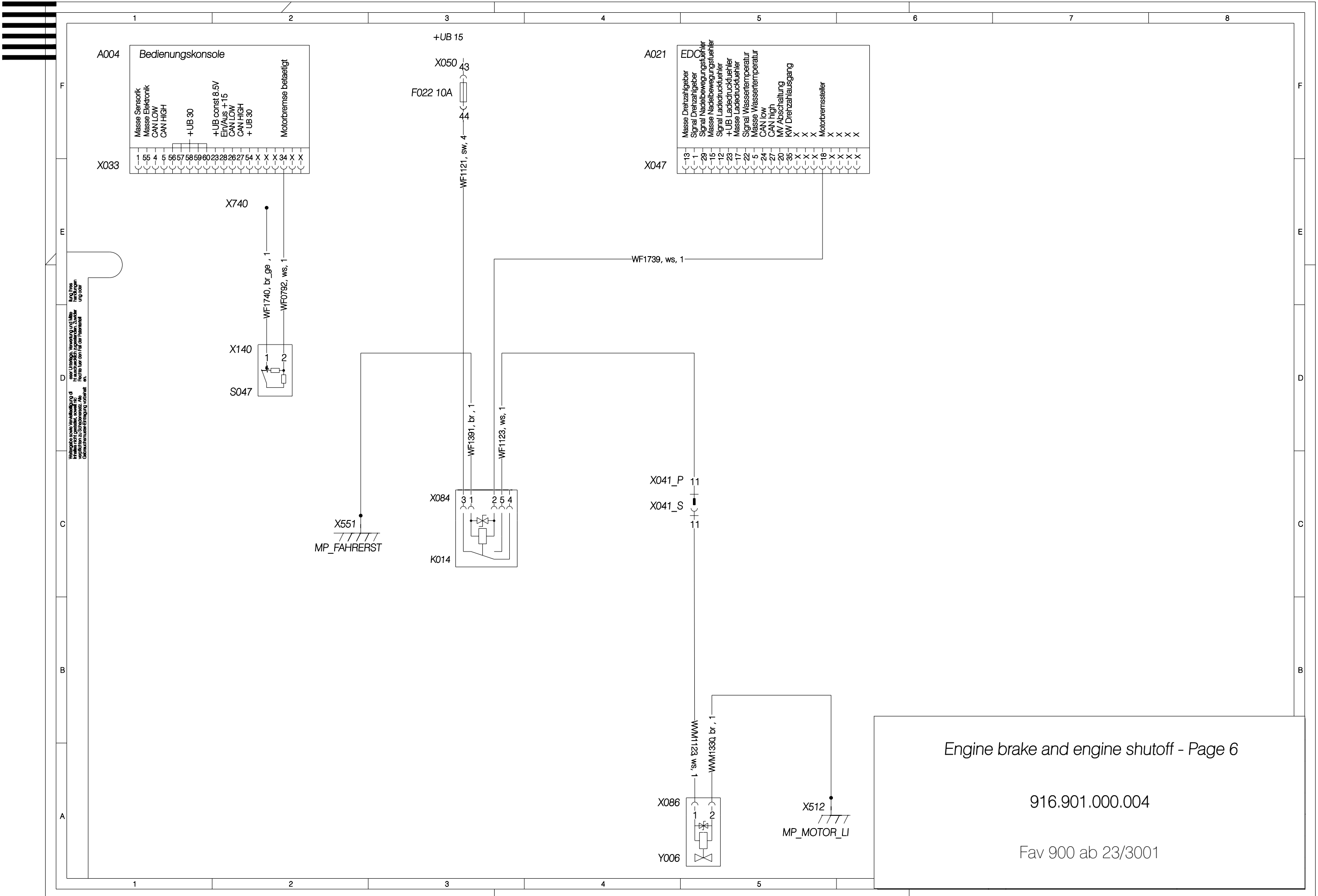
Page 2, TEIL X453, PIN 1

Bei Einbau von Kraftstoff-  
heizung Steckhülse montieren  
X429 1

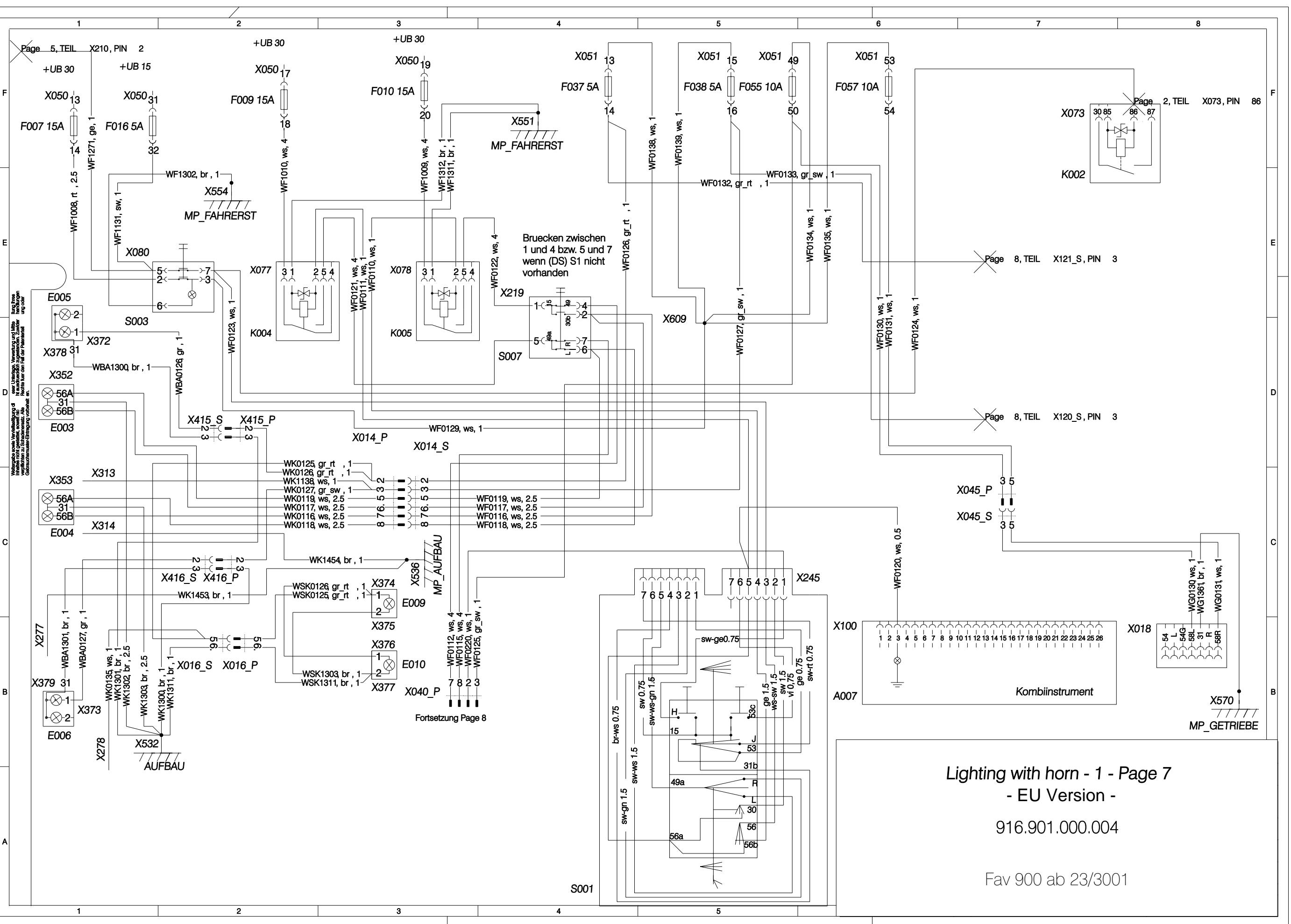
Cold-start system - Page 5

916.901.000.004

Fav 900 ab 23/3001



Vorarbeiten sind vorzubereiten und die  
 Freigabe des Werkstücks ist  
 freigegeben. Die Freigabe ist  
 durch den Techniker zu bestätigen.  
 Die Freigabe ist durch den Techniker  
 zu bestätigen.

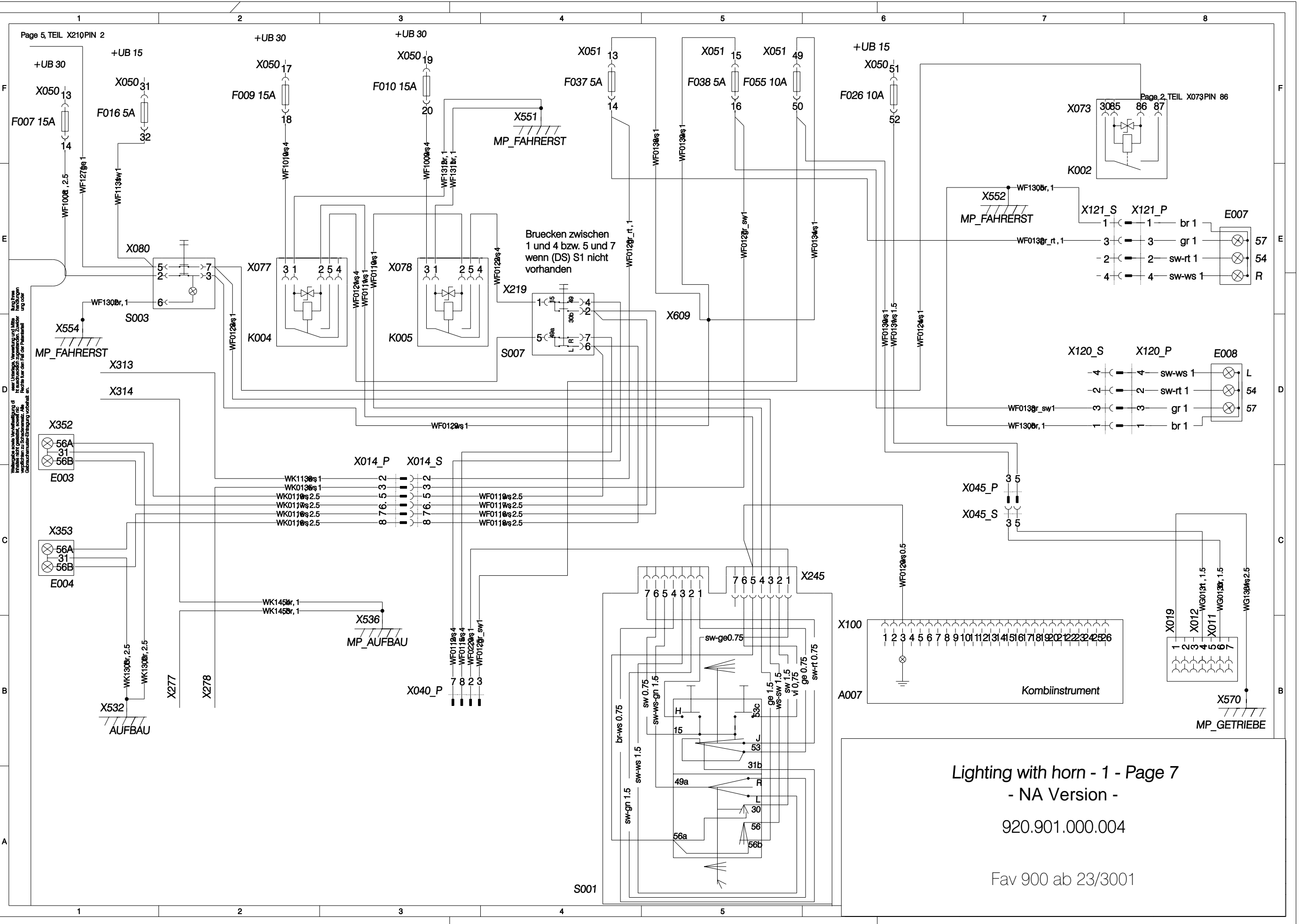


Page 5, TEIL  
 +UB 30  
 +UB 15  
 X210, PIN 2  
 X050 13  
 F007 15A  
 X050 31  
 F016 5A  
 X050 17  
 F009 15A  
 X050 18  
 F010 15A  
 X051 13  
 F037 5A  
 X051 15  
 F038 5A  
 X051 49  
 F055 10A  
 X051 53  
 F057 10A  
 X073 30 85 86 87  
 K002  
 X554  
 MP\_FAHREERST  
 X551  
 MP\_FAHREERST  
 X080  
 X077 3 1 2 5 4  
 X078 3 1 2 5 4  
 X219 1 2 3 4 5 6 7  
 S003  
 X372  
 X378 31  
 X352 56A 31 56B  
 E003  
 X415\_S X415\_P  
 X014\_P X014\_S  
 X313 X314  
 E004 56A 31 56B  
 X277  
 X379 31  
 X373  
 E006  
 X278  
 X532  
 AUFBAU  
 X536  
 MP\_AUFBAU  
 X374 X375 X376 X377  
 E009 E010  
 X040\_P  
 X245 7 6 5 4 3 2 1 7 6 5 4 3 2 1  
 X100 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26  
 A007  
 Kombiinstrument  
 X018 54 L 54G 56L 31 R 56R  
 X570  
 MP\_GETRIEBE  
 Page 8, TEIL X121\_S, PIN 3  
 Page 8, TEIL X120\_S, PIN 3  
 Page 2, TEIL X073, PIN 86

Fortsetzung Page 8

Lighting with horn - 1 - Page 7  
 - EU Version -  
 916.901.000.004

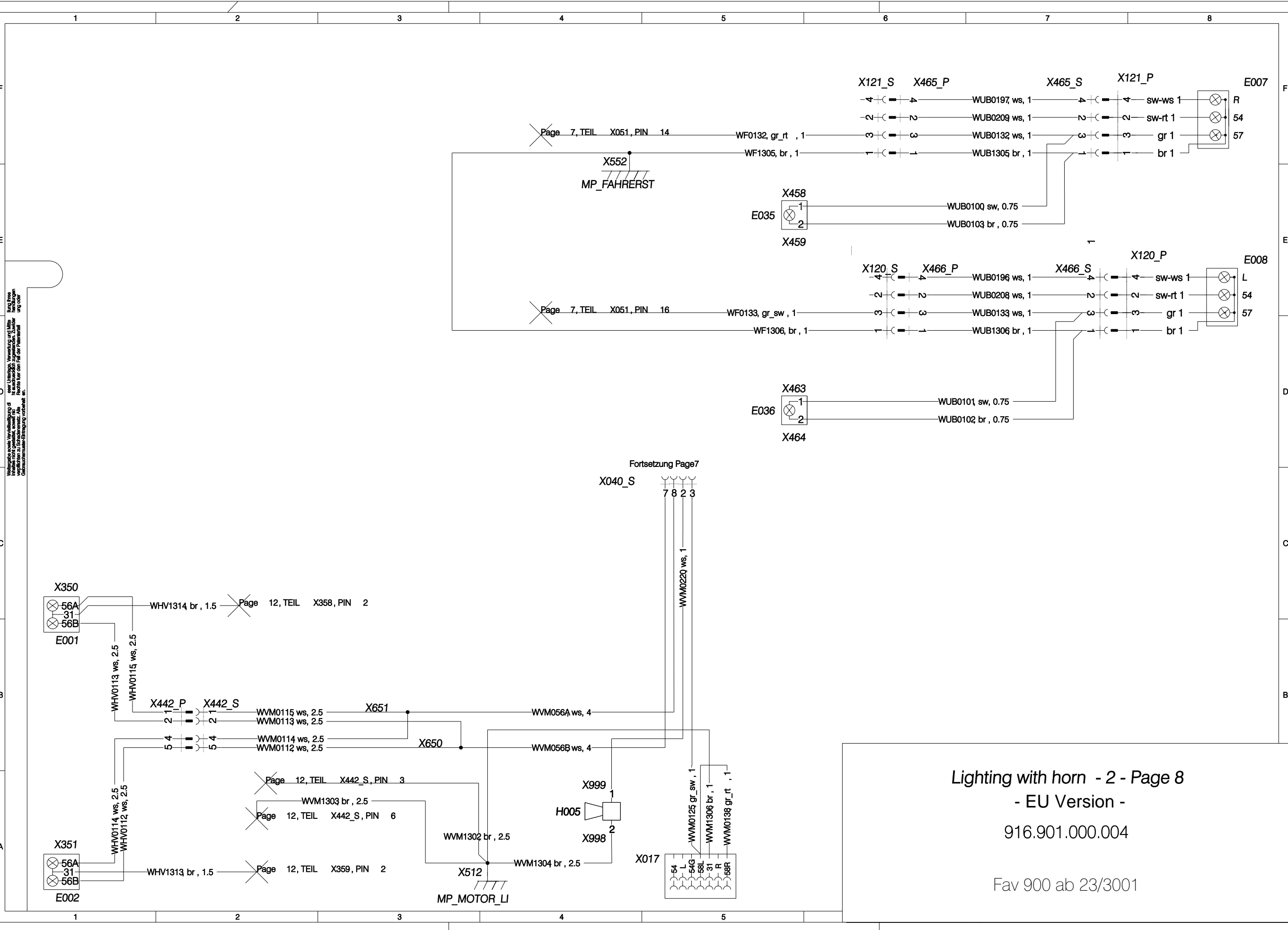
Fav 900 ab 23/3001



Lighting with horn - 1 - Page 7  
 - NA Version -  
 920.901.000.004

Fav 900 ab 23/3001

Bitte diese Verdrahtung nur bei Unterbrechung der Stromversorgung und unter Beachtung der Sicherheitsvorschriften durchzuführen. Die Verantwortung für die Sicherheit des Systems liegt bei dem Anwender.



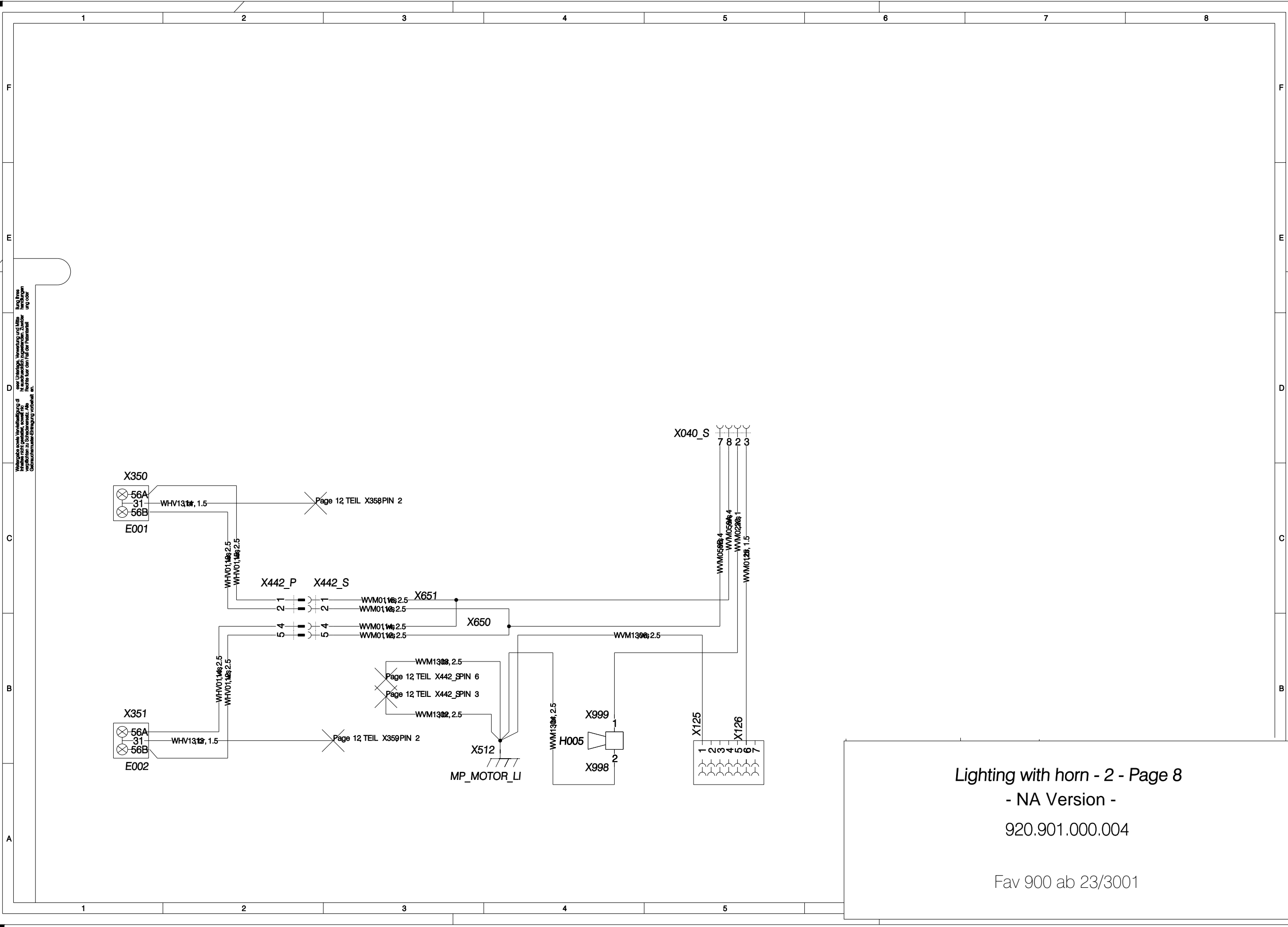
**Lighting with horn - 2 - Page 8**  
 - EU Version -  
 916.901.000.004  
 Fav 900 ab 23/3001

Wärmepumpe gemäß Verordnungsgebung der EU  
 Hersteller nicht verantwortlich für die Einhaltung der  
 CE-Markierung. Hersteller der Wärmepumpe sind für  
 die Einhaltung der CE-Markierung verantwortlich.  
 CE-Markierung ist ein Zeichen für die Einhaltung der  
 CE-Markierung.

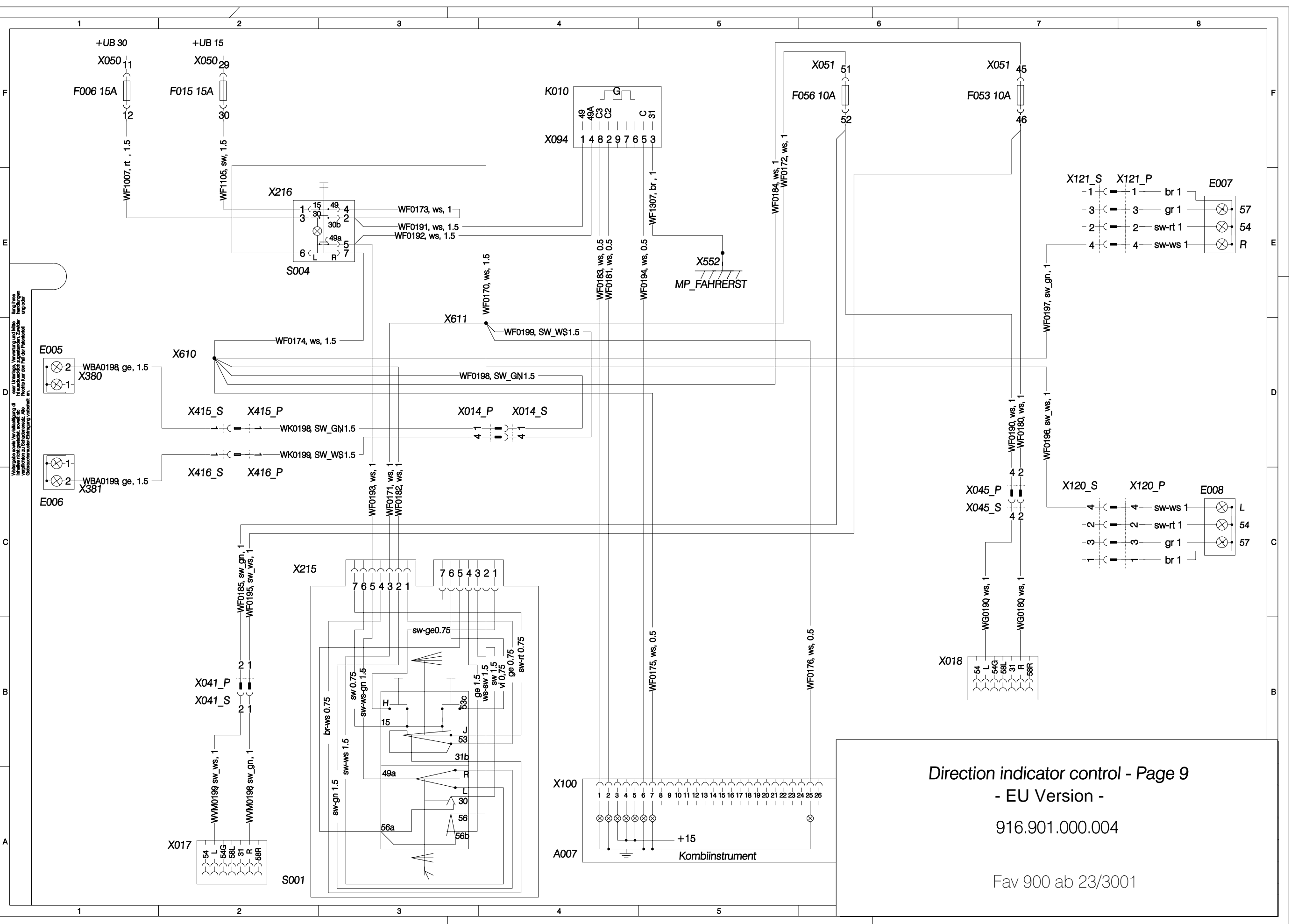
Page 7, TEIL X051, PIN 14  
 X552  
 MP\_FAHRERST

Page 7, TEIL X051, PIN 16  
 X512  
 MP\_MOTOR\_LI

Fortsetzung Page7

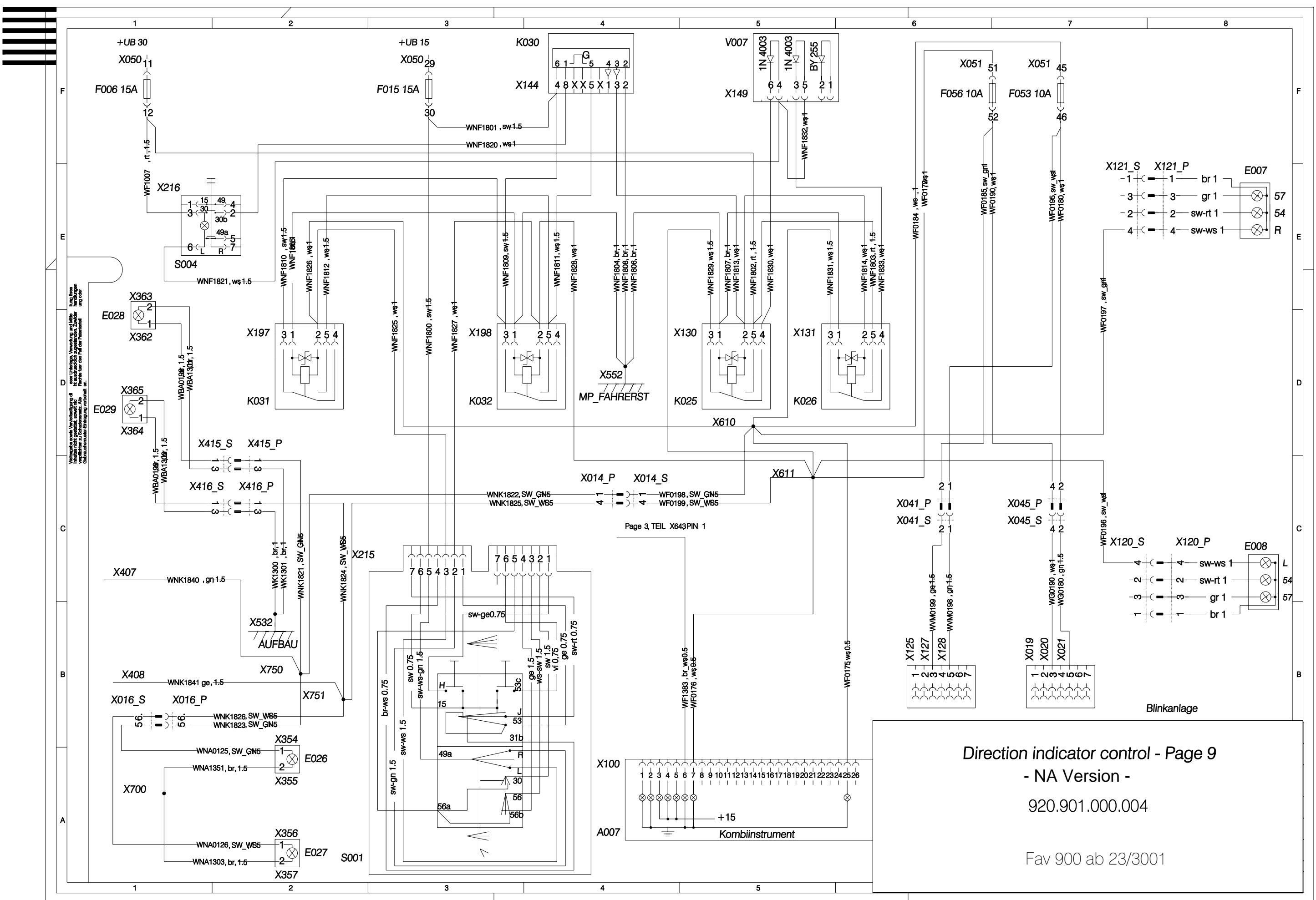


Lighting with horn - 2 - Page 8  
 - NA Version -  
 920.901.000.004  
 Fav 900 ab 23/3001



Direction indicator control - Page 9  
 - EU Version -  
 916.901.000.004  
 Fav 900 ab 23/3001

Hier sind die Verdrahtungen der Lichter, Ventile und Motor  
 im Fahrzeug dargestellt. Diese sind für die  
 Montage der Bauteile zu verwenden. Die  
 Bauteile sind im Schaltplan angegeben.  
 Die Bauteile sind im Schaltplan angegeben.  
 Die Bauteile sind im Schaltplan angegeben.



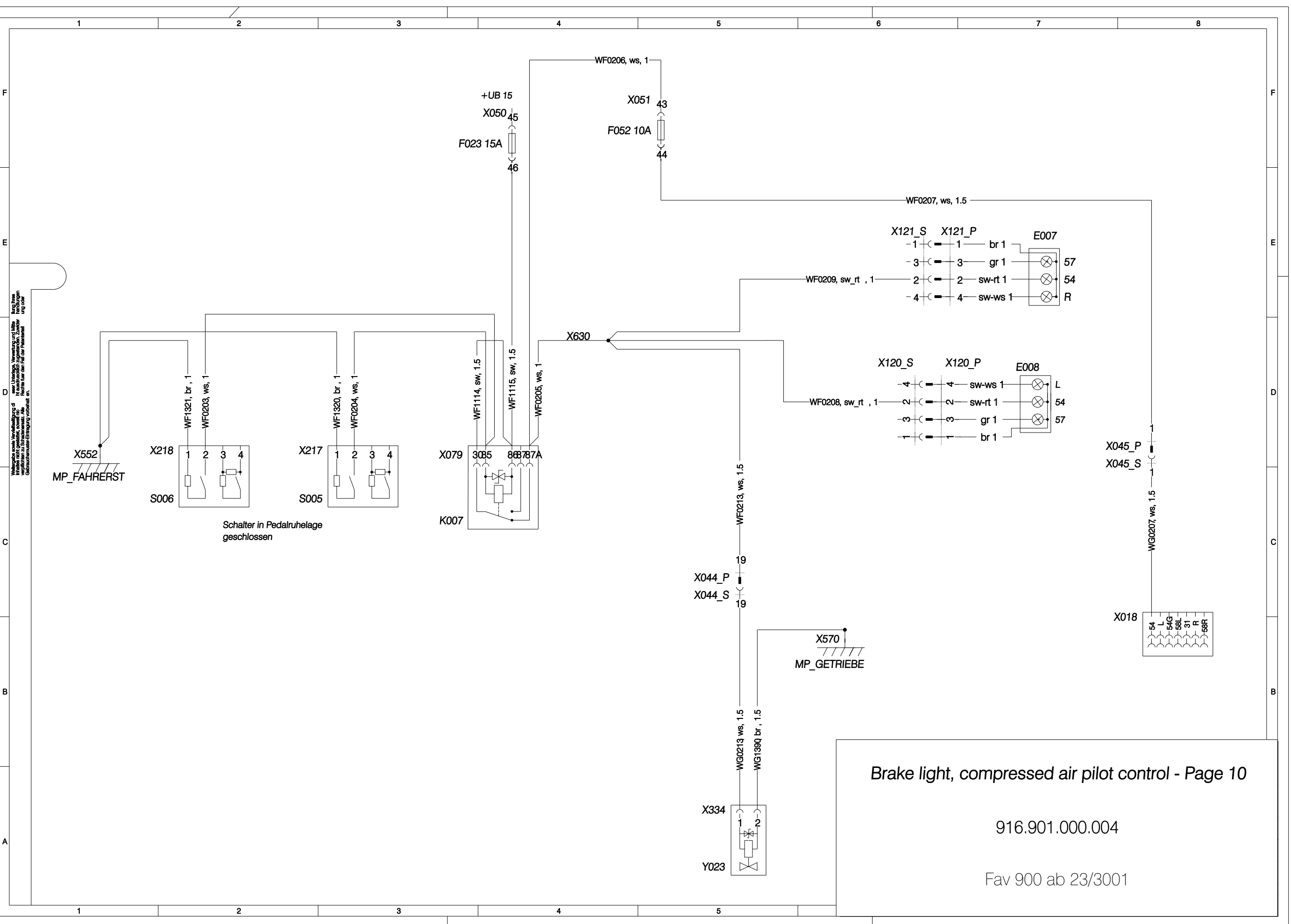
Page 3, TEIL X643PIN 1

### Direction indicator control - Page 9

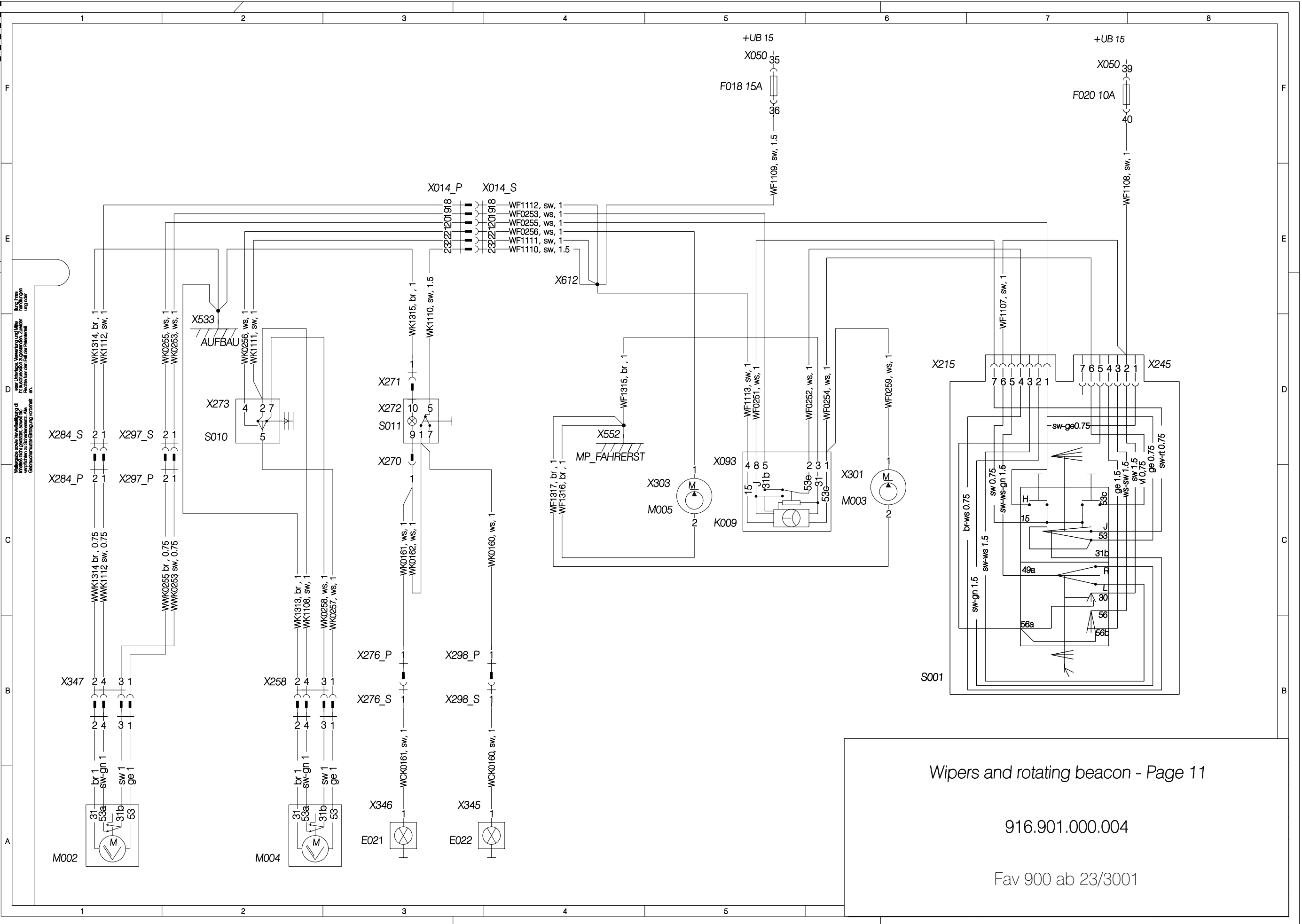
- NA Version -  
920.901.000.004

Fav 900 ab 23/3001





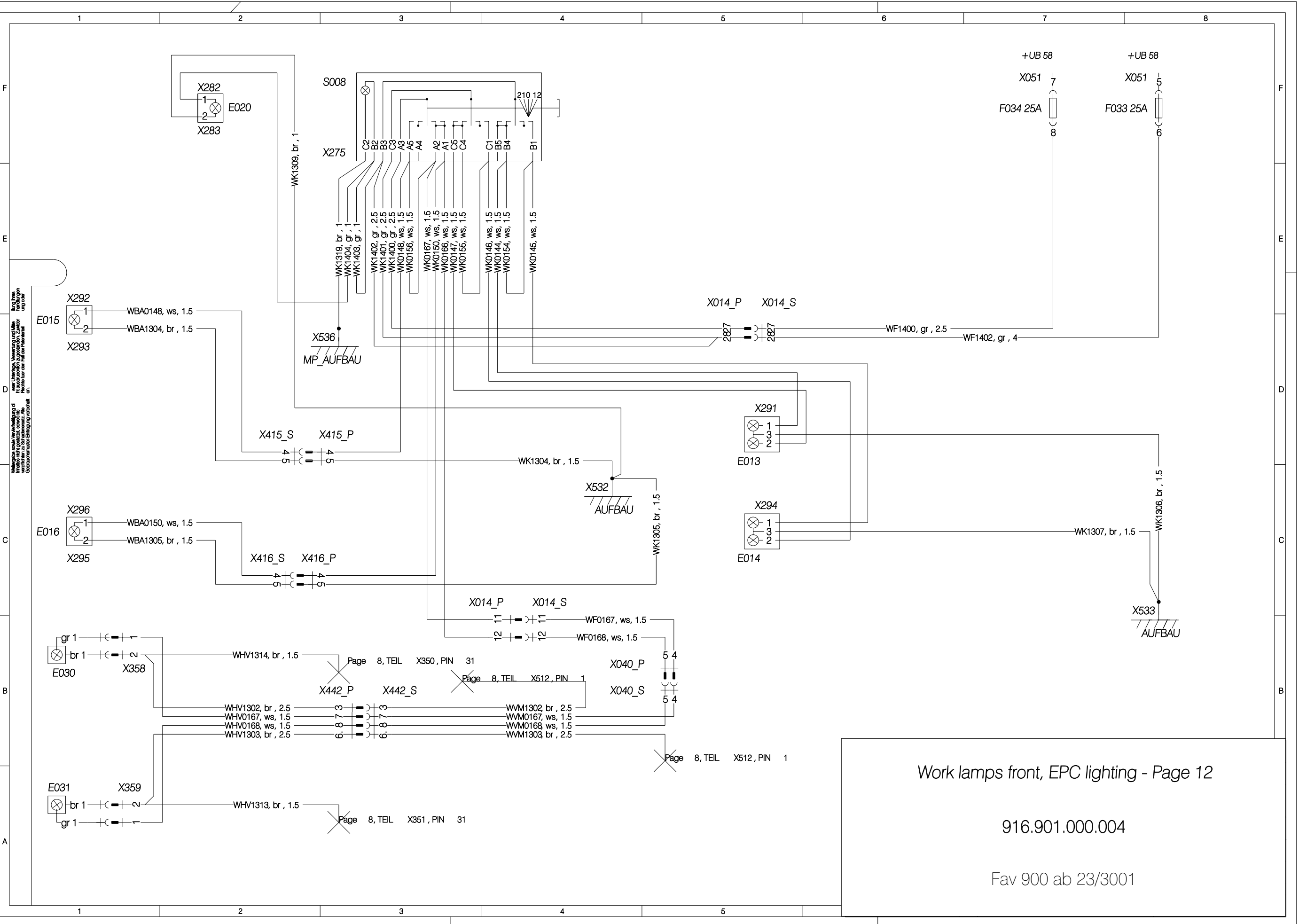
Vollständig nach Veredelung d. Baugruppe  
 prüfen und bestätigen, sonst sind  
 die Anschlüsse anzupassen. Zu jeder  
 Baugruppe sind die notwendigen  
 Anschlüsse für den Fall der  
 Gebrauchsanweisung vorhanden.



Wipers and rotating beacon - Page 11

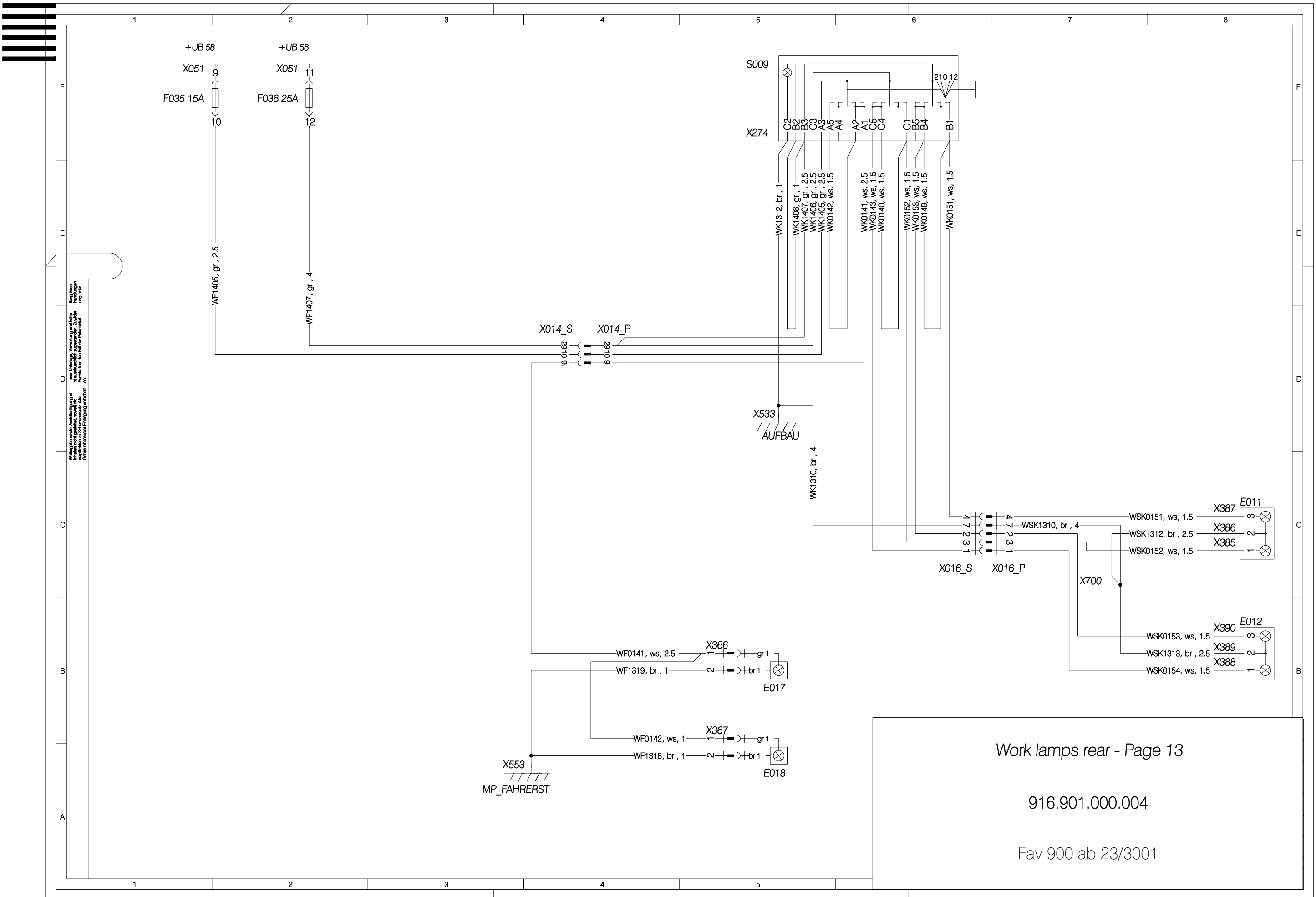
916.901.000.004

Fav 900 ab 23/3001



Alle Leistungen, Normen und Maße  
 sind nach DIN EN 60900, 60901, 60902, 60903, 60904, 60905, 60906, 60907, 60908, 60909, 60910, 60911, 60912, 60913, 60914, 60915, 60916, 60917, 60918, 60919, 60920, 60921, 60922, 60923, 60924, 60925, 60926, 60927, 60928, 60929, 60930, 60931, 60932, 60933, 60934, 60935, 60936, 60937, 60938, 60939, 60940, 60941, 60942, 60943, 60944, 60945, 60946, 60947, 60948, 60949, 60950, 60951, 60952, 60953, 60954, 60955, 60956, 60957, 60958, 60959, 60960, 60961, 60962, 60963, 60964, 60965, 60966, 60967, 60968, 60969, 60970, 60971, 60972, 60973, 60974, 60975, 60976, 60977, 60978, 60979, 60980, 60981, 60982, 60983, 60984, 60985, 60986, 60987, 60988, 60989, 60990, 60991, 60992, 60993, 60994, 60995, 60996, 60997, 60998, 60999, 61000.

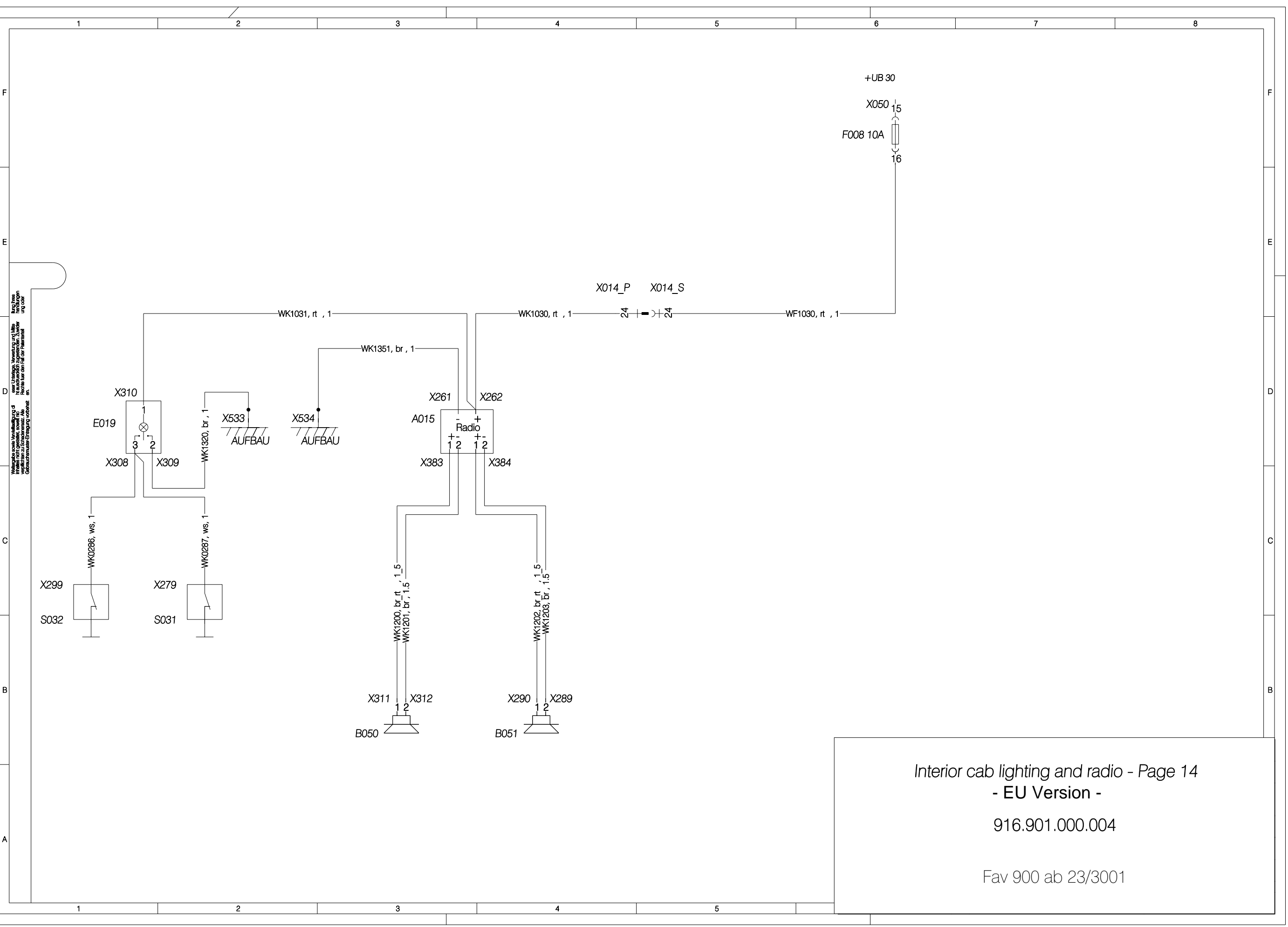
Work lamps front, EPC lighting - Page 12  
  
 916.901.000.004  
  
 Fav 900 ab 23/3001



Work lamps rear - Page 13

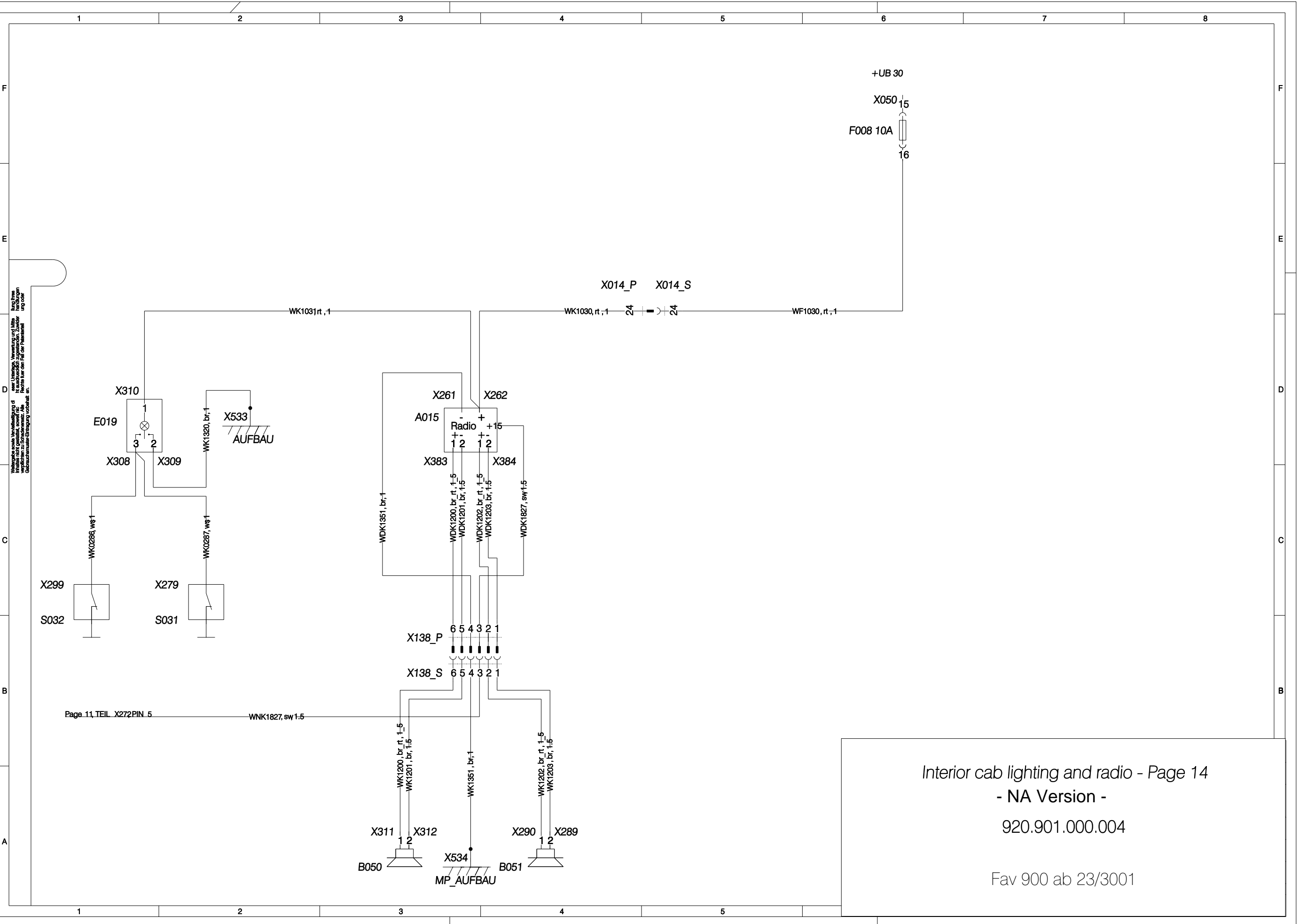
916.901.000.004

Fav 900 ab 23/3001



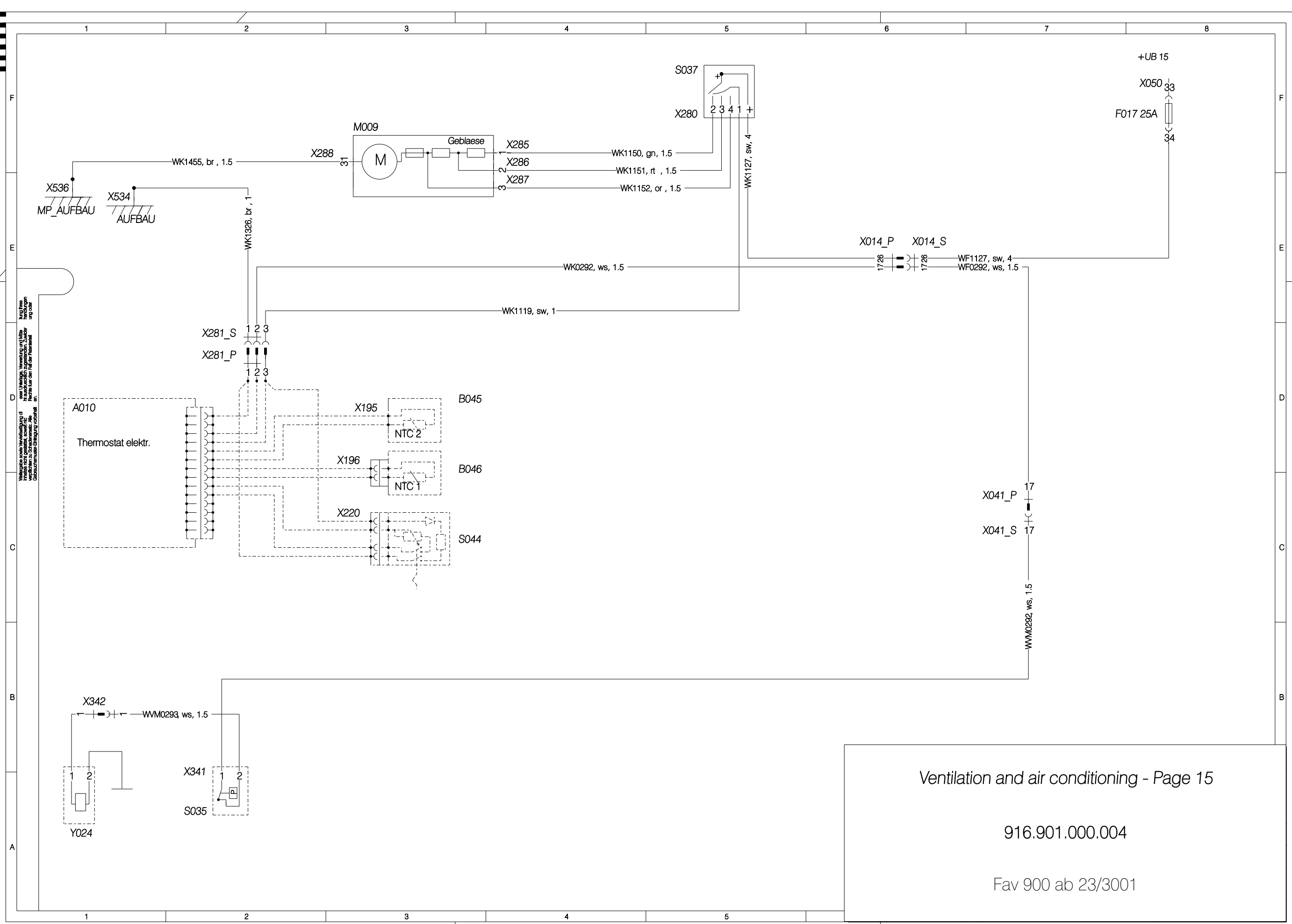
Mit dieser  
 Zeichnung werden die  
 Anschlüsse der  
 Bauteile an den  
 Steckverbindern  
 festgelegt. Die  
 Bezeichnungen der  
 Bauteile sind  
 in der Liste der  
 Bauteile  
 angegeben.  
 Die  
 Bezeichnungen  
 der  
 Bauteile sind  
 in der Liste der  
 Bauteile  
 angegeben.

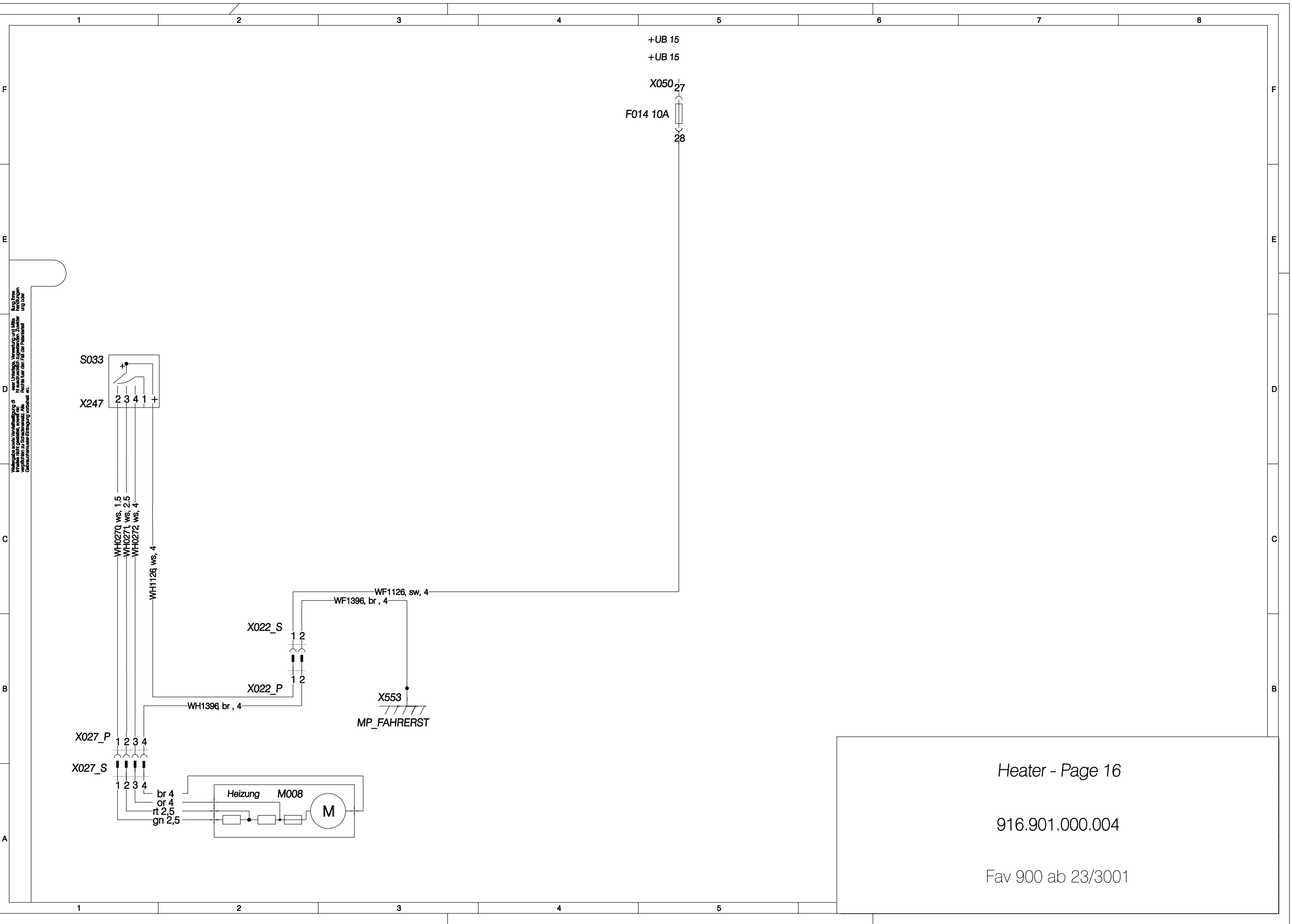
Interior cab lighting and radio - Page 14  
 - EU Version -  
 916.901.000.004  
 Fav 900 ab 23/3001



Wichtiges nach Veredelung d... der Unterleg... Verwertung und Mit... zu berücksichtigen... Zu berücksichtigen...  
Bitte diese...  
Hinweis nicht...  
Gekennzeichnete...  
und Co.

Interior cab lighting and radio - Page 14  
- NA Version -  
920.901.000.004  
Fav 900 ab 23/3001



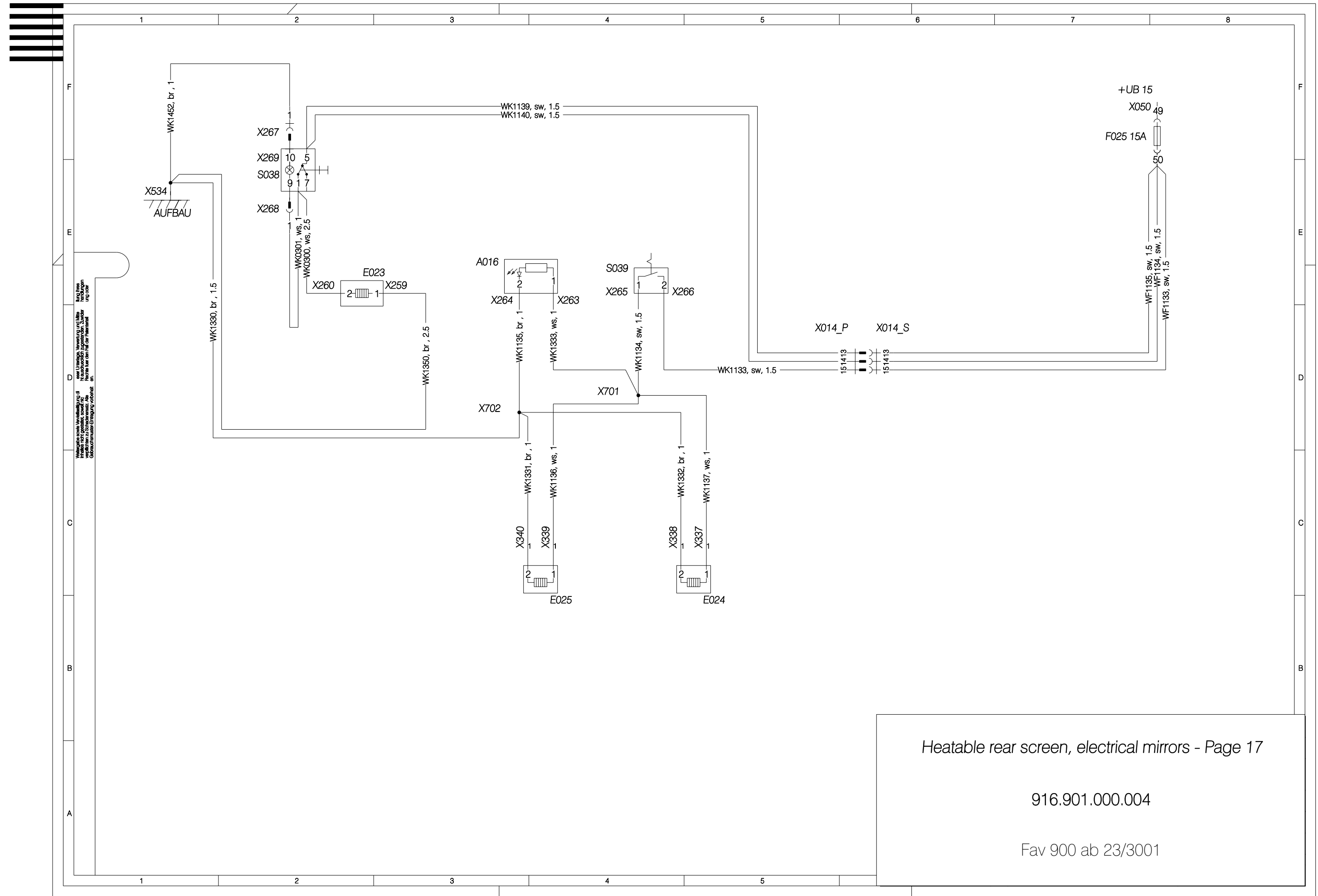


Heater - Page 16

916.901.000.004

Fav 900 ab 23/3001



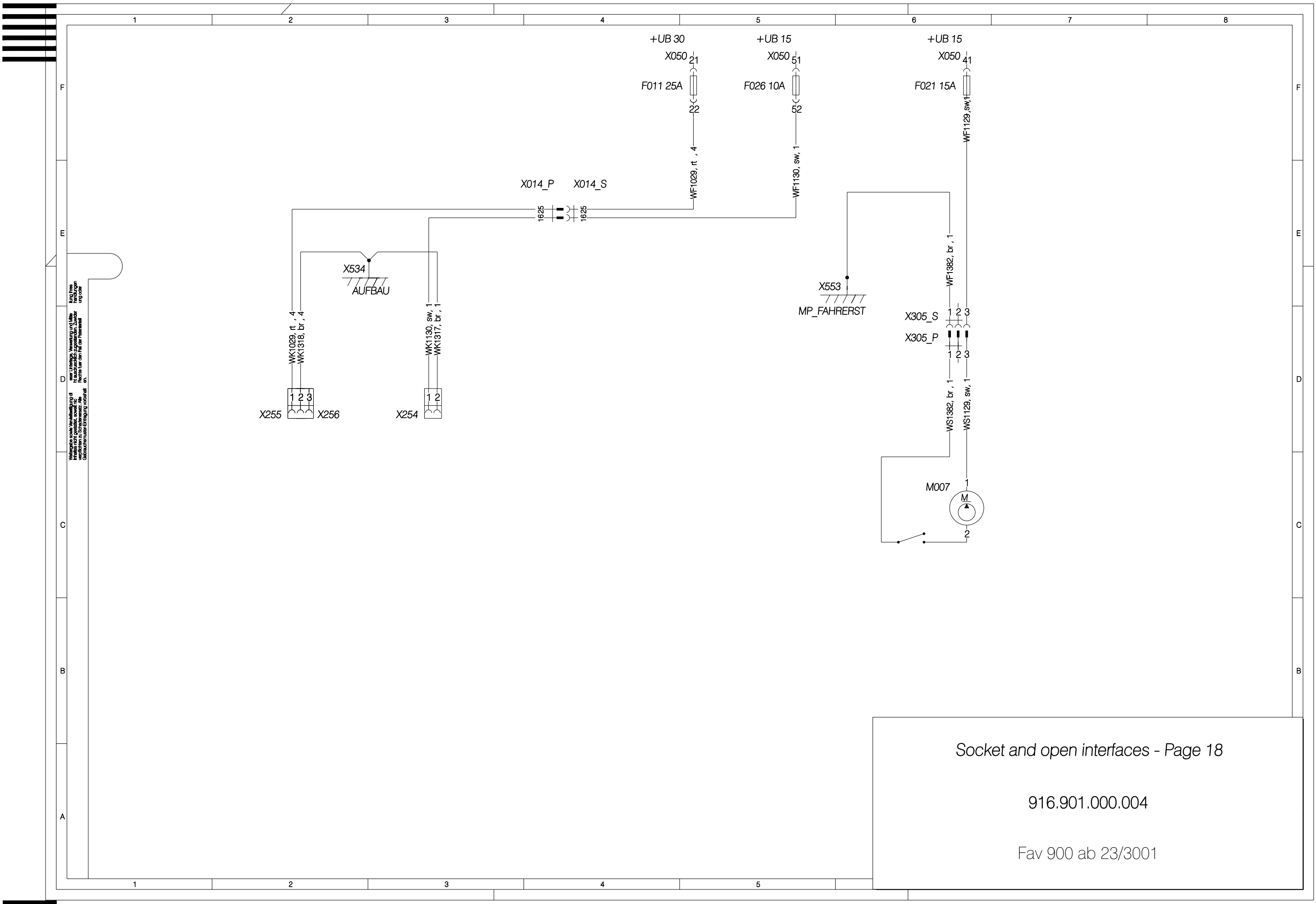


Wichtiges: Nach dem Einbau des Heckschirms muss die elektrische Anlage überprüft werden. Bei einer Fehlfunktion des Heckschirms muss die elektrische Anlage überprüft werden. Bei einer Fehlfunktion des Heckschirms muss die elektrische Anlage überprüft werden.

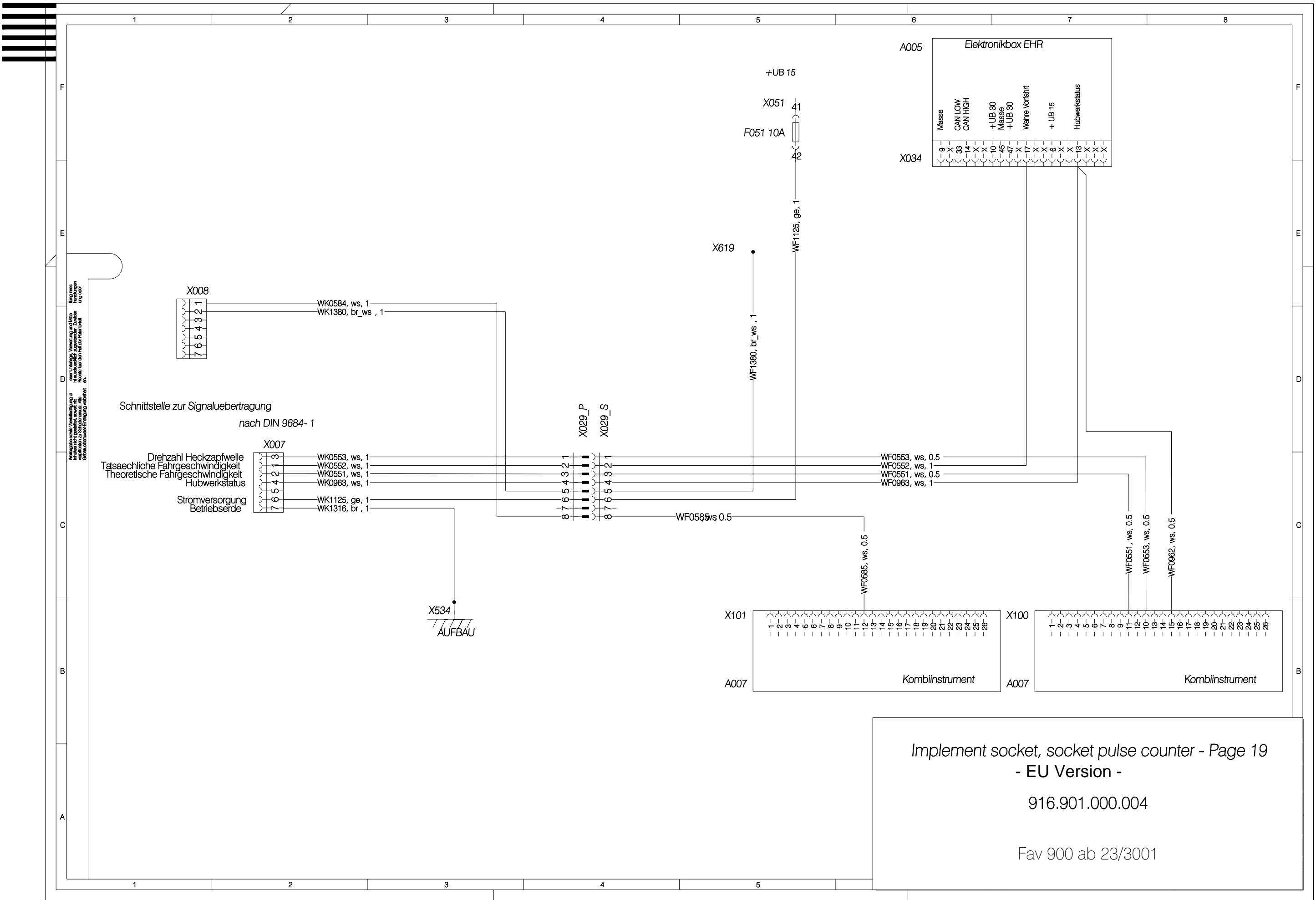
Heatable rear screen, electrical mirrors - Page 17

916.901.000.004

Fav 900 ab 23/3001



Alle Angaben sind ohne Gewähr. Die Firma ist nicht verantwortlich für Schäden, die durch den Gebrauch der Anlage verursacht werden.



Implement socket, socket pulse counter - Page 19  
 - EU Version -  
 916.901.000.004  
 Fav 900 ab 23/3001

Wichtig: Vor der Verwendung des Produktes  
 lesen Sie bitte die Bedienungsanleitung  
 sorgfältig durch. Die Verantwortung für  
 die sichere Anwendung des Produktes  
 liegt bei Ihnen.

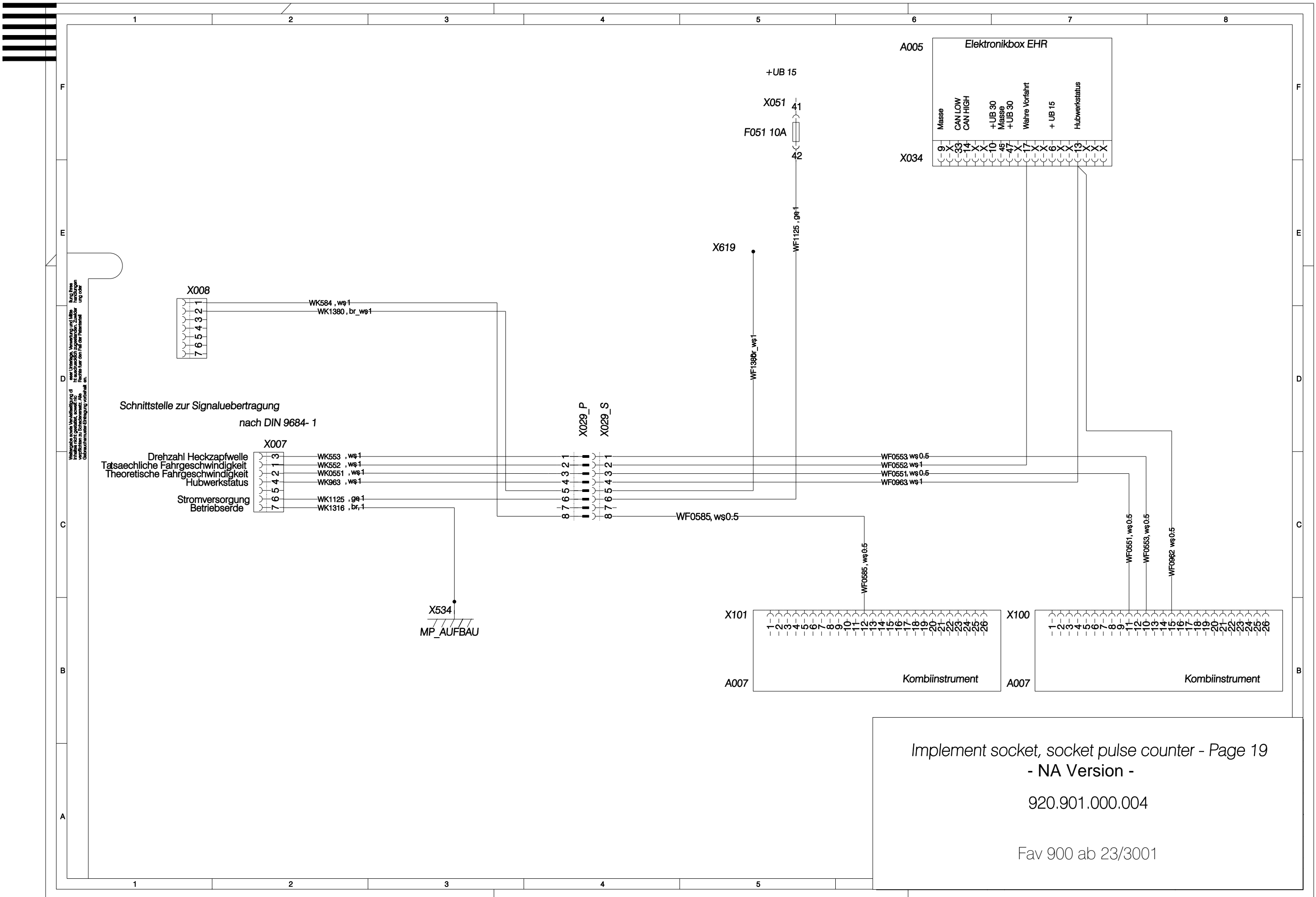
Schnittstelle zur Signalübertragung  
 nach DIN 9684-1

Drehzahl Heckzapfwelle  
 Tatsächliche Fahrgeschwindigkeit  
 Theoretische Fahrgeschwindigkeit  
 Hubwerkstatus  
 Stromversorgung  
 Betriebs Erde

Elektronikbox EHR														
Masse	CAN LOW	CAN HIGH	+UB 30	Masse	+UB 30	Wahne Vorfahrt	+ UB 15	Hubwerkstatus						
X-9	X-33	X-14	X-10	X-45	X-47	X-17	X-6	X-13	X-13	X-13	X-13	X-13	X-13	
X-9	X-33	X-14	X-10	X-45	X-47	X-17	X-6	X-13	X-13	X-13	X-13	X-13	X-13	

X101	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
A007	Kombiinstrument																									

X100	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
A007	Kombiinstrument																									



Implement socket, socket pulse counter - Page 19  
 - NA Version -  
 920.901.000.004  
 Fav 900 ab 23/3001

Elektrische sowie Verdrahtungsarbeiten sind nur durch geschultes Personal auszuführen. Bei unsachgemäßer Handhabung kann es zu Schäden an den Bauteilen und an der Person kommen.

Schnittstelle zur Signalübertragung  
 nach DIN 9684-1

Drehzahl Heckzapfwelle  
 Tatsächliche Fahrgeschwindigkeit  
 Theoretische Fahrgeschwindigkeit  
 Hubwerksstatus  
 Stromversorgung  
 Betriebs Erde

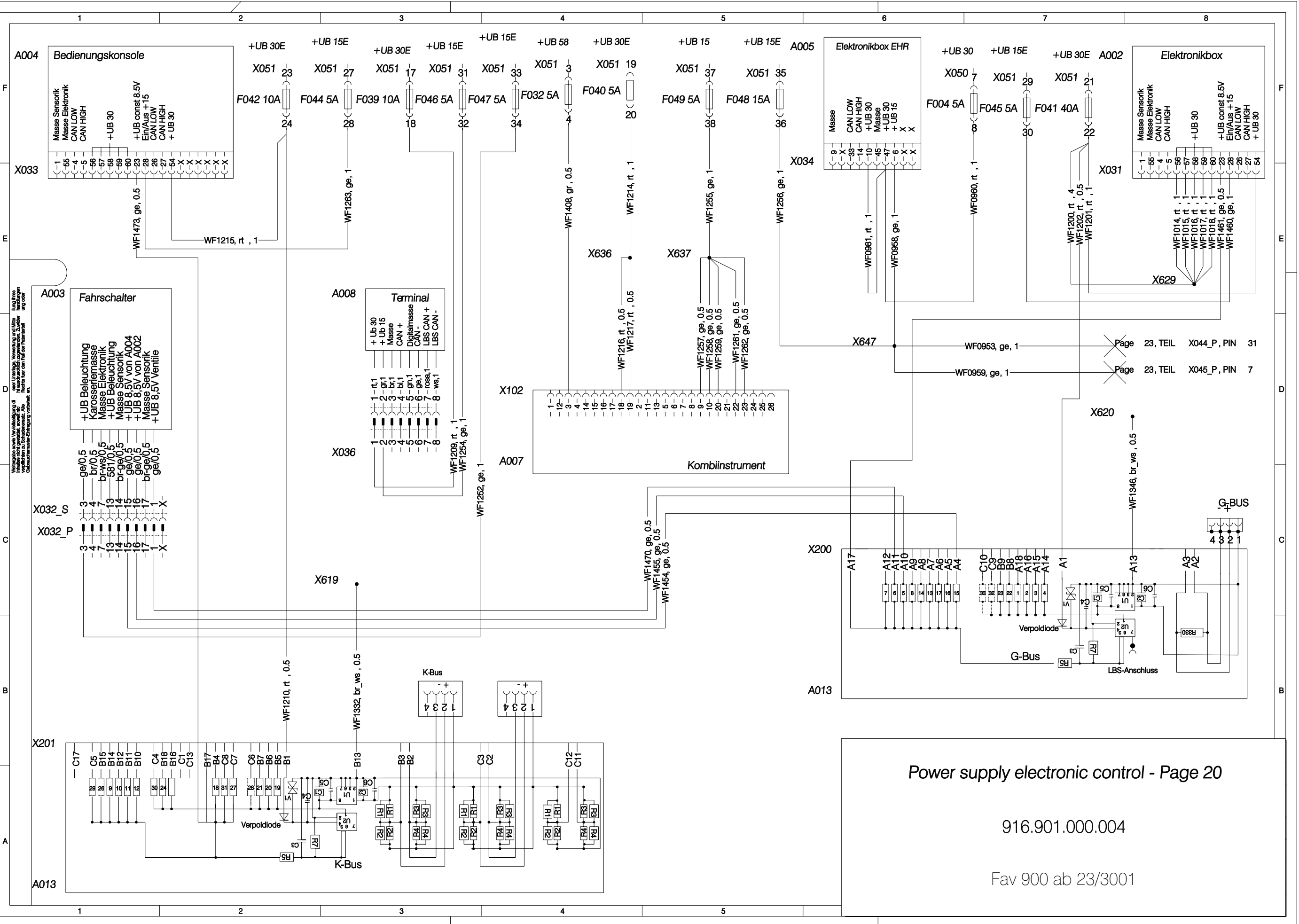
X007  
 1 WK553, ws1  
 2 WK552, ws1  
 3 WK0551, ws1  
 4 WK963, ws1  
 5 WK1125, gs1  
 6 WK1316, br,1  
 7

X029\_P  
 1  
 2  
 3  
 4  
 5  
 6  
 7  
 8  
 X029\_S  
 1  
 2  
 3  
 4  
 5  
 6  
 7  
 8

A005 Elektronikbox EHR  
 Masse  
 CAN LOW  
 CAN HIGH  
 +UB 30  
 Masse  
 +UB 30  
 Wahre Vorfahrt  
 + UB 15  
 Hubwerksstatus  
 X034  
 9 X  
 10 X  
 11 X  
 12 X  
 13 X  
 14 X  
 15 X  
 16 X  
 17 X  
 18 X  
 19 X  
 20 X  
 21 X  
 22 X  
 23 X  
 24 X  
 25 X  
 26 X

X101  
 1  
 2  
 3  
 4  
 5  
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 20  
 21  
 22  
 23  
 24  
 25  
 26  
 A007 Kombiinstrument

X100  
 1  
 2  
 3  
 4  
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 6  
 7  
 8  
 9  
 10  
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 21  
 22  
 23  
 24  
 25  
 26  
 A007 Kombiinstrument



Power supply electronic control - Page 20

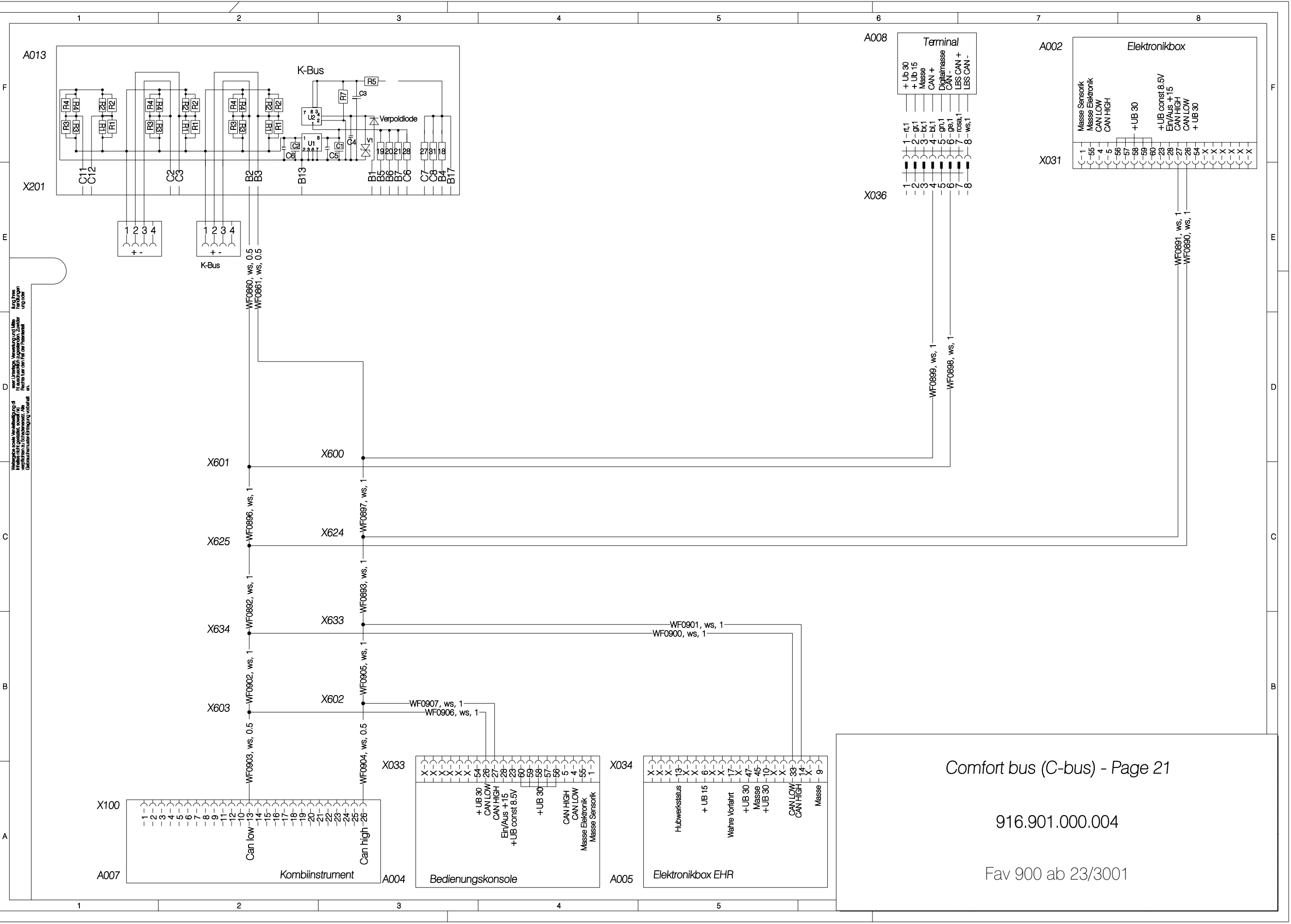
916.901.000.004

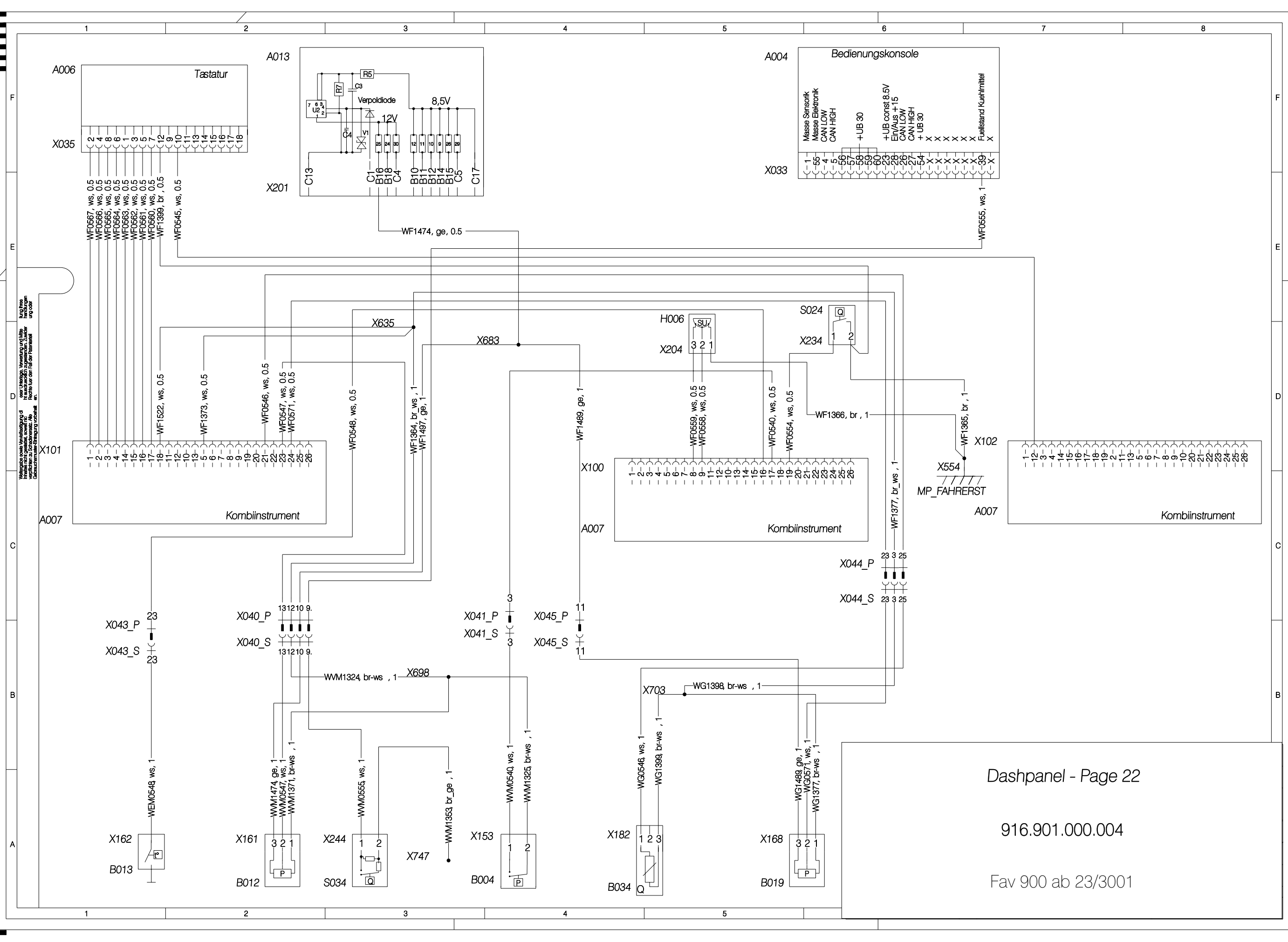
Fav 900 ab 23/3001

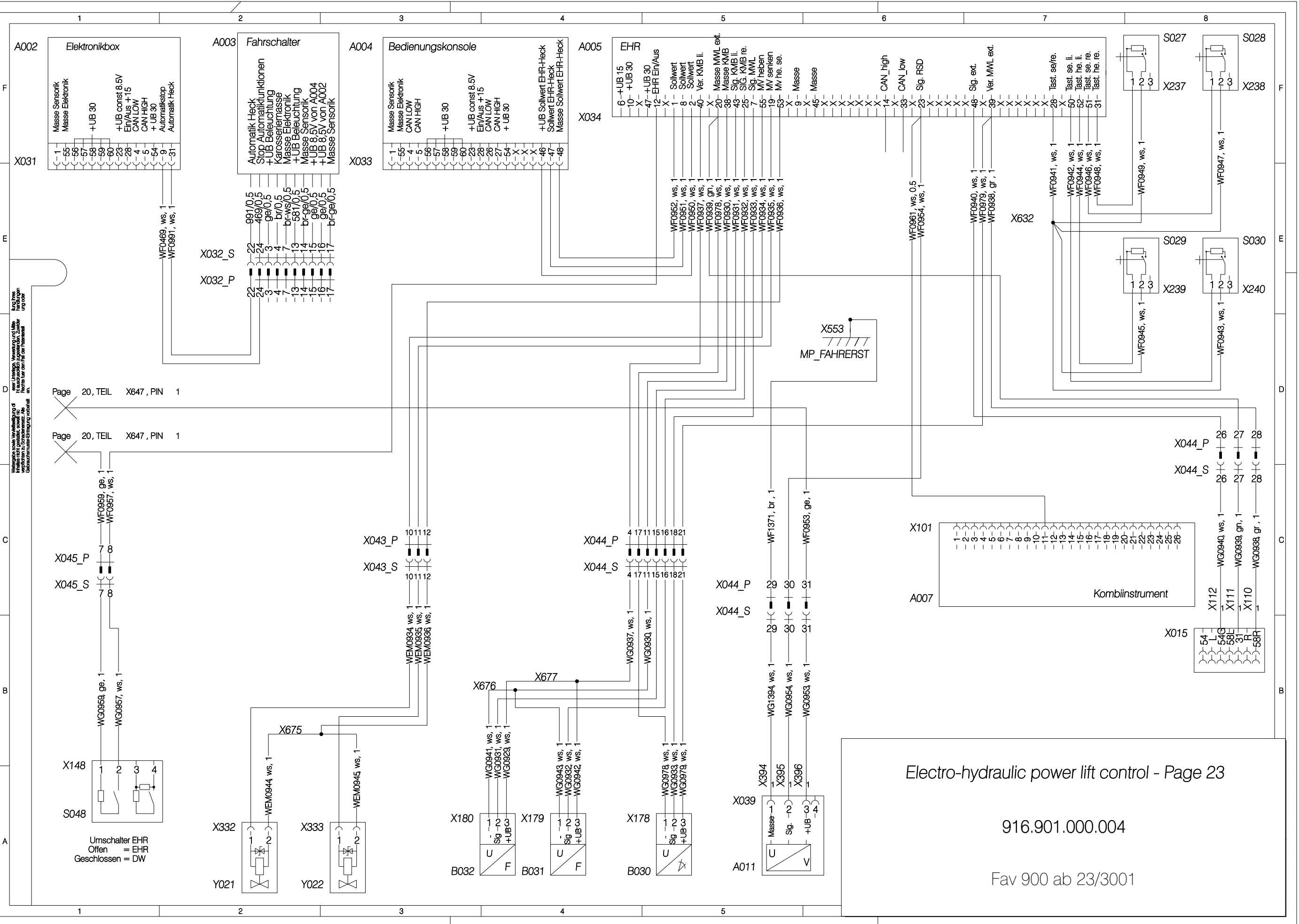
Page 23, TEIL X044\_P, PIN 31  
 Page 23, TEIL X045\_P, PIN 7

Hier sind die Verdrahtungsbedingungen für die Installation des Fahrerlichts zu finden. Die Verdrahtung ist in der Tabelle unten aufgeführt. Die Verdrahtung ist für die Fahrerlicht-Steuerung vorgesehen.

Verfahren nach Verwendungsart  
Prüfung des Herstellers, wenn die  
Anforderungen an die Bauteile  
nicht durch den Hersteller  
gegarantet werden können.  
Für diese  
Anforderungen  
sind die  
Bauteile  
für den Fall der  
Gebräuchlichkeit  
anzugeben.







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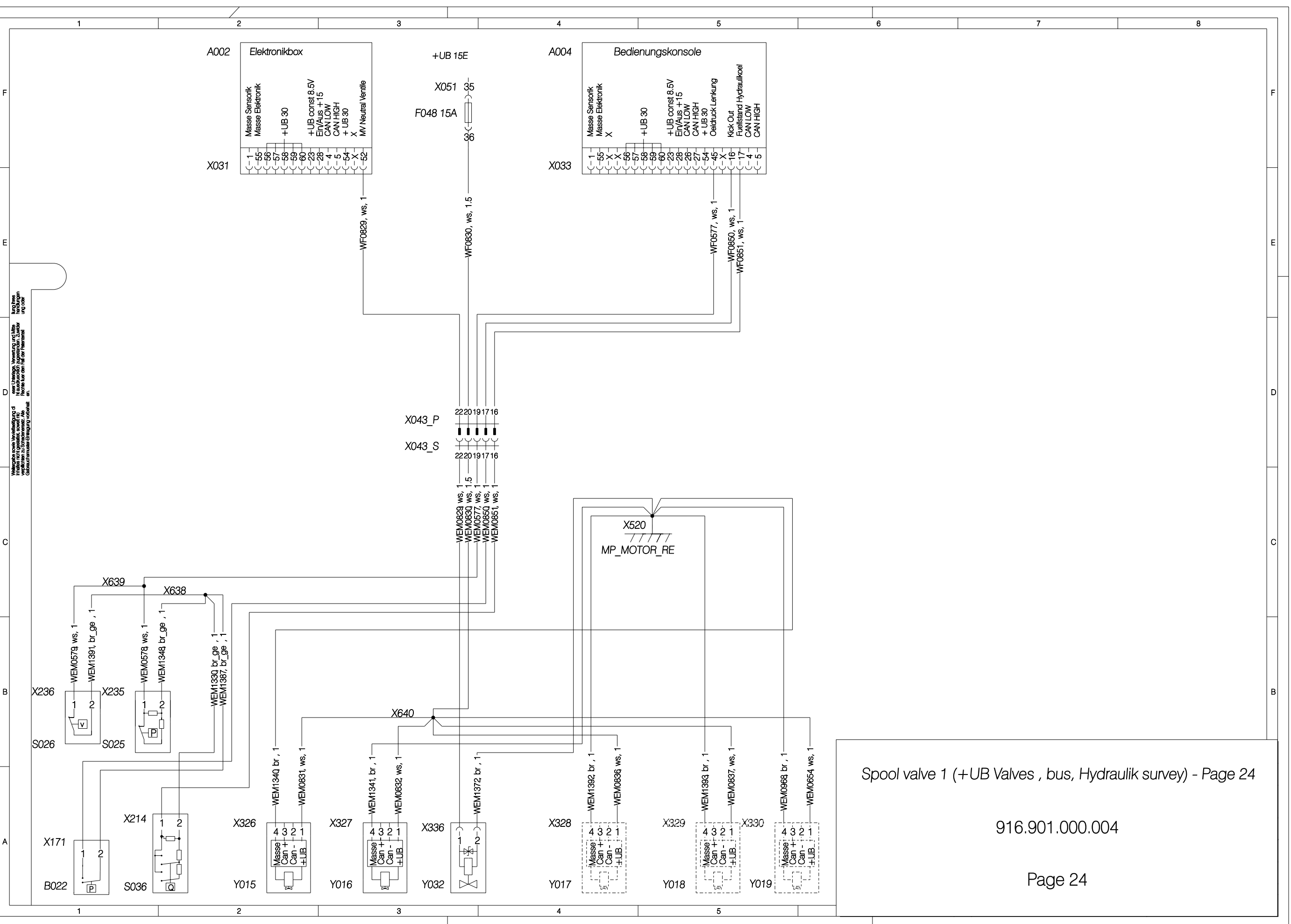
Page 20, TEIL X647, PIN 1  
 Page 20, TEIL X647, PIN 1

Electro-hydraulic power lift control - Page 23

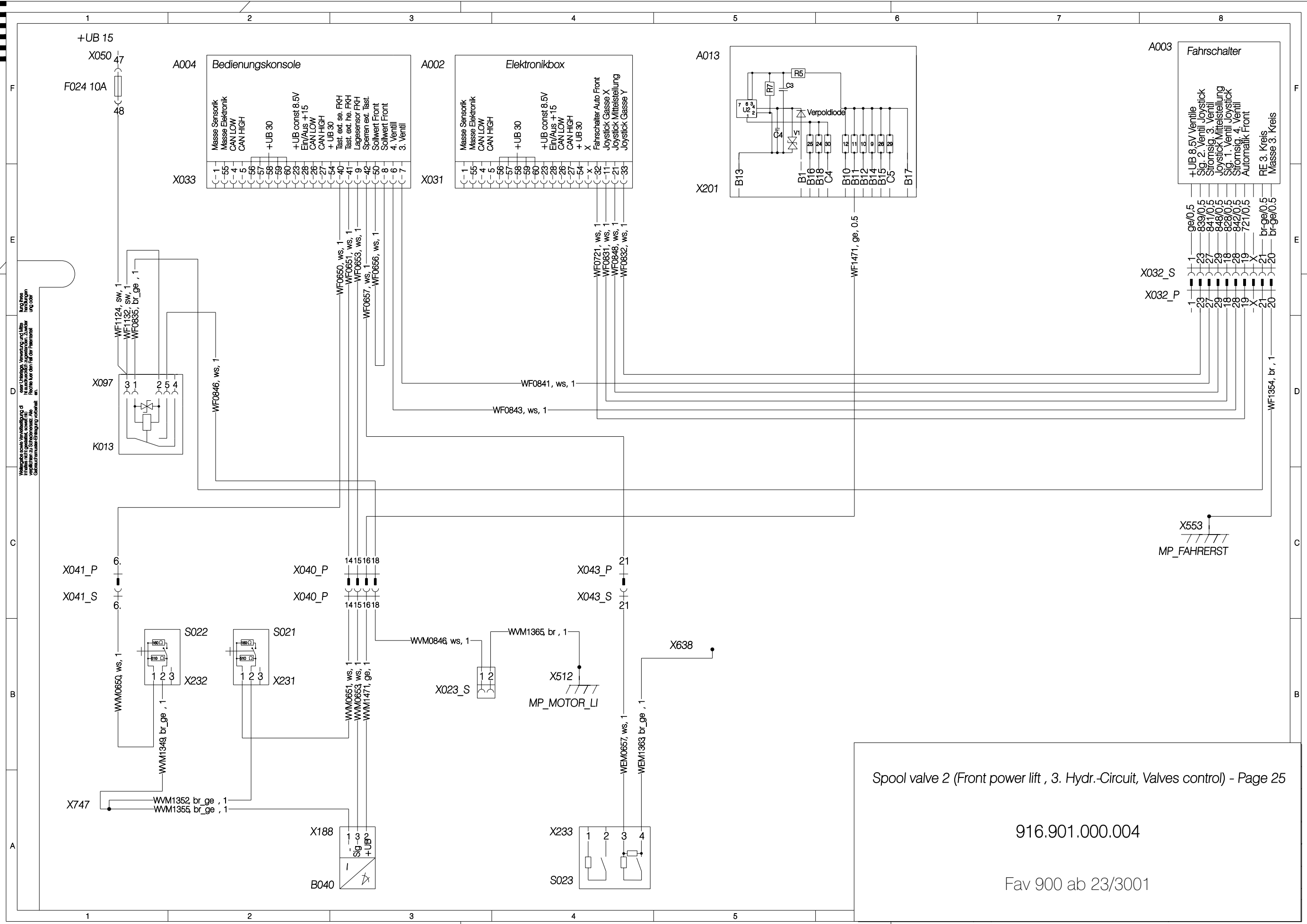
916.901.000.004  
 Fav 900 ab 23/3001



Wemacchio oder Verwendungsfall  
 nicht anwenden, wenn die  
 Reaktionszeit zu langsam ist, z.B. bei  
 der Steuerung von Ventilen.  
 Die Reaktionszeit ist für den Hersteller  
 angegeben.



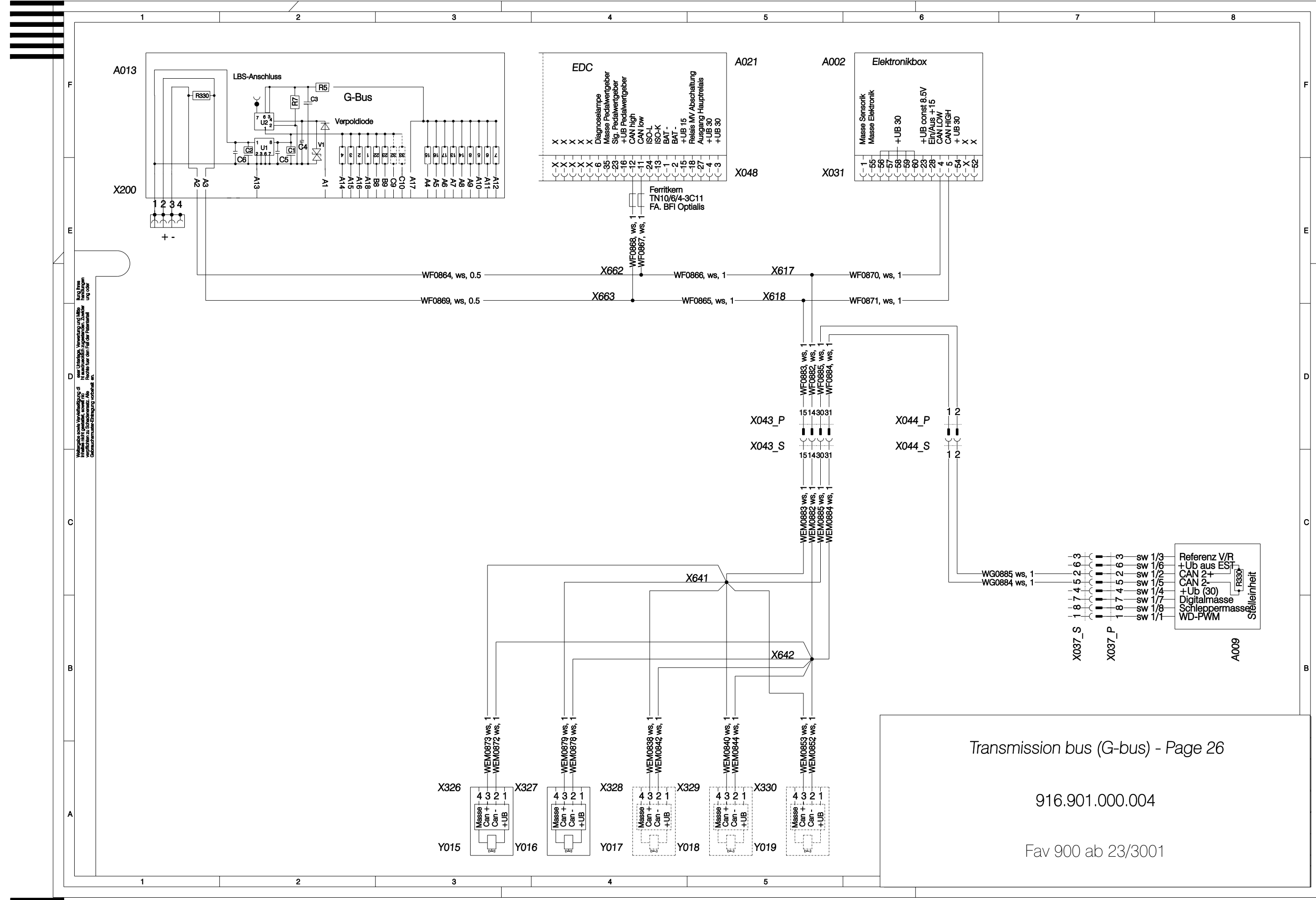
Spool valve 1 (+UB Valves , bus, Hydraulik survey) - Page 24  
  
 916.901.000.004  
  
 Page 24



Spool valve 2 (Front power lift , 3. Hydr.-Circuit, Valves control) - Page 25

916.901.000.004

Fav 900 ab 23/3001

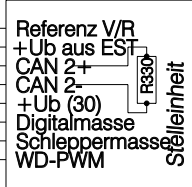
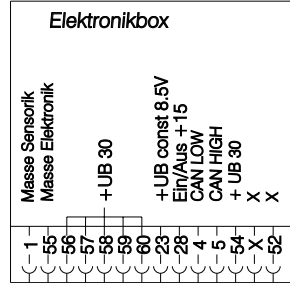
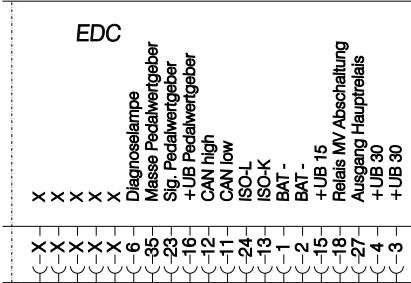


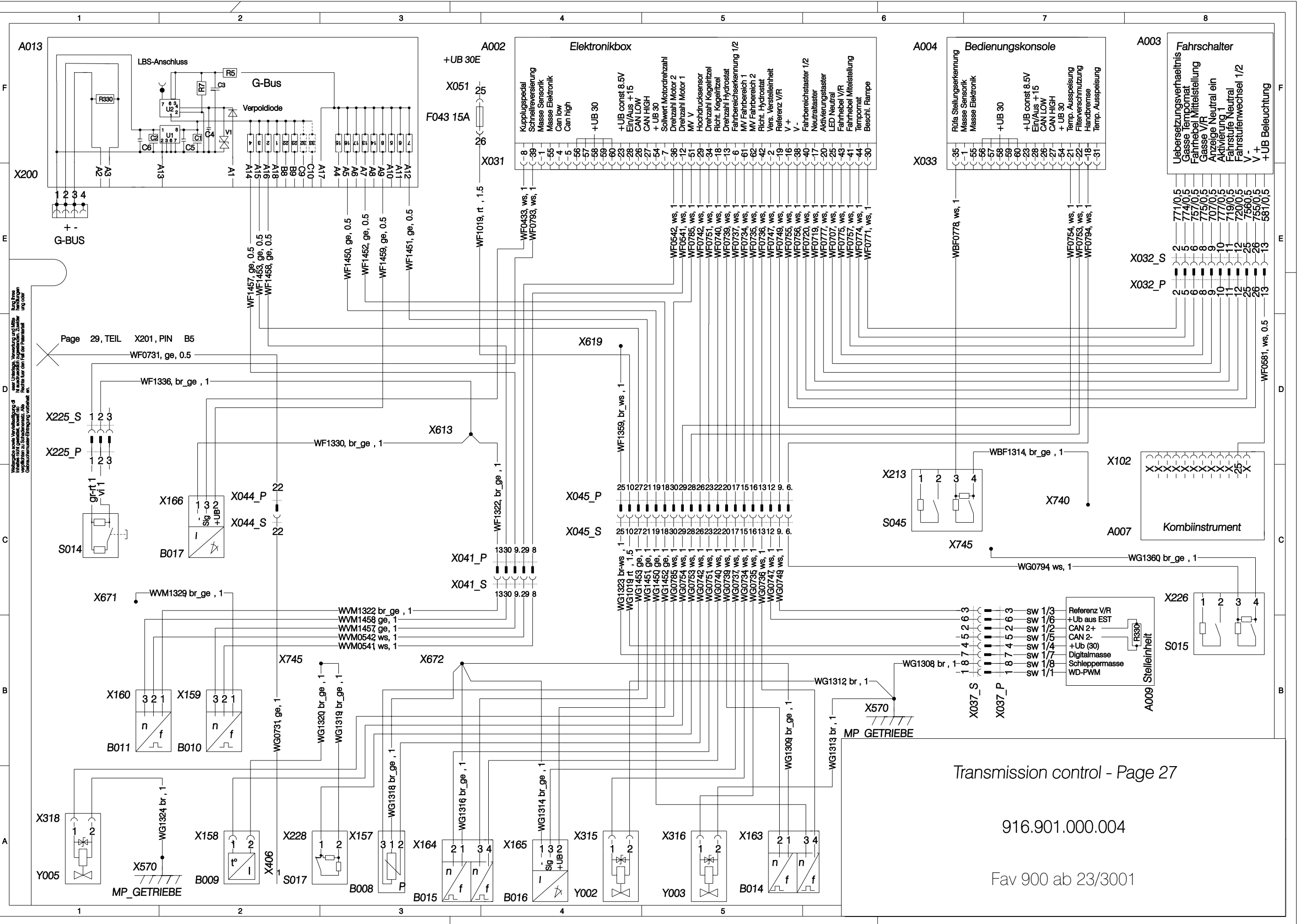
Wichtiges neue Verdrahtungsdiagramm!  
 Bitte nicht drucken, sondern nur  
 auf dem Computer anzeigen!  
 Die alte Version ist nicht mehr gültig.  
 Änderungen sind hiermit bekannt gegeben.

Transmission bus (G-bus) - Page 26

916.901.000.004

Fav 900 ab 23/3001





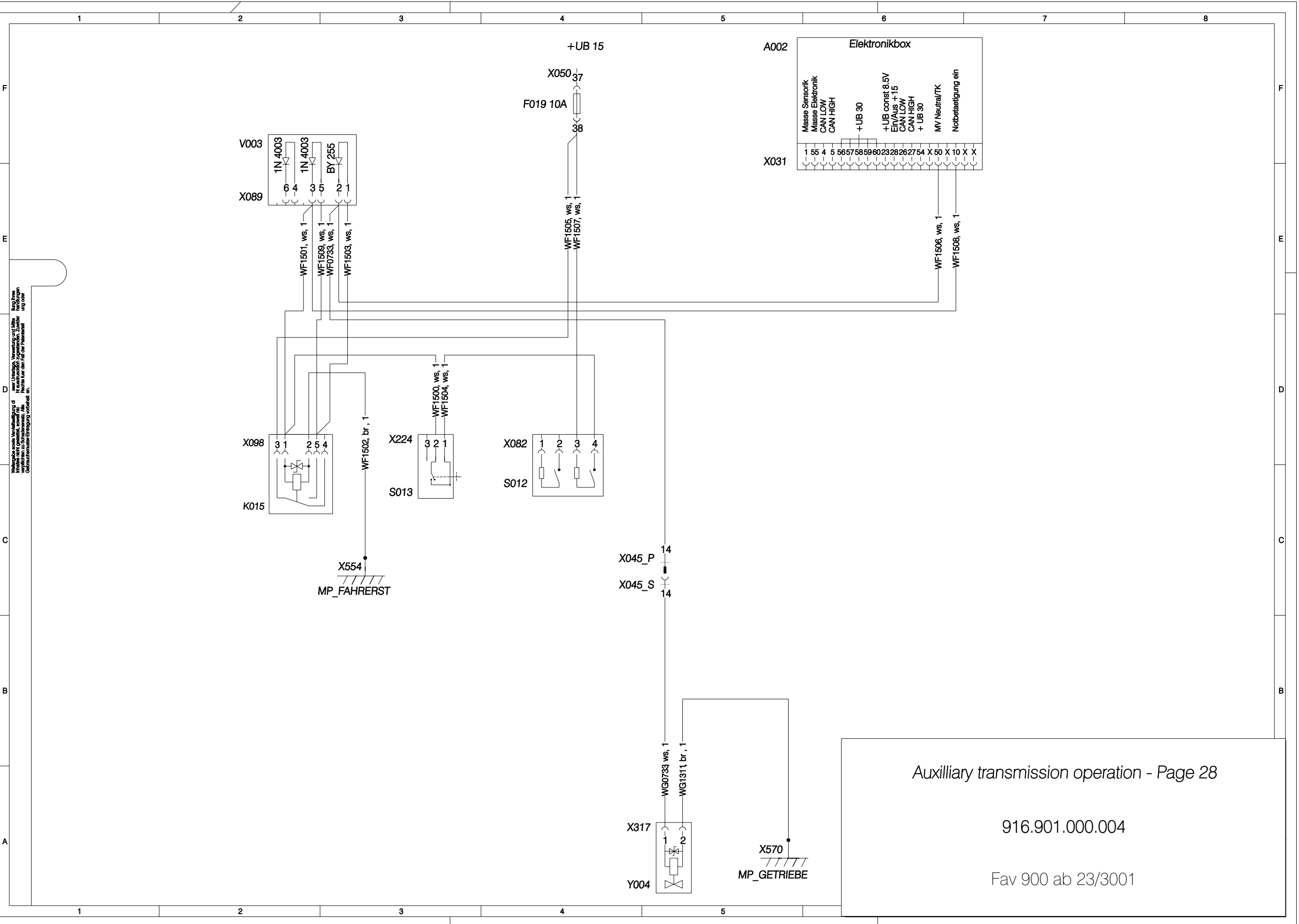
Transmission control - Page 27

916.901.000.004

Fav 900 ab 23/3001

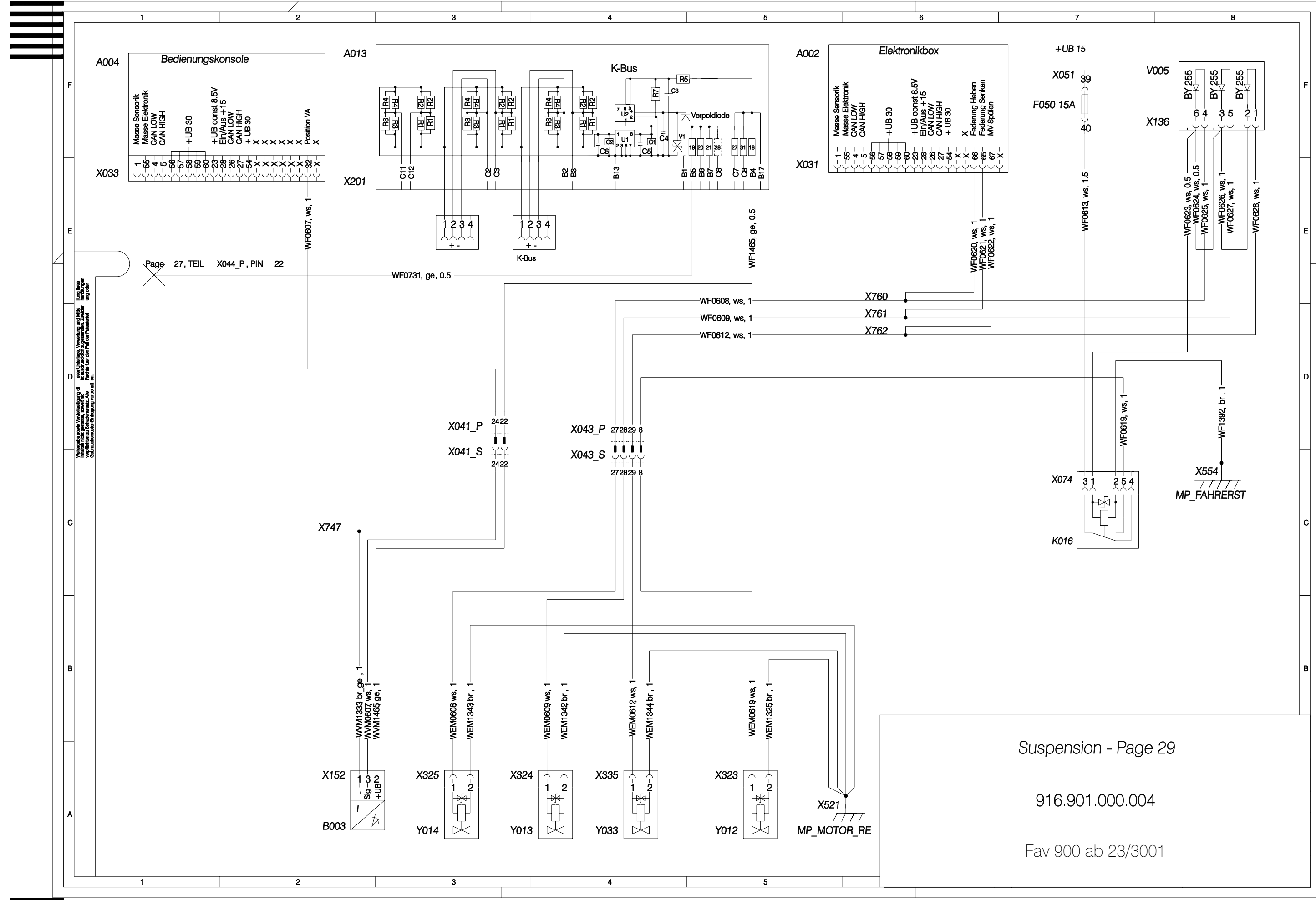
Vollständig nach Verifizierung d. Baugruppe  
 ist zu überprüfen, ob alle Anschlüsse  
 korrekt sind. Bei Bedarf sind die  
 Anschlüsse nach dem Schaltplan  
 anzuschließen.

Page 29, TEIL X201, PIN B5



Vollständig nach Verifizierung d. Baugruppe  
 Prüfung nicht positiv, sonst nur  
 in schriftlicher Ausfertigung, Zuzulassen  
 Gebrauchsmuster eingetragen, Vorbehalt an.  
 Bei einer Änderung, Verletzung und Miss-  
 bräuchlich, Zusätzliche, Zuzulassen  
 und sonst.

Auxilliary transmission operation - Page 28  
  
 916.901.000.004  
  
 Fav 900 ab 23/3001



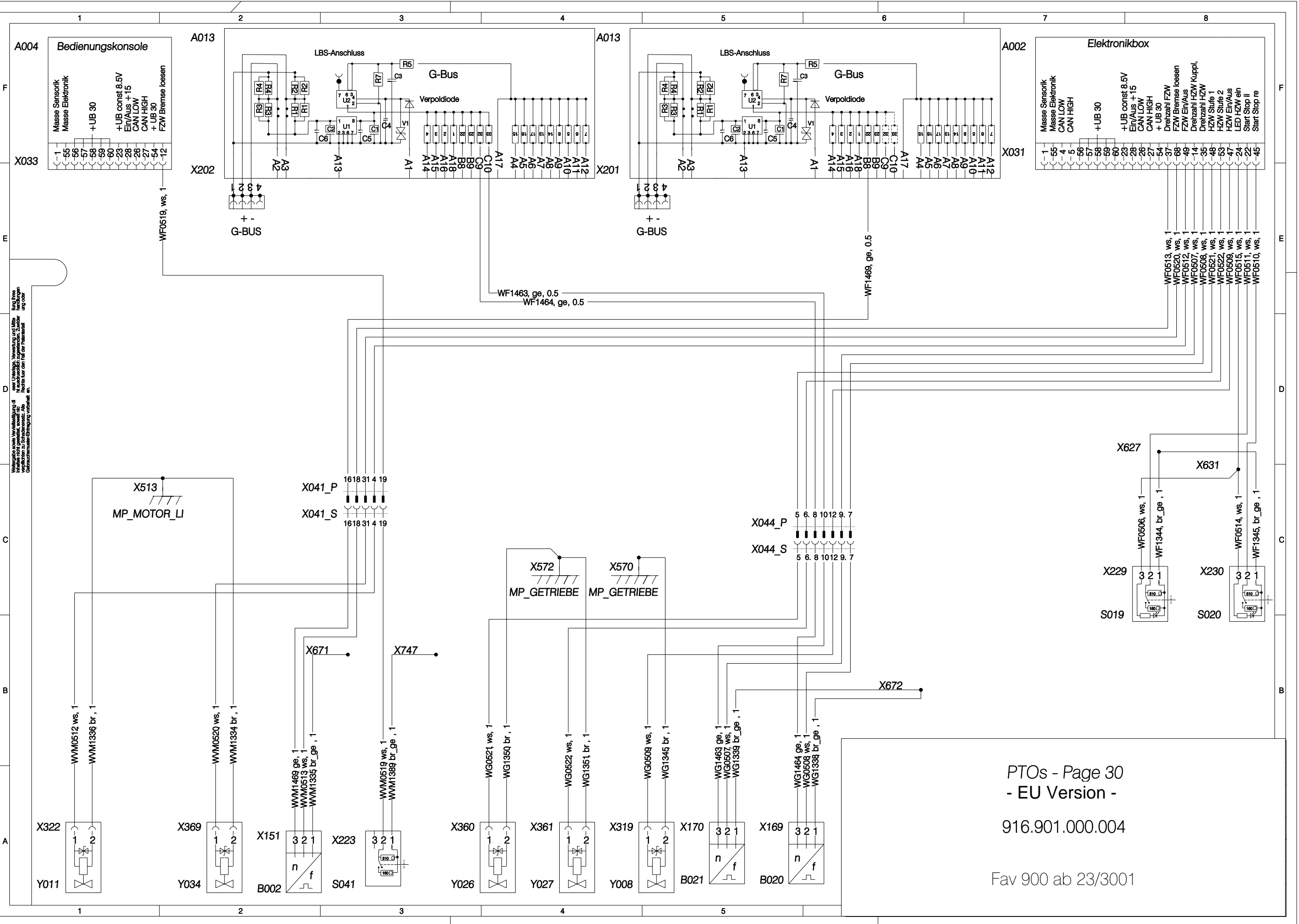
Page 27, TEIL X044\_P, PIN 22

Alle Angaben sind ohne Gewähr. Die Firma ist nicht verantwortlich für Schäden, die durch den Einsatz dieses Schaltplans entstehen.

Suspension - Page 29

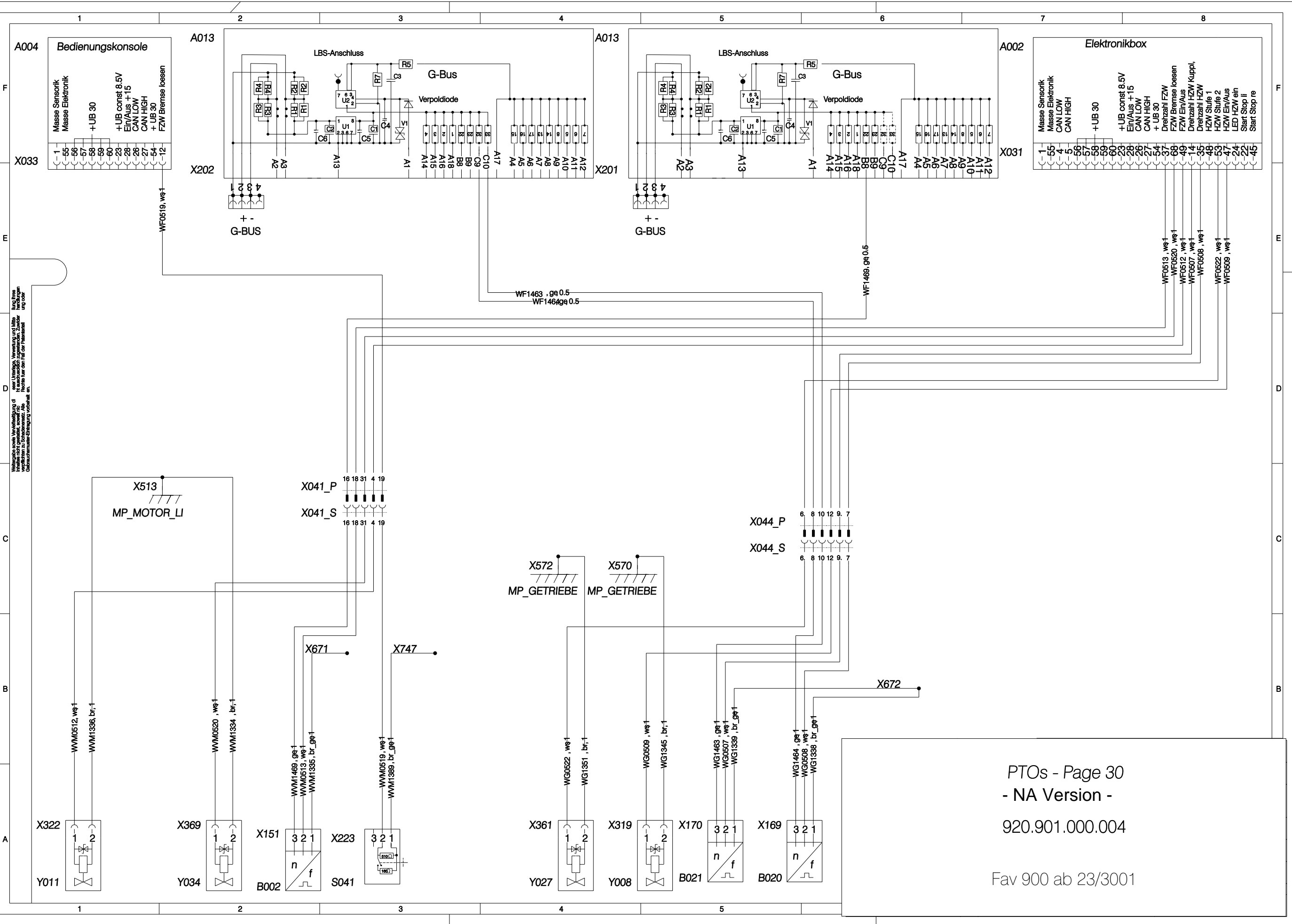
916.901.000.004

Fav 900 ab 23/3001



PTOs - Page 30  
 - EU Version -  
 916.901.000.004

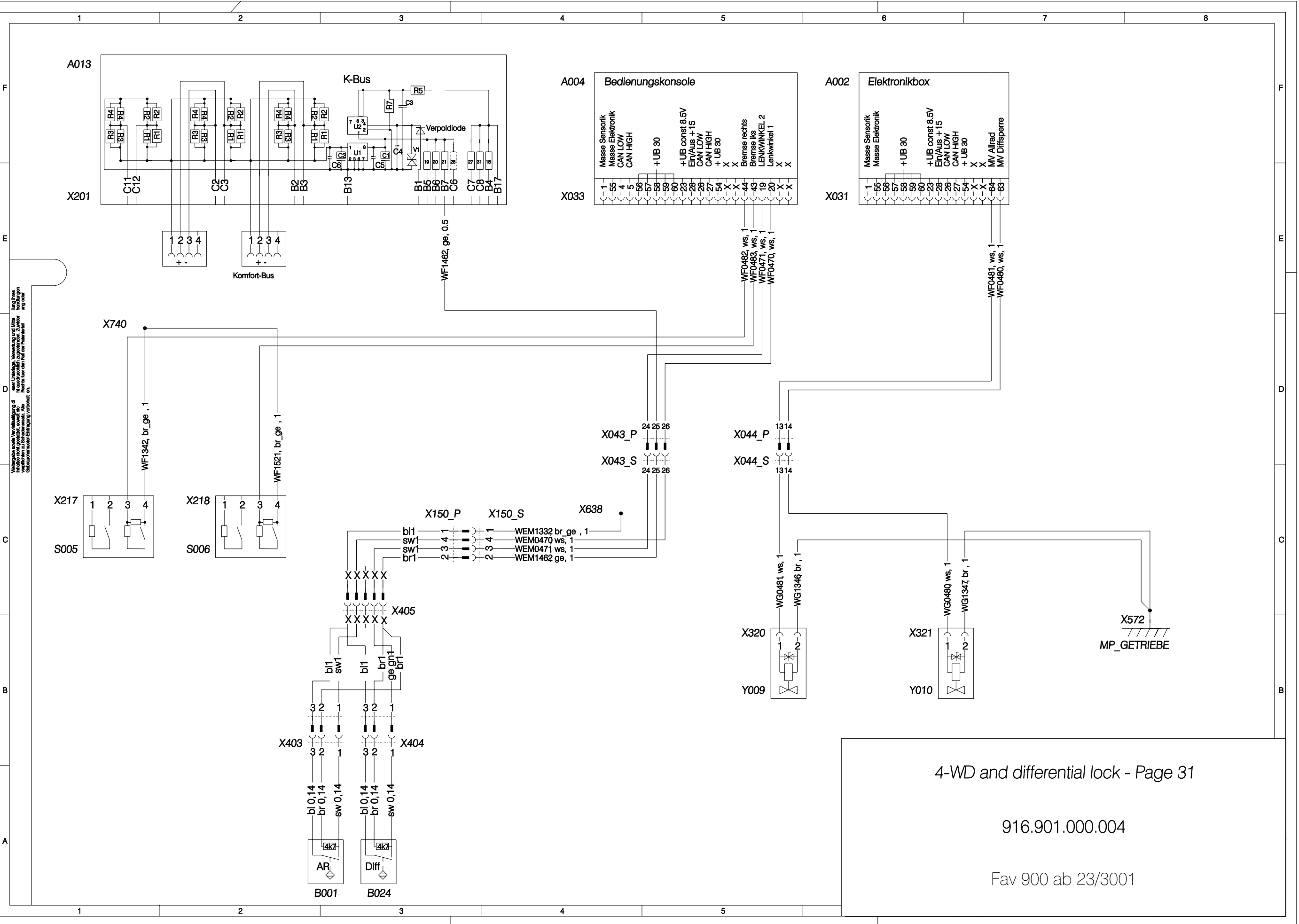
Fav 900 ab 23/3001



Mikrorechner wird über CAN-Bus mit dem Motor verbunden. Die Verbindung ist über einen CAN-Adapter zu realisieren. Die Verbindung ist über einen CAN-Adapter zu realisieren. Die Verbindung ist über einen CAN-Adapter zu realisieren.

PTOs - Page 30  
 - NA Version -  
 920.901.000.004  
 Fav 900 ab 23/3001





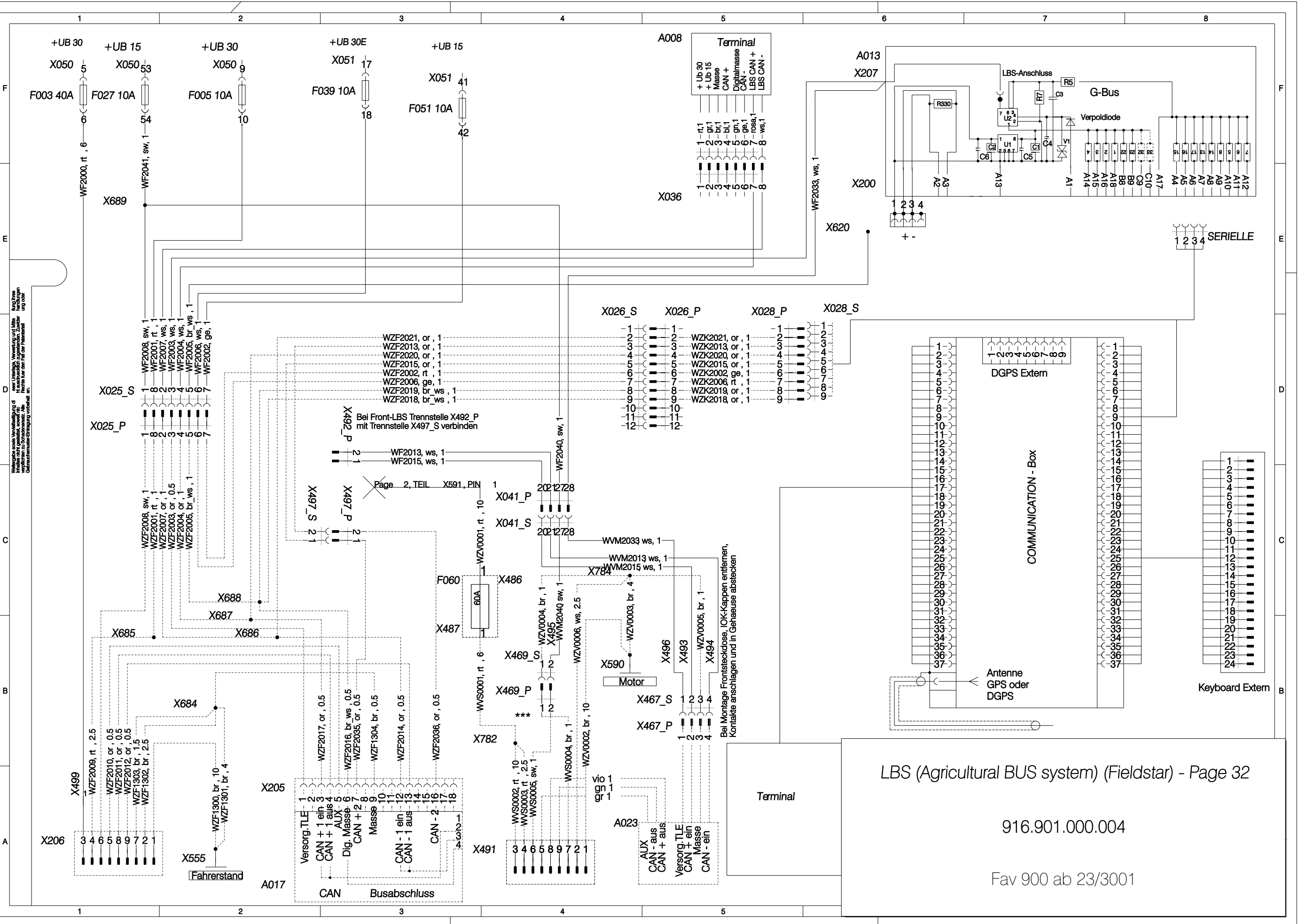
Vollständige und vollständige oder  
 teilweise nicht komplette, sowie für  
 die Anwendungszwecke, zu den  
 angegebenen Teilen für die  
 Gebrauchsanweisung, vorhalten.

Bitte diese  
 Hinweise und  
 Anmerkungen  
 sorgfältig  
 lesen und  
 beachten.

4-WD and differential lock - Page 31

916.901.000.004

Fav 900 ab 23/3001



LBS (Agricultural BUS system) (Fieldstar) - Page 32

916.901.000.004

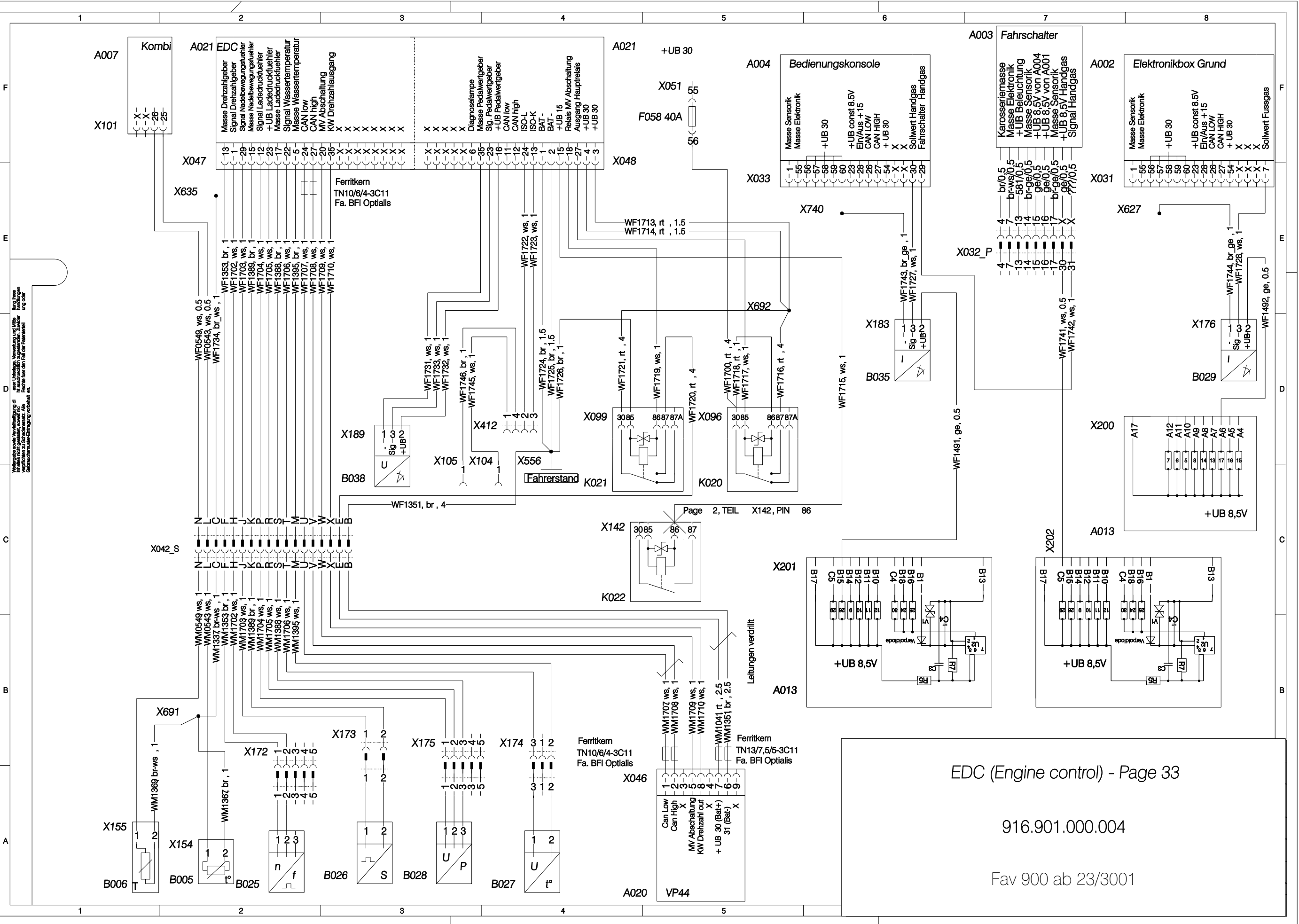
Fav 900 ab 23/3001

Vollversion nach Veredelung d...  
 ist nicht...  
 ...  
 ...

Bei Montage Frontsteckdose, IOK-Kappen entfernen,  
 Kontakte anschlagen und in Gehäuse abstecken

Bei Front-LBS Trennstelle X492\_P  
 mit Trennstelle X497\_S verbinden

Page 2, TEIL

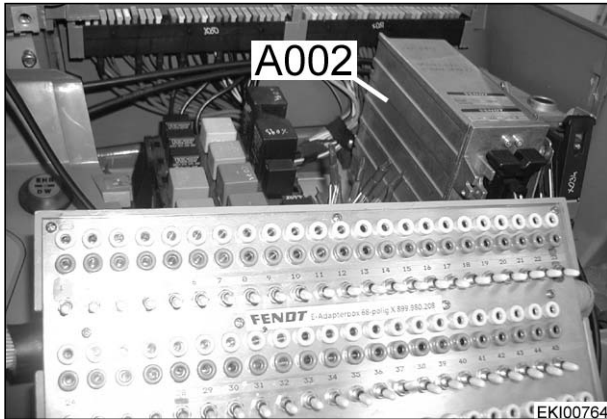


## Single e-box

711 / 712 > 21/1001 - 714 / 716 > 21/2001; Fav 900 > 23/3001

Testing

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / system in general <b>A002 - e-box</b>	<b>E</b>
---	--	----------



Connect e-adapter box X 899.980.208.100 directly to A002 e-box.

Verifying power supply

**Note:**  
Ignition "ON"

Test	Pin	Target value	Condition	Possible cause of fault
+UB 15 supply	28	12.0 VDC to 14.0 VDC		Fuse (F045) in X051 or in wiring. See also electronics power supply circuit diagram (sheet 19)
Sensor system earth	1			
+UB 30 supply	54	12.0 VDC to 14.0 VDC		Fuse (F041) in X051 or in wiring
Sensor system earth	1			
+UB 30 supply	56, 57, 58, 59, 60	12.0 VDC to 14.0 VDC		Fuse (F041) in X051 or in wiring, X629 connector UB 30
Sensor system earth	1			

## Pin assignment and signal values

**Note:**  
Ignition "ON"  
Connect e-adapter box X 899.980.208.100 directly to A002 - e-box.

All readings +/- 10%

Description of ECU signal type, see Chapter 9700 Index A

Pin	Pin description	Signal type	Signal at component	Signal from e-box (break in cable)
1	Analogue earth (sensor earth)	Earth		

Date	Version	Page	A002 - e-box	Capitel	Index	Docu-No.
02.11.2000	a	1/6		9000	E	000028

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b> <b>A002 - e-box</b>	<b>E</b>
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Pin	Pin description	Signal type	Signal at component	Signal from e-box (break in cable)
2	A009 Actuator unit Supply	Digital output	0 V 12 V	
3	Not assigned			
4	Transmission bus	- wire	approx. 2.8 V	
5	Transmission bus	+ wire	approx. 1.7 V	
6	B016 Angular resolver Range sensor	Current input 4-20 mA	1 V	0 V
7	B018 Angular resolver Setpoint engine speed	Current input 4-20 mA	1.2-3.6 V	0 V
8	B017 Angular resolver Clutch pedal	Current input 4-20 mA	0.8-3.6 V	0 V
9	A003 Joystick Automatic stop	Current input 4-20 mA	1.0 V 2.9 V	0 V
10	S013 Emergency mode push-button	Current output 4-20 mA	0.4 V	
11	A003 Crossgate lever Signal valve no. 1 (yellow)	Analogue input 0-8.5 V	6.9 V- 5.8 V- 4.0 V- 1.8 V- 1.0 V	
12	B010 Hall-effect sensor engine 1	Frequency input	5.4 V 1.1 V	7.3 V
13	B014 Speed sensor Hydrostatic unit/speed	Frequency input	5.4 V 1.1 V	7.3 V
14	B021 Hall-effect sensor Rear PTO clutch	Frequency input	5.4 V 1.1 V	7.3 V
15	Not assigned			

Date	Version	Page	<b>A002 - e-box</b>	Capitel	Index	Docu-No.
02.11.2000	<b>a</b>	2/6		<b>9000</b>	<b>E</b>	<b>000028</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b> <b>A002 - e-box</b>	<b>E</b>
---	---	----------

Pin	Pin description	Signal type	Signal at component	Signal from e-box (break in cable)
16	A003 Joystick v +	Digital input	5.1 V	8.0 V
17	A003 Joystick Operating range Neutral	Digital input	5.1 V 2.4 V	8.0 V
18	B015 Speed sensor Bevel pinion/rotational direction	Digital input	5.1 V 2.4 V	8.0 V
19	A009 Actuator unit Reference F/R	Digital input	5.1 V 2.4 V	8.0 V
20	A003 Joystick	Digital input	5.1 V 2.4 V	8.0 V
21	A003 Crossgate lever Rest position	Digital input	2.4 V	8.0 V
22	S019 "PTO on" switch Left rear	Digital input	5.1 V 2.4 V	8.0 V
23	A013 fuse board ABC Enhanced controls e-box 8.5 V output	8.5 V output for sensors	8.5 V	8.5 V
24	S019 / S020 "PTO on" switch rear, (LED)	Digital output	0 V 12 V	0 V
25	A003 Joystick LED Neutral	Digital output	12 V 0 V	12 V
26	A002  Enhanced controls e-box CAN interface	- wire	approx. 3.0 V	
27	A002  Enhanced controls e-box CAN interface	+ wire	approx. 1.8 V	
28	A002 Enhanced controls e-box Electronics On / Off +15	D+ input	12 V	0 V
29	B008 High-pressure sensor	Current input 0-20 mA	0.8 V	0 V
30	A003 Joystick Acceleration I-IV	Current input 0-20 mA	I=3.6V- I=2.7V- I=1.8V- I=0.9V-	0 V

Date	Version	Page	<b>A002 - e-box</b>	Capitel	Index	Docu-No.
02.11.2000	<b>a</b>	3/6		<b>9000</b>	<b>E</b>	<b>000028</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b> <b>A002 - e-box</b>	<b>E</b>
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Pin	Pin description	Signal type	Signal at component	Signal from e-box (break in cable)
31	A003 Joystick Automatic rear	Current input 0-20 mA	1.0 V	0 V
32	A003 Joystick Automatic front	Current input 0-20 mA	1.0 V	0 V
33	A003  Crossgate lever Signal valve no. 2 (blue)	Analogue input  0-8.5 V	6.9V - 5.8V - 4.0V - 1.8V - 1.0V	0 V
34	B015 Speed sensor Bevel pinion/speed	Frequency input	5.4 V 1.1 V	7.3 V
35	B020 Hall-effect sensor Rear PTO	Frequency input	5.4 V 1.1 V	7.3 V
36	B011 Hall-effect sensor engine 2	Frequency input	5.4 V 1.1 V	7.3 V
37	B002 Hall-effect sensor Front PTO	Frequency input	5.4 V 1.1 V	7.3 V
38	A003 Joystick v -	Digital input	5.1 V	8.0 V
39	S014 Switch Rapid reversing	Digital input	5.1 V 2.4 V	8.0 V
40	A003 Joystick	Digital input	5.1 V 2.4 V	8.0 V
41	A003 Joystick Rest position	Digital input	2.4 V	8.0 V
42	B014 Speed sensor Hydrostatic unit/rotational direction	Digital input	2.4 V 5.1 V	8.0 V
43	A003 Joystick Rapid reversing	Digital input	5.1 V	8.0 V
44	A003 Joystick Cruise control	Digital input	5.1 V	8.0 V
45	S020 "PTO on" switch right rear	Digital input	5.1 V 2.4 V	8.0 V

Date	Version	Page	<b>A002 - e-box</b>	Capitel	Index	Docu-No.
02.11.2000	<b>a</b>	4/6		<b>9000</b>	<b>E</b>	<b>000028</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b> <b>A002 - e-box</b>	<b>E</b>
---	---	----------

Pin	Pin description	Signal type	Signal at component	Signal from e-box (break in cable)
46	Y006 Solenoid valve Exhaust brake	Pulse width output	0 V 12 V	0 V
47	Y008 Solenoid valve Rear PTO	Pulse width output	0 V 12 V	0 V
48	Y026 Solenoid valve PTO stage I	Pulse width output	0 V 12 V	0 V
49	Y011 Solenoid valve Front PTO	Pulse width output	0 V 12 V	0 V
50	Y004 Solenoid valve	Pulse width output	0 V 12 V	0 V
51	Y005 Solenoid valve Speed limiter	Pulse width output	0 V 12 V	0 V
52	Y032 Solenoid valve neutral Control pressure electr. valves	Pulse width output	0 V 12 V	0 V
53	Y027 Solenoid valve PTO stage II	Pulse width output	0 V 12 V	0 V
54	A002 Enhanced controls e-box + UB 30	+ UB 30	12 V	0 V
55	A002 Enhanced controls e-box Electrics/digital earth	Electrics/digital earth		
56.. 60	A002 Enhanced controls e-box	+UB Output stage supply	12 V	0 V

Date	Version	Page	<b>A002 - e-box</b>	Capitel	Index	Docu-No.
02.11.2000	<b>a</b>	5/6		<b>9000</b>	<b>E</b>	<b>000028</b>



**Single e-box**

711 / 712 > 21/1001 - 714 / 716 > 21/2001; Fav 900 > 23/3001

Testing

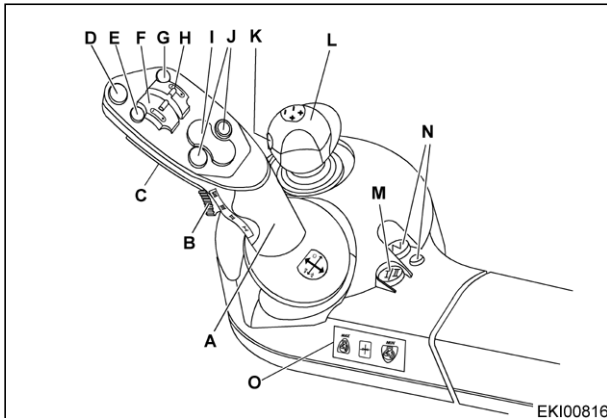
<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b> <b>A002 - e-box</b>	<b>E</b>
---	---	----------

Pin	Pin description	Signal type	Signal at component	Signal from e-box (break in cable)
61	Y002 Solenoid valve Range I	Digital output	0 V 12 V	0 V
62	Y003 Solenoid valve Range II	Digital output	0 V 12 V	0 V
63	Y010 Solenoid valve Diff. lock	Digital output	0 V 12 V	0 V
64	Y009 Solenoid valve 4WD	Digital output	12 V 0 V	0 V
65	Y013 Solenoid valve Lower suspension	Digital output	0 V 12 V	0 V
66	Y014 Solenoid valve Raise suspension	Digital output	0 V 12 V	0 V
67	Y033 Solenoid valve Charge/flush suspension	Digital output	0 V 12 V	0 V
68	Y028 Solenoid valve PTO stage III	Digital output	0 V 12 V	0 V

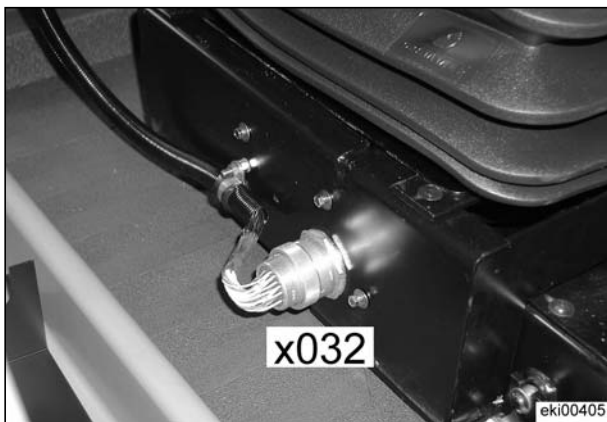
v+ = accelerate, v- = decelerate, FT = membrane keypad, WS = rocker switch

Date	Version	Page	<b>A002 - e-box</b>	Capitel	Index	Docu-No.
02.11.2000	<b>a</b>	6/6		<b>9000</b>	<b>E</b>	<b>000028</b>

<b>Fav 900</b>	<b>Electrics / General system</b> <b>A003 joystick</b>	<b>E</b>
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- A = Joystick
- B = Acceleration control
- C = Activating control
- D = Stop key EPC - PTO control
- E = Floating position spool valve green or blue
- F = Raising / lowering spool valve green or blue
- G = Floating position spool valve red or yellow
- H = Raising / lowering spool valve red or yellow
- I = Rear power lift - PTO control
- J = Front power lift - PTO control
- K = 3rd hydraulic circuit on front loader
- L = Crossgate lever, raising / lowering and floating position spool valves yellow/blue or red/green
- M = Range control
- N = Neutral switch with LED
- O = EDC control module



Bottom right of driver's seat bracket  
Connect e-adapter box X 899.980.208.100 to cable coupler X032.

**Note:**  
Ignition "ON"

Test	Pin	Switch position	Target value A	Target value B	Condition	Possible cause of fault
Supply to A002	16		8.5 VDC			Miniature fuse (5) within A013 or within wiring
Sensor system earth	14					

Supply to A002	15		8.5 VDC			Miniature fuse (15) within A013 or within wiring
Sensor system earth	14					

Date	Version	Page	<b>A003 joystick</b>	Capitel	Index	Docu-No.
29.11.2000	<b>b</b>	1/5		<b>9000</b>	<b>E</b>	<b>000051</b>

<b>Fav 900</b>	<b>Electrics / General system</b> <b>A003 joystick</b>	<b>E</b>
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Test	Pin	Switch position	Target value A	Target value B	Condition	Possible cause of fault
Acceleration control (ramp switch)	2	4	0.94 VDC	4.6 mA		
		3	1.91 VDC	9.4 mA		
		2	3.14 VDC	15.4 mA		
		1	4.05 VDC	19.7 mA		
Sensor system earth	14					

Cruise control	5		5.0 VDC	9.6 mA	Activated - push joystick to right	
			2.5 VDC	19.0 mA		
Sensor system earth	14					

Joystick in rest position	6		2.5 VDC	19.0 mA	Push joystick forward, backward, left and right	
			5.0 VDC	9.6 mA		
Sensor system earth	14					

Rapid direction change	8		5.0 VDC	9.6 mA	Push joystick to left	
			2.5 VDC	19.0 mA		
Sensor system earth	14					

"Neutral" display	9		12 VDC to 13.0 VDC		Neutral switch to "ON"	
Earth	4					

"Neutral" operating range	11		5.0 VDC	9.6 mA	Neutral activated	
			2.5 VDC	19.0 mA	Push back and hold	
Earth	4					

Activation	10		5.0 VDC	9.6 mA	Activating control pressed	
			2.5 VDC	19.0 mA		
Sensor system earth	14					

Switching operating ranges I / II	12		5.0 VDC	9.6 mA	Switch pressed	
			2.5 VDC	19.0 mA		
Sensor system earth	14					

<b>Fav 900</b>	<b>Electrics / General system</b> <b>A003 joystick</b>					<b>E</b>
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Test	Pin	Switch position	Target value A	Target value B	Condition	Possible cause of fault
Rear automatic control toggle switch	22	Neutral	1.2 VDC	5.4 mA		
		Raise	1.9 VDC	8.9 mA		
		Lower	3.0 VDC	14.5 mA		
Earth	4					

Stop - automatic function	24		1.1 VDC	5.3 mA		
			3.0 VDC	14.4 mA		
Earth	4					

Transmission ratio, forwards	26		5.0 VDC	9.5 mA		
			2.4 VDC	19.0 mA	Push joystick forward and hold	
Sensor system earth	14					

Transmission ratio, reverse	25		5.0 VDC	9.5 mA		
			2.4 VDC	19.0 mA	Push joystick back and hold	
Sensor system earth	14					

+ UB lighting	3		12.0 VDC to 13.0 VDC			
Earth	4					

+ UB lighting dimmer	13		7.0 VDC to 12.0 VDC	6.3 mA to 10.0 mA		
Earth	7					



Dimmer control at top of instrument panel. Current and voltage will vary.

<b>Fav 900</b>	<b>Electrics / General system</b> <b>A003 joystick</b>	<b>E</b>
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Test	Pin	Switch position	Target value A	Target value B	Condition	Possible cause of fault
Crossgate lever, supply to A002	1		8.5 VDC			Miniature fuse (6) within A013 or within wiring
Sensor system earth	14					

Crossgate lever, rest position (signal to A002 - ECU)	29		2.4 VDC			
Sensor system earth	14					

Valve no. 1 (yellow)	18	Neutral	4.0 VDC	54.5 mA		
		Raise	1.8 VDC	22.5 mA		
		Lower	5.8 VDC	81.5 mA		
		Floating position	6.9 VDC	96.4 mA		
Sensor system earth	14					

Valve no. 2 (blue)	23	Neutral	4.0 VDC	54.5 mA		
		Raise	5.8 VDC	81.5 mA		
		Lower	1.8 VDC	22.5 mA		
		Floating position	1.0 VDC	14.5 mA		
Sensor system earth	14					

Relay, 3rd circuit	21	Not actuated	12.0 VDC			
		Actuated	0 VDC			
Earth, 3rd circuit	20					

Rocker switch, valve no. 3 (red)	27	Neutral	1.0 VDC	5.3 mA		
		Raise	1.4 VDC	7.2 mA		
		Lower	2.9 VDC	14.0 mA		
		Floating position	3.6 VDC	17.0 mA		
Sensor system earth	14					

Rocker switch, valve no. 4 (green)	28	Neutral	1.0 VDC	5.3 mA		
		Raise	1.4 VDC	7.2 mA		
		Lower	2.9 VDC	14.0 mA		
		Floating position	3.6 VDC	17.0 mA		
Sensor system earth	14					

Date	Version	Page	A003 joystick			Capitel	Index	Docu-No.
29.11.2000	<b>b</b>	4/5				<b>9000</b>	<b>E</b>	<b>000051</b>

<b>Fav 900</b>	<b>Electrics / General system A003 joystick</b>	<b>E</b>
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Test	Pin	Switch position	Target value A	Target value B	Condition	Possible cause of fault
Max. engine speed	31	Not actuated	1.1 VDC	5.3 mA		
		Actuated	2.1 VDC	10.5 mA	Actuate and hold	
Sensor system earth	14					

Min. engine speed	31	Not actuated	1.1 VDC	5.3 mA		
		Actuated	1.5 VDC	7.3 mA	Actuate and hold	
Sensor system earth	14					

Maintain engine speed	31	Not actuated	1.1 VDC	5.3 mA		
		Actuated	2.9 VDC	14 mA	Actuate and hold	
Sensor system earth	14					

**The "Store engine speeds" function is cancelled under the following conditions:**

1. Speed greater than 18 km/h and footbrake actuated.
2. Speed greater than 18 km/h and exhaust brake actuated.
3. Relevant keys pressed again.
4. Higher value than stored value is reached using accelerator or hand throttle.
5. Hand throttle actuation involving engine speed change of greater than 150 rpm.

Date	Version	Page	Capitel	Index	Docu-No.
29.11.2000	<b>b</b>	5/5	<b>A003 joystick</b>	<b>9000</b>	<b>E</b>
				<b>E</b>	<b>000051</b>

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Electrics / system in general  <b>A004 - control console</b></p>	<p><b>E</b></p>
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Connect e-adapter box X 899.980.208.100 directly to A004 - control console.

**Checking power supply to A004 - control console**

**Note:**  
 Ignition "ON".

Test	Pin	Target value	Condition	Possible cause of fault
+UB15 supply	28	12 VDC to 14 VDC		Fuse (F044) in X051 or in wiring
Sensor system earth	1			
+UB30 supply	54	12 VDC to 14 VDC		Fuse (F042) in X051 or in wiring
Sensor system earth	1			
+UB30 supply	56,57,5-8,59,60	12 VDC to 14 VDC		Fuse (F042) in X051 or in wiring, X604 connector UB30
Sensor system earth 1	1			

**Pin assignment and signal values**

**Note:**  
 Ignition "ON"  
 Connect e-adapter box X 899.980.208.100 directly to A004 - control console.  
 All readings +/- 10%  
 Description of control console signal type, see Chapter 9700 Index A

Pin	Pin description	Signal type	Signal at component	Signal from A004 (break in cable)
1	Analogue earth			
2	Not assigned			
3	Not assigned			
4	Not assigned			

Date	Version	Page	A004 - control console	Capitel	Index	Docu-No.
6.3.2001	a	1/4		9000	E	000092

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b> <b>A004 - control console</b>	<b>E</b>
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Pin	Pin description	Signal type	Signal at component	Signal from A004 (break in cable)
5	Not assigned			
6	A003 valve no. 4 (green)	Current input	Neutral 5.3 mA + (raise) 7.2 mA - (lower) 14 mA Neutral 1.0 V + (raise) 1.4 V - (lower) 2.9 V	0 V
7	A003 valve no. 3 (red)	Current input	Neutral 5.3 mA + (raise) 7.2 mA - (lower) 14 mA Neutral 1.0 V + (raise) 1.4 V - (lower) 2.9 V	0 V
8	A004 front power lift target value	Current input	Item 10: 4.0 mA Item 0: 20 mA Item 10: 0.8 V Item 0: 4.0 V	0 V
9	B040 front power lift position angular resolver	Current input	Lower limit position: 5.9 mA Upper limit position: 18.8 mA Lower limit position: 1.0 V Upper limit position: 3.8 V	0 V
10	Not assigned			

Pin	Pin description	Signal type	Signal at component	Signal from A004 (break in cable)
11	Not assigned			
12	Not assigned			
13	Not assigned			
14	Not assigned			
15	Not assigned			
16	B022 pressure-operated switch kickout, NA version only	Digital input	5.1 V and 2.4 V	8.0 V
17	S036 hydraulic oil level switch	Digital input	Full 5.8 V Empty 3.8 V	8.0 V
18	S015 handbrake switch	Digital input	Brake released 2.4 V Brake applied 5.1 V	8.0 V
19	B047 steering angle switch (4WD and diff. lock)	Digital input	For figures see Chapter 9000 Index E (B047)	8.0 V
20	B047 steering angle switch (4WD and diff. lock)	Digital input	For figures see Chapter 9000 Index E (B047)	8.0 V

Date	Version	Page	<b>A004 - control console</b>	Capitel	Index	Docu-No.
6.3.2001	<b>a</b>	2/4		<b>9000</b>	<b>E</b>	<b>000092</b>



<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b> <b>A004 - control console</b>	<b>E</b>
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Pin	Pin description	Signal type	Signal at component	Signal from A004 (break in cable)
21	B009 output temperature sensor	Digital input	For figures see Chapter 9000 Index E (B009)	8.0 V
22	S017 clogged filter pressure-operated switch	Digital input	System OK 2.4 V Pressure filter clogged 5.1 V	8.0 V
23	A013 fuse board ABC	8.5 V output for sensors	8.5 V	8.5 V
24	Not assigned			
25	Not assigned			
26	CAN-low	- wire	approx. 2.9 V	
27	CAN-high	+ wire	approx. 1.7 V	
28	A004 control console electronics On / Off +15	D+ input	12 V	0 V
29	A003 joystick, hand throttle memory keys only on Fav 900/23/3001 (EDC)		For values see chapter 2710 section A speed adjustment EDC	
30	B035 hand throttle angular resolver only on Fav 900/23/3001 (EDC)		For values see chapter 2710 section A speed adjustment EDC	

Pin	Pin description	Signal type	Signal at component	Signal from A004 (break in cable)
31	Not assigned			
32	B003 suspension angular resolver	Current input	Upper limit position: 8.2 mA Lower limit position: 18 mA Upper limit position: 1.6 V Lower limit position: 3.6 V	
33	Not assigned			
34	S047 exhaust brake plunger-operated switch	Digital input	Switch not actuated 2.4 V Switch actuated 5.1 V	8.0 V
35	S045 reversing system solenoid switch)	Digital input	Forwards 5.1 V Reverse 2.4 V	8.0 V
36	Not assigned			
37	Not assigned			
38	Not assigned			
39	S034 coolant level switch	Digital input	Level OK: 2.4 V too low 5.1 V	8.0 V
40	S022 external switch, lower front power lift	Digital input	Rest position 5.1 V Lower 2.4 V	8.0 V

Date	Version	Page	<b>A004 - control console</b>	Capitel	Index	Docu-No.
6.3.2001	<b>a</b>	3/4		<b>9000</b>	<b>E</b>	<b>000092</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b> <b>A004 - control console</b>	<b>E</b>
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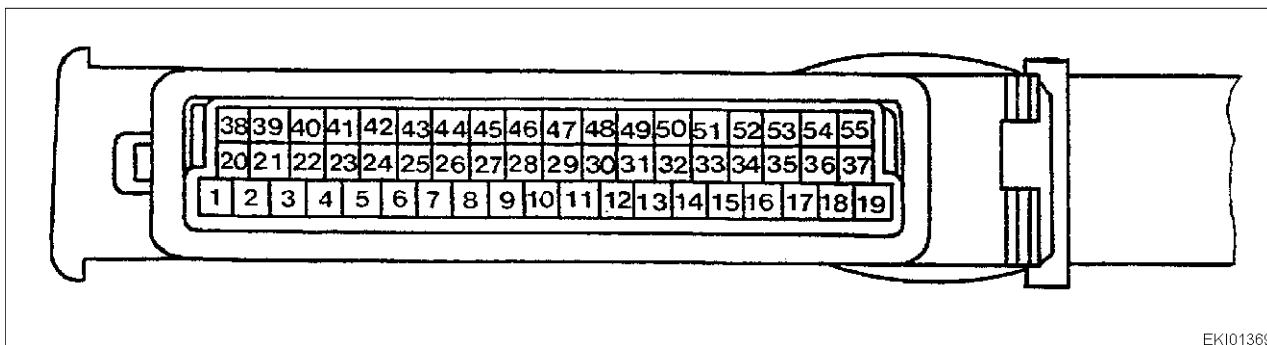
Pin	Pin description	Signal type	Signal at component	Signal from A004 (break in cable)
41	S021 external switch, raise front power lift	Digital input	Rest position: 5.1 V Raise: 2.4 V	8.0 V
42	S023 solenoid switch to lock front power lift external switch	Digital input	5.1 V or 2.4 V	8.0 Vnde
43	S006 left brake solenoid switch	Digital input	Not actuated 2.4 V Actuated 5.1 V	8.0 V
44	S005 right brake solenoid switch	Digital input	Not actuated 2.4 V Actuated 5.1 V	8.0 V
45	S025 / S026 steering pressure-operated switch / flow monitor	Digital input	System OK: 5.1 V, for further test stages see Chapter 9000 Index E (S025/S026)	8.0 V
46	A005 EPC e-box, target value rear EPC +UB	+UB, when measuring, earth at pin 48 (A005)	9.5 V	0 V
47	A005 EPC e-box, target value rear EPC	when measuring, earth at pin 48 (A005)	Item 10: 1.2 V Item 0: 8.5 V	10 V
48	A005 EPC e-box, target value rear EPC earth	Earth		
49	Not assigned			
50	A004 control console, front power lift target value	Current input	Item 10: 4 mA Item 0: 20 mA Item 10: 0.8 V Item 0: 4 V	0 V

Pin	Pin description	Signal type	Signal at component	Signal from A004 (break in cable)
51	Not assigned		nde	
52	Not assigned			
53	Not assigned			
54	A004 control console, +UB 30	Supply	12 V	0 V
55	A004 control console, electronics earth	Digital earth		
56-60	A004 control console	Output stage supply +UB	12	0 V
61-68	Not assigned			

Date	Version	Page	<b>A004 - control console</b>	Capitel	Index	Docu-No.
6.3.2001	<b>a</b>	4/4		<b>9000</b>	<b>E</b>	<b>000092</b>

Farmer 400 Fav 700 Fav 900	Electrics / system in general <b>A005 - ECU, lift assembly</b>	<b>E</b>
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**A005** - pin assignment of cable loom plug



EKI01369



**Note:**  
 Connect e-adapter box X 899.980.208.100 directly to A005 using adapter cable X 899.980.208.205. Ignition "ON".

Test	Pin	Target value	Condition	Possible cause of fault
Supply	47	approx. 12 VDC	Engine stopped	Fuse (F045) or in wiring
		approx. 13 VDC to 14 VDC	Engine running	
Earth	9			
Supply	47	Voltage drop: max. 1 VDC over last measurement	Also connect approx. 55 W bulb	Voltage must remain stable even under load
Earth	9			

Date	Version	Page	<b>A005 - ECU, lift assembly</b>	Capitel	Index	Docu-No.
28.11.2000	<b>b</b>	1/5		<b>9000</b>	<b>E</b>	<b>000046</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / system in general <b>A005 - ECU, lift assembly</b>	<b>E</b>
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**Note:**  
 If voltage drop is greater, remove contact resistances (e.g. at fuse).

Test	Pin	Target value	Condition	Possible cause of fault
Supply	10	approx. 12 VDC	Engine stopped	Fuse (F045) or in wiring
		approx. 13 VDC to 14 VDC	Engine running	
Earth	9			
Supply	10	Voltage drop: max. 1 VDC over last measurement	Also connect approx. 55 W bulb	Voltage must remain stable even under load
Earth	9			

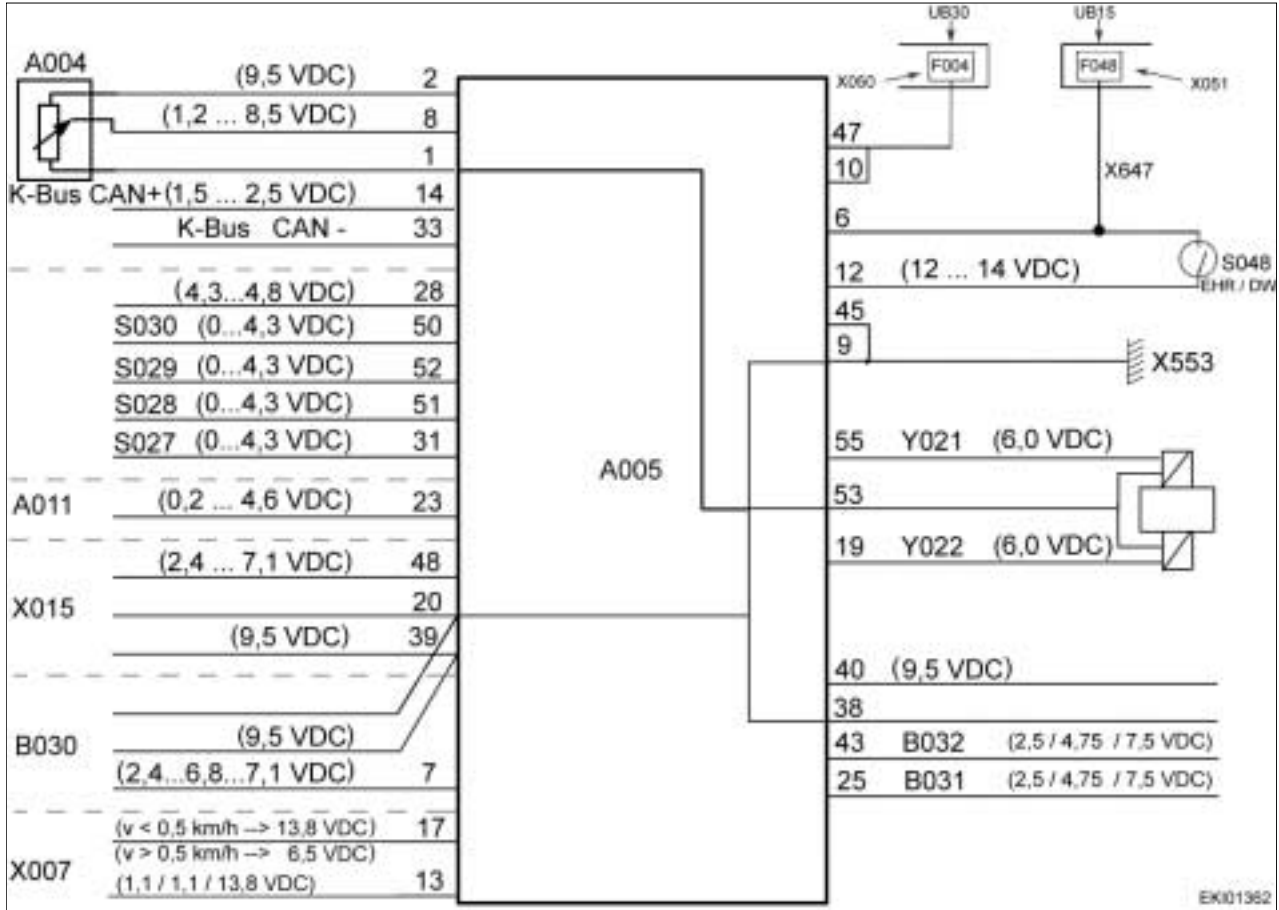
Test	Pin	Requested value	Condition	Possible cause of fault
Supply	6	approx. 12 VDC	Engine stopped	Fuse (F045) or in wiring
		approx. 13 VDC to 14 VDC	Engine running	
Earth	9			
Supply	6	Voltage drop: max. 1 VDC over last measurement	Also connect approx. 55 W bulb	Voltage must remain stable even under load
Earth	9			

Test	Pin	Target value	Condition	Possible cause of fault
S048 - switch, EPC / DA switchover	12	0 VDC	Switchover to EPC (S048, open)	
		12 VDC	Switchover to DA (S048, closed)	
Earth	9			

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Electrics / system in general  <b>A005 - ECU, lift assembly</b></p>	<p><b>E</b></p>
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**Note:**

Maximum load on S048 - switch, EPC / DA switchover 10 W.



**Note:**

All readings +/- 10%

Pin	Component
1	Depth control earth
2	Depth control supply (9.5 VDC)
6	+UB15 connector (12 VDC to 14 VDC)
7	Signal B030 - sensor, rear power lift position (lift assembly lowered - 2.4 VDC; lift assembly raised - 6.7 VDC; mechanical stop, ext. switch - 7.1 VDC)
8	Depth control signal (1.2 VDC to 8.5 VDC)
9	Cab earthing point (X553)
10	+UB30 connector (12 VDC to 14 VDC)
12	UB15 connector / EPC / DA switchover (X647)
13	Rapid lift control output (lower - 1.1 VDC; stop - 1.1 VDC; raise - 13.8 VDC) for X007
14	Enhanced controls bus CAN-high
17	Actual travel speed (X007) Travel speed less than 0.5 km/h (13.8 VDC) Travel speed greater than 0.5 km/h (6.5 VDC) depending on travel speed
19	Y022 - valve, lowering (6 VDC)
20	Earth for ext. position gauge and B030 - sensor, rear power lift position
23	Signal A011 - sensor; radar (0.2 VDC to 4.6 VDC)

Date	Version	Page	A005 - ECU, lift assembly	Capitel	Index	Docu-No.
28.11.2000	b	3/5		9000	E	000046

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b> <b>A005 - ECU, lift assembly</b>	<b>E</b>
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<b>Pin</b>	<b>Component</b>
25	B031 - sensor, draft-sensing pin right (tensile load - 2.5 VDC; neutral - 4.75 VDC; compressive load - 7.5 VDC)
28	External control supply (not actuated - 4.8 VDC; actuated - 4.3 VDC)
31	S027 - switch, raise rear power lift, right (not actuated - 0 VDC; actuated - 4.3 VDC)
33	Enhanced controls bus CAN-low
38	Draft-sensing pin earth
39	Supply for ext. position gauge and B030 - sensor, rear power lift position (9.5 VDC)
40	Draft-sensing pin supply (9.5 VDC)
43	B032 - sensor, draft-sensing pin left (tensile load - 2.5 VDC; neutral - 4.75 VDC; compressive load - 7.5 VDC)
45	Cab earthing point (X553)
47	UB30 connector (12 VDC to 14 VDC)
48	Electrohydraulic remote control signal via socket X015 (2.4 VDC to 7.1 VDC)
50	S030 - switch, lower rear power lift, left (not actuated - 0 VDC; actuated - 4.3 VDC)
51	S028 - switch, raise rear power lift, right (not actuated - 0 VDC; actuated - 4.3 VDC)
52	S029 - switch, raise rear power lift, left (not actuated - 0 VDC; actuated - 4.3 VDC)
53	Control valve earth
55	Y021 - valve, raising (6 VDC)

<b>Component number</b>	<b>Component</b>
A004	ECU, control console (depth control potentiometer)
A005	ECU, lift assembly
A011	Sensor, radar
B030	Sensor, rear power lift position
B031	Sensor, draft-sensing pin right
B032	Sensor, draft-sensing pin left
F004	Fuse, EPC relay UB
F048	Fuse, EPC supply
K-Bus	Enhanced controls bus
S027	Switch, raise rear power lift, right
S028	Switch, lower rear power lift, right
S029	Switch, raise rear power lift, left
S030	Switch, lower rear power lift, left
S048	Switch, EPC / DA switchover
X007	Implement socket cable coupler
X015	Electrohydraulic remote control socket
X050	Fuse holder 1 compl.
X051	Fuse holder 2 compl.
X553	Cab earthing point
X647	UB 15 connector (EPC / DA switchover)
Y021	Valve, raising
Y022	Valve, lowering

**Note:**

**Signal from depth control system passes via pin 8 to EPC-C e-box A005.**

**Signal from rapid lift control passes via K-bus to EPC-C e-box A005.**

**Signals from rapid lowering system, hitch lift lock and rear power lift automatic system pass via K-bus to EPC-C e-box A005.**

Validity:

relevant e-box = G 716.860.100.055 and further sequential end numbers.

Date	Version	Page	Capitel	Index	Docu-No.
28.11.2000	<b>b</b>	4/5	<b>A005 - ECU, lift assembly</b>	<b>9000</b>	<b>E</b>
					<b>000046</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / system in general <b>A005 - ECU, lift assembly</b>	<b>E</b>
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**Applicability:**

previous versions of Fav 700 - twin e-box with end numbers 051 to 054 are interchangeable with current latest versions.

**Explanation and comparison with EPC-C box:**

- (fitted to Fav 500; Xylon; Fav 800 and Fav 900 up to 23/3000)

**New**

- Terminal setting options for rear power lift mean that several pin assignments are no longer applicable, though this has to be programmed via K-bus (see pins 14,33).
- Only "actual" signal cables are shown in relevant electrical circuit diagrams (EPC control system). Bus messages to terminal, e-box A002, instrument panel A007 and terminal A008 cannot be seen in circuit diagram (see "CAN enhanced controls bus circuit diagram").

**Unchanged**

- Setpoint / depth settings in control console A004 as voltage potentiometer
- Connection to K-bus and CAN1
- Electrical values of power lift components

**Testing and diagnostics:**

- Generally applicable circuit diagram: "Electrohydraulic power lift control"
- Other circuit diagrams required: "Power supply", "Earthing system", "Implement socket", "Electronics power supply", "Enhanced controls bus", and "Instrument panel"
- Following test equipment is required to carry out electrical measurements directly on EPC box: 68-pin adapter box X 899.980.208.100 and 68-pin/55-pin intermediate adapter cable X 899.980.208.208
- "EPC rear" menu should be used in FENDIAS.
- Please refer to Electrical Block Diagram for terminal diagram for pulse counting with on-board computer using external switch.....

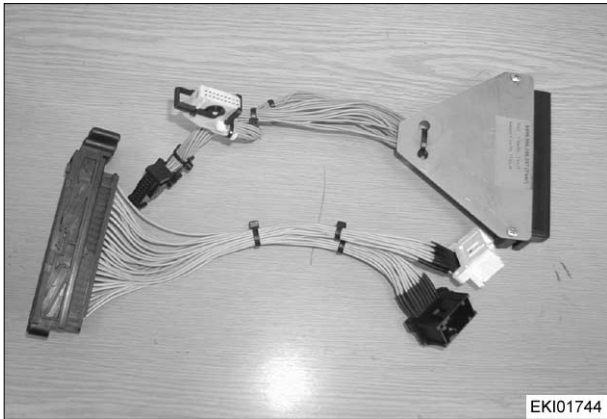
**Note:**

**Chapter 8610 Index B - Rear power lift troubleshooting plan**

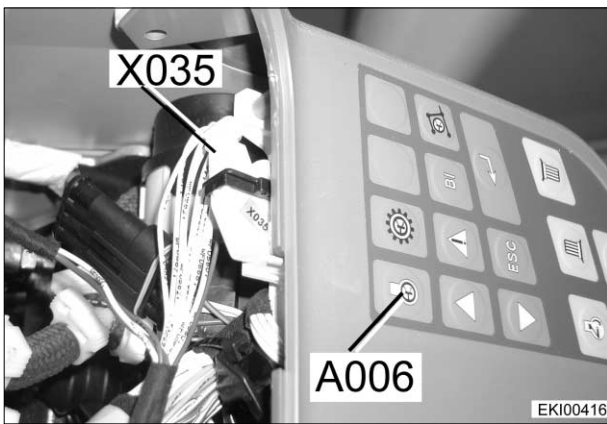
**Chapter 9000 Index C - Electrical circuit diagrams**

Date	Version	Page	Capitel	Index	Docu-No.
28.11.2000	<b>b</b>	5/5	<b>9000</b>	<b>E</b>	<b>000046</b>

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Electrics / General system  <b>A006 - front dashboard keypad</b></p>	<p><b>E</b></p>
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Connect e-adapter box X 899.980.208.100 to A006 - front dashboard keypad using adapter cable X 899.980.208.207.



A006 - front dashboard keypad  
 Connector X035

Date	Version	Page	Capitel	Index	Docu-No.
20.07.2001	a	1/2	A006 - front dashboard keypad	9000	E 000131



<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / General system</b> <b>A006 - front dashboard keypad</b>	<b>E</b>
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<b>Connector X035</b>			
<b>Earth from pin 12</b>			
<b>Ignition ON</b>			
<b>Pin</b>	<b>Pin description</b>	<b>Condition</b>	<b>Signal</b>
1	A007 - instrument panel Connector X101	Switch not actuated Switch actuated	210 mV 102 mV
2	A007 - instrument panel Connector X101		94 mV
3	A007 - instrument panel Connector X101	Switch not actuated Switch actuated	210 mV 102 mV
4	A007 - instrument panel Connector X101		94 mV
5	A007 - instrument panel Connector X101	Switch not actuated Switch actuated	210 mV 102 mV
6	A007 - instrument panel Connector X101	Switch not actuated Switch actuated	94 mV
7	A007 - instrument panel Connector X101	Switch not actuated Switch actuated	210 mV 102 mV
8	A007 - instrument panel Connector X101		94 mV
9	Not assigned		
10	A007 - instrument panel Connector X102		12 VDC to 14 VDC
11	Not assigned		
12	Earth X554		
13-18	Not assigned		

**Note:****All readings +/- 15%**

The A006 - front dashboard keypad is a diode circuit which processes voltage signals from the A007 - instrument panel.

When a switch is actuated, it must be possible to measure a slight variation in voltage (mV range).

Date	Version	Page	<b>A006 - front dashboard keypad</b>	Capitel	Index	Docu-No.
20.07.2001	<b>a</b>	2/2		<b>9000</b>	<b>E</b>	<b>000131</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / General system</b> <b>A007 - instrument panel</b>	<b>E</b>
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<b>Connector X100 (blue)</b>			
<b>Earth from pin 18 connector X101 (yellow)</b>			
<b>Ignition ON</b>			
<b>Pin</b>	<b>Pin description</b>	<b>Condition</b>	<b>Signal</b>
1	K010 - relay for direction indicator controller C3	Connected trailer lighting	12 VDC pulse
2	K010 - relay for direction indicator controller C2	Connected trailer lighting	12 VDC pulse
3	S001 - control stalk	Main beam indicator: Main beam off Main beam on	0 VDC 12 VDC to 14 VDC
4	G004 - generator 2 (Fav 900) G002 - generator (Farmer 400, Fav 700)	Battery charge indicator: Ignition on, engine off  Ignition on, engine on	0 VDC  12 VDC to 14 VDC
5	A012 - cold-start aid	Preheating, indicator flashing Indicator goes out	12 VDC pulse 12 VDC to 14 VDC
6	K010 - direction indicator controller relay	Actuate turn indicator	12 VDC pulse
7	X610 - right turn indicator connector	Actuate turn indicator	12 VDC pulse
8	H006 - beeper	Continuous tone	approx. 9 VDC
9		Intermittent tone	12 VDC pulse
10	X007 - implement socket	Rear PTO speed: PTO off  PTO on	0 VDC or 13.8 VDC (de- pending on ratchet wheel) approx. 6.5 VDC
11	X007 - implement socket	Transmission signal: Speed 0 km/h Speed greater than 0.1 km/h	13.8 VDC approx. 6.5 VDC
12	Not assigned		
13	A013 - fuse board B (X201)	CAN-low	2.5 VDC to 3.5 VDC
14	Not assigned		
15	A005 - EPC ECU	Lift status for X007 - imple- ment socket: Lower Stop Raise	1.1 VDC 1.1 VDC 13.8 VDC
16	B013 - hydraulic oil thermostat	Temperature < approx. 95°C Temperature > approx. 95°C ( warning display)	12 VDC to 14 VDC 0 VDC
17	B004 - underpressure switch	Underpressure < approx. 65 mbar Underpressure > approx. 65 mbar	12 VDC to 14 VDC 0 VDC
18	Not assigned		
19	S024 - brake-fluid sensor	Float at top Float at bottom	12 VDC to 14 VDC 0 VDC
20-24	Not assigned		
25	X611 - left turn indicator connector	Turn indicator actuated	12 VDC pulse
26	A013 - fuse board B (X201)	CAN-high	1.5 VDC to 2.5 VDC

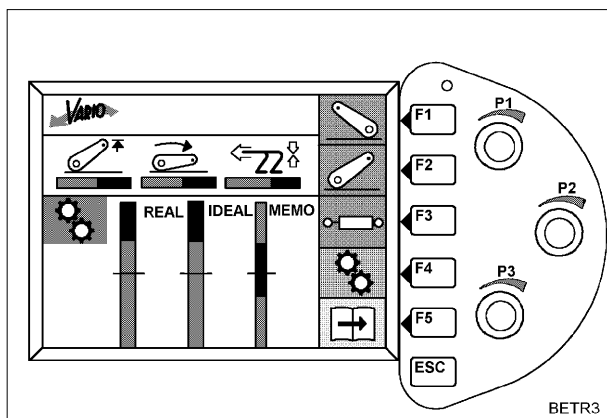
**Note: All readings +/- 10%**

Date	Version	Page	<b>A007 - instrument panel</b>	Capitel	Index	Docu-No.
16.07.01	a	2/4		<b>9000</b>	<b>E</b>	<b>000128</b>

Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**A008 - terminal, operation of rotary potentiometers**

**E**



If settings can no longer be changed via potentiometers P1 - P3, proceed as follows:

1. Switch off tractor ignition
2. Hold down keys F1, F3 and F5 on terminal at same time as turning ignition on.
3. Instead of Fendt start page, blue screen is now displayed containing following data.



"Encoder 1" to "Encoder 3" shows current status and numerical values of three potentiometers. If you turn relevant potentiometer, 4-digit figure counts pulses up or down hexadecimally.

If you turn potentiometer slowly, following sequence should be observed:

**00 -> 01 -> 11 -> 10 -> 00 etc.**

If you turn in opposite direction, then sequence read correspondingly from left to right is applicable.

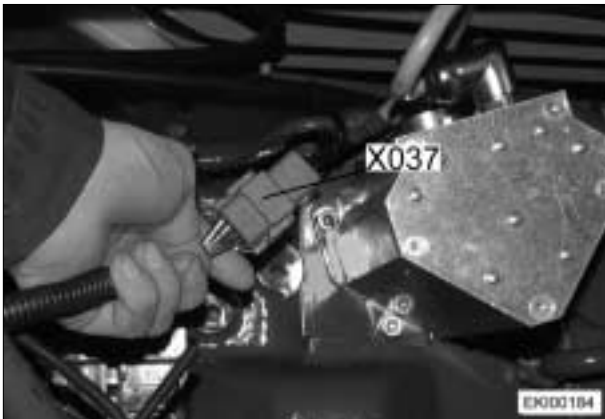
If figures do not appear when you actuate relevant potentiometer, there is a fault. Press ESC key to exit blue screen, and Fendt start page is then displayed.

**or**

Switch ignition off and on to exit blue screen, and Fendt start page is then displayed.

Date	Version	Page	Capitel	Index	Docu-No.
05/2000	a	1/1	A008 - terminal, operation of rotary potentiometers	9000	E 000027

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / system in general <b>A009 - actuator unit</b>	<b>E</b>
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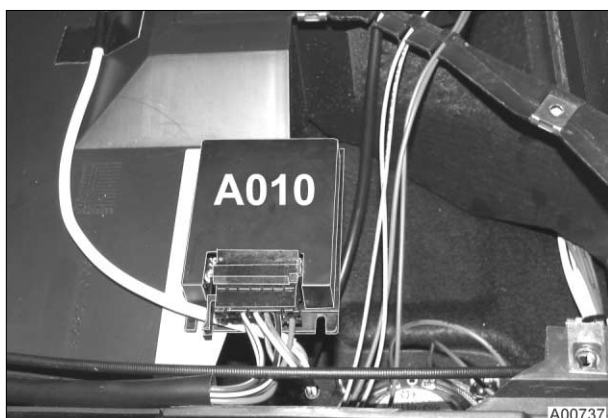
Pin	Function
1	WD PWM
2	CAN 2+
3	Reference F/R
4	+ UB 30
5	CAN 2-
6	+ UB from ECU
7	Digital earth
8	Tractor earth

**Note:**

Connect adapter cable X 899.980.246.207 to cable coupler X037.  
 Ignition "ON"

Test	Pin	Target value	Condition	Possible cause of fault
Electric motor supply	4	12 - 14 VDC		Verification of fuse (F043)
Earth	8			
Electric motor supply	4	Voltage drop: max. 1 VDC over last measurement	Also connect approx. 55 W bulb	Voltage must remain stable even under load
Earth	8			
UB from e-box	6	12.0 VDC to 14.0 VDC		
Digital earth	7			
Reference F/R	3	2.4 VDC or 5.0 VDC		If voltage reading is approx. 2.4 VDC, turn emergency control briefly to left. If voltage reading is approx. 5.0 VDC, turn emergency control briefly to right.
Digital earth	7			
CAN 2+	2	1.5 VDC - 2.5 VDC		
Digital earth	7			
CAN 2-	5	1.5 VDC - 3.5 VDC		
Digital earth	7			

Farmer 400 Fav 700 Fav 900	Electrics / General system <b>A010 - electronic thermostat</b>	<b>E</b>
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Pin	Colour	Function
1	Brown	Earth
2	-	Not assigned
3	Red	S037 (+UB)
4	Black/yellow	Y024 (+UB)
5	Blue	B045 - sensor
6	Brown	B045 - sensor
7	White	B046 - sensor
8	White	B046 - sensor
9	Brown/yellow	S044 - potentiometer
10	Brown/yellow	S044 - potentiometer

Pin	Pin description	Condition	Signal
1	Earth		
2	Not assigned		
3	S037 - fan switch	Ignition ON Fan switch ON Fan switch OFF	12 VDC to 14 VDC 0 VDC
4	Y024 - magnetic clutch	Ignition ON A010 switches on A010 switches off	12 VDC to 14 VDC 0 VDC
5	B045 - temp. sensor 2	Disconnect A010	approx. 1.18 kOhm at 20°C
6			
7	B046 - temp. sensor 1	Disconnect A010	approx. 10 kOhm at 20°C
8			
9	S044 - AC potentiometer	Disconnect A010	
10		Max. position Min. position	approx. 60 ohms approx. 10.4 kOhm

**Note:**

All readings +/- 10%

B045 and B046 are Negative Temperature Coefficient sensors,

in other words, the sensor resistance decreases with increasing ambient temperature.

The A010 - electronic thermostat switches as a function of:

- S037 - fan switch ( **A010 supply** )
- S044 - AC potentiometer ( **setpoint** )
- B046 - temp. sensor 1 in air current ( **actual value** )
- B045 - temp. sensor 2 on evaporator ( **safeguard against system icing up** )
- S035 - high-pressure/low-pressure switch ( **coolant circuit protection** )

**Voltage (12 VDC to 14 VDC) to Y024 - magnetic clutch (air-conditioning compressor switches on)**

Date	Version	Page	Capitel	Index	Docu-No.
18.07.2001	<b>a</b>	1/2	<b>A010 - electronic thermostat</b>	<b>9000</b>	<b>E</b>
					<b>000129</b>

Farmer 400  
Fav 700  
Fav 900

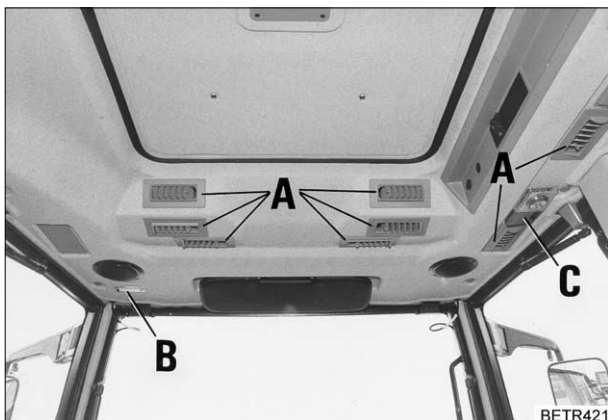
Electrics / General system  
**A010 - electronic thermostat**

**E**

## Fault location in air-conditioning

### Air-conditioning compressor does not switch on

1. Check X050, fuse F017 (UB 15) (supply for M009 - fan and A010 - electronic thermostat).
2. Supply Y024 - magnetic clutch with 12 VDC from external source (check: does magnetic clutch operate?).
3. Check S037 - fan switch for continuity (supply to A010 - electronic thermostat. "Green telltale" ).
4. Check S035 - high-pressure/low-pressure switch for continuity (check refrigerant circuit).
5. Check all connectors for continuity.
6. Check voltage output of A010 - electronic thermostat at Y024 - magnetic clutch.
7. Check operation of B045 - sensor, B046 - sensor and S044 - potentiometer (see table above).



### Checking performance of air-conditioning

- Hold thermometer in fan air current and measure air current temperature directly at air nozzle outlet (A).

**Target value: approx. 6°C - 8°C** at 25°C ambient temperature

#### Note:

**Set recirculation switch to recirculation mode to ensure optimum cooling performance.**

#### Note:

**If target value is not achieved, recirculation filter, condenser or evaporator may be soiled/clogged (please see Operating Manual for details of how to clean).**

#### Note:

**See also:**

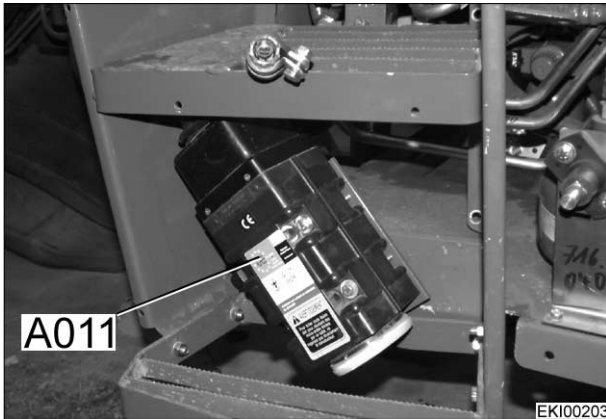
**Chapter 5500 Reg. A - Functional description**

**Chapter 5570 Reg. A - Electrical check on air-conditioning**

**Chapter 9000 Reg. C - Electric circuit diagrams**

Date	Version	Page	Capitel	Index	Docu-No.
18.07.2001	a	2/2	<b>9000</b>	<b>E</b>	<b>000129</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / General system <b>A011 - radar sensor</b>	<b>E</b>
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A011 = Radar sensor

**Note:**

**See also :**

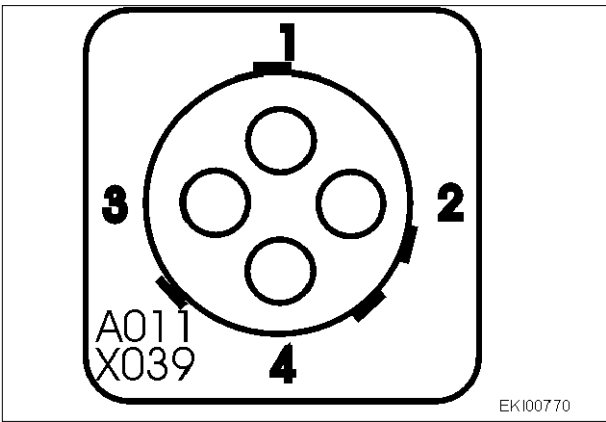
**Chapter 8610 Reg. A - Operation and function of electronic slip control**

**Chapter 8610 Reg. B - Faults in slip control (radar A011)**

**Chapter 9000 Reg. E - X007 - Implement socket**

**Chapter 9000 Reg. E - A005 - EPC ECU**

**Chapter 8610 Reg.E - Slip control performance test**



Radar plug X039	
Pin	Function
1	Earth
2	Signal
3	+ supply
4	Not assigned

To radar plug X039			
	Test condition	Target value	Directly to radar sensor A011
+ supply	Ignition ON	12 - 14 VDC	Pins 3 and 1.
Power consumption	Ignition ON	approx. 0.5 ADC	Measure at fuse F048 (isolate consumers A005 and S048 in parallel)

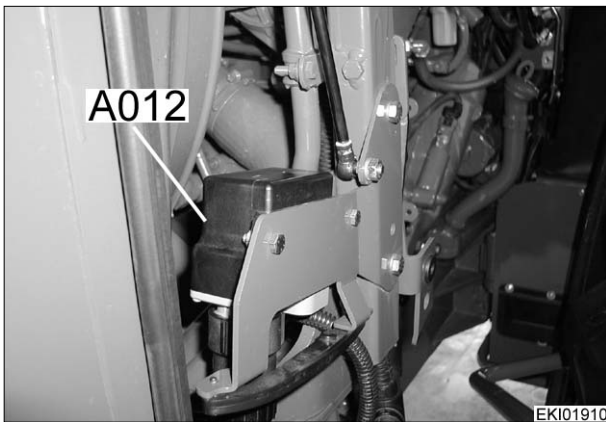
To EPC ECU A005			
	Test condition	Target value	Directly to EPC ECU A005
Signal	Tractor driving slower than 0.5 km/h	approx. 0.2 VDC	Pins 23 and 9.
	... faster than 0.5 km/h	approx. 4.6 VDC	

To implement socket X007			
	Test condition	Target value	Directly to implement socket X007
Signal	Tractor driving slower than 0.5 km/h	12 - 14 VDC (UB)	Pins 1 and 7.
	... faster than 0.5 km/h	approx. 6.5 VDC (UB/2)	

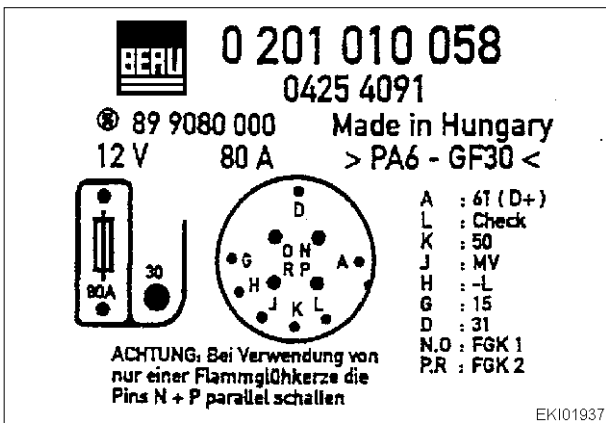
<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Electrics / General system  <b>A012 - ECU, cold-start aid</b></p>	<p><b>E</b></p>
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Farmer 400, Fav 700



Fav 900 chassis number 23/3001 and up



Pin assignment for A012 - ECU, cold-start aid



At bottom of A012 - ECU, cold-start aid  
**X382 = Terminal for pin 30 (B+)**

Date	Version	Page	A012 - ECU, cold-start aid	Capitel	Index	Docu-No.
09.08.2001	a	1/12		9000	E	000147



<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / General system <b>A012 - ECU, cold-start aid</b>	<b>E</b>
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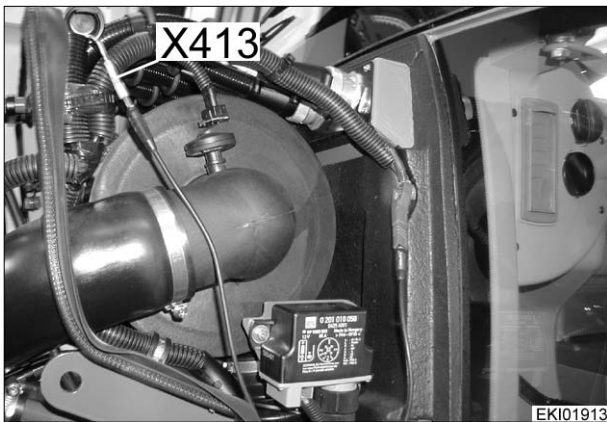
A00609

At bottom of A012 - ECU, cold-start aid

**FU** = 80 amp fuse

**Note:**

**A012 - ECU shown removed for greater clarity.**

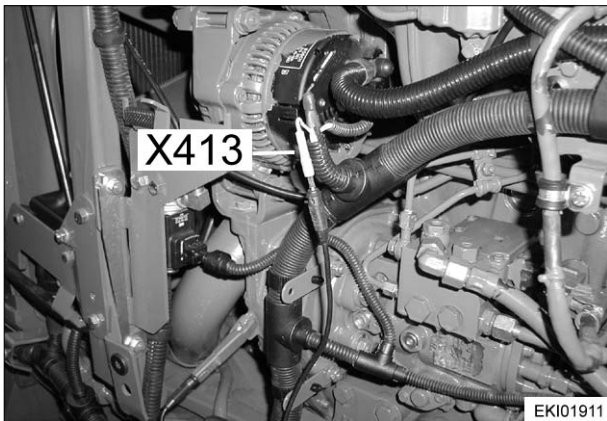


EKI01913

**Farmer 400, Fav 700**

**To check cold-start system at temperature > glow-stop temperature (2.5°C)**

Open screw cap and connect contact X413 to vehicle earth.



EKI01911

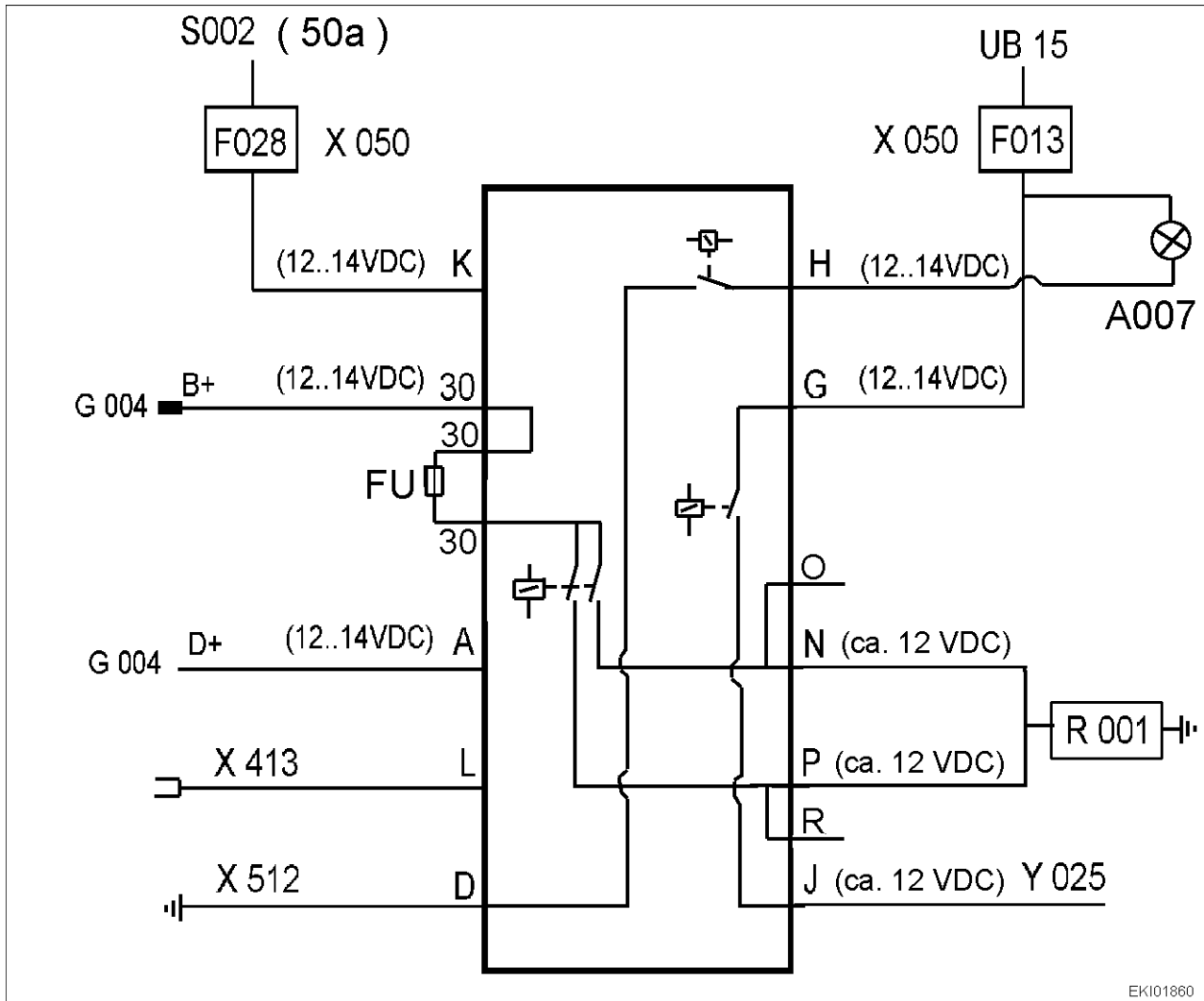
**Fav 900 chassis number 23/3001 and up**

**To check cold-start system at temperature > glow-stop temperature (2.5°C)**

Open T-piece of cable loom and connect contact X413 to vehicle earth.

Date	Version	Page	A012 - ECU, cold-start aid	Capitel	Index	Docu-No.
09.08.2001	a	2/12		9000	E	000147

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / General system <b>A012 - ECU, cold-start aid</b>	<b>E</b>
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EK101860

Item	Designation	Item	Designation
A	G002 / G004 - generator indicator D+	X050	Fuse holder 1
D	X512 - left engine earthing point links	30	G002 / G004 - generator B+
G	Preheating (supply)	FU	80 amp fuse
H	Telltale in A007 - display unit		
J	Y025 - valve, cold-start aid	B+	Battery + (generator)
K	S002 - switch, ignition (50a)	D+	Dynamo + (generator)
L	Check (cold-start system, temperature > glow-stop temperature (2.5°C))	UB15	Switched voltage after battery (output S002 - switch, ignition)
N,P	R001 - heater plug	50a	Battery changeover relay, output for starter control unit
O,R	Not assigned		

**Note:**

**G002 - generator (Farmer 400, Fav 900)**

**G004 - generator (Fav 900 chassis number 23/3001 and up)**

**Note:**

**Chapter 9000 Index C - Cold-start system circuit diagram**

**Chapter 9000 Index C - Starter motor control unit circuit diagram**

Date	Version	Page	A012 - ECU, cold-start aid	Capitel	Index	Docu-No.
09.08.2001	a	3/12		9000	E	000147

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / General system</b> <b>A012 - ECU, cold-start aid</b>	<b>E</b>
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**Note:**

Unless otherwise stated, all current values refer to rated voltage of 12 VDC.

Pin	Pin designation	Function
	Signal	
A	(D+)	Generator indicator (dynamo+). As long as engine is running at sufficiently high speed, G002/G004 - generator charging voltage is present.
	5 mA - 20 mA at 12 VDC	
	Engine running / UD+ > 9 VDC	
	Engine not running / UD+ < 2.5 VDC	

Pin	Pin designation	Function
	Signal	
L	Check	To check A012 - ECU at temperatures > 0°C this terminal must be connected to vehicle earth.
	Max. 50 mA	

Pin	Pin designation	Function
	Signal	
K	50 (17)	S002 - switch, ignition. If starter motor is operated, battery voltage can be measured here.
	Min. 5 mA	
	Max. 100 mA	

Pin	Pin designation	Function
	Signal	
G	15 (19)	Ignition (preheating). If battery voltage is connected to this pin (by turning S002 - switch), A012 - ECU starts preheating. Voltage must not be interrupted at this pin throughout operation since program sequence of A012 - ECU is otherwise disrupted.
	Max. 8 A	
	Fuse F013 (X050)	

Pin	Pin designation	Function
	Signal	
J	Y025 - valve, cold-start aid	Output for Y025 - valve is connected to pin G (input terminal 15). Protection against short-circuit is provided by fuse F013 (X050).
	Approx. 2.5 A	

Pin	Pin designation	Function
	Signal	
H	Telltale in A007 - display unit	Telltale is connected here to A007 - display unit. Output switches vehicle earth to telltale which is supplied with power via its second pin.
	3 W / 12 VDC	

Date	Version	Page	A012 - ECU, cold-start aid		
09.08.2001	a	4/12	9000	E	000147

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / General system <b>A012 - ECU, cold-start aid</b>	<b>E</b>
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Pin	Pin designation Signal	Function
N,O / P,R	R001 - heater plug  Approx. 80 A ON Approx. 35 A continuous current per heater plug	A012 - ECU switches voltage at pin 30 (screw connection) to plug pins via relay (in ECU) with two pins. If only one heater plug is to be used, outputs N and P should be used in parallel. Two plug-in contacts are designed for operating each heater plug with maximum continuous current each of 35 A. Protection is provided by fuse located in A012 - ECU.

**Note:**

Chapter 9000 Index A - Terminal designation (pins) to DIN 72 552

Chapter 9000 Index E - Y025 / R001 - valve, cold-start aid / heater plug



At bottom of A012 - ECU, cold-start aid

**FU** = 80 amp fuse

**Note:**

**A012 - ECU shown removed for greater clarity.**

Date	Version	Page	A012 - ECU, cold-start aid	Capitel	Index	Docu-No.
09.08.2001	a	5/12		9000	E	000147

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / General system</b> <b>A012 - ECU, cold-start aid</b>	<b>E</b>
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## Control data for A012 - ECU, cold-start aid

### Preheating times

The R001 - heater plug requires this time to reach a temperature which can ignite the fuel in the air current.

The preheating time depends on the on-board voltage.

The A012 - ECU measures the relevant voltage for the preheating time 3 sec +/- 1 sec after the R001 - heater plug is switched on.

<b>UB</b> <b>[Volt]</b>	<b>Preheating time</b> <b>[sec]</b>
9.6	45 +/- 10%
10.6	35 +/- 10%
11.6	25 +/- 10%
12.6	18 +/- 10%
13.6	15 +/- 10%
14.6	12 +/- 10%
16.0	System switches off

### Start standby time

The start standby time indicates how long it is still possible to start the engine with the aid of the cold-start system after the preheating time has finished.

The telltale in the A007 - display unit flashes during this time.

The start standby time depends on the on-board voltage.

The A012 - ECU measures the relevant voltage for the start standby time shortly after its start.

<b>UB</b> <b>[Volt]</b>	<b>Start standby time</b> <b>[sec]</b>
9.6	30 +/- 10%
10.6	30 +/- 10%
11.6	30 +/- 10%
12.6	20 +/- 10%
13.6	10 +/- 10%
14.6	8 +/- 10%
16.0	System switches off

### Attempted start

If the battery voltage is applied to pin K (50) of A012 - ECU, this is interpreted as a start signal after 250 ms +/- 50 ms. The afterburn phase begins with the first downward transition of the starter signal.

### Safety cut-out time

After a failed start, or if pin A (D+) becomes or remains de-energised for another reason, the A012 - ECU switches off the Y025 - valve and the R001 - heater plug at the end of the safety cut-out time.

**The safety cut-out time is 20 sec +/- 10%.**

### Glow stop

At temperatures > the glow-stop temperature, operation of the cold-start aid is not required.

The telltale in the A007 - display unit flashes to show that the engine is ready for an immediate start.

**The glow-stop temperature is 2.5 °C +/- 2.5°C.**

Date	Version	Page	Capitel	Index	Docu-No.
09.08.2001	a	6/12	<b>A012 - ECU, cold-start aid</b>	<b>9000</b>	<b>E</b>
					<b>000147</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / General system</b> <b>A012 - ECU, cold-start aid</b>	<b>E</b>
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**Afterburn time**

Afterburning with the engine running ensures better fuel combustion and faster warming of the engine to an ideal operating temperature.

The afterburn time depends on the resistance of the temperature sensor in the A012 - ECU when preheating starts.

<b>Sensor temperature</b> <b>[°C]</b>	<b>Afterburn time</b> <b>[sec]</b>
<b>Tolerance +/- 2.5°C</b>	<b>Tolerance +/- 1.0 sec</b>
> 2.5	0
2.5	60
- 12.5	80
- 22.5	100
- 32.5	120
< - 32.5	120

**Clocking heater plug output**

While afterburning is taking place, the output at the R001 - heater plug is limited by clocking (voltage ON - voltage OFF - voltage ON - etc.) pins P,N (A012 - ECU).

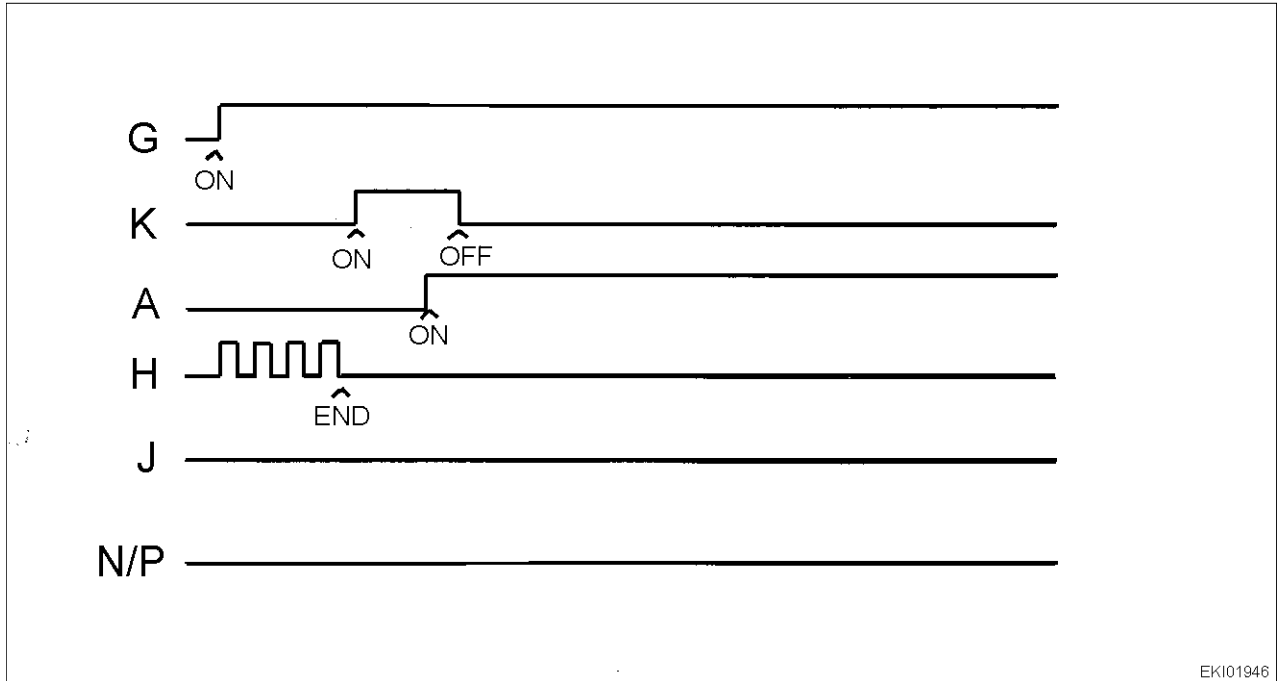
If the voltage at pin G (A012 - ECU ) rises above approx. 11.5 VDC during afterburning, the outputs for the R001 - heater plug are clocked such that an effective voltage of approx. 11.5 VDC is applied at the outputs.

Date	Version	Page	<b>A012 - ECU, cold-start aid</b>	Capitel	Index	Docu-No.
09.08.2001	a	7/12		<b>9000</b>	<b>E</b>	<b>000147</b>

Farmer 400 Fav 700 Fav 900	Electrics / General system <b>A012 - ECU, cold-start aid</b>	<b>E</b>
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**Flow diagrams for the A012 - ECU, cold-start aid**

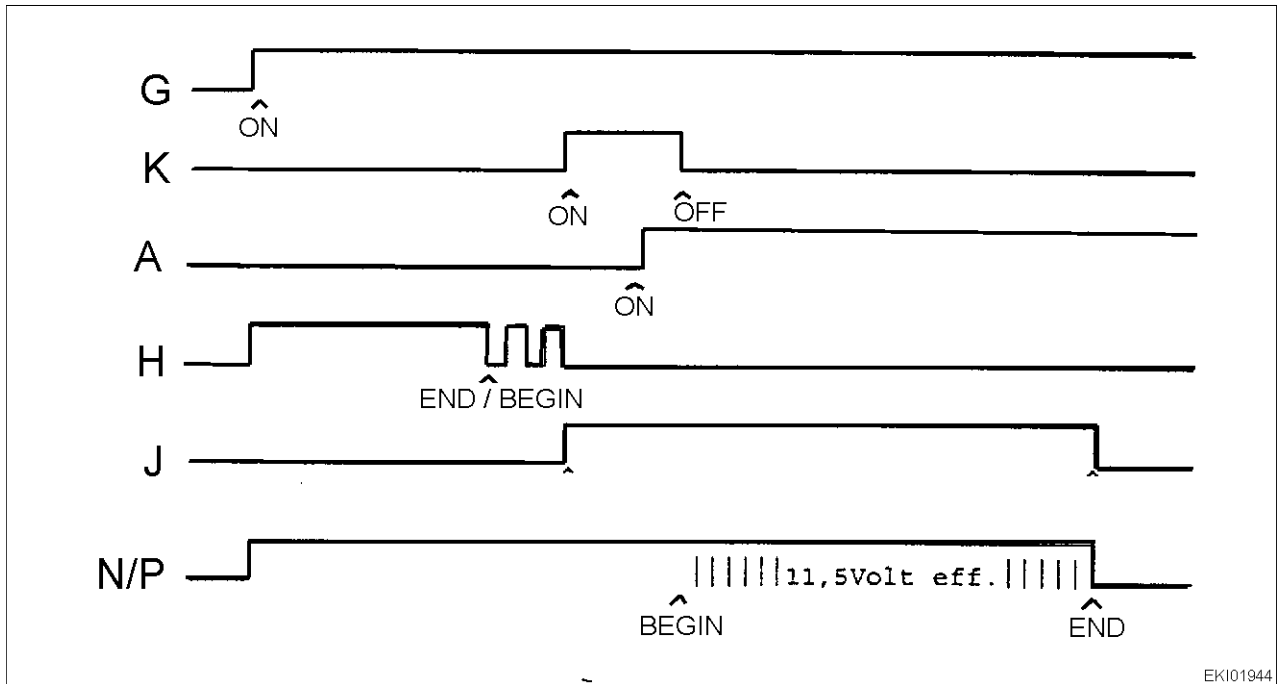
**Normal engine start, temperature > glow-stop temperature (2.5°C +/- 2.5°C)**



Pin	Function	Note
G	S002 - switch, ignition (terminal 15)	Supply for A012 - ECU
K	M001/M011 - starter (terminal 50)	Starter control unit
A	G002/G004 - generator (D+)	Battery charge indicator
H	Telltale in A007 - display unit	Start standby: telltale flashes
J	Y025 - valve, cold-start aid	Y025 - valve remains switched off (no fuel feed to R001)
N/P	R001 - heater plug	No preheating and III afterburning III

Farmer 400 Fav 700 Fav 900	Electrics / General system <b>A012 - ECU, cold-start aid</b>	<b>E</b>
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**Normal engine start, temperature < glow-stop temperature (2.5°C +/- 2.5°C)**



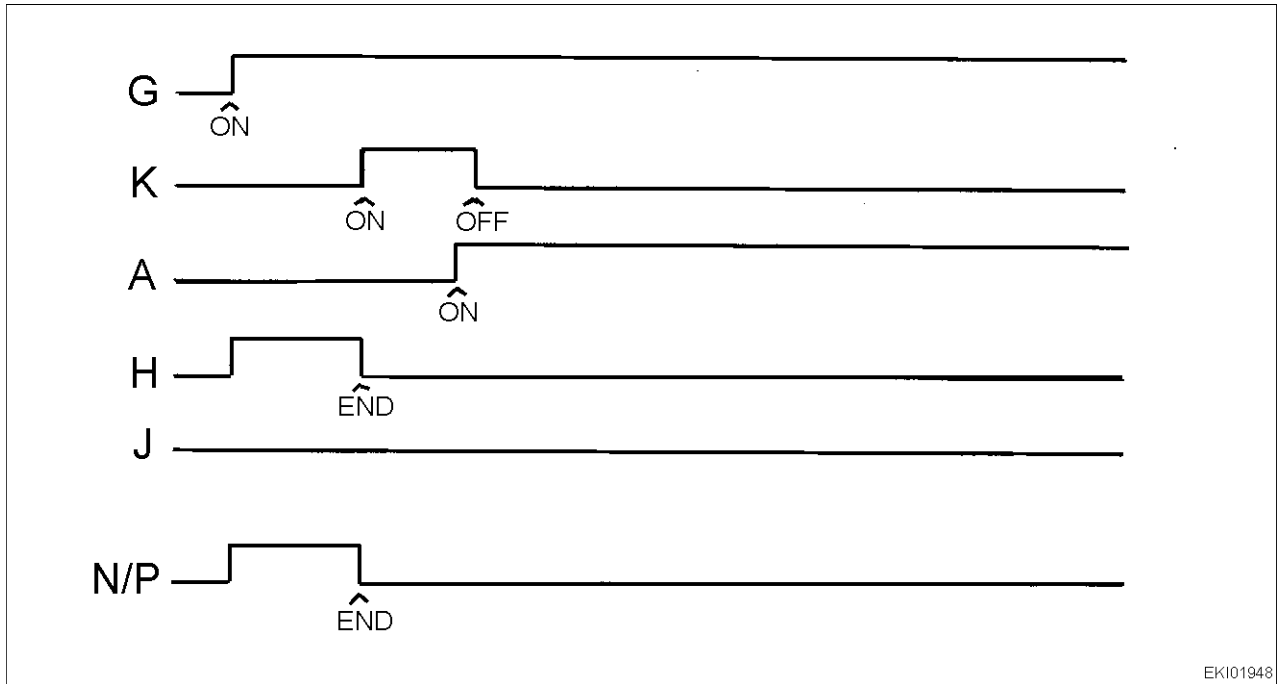
EKI01944

Pin	Function	Note
G	S002 - switch, ignition (terminal 15)	Supply for A012 - ECU
K	M001/M011 - starter (terminal 50)	Starter control unit
A	G002/G004 - generator (D+)	Battery charge indicator
H	Telltale in A007 - display unit	Preheating: telltale illuminated Start standby: telltale flashes
J	Y025 - valve, cold-start aid	Y025 - valve is powered (fuel feed to R001)
N/P	R001 - heater plug	Phase 1 = preheating Phase 2 = III afterburning III



Farmer 400 Fav 700 Fav 900	Electrics / General system <b>A012 - ECU, cold-start aid</b>	<b>E</b>
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**Engine started before end of preheating time, temperature < glow-stop temperature (2.5°C +/- 2.5°C)**

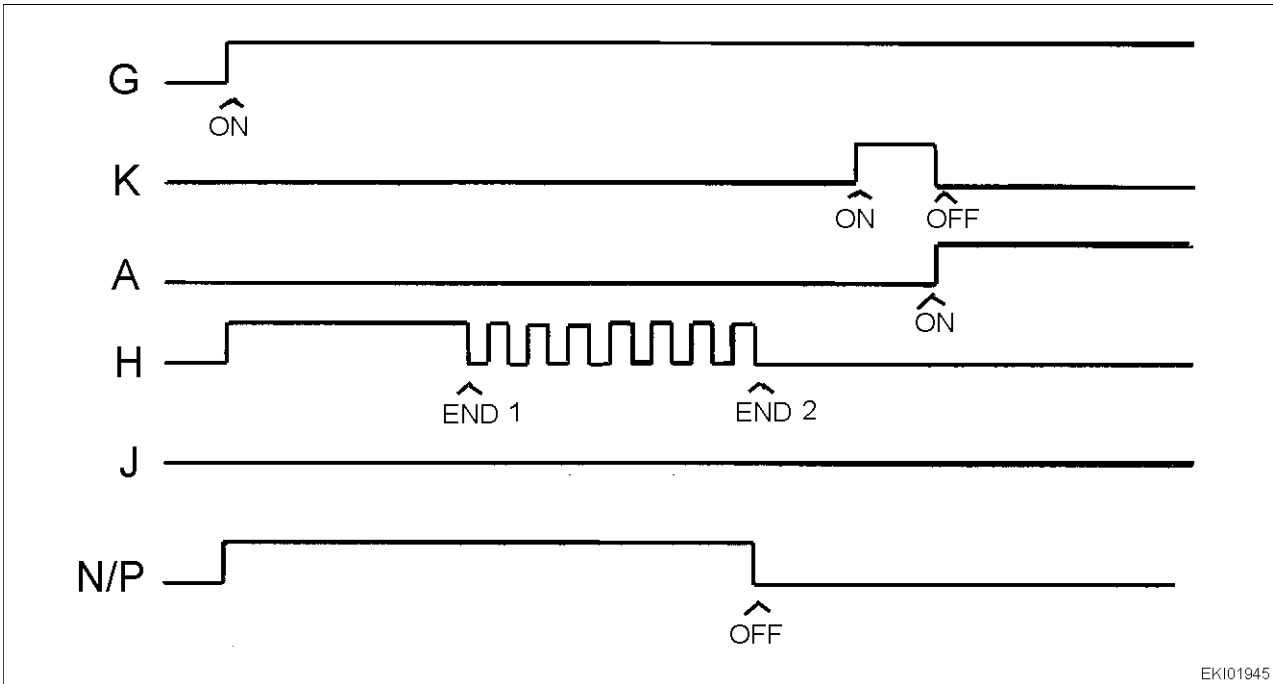


EKI01948

Pin	Function	Note
G	S002 - switch, ignition (terminal 15)	Supply for A012 - ECU
K	M001/M011 - starter (terminal 50)	Starter control unit
A	G002/G004 - generator (D+)	Battery charge indicator
H	Telltale in A007 - display unit	Preheating: telltale illuminated Preheating terminated prematurely.
J	Y025 - valve, cold-start aid	Y025 - valve remains switched off (no fuel feed to R001)
N/P	R001 - heater plug	Preheating terminated prematurely, no III afterburning III

Farmer 400 Fav 700 Fav 900	Electrics / General system <b>A012 - ECU, cold-start aid</b>	<b>E</b>
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**Engine start after end of start standby time, temperature < glow-stop temperature (2.5°C +/- 2.5°C)**

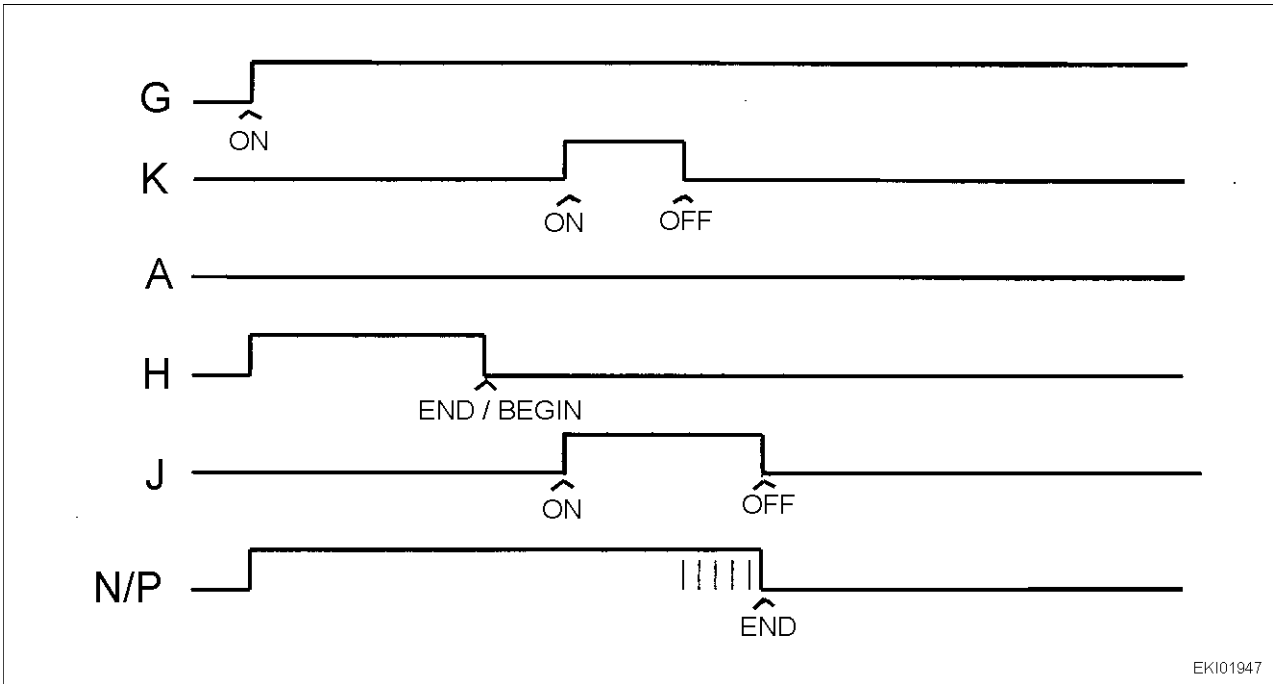


EKI01945

Pin	Function	Note
G	S002 - switch, ignition (terminal 15)	Supply for A012 - ECU
K	M001/M011 - starter (terminal 50)	Starter control unit
A	G002/G004 - generator (D+)	Battery charge indicator
H	Telltale in A007 - display unit	Preheating: telltale illuminated Start standby: telltale flashes
J	Y025 - valve, cold-start aid	Y025 - valve remains switched off (no fuel feed to R001)
N/P	R001 - heater plug	Phase 1 = preheating No III afterburning III

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / General system <b>A012 - ECU, cold-start aid</b>	<b>E</b>
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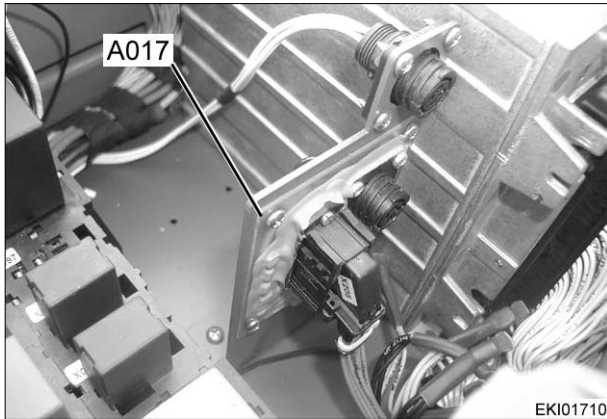
**Failed start, no generator signal at terminal D+, temperature < glow-stop temperature (2.5°C +/- 2.5°C)**



EKI01947

Pin	Function	Note
G	S002 - switch, ignition (terminal 15)	Supply for A012 - ECU
K	M001/M011 - starter (terminal 50)	Starter control unit
A	G002/G004 - generator (D+)	Battery charge indicator remains switched off
H	Telltale in A007 - display unit	Preheating: telltale illuminated Start standby: telltale is extinguished
J	Y025 - valve, cold-start aid	Y025 - valve is powered (fuel feed to R001)
N/P	R001 - heater plug	Phase 1 = preheating Phase 2 = III afterburning III after safety period afterburning is terminated

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / General system <b>A017 - PCB, LBS</b>	<b>E</b>
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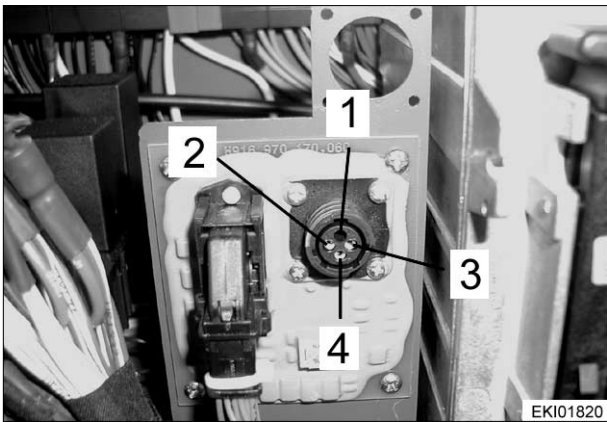
A017 = PCB, LBS

LBS = LBS is the German abbreviation for Agricultural Bus System, for data transmission between tractor and implement

**Note:**

**Chapter 9000 Reg. C - LBS**

**Chapter 9700 Reg. A - Electronic concept**



Pin	Function
1	Not assigned
2	CAN +
3	CAN -
4	Digital earth

CAN + , i.e. low voltage level

CAN - , i.e. high voltage level

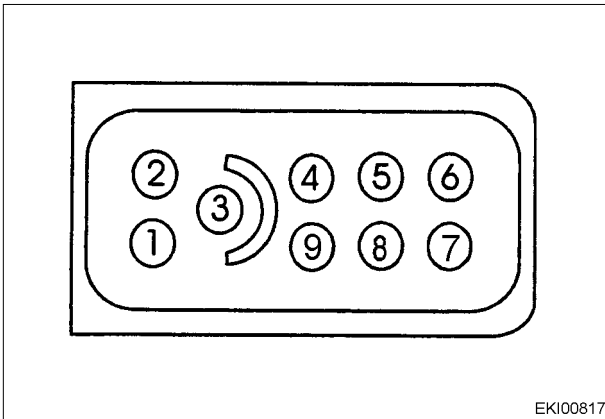
Digital earth (electronics earth), connection between A017 - PCB and vehicle earth

**Note:**

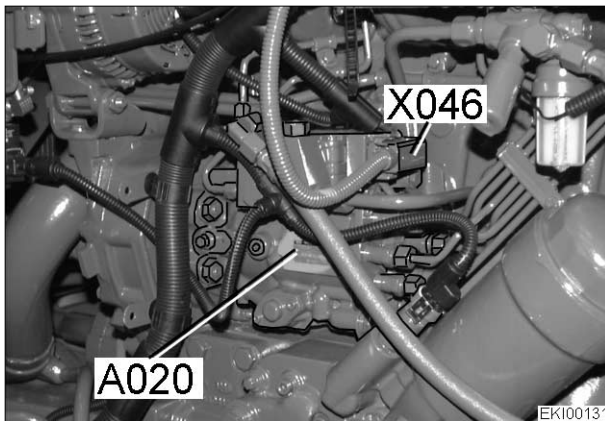
**Ignition "ON"**

Test	Pin	Target value	Condition	Remark
LBS CAN +	2	approx. 2.1 VDC		Target values are approximate and are subject to variations according to volume of momentarily transmitted data.
Earth	4			
LBS CAN -	3	approx. 2.9 VDC		Target values are approximate and are subject to variations according to volume of momentarily transmitted data.
Earth	4			

<b>Fav 900</b>	<b>Electrics / General system</b> <b>A020 - ECU, VP44</b>	<b>E</b>
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Pin	Function
1	CAN-low
2	CAN-high
3	Not assigned
4	Not assigned
5	Solenoid valve shut-off
6	Earth
7	+ UB 30
8	Rotational speed input signal
9	Not assigned



Connect e-adapter cable X899.980.251.101 directly to A020 - ECU, VP44.

**Note:**  
Ignition "OFF".

Test	Pin	Target value	Condition	Possible cause of fault
Solenoid valve (shut-off)	5	5.7 kOhm		
	6			

Pump electronics	7	3.4 kOhm		
	6			

**Note:**  
Ignition "ON"

Test	Pin	Target value	Condition	Possible cause of fault
CAN-low	1	approx. 2.5 VDC		Fuse - F041
Earth	6			

CAN-high	2	approx. 2.6 VDC		Fuse - F041
Earth	6			

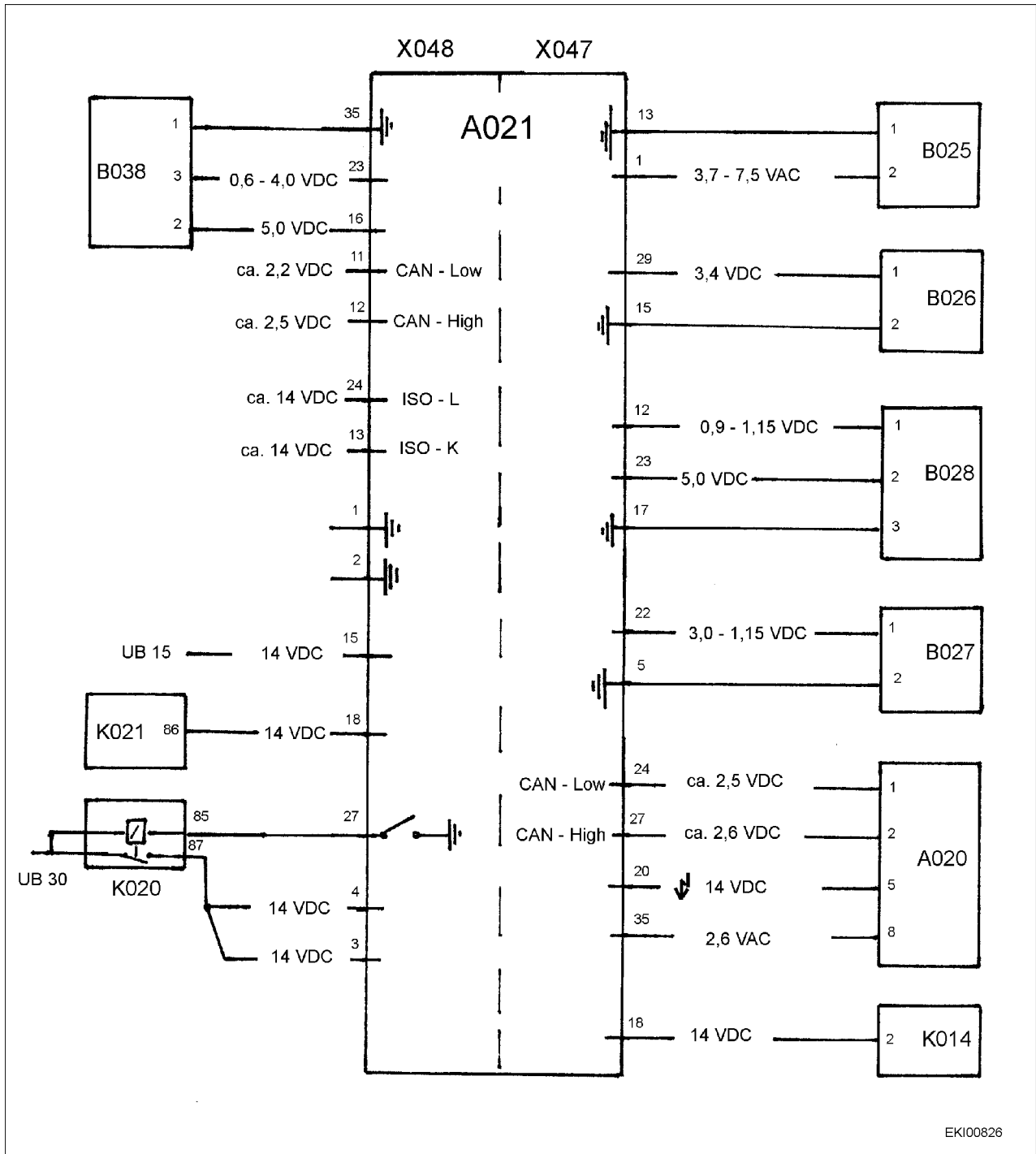
<b>Fav 900</b>	<b>Electrics / General system A020 - ECU, VP44</b>	<b>E</b>
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Test	Pin	Target value	Condition	Possible cause of fault
Solenoid valve shut-off	5	0 VDC		
		12 VDC	When engine is switched off	
Earth	6			

+ UB 30	7	12 VDC - 14 VDC		K021 or fuse F058
Earth	6			

Rotational speed input signal	8	2.6 VAC		
Earth	6			

<b>Fav 900</b>	<b>Electrics / General system</b> <b>A021- EDC control module, block diagram</b>	<b>E</b>
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EKI00826

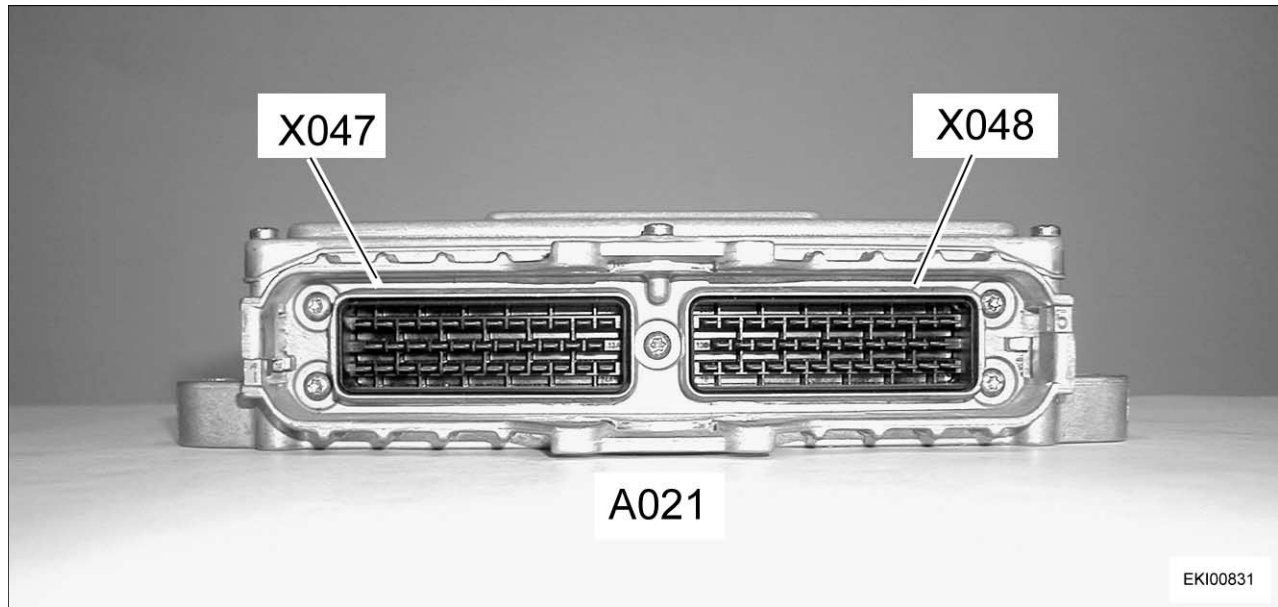
A020	Pump control unit	B038	Accelerator sensor, EDC
A021	EDC control module	K014	Exhaust brake relay
B025	EDC speed sensor	K020	EDC UB 30 relay
B026	Needle motion sensor	K021	Shutoff solenoid valve relay
B027	Water temperature sensor	X047	Engine connector
B028	Intercooler pressure sensor	X048	Body connector

Date	Version	Page	A021- EDC control module, block diagram	Capitel	Index	Docu-No.
09.05.0001	a	1/2		9000	E	000140

<b>Fav 900</b>	Electrics / General system <b>A021- EDC control module, block diagram</b>	<b>E</b>
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**Pin assignment for EDC control module A021**

12.....1	12.....1
23.....13	23.....13
35.....24	35.....24



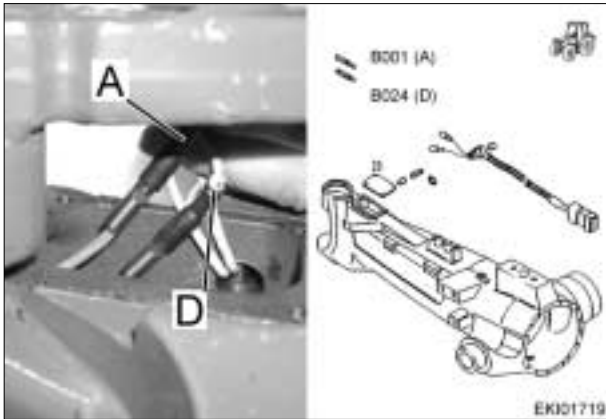
**Note:**

- Chapter 9000 Reg. C - EDC control module circuit diagram, sheet 33
- Chapter 9000 Reg. C - Exhaust brake and engine stop circuit diagram, sheet 6
- Chapter 2710 Reg. A - EDC speed adjustment
- Chapter 2710 Reg. A - EDC control module (A021) and pump control unit (A020)
- Chapter 2710 Reg. A - Electric pump actuation / engine stop
- Chapter 2710 Reg. A - Fuel injection pump emergency mode
- Chapter 2000 Reg. B - EDC troubleshooting plan

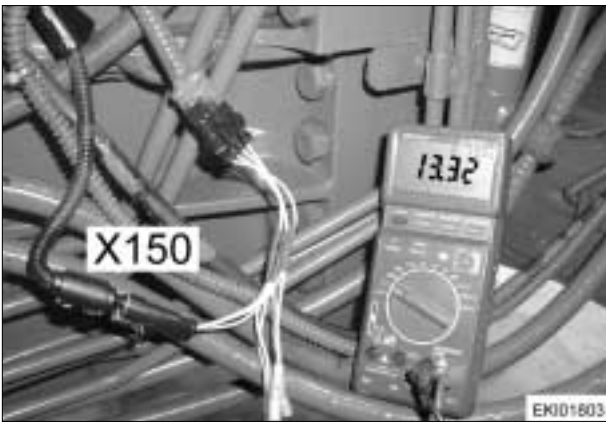
Date	Version	Page	Capitel	Index	Docu-No.
09.05.0001	a	2/2	A021- EDC control module, block diagram	9000	E 000140



<b>Fav 900</b>	<b>Electrics / General system</b> <b>B001 / B024 - sensor, steering angle 1 / 2</b>	<b>E</b>
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B001 = Sensor, steering angle 1 (4WD)  
 B024 = Sensor, steering angle 2 (diff. lock)



Connector X150	
Pin	Function
1	Earth
2	+ supply
3	Diff. lock
4	4WD

**Note:**  
 Ignition "ON"  
 Engine running (hydraulic steering)

Test	Pin	Target value	Condition	Possible cause of fault
Supply	2	12 VDC		Miniature fuse (21) within A013 or within wiring
Earth	1			

<b>Fav 900</b>	<b>Electrics / General system</b> <b>B001 / B024 - sensor, steering angle 1 / 2</b>	<b>E</b>
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			Left-hand curve		Right-hand curve		
Steering angle	>=30°	>=25°	>=15°	0°	>=15°	>=25°	>=30°
B001 - sensor 1 (4WD)	0 VDC	0 VDC	approx. 12 VDC	approx. 12 VDC	12 VDC	0 VDC	0 VDC
4WD	Off	Off	On	On	On	Off	Off
Connector X150 Earth 1 Signal 4							
B024 - sensor 2 (diff. lock)	0 VDC	0 VDC	0 VDC	approx. 12 VDC	0 VDC	0 VDC	0 VDC
Diff. lock	Off	Off	Off	On	Off	Off	Off
Connector X150 Earth 1 Signal 3							

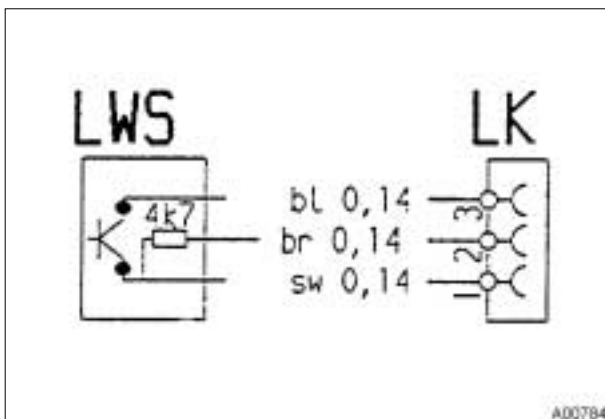
**Note:**

Sensors, steering angle 1 / 2 are not monitored via self-diagnostic test system.

Pin assignment for B001 / B024 sensor, steering angle 1 / 2			
Sensor	X150 - connector	A004 - ECU, control console	A013 - board, fuse
B001 - sensor (4WD)			
1	4	20	
2	2		Miniature fuse 21
3	1	1	
B024 - sensor (diff. lock)			
1	3	19	
2	2		Miniature fuse 21
3	1	1	

**Note:**

Chapter 9000 Reg. C - Electric circuit diagrams



LWS = sensor, steering angle

LK = cable coupler (connector)

3 bl = pin 3 blue = earth

2 br = pin 2 brown = power supply

1 sw = pin 1 black = signal

**Resistance; sensor, steering angle**  
**(pins 1 and 2) = 4.7 kOhm +/- 5%**

Date	Version	Page	<b>B001 / B024 - sensor, steering angle 1 / 2</b>	Capitel	Index	Docu-No.
31.07.2001	a	2/4		<b>9000</b>	<b>E</b>	<b>000137</b>

<b>Fav 900</b>	<b>Electrics / General system</b> <b>B001 / B024 - sensor, steering angle 1 / 2</b>	<b>E</b>
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### Spacing; sensor, steering angle

When installed there must be a gap of **0.6 +/- 0.2 mm** between sensor and knuckle pin.

**Note:**

For details of setting procedure see Workshop Manual, planetary steering drive shaft 060 F Order no. X990.005.036

### Operation of 4WD shift

#### 4WD OFF

In this position 4WD is "actively" disengaged.

Actively disengaged means that engine must be running and **transmission system pressure (18 bar)** must be available in order to disengage 4WD clutch.

**Y009 - valve, 4WD is energised ---> 12 - 14 VDC.**

Front-wheel drive clutch is closed by means of spring force and opened by means of hydraulic pressure.

4WD is permanently engaged if electrical, electronic or transmission hydraulic systems fail.

#### 4WD ON (100% engaged)

**Y009 - valve, 4WD is not energised ---> there is no transmission system pressure at front-wheel drive clutch.**

#### 4WD automatic

When 4WD automatic is set, 4WD is engaged and disengaged in accordance with following table:

To ensure that 4WD automatic function is working, steer to one side and then back again out of straight line.

<b>Condition</b>	<b>4WD</b>
Steering angle left / right < 25°	On
Steering angle left / right > 25°	Off
Theoretical speed < 15 km/h	On
Theoretical speed > 15 km/h	Off
Once v < 15 km/h again, automatically ---->	On
Brake actuated , not actuated	No effect

Date	Version	Page	<b>B001 / B024 - sensor, steering angle 1 / 2</b>	Capitel	Index	Docu-No.
31.07.2001	a	3/4		<b>9000</b>	<b>E</b>	<b>000137</b>

Fav 900	Electrics / General system <b>B001 / B024 - sensor, steering angle 1 / 2</b>	<b>E</b>
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**Operation of diff. lock control**

**Diff. lock OFF**

Y010 - valve, diff. lock is not energised ---> there is no transmission system pressure at diff. lock.

Diff. lock can no longer be engaged if electrical, electronic or transmission hydraulic systems fail.

**Diff. lock ON (100% engaged)**

Y010 - valve, diff. lock is energised ---> 12 - 14 VDC

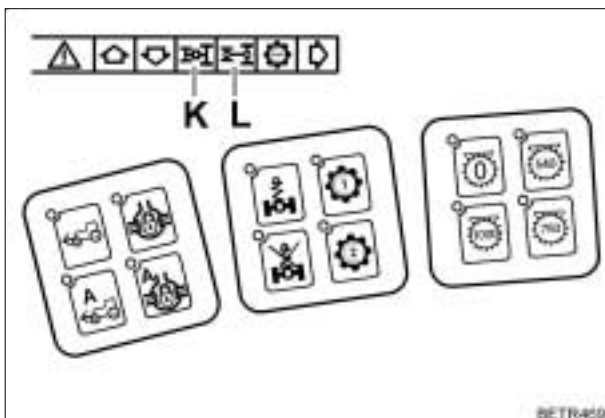
Diff. lock is engaged by means of **transmission system pressure (18 bar)** and disengaged by means of spring force.

**Diff. lock automatic**

When diff. lock automatic is set, diff. lock is engaged or disengaged in accordance with following table:

To ensure that diff. lock automatic function is working, steer to one side and then back again, out of straight line.

Condition	Diff. lock
Steering angle left / right < 15°	On
Steering angle left / right > 15°	Off
Theoretical speed < 15 km/h	On
Theoretical speed > 15 km/h	Off For automatic mode press Automatic key again
Brake actuated	Off
Brake not actuated	On



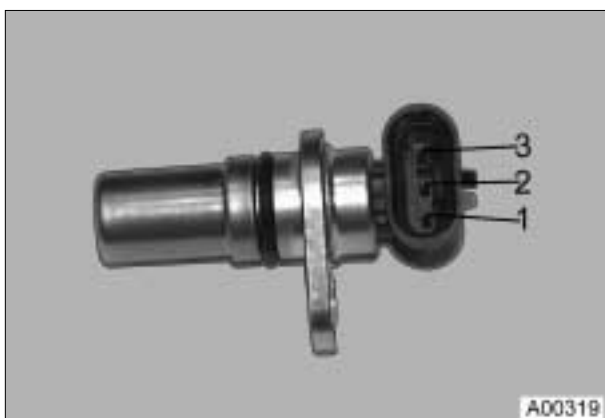
**Note:**

Please refer to Operating Manual for details of operating 4WD and diff. lock control.

K = 4WD telltale

L = Diff. lock telltale

Farmer 400 Fav 700 Fav 900	Electrics / system in general <b>B002 - front PTO speed Hall-effect sensor</b>	<b>E</b>
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Pin	Function
1	Earth
2	Signal
3	+ supply

**Note:**

Connect adapter cable X 899.980.246.205 directly to component B002.

Ignition ON

Test	Pin	Target value	Condition	Possible cause of fault
Supply	3	12 VDC to 14 VDC		Micro fuse (22) within A013 or in wiring
Earth	1			
Speed signal	2	approx. 1.5 VDC	Front PTO rotating	A) Reading 7.3 VDC, fault in component B) Reading 0 VDC: - Unplug component and measure at plug - If reading is 0 VDC, fault in A002 (pin 37) or in wiring - If reading is 7.3 VDC, fault in component
		1.1 VDC or 5.4 VDC	Front PTO stationary	
Earth	1			

Measuring points on A002 - e-box	Pin
Earth	1
Speed signal	37

**Note:**

Checking A002 - e-box, Chapter 9000 Index E

Date	Version	Page	Capitel	Index	Docu-No.
19.2.2001	a	1/1	<b>9000</b>	<b>E</b>	<b>000064</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / system in general <b>B003 - suspension angular resolver</b>	<b>E</b>
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Pin	Function
1	Earth
2	+ supply
3	Signal

**Note:**

Connect adapter cable X 899.980.246.205 directly to component B003.  
Ignition "ON".

Test	Pin	Target value	Condition	Possible cause of fault
Supply	2	8.5 VDC		Micro fuse (18) in A013 or in wiring
Earth	1			
Signal voltage	3	approx. 1.4 VDC +/-0.3 VDC	Upper limit position	
		approx. 2.7 VDC +/-0.3 VDC	Mid-position	
		approx. 3.6 VDC	Lower limit position "Suspension locked"	
Earth	1			

Measuring points on A004 - control console	Pin
Earth	1
Signal	32

**Note:**

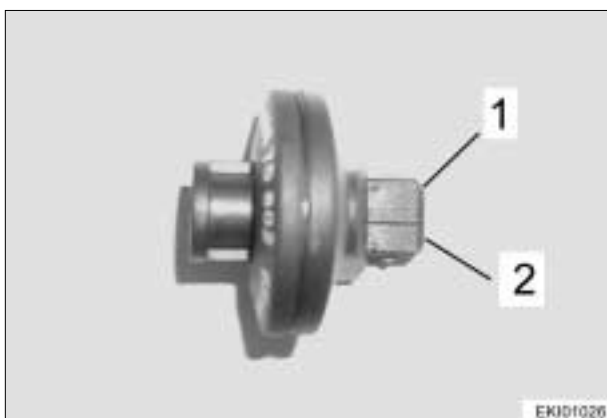
Adjusting suspension sensor, code 7666 - Chapter 0000 Index F

Date	Version	Page	Capitel	Index	Docu-No.
13.2.2001	<b>a</b>	1/1	<b>B003 - suspension angular resolver</b>	<b>9000</b>	<b>E</b>
					<b>000053</b>

Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**B004 - underpressure switch**

**E**



Pin	Function
1	Signal
2	Earth

**Note:**

Connect adapter cable X 899.980.246.201 directly to component B004.

Underpressure mbar	Resistance Ohm	Fault code
< 65	Infinite Switch open	
> 65	approx. 0 Switch closed	- Warning beep - Warning display



**Checking warning display (clogged air filter) on instrument panel A007.**

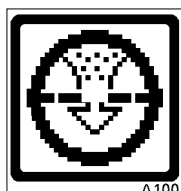
Ignition ON

Disconnect line coupling X153 from underpressure switch B004.

Connect line coupling X153, pin 1 to vehicle earth.

**Note:**

See circuit diagram, instrument panel - Chapter 9000 Index C



Clogged air filter warning display

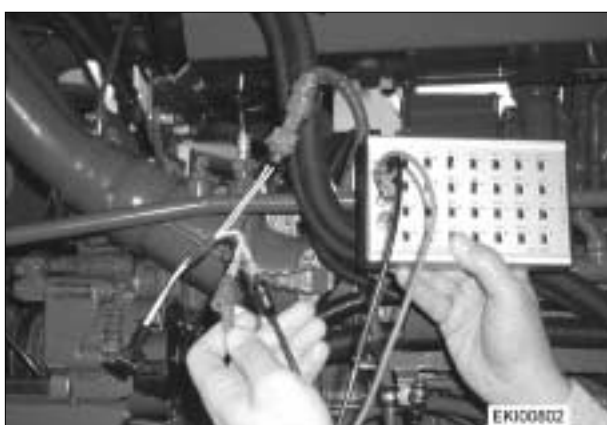
Measuring point on A007 - instrument panel	Pin
Earth	18 and 5 (X101)
Signal	17 (X100)

Date	Version	Page	Capitel	Index	Docu-No.
14.2.2001	a	1/1	B004 - underpressure switch	9000	E 000054

<b>Fav 900</b>	<b>Electric / System in General</b> <b>B005 - Engine coolant Temperature sensor (Dashpanel A007)</b>	<b>E</b>
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Pin	Function
1	Signal
2	Earth



Temperature °C	Resistance Ohm	Failure code
20 (1 Bar)	ca. 55 K	
60 (1 Bar)	approx. 9,7 K	
90 (8 Bars)	approx. 3,3 K	
approx. 105 (11 Bars)	approx. 2,0 K	green - red: Limit
108	approx. 1,8 K	- Warning Beep - Warning- display

### Checking (Engine Coolant temperater ) Warning within Daspanel A007 .

Component B005 separately.

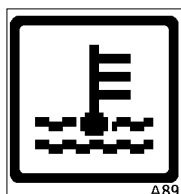
Connect adaptor connector X 899.980.251.102 onto Conector X154 .

Connect resistor decade X 899.980.224 .

Select desired Resistance (according to table) .

Ignition "ON".

Warning Beep and Display (Engine Coolant temperature) must appear on Dashpanel A007.



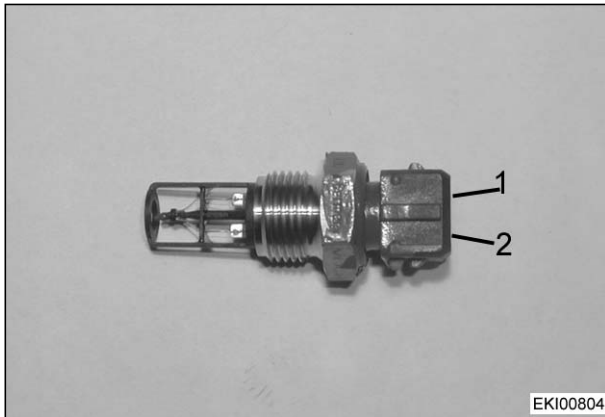
Warning Engine coolant temperature

Measuring Point on Dashpanel A007	Pin
Earth	5 and 18
Signal	25

Date	Version	Page	Capitel	Index	Docu-No.	
23.11.2000	a	1/1	B005 - Engine coolant Temperature sensor (Dashpanel A007)	9000	E	000040



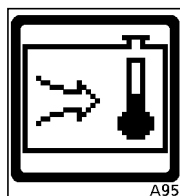
<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electric / System in General <b>B006 -Intake Air Temperature Sensor</b>	<b>E</b>
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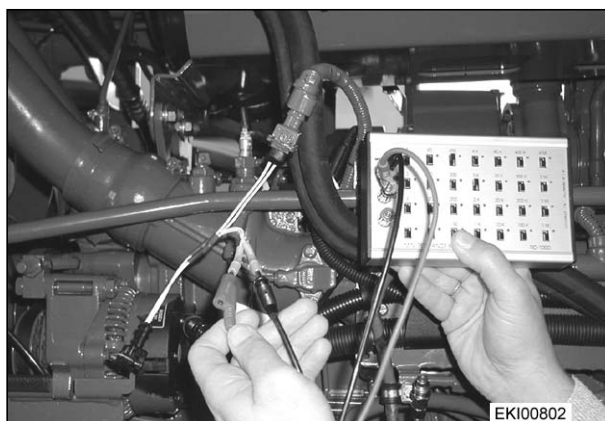
Pin	Function
1	Signal
2	Earth

**Values (Resistance) of Intake Air Temperature Sensor B006**

Temperature °C	resistance Ohm	failure Code
0	16 K +/- 7%	
20	6,5 K +/- 7%	
30	4,0 K +/- 7%	
60	1,2 K +/- 7%	
73	0,8 - 0,9 K +/- 7%	Warning Display Warning Beep
90	0,4 K +/- 7%	
120	0,2 K +/- 7%	



Warning Display Intake Air Temperature



Checking Warning Display with resistor decade

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electric / System in General</b> <b>B006 -Intake Air Temperature Sensor</b>	<b>E</b>
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### Checking Warning Display with resistor decade

Component B006 separately

Connect Adaptor Connectro X 899.980.251.102 onto connector X155.

Connect resistor decade X 899.980.224 and select desired Value.

Ignition "ON".

Continuous Beep and Warning is displayed on dashpanel A007 .

Measuring Point on Dashpanel A007	Pin
Earth	15 and 18
Signal	26

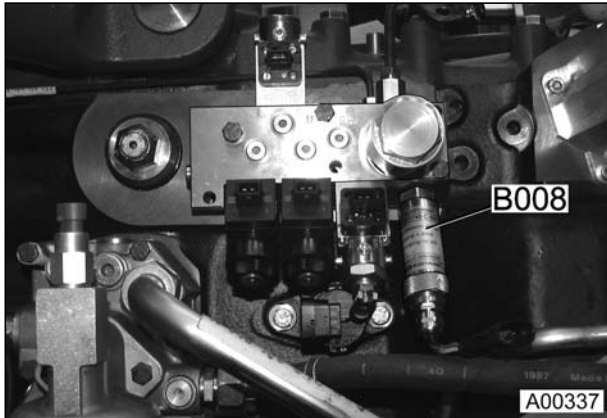
Date	Version	Page	B006 -Intake Air Temperature Sensor	Capitel	Index	Docu-No.
24.11.2000	a	2/2		9000	E	000042

# Single e-box

711 / 712 from 21/1001 - 714 / 716 from 21/2001; Fav 900 chassis number 23/3001 and up

Testing

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b> <b>B008 - high-pressure sensor</b>	<b>E</b>
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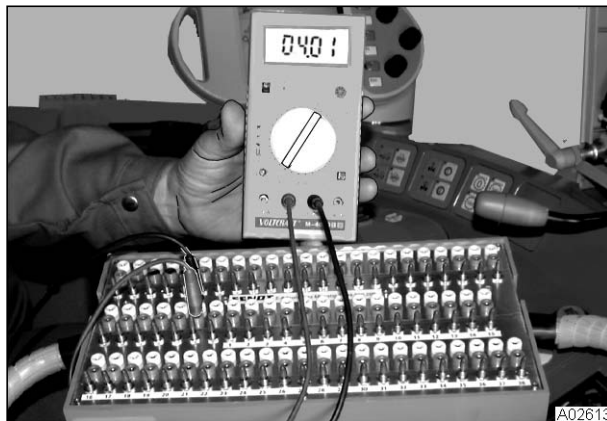
Pin	Function
1	Earth
2	Signal
3	+ supply

**Note:**

Connect adapter cable X 899.980.246.205 directly to component B008.  
 Ignition "ON"

Test	Pin	Target value	Condition	Possible cause of fault
Supply	3	12.0 VDC to 14.0 VDC		Micro fuse (3) within A013 or within wiring
Earth	1			

Signal	2	0.8 VDC		
Earth	1			



Connect e-adapter box 899.980.208.100 to A002.

Test	Pin	Target value	Condition	Possible cause of fault
Power consumption	29	approx. 4.0 mA	Connect ammeter to pin 29 of test socket green and yellow. Switch toggle switch (29) to Isolate.	

Date	Version	Page	B008 - high-pressure sensor	Capitel	Index	Docu-No.
02/2000	a	1/2		9000	E	000001

Farmer 400 Fav 700 Fav 900	Electrics / system in general <b>B008 - high-pressure sensor</b>	<b>E</b>
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**Warning:**

All four wheels of tractor must be jacked up for following test (to prevent accidents).

Leave engine running.

Engage speed range II.

Actuate handbrake and footbrake.

Actuate neutral switch such that both F/R lights light up.

Switch to forward or reverse in cab.

**Carry out high-pressure test for maximum of 5 seconds only (to prevent oil temperature from rising too much).**

Test	Pin	Engine speed n	Target value current / mA	Pressure bar
Power consumption	29	-	4.0	0
		800	6.4	90
		1400	17.0	480
			8.0	150
			9.4	200
			10.8	250
			12.2	300
			13.5	350
			14.9	400
			16.2	450

Measuring points on A002 - e-box	Pin
Earth	1
Signal	29

**Note:**

Checking A002 - e-box, Chapter 9000 Index E

Date	Version	Page	B008 - high-pressure sensor	Capitel	Index	Docu-No.
02/2000	a	2/2		9000	E	000001

Farmer 400 Fav 700 Fav 900	Electronics / system in general <b>B009 - output temperature sensor</b>	<b>E</b>
----------------------------------	--	----------



Pin	Function
1	Signal
2	Earth



Temperature in °C	Resistance Ohm	Fault code
50	150	
60	105	
95	40	
105	35	
110	30	4.1.53

**Note:**

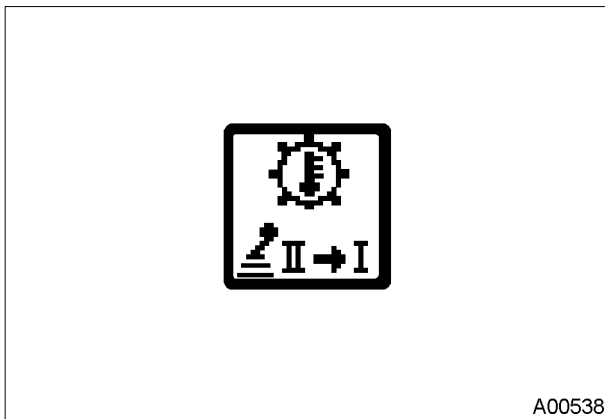
Connect adapter cable X 899.980.251.102 to connector X158.

Component B009 remains isolated.

Ignition "ON".

Connect resistor decade X 899.980.224 and select desired value.

Warning must be displayed on instrument panel. Fault code is stored.



**Note:**

Warning message is displayed on instrument panel from 95°C upwards in range II. Warning message is always displayed at 105°C and above. In addition, fault code 4.1.53 is stored at 110°C and above.

Measuring points on A004 - control console		Pin
Earth		1
Signal		21

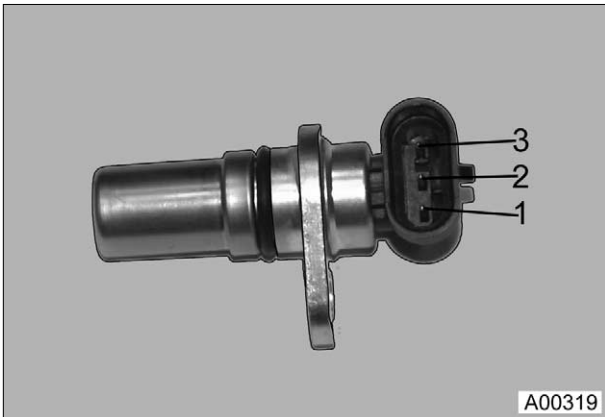
Date	Version	Page	B009 - output temperature sensor	Capitel	Index	Docu-No.
02/2000	a	1/1		9000	E	000017

**Single e-box**

711 / 712 from 21/1001 - 714 / 716 from 21/2001; Fav 900 chassis number 23/3001 and up

Testing

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b> <b>B010 - engine speed sensor 1</b>	<b>E</b>
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Pin	Function
1	Earth
2	Signal
3	+ supply

**Note:**

Connect adapter cable X 899.980.246.205 directly to component B010.  
 Ignition "ON".

Test	Pin	Target value	Condition	Possible cause of fault
Supply	3	12.0 VDC to 14.0 VDC		Micro fuse (4) within A013 or within wiring
Earth	1			

Speed signal	2	1.5 VDC	Engine running	A) Reading 7.3 VDC, fault in component. B) Reading 0 VDC: - Unplug component - If reading is 0 VDC, fault in A002 (PIN 12) or in wiring. - If reading is 7.3 VDC - fault in component.
		1.0 VDC or 5.4 VDC	Engine stopped	
Earth	1			

Measuring points on A002 - e-box	Pin
Earth	1
Speed signal	12

**Note:**

Checking A002 - e-box, Chapter 9000 Index E

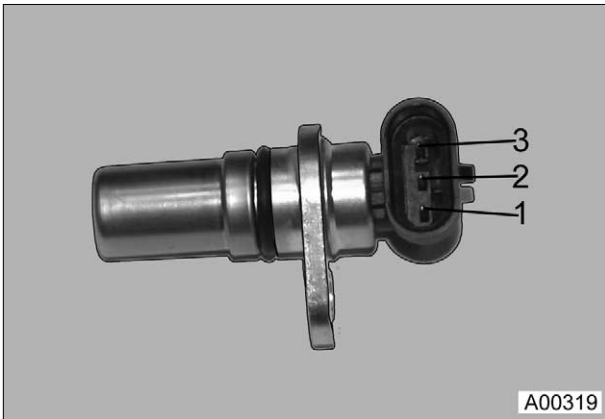
Date	Version	Page	Capitel	Index	Docu-No.	
06/2000	a	1/1	B010 - engine speed sensor 1	9000	E	000003

**Single e-box**

711 / 712 from 21/1001 - 714 / 716 from 21/2001; Fav 900 chassis number 23/3001 and up

Testing

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b> <b>B011 - engine speed sensor 2</b>	<b>E</b>
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Pin	Function
1	Earth
2	Signal
3	+ supply

**Note:**

Connect adapter cable X 899.980.246.205 directly to component B011.  
 Ignition "ON".

Test	Pin	Target value	Condition	Possible cause of fault
Supply	3	12.0 VDC to 14.0 VDC		Micro fuse (2) within A013 or within wiring
Earth	1			

Speed signal	2	1.5 VDC	Engine running	A) Reading 7.3 VDC, fault in component. B) Reading 0 VDC: - Unplug component - If reading is 0 VDC, fault in A002 (PIN 36) or in wiring. - If reading is 7.3 VDC - fault in component.
		1.0 VDC or 5.4 VDC	Engine stopped	
Earth	1			

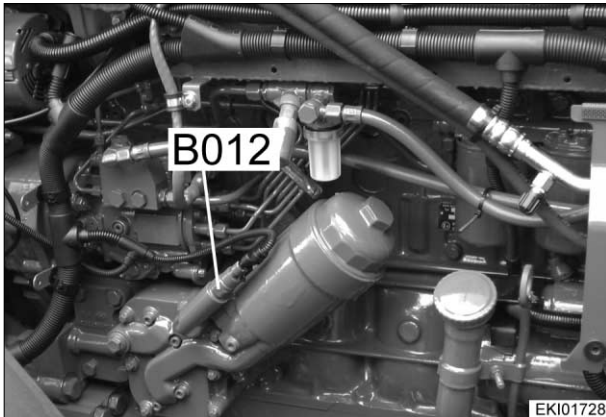
Measuring points on A002 - e-box	Pin
Earth	1
Speed signal	36

**Note:**

Checking A002 - e-box, Chapter 9000 Index E

Date	Version	Page	Capitel	Index	Docu-No.	
06/2000	a	1/1	B011 - engine speed sensor 2	9000	E	000004

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Electrics / General system  <b>B012 - engine oil pressure sensor</b></p>	<p><b>E</b></p>
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**Note:**  
**Checking engine oil pressure sensor:**  
**see Lubrication pressure test -**  
**Chapter 2312 Reg. E**

Date	Version	Page	Capitel	Index	Docu-No.
20.07.2001	a	1/1	<b>B012 - engine oil pressure sensor</b>	<b>9000</b>	<b>E</b>
				<b>E</b>	<b>000130</b>



Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**B013 - hydraulic oil temperature switch**

**E**



Pin	Function
1	Signal
Screw socket	Earth

Temperature °C	Resistance Ohm	Fault code
< 94 +/-3	Infinite Switch open	
> 94 +/-3	approx. 0 Switch closed	- Warning beep - Warning display



**Checking warning display (hydraulic oil temperature) on instrument panel A007**

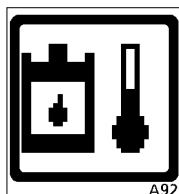
Ignition ON

Disconnect line coupling X162 from temperature sensor B013.

Connect line coupling X162 to vehicle earth.

**Note:**

See circuit diagram, instrument panel - Chapter 9000 Index C



Hydraulic oil temperature warning display

Measuring point on instrument panel A007	Pin
Signal	16

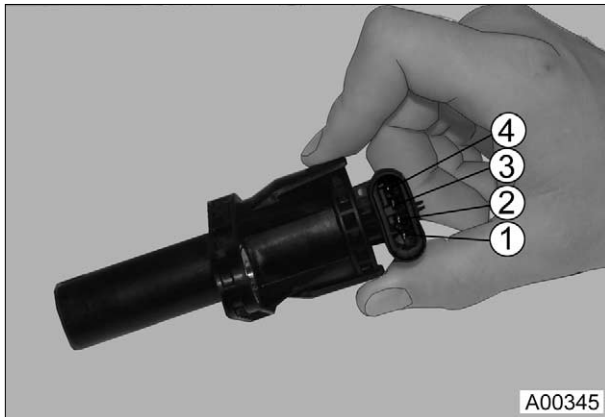
Date	Version	Page	Capitel	Index	Docu-No.	
14.2.2001	a	1/1	B013 - hydraulic oil temperature switch	9000	E	000056

**Single e-box**

711 / 712 from 21/1001 - 714 / 716 from 21/2001; Fav 900 chassis number 23/3001 and up

Testing

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / system in general <b>B014 - speed sensor for hydrostatic accumulator shaft</b>	<b>E</b>
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Pin	Function
1	Earth
2	Speed signal
3	+ supply
4	Rotational direction sensor

**Note:**

Connect adapter cable X 899.980.246.206 directly to component B014. Ignition "ON".

Test	Pin	Target value	Condition	Possible cause of fault
Supply	3	8.5 VDC		Micro fuse (16) within A013 or within wiring
Earth	1			

Speed signal	2	3.0 VDC	Tractor moving at approx. 5 km/h	A) Reading 7.3 VDC: fault in component B) Reading 0 VDC: - Unplug component - If reading is 0 VDC, fault in A002 (PIN 13) or in wiring - If reading is 7.3 VDC - fault in component.
		1.0 VDC or 5.0 VDC	Tractor stationary	
Earth	1			

Rotational direction	4	5.1 VDC	Forwards at approx. 5 km/h	A) Reading 8.0 VDC: fault in component B) Reading 0 VDC: - Unplug component - If reading is 0 VDC, fault in A002 (PIN 42) or in wiring. - If reading is 8.0 VDC, fault in component.
		2.4 VDC	Reverse at approx. 5 km/h	
Earth	1			

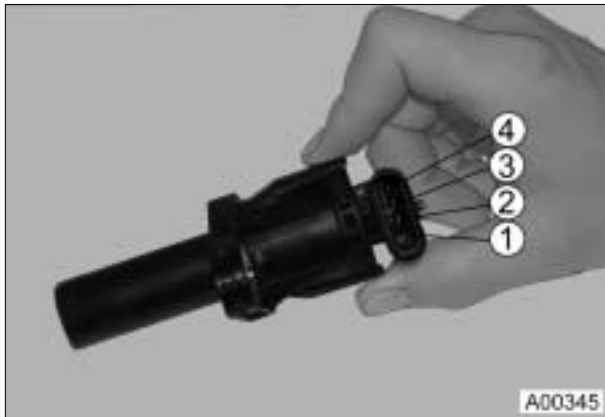
Measuring points on A002 - e-box	Pin
Earth	1
Speed signal	13
Rotational direction	42

**Note:**

Checking A002 - e-box, Chapter 9000 Index E

Date	Version	Page	Capitel	Index	Docu-No.
06/2000	<b>b</b>	1/1	<b>B014 - speed sensor for hydrostatic accumulator shaft</b>	<b>9000</b>	<b>E</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b> <b>B015 - bevel pinion speed sensor</b>	<b>E</b>
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Pin	Function
1	Earth
2	Speed signal
3	+ supply
4	Rotational direction sensor

**Note:**

Connect adapter cable X 899.980.246.206 directly to component B015.  
Ignition "ON".

Test	Pin	Target value	Condition	Possible cause of fault
Supply	3	8.5 VDC		Micro fuse (7) within A013 or within wiring
Earth	1			

Speed signal	2	3.0 VDC	Tractor moving at approx. 5 km/h	A) Reading 7.3 VDC: fault in component B) Reading 0 VDC: - Unplug component - If reading is 0 VDC, fault in A002 (PIN 34) or in wiring - If reading is 7.3 VDC - fault in component.
		1.0 VDC or 5.0 VDC	Tractor stationary	
Earth	1			

Rotational direction	4	2.4 VDC	Forwards at approx. 5 km/h	A) Reading 8.0 VDC: fault in component B) Reading 0 VDC: - Unplug component - If reading is 0 VDC, fault in A002 (PIN 18) or in wiring. - If reading is 8.0 VDC fault in component.
		5.1 VDC	Reverse at approx. 5 km/h	
Earth	1			

Measuring points on A002 - e-box	Pin
Earth	1
Speed signal	34
Rotational direction	18

**Note:**

Checking A002 - e-box, Chapter 9000 Index E

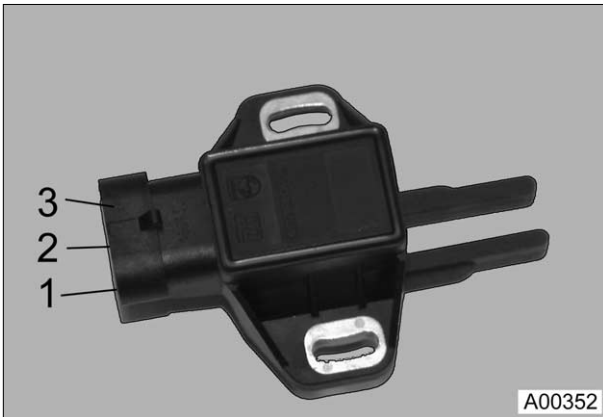
Date	Version	Page	B015 - bevel pinion speed sensor	Capitel	Index	Docu-No.
06/2000	a	1/1		9000	E	000006

**Single e-box**

711 / 712 from 21/1001 - 714 / 716 from 21/2001; Fav 900 chassis number 23/3001 and up

Testing

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / system in general <b>B016 - range rotary position sensor</b>	<b>E</b>
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Pin	Function
1	Earth
2	+ sppy
3	Signal

**Note:**

Connect adapter cable X 899.980.246.205 directly to component B016.  
 Ignition "ON"

Test	Pin	Target value	Condition	Possible cause of fault
Supply	2	8.5 VDC		Micro fuse (13) within A013 or within wiring
Earth	1			
Signal voltage	3	4.0 VDC	Range 1	
		1.0 VDC	Range 2	
Earth	1			

Measuring points on A002 - e-box	Pin
Earth	1
Signal voltage	6

**Note:**

Checking A002 - e-box, Chapter 9000 Index E  
 Adjustment Chapter 0000 Index F

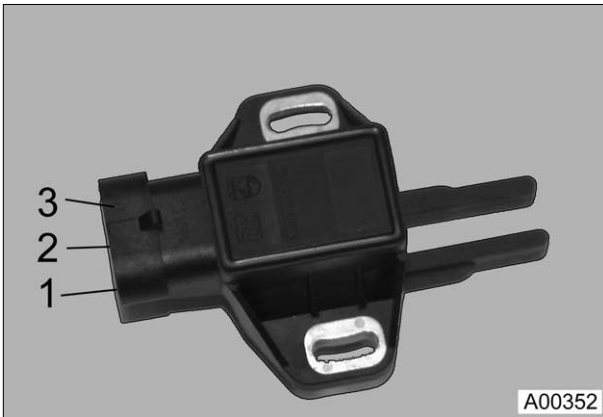
Date	Version	Page	Capitel	Index	Docu-No.
06/2000	a	1/1	<b>9000</b>	<b>E</b>	<b>000007</b>

**Single e-box**

711 / 712 from 21/1001 - 714 / 716 from 21/2001; Fav 900 chassis number 23/3001 and up

Testing

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / system in general <b>B017 - clutch pedal rotary position sensor</b>	<b>E</b>
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Pin	Function
1	Earth
2	+ supply
3	Signal



Remove hatch cover at top of steering column, then remove instrument panel.

Connect adapter cable X 899.980.246.205 directly to component B017.

**Note:**  
Ignition "ON".

Test	Pin	Target value	Condition	Possible cause of fault
Supply	2	8.5 VDC		Micro fuse (8) within A013 or within wiring
Earth	1			

Signal voltage	3	0.8 VDC	Clutch pedal not actuated	
		4.0 VDC	Clutch pedal actuated	
Earth	1			

Measuring points on A002 - e-box	Pin
Earth	1
Signal voltage	8

**Note:**  
 Checking A002 - e-box, Chapter 9000 Index E  
 Adjustment Chapter 0000 Index F

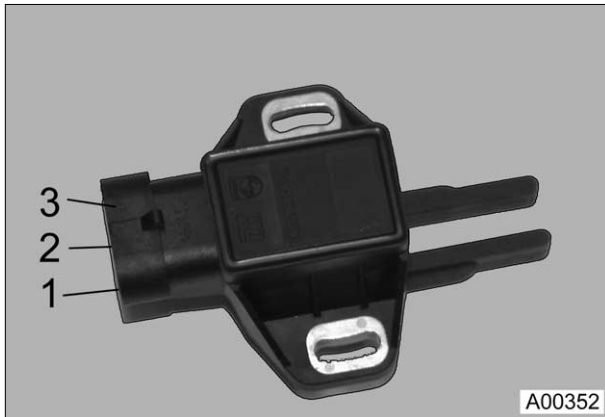
Date	Version	Page	B017 - clutch pedal rotary position sensor	Capitel	Index	Docu-No.
06/2000	a	1/1		9000	E	000008

**Single e-box**

711 / 712 from 21/1001 - 714 / 716 from 21/2001; Fav 900 chassis number 23/3001 and up

Testing

<b>Farmer 400</b> <b>Fav 700</b>	Electrics / system in general <b>B018 - setpoint engine speed rotary position sensor</b>	<b>E</b>
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Pin	Function
1	Earth
2	+ supply
3	Signal

**Note:**

Connect adapter cable X 899.980.246.205 directly to component B018.  
 Ignition "ON".

Test	Pin	Target value	Condition	Possible cause of fault
Supply	2	8.5 VDC		Micro fuse (14) within A013 or within wiring
Earth	1			
Speed signal	3	1.2 VDC	Accelerator not actuated	
		3.6 VDC	Accelerator actuated	
Earth	1			

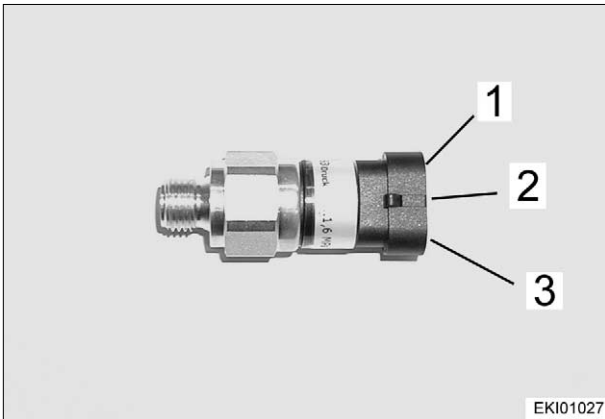
Measuring points on A002 - e-box	Pin
Earth	1
Speed signal	7

**Note:**

Checking A002 - e-box, Chapter 9000 Index E  
 Adjustment Chapter 0000 Index F

Date	Version	Page	B018 - setpoint engine speed rotary position sensor	Capitel	Index	Docu-No.
06/2000	a	1/1		9000	E	000009

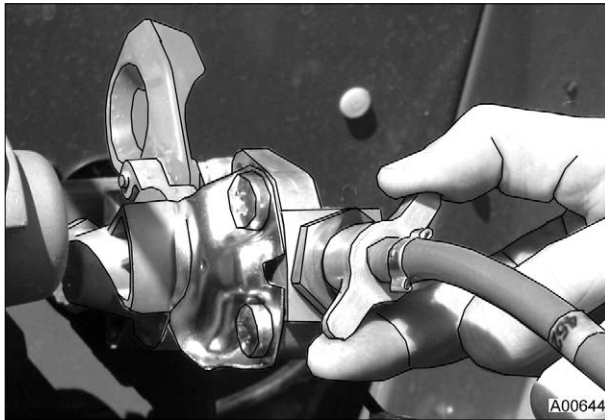
<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / system in general <b>B019 - compressed-air pressure sensor</b>	<b>E</b>
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Pin	Function
1	Earth
2	Signal
3	+ supply

**Note:**

Connect adapter cable X 899.980.246.205 directly to component B019.



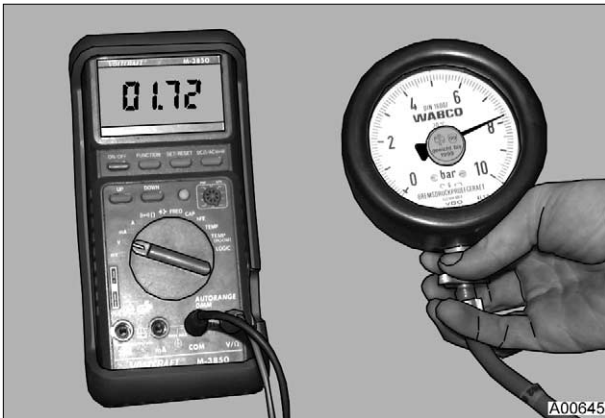
Release pressure from air compressor. Connect test pressure gauge to red coupling head (container).

Connect pin 1 (earth) and pin 2 (signal) to pressure transducer B019.

Start engine.

**Note:**

Pressure regulator vents at approx. 8.3 bar.

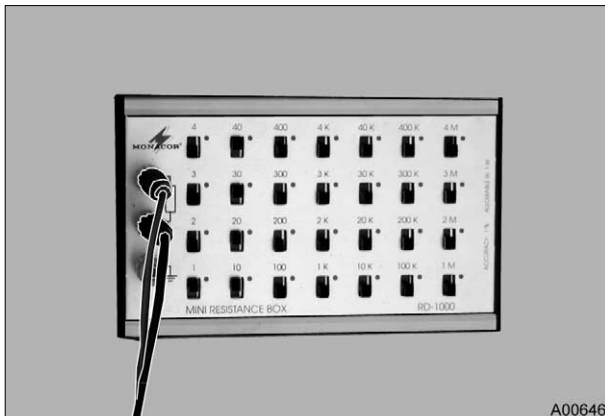


Voltage	Pressure	Display
VDC	bar	bars
0.2	0	1 flashing
0.6	2	1 flashing
0.95	4	2 flashing
1.25	6	5
1.65	8	7
2.4	12	Theoretical value
3.5	16	Theoretical value

**Farmer 400**  
**Fav 700**  
**Fav 900**

Electrics / system in general  
**B019 - compressed-air pressure sensor**

**E**



**Checking display (compressed-air volume) on instrument panel A007**

Connect adapter cable X 899.980.246.205 to connector X168.

Connect resistor decade X 899.980.224 and select desired value (see table).

Ignition "ON".

Compressed-air volume is displayed on instrument panel.

Resistance	Display
<b>Ohm</b>	<b>bars</b>
45	1 flashing
55	2 flashing
60	3 flashing
64	4
74	5
81	6
91	7
103	8

Measuring points on A007 - instrument panel	Pin
Earth	5 and 18 (X101)
Signal	24 (X101)

+ supply 12 VDC: fuse board A013 / fuse 25

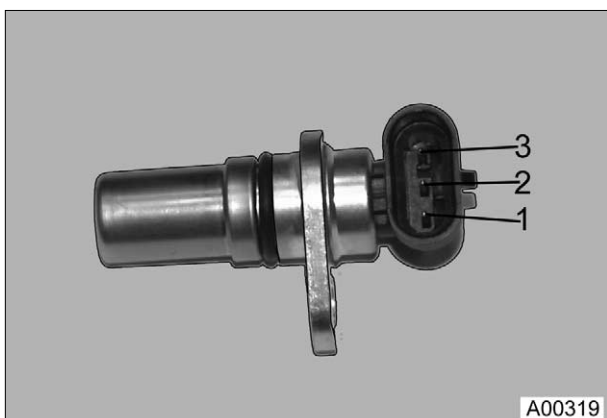
Date	Version	Page	Capitel	Index	Docu-No.
15.2.2001	a	2/2	<b>B019 - compressed-air pressure sensor</b>	<b>9000</b>	<b>E</b>
					<b>000057</b>



Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**B020 - rear PTO shaft speed sensor**

**E**



A00319

Pin	Function
1	Earth
2	Signal
3	+ supply

**Note:**

Connect adapter cable X 899.980.246.205 directly to component B020.

Ignition ON

Test	Pin	Target value	Condition	Possible cause of fault
Supply	3	12 VDC to 14 VDC		Micro fuse (32) within A013 or within wiring
Earth	1			
Speed signal	2	approx. 1.5 VDC	PTO rotating	A) Reading 7.3 VDC, fault in component B) Reading 0 VDC: - Unplug component and measure at plug - If reading is 0 VDC, fault in A002 (PIN 35) or in wiring - If reading is 7.3 VDC, fault in component
		1.1 VDC or 5.4 VDC	PTO stationary	
Earth	1			

Measuring points on A002 - e-box	Pin
Earth	1
Speed signal	35

**Note:**

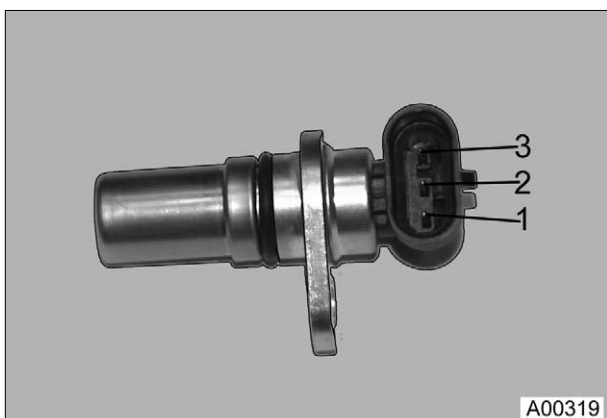
Checking A002 - e-box, Chapter 9000 Index E

Date	Version	Page	Capitel	Index	Docu-No.
17.2.2001	a	1/1	<b>9000</b>	<b>E</b>	<b>000062</b>

Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**B021 - rear PTO shaft clutch output speed sensor**

**E**



Pin	Function
1	Earth
2	Signal
3	+ supply

**Note:**

Connect adapter cable X 899.980.246.205 directly to component B021.  
Ignition ON

Test	Pin	Target value	Condition	Possible cause of fault
Supply	3	12 VDC to 14 VDC		Micro fuse (33) within A013 or in wiring
Earth	1			
Speed signal	2	approx. 1.5 VDC	PTO rotating	A) Reading 7.3 VDC, fault in component B) Reading 0 VDC: - Unplug component and measure at plug - If reading is 0 VDC, fault in A002 (PIN 14) or in wiring - If reading is 7.3 VDC, fault in component
		1.1 VDC or 5.4 VDC	PTO stationary	
Earth	1			

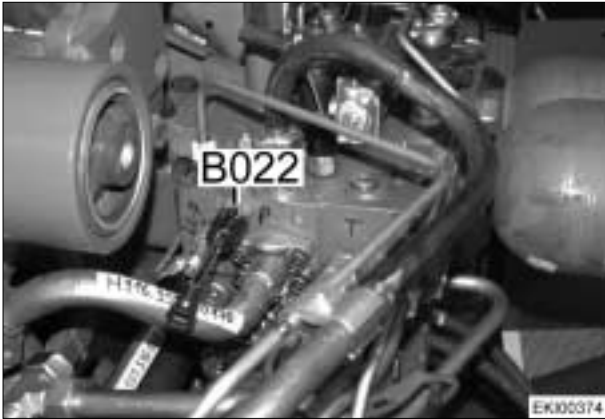
Measuring points on A002 - e-box	Pin
Earth	1
Speed signal	14

**Note:**

Checking A002 - e-box, Chapter 9000 Index E

Date	Version	Page	Capitel	Index	Docu-No.
19.2.2001	a	1/1	<b>9000</b>	<b>E</b>	<b>000063</b>

<p>Fav 700 Fav 900</p>	<p>Electrics / General system <b>B022 - sensor, kickout (NA version only)</b></p>	<p><b>E</b></p>
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On central control block ZSB

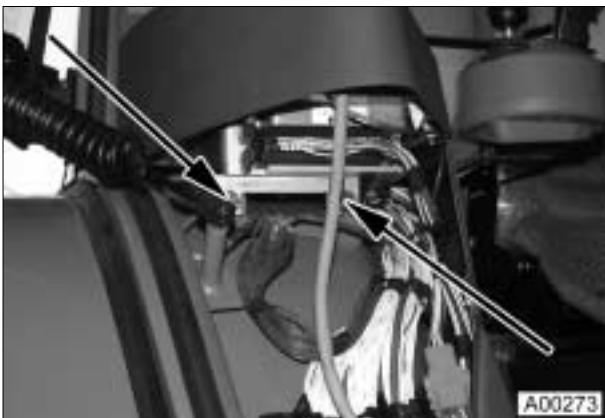
**B022** = sensor, kickout



Pin	Function
1	Signal
2	Earth

**Note:**  
Ignition 'OFF'  
Measure resistance directly at sensor.

Test	Pin	Target value	Condition	Possible cause of fault
Resistance	1	510 ohms	Y015-Y019 - valve not actuated	
		121 ohms	Y015-Y019 - valve operating against pressure	
	2		LS pressure > 175 +/- 5 bar	



Connect e-adapter box X 899.980.208.100 directly to A004 - ECU.

Date	Version	Page	B022 - sensor, kickout (NA version only)	Capitel	Index	Docu-No.
30.08.2001	a	1/3		9000	E	000152

<b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / General system</b> <b>B022 - sensor, kickout (NA version only)</b>	<b>E</b>
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Measuring points on A004 - ECU, control console	Pin
Signal	16
Sensor system earth	1

**Note:****Ignition 'ON'****Start tractor.****Unlock Y015-Y019 - valves.**

Test	Pin	Target value	Condition	Possible cause of fault
Signal	16	5.1 VDC	Y015-Y019 - valve not actuated (LS pressure < 175 +/- 5 bar)	A Reading 8.0 VDC, fault in component
		2.4 VDC	Y015-Y019 - valve operating against pressure (LS pressure > 175 +/- 5 bar)	B Reading 0 VDC: - Unplug component  - If reading is 0 VDC, fault in A004 ECU (pin 16) or in wiring - If reading is 8.0 VDC, fault in component.
Earth	1			

**Note:****If fault is detected, fault code A.1.DA is output.****Consequence: no kickout function possible****Operation of B022 - sensor, kickout**

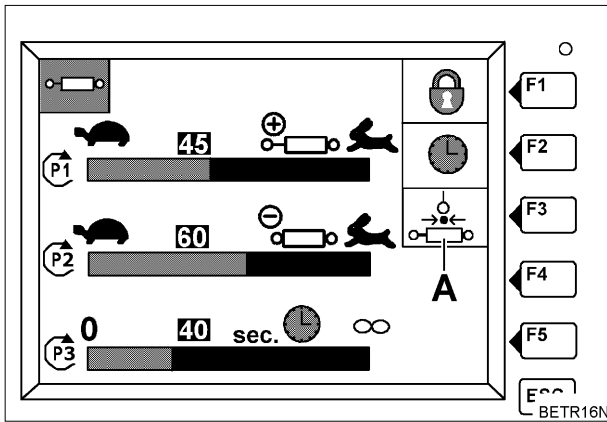
- B022 - sensor passes signal to A004 - ECU (**load-sensing pressure > 175 +/- 5 bar**).
- A004 - ECU transmits CAN message to A002 - ECU via K-bus.
- A002 - ECU transmits CAN message to Y015-Y019 - valves via G-bus.
- All preselected Y015-Y019 - valves move to neutral position.

**Note:****North American version (NA):****B022 - sensor, mounted on central control block.****Kickout function is activated via end-of-line program (EOL) .****European version (EU):****B022 - sensor not mounted on central control block.****Kickout function is deactivated via end-of-line program (EOL).**

Date	Version	Page	Capitel	Index	Docu-No.
30.08.2001	a	2/3	B022 - sensor, kickout (NA version only)	9000	E 000152

<p>Fav 700 Fav 900</p>	<p>Electrics / General system <b>B022 - sensor, kickout (NA version only)</b></p>	<p><b>E</b></p>
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**Presetting kickout function ( N orth A merican version only)**



**On A008 - terminal**

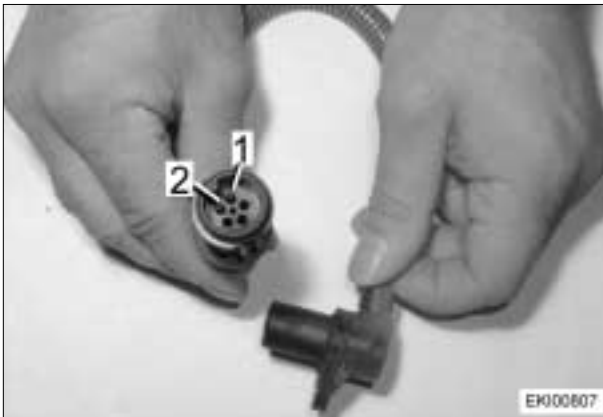
Select Y015-Y019 - valve.

Isolate or lock kickout function (A) by pressing F3.

**If load-sensing pressure is greater than 175 +/- 5 bar for longer than 1 sec, selected Y015-Y019 - valves move to neutral position.**

Date	Version	Page	Capitel	Index	Docu-No.
30.08.2001	a	3/3	B022 - sensor, kickout (NA version only)	9000	E 000152

<b>Fav 900</b>	<b>Electric / System in General</b> <b>B025 - Speed sensor EDC</b>	<b>E</b>
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Pin	Function
1	Earth
2	Signal

**Note:**

Connect Adaptor Connector X 899.980.251.105 directly onto Component B025 .  
Multimeter set on Range VAC !  
Ignition "ON".

Test	Pin	Reque- sted Value	Condition	Possible Origin of failure
Speed Signal	2	approx. 3,7 VAC approx. 7,5 VAC	Engine runs  approx. 800 Rpm  approx. 2350 Rpm	A) Value 0 VAC: Failure within Component or within Wiring (Earth or Signal wire)
Earth	1			

**Internal resistance of Speed Sensor EDC B025 = approx. 0,9 KOhm**

Measuring Points on EDC Control Module A021 (X047)		Pin
Earth		13
Speed signal		1

**Note:**

Diagnostic program EDC - Chapter 2000 Reg. B (F.C. 1.2.84 )

Date	Version	Page	<b>B025 - Speed sensor EDC</b>	Capitel	Index	Docu-No.
28.11.2000		1/1		<b>9000</b>	<b>E</b>	<b>000048</b>

<b>Fav 900</b>	<b>Electric / System in General</b> <b>B026 - Needle Motion Sensor</b>	<b>E</b>
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Pin	Function
1	Signal
2	Earth

**Note:**

Connect Adaptor Connector X 899.980.251.104 directly onto Component B026 Ignition "ON".

Test	Pin	Requested Value	Condition	Possible Origin of failure
Signal	1	ca. 3,4 VDC	Engine stopped	A) Value 12 VDC: Failure within Component or within Wiring (Signal wire). B) Value 0 VDC: within Wiring (Short Circuit).
		ca. 3,4 VDC	Engine runs	
Earth	2			

**Internal resistance of needle Motion Sensor B026 = ca. 104 Ohm**

Measuring Points on EDC Control Module - A021 (X047)	Pin
Earth	15
Signal	29

**Note:**

Diagnostic program EDC - Chapter 2000 Reg. B (F.C. 1.2.1A )

<b>Fav 900</b>	Electric / System in General <b>B027 - Engine Coolant Temperature Sensor EDC</b>	<b>E</b>
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Pin	Function
1	Signal
2	Earth

**Note:**

Connect Adaptor Connector X 899.980.251.102 directly onto Component B027 .  
Ignition "ON".

Temperature (°C)	Resistance (Ohm)
15 - 30	3,6 K - 1,3 K
75 - 80	460 - 230

**Signal (3) at 30° - 90° C = 3,0 - 1,15 VDC**

**Value 0 VDC, Failure within Component or within Wiring (Signal wire).**

Measuring Points on EDC Control Module A021 (X047)	Pin
Earth	5
Signal	22

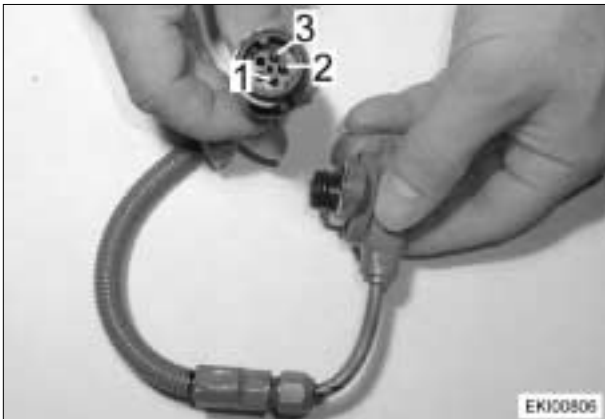
**Note:**

**Diagnostic program EDC - Chapter 2000 Reg. B (F.C. 1.2.87)  
eventually . Engine Power loss without Failure Code!**

Date	Version	Page	<b>B027 - Engine Coolant Temperature Sensor EDC</b>	Capitel	Index	Docu-No.
29.11.2000	<b>a</b>	1/1		<b>9000</b>	<b>E</b>	<b>000050</b>



<b>Fav 900</b>	<b>Electric / System in General</b> <b>B028 --Intake Air Pressure sensor</b>	<b>E</b>
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Pin	Function
1	Signal
2	+ Supply
3	Earth

**Note:**

Connect Adapteor Connectorl X 899.980.251.103 directly onto Component B028 .  
Ignition "ON".

Test	Pin	Reque- sted Value	Condition	Possible Origin of failure
Supply	2	5,0 VDC		A021 EDC MSG or within Wi- ring
Earth	3			
Signal	1	0,9 VDC	Cold engine, Engine stopped	A) Value 0 VDC, Failure within Component or within Wiring (Signal wire). B) Value 4,8 VDC: Failure within Component or within Wiring (Earth wire).
		0,9 VDC	Cold engine, Engine runs approx. 800 Rpm.	
		1,15 VDC	approx. 2350 Rpm.	
Earth	3			

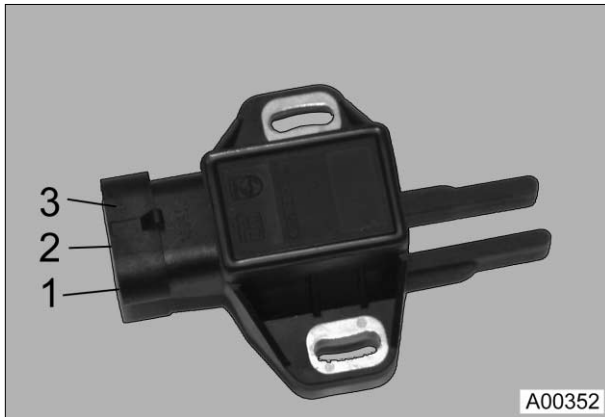
Measuring points on EDC Control Unit A021 (X407)	Pin
Earth	17
Signal	12
+ Supply	23

**Note:**

Diagnostic program EDC - Chapter 2000 Reg. B (F.C. 1.2.85)  
eventually . Egin Power loss without Failure Code!

Date	Version	Page	<b>B028 --Intake Air Pressure sensor</b>	Capitel	Index	Docu-No.
28.11.2000	<b>a</b>	1/1		<b>9000</b>	<b>E</b>	<b>000044</b>

<b>Fav 900</b>	<b>Electric / System in General</b> <b>B029 - Accelerator Pedal sensor EST (red)</b>	<b>E</b>
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Pin	Function
1	Earth
2	+ Supply
3	Signal

**Note:**

Connect Adaptor Connector X 899.980.246.205 directly onto Component B029 Ignition "ON".

Test	Pin	Requested Value	Condition	Possible Failure Origin
Supply	2	8,5 VDC		Fuse (17) within A013 or within wiring
Earth	1			
Signal	3	Approx. 4 VDC approx. 20 mA	Accelerator Pedal not actuated	Value . 0 VDC: Value: 0 mA: Failure within Component, Failure within Wiring ( Earth or Signal Wire)
		Approx. 0,7 VDC ca. 4 mA	Pedal actuated	
Earth	1			

measuring Points on EST Control module A002 .	Pint
Earth	1
Signal	7

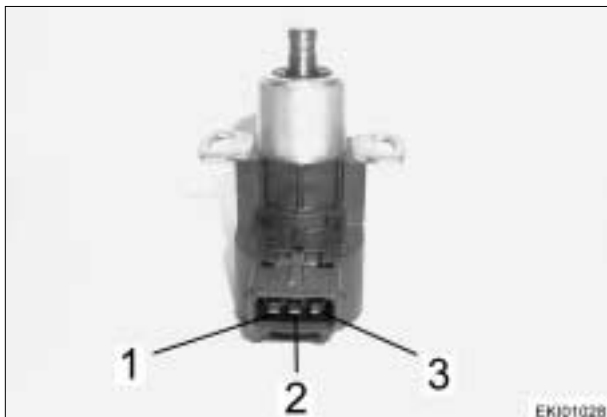
+ Supply 8,5 VDC: Fuse Board A013 / Fuse 17

**Note:**

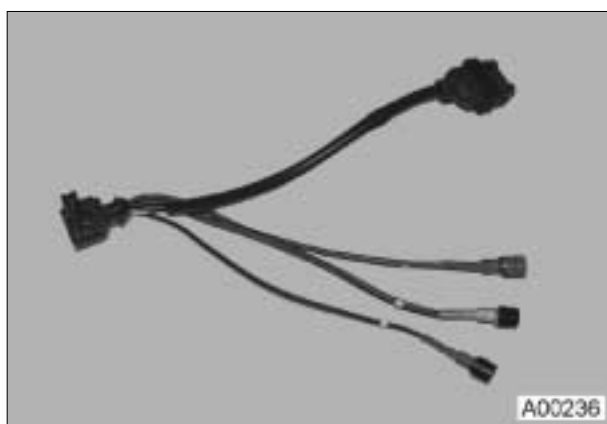
Diagnostic program EDC - Chapter 9000 Reg. B (F.C. 4.1.06)  
Description Engine speed Control EDC - Chapter 2710 Reg. A  
Calibration 4005 - Chapter 0000 Reg.F (Calibration Accelerator Pedal)

Date	Version	Page	Capitel	Index	Docu-No.	
24.11.2000	a	1/1	B029 - Accelerator Pedal sensor EST (red)	9000	E	000043

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / system in general <b>B030 - position sensor reading</b>	<b>E</b>
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Pin	Function
1	Earth
2	Signal
3	+ supply



**Note:**  
**Voltage measurement using adapter cable (DIY)**  
**Made from: 3-core adapter cable (H 205.860.100.020)**  
**Connect adapter cable directly to component B030.**

**Note:**  
**Ignition "ON".**

Test	Pin	Target value	Condition	Possible cause of fault
Supply	3	9.5 +/- 7% VDC		Supply and earth come from A005 (EPC box)
Earth	1			
Signal	2	approx. 2.5 VDC	Lift assembly lowered	
		approx. 6.8 VDC	Lift assembly raised	
		approx. 7.1 VDC	Mech. stop	
Earth	1			

Measuring points on A005 - EPC box	Pin
Earth	20
Signal	7
+ supply	39

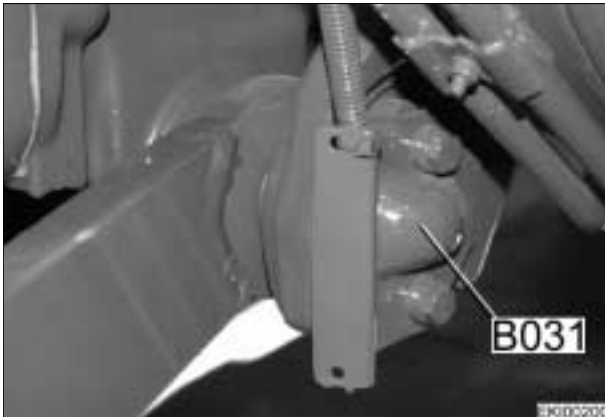
**Note:**  
**Checking EPC box A005 - Chapter 9000 Index E**  
**Adjustment Chapter 9000 Index F**

Date	Version	Page	B030 - position sensor reading	Capitel	Index	Docu-No.
15.2.2001	a	1/1		9000	E	000058

**Farmer 400**  
**Fav 700**  
**Fav 900**

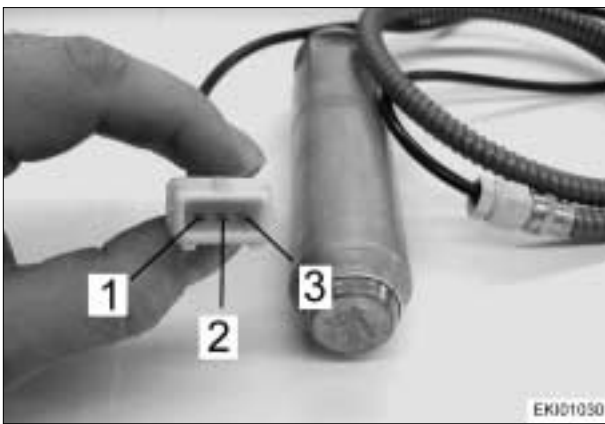
**Electrics / system in general**  
**B031 / B032 - draft-sensing pin right / left**

**E**

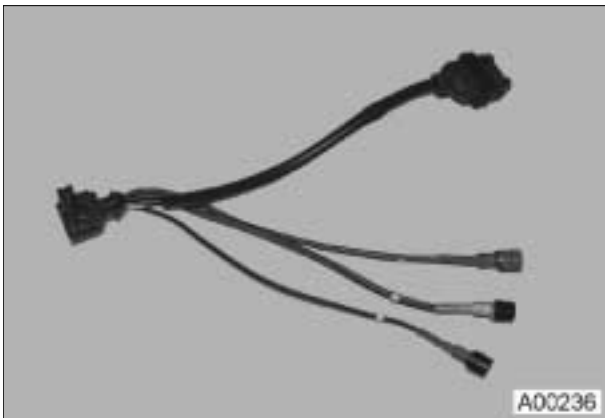


On left and right bottom links (draft-sensing pin B032 and draft-sensing pin B031)

Draft-sensing pin measures tensile and compressive loads in bottom links.



Pin	Function
1	Earth
2	Signal
3	+ supply



**Note:**

**Voltage measurement using adapter cable (DIY)**

Made from: 3-core adapter cable (H 205.860.100.020)

Connect adapter cable directly to component B031.

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / system in general <b>B031 / B032 - draft-sensing pin right / left</b>	<b>E</b>
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When checking signal voltage, press bottom link back with tyre lever.

**Note:**  
**Ignition ON**

Test	Pin	Target value	Condition	Possible cause of fault
Supply	3	9.5 +/- 7% VDC		Supply and earth come from A005 (EPC box) (in event of overload A005 switches off)
Earth	1			
Signal	2	2.5 VDC	Tensile load	
		4.75 +/- 10% VDC	Neutral	
		7.5 VDC	Compressive load	
Earth	1			

**Measuring points on B031 (right draft-sensing pin)**

Measuring points on A005 - EPC box	Pin
Earth	38
Signal	25
+ supply	40

**Measuring points on B032 (left draft-sensing pin)**

Measuring points on A005 - EPC box	Pin
Earth	38
Signal	43
+ supply	40

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b> <b>B031 / B032 - draft-sensing pin right / left</b>	<b>E</b>
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### Technical specifications of draft-sensing pins B031/B032

Supply voltage	9.5 VDC
Signal:	
Tensile / compressive load	2.5 VDC / 7.5 VDC
Neutral	4.7 VDC
Rated load	
Farmer 400	60 KN (6.0 t)
Fav. 700	90 KN (9.0 t)
Fav. 900	90 KN (9.0 t)
Overload limit	120 KN (12 t)

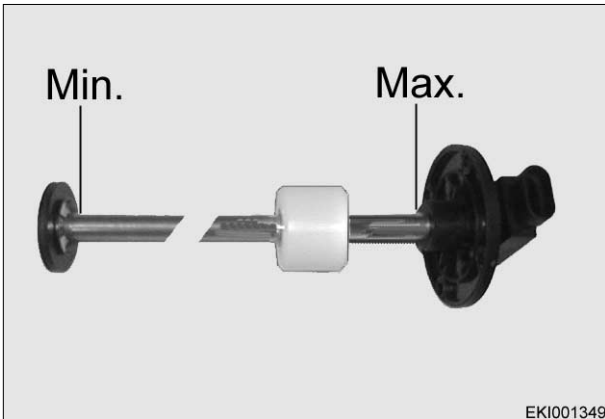
**Note:**

**Chapter 9000 Index E - Checking A005 - ECU, EPC**

**Chapter 8610 Index A - B031/B032 - functional description of draft-sensing pins**

Date	Version	Page	Capitel	Index	Docu-No.
16.2.2001	<b>b</b>	3/3	<b>9000</b>	<b>E</b>	<b>000059</b>

<b>Fav 900</b>	<b>Electrics / General system</b> <b>B034 - fuel tank level sensor</b>	<b>E</b>
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Pin	Function
1	Signal
2	Not assigned
3	Earth
Resistances at	
Min.	20 ohms
Max.	500 ohms

**Note:**

Connect adapter cable X 899.980.246.205 directly to B034.  
Measure resistance using multimeter (ohmmeter).  
Fill tank with fuel.



<b>Checking B034 - sensor, fuel:</b> <b>(These are only guideline figures)</b>		
Resistance	Bars	Litres
Ohms		
20	0 flashing	0 - 25
50	1 reserve	30
170	5 - 1/4	122
320	10 - 1/2	260
410	13 - 3/4	380
500	16 - 1/1	508
500	16	540



**Checking fuel display on instrument panel A007**

Connect adapter cable X 899.980.246.205 to line coupling X182  
(connection to B034 remains isolated).

Connect resistor decade X 899.980.224 .  
Ignition "ON"

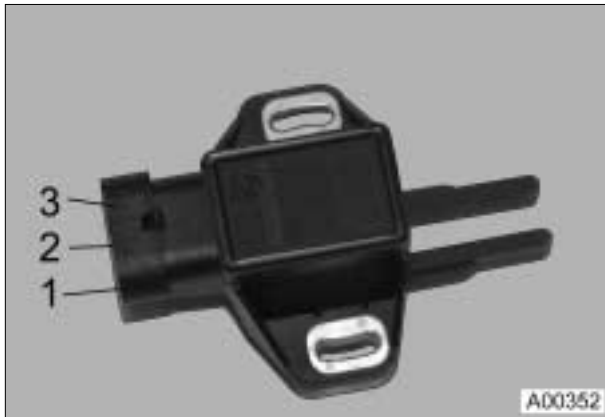
Select desired resistance (see table) and compare figures.

**Note:**

Allow preconditioning time of approx. 1 minute.

Date	Version	Page	<b>B034 - fuel tank level sensor</b>	Capitel	Index	Docu-No.
24.07.2001	a	1/1		<b>9000</b>	<b>E</b>	<b>000133</b>

<b>Fav 900</b>	<b>Electric / System in General</b> <b>B035 - Hand throttle Position Sensor</b>	<b>E</b>
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Pin	Function
1	Earth
2	+ Versorgung
3	Signal

**Note:**

Connect Adaptor Connector X 899.980.246.205 directly onto Component B035 .  
Ignition "ON".

Test	Pin	Requested Value	Condition	Possible Origin of failure
Supply	2	8,5 VDC		Value 0 VDC, Failure within Wiring, Fuse board, Fuse
Earth	1			
Signal Amplitude	30	approx. 4 VDC approx. . 20 mA	Pos. max.	Value 0 VDC: Failure within Component or within Wiring (Earth or Signal wire).
or		approx. 0,7 VDC approx. 4,0 mA	Pos. min.	
Current				
Earth	1			

Measuring Points on A004 - Side console	Pin
Earth	1
Signal ( Setting Hand Throttle)	30

+ Supply : Fuse 26 of Fuse board A013

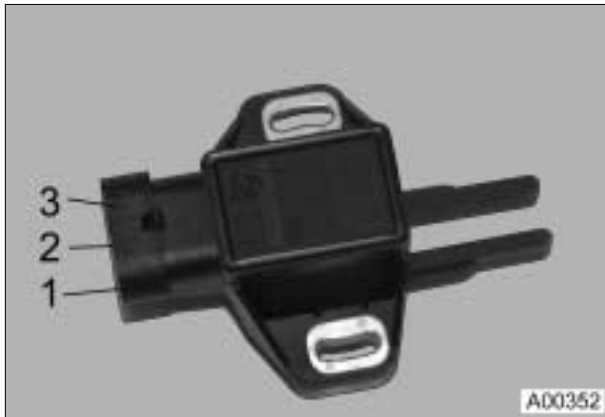
**Note:**

Diagnostic program EDC - Chapter 2000 Reg. B(F.C. 1.1.7E)  
Description Engine speed Control EDC - Chapter 2710 Reg. A  
Calibration 4002 - Chapter 0000 Reg.F (Calibration Hand Throttle)

Date	Version	Page	B035 - Hand throttle Position Sensor	Capitel	Index	Docu-No.
29.11.2000	a	1/1		9000	E	000049



<b>Fav 900</b>	<b>Electric / System in General</b> <b>B038 - Accelerator Pedal position Sensor EDC (yellow)</b>	<b>E</b>
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Pin	Function
1	Earth
2	+ Supply
3	Signal

**Note:**

Connect Adaptor Connector X 899.980.246.205 directly onto Component B038 .  
Ignition "ON".

Measurement	Pin	Requested Value	Condition	Possible origin of Error
Supply	2	approx. 5 VDC		Supply cable disconnected:
Earth	1			A021 - EST EDC (X048) PIN 16

Signal Amplitude	3	0,55 VDC - 0,65 VDC	Accelerator Pedal not actuated	If Accelerator pedal will be actuated and Value remains constant at 0,6 VDC or approx. 4,5 VDC: Component failure, Wiring failure (Signal Wire) Value approx. 5 VDC: Earth wire disconnected, Component Failure
or Current		4,0 VDC 4,5 VDC	Accelerator Pedal actuated	
Earth	1			

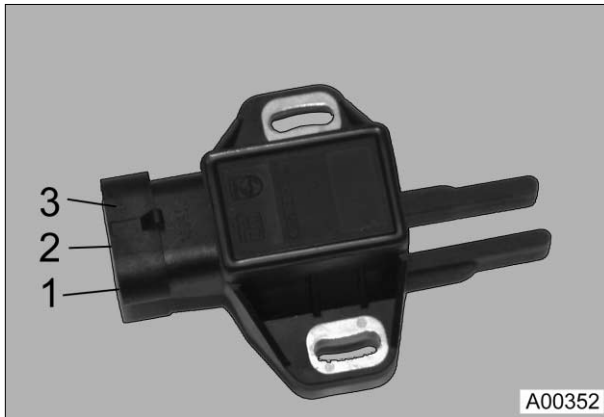
Measuring Points on A021 - EDC Control Module (X048)	Pin
Earth	35
Signal	23
+ Supply	16

**Note:**

Diagnostic Program EDC - Chapter 2000 Reg. B (F.C. 1.1.01)  
Description Speed Control EDC - Chapter 2710 Reg. A  
Calibration 4005 - Chapter 0000 Reg.F (Calibration Accelerator Pedal Position Sensor)

Date	Version	Page	Capitel	Index	Docu-No.
28.11.2000	a	1/1	B038 - Accelerator Pedal position Sensor EDC (yellow)	9000	E 000045

<b>Fav 900</b>	<b>Electrics / General system</b> <b>B040 - sensor, front power lift position</b>	<b>E</b>
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Pin	Function
1	Earth
2	+ supply
3	Signal

**Note:**

Connect adapter cable X 899.980.246.205 directly to component B040.  
Ignition "ON"

Test	Pin	Target value	Condition	Possible cause of fault
Supply	2	8.5 VDC		Miniature fuse (11) within A013 or within wiring
Earth	1			
Signal	3	4.2	Power lift upper limit position	
		1.5	Power lift lower limit position	
Earth	1			

**Note:**

All readings +/- 10%

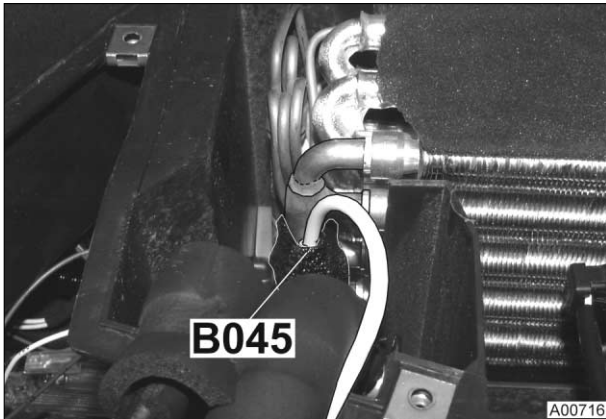
Measuring point on A004 - control console	Pin
Earth	1
Signal	9

**Note:**

Checking A004 - control console, Chapter 9000 Reg. E  
Calibration, Chapter 0000 Reg. F

Date	Version	Page	Capitel	Index	Docu-No.
01.08.2001	a	1/1	<b>9000</b>	<b>E</b>	<b>000138</b>

Farmer 400 Fav 700 Fav 900	Electrics / General system <b>B045 - sensor, air-conditioning 2 (anti-icing protection)</b>	<b>E</b>
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Remove cab roof. Top right between A- and B-pillar at air-conditioning expansion valve.

B045 = sensor, air-conditioning (NTC2).

**Prevents expansion valve from icing up** when air-conditioning is on.  
 Temperature + 1°C to 4°C

**Note:**

NTC = **N**egative **T**emperature **C**oefficient

in other words, the sensor resistance decreases with increasing ambient temperature.

Test	Pin	Target value	Condition	Remark
Resistance	1 (blue)	approx. 1.18 kOhm	At 20°C ambient temperature	Sensor (NTC) resistance decreases with increasing ambient temperature
	2 (brown)			

**Note:**

All readings +/- 10%

**Note:**

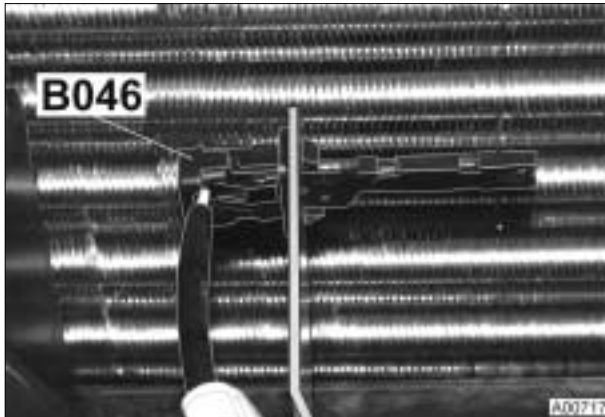
Chapter 5500 Reg. A - Air-conditioning / General system, operation  
 Chapter 5570 Reg. E - Electrical check on air-conditioning

Date	Version	Page	Capitel	Index	Docu-No.
02.08.2001	a	1/1	<b>B045 - sensor, air-conditioning 2 (anti-icing protection)</b>	<b>9000</b>	<b>E</b>

Farmer 400  
Fav 700  
Fav 900

Electrics / General system  
**B046 - sensor, air-conditioning 1 (in air current)**

**E**



Remove roof cover from cab, then unscrew plastic cover.

B046 = Sensor, air-conditioning 2 (NTC 1).

**Regulates cooling air when air-conditioning is on.**

**Note:**

**NTC = N**egative **T**emperature **C**oefficient

**in other words, the sensor resistance decreases with increasing ambient temperature.**

Test	Pin	Target value	Condition	Remark
Resistance	1 (white)	approx. 10 kOhm	At 20°C ambient temperature	Sensor (NTC) resistance decreases with increasing ambient temperature
	2 (white)			

**Note:**

**All readings +/- 10%**

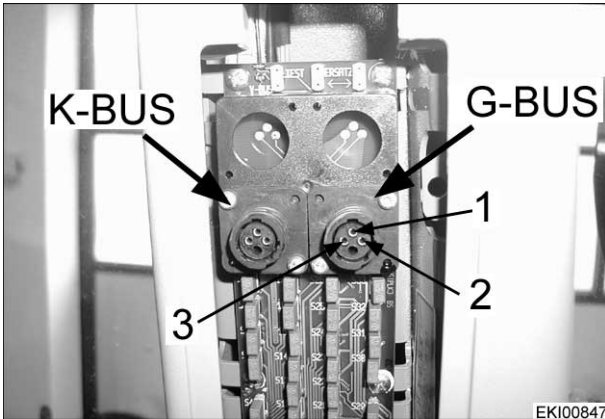
**Note:**

**Chapter 5500 Reg. A - Air-conditioning / General system, operation**

**Chapter 5570 Reg. E - Electrical check on air-conditioning**

Date	Version	Page	Capitel	Index	Docu-No.	
02.08.2001	a	1/1	<b>B046 - sensor, air-conditioning 1 (in air current)</b>	<b>9000</b>	<b>E</b>	<b>000142</b>

Fav 900	Electric / System in General <b>CAN - BUS</b>	<b>E</b>
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**K - Bus = Comfort - Bus for:**

**Data reading and Diagnostic** via Interface K - Bus (Fendias)

**End of Line (EOL) programming of tractor** via Interface K - Bus

**G-Bus = Transmission - Bus**

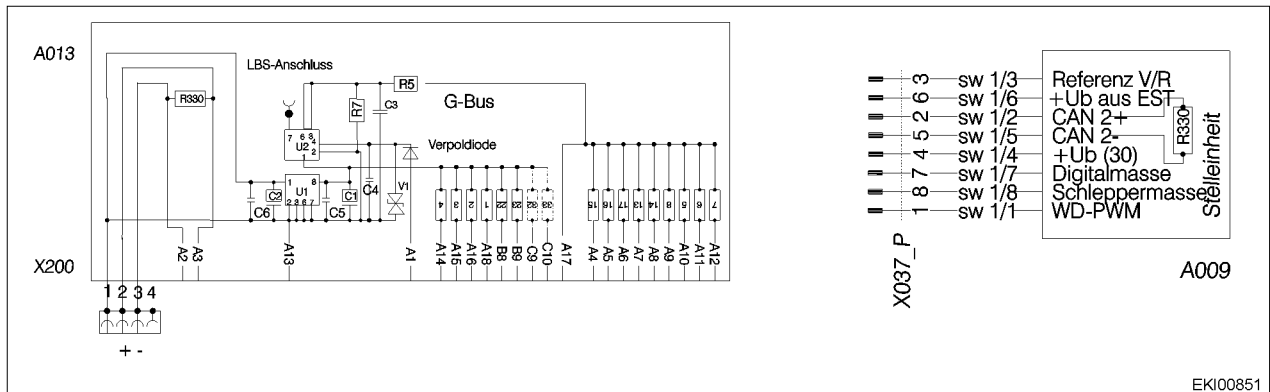
**Data Transmission** (between EST Control Module A002, spool Valves Y015..Y019, Transmission control Module A009, EDC Control Module A021)

**End of Line (EOL) Programming** (Programming Spool Valves) via Interface G-Bus

**Note:**

**EST Control module A002 links G-Bus to K-Bus**

**Checking Transmission Bus Termination**



Multimeter in Range "Ohm ", check Pin 2 and Pin 3.

G-Bus Termination on Fuse board A013 = 300 Ohm

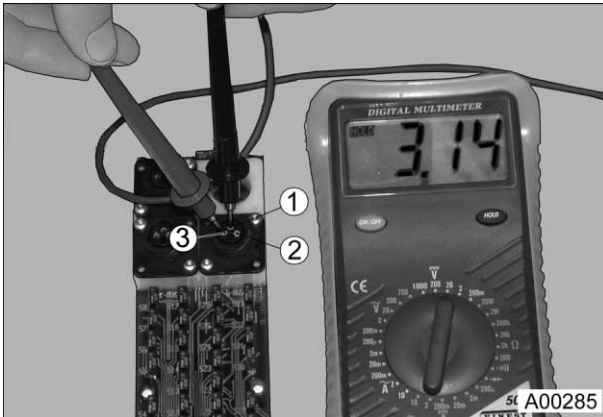
G-Bus Termination on Transmission Control Module A009 = 300 Ohm

Termination Resistors are connected parallelly.

**Resulting Resistance approx. 162 Ohm**

Date	Version	Page	CAN - BUS	Capitel	Index	Docu-No.
6.12.2000	a	1/2		9000	E	00052

<b>Fav 900</b>	<b>Electric / System in General</b> <b>CAN - BUS</b>	<b>E</b>
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Checking CAN-Bus on the Socket  
Requested values, consult table

**Note:**  
Ignition "ON"

Test	KontaktPin	Requested value	Condition	Remark
G-Bus	2	1,5 VDC to ??5 VDC	+ UB 8,5V from A002 EST (Pin23).	Supply from fuse F041 (X051). Indicated values are approxi- mative and are sub- ject to variations accord- ing to the volume of mo- mentarily transmitted Data.
	1			
G-Bus	3	2,5 VDC to 3,5 VDC		
	1			
K-Bus	2	1,5 VDC to 2,5 VDC	+ UB 8,5V from A004 Side Console (Pin 23).	Supply from Fuse F042 (X051). Indicated values are approxi- mative and are sub- ject to variations accord- ing to the volume of mo- mentarily transmitted Data.
	1			
K-Bus	3	2,5 VDC to 3,5 VDC		
	1			

**Important:**  
Fav. 900/23/..... und Fav. 700 are equipped with different Bus-Systems (Baud Rate).  
Components such as Spool valves are not interchangeable !

**Note:**  
Chapter 9700 Reg. A - Electronics Concept Fav.900/23/.....  
Chapter 9000 Reg. C - Electric Diagram Comfort Bus (K-Bus) Sheet 21  
Chapter 9000 Reg. C - Electric Diagram Transmission Bus (G-Bus) Sheet 26  
Chapter 9000 Reg. C - Electric Diagram Voltage supply Electronics Sheet 20

Date	Version	Page	CAN - BUS	Capitel	Index	Docu-No.
6.12.2000	a	2/2		9000	E	000052

Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**G001 - battery**

**E**



G001 = **battery**

Check battery charge with aid of open-circuit voltage.

Test conditions: ambient temperature approx. 27°C



For six hours before test do not charge battery or connect to consumer. Disconnect earth cable from battery.

Connect multimeter (voltmeter).

Target values at 27°C:

12.8 VDC = **full**

12.1 VDC to 12.25 VDC = **1/2**

11.4 VDC to 11.8 VDC = **empty**



Complaint: battery goes flat without any consumers being switched on.

Check discharge current using multimeter (ammeter).

Switch off all consumers. Disconnect battery's earth cable, and connect multimeter (ammeter) in series.

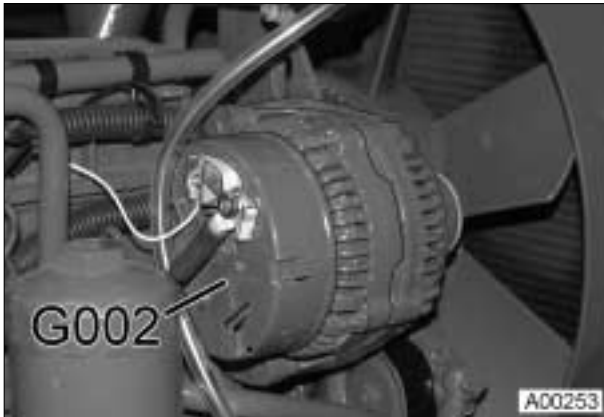
Consumption must not exceed 50 mA.

Date	Version	Page	Capitel	Index	Docu-No.
21.2.2001	a	1/1	<b>G001 - battery</b>	<b>9000</b>	<b>E</b>
					<b>000081</b>

Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**G002 - generator**

**E**



G002 = **generator**

Measure limit voltage using multimeter (voltmeter):

With engine running,  
battery charge indicator goes out.

Connect B+ on generator and earth.

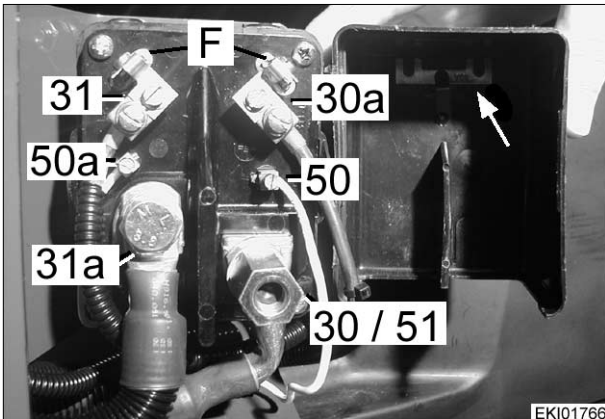
Target value: at 20°C ambient temperature 13.8 to 14.5 VDC.

In event of discrepancies have generator G002 repaired in specialist workshop.

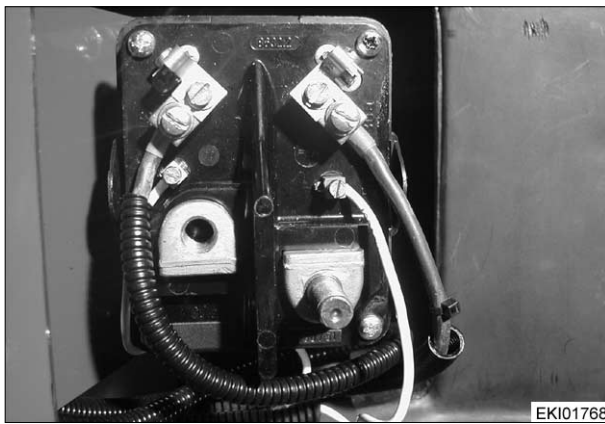
Date	Version	Page	Capitel	Index	Docu-No.
22.2.2001	<b>a</b>	1/1	<b>9000</b>	<b>E</b>	<b>000082</b>



Fav 900	Electrics / General system K018 - relay, battery switch	E
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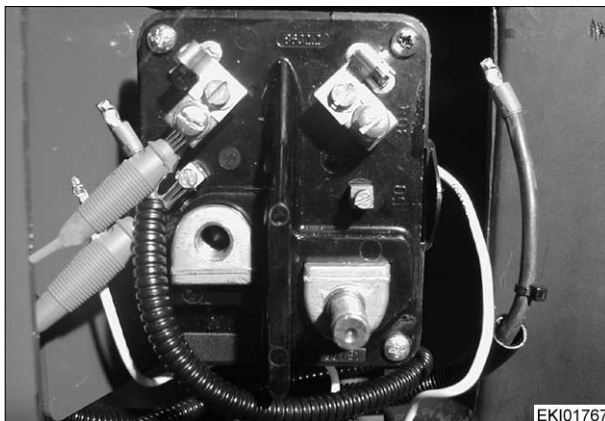
Pin	Function
30 / 51	+UB G001
30a	+UB G003
31	Earth (X514)
31a	- negative G003
50	M011 - pin 50
50a	S002 - pin 50a
F	80 A fuses
Arrow	Spare fuses



**Note:**  
**Ignition "OFF"**  
**Disconnect battery (negative terminal).**  
**Remove terminals 31a and 30 / 51 from K018.**

Test	Pin	Target value	Condition	Remark
Resistance	31a, 50, 31 and 50a	No continuity		
	30			

Resistance	30a	Continuity		
	30			



**Note:**  
**Remove terminals 30a, 31, 50 and 50a from K018.**  
**Apply 12 VDC to terminals 31 and 50a from external source.**

<b>Fav 900</b>	<b>Electrics / General system</b> <b>K018 - relay, battery switch</b>	<b>E</b>
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Test	Pin	Target value	Condition	Remark
Resistance	31a	No continuity		
	31			

Resistance	31	Continuity		Internal resistance of battery
	30			

Resistance	50	Continuity		
	30a			

Connect leads to K018 and battery.

### Put K018 under load:

Disconnect X046 - cable coupler from A020 (fuel injection pump).

Test	Pin	Target value	Condition	Remark
Voltage	30	approx. 12 VDC	Ignition "ON"	Measurement carried out at pin 30 of starter motor
Vehicle earth				

Voltage	30	approx. 21 VDC to 24 VDC	Operate starter motor	Measurement carried out at pin 30 of starter motor
Vehicle earth				

#### **Note:**

**Chapter 9000 Reg. E - M011 - starter, 24 V starter motor**

Date	Version	Page	Capitel	Index	Docu-No.
24.07.2001	a	2/2	9000	E	000132

Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**M002 / M004 - front / rear wiper motor**

**E**



In windscreen:

M002 = **front wiper motor**



X37 =  **cable coupler** to front wiper motor



#### Testing wiper motor M002

Switch on ignition and wiper motor.

Connect yellow electric cable and earth (wiper motor) at cable coupler X37.

If voltage is present and wiper motor M002 is not running, wiper motor M002 is defective.



#### Testing wiper shut-off (park position)

Ignition "ON"

Connect black/green electric cable and earth (wiper motor) at cable coupler X37.

Is voltage present?

Switch wipers on, wiper motor runs.

Connect black electric cable and earth (wiper motor).

Voltage pulsates. If voltage does not pulsate, end shut-off in wiper motor is defective.

Date	Version	Page	M002 / M004 - front / rear wiper motor	Capitel	Index	Docu-No.
21.2.2001	a	1/2			9000	E

Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**M002 / M004 - front / rear wiper motor**

**E**



In rear window:

M004 = rear wiper motor

**Note:**

Test rear wiper motor in same manner as front wiper motor M002.

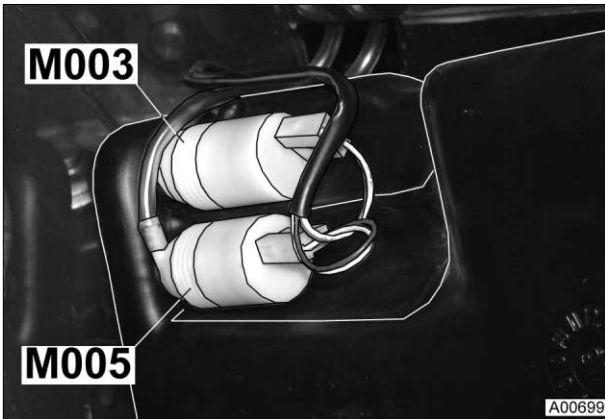


Remove panels on rear wiper motor M004.

X258 = **cable coupler** on rear wiper motor

Date	Version	Page	Capitel	Index	Docu-No.
21.2.2001	a	2/2	9000	E	000077

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / General system <b>M003 - wiper pump, front</b>	<b>E</b>
---	---	----------



Pin	Function
1 (white)	+ supply
2 (brown)	Earth



Check power consumption of M003 - wiper pump. Remove fuse no. F020 (10 A) from fuse holder 1 (X050).

Connect multimeter (ammeter) in place of fuse.

**Note:**

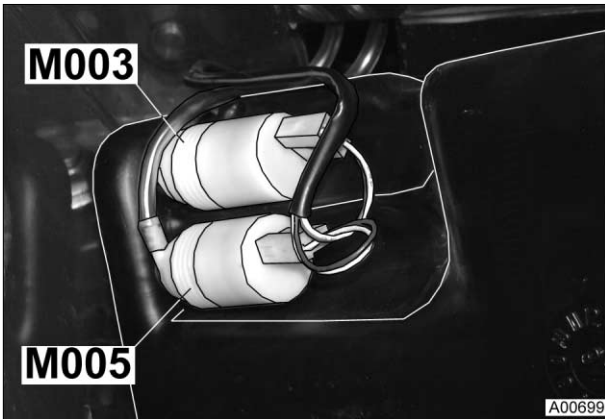
**Protect one test lead of multimeter with 16 amp fuse (free-standing fuse).**

**Note:**  
Ignition "ON"

Test	Pin	Target value	Condition	Remark
Power consumption	Between fuse F020	approx. 3 A	Actuate windscreen washer	+ supply to fuse F020
		0 A	Windscreen washer not actuated	

**Note:**  
All readings +/- 10%

Farmer 400 Fav 700 Fav 900	Electrics / General system <b>M005 - wiper pump, rear</b>	<b>E</b>
----------------------------------	--	----------



Pin	Function
1 (white)	+ supply
2 (brown)	Earth



Check power consumption of M005 - wiper pump. Remove fuse no. F018 (15 A) from fuse holder 1 (X050).

Connect multimeter (ammeter) in place of fuse.

**Note:**  
 Protect one test lead of multimeter with 16 amp fuse (free-standing fuse).

**Note:**  
 Ignition "ON"

Test	Pin	Target value	Condition	Remark
Power consumption	Between fuse F018	approx. 2.6 A	S010 - switch, rear wiper motor Stage 1: M004 - wiper motor running M005 - wiper pump stationary	+ supply to fuse F018
		approx. 4.9 A	S010 - switch, rear wiper motor Stage 2: M004 - wiper motor running M005 - wiper pump running	

**Note:**  
 All readings +/- 10%

Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**M007 - seat adjustment motor (compressor)**

**E**



On driver's seat spring unit: remove rubber bellows.

M007 = **seat adjustment motor (compressor)**



Remove panel at bottom right rear on driver's seat.

X305 =  **cable coupler** for seat adjustment motor M007



### Testing seat adjustment motor

Test power consumption.

Fuse no. 21 in fuse holder 1

Actuate seat adjustment motor M007 and read off power consumption.

Target value: 7.0 amps +/- 10%

#### **Note:**

**See electric circuit diagram - Chapter 9000 Index C**

Date	Version	Page	Capitel	Index	Docu-No.
21.2.2001	a	1/1	<b>9000</b>	<b>E</b>	<b>000078</b>

Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**M008 - heater fan**

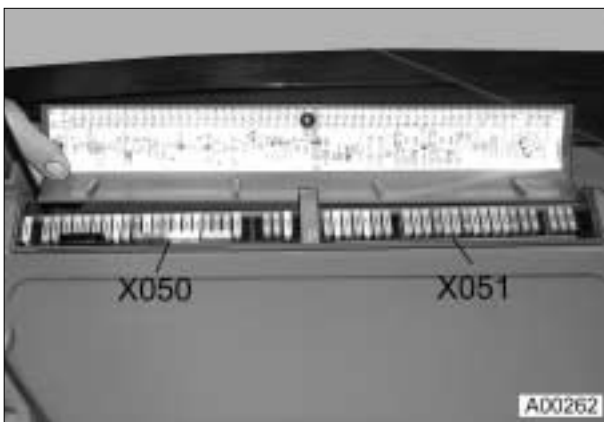
**E**



Remove sheet-metal panel at rear above power lift (on Fav 700).

M008 = **heater with fan motor**

X027 = **cable coupler** for heater fan motor



X050 = fuse holder 1 compl.

X051 = fuse holder 2 compl.

Fuse assignment from left to right nos. 1 to 29



Measure power consumption of heater fan motor.

Remove fuse no. 14 from fuse holder 1 (X050).

Connect multimeter (ammeter) in place of fuse.

**Note:**

**Protect one test lead of multimeter with 16 amp fuse (free-standing fuse).**



**Start motor and read off power consumption.**

Switch position	Ampere
0	0
1	4.5
2	9.0
3	14.2



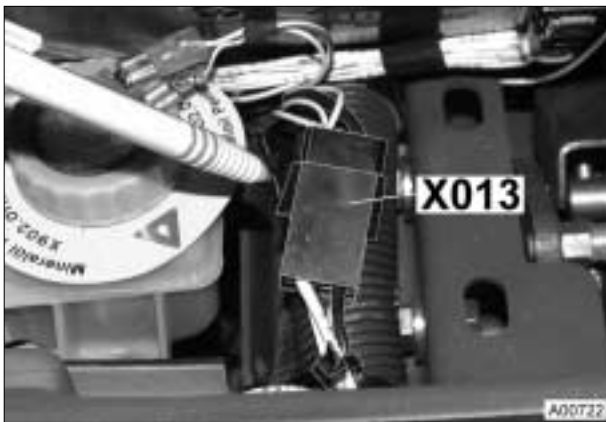
Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**M008 - heater fan**

**E**



S033 = **heater control** (three-stage)



Remove hatch cover at top front of steering column.

X013 = **cable coupler for heater control**

Date	Version	Page	Capitel	Index	Docu-No.
22.2.2001	<b>a</b>	2/2	<b>M008 - heater fan</b>	<b>9000</b>	<b>E</b>
					<b>000087</b>

Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**M009 - fan**

**E**



Remove roof cover from cab, then unscrew plastic cover:

M009 = **fan** levels 1, 2 and 3 for air-conditioning.



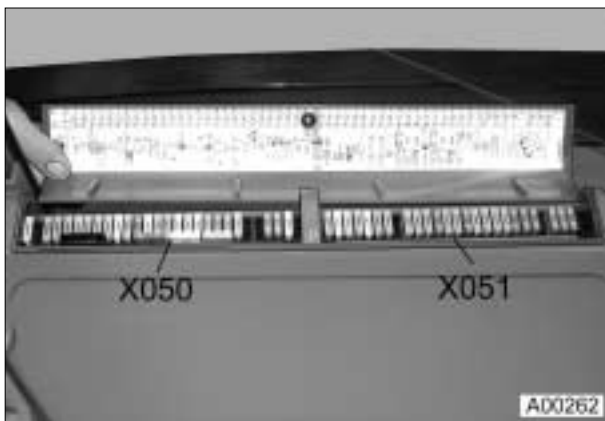
#### Checking fan:

Checking power consumption of fan motor:

Remove fuse no. 17 from fuse holder 1. Connect multimeter (ammeter) in place of fuse.

#### Note:

**Protect one test lead of multimeter with 16 amp fuse (free-standing fuse).**



At right rear in cab:

Remove cover.

X050 = fuse holder 1 compl.

X051 = fuse holder 2 compl.

Fuse assignment from left to right nos. 1 to 29



Run engine and read off power consumption.

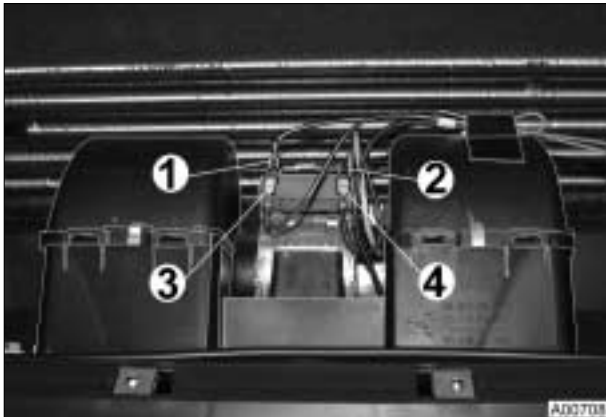
Switch position	Ampere
0	0
1	4.3
2	9.8
3	17.0

All readings +/- 10%

Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**M009 - fan**

**E**



Mark and disconnect electrical leads.

- 1 = orange
- 2 = yellow
- 3 = green
- 4 = red



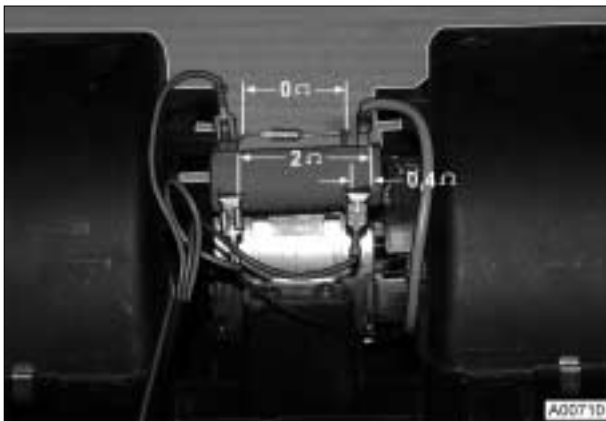
### Checking overheating fuse

Behr can supply resistor with overheating fuse as spare part.

In event of complaint that power supply is OK, but fan motor will not run:

Test with multimeter (ohmmeter):

Target value: resistance of overheating fuse approx. 0 ohm.



### Checking resistances

Target value for overall resistance: approx. 2 ohms

This total resistance is made up of 1.6 + 0.4 ohms.

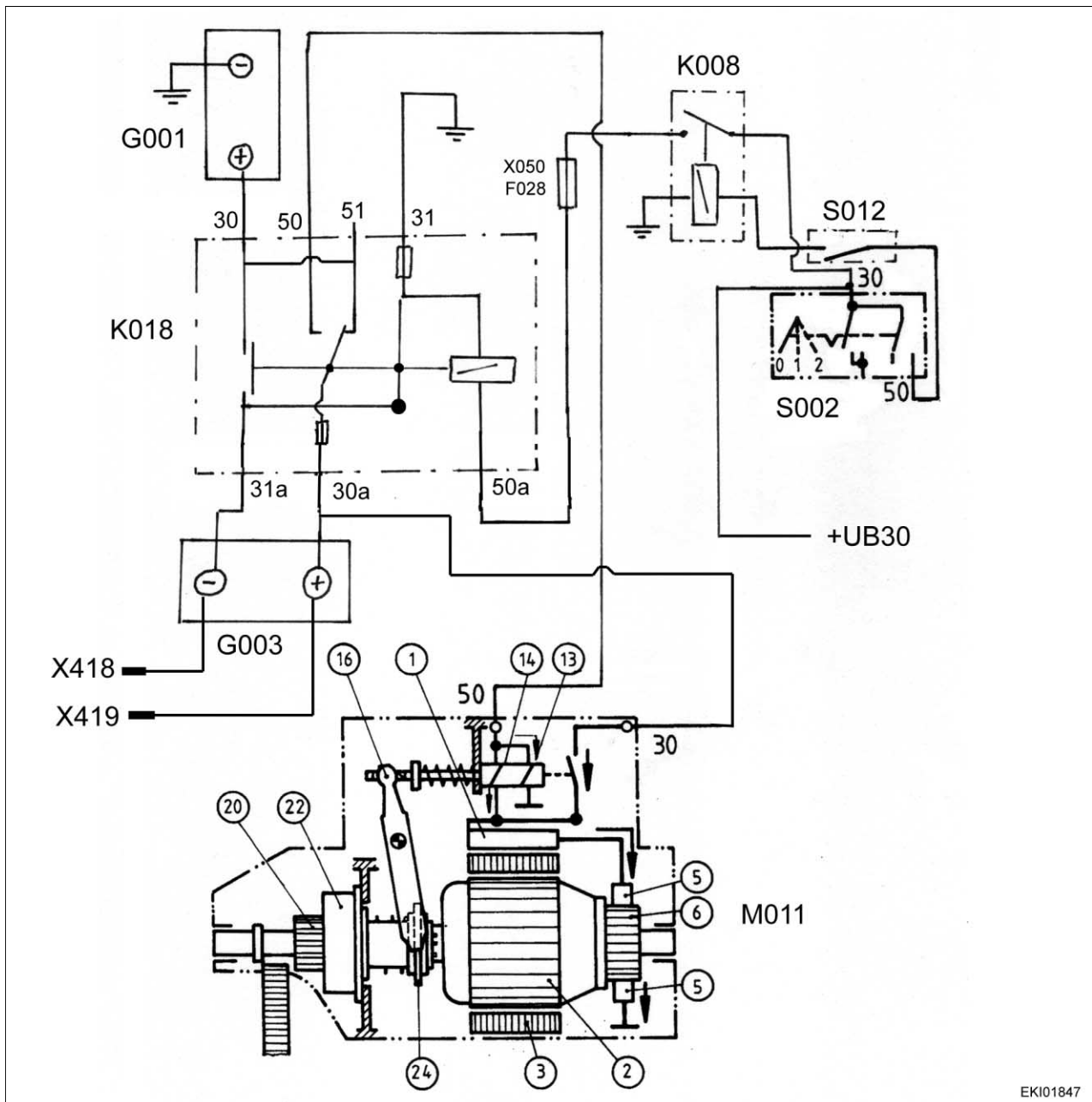
### Note:

Electric circuit diagrams - Chapter 9000 Index C

Date	Version	Page	Capitel	Index	Docu-No.
21.02.2001	a	2/2	9000	E	000073

Fav 900

Electrics / General system  
**M011 - starter, 24 V starter motor**

**E****Plan of 24 V starter motor system**

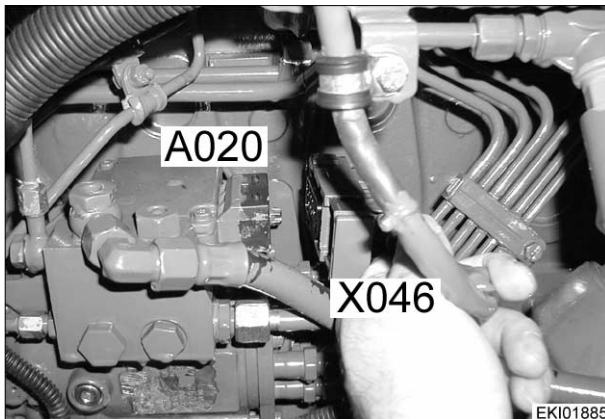
EKI01847

Item	Designation	Item	Designation
1	Exciter winding	G001	Battery 1
2	Rotor	G003	Battery 2
3	Pole shoe	K008	Relay, starter inhibitor
5	Carbon brushes	K018	Relay, battery switchover
6	Commutator	M011	24 V starter motor
13	Holding winding	S002	Switch, ignition
14	Pull-in winding	S012	Switch, starter inhibitor
16	Engaging lever	X050	Fuse holder 1
20	Pinion	X418	External start terminal -
22	Roller freewheel	X419	External start terminal +
24	Guide ring	+UB30	Supply for S002 - switch (12 - 14 VDC)

Date	Version	Page	M011 - starter, 24 V starter motor		
07.08.2001	a	1/3	Capitel	Index	Docu-No.
			9000	E	000145

Fav 900

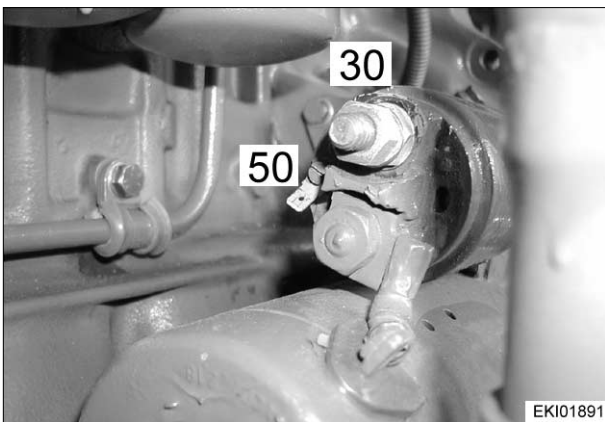
Electrics / General system  
**M011 - starter, 24 V starter motor**

**E**

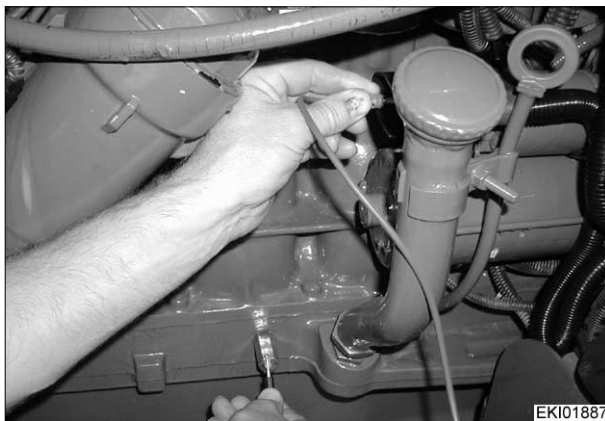
Disconnect X046 - connector for A020 - ECU, VP44.

**Note:**

When starter motor is turned (test procedure) EDC faults are displayed on A007 - display unit.



Pin	Function
30	Input direct from battery positive terminal
50	Starter control unit

**Testing voltage drop when starting**

Actuate M011 - starter.

Measure voltage at pin 30 of M011 - starter (24 VDC) using voltmeter.

**Target value: approx. 20 VDC (at 20°C ambient temperature).**

**Note:**

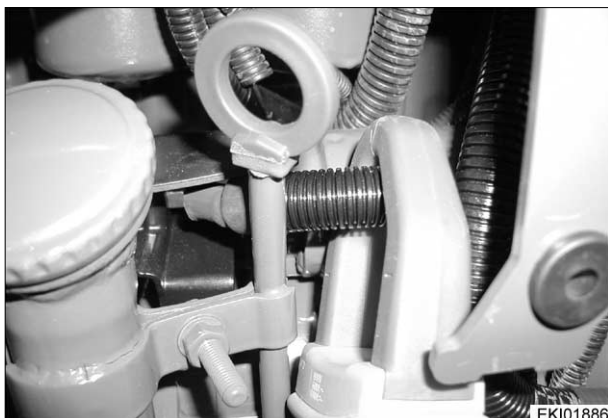
If S002 - switch is not actuated, there is + UB (12 VDC) at pin 30 of M011 - starter.

When S002 - switch is actuated, K018 - relay switches G001/G003 - batteries in series. M011 - starter turns.

Date	Version	Page	Capitel	Index	Docu-No.
07.08.2001	a	2/3	M011 - starter, 24 V starter motor	9000	E 000145

Fav 900

Electrics / General system  
**M011 - starter, 24 V starter motor**

**E**

**Checking power consumption of M011 - starter**

Measure power consumption at pin 30 of M011 - starter using clip-on or standard ammeter.

**Target value: approx. 350 amps (at 20°C)**

**Note:**

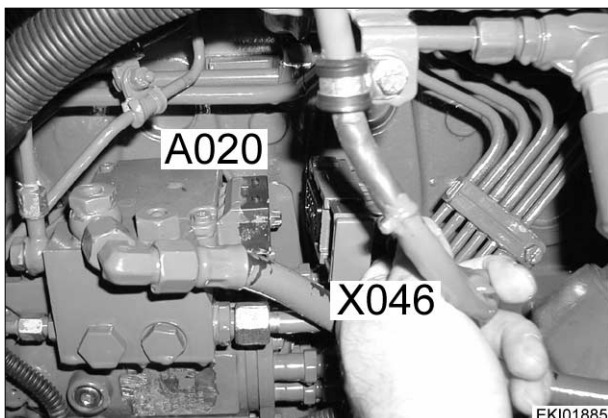
Target value of approx. 20 VDC / 350 amps depends on charge in G001 / G003 - batteries and on temperature (ambient temperature and / or engine temperature).

If approx. value is not reached, G001 / G003 - batteries and / or supply lead via relay circuit (positive and earth) are not OK.

**Note:**

Chapter 9060 Reg. B - Troubleshooting table for M011 - 24 V starter motor

Chapter 9000 Reg. E - K018 - relay, battery switchover



**On completion of measurements on M011 - starter:**

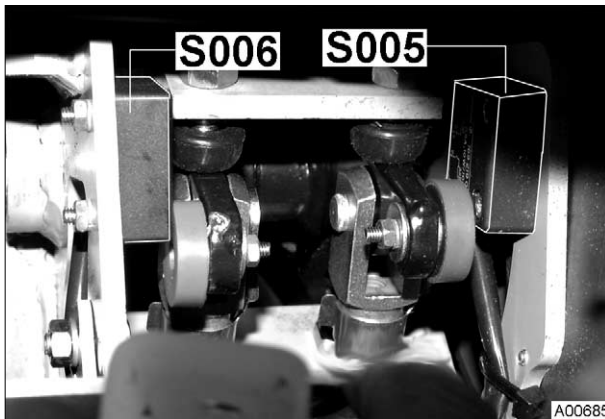
- Connect X046 - connector for A020 - ECU, VP44.
- Clear fault memory in A007 - display unit.

Date	Version	Page	Capitel	Index	Docu-No.
07.08.2001	a	3/3	9000	E	000145

Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**S005 / S006 right / left magnetic brake switch**

**E**

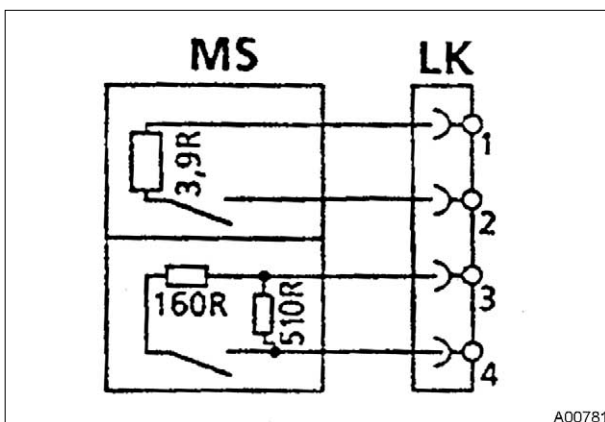


At top on brake pedals; shown with clutch/brake reservoir removed for greater clarity.

S005 = **right brake solenoid switch**

S006 = **left brake solenoid switch**

To test, connect adapter cable  
(DIY using connector G 816.900.043.040).



**Note:**

Solenoid switches S005 and S006 are closed with pedal in rest position.

Pins 1 and 2 for brake light and compressed-air advance control system solenoid valve.

Pins 3 and 4 for differential lock control.  
For pin assignment see drawing



Connect multimeter (ohmmeter) and test each solenoid switch.

Connect pins 1 and 2:

Pedal in rest position approx. 3.9 ohms

Pedal depressed, infinite resistance.

Connect pins 3 and 4:

Pedal in rest position approx. 121 ohms

Pedal depressed approx. 510 ohms

Date	Version	Page	Capitel	Index	Docu-No.	
20.2.2001	a	1/2	S005 / S006 right / left magnetic brake switch	9000	E	000069

**Farmer 400**  
**Fav 700**  
**Fav 900**

**Electrics / system in general**  
**S005 / S006 right / left magnetic brake switch**

**E**



Connect multimeter (voltmeter) and test each solenoid switch.

Ignition "ON".

Connect pins 1 and 2:

Pedal in rest position approx. 0.3 VDC

Pedal depressed  $U_b$  approx. 12 VDC

Connect pins 3 and 4:

Pedal in rest position approx. 2.4 VDC

Pedal depressed approx. 5,0 VDC

**Note:**

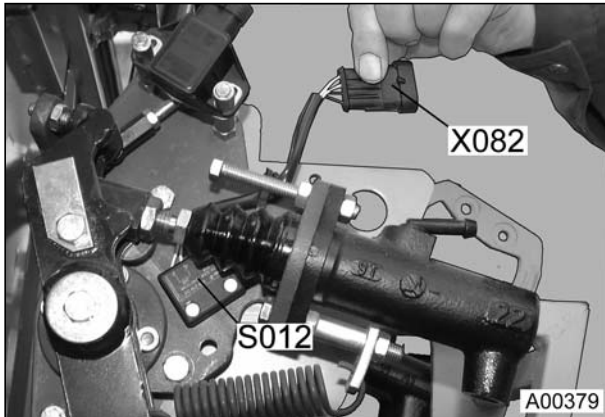
**Electric circuit diagram - Chapter 9000 Index C**

**Setting magnet for solenoid switch - Chapter 1070 Index E**

Date	Version	Page	Capitel	Index	Docu-No.
20.2.2001	a	2/2	9000	E	000069



<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Electrics / system in general  <b>S012 - starter inhibitor switch</b></p>	<p><b>E</b></p>
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**Note:**  
 Connect adapter cable X 899.980.246.206 directly to component S012. Ignition "OFF".

Test	Pin	Target value	Condition	Possible cause of fault
Resistance	1	3.8 ohms	Clutch pedal actuated	
		Infinite	Clutch pedal <b>not</b> actuated	
	2			
Resistance	3	3.8 ohms	Clutch pedal actuated	
		Infinite	Clutch pedal <b>not</b> actuated	
	4			

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Electrics / system in general  <b>S013 Emergency mode push-button</b></p>	<p><b>E</b></p>
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S013 = **Emergency mode button** to engage Emergency mode if electronics fail.  
 Engage Emergency mode:  
 Ignition on or engine running.  
 Depress clutch and press Emergency mode button.



Following display appears on instrument panel.



Press key (arrowed) several times.



Fault code 4.1.59 is displayed briefly on instrument panel.

**Note:**  
 However, this fault code is not stored. It is normal for this fault code to be displayed in Emergency mode.

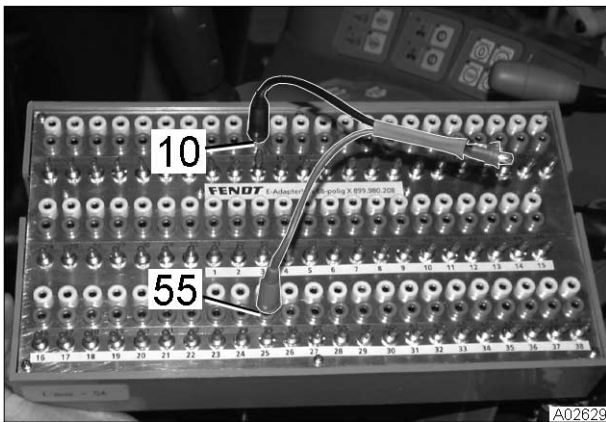
Date	Version	Page	S013 Emergency mode push-button	Capitel	Index	Docu-No.
4/2000	<b>b</b>	1/2		<b>9000</b>	<b>E</b>	<b>000024</b>

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Electrics / system in general  <b>S013 Emergency mode push-button</b></p>	<p><b>E</b></p>
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**Note:**

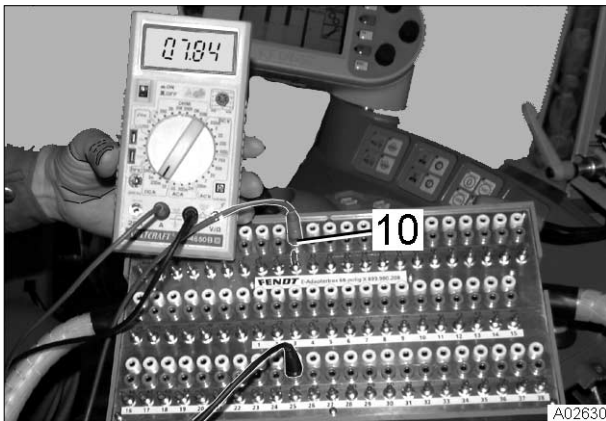
Emergency mode is not engaged. However, fault code 4.1.59 is displayed on instrument panel = fault in wiring or other interruption, e.g. defective relay, see transmission emergency mode circuit diagram.



**Test:** Connect e-adapter box up to **chassis no. 714 / 716 21/2000 to A001 transmission e-box**, from 711 / 712 21/1001 onwards and chassis no. 714 / 716 21/2000 to A002 e-box .

Isolate pin 10. Connect approx. 2 W bulb across pins 10 and 55 (bulb does not light up).

Fault code 4.1.59 is no longer displayed. There is definitely a fault.



System is OK:

Emergency mode is **not engaged**.

Approx. 7 mA flows across pin 10.

Emergency mode is **engaged**.

**No** current flows across pin 10.

Date	Version	Page	S013 Emergency mode push-button	Capitel	Index	Docu-No.
4/2000	b	2/2		9000	E	000024

Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**S014 - rapid reversing control**

**E**



Pin	Function
1	Signal
2	Earth
3	Not assigned



Remove steering column cover.  
Connect adapter cable X 899.980.246.204 to X225 - rapid reversing control cable coupler.

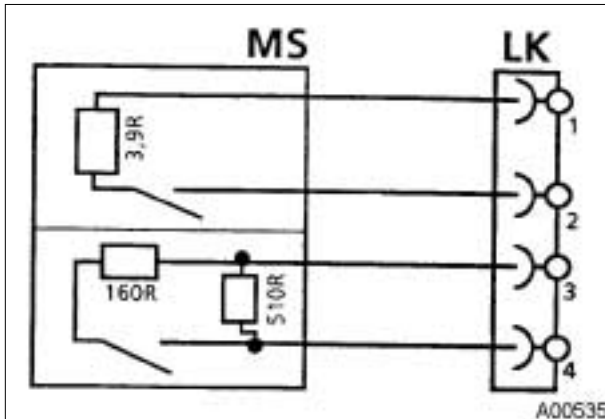
**Note:**  
Ignition "OFF".

Test	Pin	Target value	Condition	Remark
Resistance	1	121 ohms	Switch pressed	
		510 ohms	Switch <b>not</b> pressed	
	2			

**Note:**  
Ignition "ON"

Test	Pin	Target value	Condition	Remark
Voltage	1	2.4 VDC	Switch pressed	
		5.1 VDC	Switch <b>not</b> pressed	
Earth	2			

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / system in general <b>S015 - handbrake switch</b>	<b>E</b>
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Pin	Function
1	Not assigned
2	Not assigned
3	Signal
4	Earth

**Note:**

Connect adapter cable X 899.980.246.206 directly to component S015. Ignition "ON".

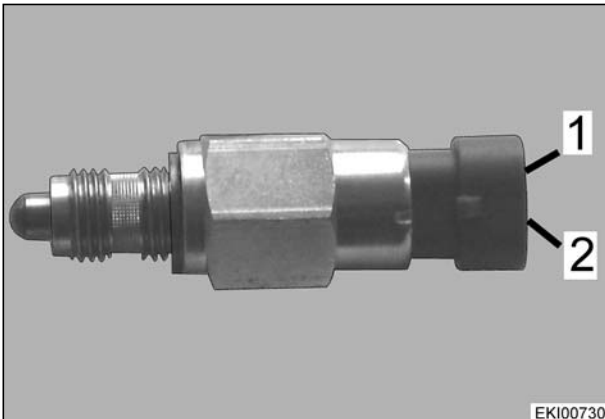
Test	Pin	Target value	Condition	Possible cause of fault
Signal	3	2.4 VDC	Handbrake off	
		5.1 VDC	Handbrake on	
Earth	4			

Measuring points on A004 - control console	Pin
Earth	1
Signal	18

**Note:**

Checking A004 - control console, Chapter 9000 Index E

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Electrics / system in general  <b>S017 - filter clogging pressure-operated switch</b></p>	<p><b>E</b></p>
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Pin	Function
1	Signal
2	Earth



Remove pressure-operated switch.  
 Plunger (arrowed) must be actuated in test.

**Note:**  
**Before fitting, oil thread of pressure-operated switch, locate sealing ring and turn until stop is reached.**

Test	Pin	Target value	Condition	Possible cause of fault
Resistance	1	121 ohms	Plunger <b>not</b> actuated	
		510 ohms	Plunger actuated	
	2			

**Note:**  
 Connect adapter cable X 899.980.246.204 directly to component S017.  
 Ignition "ON".

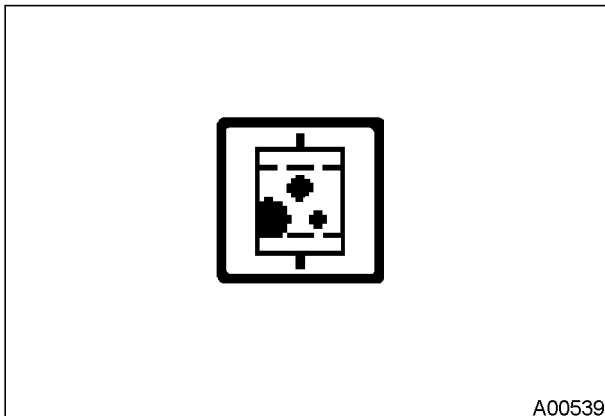
Signal	1	2.4 VDC	Oil temperature < 0° or clogged pressure filter	A) Reading 8.0 VDC, fault in component.
		5.1 VDC		B) Reading 0 VDC: - Unplug component - If reading is 0 VDC, fault in A004 (PIN 22) or in wiring - If reading is 8.0 VDC, fault in component.
Earth	2			

Measuring points on A004 - control console	Pin
Earth	1
Signal	22

**Note:**  
 Checking A004 - control console, Chapter 9000 Index E

Date	Version	Page	S017 - filter clogging pressure-operated switch	Capitel	Index	Docu-No.
06/2000	a	1/2			9000	E

<p><i>Farmer 400</i>  <i>Fav 700</i>  <i>Fav 900</i></p>	<p>Electrics / system in general  <b>S017 - filter clogging pressure-operated switch</b></p>	<p><b>E</b></p>
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**Note:**

**Warning (pressure filter clogged) is displayed on instrument panel if following conditions are met:**

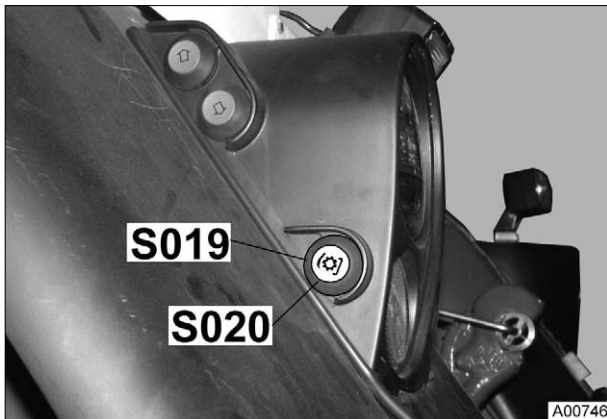
1. Engine running.
2. Transmission oil temperature greater than 50°C (thermo switch resistance < 150 ohms).
3. Pressure differential upstream and downstream of pressure filter > 5 bar.
4. Items 1 to 3 must obtain for longer than two minutes.

Date	Version	Page	Capitel	Index	Docu-No.	
06/2000	a	2/2	<b>S017 - filter clogging pressure-operated switch</b>	<b>9000</b>	<b>E</b>	<b>000010</b>

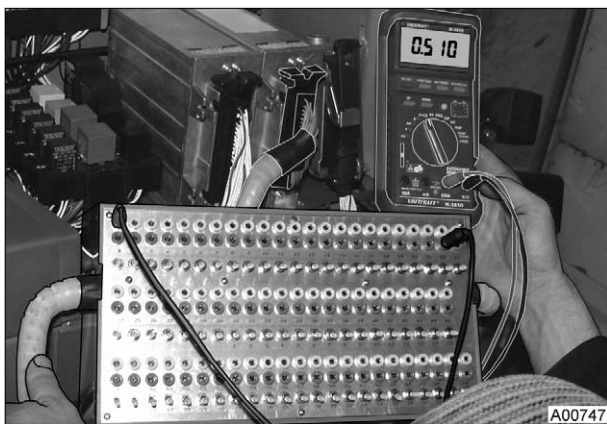
Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**S019 / S020 - left / right rear "PTO on" switch**

**E**



On left and right mudguard at rear:  
S019 = "PTO on" switch left rear  
S020 = "PTO on" switch right rear  
Connect e-adapter box X 899.980.208.100 directly between cable loom and e-box A002.

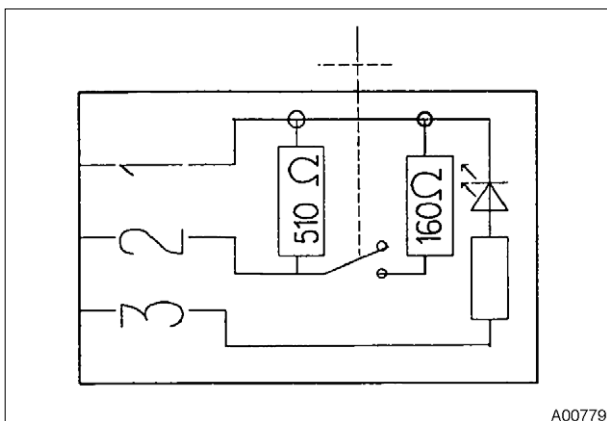


**Testing switch S019:**  
Connect pins 1 and 22.  
Switch toggle switches of e-adapter box to Isolate.  
Target values:  
Switch not actuated approx. 510 ohms  
Switch actuated approx. 121 ohms

Connect pins 1 and 22.  
Ignition "ON"  
Target values:  
Switch not actuated approx. 5 VDC  
Switch actuated approx. 2.4 VDC

Connect pins 1 and 24.  
Ignition "ON"  
Target value: PTO on  $U_b$  = approx. 12 VDC  
Target value for "PTO off" approx. 0.06 VDC

**Note:**  
**Testing of switch S020 in same manner as switch S019.**  
**For pin assignment and test values see table.**



Pin assignment of switches S019 / S020

- 1 = earth
- 2 = switch on / off
- 3 = switch illumination on / off

Date	Version	Page	Capitel	Index	Docu-No.	
20.2.2001	a	1/2	<b>S019 / S020 - left / right rear "PTO on" switch</b>	<b>9000</b>	<b>E</b>	<b>000070</b>



<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b> <b>S019 / S020 - left / right rear "PTO on"switch</b>	<b>E</b>
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**Pin assignment and test values of switch S019**

<b>Pin no.</b> <b>Left switch</b> <b>S019</b>	<b>Pin no.</b> <b>E-box</b> <b>A002</b>	<b>Switch</b> <b>Not pressed</b> <b>Ohm / VDC</b>	<b>Switch</b> <b>Pressed</b> <b>Ohm / VDC</b>	<b>PTO</b> <b>On</b> <b>VDC</b>	<b>PTO</b> <b>Off</b> <b>VDC</b>
1	1	approx. 510 / 5.0	approx. 121 / 2.4	approx. 12	approx. 0.06
2	22	Pin no. 1 and 22	Pin no. 1 and 22	Pin no. 1 and 24	Pin no. 1 and 24
3	24				

**Pin assignment and test values of switch S020**

<b>Pin no.</b> <b>Right switch</b> <b>S020</b>	<b>Pin no.</b> <b>E-box</b> <b>A002</b>	<b>Switch</b> <b>Not pressed</b> <b>Ohm / VDC</b>	<b>Switch</b> <b>Pressed</b> <b>Ohm / VDC</b>	<b>PTO</b> <b>On</b> <b>VDC</b>	<b>PTO</b> <b>Off</b> <b>VDC</b>
1	1	approx. 510 / 5.0	approx. 121 / 2.4	approx. 12	approx. 0.06
2	45	Pin no. 1 and 45	Pin no. 1 and 45	Pin no. 1 and 24	Pin no. 1 and 24
3	24				

**Note:****Electric circuit diagram - Chapter 9000 Index C**

Date	Version	Page	Capitel	Index	Docu-No.
20.2.2001	a	2/2	9000	E	000070

<p>Fav 700 Fav 900</p>	<p>Electrics / system in general <b>S021 - external switch, "Raise" front power lift</b></p>	<p><b>E</b></p>
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Pin	Function
1	Signal
2	Earth
3	Free

**Note:**  
Ignition "OFF".  
Measure resistance directly at switch.

Test	Pin	Target value	Condition	Possible cause of fault
	1	510 ohms	Switch <b>not</b> pressed	
		121 ohms	Switch pressed	
	2			



Connect e-adaptor box X899.980.208.100 directly to A004 - control console.

**Note:**  
Ignition "ON".

Test	Pin	Target value	Condition	Remark
Signal	41	5.1 VDC	Switch <b>not</b> pressed	
		2.4 VDC	Switch pressed	
Earth	1			
Signal	41	9.5 mA	Switch <b>not</b> pressed	Switch toggle switch of e-adaptor box pin 41 to Isolate
		19 mA	Switch pressed	

**Note:**  
Checking A004 - control console, Chapter 9000 Index E

Date	Version	Page	S021 - external switch, "Raise" front power lift	Capitel	Index	Docu-No.
9.3.2001	a	1/1		9000	E	000110

Fav 700 Fav 900	Electrics / system in general <b>S022 - external switch, "Lower" front power lift</b>	<b>E</b>
--------------------	--	----------



Pin	Function
1	Signal
2	Earth
3	Free

**Note:**  
 Ignition "OFF".  
 Measure resistance directly at switch.

Test	Pin	Target value	Condition	Possible cause of fault
	1	510 ohms	Switch <b>not</b> pressed	
		121 ohms	Switch pressed	
	2			



Connect e-adapter box X 899.980.208.100 directly to A004 - control console.

**Note:**  
 Ignition "ON".

Test	Pin	Target value	Condition	Remark
Signal	40	5.1 VDC	Switch <b>not</b> pressed	
		2.4 VDC	Switch pressed	
Earth	1			
Signal	40	9.5 mA	Switch <b>not</b> pressed	Switch toggle switch of e-adapter box pin 40 to Isolate
		19 mA	Switch pressed	

**Note:**  
 Checking A004 - control console, Chapter 9000 Index E

Date	Version	Page	S022 - external switch, "Lower" front power lift	Capitel	Index	Docu-No.
9.3.2001	a	1/1		9000	E	000114

Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**S024 - brake fluid level sensor**

**E**



Remove hatch cover at top front of steering column.

S024 = brake fluid level sensor

**Note:**

Brake fluid must not be used. Only Pentosin CHF11S, order no. X 902.011.622, is permissible.



**Checking brake-fluid sensor:**

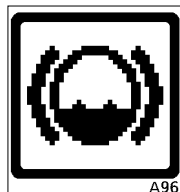
Unscrew cover of brake-fluid reservoir.

Ignition "ON".

Operate float.

**Float at bottom = warning display**

**Float at top = no warning display**



Warning display: brake and clutch oil level too low  
Display with buzzer and warning light

Date	Version	Page	Capitel	Index	Docu-No.
19.2.2001	a	1/1	9000	E	000068

Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
Pressure-operated switch S025 and flow monitor S026

E

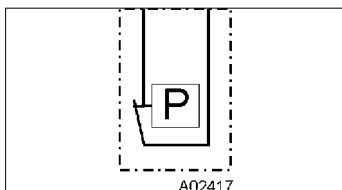
## Pressure-operated switch S025

Component description, function and testing

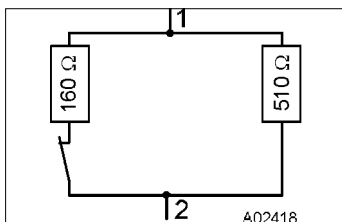
- Possible other designations: pressure switch
- Versions (chronological)

	Operating point	Feature	Validity
1	25 bar		
2	8 bar		from ... onwards

- Installation: **tightening torque Nm**
- Function break-contact with resistor circuit



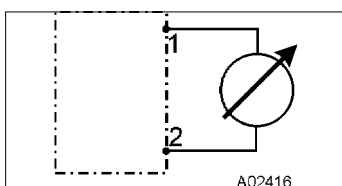
Circuit diagram symbol



Detailed circuit diagram

- Terminals / labels

Pin	Meaning
1	Signal
2	Earth



Test circuit

- Test values

Position	Meaning	Condition	Condition in tractor	Test value
0	Rest	Closed	Actual pressure is less than switching pressure	120 ohms
1	Active	Open	Actual pressure is greater than switching pressure	510 ohms

Date	Version	Page	Capitel	Index	Docu-No.
6.3.2001	a	1/9	Pressure-operated switch S025 and flow monitor S026	9000	E 000091

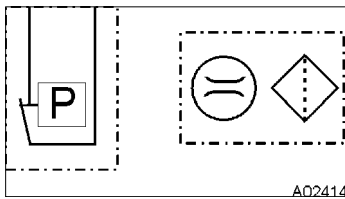
<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / system in general <b>Pressure-operated switch S025 and flow monitor S026</b>	<b>E</b>
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## Flow monitor S026

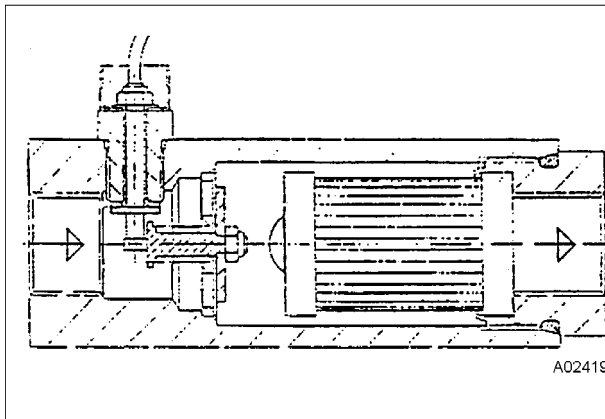
Component description, function and testing

- Possible other designations: high-pressure filter (=FENDOS)
- Versions (chronological): in earlier types auxiliary pump was monitored by pressure-operated switch
- Installation: **oil flow direction as per stamped arrow**
- Function; Switching properties: **opening** of baffle plate depends on flow, i.e. static pressure does not cause opening. Operating points depend on oil temperature, i.e. the warmer the oil, the larger the oil flow must be to open switch.
- Characteristics:

Reference values	At approx. 30°C oil temperature	At approx. 65°C oil temperature
Oil volume increasing Switch opens at	6-6.5 l/min	8.6-9.7 l/min
Oil volume decreasing Switch closes at	approx. 5.5 l/min	9.7-8.2 l/min



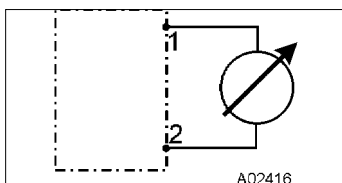
Circuit diagram symbols



Detailed internal structure

- Terminals / labels

Pin	Meaning
1	Signal
2	Earth



Test circuit

- Test values:

Position	Meaning	Condition	Condition in tractor	Test value ohms
0	Rest	Closed	Insufficient oil	0

Date	Version	Page	Capitel	Index	Docu-No.
6.3.2001	a	2/9	Pressure-operated switch S025 and flow monitor S026	9000	E 000091

Farmer 400 Fav 700 Fav 900	Electrics / system in general <b>Pressure-operated switch S025 and flow monitor S026</b>	<b>E</b>
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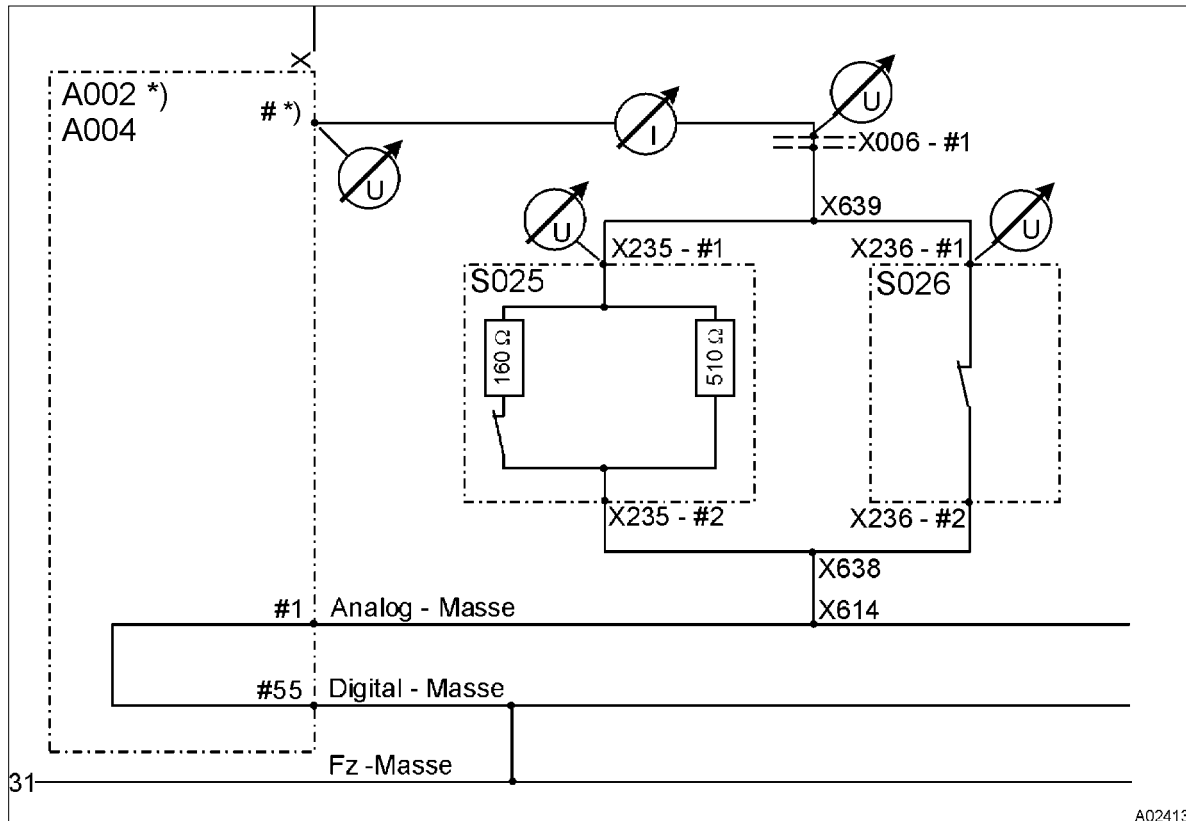
Position	Meaning	Condition	Condition in tractor	Test value ohms
1	Active	Open	Sufficient oil	Infinite

### Pressure-operated switch and flow monitor

#### Function and testing on tractor

#### 1st operating scenario: "everything OK"

Outline circuit diagram with measuring points:



#### Notes on electrical measurements:

- Voltage measurements (volts): between measurement pin and analogue, digital or vehicle earth
- Current measurements (mA): using 68-pin adapter box between green and yellow measurement pins
- Test values at e-box and at 31-pin cable coupler X006 are identical

Tractor condition	Component condition		Measuring point			Test value	
	Pressure-operated switch S025	Flow monitor S026			Measurement pin		
Ignition ON	Closed	Closed	E-box *)	*)	*)	0	VDC
						0	mADC
			Pressure-operated switch	X235	1	0	VDC
			Flow monitor	X236	1	0	VDC
Engine running	Open	Open	E-box *)	*)	*)	5.1	VDC

Date	Version	Page	Pressure-operated switch S025 and flow monitor S026	Capitel	Index	Docu-No.
6.3.2001	a	3/9		9000	E	000091

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b> <b>Pressure-operated switch S025 and flow monitor S026</b>	<b>E</b>
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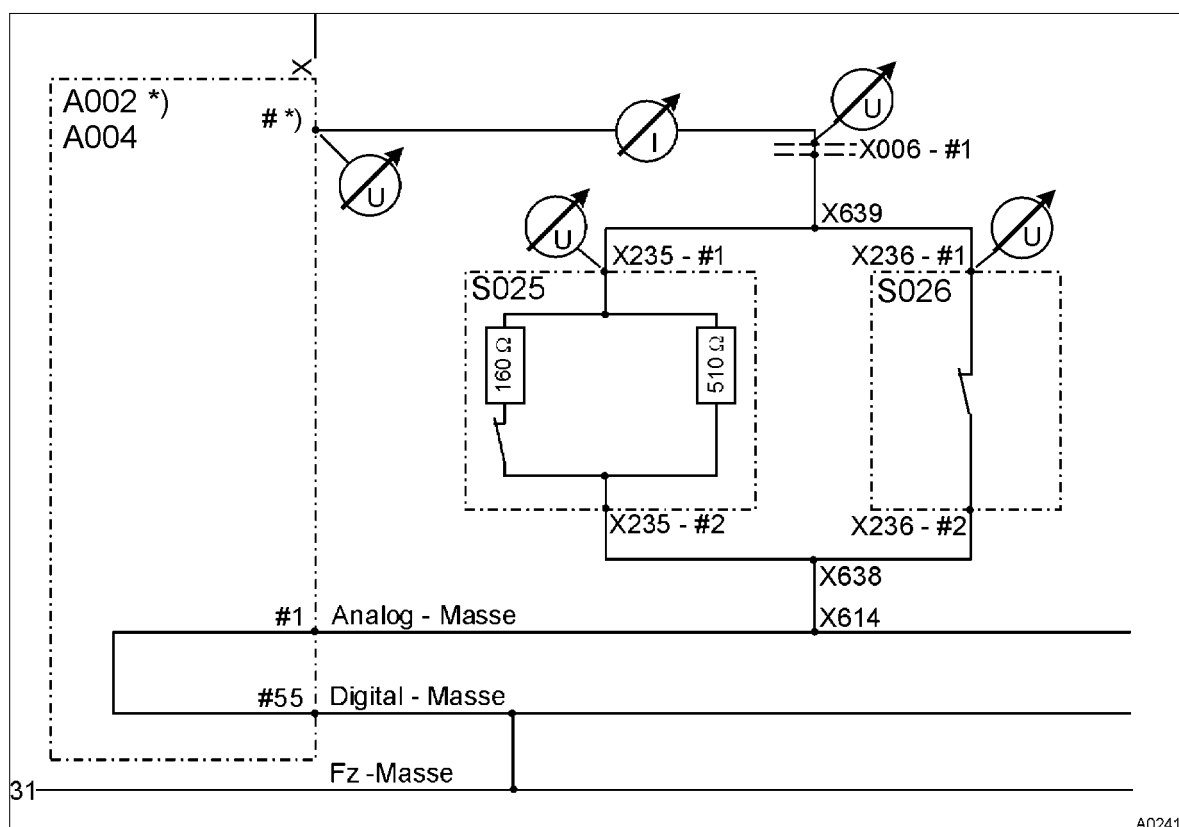
					9.5	mADC
		Pressure-operated switch	X235	1	5.1	VDC
		Flow monitor	X236	1	5.1	VDC

\*)

Modification	Validity	E-box	Interface	Measurement pin
Twin-box version	FAV700 up to chassis no. < 2000	A002	X031	44
Single-box version		A004	X033	45

**2nd operating scenario: "Malfunctions"**

Outline circuit diagram with measuring points



A02413

**Notes on electrical measurements:**

- Voltage measurements (volts): between measurement pin and analogue, digital or vehicle earth
- Current measurements (mA): using 68-pin adapter box between green and yellow measurement pins
- Test values at e-box and at 31-pin cable coupler X006 are identical

Tractor condition	Component condition	Measuring point	Test value
	Hydraulics condition		Fault code

Date	Version	Page	Capitel	Index	Docu-No.
6.3.2001	a	4/9	Pressure-operated switch S025 and flow monitor S026	9000	E



<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b> <b>Pressure-operated switch S025 and flow monitor S026</b>	<b>E</b>
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Engine running, engine speed still under 1000 rpm	- Pressure-operated switch does not open or closes again or	E-box *)	*)	*)	2.4	VDC
		Pressure- operated switch	X235	1	2.4	mADC
over 1000 rpm	- Pressure is not reached or dissipates again	Flow monitor	X236	1	2.4	VDC
					5.1.98	
Engine running, engine speed still under 1000 rpm	- Flow monitor does not open or closes again or	E-box *)	*)	*)	0	VDC
		Pressure- operated switch	X235	1	0	mADC
over 1000 rpm	- Volume is not reached or dissipates again	Flow monitor	X236	1	0	VDC
					5.1.99	

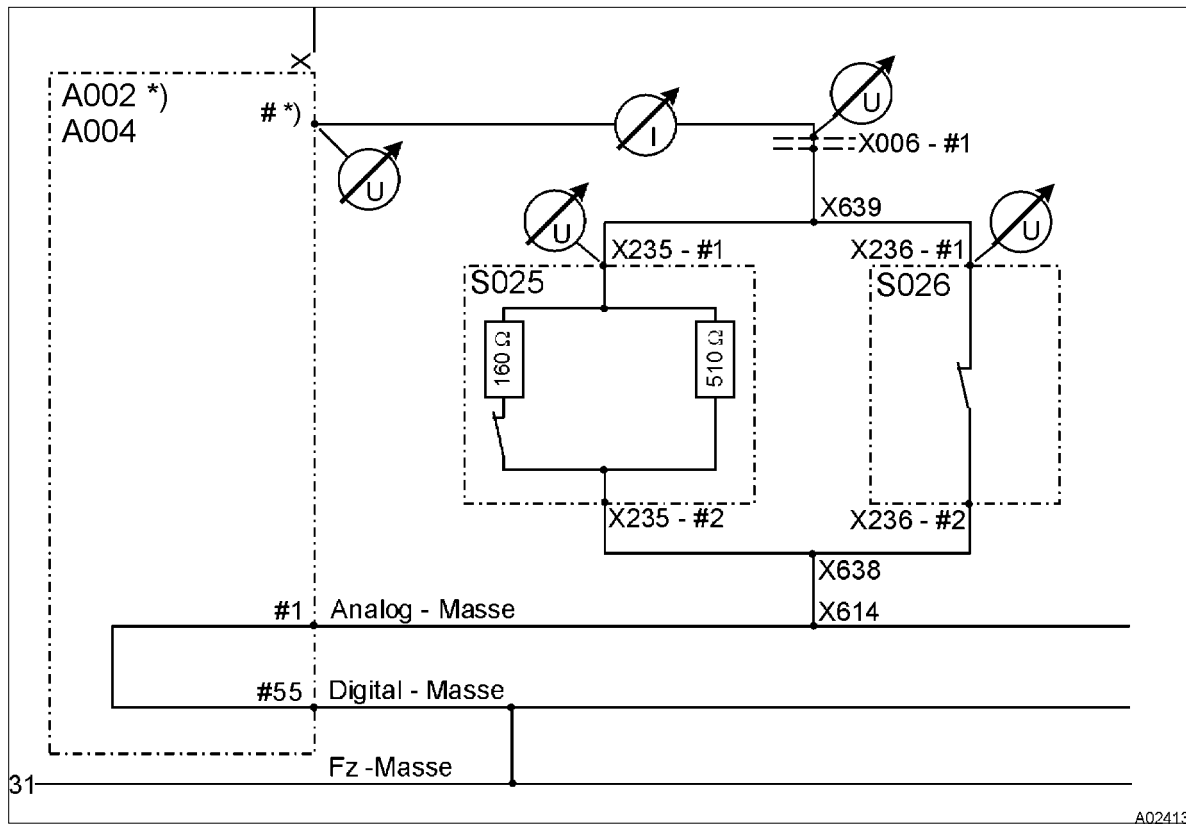
\*)

Modification	Validity	E-box	Interface	Measure- ment pin
Twin-box version	FAV700 up to chassis no. < 2000	A002	X031	44
Single-box version		A004	X033	45

Date	Version	Page	Capitel	Index	Docu-No.
6.3.2001	a	5/9	Pressure-operated switch S025 and flow monitor S026 <b>9000</b>	<b>E</b>	<b>000091</b>

Farmer 400 Fav 700 Fav 900	Electrics / system in general <b>Pressure-operated switch S025 and flow monitor S026</b>	E
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**3rd operating scenario: "cable break"**  
 Outline circuit diagram with measuring points



**Notes on electrical measurements:**

- Voltage measurements (volts): between measurement pin and analogue, digital or vehicle earth
- Current measurements (mA): using 68-pin adapter box between green and yellow measurement pins
- Test values at e-box and at 31-pin cable coupler X006 are identical

Component condition	Measuring point			Test value / fault code		
				Ignition ON	Engine running	
Interruption (cable break) between e-box *) and connector X639	E-box *)	*)	*)	8	8	VDC
	Pressure-operated switch	X235	1	0	0	VDC
	Flow monitor	X236	1	0	0	VDC
				5.1.9A 5.1.9B	5.1.9A 5.1.9B	
Interruption (cable break) between X639 and pressure-operated switch S025	E-box *)	*)	*)	0	8	VDC
	Pressure-operated switch	X235	1	0	0	VDC
	Flow monitor	X236	1	0	8	VDC
				-	5.1.9B	
Interruption (cable break) between X639 and flow monitor S026	E-box *)	*)	*)	2.4	5.1	VDC
	Pressure-operated switch	X235	1	2.4	5.1	VDC
	Flow monitor	X236	1	0	0	VDC
				5.1.9A	-	

Date	Version	Page	Pressure-operated switch S025 and flow monitor S026	Capitel	Index	Docu-No.
6.3.2001	a	6/9		9000	E	000091

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b>				<b>E</b>
<b>Pressure-operated switch S025 and flow monitor S026</b>					

Interruption (cable break) between X638 and earth	E-box *)	*)	*)	8	8	VDC
	Pressure- operated switch	X235	1	8	8	VDC
	Flow monitor	X236	1	8	8	VDC
				5.1.9A	5.1.9B	

\*)

Modification	Validity	E-box	Interface	Measure- ment pin
Twin-box version	FAV700 up to chassis no. < 2000	A002	X031	44
Single-box version		A004	X033	45

Date	Version	Page		Capitel	Index	Docu-No.
6.3.2001	<b>a</b>	7/9	<b>Pressure-operated switch S025 and flow monitor S026</b>	<b>9000</b>	<b>E</b>	<b>000091</b>

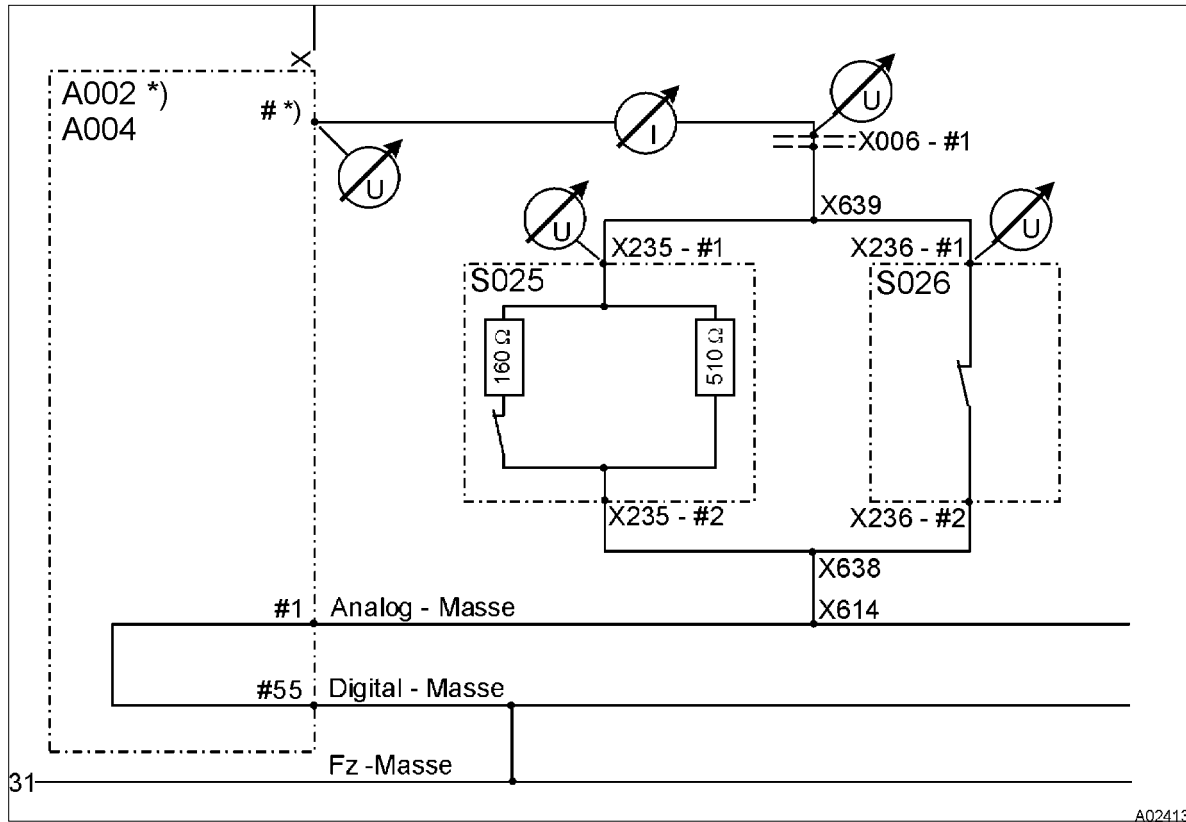
Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
Pressure-operated switch S025 and flow monitor S026

E

**4th operating scenario: "Components disconnected"**

Outline circuit diagram with measuring points



**Notes on electrical measurements:**

- Voltage measurements (volts): between measurement pin and analogue, digital or vehicle earth
- Current measurements (mA): using 68-pin adapter box between green and yellow measurement pins
- Test values at e-box and at 31-pin cable coupler X006 are identical

Component condition	Measuring point			Test value / fault code			
				Ignition ON	Engine running	over 1000	
Only pressure-operated switch S025 disconnected	E-box *)	*)	*)	0	8	8	VDC
	Pressure-operated switch	X235	1	0	8	8	VDC
	Flow monitor	X236	1	0	8	8	VDC
				5.1.9A 5.1.9B	5.1.9A 5.1.9B	5.1.9A 5.1.9B	
Only flow monitor S026 disconnected	E-box *)	*)	*)	2.4	5.1	5.1	VDC
	Pressure-operated switch	X235	1	2.4	5.1	5.1	VDC
	Flow monitor	X236	1	2.4	5.1	5.1	VDC
				5.1.9A	5.1.9A	5.1.9A	

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b> <b>Pressure-operated switch S025 and flow monitor S026</b>	<b>E</b>
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Pressure-operated switch S025 and flow monitor S026 disconnected	E-box *)	*)	*)	8	8	8	VDC
	Pressure-operated switch	X235	1	8	8	8	VDC
	Flow monitor	X236	1	8	8	8	VDC
				5.1.9A 5.1.9B	5.1.9A 5.1.9B	5.1.9A 5.1.9B	

\*)

Modification	Validity	E-box	Interface	Measurement pin
Twin-box version	FAV700 up to chassis no. < 2000	A002	X031	44
Single-box version		A004	X033	45

Date	Version	Page	Capitel	Index	Docu-No.
6.3.2001	<b>a</b>	9/9	<b>9000</b>	<b>E</b>	<b>000091</b>

Farmer 400 Fav 700 Fav 900	Electrics / system in general <b>S027 - external right rear "Raise" power lift switch</b>	<b>E</b>
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Pin	Function
1	Power output
2	Power input
3	Not assigned

**Note:**

Switches are connected directly to EPC e-box A005 without intermediate cable coupler.

**Note:**

Ignition "OFF". Measure resistance directly at switch.

Switch position			Resistance
0 = rest position	Open	Switch not pressed	Infinite
1 = active	Closed	Switch pressed	approx. 4 ohms

**Note:**

Connect e-adapter box X899.980.208.100 directly to EPC e-box A005 using adapter cable X 899.980.208.208.

Ignition "ON".

Voltage measurement refers to earth at pin no.1 at EPC e-box A005

Test	Pin	Target value	Condition	Possible cause of fault
+ supply	28	4.8 VDC	Switch not pressed	
		4.3 VDC	Switch pressed	
Earth	1			
Signal voltage	31	0 VDC	Switch not pressed	
		4.3 VDC	Switch pressed	
Earth	1			

Measuring points on A005 EPC e-box	Pin
Power output	31
Power input	28

Date	Version	Page	Capitel	Index	Docu-No.
24.04.2001	a	1/1	S027 - external right rear "Raise" power lift switch <b>9000</b>	<b>E</b>	<b>000094</b>

Farmer 400 Fav 700 Fav 900	Electrics / system in general S028 - external right rear "Lower" power lift switch	E
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Pin	Function
1	Power output
2	Power input
3	Not assigned

**Note:**

Switches are connected directly to EPC e-box A005 without intermediate cable coupler.

**Note:**

Ignition "OFF". Measure resistance directly at switch.

Switch position			Resistance
0 = rest position	Open	Switch not pressed	Infinite
1 = active	Closed	Switch pressed	approx. 4 ohms

**Note:**

Connect e-adapter box X 899899.980.208.100 directly to EPC e-box A005 using adapter cable X 899.980.208.208.

Ignition "ON".

Voltage measurement refers to earth at pin no.1 at EPC e-box A005

Test	Pin	Target value	Condition	Possible cause of fault
+ supply	28	4.8 VDC	Switch not pressed	
		4.3 VDC	Switch pressed	
Earth	1			
Signal voltage	51	0 VDC	Switch not pressed	
		4.3 VDC	Switch pressed	
Earth	1			

Measuring point on A005 EPC e-box	Pin
Power output	51
Power input	28

Date	Version	Page	Capitel	Index	Docu-No.	
24.04.2001	a	1/1	S028 - external right rear "Lower" power lift switch	9000	E	000096

Farmer 400 Fav 700 Fav 900	Electrics / system in general <b>S029 - external left rear "Raise" power lift switch</b>	<b>E</b>
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Pin	Function
1	Power output
2	Power input
3	Not assigned

**Note:**

Switches are connected directly to EPC e-box A005 without intermediate cable coupler.

**Note:**

Ignition "OFF". Measure resistance directly at switch.

Switch position			Resistance
0 = rest position	Open	Switch not pressed	Infinite
1 = active	Closed	Switch pressed	approx. 4 ohms

**Note:**

Connect e-adapter box X 899899.980.208.100 directly to EPC e-box A005 using adapter cable X 899.980.208.208.

Ignition "ON".

Voltage measurement refers to earth at pin no.1 at EPC e-box A005

Test	Pin	Target value	Condition	Possible cause of fault
+ supply	28	4.8 VDC	Switch not pressed	
		4.3 VDC	Switch pressed	
Earth	1			
Signal voltage	52	0 VDC	Switch not pressed	
		4.3 VDC	Switch pressed	
Earth	1			

Measuring point on A005 EPC e-box	Pin
Power output	52
Power input	28

Date	Version	Page	Capitel	Index	Docu-No.
24.04.2001	a	1/1	S029 - external left rear "Raise" power lift switch	9000	E 000098



Farmer 400 Fav 700 Fav 900	Electrics / system in general <b>S030 - external left rear "Lower" power lift switch</b>	<b>E</b>
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Pin	Function
1	Power output
2	Power input
3	Not assigned

**Note:**

Switches are connected directly to EPC e-box A005 without intermediate cable coupler.

**Note:**

Ignition "OFF". Measure resistance directly at switch.

Switch position			Resistance
0 = rest position	Open	Switch not pressed	Infinite
1 = active	Closed	Switch pressed	approx. 4 ohms

**Note:**

Connect e-adapter box X 899899.980.208.100 directly to EPC e-box A005 using adapter cable X 899.980.208.208.

Ignition "ON".

Voltage measurement refers to earth at pin no.1 at EPC e-box A005

Test	Pin	Target value	Condition	Possible cause of fault
+ supply	28	4.8 VDC	Switch not pressed	
		4.3 VDC	Switch pressed	
Earth	1			
Signal voltage	50	0 VDC	Switch not pressed	
		4.3 VDC	Switch pressed	
Earth	1			

Measuring point on A005 EPC e-box	Pin
Power output	50
Power input	28

Date	Version	Page	Capitel	Index	Docu-No.
24.04.2001	a	1/1	S030 - external left rear "Lower" power lift switch	9000	E 000102

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Electrics / system in general  <b>S034 - coolant level switch</b></p>	<p><b>E</b></p>
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Open bonnet. At top in coolant water reservoir:  
**S034 = coolant level switch**

**To test switch S034 when installed:**

Connect adapter cable (DIY using connector G 816.900.043.020) and multimeter (voltmeter).  
 Ignition "ON"

**Target values:**

**Radiator full = approx. 2.4 VDC**  
**Radiator empty or level too low approx. 5.1 VDC**

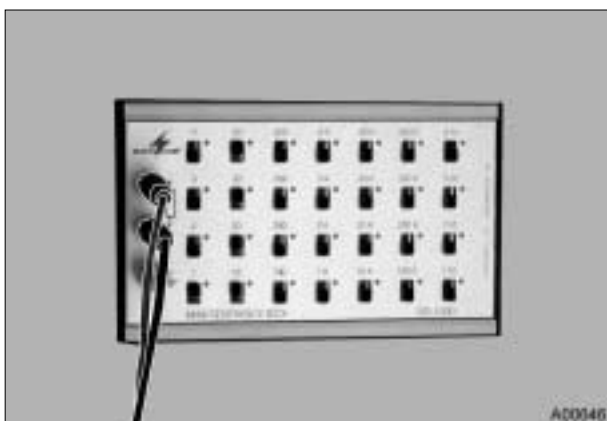


**To test switch S034 when removed:**

Connect multimeter (ohmmeter) to electrical terminals.

**Target values:**

**Float at bottom = approx. 510 ohms**  
**Float at top = approx. 121 ohms**



**Checking warning display with resistor decade**

Component S034 isolated.  
 Connect adapter cable (DIY using connector G 816.900.043.020) to line coupling.  
 Connect resistor decade X 899.980.224 and select desired value.



Warning display: low coolant level  
 Display with buzzer and warning light  
 Fault code 5.1.9E (coolant level too low or empty)

Date	Version	Page	S034 - coolant level switch	Capitel	Index	Docu-No.
19.02.2001	a	1/1		9000	E	000067

<b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b> <b>S036 - hydraulic oil level sensor</b>	<b>E</b>
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Pin	Function
1	Signal
2	Earth

**Note:**

Unlike other level sensors (e.g. fuel tank) this level sensor is connected to control console A004 and is therefore self-testing.

**Note:**

Measure resistance directly at level sensor S036

Test	Pin	Target value	Level sensor position	Tank condition	Position of internal switches	
					Switch 1	Switch 2
Signal	1	820 ohms	0 = rest position	Setpoint quantity	Open	Open
		260 ohms	2	Empty	Closed	Closed
Earth	2					

**Note:**

See electric circuit diagram Chapter 9000 Index C - valves 1

Measuring points on A004 - control console	Pin
Earth	1
Signal	17

Date	Version	Page	Capitel	Index	Docu-No.
8.1.2001	a	1/1	9000	E	000107

# Single ECU

711/712 >21/1001- 714/716>21/2001; 900>23/3001

Testing

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / General system</b> <b>S047 - switch, exhaust brake</b>	<b>E</b>
---	--	----------



Pin	Function
1	Earth
2	Signal



Connect e-adapter box X 899.980.208.100 directly to A004 - ECU.

Measuring points on A004 - ECU, control console	Pin
Earth	1
Signal	34

Test	Pin	Target value	Condition	Possible cause of fault
Resistance	2	121 ohms	S047 - switch not actuated	
		510 ohms	S047 - switch actuated	
	1			

## Single ECU

711 / 712 from 21/1001 onwards - 714 / 716 from 21/2001 onwards,

Testing

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / General system</b> <b>S047 - switch, exhaust brake</b>	<b>E</b>
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### Note:

Ignition "ON"

Test	Pin	Target value	Condition	Possible cause of fault
Signal	34	2.4 VDC	S047 - switch not actuated	A Reading 8.0 VDC, fault in component
		5.1 VDC	S047 - switch actuated	B Reading 0 VDC: - Unplug component - If reading is 0 VDC, fault in A004 ECU (pin 34) or in wiring - If reading is 8.0 VDC, fault in component.
Earth	1			

### Note:

Chapter 9000 Reg. E - Checking A004 - ECU, control console

## Exhaust brake circuit, Fav 900 chassis number 23/3001 and up

S047 - switch, exhaust brake transmits signal to A004 - ECU, control console.

A004 - ECU, control console transmits CAN message to A002 - ECU, enhanced control via K-bus.

A002 - ECU, enhanced control forwards CAN message to A021 - ECU, EDC via G-bus.

A021 - ECU, EDC switches voltage (12 - 14 VDC) to K014 - relay, exhaust brake at pin 18.

K014 - relay, exhaust brake switches +supply (12 - 14 VDC) to Y006 - valve, exhaust brake.

## Exhaust brake circuit for Fav 711/712 chassis number 21/1001 and up, 714/716 chassis number 21/2001 and up, Farmer 400

S047 - switch, exhaust brake transmits signal to A004 - ECU, control console.

A004 - ECU, control console transmits CAN message to A002 - ECU, enhanced control via K-bus.

A002 - ECU, enhanced control switches voltage (12 - 14 VDC) to Y006 - valve, exhaust brake at pin 46.

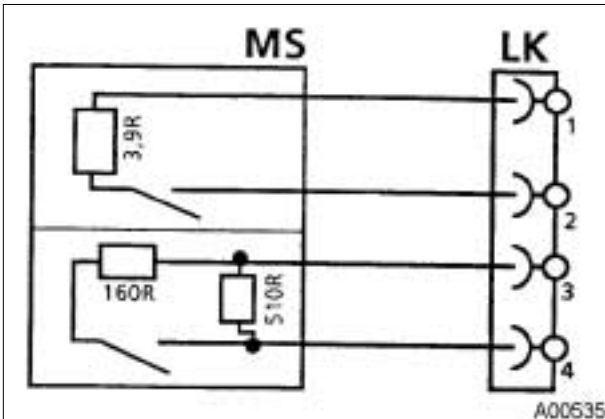
### Note:

Chapter 9000 Reg. C - Electric circuit diagrams

Chapter 9700 Reg. A - Electronic concept

Date	Version	Page	S047 - switch, exhaust brake	Capitel	Index	Docu-No.
31.07.2001	a	2/2		9000	E	000136

<p>Fav 700 Fav 900</p>	<p>Electrics / system in general <b>S048 - "EPC / DA switchover" solenoid switch</b></p>	<p><b>E</b></p>
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Pin	Function	
1	Supply	Non-self-testing switch section
2	Signal	
3	Free	Self-testing switch section
4	Free	

**Note:**

Connect e-adapter box X 899.980.208.100 directly to A005 EPC box using adapter cable X 899.980.208.208.

Ignition "ON"

Test	Pin	Target value	Condition	Remark
Signal	2	0 VDC	EPC active	Solenoid switch open
		12 VDC	DA active	Solenoid switch closed + UB 12 V from fuse F048
Vehicle earth				

Measuring points on A005 - EPC box	Pin
Signal	12
Earth	9 or 45

**Note:**

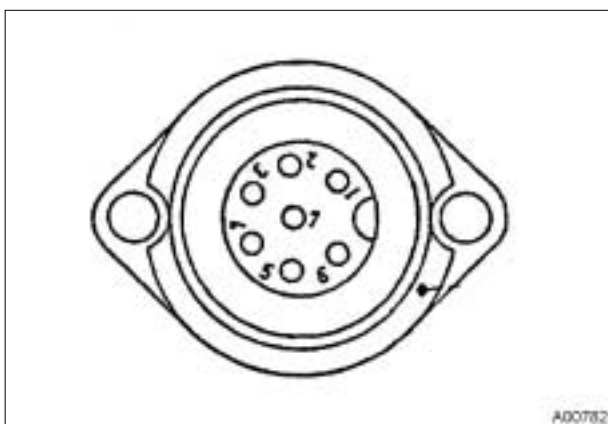
Checking EPC box A005 - Chapter 9000 Index E

Date	Version	Page	Capitel	Index	Docu-No.
26.03.2001	a	1/1	S048 - "EPC / DA switchover" solenoid switch	9000	E 000124

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Electrics / system in general  <b>X007 - implement socket cable coupler</b></p>	<p><b>E</b></p>
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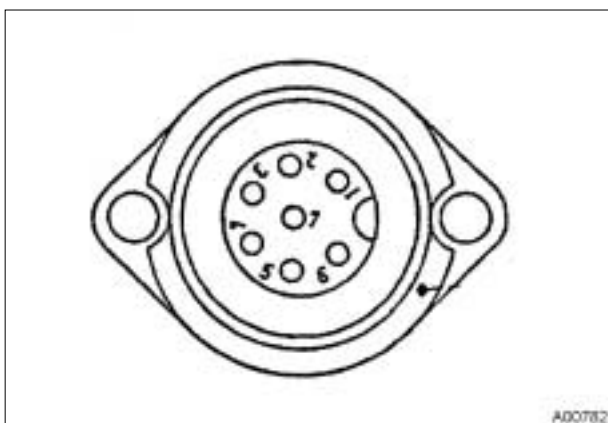


7-pin implement socket **X007** supplies signals for operating trailed and mounted implements.  
 e.g. speed signals for operating a spray computer.

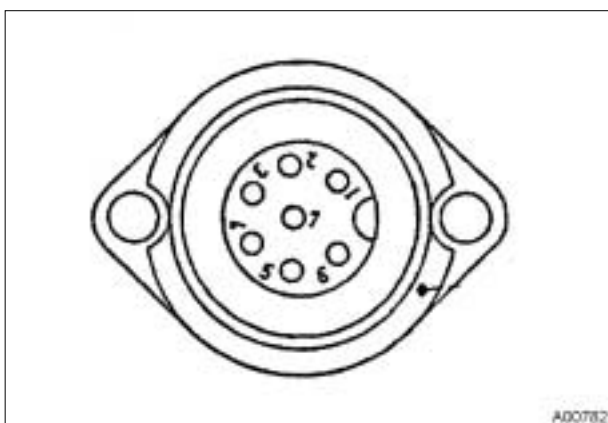


**Pin assignment in implement socket X007**

1 = radar signal (optional extra)  
 (130 pulses per metre travelled)  
 Speed 0 to 0.5 km/h = approx. 13.8 VDC  
 Speed greater than 0.5 km/h = approx. 6.5 VDC



2 = transmission signal  
 (130 pulses per metre travelled)  
 Speed 0 km/h = approx. 13.8 VDC  
 Speed greater than 0.1 km/h = approx. 6.5 VDC



**Transmission signal can be checked using on-board computer on instrument panel A007 or with terminal A008.**

**Bridge** from implement socket **X007**, pin 2 (transmission signal) to implement socket **X008** pin 1 (external counter).

On on-board computer select menu for external counter (see Operating Manual).

Drive 10 m so that number of pulses per 10 m can be read off on on-board computer, e.g. 1300 pulses.

Date	Version	Page	X007 - implement socket cable coupler	Capitel	Index	Docu-No.
22.2.2001	<b>b</b>	1/3			<b>9000</b>	<b>E</b>

<p>Farmer 400 Fav 700 Fav 900</p>	<p>Electrics / system in general <b>X007 - implement socket cable coupler</b></p>	<p><b>E</b></p>
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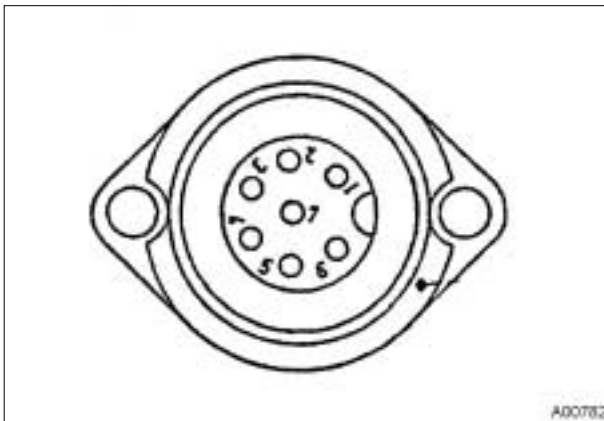
**Note:**

**Farmer 400 and Fav 700** have external counter (integrated in area meter) in on-board computer of instrument panel A007. External counter (integrated in area meter) in terminal A008 is not functional.

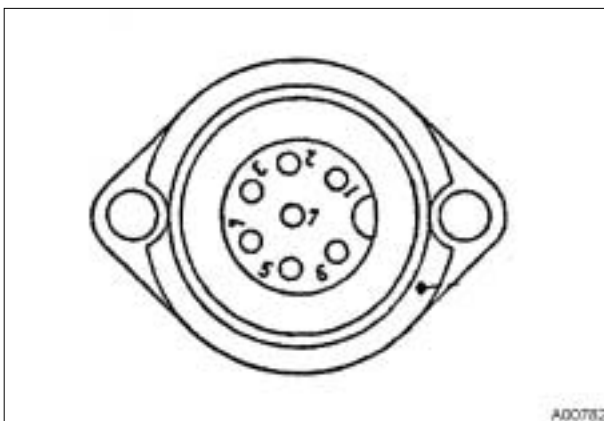
**Fav 900:**

**Version 1 :** External counter (integrated in area meter) in on-board computer of instrument panel A007 and external counters (integrated in area meter) in terminal A008. External counter (integrated in area meter) in terminal A008 is not functional.

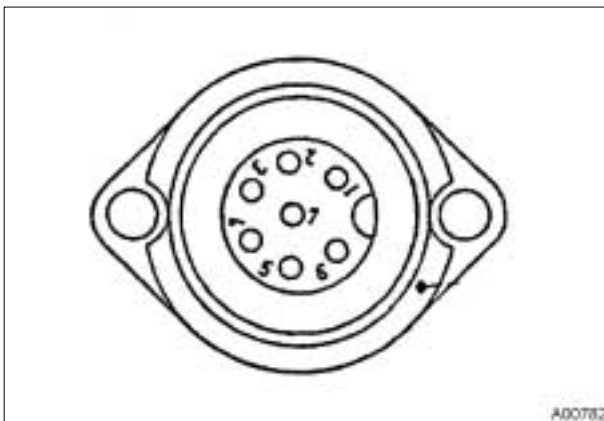
**Version 2 :** Only external counter (integrated in area meter) in terminal A008. External counter (integrated in area meter) in terminal A008 is functional.



3 = PTO speed  
(40 pulses per PTO revolution)  
PTO **off** = approx. 13.8 VDC  
PTO **on** = approx. 6.5 VDC



4 = rapid lift control (can also be used for external starting of on-board computer (area meter).  
Rapid lift control in  
Lower (Regulate) position = approx. 1 VDC  
Stop position = approx. 1 VDC  
Raise position = Ub, approx. 12 VDC (cannot be subjected to load)



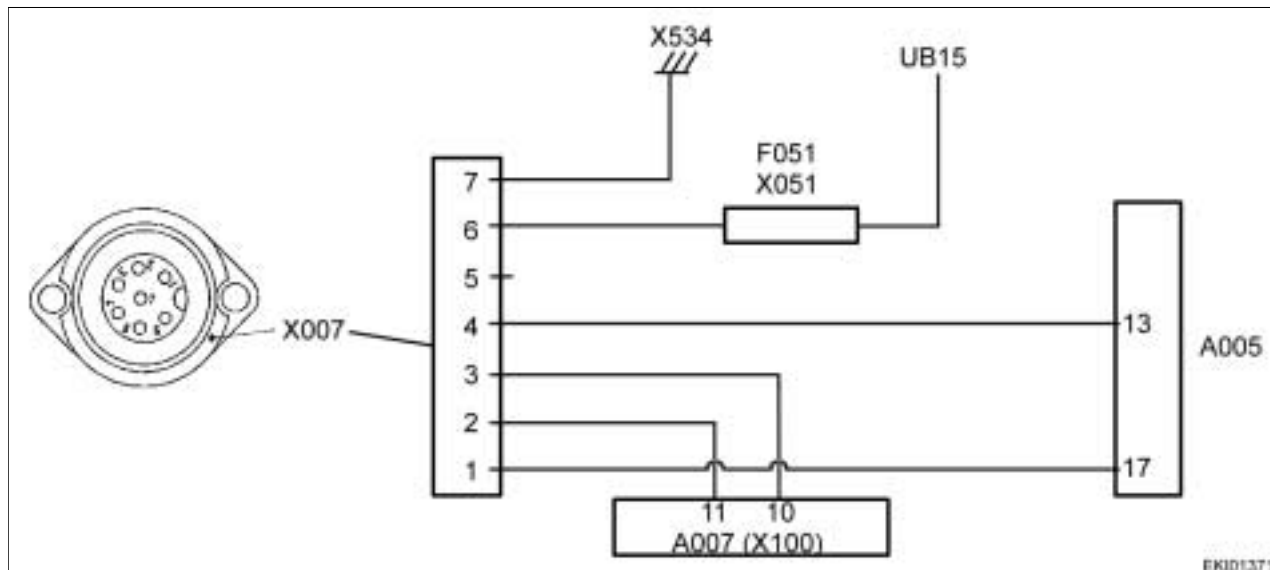
5 = Not assigned  
6 = On-board power supply Ub 15 = approx. 12 VDC (switched positive)  
7 = earth

Date	Version	Page	X007 - implement socket cable coupler	Capitel	Index	Docu-No.
22.2.2001	<b>b</b>	2/3		<b>9000</b>	<b>E</b>	<b>000089</b>



<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / system in general <b>X007 - implement socket cable coupler</b>	<b>E</b>
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**Block diagram of implement socket X007**



Component number	Component
A005	EPC e-box
A007	Instrument panel
F051	+UB 15 supply fuse
X007	Implement socket
X051	Fuse holder 2
X100	Cable coupler to instrument panel A007 (blue)
X534	Vehicle body earth point

Readings and pins on implement socket X007		
Pin	Signal	Reading
1	Radar signal - if available: Speed 0-0.5 km/h Speed greater than 0.5 km/h	approx. 13.8 VDC (UB) approx. 6.5 VDC (UB2)
2	Transmission signal Speed 0 km/h Speed greater than 0.1 km/h	approx. 13.8 VDC (UB) approx. 6.5 VDC (UB2)
3	PTO speed PTO off PTO on	approx. 13.8 VDC (UB) approx. 6.5 VDC (UB2)
4	EPC rapid lift control - actuation system on control console A004 - actuation system on joystick A003 Rapid lift control in Lower (Regulate) position Rapid lift control in Stop position Rapid lift control in Raise position	approx. 1 VDC approx. 1 VDC approx. 13.8 VDC (UB)
5	Not assigned	
6	On-board power supply UB 15 (switched positive)	approx. 13.8 VDC (UB)
7	Earth at X534	

UB = battery voltage (approx. 13.8 VDC)

**Note:**

**Connect adapter cable (DIY) to implement socket X007.**

**(Measurement can also be carried out without adapter cable, though measurement errors are possible because of small bush pins.)**

Date	Version	Page	X007 - implement socket cable coupler	Capitel	Index	Docu-No.
22.2.2001	<b>b</b>	3/3		<b>9000</b>	<b>E</b>	<b>000089</b>

Farmer 400  
Fav 700  
Fav 900

## Electrics / system in general

X008 - on-board computer counter input cable coupler (implement socket)

**E**

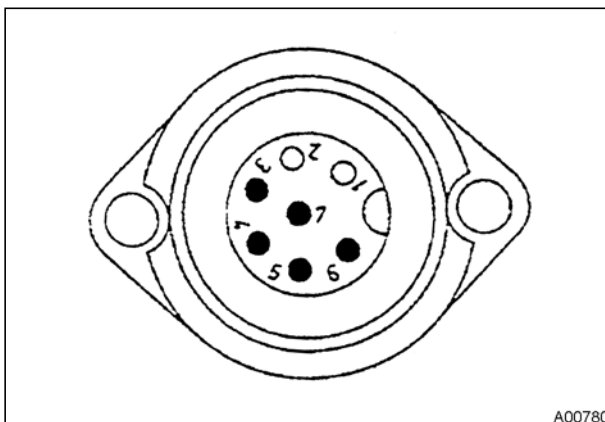
At top right rear in cab:

X008 = **on-board computer counter input cable coupler** (blue implement socket)

Implement socket X008 is 7-pin, of which only pins 1 and 2 are assigned.

Solenoid switch (event counter) is fitted to mounted implement.

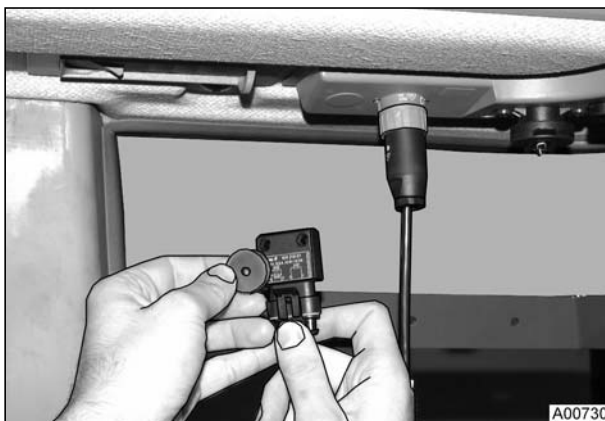
Closing is displayed as number on instrument panel A007.

**Pin assignment of implement socket X008**

1 = Signal to instrument panel A007  
(pin 12 - yellow cable coupler X101)

2 = earth

3 to 7 = not assigned, pins sealed.



Plug connection cable with external counter (solenoid switch) into implement socket X008.

Ignition "ON".

Select menu for external counter (see Operating Manual) on on-board computer (instrument panel A007).

Pass magnet over solenoid switch. Switching pulses are displayed on on-board computer.

Component can also be tested by means of bridge between pins 1 and 2 on implement socket X008.

Date	Version	Page	Capitel	Index	Docu-No.	
22.2.2001	a	1/2	X008 - on-board computer counter input cable coupler (implement socket)	9000	E	000088

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<p style="text-align: center;">Electrics / system in general</p> X008 - on-board computer counter input cable coupler (implement socket)	<b>E</b>
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**Connection cable with external counter (solenoid switch)**

1 x **counter cable loom** = H 916.970.010.010

1 x **solenoid switch** = H 312.100.070.500

1 x **magnet** = X 830.120.050.000

**Note:**

**Farmer 400 and Fav 700** have external counter (integrated in area meter) in on-board computer of instrument panel A007.

- External counter (integrated in area meter) in terminal A008 has no function .

**Fav 900**

**Version 1** : External counter (integrated in area meter) in on-board computer of instrument panel A007 and area meter (integrated in area meter) in terminal A008.

- External counter (integrated in area meter) in terminal A008 is not functional.

**Version 2** : Only external counter (integrated in area meter) in terminal A008.

- External counter (integrated in area meter) in terminal A008 is functional.

Date	Version	Page	Capitel	Index	Docu-No.	
22.2.2001	<b>a</b>	2/2	X008 - on-board computer counter input cable coupler (implement socket)	<b>9000</b>	<b>E</b>	<b>000088</b>

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / system in general <b>Y002 - range 1 solenoid valve</b>	<b>E</b>
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Pin	Function
1	Signal
2	Earth

**Note:**

Connect adapter cable X 899.980.246.201 directly to component Y002.  
 Ignition "OFF".

Test	Pin	Target value	Condition	Remark
Resistance	1	8.8 ohms		
	2			



Connect e-adapter box 899.980.208.100 directly to A002 e-box.

**Note:**

Ignition "ON"

Test	Pin	Target value	Condition	Remark
Power consumption	Between 56 and 61	1.5 A	Switch toggle switch of e-adapter box pin 61 to Isolate	When switching over, range control 1 solenoid valve is only briefly energised, hence this test method is required.

Measuring points on A002 - e-box	Pin
Vehicle earth	
Signal	61

**Note:**

Checking A002 - e-box, Chapter 9000 Index E

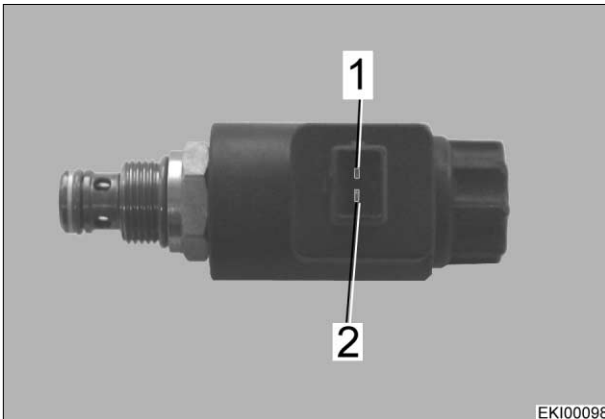
Date	Version	Page	Y002 - range 1 solenoid valve	Capitel	Index	Docu-No.
05/2000	a	1/1		9000	E	000011

**Single e-box**

711 / 712 <- - 21/1001; 714 / 716 <- - 21/2001; Fav 900 <- - 23/3001;>

Testing

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / system in general</b> <b>Y003 - range 2 solenoid valve</b>	<b>E</b>
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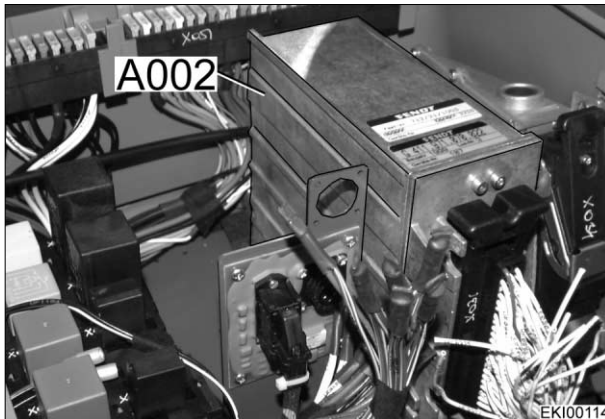


Pin	Function
1	Signal
2	Earth

**Note:**

Connect adapter cable X 899.980.246.201 directly to component Y003.  
 Ignition "OFF".

Test	Pin	Target value	Condition	Remark
Resistance	1	8.8 ohms		
	2			



Connect e-adapter box X 899.980.208.100 directly to A002 e-box.

**Note:**

Ignition "ON"

Test	Pin	Target value	Condition	Remark
Power consumption	Between 56 and 62	1.5 A	Switch toggle switch of e-adapter box pin 62 to Isolate	When switching over, range control 2 solenoid valve is only briefly energised, hence this test method is required.

Measuring points on A002 - e-box	Pin
Vehicle earth	
Signal	62

**Note:**

Checking A002 - e-box, Chapter 9000 Index E

Date	Version	Page	Y003 - range 2 solenoid valve	Capitel	Index	Docu-No.
05/2000	a	1/1		9000	E	000012

Farmer 400 Fav 700 Fav 900	Electrics / system in general Y004 - transmission neutral solenoid valve / turboclutch valve	<b>E</b>
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Pin	Function
1	Signal
2	Earth

**Note:**

Ignition "OFF" - measure resistance directly at solenoid valve

Test	Pin	Target value	Condition	Remark
Resistance	1	6.4 ohms	20°C solenoid temperature	See circuit diagram:
		9.7 ohms	150°C solenoid temperature	Transmission emergency control
	2			



Connect e-adaptor box X 899.980.208.100 directly to A002 e-box.

**Note:**

Ignition "ON"

Test	Pin	Target value	Condition	Remark
Power consumption	50	0 A	Neutral switch actuated, both F/R lights flash	Switch toggle switch of e-adaptor box pin 50 to Isolate

Test	Pin	Target value	Engine speed	Remark
Power consumption	50	0 A	0 rpm	Switch toggle switch of e-adaptor box pin 50 to Isolate
		0.46 A	800 rpm	
		0.74 A	1000 rpm	
		1.23 A	1200 rpm	
		1.71 A	1400 rpm	

Date	Version	Page	Capitel	Index	Docu-No.
05/2000	a	1/1	Y004 - transmission neutral solenoid valve / turboclutch valve	9000	E 000013

Single e-box

711 / 712 <-- 21/1001; 714 / 716 <-- 21/2001; Fav 900 <-- 23/3001;

Testing

Farmer 400 Fav 700 Fav 900	Electrics / system in general <b>Y005 - speed limiter solenoid valve</b>	<b>E</b>
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Pin	Function
1	Signal
2	Earth

**Note:**

Connect adapter cable X 899.980.246.201 directly to component Y005.  
Ignition "OFF".

Test	Pin	Target value	Condition	Possible cause of fault
Resistance	1	6.5 ohms		
	2			



Connect e-adapter box X 899.980.208.100 directly to A002 - e-box.

**Note:**

Ignition "ON"

Test	Pin	Target value	Condition	Possible cause of fault
Power consumption	51	800 mA ± 50 mA	Switch toggle switch of e-adapter box pin 51 to Isolate	

**Note:**

If current is exceeded or is not reached, transmission is locked at 30 km/h maximum.

Date	Version	Page	Y005 - speed limiter solenoid valve	Capitel	Index	Docu-No.
05/2000	a	1/1		9000	E	000032

Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**Y006 - exhaust brake solenoid valve**

**E**



At rear on engine bulkhead

Y006 = **exhaust brake solenoid valve**

**Note:**

**Shown with cab removed for greater clarity.**



Measure resistance of solenoid Y006 directly at solenoid valve using multimeter (ohmmeter).

Target value: 13.5 ohms +/- 5% at 20°C



Measure power consumption of exhaust brake solenoid valve Y006 using adapter cable (DIY using connector G 816.900.043.020) and multimeter (ammeter).

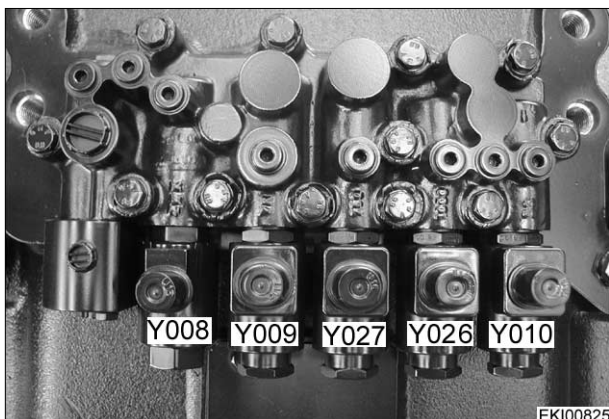
Ignition "ON".

Target value: 0.8 amps +/- 10%, depending on temperature and battery voltage.

Date	Version	Page	Capitel	Index	Docu-No.
21.2.2001	a	1/1	9000	E	000079



<b>Fav 900</b>	Electrics / General system <b>Y008 / Y009 / Y010 - valve, rear PTO / 4WD / diff. lock</b>	<b>E</b>
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Pin	Function
1	12 volt actuation
2	Vehicle earth
Y008 - valve Rear PTO	ON / OFF
Y009 - valve 4WD	ON / OFF
Y010 - valve Diff. lock	ON / OFF

**Note:****Resistance (R)**

Ignition OFF

Connect adapter cable X 899.980.246.201 directly to Y008 / Y009 / Y010 - valve.

**Current (I)**

Connect e-adapter box X 899.980.208.100 directly to A002 - ECU, enhanced control.

**Ignition ON**

Valve	Position	U [VDC]	I [ADC]	R [Ohm]
Y008 - valve Rear PTO	ON / OFF	UB / 0	1.7	7.4
Y009 - valve 4WD	ON / OFF	0 / UB	1.5	8.1
Y010 - valve Diff. lock	ON / OFF	UB / 0	1.5	8.1

**Note:**

All readings +/- 10%

UB = battery voltage = 12 VDC - 14 VDC

Measuring points on A002 - ECU, enhanced control	Pin
Y008	47
Y009	64
Y010	63
Vehicle earth	

**Note:**

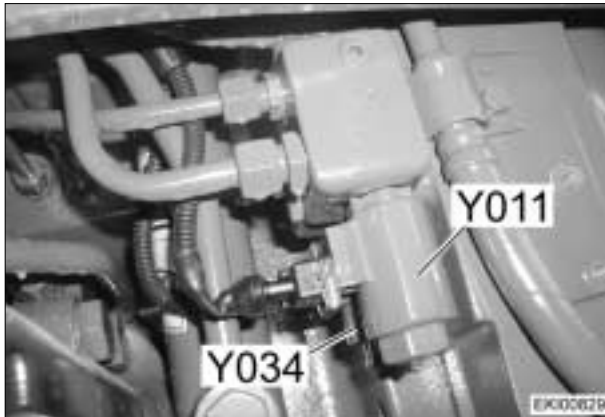
Chapter 9000 Reg. E - A012 - ECU, enhanced control

Date	Version	Page	Capitel	Index	Docu-No.
24.08.2001	a	1/1	9000	E	000149

Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**Y011 - front PTO solenoid valve**

**E**



**Fav 900**

Y011 = **front PTO solenoid valve**

Connect adapter cable (DIY using cable loom H 514.900.040.070) to solenoid valve Y011.

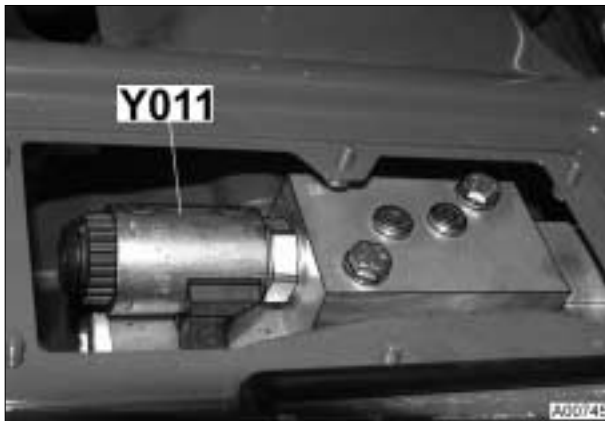
Measure resistance using multimeter (ohmmeter).

Y011 = **approx. 7.4 ohms**

Test power consumption using multimeter (ammeter).

Y011 = **front PTO on = approx. 1.7 amps**

All readings +/- 10%



**Farmer 400, Fav 700**

Open bonnet and remove cover panel.

Y011 = **front PTO solenoid valve**

Connect adapter cable (DIY using cable loom H 514.900.040.070) to solenoid valve Y011.

Measure resistance using multimeter (ohmmeter).

Y011 = **approx. 7.4 ohms**

Test power consumption using multimeter (ammeter).

Y011 = **front PTO on = approx. 1.7 amps**

All readings +/- 10%

Date	Version	Page	Capitel	Index	Docu-No.
21.2.2001	<b>b</b>	1/1	<b>9000</b>	<b>E</b>	<b>000076</b>

<b>Fav 900</b>	Electrics / General system <b>Y012 - "Charge" suspension solenoid valve</b>	<b>E</b>
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Pin	Function
1	12 volt actuation
2	Vehicle earth

**Note:**

Ignition "OFF"

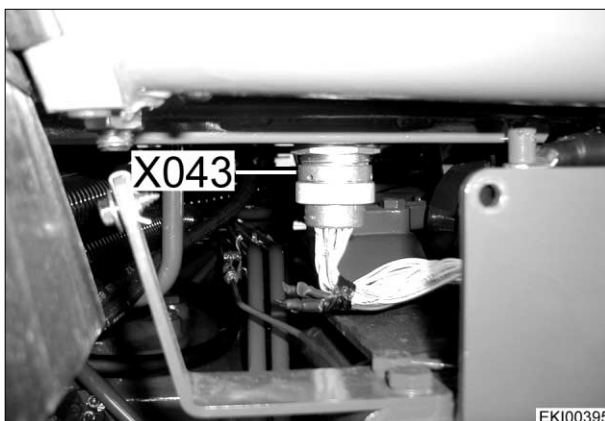
Connect adapter cable X 899.980.246.201 directly to Y012 - "Charge" suspension solenoid valve.

Test	Pin	Target value	Condition	Remark
Signal	1	8 ohms		
Earth	2			

**Note:**

Ignition "ON"

Test	Pin	Target value	Condition	Possible cause of fault
Signal	1	12 VDC	Suspension: raise or lower or oil preheater (=flush)	Fuse F050 in X051 or in wiring
Earth	2		Actuation via K016 - suspension valves relay	



Connect e-adapter box 899.980.208.100 to cable coupler X043 using adapter cable X 899.980.208.205.

Date	Version	Page	Y012 - "Charge" suspension solenoid valve	Capitel	Index	Docu-No.
04.09.2001	a	1/2		9000	E	000153

<b>Fav 900</b>	Electrics / General system <b>Y012 - "Charge" suspension solenoid valve</b>	<b>E</b>
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**Note:**  
Ignition "ON"


Test	Pin	Target value	Condition	Possible cause of fault
Actuation	8	1.5 A	Suspension: raise or lower or oil preheater (=flush)	
			Switch toggle switch of e-adapter box pin 8 to Isolate	

### Instructions for applied-voltage test on valves:

1. Disconnect existing actuation lead (open toggle switch or remove bridge on adapter box).
2. Connect external voltage source to **component contact**.
3. External voltage source: pins 56, 57 ... or 60 on ECU A002 or battery / power supply unit

Date	Version	Page	Y012 - "Charge" suspension solenoid valve	Capitel	Index	Docu-No.
04.09.2001	a	2/2		9000	E	000153

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electrics / system in general <b>Y013 - "Lower" suspension solenoid valve</b>	<b>E</b>
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**Warning:**  
 Solenoid valves Y013 / SV1 and Y014 / SV2 look similar outwardly, but they must not be confused!  
**Distinguishing features:**  
 Solenoid valve Y013 / SV1 = valve body yellow-chromed finish and no counterbore  
 Solenoid valve Y014 / SV2 = valve body white-chromed finish with counterbore



Pin	Function
1	12 volt actuation
2	Vehicle earth

**Note:**  
 Ignition "OFF".  
 Connect adapter cable X 899.980.246.201 directly to Y013 - "Lower" suspension solenoid valve.

Test	Pin	Target value	Condition	Remark
Signal	1	8 ohms		
Earth	2			

**Note:**  
 Ignition "ON"

Test	Pin	Target value	Condition	Possible cause of fault
Signal	1	12 VDC	Suspension: Lowering	
Earth	2			

**Single e-box**

711 / 712 &gt; 21/1001 - 714 / 716 &gt; 21/2001; 900 &gt; 23/3001

Testing

<i>Farmer 400</i> <i>Fav 700</i> <i>Fav 900</i>	Electrics / system in general <b>Y013 - "Lower" suspension solenoid valve</b>	<b>E</b>
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**Note:**

Connect e-adapter box 899.980.208.100 directly to A002 e-box.

Ignition "ON".

"Load valve" Y012 / MVL must be operational for movement to be carried out.

Test	Pin	Target value	Condition	Possible cause of fault
Actuation	65	1.5 A	Suspension: Lower. Remains energised for 2 seconds after reaching end position (B008).	
			Switch toggle switch of e-adapter box pin 65 to Isolate	

**Instructions for applied-voltage test on valves, if required:**

1. Disconnect existing actuation lead (open toggle switch or remove bridge on adapter box).
2. Connect separate voltage source to **component contact**.
3. Separate voltage source: pins 56, 57 ... or 60 on e-box A002 or battery/power supply unit

Date	Version	Page	Y013 - "Lower" suspension solenoid valve	Capitel	Index	Docu-No.
01/2000	<b>a</b>	2/2		<b>9000</b>	<b>E</b>	<b>000120</b>

Farmer 400 Fav 700 Fav 900	Electrics / system in general <b>Y014 - "Raise" suspension solenoid valve</b>	<b>E</b>
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**Warning:**

Solenoid valves Y013 / SV1 and Y014 / SV2 look similar outwardly, but they must not be confused!

**Distinguishing features:**

Solenoid valve Y013 / SV1 = valve body yellow-chromed finish and no counterbore

Solenoid valve Y014 / SV2 = valve body white-chromed finish with counterbore



Pin	Function
1	12 volt actuation
2	Vehicle earth

**Note:**

Ignition "OFF".

Connect adapter cable X 899.980.246.201 directly to Y014 - "Raise" suspension solenoid valve.

Test	Pin	Target value	Condition	Remark
Signal	1	8 ohms		
Earth	2			

**Note:**

Ignition "ON"

Test	Pin	Target value	Condition	Possible cause of fault
Signal	1	12 VDC	Suspension: Raise	
Earth	2			

**Note:**

Connect e-adapter box 899.980.208.100 directly to A002 - e-box.

Ignition "ON".

"Load valve" Y012 / MVL must be operational for movement to be carried out.

Test	Pin	Target value	Condition	Possible cause of fault
Actuation	66	1.5 A	Suspension: Raise	
			Switch toggle switch of e-adapter box pin 66 to Isolate	

Date	Version	Page	Capitel	Index	Docu-No.
01/2000	a	1/2	Y014 - "Raise" suspension solenoid valve	9000	E 000122

<i>Farmer 400</i> <i>Fav 700</i> <i>Fav 900</i>	Electrics / system in general <b>Y014 - "Raise" suspension solenoid valve</b>	<b>E</b>
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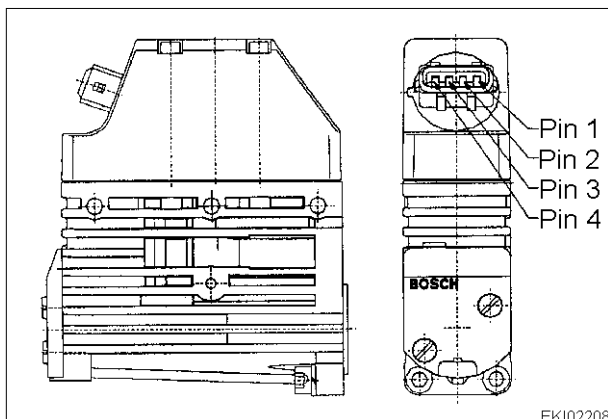
**Instructions for applied-voltage test on valves, if required:**

1. Disconnect existing actuation lead (open toggle switch or remove bridge on adapter box).
2. Connect separate voltage source to **component contact**.
3. Separate voltage source: pins 56, 57 ... or 60 on e-box A002 or battery/power supply unit

Date	Version	Page	Capitel	Index	Docu-No.
01/2000	<b>a</b>	2/2	<b>9000</b>	<b>E</b>	<b>000122</b>



<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Electrics / system in general</p> <p><b>Y015-Y019 - SB 23 - LS - EHS control valve</b></p>	<p>E</p>
--	---	----------



Pin	Function
1	+UB
2	CAN-low
3	CAN-high
4	Earth

Conventional electrical performance test consisting of measuring resistance is not permissible with this valve!

**Note:**

Valves are assigned, tape-end programming (G-bus).  
 Crossgate lever is adjusted (adjustment "1001").  
 Control pressure is present (measuring point M5 - 22bar).  
 Ignition ON, start tractor.

Test	Pin	Target value	Condition	Possible cause of fault
+ supply	1	12 VDC		Fuse (F048) in fuse holder X051 or in wiring
Earth	4			

**Extended testing of SB23-LS-EHS:**

All valves with exception of valve under test must be electrically isolated.



Measure power consumption of Y015-Y019 SB-LS-EHS control valve.  
 Remove fuse F048 (15 A) from fuse holder X051.  
 Connect multimeter (ammeter) in place of fuse.

**Note:**  
 Protect one test lead of multimeter with 16 amp fuse (free-standing fuse).

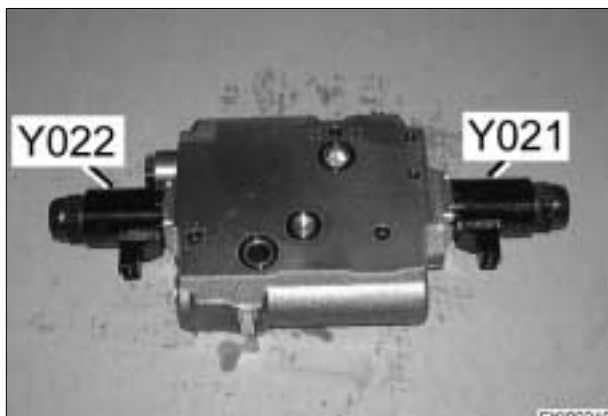
Test	Pin	Target value	Valve: position / actuation
Power consumption	1	260 mA	Neutral
		500 mA	Raise
		535 mA	Lower
		620 mA	Floating position

**Note:**

All readings +/- 15%

Date	Version	Page	Y015-Y019 - SB 23 - LS - EHS control valve	Capitel	Index	Docu-No.
8.3.2001	b	1/1		9000	E	000104

Farmer 400 Fav 700 Fav 900	Electronics / system in general Y021 "Raise" control valve	E
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Pin	Function
1	Actuation
2	Earth

**Note:**  
Ignition "OFF".  
Measure resistance directly at solenoid valve

Test	Pin	Target value	Condition	Remark
Signal	1	2.2 ohms		
Earth	2			

**Note:**  
Connect e-adapter box X 899.980.208.100 directly to EPC e-box A005 using adapter cable X 899.980.208.208.  
Ignition "ON".

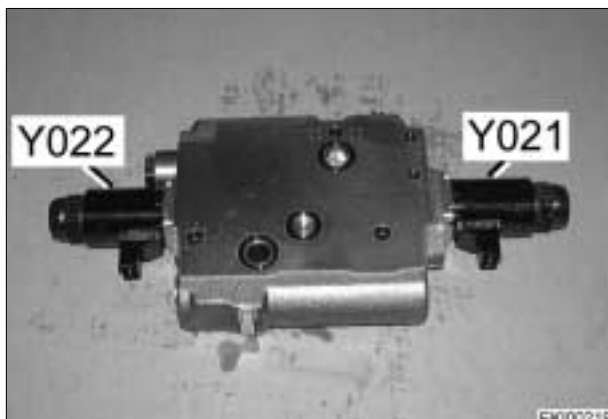
Test	Pin	Target value	Condition	Remark
Actuation	55	6.0 VDC		
Earth	53			

Actuation	55	1.25 A to 3.0 A	EPC: Raise	Switch toggle switch of e-adapter box pin 55 to Isolate
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**Note:**  
Checking EPC e-box A005 Chapter 9000 Index E

Date	Version	Page	Capitel	Index	Docu-No.
12/1999	a	1/1	9000	E	000111

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electronics / system in general <b>Y022 "Lower" control valve</b>	<b>E</b>
---	--	----------



Pin	Function
1	Actuation
2	Earth

**Note:**  
 Ignition "OFF".  
 Measure resistance directly at solenoid valve

Test	Pin	Target value	Condition	Remark
Signal	1	2.2 ohms		
Earth	2			

**Note:**  
 Connect e-adapter box X 899.980.208.100 directly to EPC e-box A005 using adapter cable X 899.980.208.208.  
 Ignition "ON".

Test	Pin	Target value	Condition	Remark
Actuation	19	6.0 VDC		
Earth	53			

Test	Pin	Target value	Condition	Remark
Actuation	19	Max. 2.2 A	100% position control	Switch toggle switch of e-adapter box pin 19 to Isolate
		3.2 A to 3.5 A	From 30% draft control	
		0.95 A to 3.5 A	Depending on position of lowering throttle valve	

**Note:**  
 Checking EPC e-box A005 Chapter 9000 Index E

Date	Version	Page	Capitel	Index	Docu-No.
12/1999	a	1/1	9000	E	000112

Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
Y023 - compressed-air advance control system solenoid valve

**E**



Right rear next to power lift

Y023 = **compressed-air advance control system solenoid valve**

Checking compressed-air advance control system solenoid valve:

Remove plug.

Connect adapter cable (DIY using connector G 816.900.043.020) and multimeter (ohmmeter ) to solenoid valve Y023.

Target value: 13.2 ohms +/- 5%



Connect adapter cable and multimeter (ammeter) and provide power.

Ignition "ON".

Actuate brake pedals.

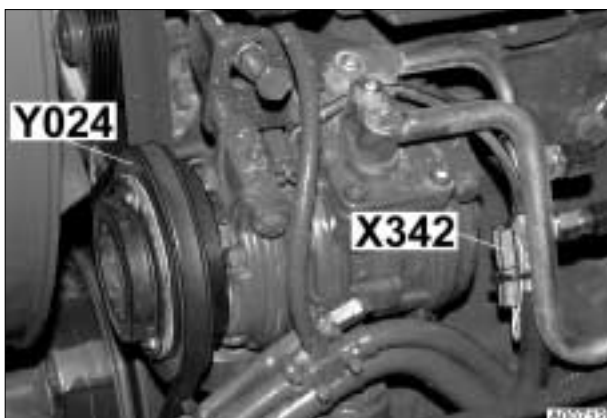
Target value: approx. 1 amp

Date	Version	Page	Capitel	Index	Docu-No.
22.2.2001	a	1/1	9000	E	000086

Farmer 400  
Fav 700  
Fav 900

Electrics / system in general  
**Y024 - air-conditioning magnetic clutch**

**E**



On left-hand side of engine:

Y024 = **air-conditioning magnetic clutch**

X342 = **cable coupler** for air-conditioning magnetic clutch



Measure resistance of solenoid of magnetic clutch Y024 using multimeter (ohmmeter).

Target value: 3.8 +/- 0.5 ohms at 20°C

Earthing point (arrowed) for magnetic clutch Y024



Measure gap between spring plate and v-belt pulley at several locations using two feeler gauges.

Target value: 0.5 +/- 0.15 mm

In event of discrepancies, correct by means of spacer rings under spring plate. Coat thread of spring plate mounting screws with synthetic bonding agent X 903.050.084 and tighten to 14 Nm.

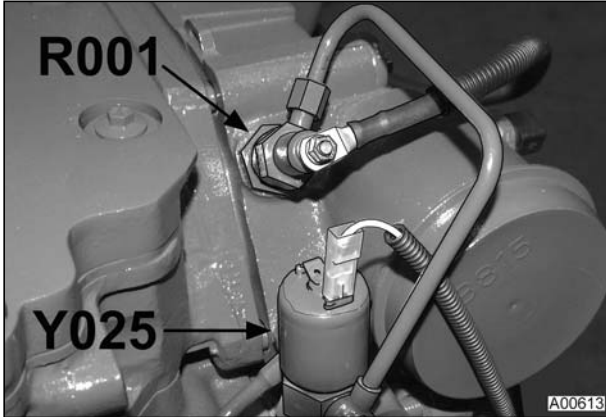
Date	Version	Page	Y024 - air-conditioning magnetic clutch	Capitel	Index	Docu-No.
21.2.2001	a	1/1		9000	E	000074

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Electrics / system in general  <b>Y025 / R001 - cold-start aid / heater plug solenoid valve</b></p>	<p><b>E</b></p>
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**Note:**

All tests were carried out on Fav 700.

Tests on Farmer 400 and Fav 900 should be carried out in same manner.



**Farmer 400, Fav 700**

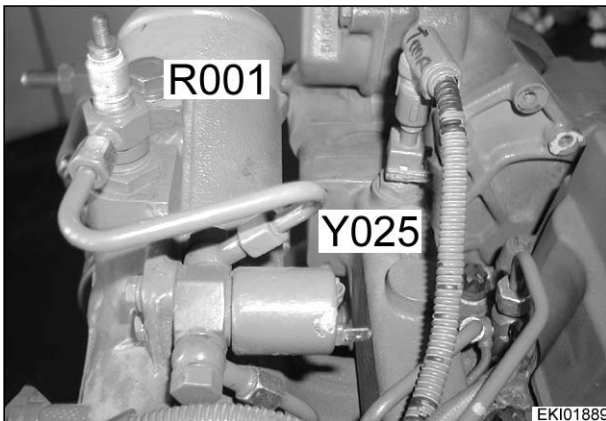
Open bonnet. At front on intake pipe

R001 = heater plug

Y025 = cold-start aid solenoid valve

**Note:**

Shown with engine removed for greater clarity.



**Fav 900 chassis number 23/3001 and up**

Open left side of bonnet. At front on intake pipe

R001 = heater plug

Y025 = cold-start aid solenoid valve

**Note:**

Shown with engine removed for greater clarity.



**Checking heater plug R001**

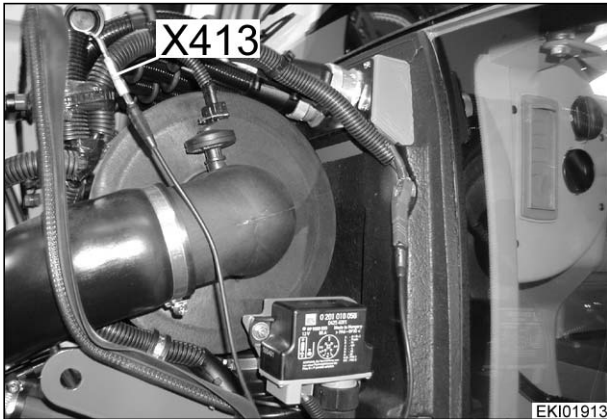
**Air temperature below 2.5°C +/- 2.5°C**  
 (minimum heater-plug temperature)

Ignition ON, heater-plug indicator must light up.

Check heater plug by touching it to see if it is warm.

Date	Version	Page	Capitel	Index	Docu-No.
20.2.2001	<b>b</b>	1/5	<b>Y025 / R001 - cold-start aid / heater plug solenoid valve</b>	<b>9000</b>	<b>E</b>
					<b>000072</b>

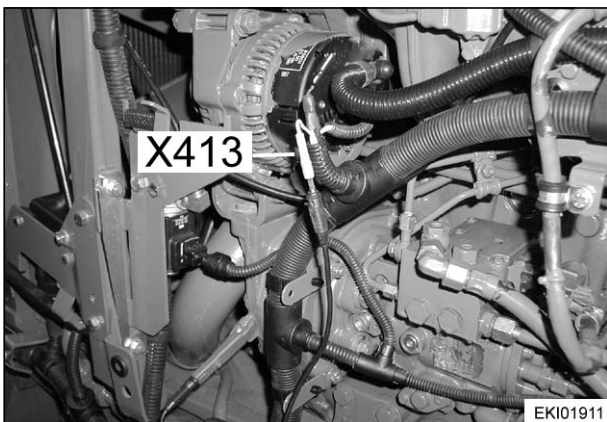
<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Electrics / system in general  <b>Y025 / R001 - cold-start aid / heater plug solenoid valve</b></p>	<p><b>E</b></p>
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**Farmer 400, Fav 700**

**Checking cold-start system at temperatures > minimum heater-plug temperature (2.5°C +/- 2.5°C)**

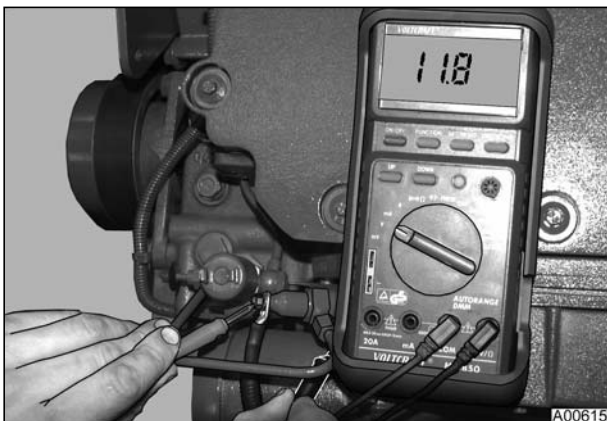
Open screw cap and connect contact X413 to vehicle earth.



**Fav 900 chassis number 23/3001 and up**

**Checking cold-start system at temperatures > minimum heater-plug temperature (2.5°C +/- 2.5°C)**

Open T-piece of cable loom and connect contact X413 to vehicle earth.

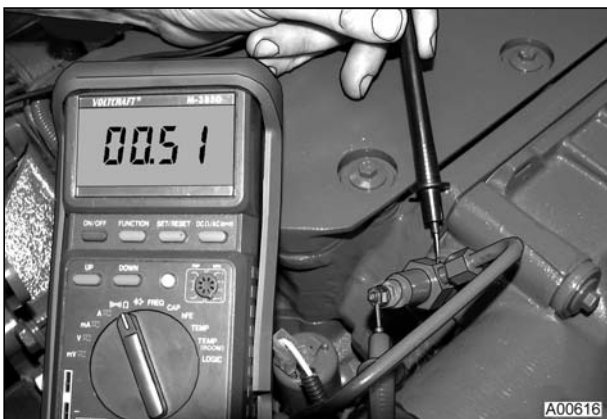


If plug does not heat up, measure voltage at electrical terminal of heater plug R001 using multimeter (voltmeter).

Ignition "ON"

Target value: at least 10.5 VDC

If voltage is below 10.5 VDC, check electrical cables according to circuit diagram.



**Checking resistance of heater plug R001**

Unscrew electrical cables from heater plug.

Measure resistance using multimeter (ohmmeter).

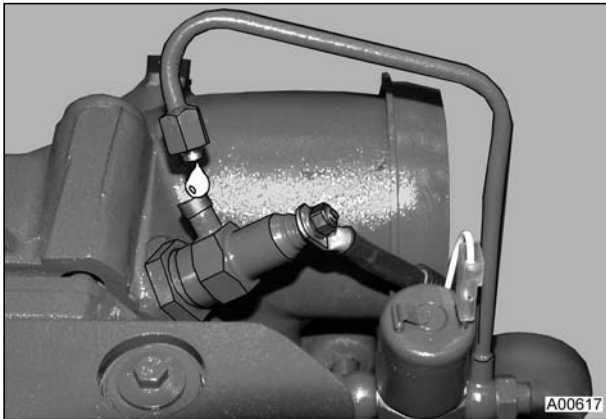
Target value: 0.5 +/- 0.1 ohm

**Note:**

**Calibrate multimeter (test internal resistance) before carrying out measurement.**

Date	Version	Page	Capitel	Index	Docu-No.
20.2.2001	<b>b</b>	2/5	<b>9000</b>	<b>E</b>	<b>000072</b>

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Electrics / system in general  <b>Y025 / R001 - cold-start aid / heater plug solenoid valve</b></p>	<p><b>E</b></p>
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If heater plug R001 is OK and voltage is present, check fuel feed.

Detach fuel line from heater plug.

**Farmer 400, Fav 700:** Remove plug from "Engine off" solenoid valve Y007.

**Fav 900 chassis number 23/3001 and up:** Remove compact plug from A020 - ECU, EDC.

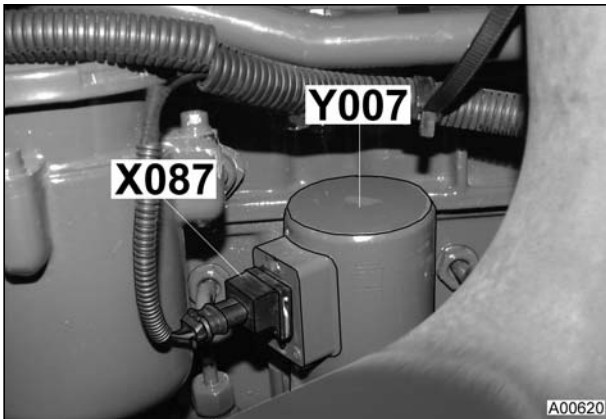
**Note:**

**Confirm EDC fault.**

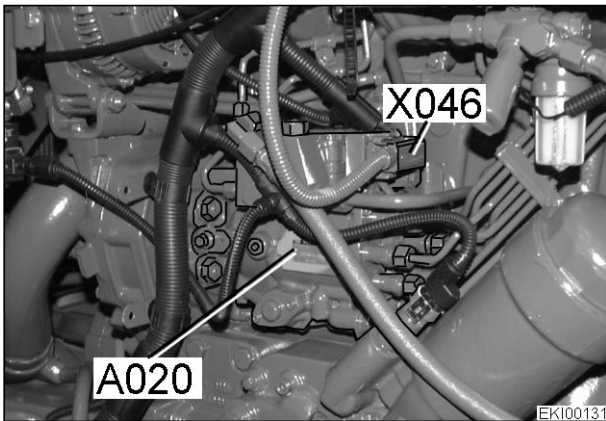
Air temperature below 2.5°C +/- 2.5°C

Operate starter motor.

Fuel must flow from line.



**Farmer 400, Fav 700:** "Engine off" solenoid valve Y007

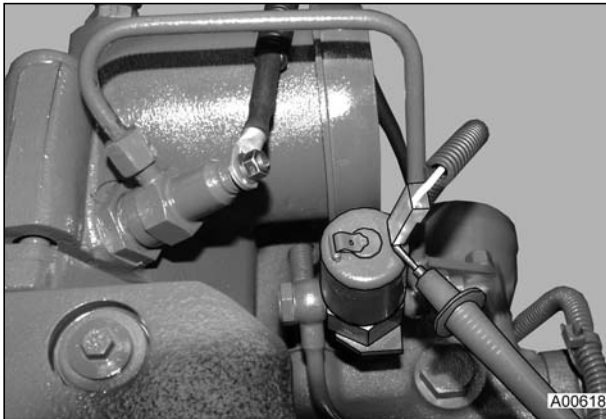


**Fav 900 chassis number 23/3001 and up:** Compact plug X046 on A020 - ECU, EDC

Date	Version	Page	Capitel	Index	Docu-No.
20.2.2001	<b>b</b>	3/5	<b>Y025 / R001 - cold-start aid / heater plug solenoid valve</b>	<b>9000</b>	<b>E</b>
				<b>E</b>	<b>000072</b>



<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Electrics / system in general  <b>Y025 / R001 - cold-start aid / heater plug solenoid valve</b></p>	<p><b>E</b></p>
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**If no fuel flows from line, check that solenoid valve Y025 is functioning.**

**Farmer 400, Fav 700:** Remove plug from "Engine off" solenoid valve Y007.

**Fav 900 chassis number 23/3001 and up:** Remove compact plug from A020 - ECU, EDC.

**Note:**  
**Confirm EDC fault.**

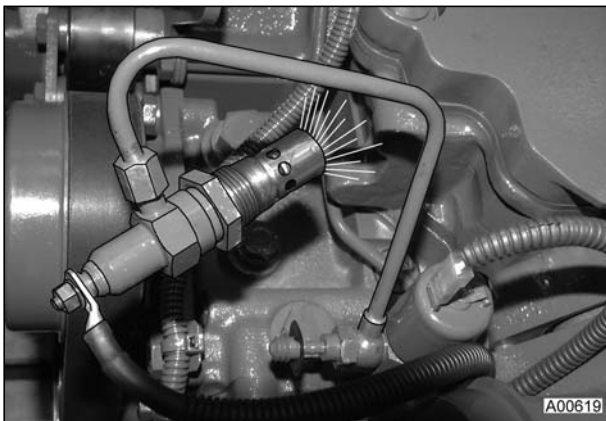
Air temperature below 2.5°C +/- 2.5°C

Operate starter motor.

Check voltage at electrical terminal of solenoid valve Y025.

Target value: approx. 12 VDC

If necessary, check electrical cables according to circuit diagram, or fit new solenoid valve Y025.



**Remove heater plug R001 for testing.**

Connect cable and fuel line.

**Farmer 400, Fav 700:** Remove plug from "Engine off" solenoid valve Y007.

**Fav 900 chassis number 23/3001 and up:** Remove compact plug from A020 - ECU, EDC.

**Note:**  
**Confirm EDC fault.**

Operate starter motor.

Blow on plug to enhance flame.

Clearly visible flame must be present.

Fit new heater plug R001 if necessary.

**Switching functions of cold-start system  
 (see electric circuit diagrams - Chapter 9000 Index C)**

**Preheating (voltage 12 VDC )**

Ignition "ON". At low temperatures heater-plug indicator lights up and shows when engine is ready to start. **At ambient temperature** (air temperature) above 2.5°C +/- 2.5°C no preheating.

**Actuation sequence**

Voltage is applied to contact 30 of cold-start aid and is transferred via 80 amp fuse to cold-start aid e-box.

Ignition ON, relay K001 closes, voltage is present at fuse F013.

There is voltage at contact G of cold-start aid. Contact H sends earth signal from cold-start aid to instrument panel for heater-plug indicator.

At cold-start aid ambient temperature of below 2.5°C +/- 2.5°C relay in cold-start aid closes. Voltage present at contacts N and P - heater plug R001 glows. Once indicator on instrument panel flashes, engine is ready to start.

Depress clutch pedal, solenoid switch S012 closes, there is voltage at relay K008 and relay closes. Voltage is transferred via fuse F028 and contact K to cold-start aid. Relay in cold-start aid closes, there is voltage at contact J of cold-start aid, solenoid valve Y025 opens, fuel flows to heater plug R001 when engine is turning over.

Date	Version	Page		Capitel	Index	Docu-No.
20.2.2001	<b>b</b>	4/5	Y025 / R001 - cold-start aid / heater plug solenoid valve	<b>9000</b>	<b>E</b>	<b>000072</b>

<p>Farmer 400 Fav 700 Fav 900</p>	<p>Electrics / system in general Y025 / R001 - cold-start aid / heater plug solenoid valve</p>	<p><b>E</b></p>
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Cold-start aid (e-box) A012



At bottom of e-box of cold-start aid A012  
X382 = terminal for contact 30



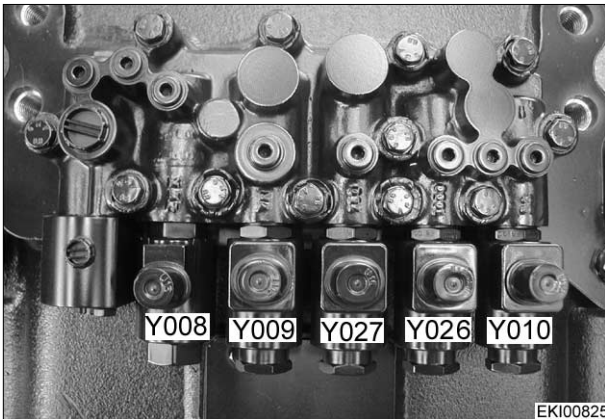
At bottom of e-box of cold-start aid A012  
FU = 80 amp fuse

**Note:**  
Shown with e-box of cold-start aid A012 removed for greater clarity.

**Note:**  
Chapter 0000 Index D - Position of components  
Chapter 9000 Index C - Electrical circuit diagrams  
Chapter 9000 Index E - A012 - ECU, cold-start aid

Date	Version	Page	Capitel	Index	Docu-No.	
20.2.2001	<b>b</b>	5/5	Y025 / R001 - cold-start aid / heater plug solenoid valve	<b>9000</b>	<b>E</b>	<b>000072</b>

<b>Fav 900</b>	<b>Electrics / General system</b> <b>Y026 / Y027 - rear PTO valve, stage 1 / stage 2</b>	<b>E</b>
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Pin	Function
1	12 volt actuation
2	Vehicle earth
Y026 (stage 1)	540 or 750 rpm
Y027 (stage 2)	1000 rpm

**Note:**

**Ignition OFF**

Connect adapter cable X 899.980.246.201 directly to Y026 / Y027 - valve.

Test	Pin	Target value	Condition	Remark
Y026				
Resistance	1	8.1 ohms		
Earth	2			
Y027				
Resistance	1	8.1 ohms		
Earth	2			

**Note:**

Connect e-adapter box X 899.980.208.100 directly to A002 - ECU, enhanced control.

Test	Pin	Target value	Condition	Remark
Y026				
Power	1	1.5 A	Ignition ON PTO ON	
Earth	2			
Y027				
Power	1	1.5 A	Ignition ON PTO ON	
Earth	2			

**Note:**

All readings +/- 10%

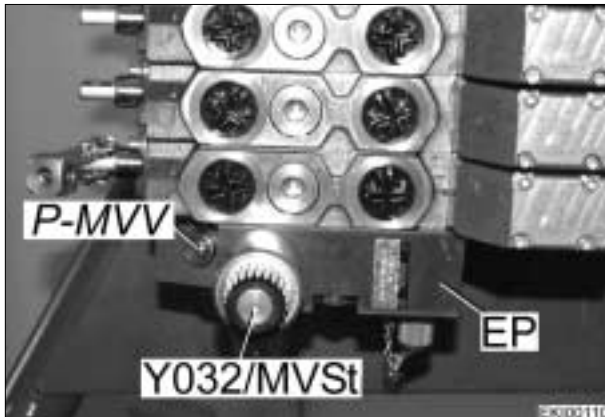
Measuring points on A002 - ECU, enhanced control	Pin
Y026	48
Y027	53
Vehicle earth	

**Note:**

Chapter 9000 Reg. E - A012 - ECU, enhanced control

Date	Version	Page	Y026 / Y027 - rear PTO valve, stage 1 / stage 2	Capitel	Index	Docu-No.
08.08.2001	a	1/1		9000	E	000146

<b>Fav 700</b> <b>Fav 900</b>	Electrics / system in general <b>Y032 - "Control pressure valve" solenoid valve</b>	<b>E</b>
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Pin	Function
1	+ supply
2	Earth

**Note:**  
Ignition "OFF".  
Measure resistance directly at solenoid valve

Test	Pin	Target value	Condition	Possible cause of fault
+ supply	1	4.6 ± 0.5 ohms		Fuse (F048) in fuse holder X051 or in wiring
Earth	2			

**Note:**  
Ignition "ON".

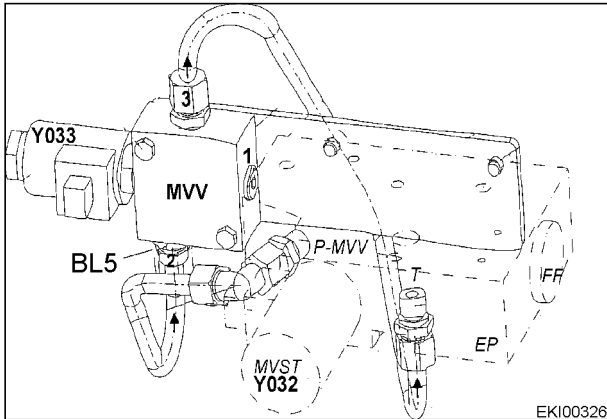
Test	Pin	Target value	Target value	Condition
+ supply	1	12 VDC	2.5 A	Engine speed > 400 rpm
Earth	2			

All readings +/- 10%

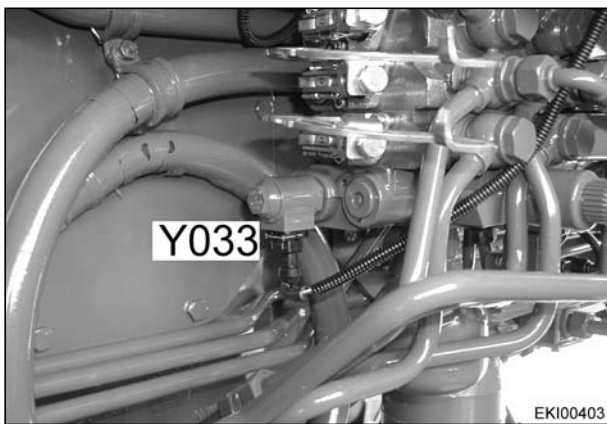
**Note:**  
Chapter 9000 Index C - Electric circuit diagram valves 1

Date	Version	Page	Capitel	Index	Docu-No.
8.1.2001	<b>b</b>	1/1	<b>9000</b>	<b>E</b>	<b>000108</b>

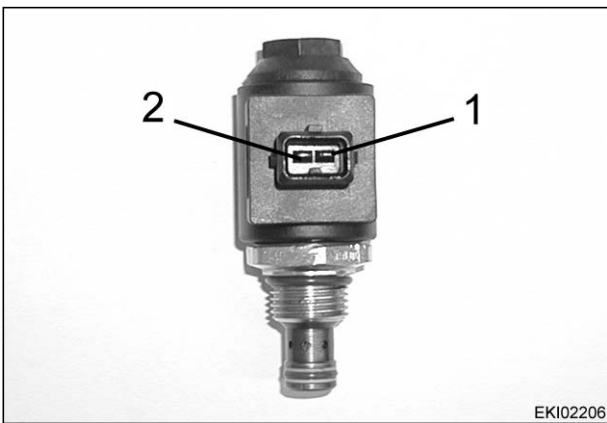
<p>Fav 700 Fav 900</p>	<p>Electrics / General system <b>Y033 - valve, flushing (oil preheater)</b></p>	<p><b>E</b></p>
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Fav 700 (external heater circuit)



Fav 700, Fav 900 chassis number 23/3001 and up (integral heater circuit)



Pin	Function
1	12 volt actuation
2	Vehicle earth

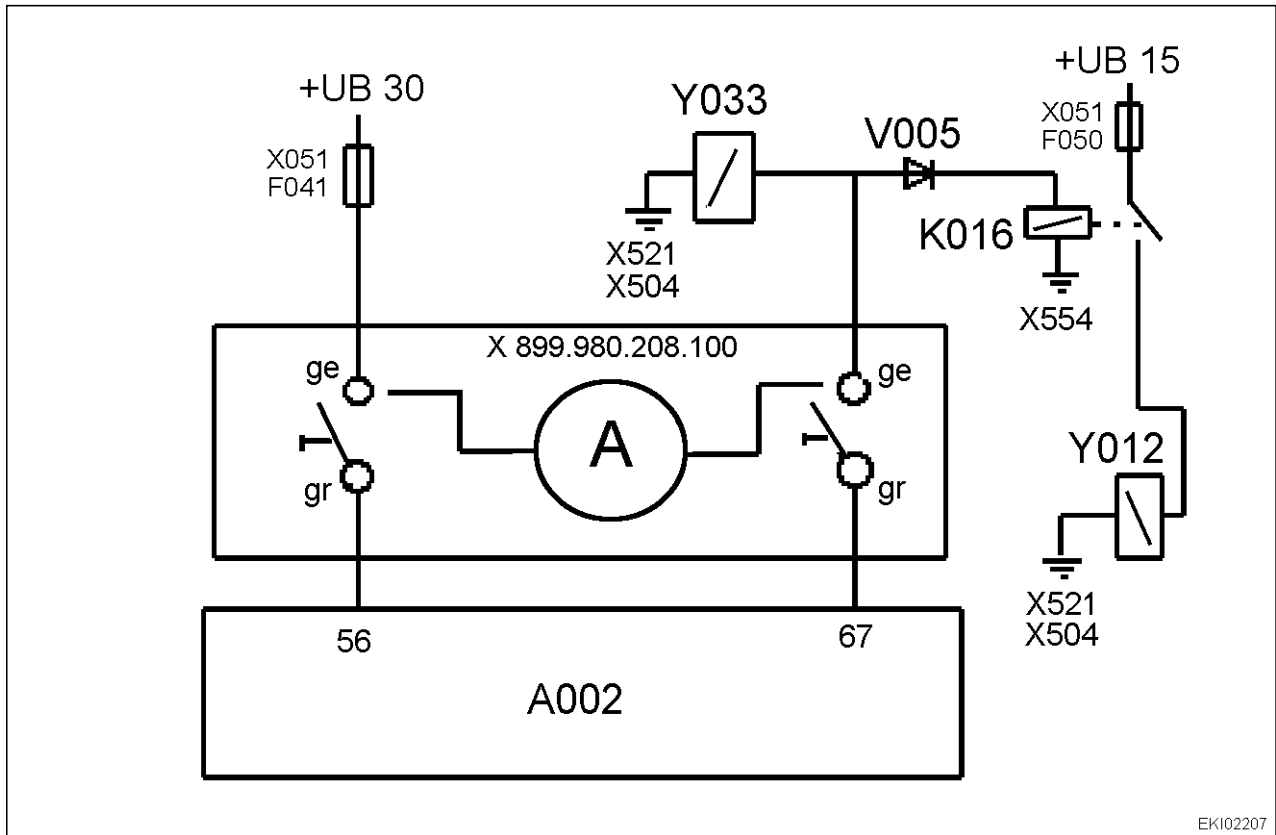
**Note:**  
Ignition "OFF".  
Connect adapter cable X 899.980.246.201 directly to Y033 - valve, flushing.

Test	Pin	Target value	Condition	Note
Signal	1	10 ohms		
Earth	2			

**Note:**  
All readings +/- 10%

<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Electrics / General system <b>Y033 - valve, flushing (oil preheater)</b></p>	<p><b>E</b></p>
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**Measuring power consumption (I)**  
**Test tips or simulating oil preheater**



EKI02207

Item	Designation	Item	Designation
A002	ECU, enhanced control	X554	Earthing point
K016	Relay		
V005	Diode, group	+ UB 30	Direct from battery positive
Y012	Valve, charging	+ UB 15	Switched positive
Y033	Valve, flushing		
X051	Fuse holder 2 compl. Fuse - F041 Fuse - F050		68-pin e-adapter box X 899.980.208.100
X504	Earthing point (Fav 700)	ge	Yellow bush
X521	Earthing point (Fav 900)	gr	Green bush

- Connect e-adapter box X 899.980.208.100 directly to A002 ECU, enhanced controls.
- Isolate toggle switch pin 56 at e-adapter box.
- Isolate toggle switch pin 67 at e-adapter box.
- **Connect ammeter (A) between yellow bush of pin 67 and yellow bush of pin 56 (to measure power consumption).**

<b>Fav 700</b> <b>Fav 900</b>	<b>Electrics / General system</b> <b>Y033 - valve, flushing (oil preheater)</b>	<b>E</b>
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Test	Pin	Target value	Condition	Possible cause of fault
Power	56	Approx. 1.4 A	K016 - relay plugged in	G001 - battery discharged Fault in K016 - relay
	67			Fault in V005 - diode

**Note:**

All readings +/- 10%

**Other test option**

Provide external power supply to Y033 - valve, flushing (as described above).

Start tractor.

**Oil preheater is switched on (audible sound of hydraulics).****Note:**Oil preheater is not indicated on A008 - terminal.**Note:**

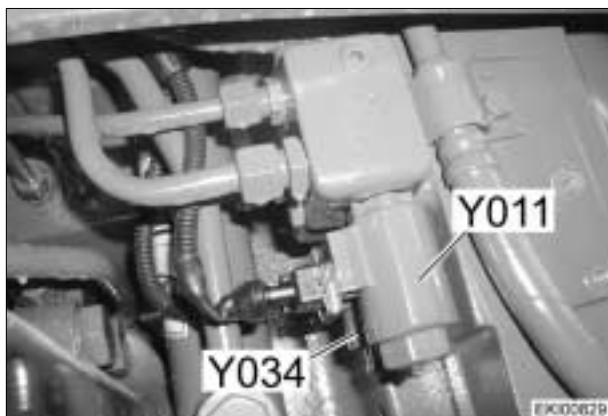
Chapter 9000 Index C - Electrical circuit diagrams

Chapter 9000 Index E - Y012 - "Charge" suspension solenoid valve

Chapter 9690 Index E - Hydraulic oil preheater

Date	Version	Page	Capitel	Index	Docu-No.	
29.08.2001	<b>a</b>	3/3	<b>Y033 - valve, flushing (oil preheater)</b>	<b>9000</b>	<b>E</b>	<b>000151</b>

<b>Fav 900</b>	<b>Electrics / General system</b> <b>Y034 - valve, release brake (front PTO)</b>	<b>E</b>
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Pin	Function
1	12 volt actuation
2	Vehicle earth

**Note:****Resistance (R)**

Ignition OFF

Connect adapter cable X 899.980.246.201 directly to Y034 - valve.

**Current (I)**

Connect e-adapter box X 899.980.208.100 directly to A002 - ECU, enhanced control.

Ignition ON

Valve	Position	U [VDC]	I [ADC]	R [Ohm]
Y034 - valve Release brake, front PTO	ON / OFF	0 / UB	1.5	8.1

**Note:**

All readings +/- 10%

UB = battery voltage = 12 VDC - 14 VDC

Measuring points on A002 - ECU, enhanced control	Pin
Y034	68
Vehicle earth	

**Note:**

Chapter 9000 Reg. E - A012 - ECU, enhanced control

Date	Version	Page	Capitel	Index	Docu-No.
24.08.2001	a	1/1	9000	E	000150



<b>Fav 900</b>	<b>Electrics / Fuses</b> <b>Fuse assignment - fuse holders A013, X050 and X051</b>	<b>C</b>
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**⚠ Danger:**  
**Use only genuine fuses! Electrical system will be destroyed if fuses with too high ratings are used. Beware of fire risk!**

**Fuse holder X050**

Nr.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
PIN		30	30	30	30	30	30	30	30	30	30	30	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	50	15
Wert(A)		25	40	5	10	25	15	10	15	15	25		10	25	15	5	40	15	10	10	15	10	15	10	15	10	10	40	25
Verbraucher																													
916.901.040.131		WART388																											

Fuse no.	Pin	Rating (A)	Consumer
1	-	-	-
2	30	25	Heater plug starter switch position ON
3	30	40	LBS implement socket
4	30	5	EPC relay Ub
5	30	5	LBS implement socket CAN-bus terminal
6	30	15	Hazard warning lights pushbutton
7	30	15	Headlights pushbutton
8	30	10	Radio, cab lighting
9	30	15	Relay no. 56a (headlights)
10	30	15	Relay no. 56b (dipped headlights)
11	30	25	Socket 25 A
12	30	-	-
13	15	10	Cold-start aid
14	15	25	Heater control
15	15	15	Hazard warning lights pushbutton
16	15	5	Headlights pushbutton
17	15	25	Fan switch
18	15	15	Front wipers pulse generator
19	15	10	Starter inhibitor switch, emergency control relay
20	15	10	Control stalk (multifunction control stalk)
21	15	15	Driver's seat
22	15	10	Exhaust brake
23	15	15	Brake relay
24	15	10	3rd hydraulic circuit relay
25	15	15	Heated rear window, heated mirror
26	15	10	Socket 10 A
27	15	10	LBS implement socket
28	50	40	Heater plug starter switch position Start
29	15	25	not allocated

Date	Version	Page	Fuse assignment - fuse holders A013, X050 and X051	Capitel	Index	Docu-No.
11.12.2000	a	1/3		9040	C	000003

<b>Fav 900</b>	<b>Electrics / Fuses</b>	<b>C</b>
<b>Fuse assignment - fuse holders A013, X050 and X051</b>		

**Fuse holder X051**

Nr.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
PIN		58	58	58	58	58	58	58	30E	30E	30E	30E	30E	15E	15E	15E	15E	15E	15E	15/58	15/58	54	R	15E	58L	L	58R	30	
Wert(A)		5	25	25	15	25	5	5	10	5	40	10	15	5	5	5	5	15	5	15	10	10	10	5	10	10	10	40	
Verbraucher		Kombi																											

WART320

Fuse no.	Pin	Rating (A)	Consumer
31	-	-	-
32	58	5	Instrument panel
33	58	25	Front working lights switch
34	58	15	Front working lights switch
35	58	15	Rear working lights switch
36	58	25	Rear working lights switch
37	58	5	Right rear tail light, right sidelight
38	58	5	Left rear tail light, left sidelight
39	30E	10	Terminal, communications box load circuit
40	30E	5	Instrument panel
41	30E	40	Enhanced control ECU, fuse board A
42	30E	10	Control console, fuse board B
43	30E	15	Actuator unit control
44	15E	5	Control console
45	15E	5	Enhanced control ECU
46	15E	5	Vario terminal
47	15E	5	Joystick
48	15E	15	EPC, radar sensor, spool valves, EPC/DA
49	15E	5	Instrument panel
50	15/58	15	Heater valves
51	15/58	10	Implement socket, communications box load circuit
52	54	10	Trailer socket
53	R	10	Front socket on front power lift, trailer socket
54	15E	5	Test connection
55	58L	10	Front socket on front power lift, trailer socket
56	L	10	Front socket on front power lift, trailer socket
57	58R	10	Trailer socket
58	30	40	EDC control unit
59	-	-	-

<b>Fav 900</b>	<b>Electrics / Fuses</b>	<b>C</b>
<b>Fuse assignment - fuse holders A013, X050 and X051</b>		

**Fuse holder A013**

Sicherung	Trennstelle	Komponente	Trennst. Komp.
01	X200/18		
02	X200/16	Hallgeber Motor2	X160
03	X200/15	Hochdrucksensor	X157
04	X200/14	Hallgeber Motor1	X159
05	X200/10	Fahrschalter Geotr.sl.	X032
06	X200/11	Fahrschalter el. Ventile	X032
07	X200/12	Drehzahlsensor Kegeleinzel	X164
08	X200/09	Drehwinkelsensor Kupplungspedal	X166
09	X201/14		
10	X201/12		
11	X201/11	Drehwinkelsensor Lage Fronkraftheber	X188
12	X201/10		
13	X200/07	Drehwinkelsensor Fahrbereichsenken.	X165
14	X200/08		
15	X200/04	Fahrschalter Bedienkonsole	X032
16	X200/05	Drehzahlsensor Hydrostatl Sum.welle	X163
17	X200/06	Drehwinkelsensor Fussgas	X176
18	X201/04	Drehwinkelsensor Federung	X152
19	X201/05		
20	X201/06		
21	X201/07	Lenkwinkelsensor	X404 X403
22	X201/08	Hallgeber Zapfw. vo.	X151
23	X201/09	Temp. Geber Getriebe	X406
24	X201/18		
25	X201/16	Motor öldruck- und Druckluftgeber	X161 X168
26	X201/15	Drehwinkelsensor Handgas	X183
27	X202/07		
28	X202/06		
29	X202/05	Fahrschalter E-Gas	X032
30	X202/04		
31	X202/08		
32	X202/09	Hallgeber Zapfw. hi.	X169
33	X202/10	Hallgeber Zapfw. hi. n. Kuppl.	X170

716.902.040.021

WART387

Fuse	Con- nector	Components	Comp. conn.
01	X200/18	-	
02	X200/16	Engine Hall-effect sensor 2	X160
03	X200/15	High-pressure sensor	X157
04	X200/14	Engine Hall-effect sensor 1	X159
05	X200/10	Transmission control unit, joystick	X032
06	X200/11	-	-
07	X200/12	Bevel pinion speed sensor	X164
08	X200/09	Clutch pedal position sensor	X166
09	X201/14		
10	X201/12		X032
11	X201/11		
12	X201/10	Spool valves, joystick	X032
13	X200/07	Range sensor position sensor	X165
14	X200/08		
15	X200/04	-	-
16	X200/05	Speed sensor for hydrostatic accumulator shaft	X163
17	X200/06	Accelerator position sensor	X176
18	X201/04	Suspension position sensor	X152
19	X201/05		
20	X201/06		
21	X201/07	Steering angle sensor	X403 X404
22	X201/08	Front PTO Hall-effect sensor	X151
23	X201/09	Transmission temperature sensor	X158
24	X201/18		
25	X201/16	Engine oil pressure and compressed-air sensor	X161 X168
26	X201/15	Hand throttle position sensor	X183
27	X202/07		
28	X202/06	-	-
29	X202/05	Electronic accelerator, joystick	X032
30	X202/04	-	-
31	X202/08	-	-
32	X202/09	Rear PTO Hall-effect sensor	X169
33	X202/10	Rear PTO Hall-effect sensor after clutch	X170

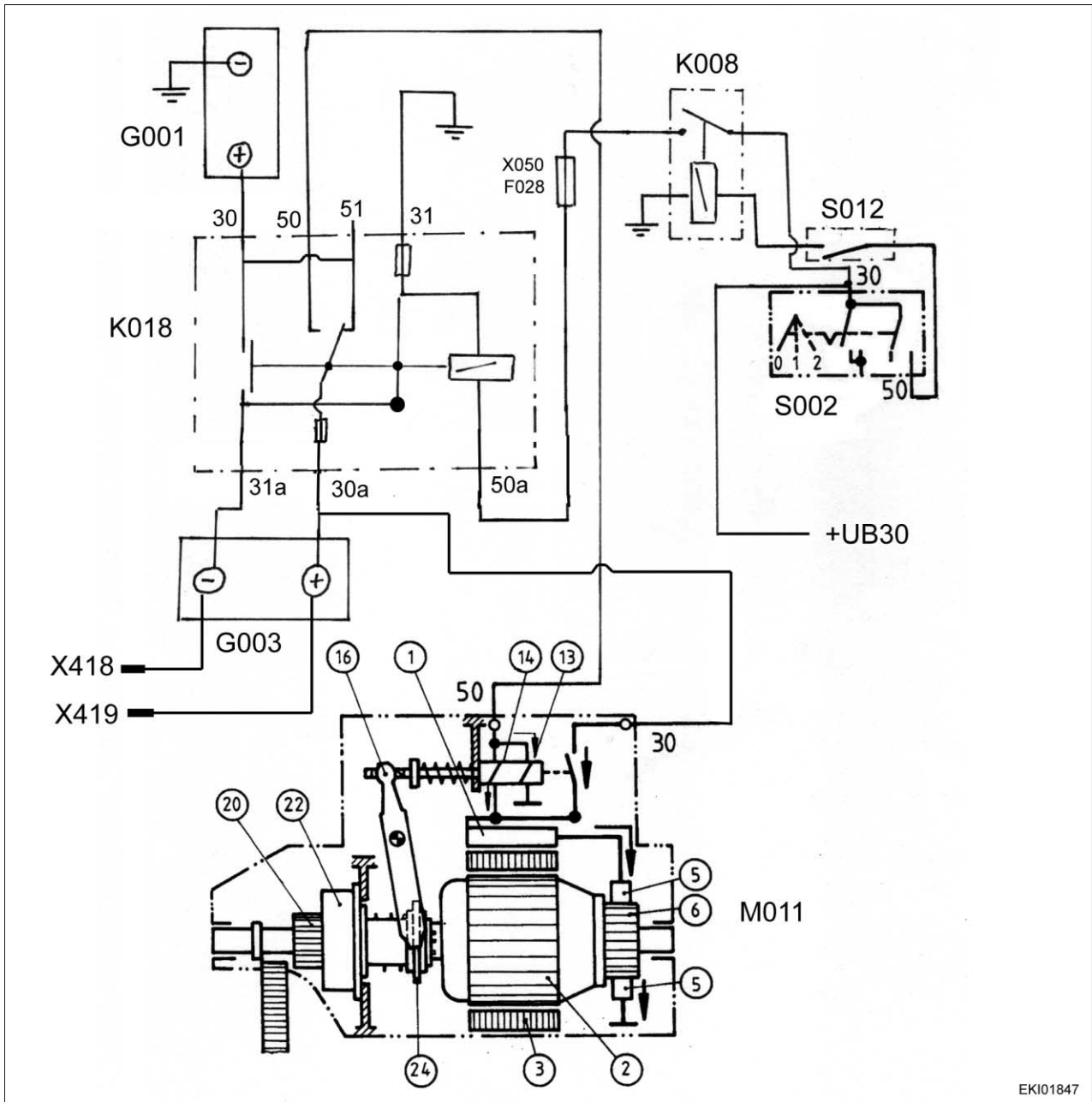
Date	Version	Page	Capitel	Index	Docu-No.
11.12.2000	a	3/3	<b>9040</b>	<b>C</b>	<b>000003</b>

Fav 900

Electrics / Starter motor system  
 Troubleshooting table for M011 - starter, 24 V starter motor

**B**

Plan of 24 V starter motor system



EKI01847

Item	Designation	Item	Designation
1	Exciter winding	G001	Battery 1
2	Rotor	G003	Battery 2
3	Pole shoe	K008	Relay, starter inhibitor
5	Carbon brushes	K018	Relay, battery switchover
6	Commutator	M011	24 V starter motor
13	Holding winding	S002	Switch, ignition
14	Pull-in winding	S012	Switch, starter inhibitor
16	Engaging lever	X050	Fuse holder 1
20	Pinion	X418	External start terminal -
22	Roller freewheel	X419	External start terminal +
24	Guide ring	+UB30	Supply for S002 - switch (12 - 14 VDC)

Date	Version	Page	Capitel	Index	Docu-No.	
07.08.2001	a	1/3	Troubleshooting table for M011 - starter, 24 V starter motor	9060	B	000001

<b>Fav 900</b>	<b>Electrics / Starter motor system</b> <b>Troubleshooting table for M011 - starter, 24 V starter motor</b>	<b>B</b>
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**Note:**

Supply +UB30 for S002 - switch, ignition see  
Chapter 9000 Reg. C - Electric circuit diagrams (power supply +UB)

**Note:**

Chapter 9000 Reg. A - Terminal designation to DIN 72 552

<b>Fault: when switching on, starter shaft does not rotate or rotates too slowly</b>	
<b>Cause</b>	<b>Remedy</b>
F028 fuse in X050 defective	Change fuse (40 amps)
G001, G003 - battery discharging	Charge battery
G001, G003 - battery defective	Test with battery tester, fit new battery if necessary
Battery cable clamps are loose, oxidised, poor earth connection.	Tighten cable clamps, clean terminal head cable clamps and grease with acid-proof grease.
Starter terminals or brushes have short-circuit to earth.	Eliminate short-circuit to earth.
Starter carbon brushes are not in contact with commutator, are jammed in their guideways, are worn, broken, oil-covered or soiled.	Inspect, clean or fit new carbon brushes; if necessary, clean guideways in brush holders.
S002 - switch, S012 - switch, K008 - relay, K018 - relay damaged. (Components loose so switch or relay does not switch on, burned-out)	Check switch, relay; fit new one, if necessary.
Relay of M011 - starter damaged	Have starter repaired in specialist workshop.
Voltage drop in cables excessive, cables damaged, cable connections loose. Terminals and plug-and-socket connections oxidised.	Inspect starter cables and their connections.

<b>Fault: rotor rotates, but pinion does not engage</b>	
<b>Cause</b>	<b>Remedy</b>
Pinion bearing clogged	Clean bearing point and lightly oil.
Mechanical damage to pinion or gearwheel, burrs	File burrs down; if necessary, fit new pinion and gearwheel.

<b>Fault: when switching on, starter rotor rotates, pinion engages properly, but engine does not turn over</b>	
<b>Cause</b>	<b>Remedy</b>
G001, G003 - battery insufficiently charged	Charge G001, G003 - battery
Inadequate carbon brush pressure	Inspect, clean or fit new carbon brushes.
Starter relay or K018 - relay defective	Check relay for continuity.
Excessive voltage drop in cables	Inspect cables and their connections.
Freewheeling clutch slipping	Have freewheeling clutch repaired in specialist workshop.

Date	Version	Page	Capitel	Index	Docu-No.
07.08.2001	a	2/3	Troubleshooting table for M011 - starter, 24 V starter motor <b>9060</b>	<b>B</b>	<b>000001</b>

<i>Fav 900</i>	Electrics / Starter motor system Troubleshooting table for M011 - starter, 24 V starter motor	<b>B</b>
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<b>M011 - starter runs on after S002 - switch has been released</b>	
Cause	Remedy
S012 - switch does not switch off or starter relay or K008 - relay or K018 - relay does not disconnect	Switch engine off immediately, check relay

<b>Fault: pinion does not disengage once engine starts</b>	
Cause	Remedy
Return spring stretched or broken	Have M011 - starter repaired in specialist work-shop.

**⚠ Caution:**  
 If M011 - starter is removed, disconnect earth cables from G001 and G003 - batteries.

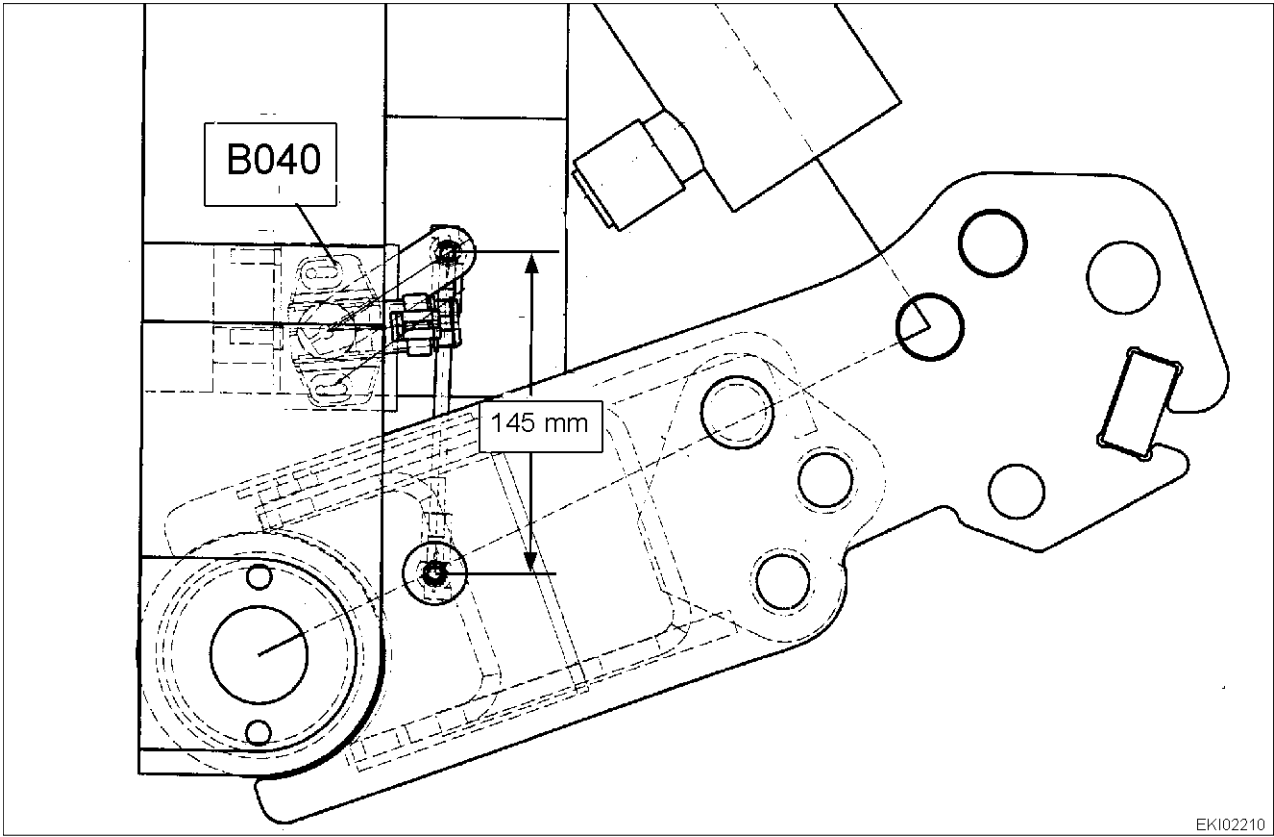
**Note:**  
 Chapter 9000 Reg. E - Measuring and testing electrical components



- Using jump leads, connect external start terminal + (X419) to positive terminal of battery which is delivering power (12 - 14 VDC).
- First connect jump lead to negative terminal of battery providing power (12 - 14 VDC), then to external start terminal (X418).

Date	Version	Page		Capitel	Index	Docu-No.
07.08.2001	a	3/3	Troubleshooting table for M011 - starter, 24 V starter motor	9060	B	000001

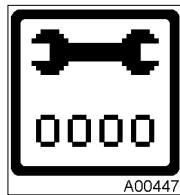
Fav 900	Front power lift / Enhanced-control power lift <b>B040 - sensor, front power lift position</b>	<b>F</b>
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**Replacing B040 - sensor, front power lift position:**

- Fully lower front power lift.
- Unscrew guard and disconnect connector X188.
- Replace B040 - sensor, front power lift position.

**Note:**  
Can only be mounted in one position. Set linkage to distance of 145 mm (see drawing).



Calibrate B040 - sensor, front power lift position.  
Calibration - enhanced-control power lift,  
code 9002

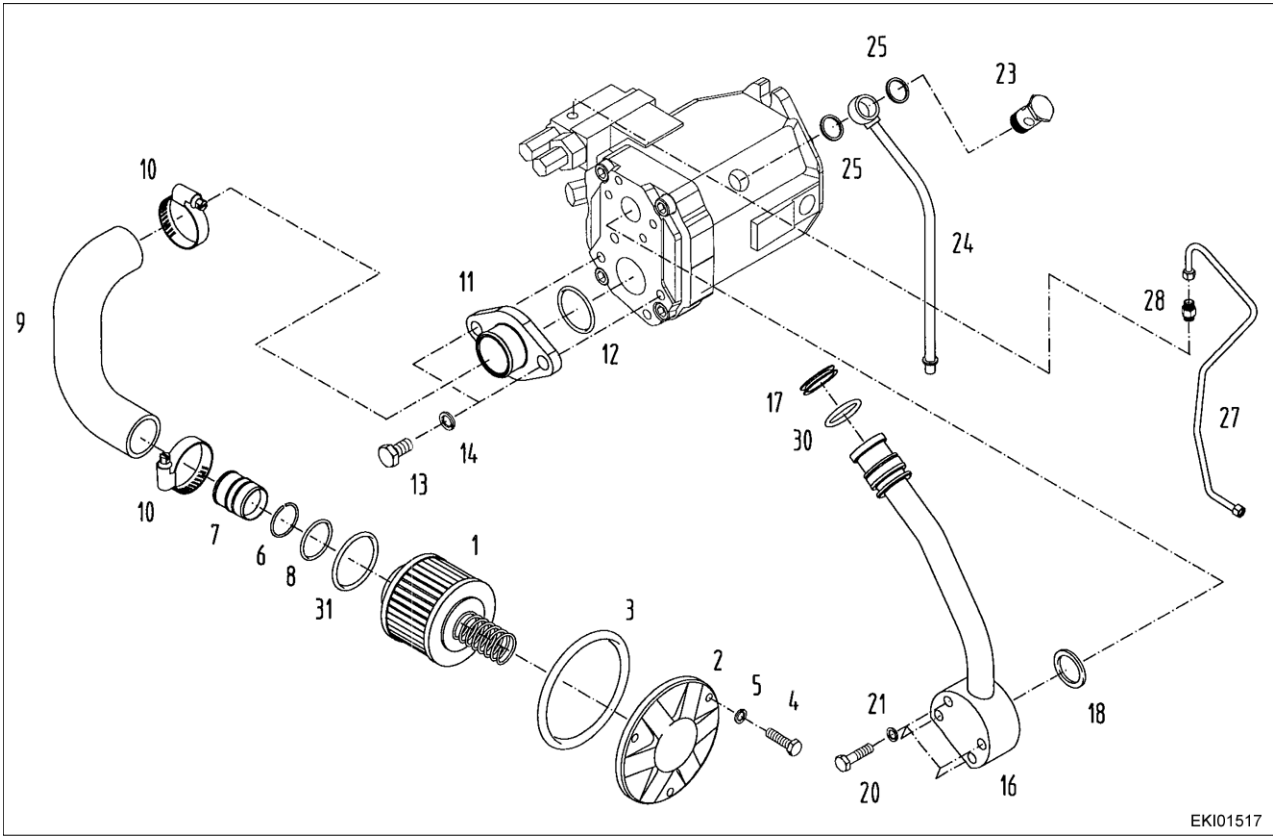
**Note:**  
For details of calibration procedure, see  
Chapter 0000 Reg. F.

Date 30.08.2001	Version a	Page 1/1	B040 - sensor, front power lift position	Capitel 9260	Index F	Docu-No. 000001

**Fav 900**

**Hydraulic pump assembly / LS pump  
Installation and removal of LS pump**

**G**



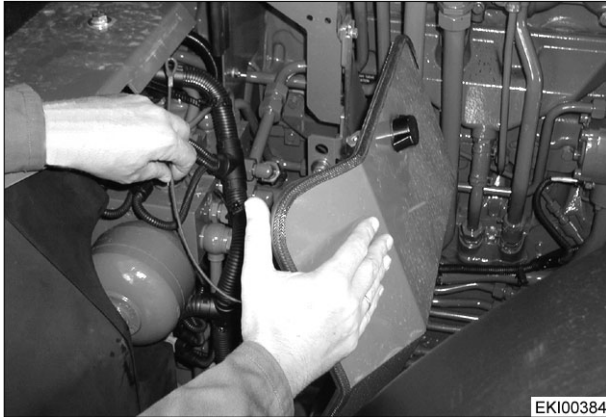
Item	Designation	Item	Designation
1	Intake filter	14	Spring washer
2	Cover	16	Pressure pipe
3	O-ring	17	V-section sealing ring
4	Hexagon screw	18	Sealing ring
5	Spring washer	20	Hexagon screw
6	Snap ring	21	Spring washer
7	Intake socket	23	Hollow-core screw
8	O-ring	24	Oil leakage line
9	Hose bend	25	Sealing ring
10	Hose clip	27	Control line
11	Intake flange	28	GE socket
12	O-ring	30	O-ring
13	Hexagon screw	31	O-ring



<b>Fav 900</b>	<b>Hydraulic pump assembly / LS pump Installation and removal of LS pump</b>	<b>G</b>
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**Preliminary work:**

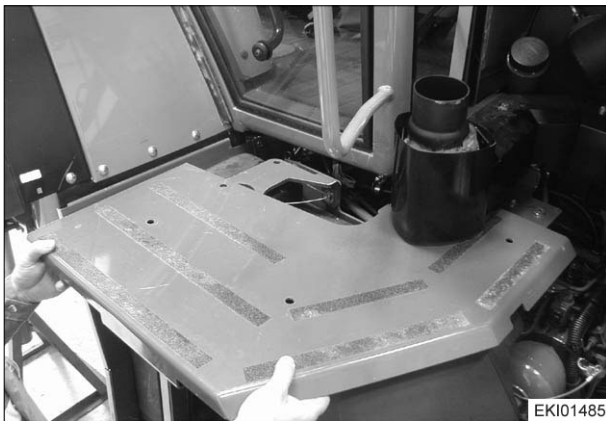
- Lower rear power lift.
- Prop tractor, taking appropriate safety precautions, and remove right rear wheel.
- Lower rear power lift.
- Remove panels on right side.



EKI00384

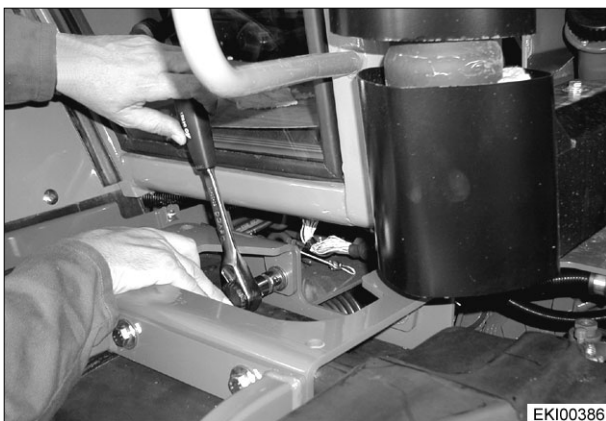
**Removing LS pump**

Remove front panel.  
Remove right engine cover.



EKI01485

Remove footplate.



EKI00386

Remove right step.

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**Fav 900**

**Hydraulic pump assembly / LS pump  
Installation and removal of LS pump**

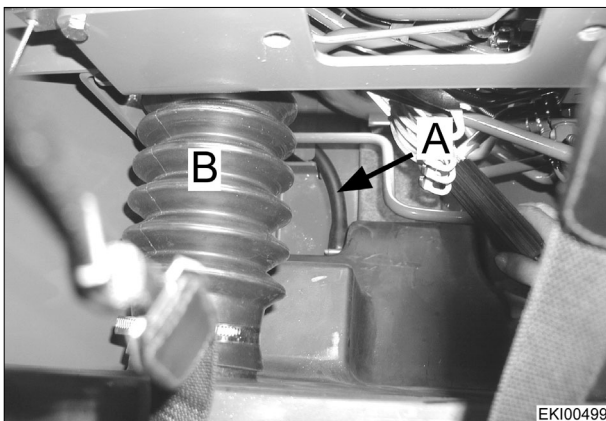
**G**



Withdraw auxiliary tank on right as far as retaining cable.

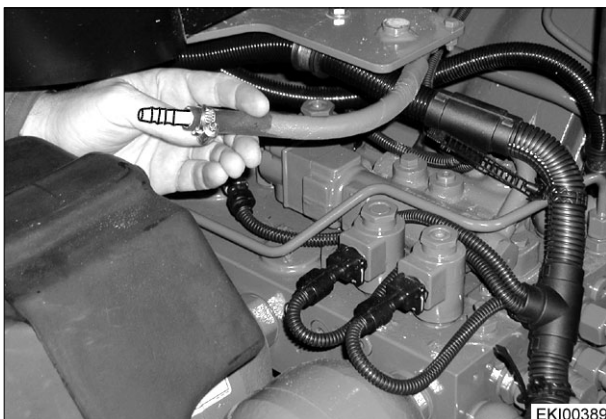


Cap fuel hose at bottom using hose clamp.  
Pump fuel out of auxiliary tank.



Release both hose clips.  
Withdraw connecting hoses A and B.  
Remove retaining cable.

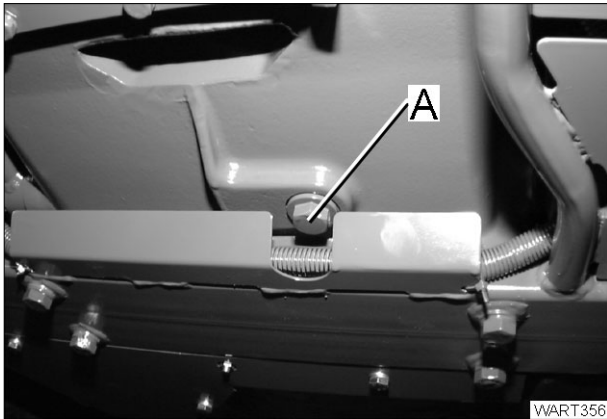
**Note:**  
Pump fuel off as far as level of upper connecting pipe B.



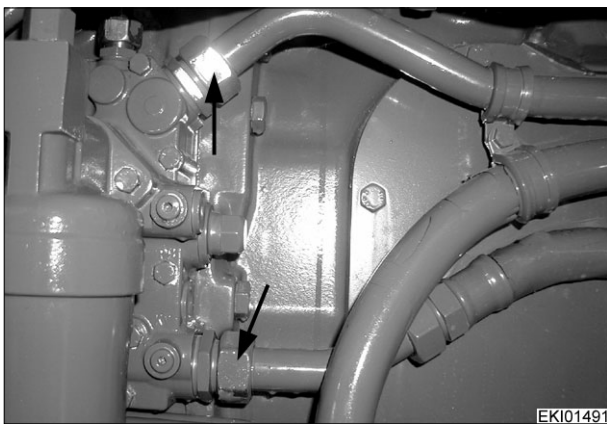
Withdraw venting tube from fuel tank.  
Remove auxiliary tank.

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<p><b>Fav 900</b></p>	<p><b>Hydraulic pump assembly / LS pump Installation and removal of LS pump</b></p>	<p><b>G</b></p>
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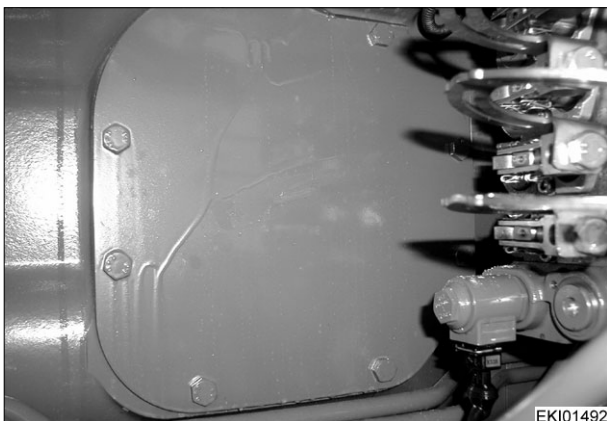
Drain hydraulic oil. Volume approx. 70 l.



Disconnect both hydraulic lines (arrowed).



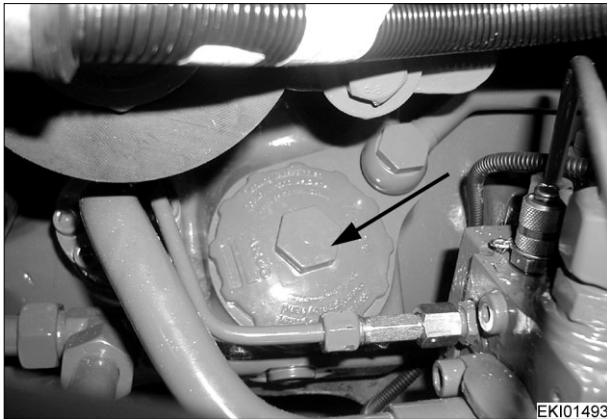
Disconnect hydraulic lines at connector (arrowed).  
Remove both hydraulic lines.



Remove hatch cover.

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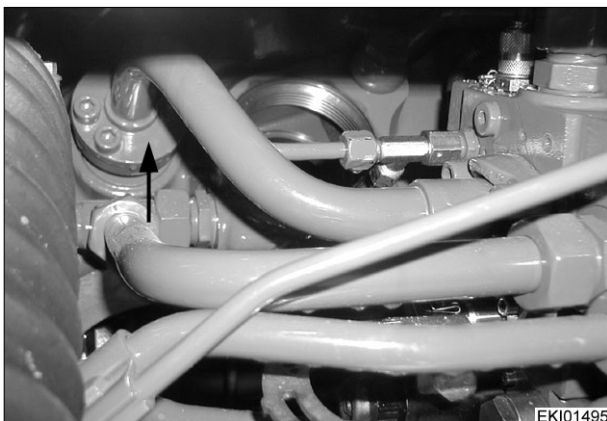
<p><b>Fav 900</b></p>	<p align="center"><b>Hydraulic pump assembly / LS pump Installation and removal of LS pump</b></p>	<p align="center"><b>G</b></p>
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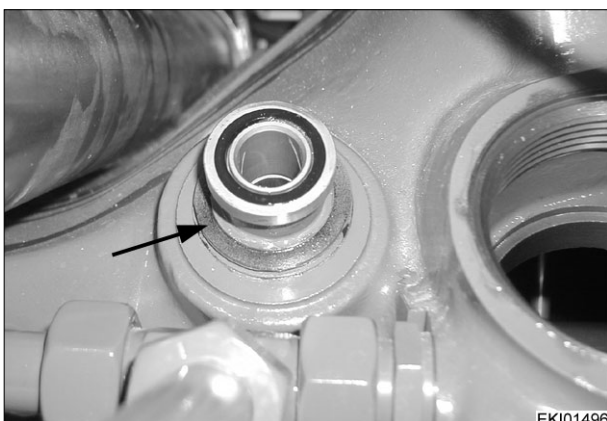
Remove cover (arrowed) from return-flow filter and remove entire filter unit.



Release hose clip (arrowed).  
Remove intake pipe.  
Withdraw intake socket with pipe bend from intake filter.



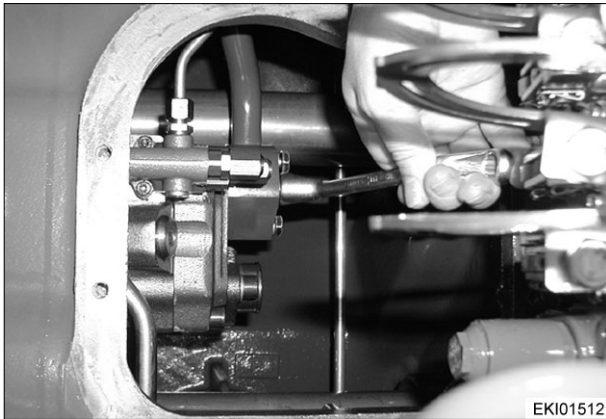
Remove LS pump - central control block (ZSB) pressure pipe.



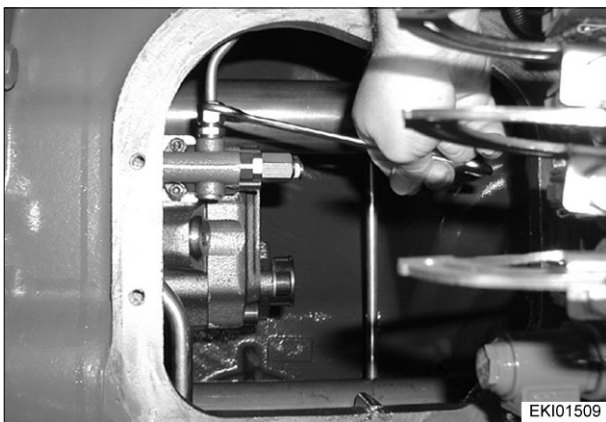
Remove V-section sealing ring (17) (arrowed) from pressure pipe.

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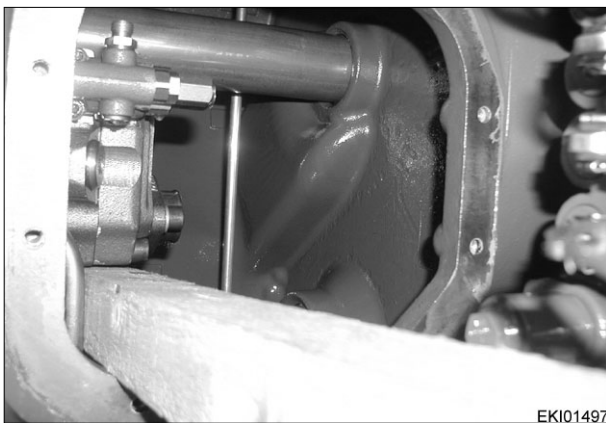
<b>Fav 900</b>	<b>Hydraulic pump assembly / LS pump Installation and removal of LS pump</b>	<b>G</b>
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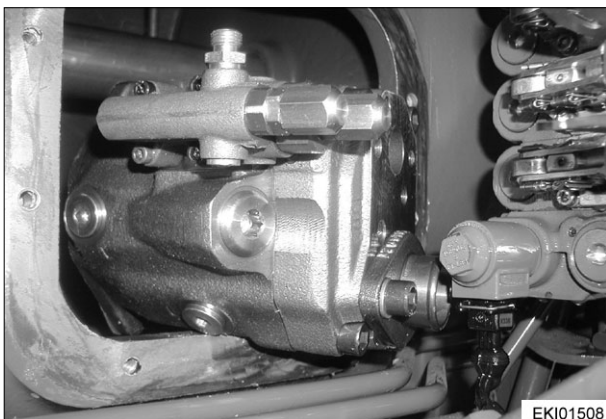
Remove 4 M10 hexagon screws (20) from pressure pipe (16), pull pressure pipe inwards out of housing.



Remove control line (27) (load-sensing system).



Remove 2 M12 hexagon screws from LS pump retaining flange.  
Support LS pump with timber prop through hatch and withdraw pump out of gearing.  
Withdraw pump through hatch.

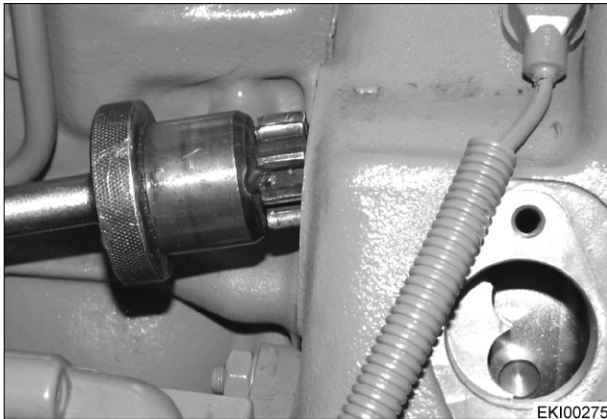


**Installing LS pump**

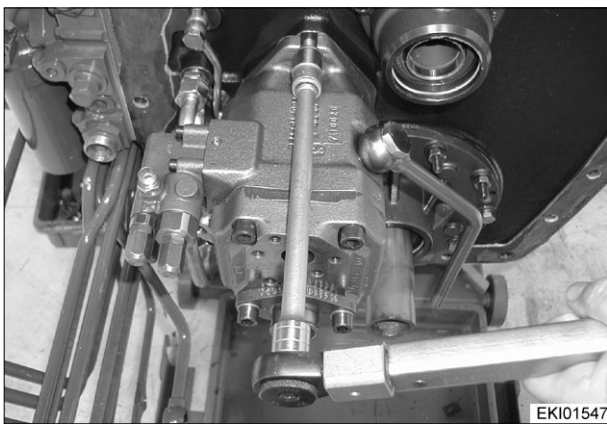
Screw in two M12 guide pins (fitting aid).  
Fit new gasket.  
Insert LS pump through hatch and locate on guide pins.

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28.05.2001	a	6/11		<b>9410</b>	<b>G</b>	<b>000001</b>

<p><b>Fav 900</b></p>	<p align="center"><b>Hydraulic pump assembly / LS pump Installation and removal of LS pump</b></p>	<p align="center"><b>G</b></p>
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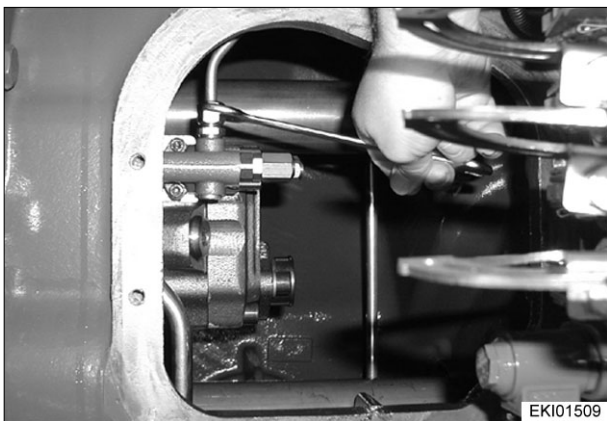
**Note:**  
If drive gearing of LS pump does not engage, turn engine using cranking device X 899.980.220.000.



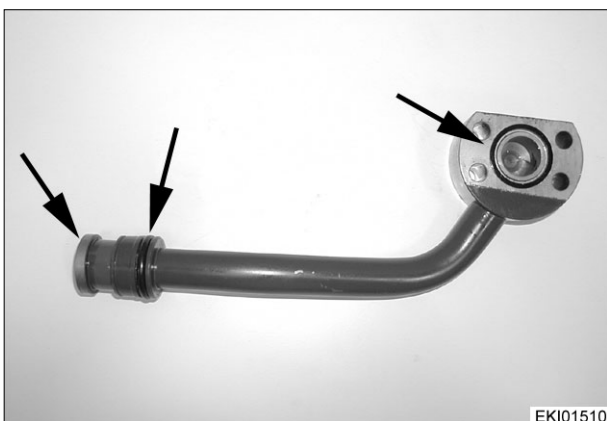
Unscrew guide pins and fit LS pump using M12 hexagon screws.

Tighten M12 hexagon screws to **86 Nm** .

**Note:**  
**Shown with tractor disconnected for greater clarity.**



Fit control line (27) (load-sensing system).

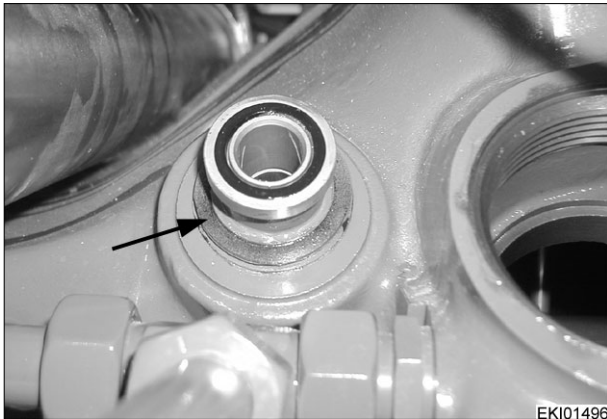


Fit new sealing rings to pressure pipe (16) and grease.

Fit pressure pipe (16) and tighten M10 hexagon screws (20) to **50 Nm** .

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<p><b>Fav 900</b></p>	<p>Hydraulic pump assembly / LS pump  <b>Installation and removal of LS pump</b></p>	<p><b>G</b></p>
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Fit V-section sealing ring (17) (arrowed) to pressure pipe (16).

EKI01496

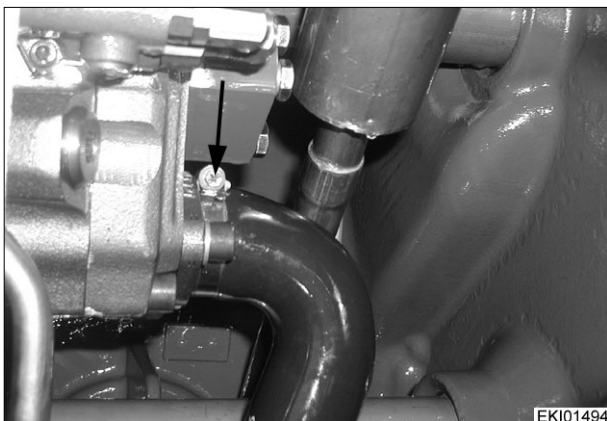


Pre-assemble hose bend (9) and intake socket (7).

Clip snap ring (6) in place.

**Note:**  
**Insert new O-ring in intake filter housing and grease.**

EKI01511



Fit pre-assembled intake pipe.

**Note:**  
**Slide intake socket (7) on until snap ring (6) engages.**

EKI01494



Fit filter housing with new O-ring.

EKI01514

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**Fav 900**

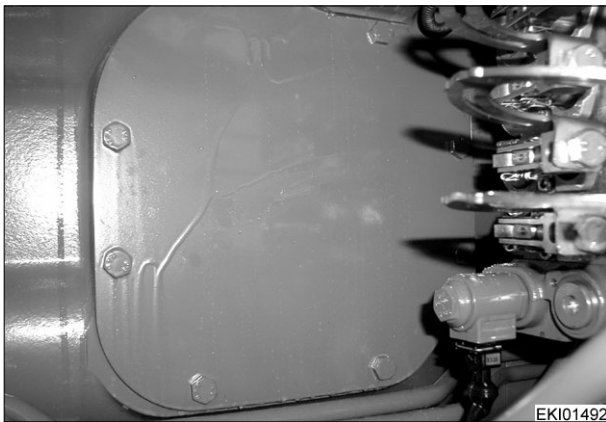
**Hydraulic pump assembly / LS pump  
Installation and removal of LS pump**

**G**



EKI01515

Fit new filter element and hand-tighten filter cover.



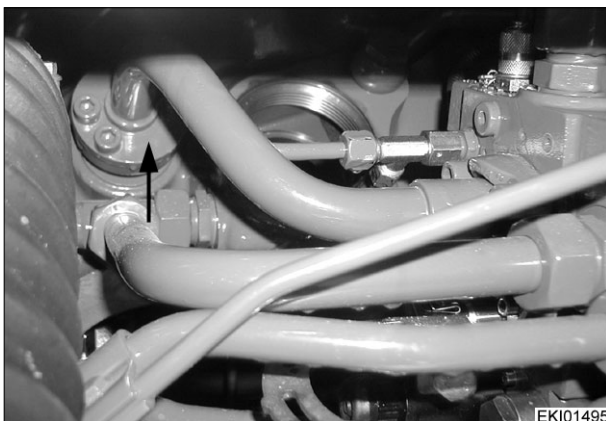
EKI01492

Clean flange surface, coat with sealant X 903.050.074.000 and fit cover.



EKI01513

Locate new sealing ring on pressure pipe and grease.



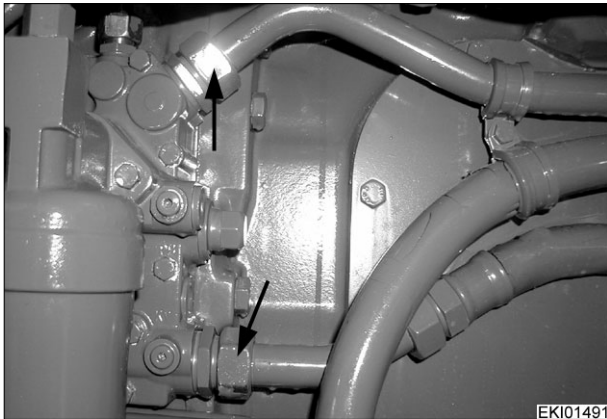
EKI01495

Fit pressure pipe to LS pump and to central control block (ZSB).

Date	Version	Page	Installation and removal of LS pump	Capitel	Index	Docu-No.
28.05.2001	a	9/11		9410	G	000001

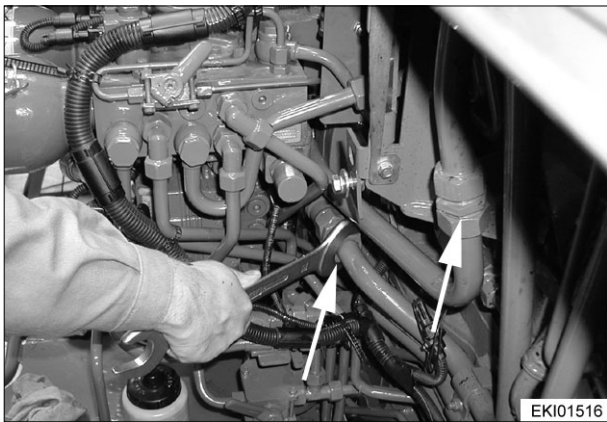


<p><b>Fav 900</b></p>	<p><b>Hydraulic pump assembly / LS pump Installation and removal of LS pump</b></p>	<p><b>G</b></p>
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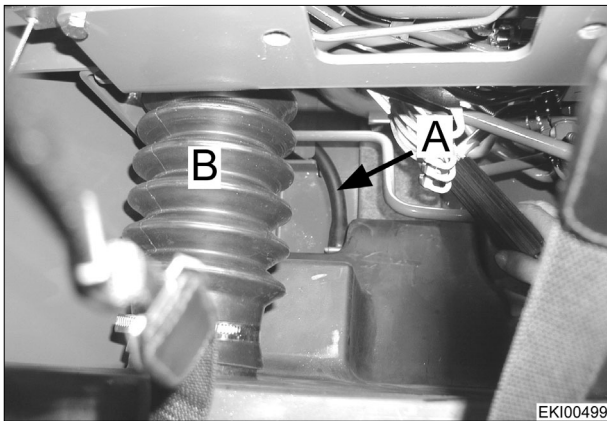
Connect hydraulic lines (to transmission oil cooler) to valve unit.

EKI01491



Connect hydraulic lines (to transmission oil cooler) to connector (arrowed).

EKI01516



Fit right auxiliary tank with retaining cable. Slide both connecting hoses A and B on and tighten hose clips.

EKI00499



Fit venting tube.

EKI00389

Date	Version	Page	Capitel	Index	Docu-No.
28.05.2001	a	10/11	9410	G	000001

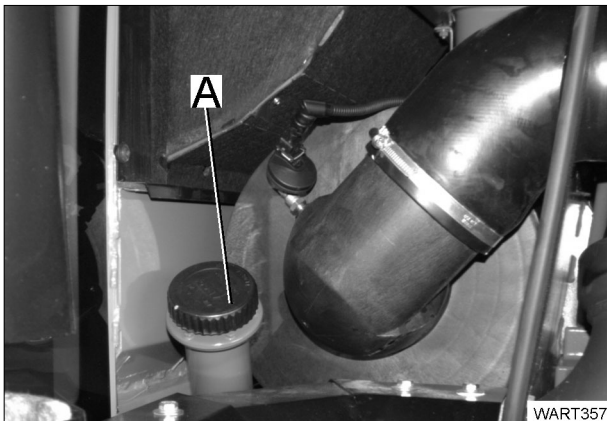
<p><b>Fav 900</b></p>	<p align="center"><b>Hydraulic pump assembly / LS pump Installation and removal of LS pump</b></p>	<p align="center"><b>G</b></p>
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Release hose clamp.



Insert auxiliary tank and fit right step.



**Fill with oil using pump, preferably via return-flow coupling. (Oil is filtered in return flow.)**

If this is not possible, unscrew venting filter (A) and fill with oil through this opening.

Comply with specifications for oil type and quantity.

Initial fill approx. 70 l

**Note:**

**See also :**

**Chapter 0000 Reg. A - Fuels and lubricants**



Check hydraulic system for performance and leaks.

If necessary, bleed load-sensing line at central control block (ZSB).

**Concluding work:**

Fit panels on right side.

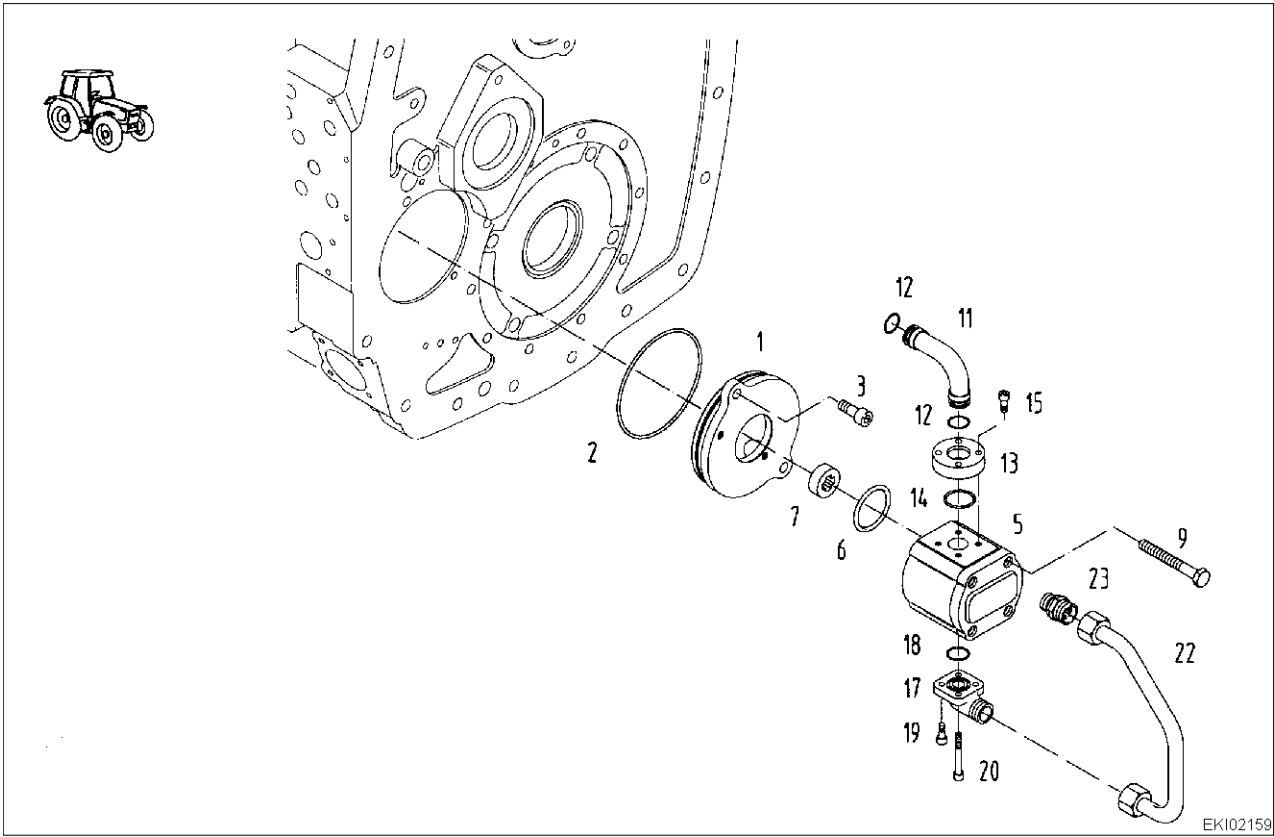
Fit right rear wheel.

Date	Version	Page	Installation and removal of LS pump	Capitel	Index	Docu-No.
28.05.2001	a	11/11		9410	G	000001

**Fav 900**

**Hydraulic pump assembly / Transmission pump  
Installation and removal of 1P1 - servopump**

**G**



Item	Designation	Item	Designation
1	Centering cover	13	Intake flange
2	O-ring	14	O-ring
3	Socket head cap screw	15	Socket head cap screw
5	1P1 - servopump	17	Flange socket
5	Seal set	18	O-ring
6	O-ring	19	Socket head cap screw
7	Driver	20	Socket head cap screw
9	Hexagon screw	22	Pressure pipe
11	Bend	23	Screw socket
12	O-ring		

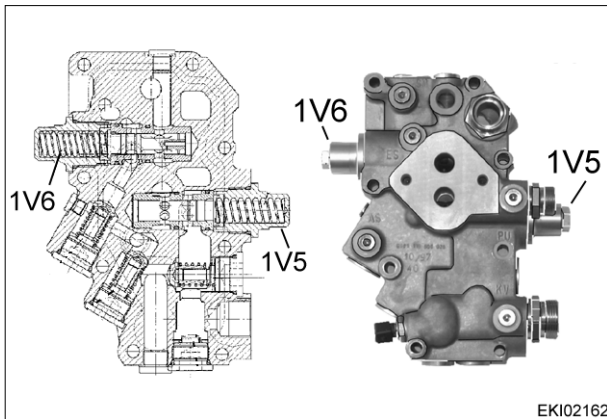
**Note:**

Chapter 1005 Reg. C - Transmission hydraulic circuit diagram with key  
Chapter 1005 Reg. E - Transmission pressure test

**Fav 900**

**Hydraulic pump assembly / Transmission pump  
Installation and removal of 1P1 - servopump**

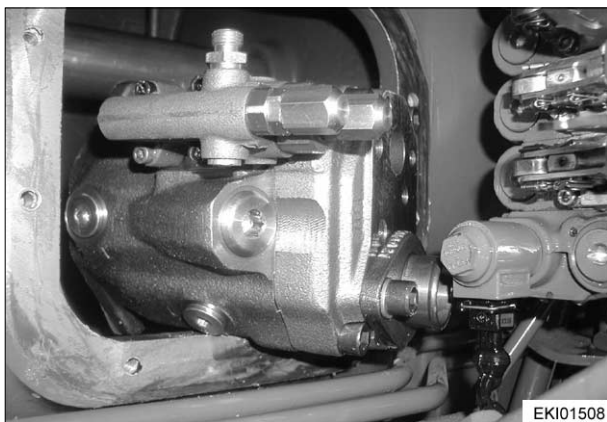
**G**



If minimum pressure (approx. 25 bar) is not generated, check

1V5 = servopump pressure-relief valve

1V6 = servocircuit pressure-relief valve for leaks.



**Removing servopump (5)**

**Preliminary work:**

Remove PR - LS pump via hatch.

**Chapter 9400 Reg. G - Installation and removal of PR - LS pump**

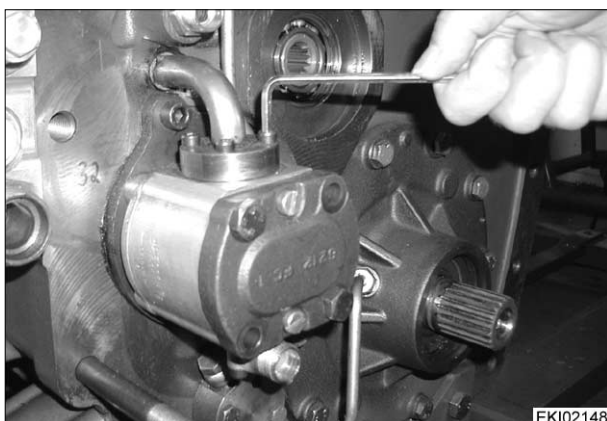
Install and remove 1P1 - servopump via hatch.

**Note:**

**Work was carried out on disconnected tractor for greater clarity.**



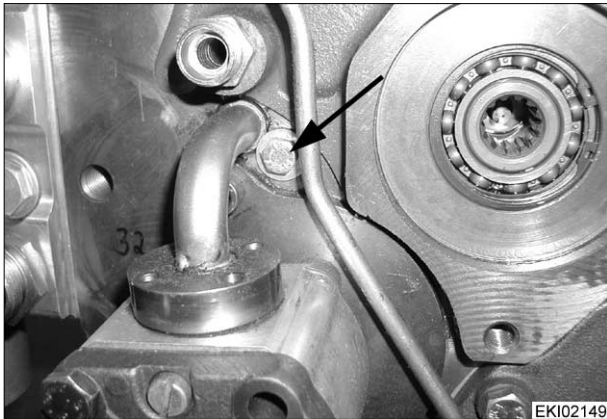
Remove pressure pipe (22).



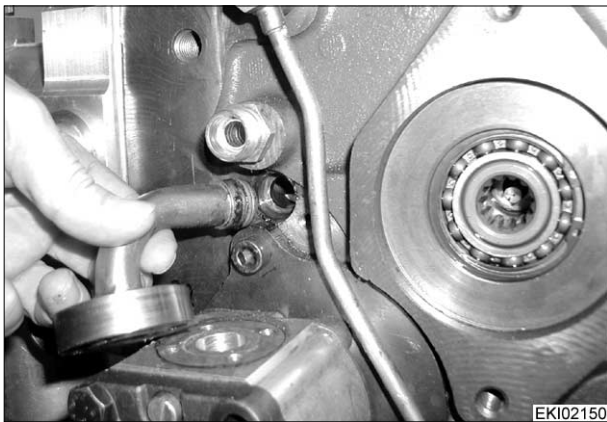
Remove intake flange (13).

Date	Version	Page	Capitel	Index	Docu-No.
23.08.2001	a	2/6	9420	G	000001

<b>Fav 900</b>	<b>Hydraulic pump assembly / Transmission pump Installation and removal of 1P1 - servopump</b>	<b>G</b>
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Unscrew screw (arrowed).



Remove bend (11) with intake flange (13).



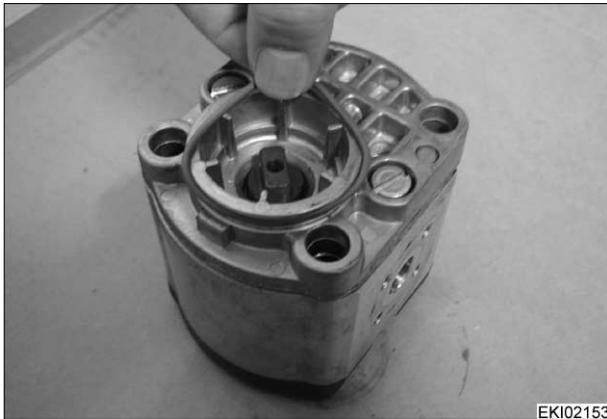
Unscrew two hexagon screws (9) and remove servopump (5).



Servopump (5) and driver (7)

Date	Version	Page	Capitel	Index	Docu-No.
23.08.2001	a	3/6	9420	G	000001

<b>Fav 900</b>	<b>Hydraulic pump assembly / Transmission pump Installation and removal of 1P1 - servopump</b>	<b>G</b>
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EKI02153

**Installing servopump (5)**

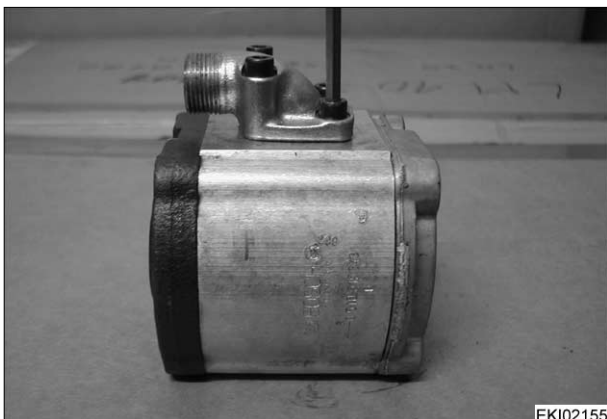
Insert O-ring (6) into groove in servopump (5) and grease.



EKI02154

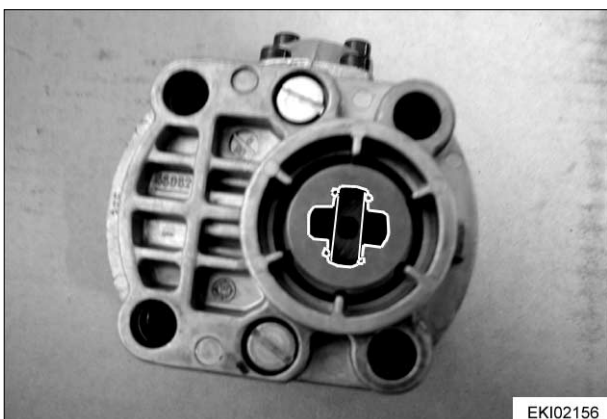
Unscrew flange socket (17).

Insert O-ring (18) into groove in flange socket (17) and grease.



EKI02155

Tighten flange socket (17) crosswise and in stages to **10 Nm** .



EKI02156

Place driver (7) against drive lug of servopump (5).

**Note:**

**Drive lug of servopump (5) and driven lug of pump drive are offset by 90° relative to each other.**

**To prevent incorrect fitting one groove in driver (7) is caulked in each case.**

Date	Version	Page	Capitel	Index	Docu-No.
23.08.2001	a	4/6	Installation and removal of 1P1 - servopump	9420	G 000001

**Fav 900**

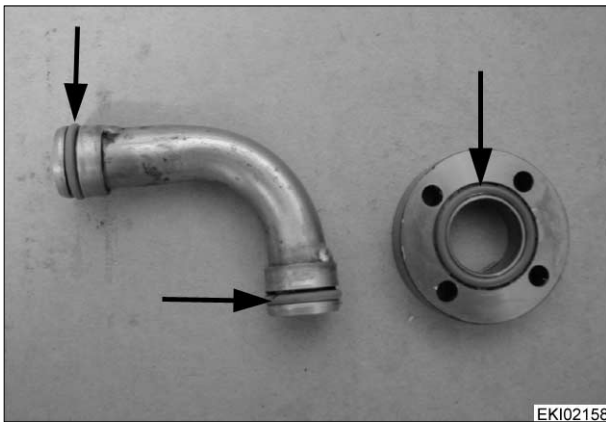
**Hydraulic pump assembly / Transmission pump  
Installation and removal of 1P1 - servopump**

**G**



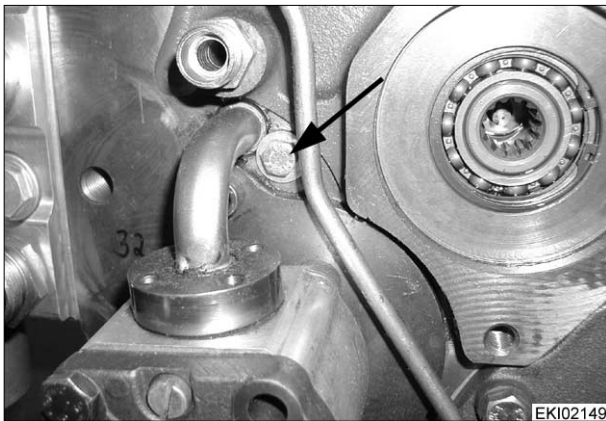
EKI02157

Locate driver (7) and tighten servopump (5) in uniform stages to **49 Nm** .



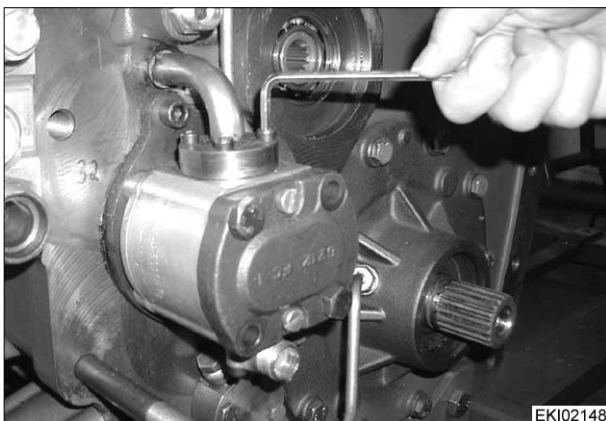
EKI02158

Insert O-rings (12) into grooves in bend (11) and grease.  
Insert O-ring (14) into groove in intake flange (13) and grease.



EKI02149

Fit bend (11) with intake flange (13) and secure with screw (arrowed).



EKI02148

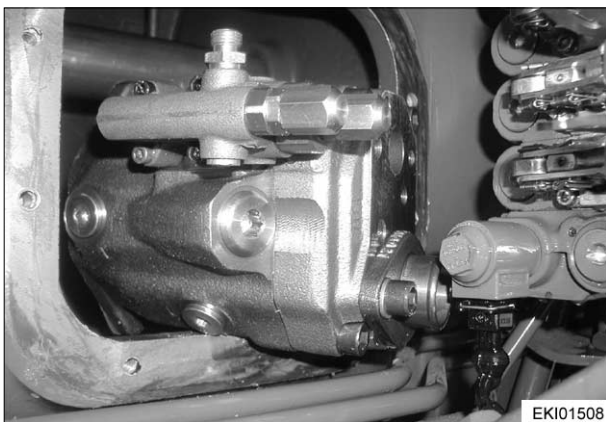
Tighten intake flange (13) uniformly.

Date	Version	Page	Capitel	Index	Docu-No.
23.08.2001	a	5/6	9420	G	000001

<b>Fav 900</b>	<b>Hydraulic pump assembly / Transmission pump Installation and removal of 1P1 - servopump</b>	<b>G</b>
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Fit pressure pipe (22).



**Concluding work:**

Fit PR - LS pump via hatch.

**Note:**

**Chapter 9400 Reg. G - Installation and removal of PR - LS pump**

Date	Version	Page	Capitel	Index	Docu-No.
23.08.2001	a	6/6	9420	G	000001

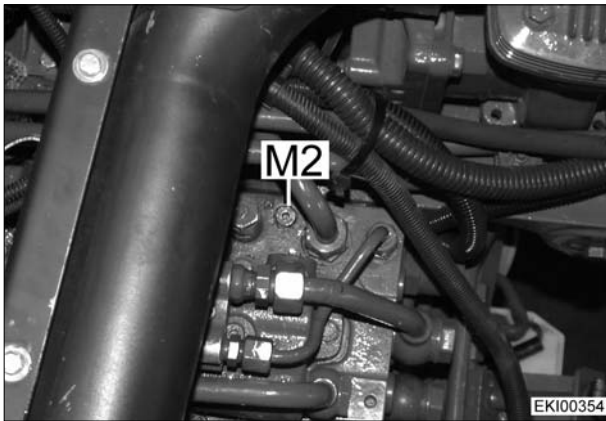


<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Hydraulic pump assembly / Steering pump <b>PL - auxiliary pump</b></p>	<p><b>E</b></p>
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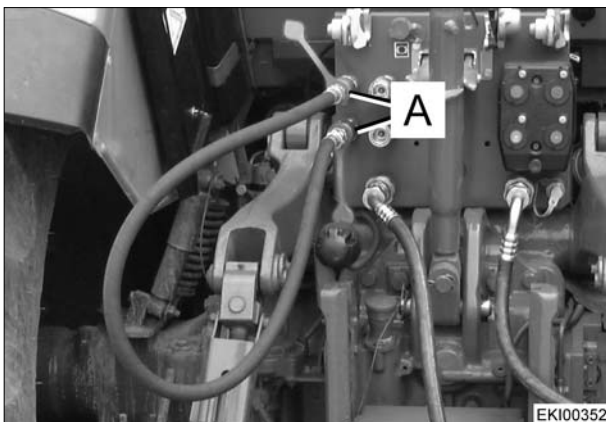
**General:**

- Operation and pressure for auxiliary pump connection can only be checked on tractor in event of **need scenario** .
- Need scenario exists when LS pump is exhausted by current oil demand **and** pressure demand from steering system is still higher than current working pressure of LS pump.

**Verification by bypassing control valves:**



Connect 250 bar pressure gauge to measuring point M2 on central control block.



Short-circuit any control valve using hydraulic hose.  
E.g. + yellow valve connected to - yellow valve

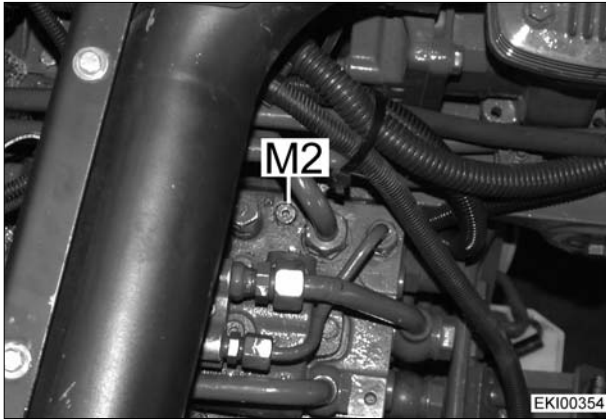
**Test stages**

1. Start engine, idling speed.
2. Set relevant control valve to max. flow.
3. Open valve (permanent setting).
4. Move steering to full lock.
5. Check pressure at pressure gauge (measuring point M2) - **TARGET 190 bar** .  
Enter readings in copy of test report (document 9600 E 000003).

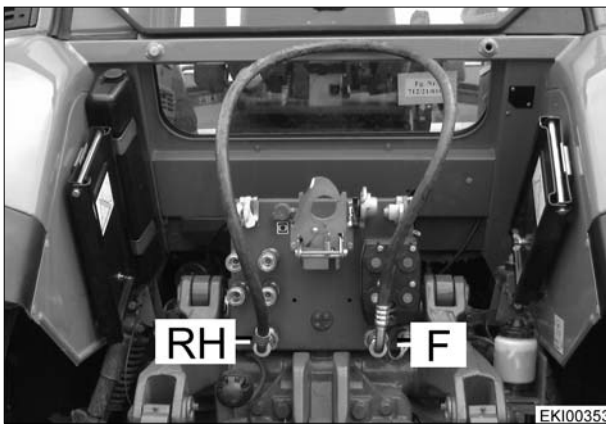
Date	Version	Page	PL - auxiliary pump	Capitel	Index	Docu-No.
05/2000	a	1/3		9430	E	000001

<p><i>Fav 700</i> <i>Fav 900</i></p>	<p>Hydraulic pump assembly / Steering pump <b>PL - auxiliary pump</b></p>	<p><b>E</b></p>
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**Verification using external pressure supply:**



Connect 250 bar pressure gauge to measuring point M2 on central control block.



Connect terminal F = external pressure supply and RH = free return flow using hydraulic hose.

**Test stages**

1. Start engine, idling speed.
2. Move steering to full lock.
3. Check pressure at pressure gauge (measuring point M2) - **TARGET 190 bar** .  
Enter readings in copy of test report (document 9600 E 000003).

**Verification without pressure hose:**

**Test stages**

1. Start engine, idling speed.
2. Move steering to full lock
3. Fully lower rear power lift (without implement) or front loader (empty).
4. Move steering almost to full lock (release steering wheel.)
5. Raise rear power lift or front loader while simultaneously moving steering to full lock.

Date	Version	Page	PL - auxiliary pump	Capitel	Index	Docu-No.
05/2000	a	2/3		9430	E	000001

<b>Fav 700</b> <b>Fav 900</b>	Hydraulic pump assembly / Steering pump <b>PL - auxiliary pump</b>	<b>E</b>
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**Steering system response:**

- Steering can be operated throughout using normal manual force, i.e. even when auxiliary pump is connected.
- At full lock engine is subjected to slight load and reduces its idling speed.

**Pressure gauge readings:**

	<b>Pressure gauge readings at M2</b>
Free steering	Depending on force requirement
At full lock	190 bar

Date	Version	Page	<b>PL - auxiliary pump</b>	Capitel	Index	Docu-No.
05/2000	<b>a</b>	3/3		<b>9430</b>	<b>E</b>	<b>000001</b>

Fav 700 Fav 900	Hydraulics / General system Hydraulics comparison of Fav 700 with Fav 500, 800, 900 and XYLON	A
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## Abridged version and hydraulics comparison

	FAVORIT 700	FAV 900, 800, 500, XYLON
<b>Feature</b>	Central control block (ZSB) with integral switching and functional components	Components located externally in pipes
<b>LS pump</b>	Inclined-disc axial-flow piston pump with pressure and flow rate regulation	
Minimum standby pressure	42-45 bar	20-23 bar
Starting process	First preliminary stage - without 22 bar control pressure - parallel oil preheating at low temperatures	Directly to standby
Swivel angle Volumetric capacity	Initially limited to 40 cm <sup>3</sup> /rev Approx. 100 l/min From Oct 98 max. 45 cm <sup>3</sup> /rev Approx. 110 l/min	Limited to 40 cm <sup>3</sup> /rev Approx. 100 l/min
Design	Compression and intake connections radially in cover From Oct 98 on axial face in cover	
Control pressure differential	20 bar	
Max. working pressure	200 bar	
<b>Auxiliary pump</b>	Gear pump 11 cm <sup>3</sup> /rev 34 l/min	Gear pump 16 cm <sup>3</sup> /rev 39-41 l/min
Connection precondition	LS pump exhausted and steering heavy	
Max. pressure	190 bar	
Location / drive	On transmission	On engine
<b>Monitor</b>	Active above 1000 rpm engine speed; separate monitor	Only active above 1800/1000; common monitor
LS pump	25 bar or 8 bar pressure-operated switch	0.5 / 5 bar pressure-operated switch
Auxiliary pump	Flow monitor	0.5 bar pressure-operated switch / flow monitor
Oil level	Level sensor (= switch)	Level sensor (= sensor)
Oil level display/messages	Normal / empty warning / empty fault message	At min and max: flashing bars
Positions	Solenoid switch at front power lift shutoff From 6/99: Solenoid switch at EPC/DA switch	Solenoid switch at EPC/DA switch
<b>Control valve type</b>	SB 23 LS-EHS	SB 23 LS
Actuation system	Electrohydraulic with CAN-bus ("V-bus") and control pressure of 22 bar	Mechanical
Volume setting	Programmable assignment button / valve yellow / blue / red / green (red / green / yellow / blue)	Fixed assignment control lever / valve yellow / blue / red / green
Rear EPC valve, spool valve type	Electrically proportional	Mechanical preset
<b>Front power lift control valve</b>	"Disc" valve, two-piece	Flange-mounted valve, one-piece
E-box	Last valve / integral	Separately enclosed / lockable
EPC-DA	Fendt	Bosch
<b>EPC-DA</b>	Integrated in central control block	

Date	Version	Page		Capitel	Index	Docu-No.
12/1999	a	1/3	Hydraulics comparison of Fav 700 with Fav 500, 800, 900 and XYLON	9600	A	000003

<b>Fav 700</b> <b>Fav 900</b>	<b>Hydraulics / General system</b>	<b>A</b>
<b>Hydraulics comparison of Fav 700 with Fav 500, 800, 900 and XYLON</b>		

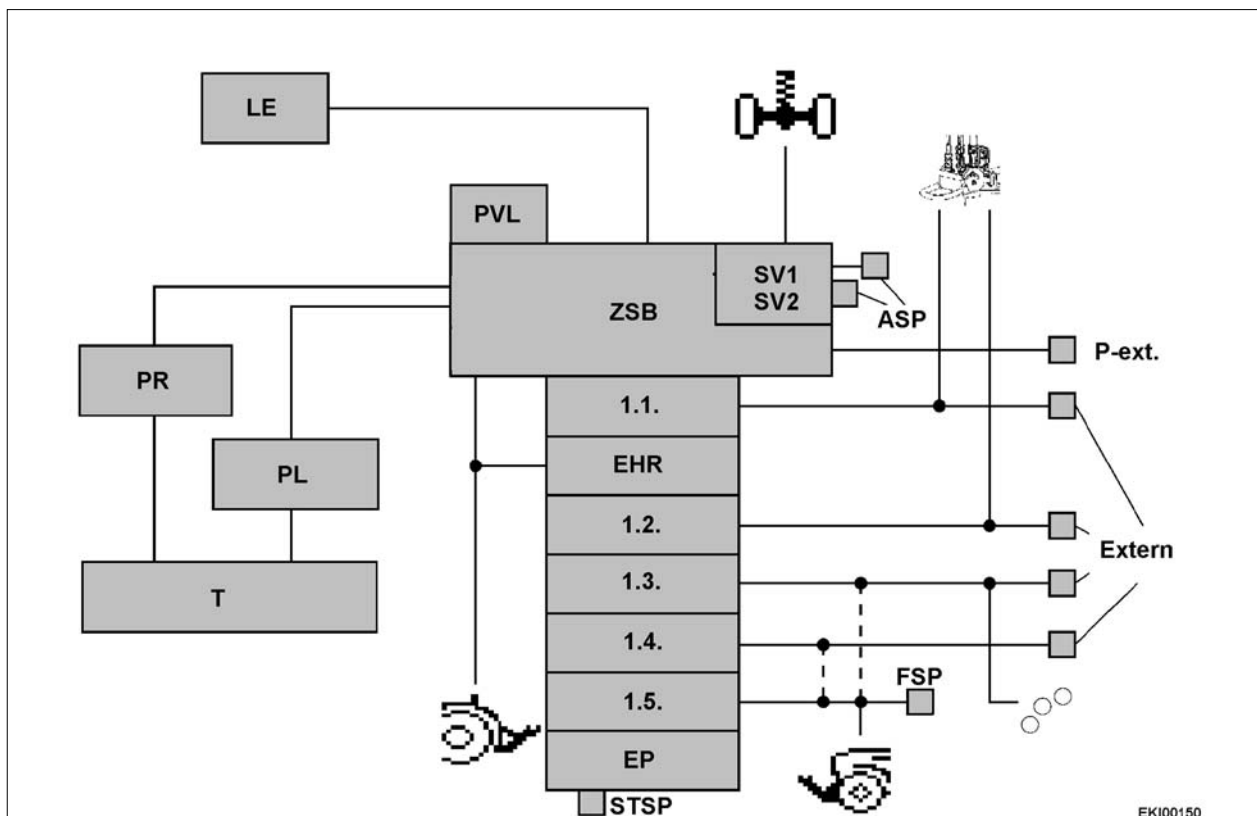
**Abridged version and hydraulics comparison (Forts.)**

	<b>FAVORIT 700</b>	<b>FAV 900, 800, 500, XYLON</b>
<b>Switchover</b>	Spool valves, key on control console	
	From 6/99: externally enclosed Mechanical block ball valve	Externally enclosed Mechanical block ball valve
Possible option	-	Pressure sensor (regulator) for front and rear power lift
<b>Shuttle valves</b>	Principle, operation, required quantity	
- position	Integrated in central control block	Externally enclosed in part
<b>Maintenance</b> (acc. to op. hours)		
Return flow filter change	Initially after 500, then every 1000	
Control pressure microfilter	Initially after 500, (see Maintenance Schedule)	(Not available)
Oil change	Initially after 1000, then every 1000	
High-pressure filter in flow monitor	Maintenance-free	
	Oil grade as per Maintenance Schedule	
	Commissioning specification (LS pump)	
<b>Measuring and testing of existing pressure-measuring points</b>	M1 (not required and therefore not available)  M2 = auxiliary pump M3 = LS pump M4 = LS pressure (marked at central control block) M5 = 22 bar control pressure (at end plate)	M1 = LS pump (depending on accessibility)  M2 = auxiliary pump M3 = LS pump

Date	Version	Page	Capitel	Index	Docu-No.
12/1999	a	2/3	9600	A	000003

Fav 700  
Fav 900Hydraulics / General system  
Hydraulics comparison of Fav 700 with Fav 500, 800, 900 and XYLON

A



EKI00150

LE	Steering	1.2.	Control valve 2nd position
PR	LS pump	1.3.	Control valve 3rd position
PL	Auxiliary pump	1.4.	Control valve 4th position
T	Hydraulic oil tank	1.5.	Control valve 5th position (enhanced-feature front power lift)
PVL	Steering priority valve	EP	End plate
ZSB	Central control block	STSP	Control pressure accumulator
SV1 / SV2	Lower suspension / Raise suspension	FSP	Front power lift accumulator
ASP	Suspension accumulator	P-ext.	External pressure connection
1.1.	Control valve 1st position	External	Rear connections
EPC	EPC lift / lower		

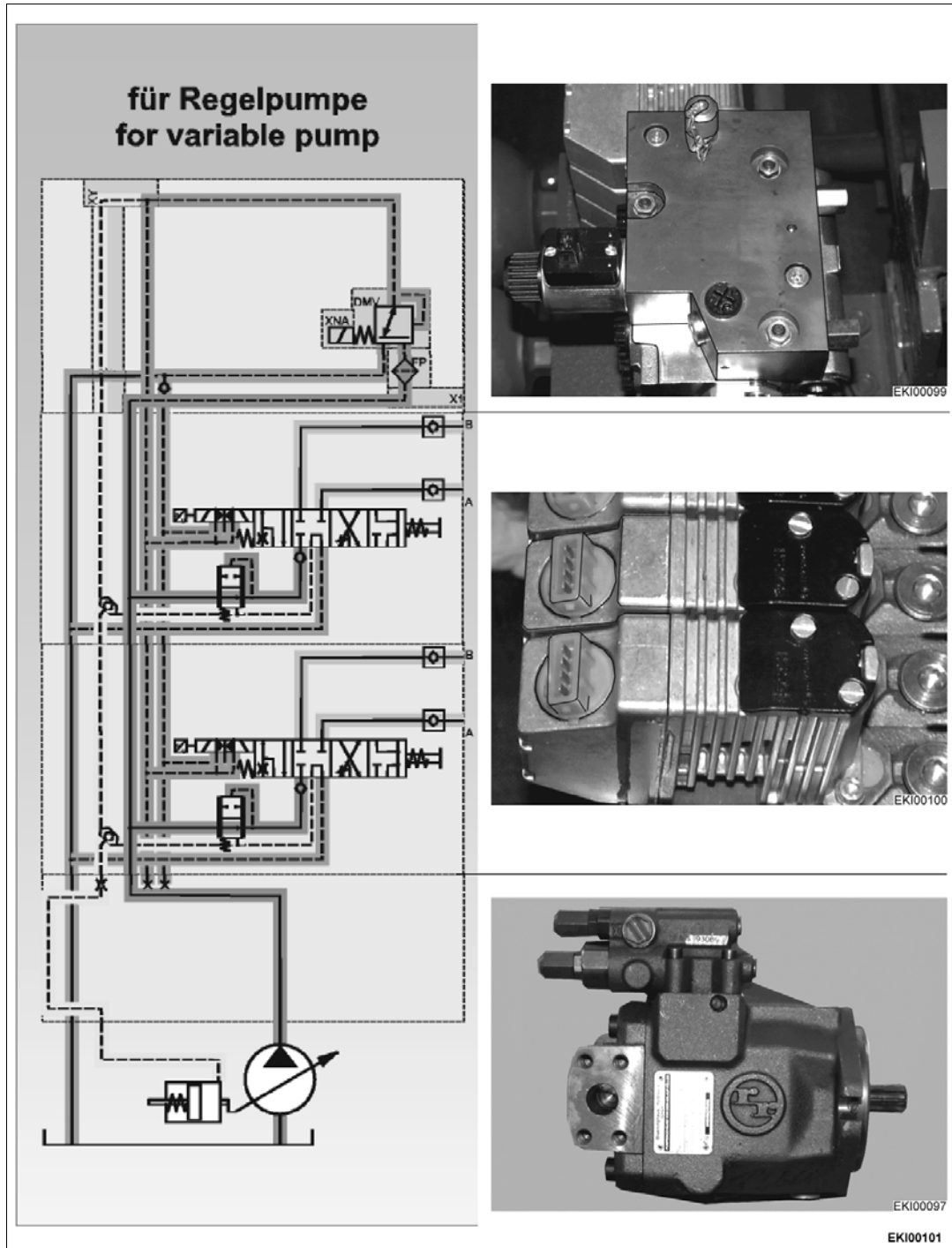
Date	Version	Page	Capitel	Index	Docu-No.
12/1999	a	3/3	9600	A	000003

Fav 700  
Fav 900

Hydraulics / General system  
Hydraulic circuit design

**A**

**Hydraulics control system function chart for electrohydraulic control units SB 23 LS-EHS**

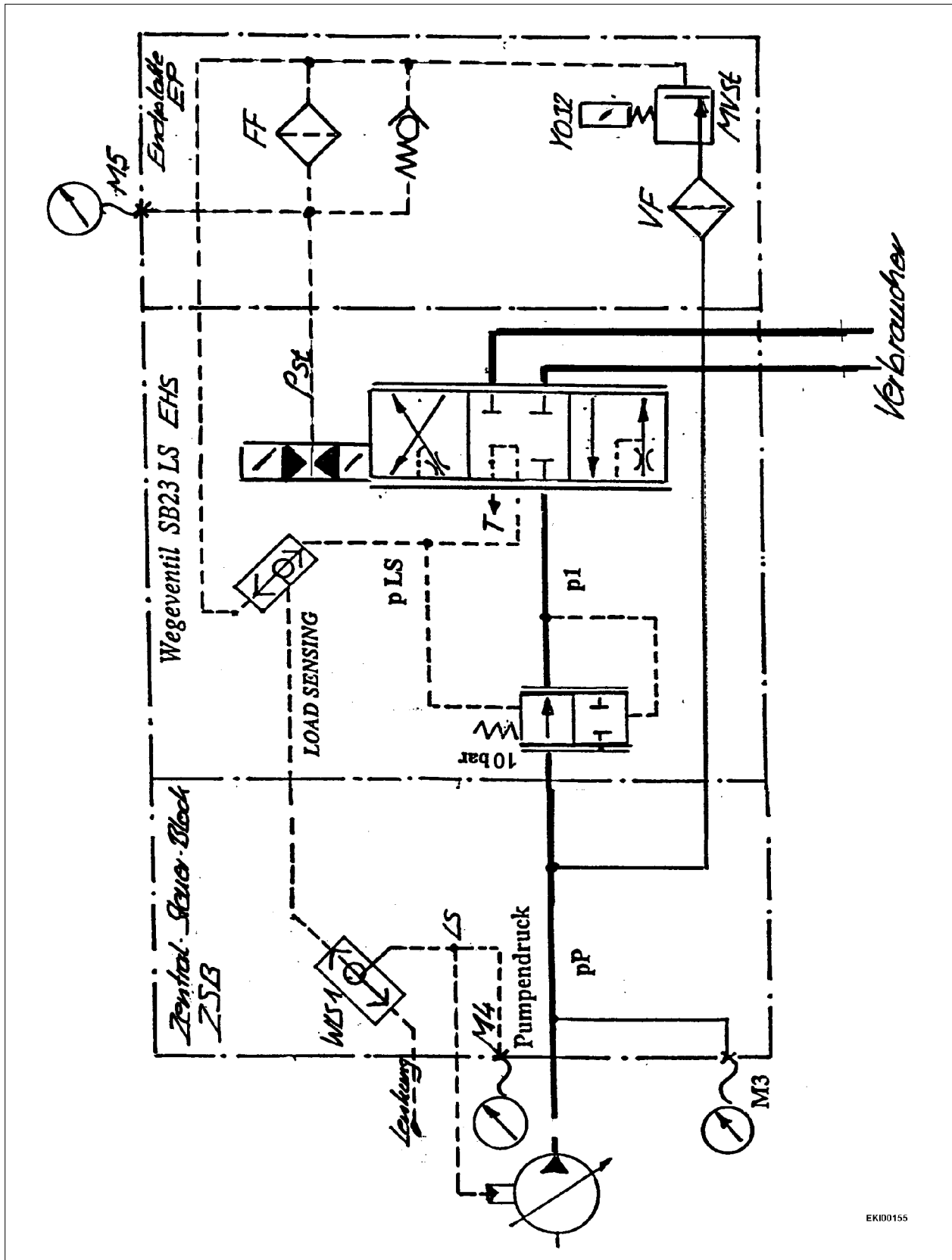


Date	Version	Page	Capitel	Index	Docu-No.
01/2001	a	1/1	9600	A	000005

Fav 700  
Fav 900

Hydraulics / General system  
22 bar control pressure

A



EKID0155

Date	Version	Page	Capitel	Index	Docu-No.
11.01.2001	a	1/1	22 bar control pressure	9600	A
					000006



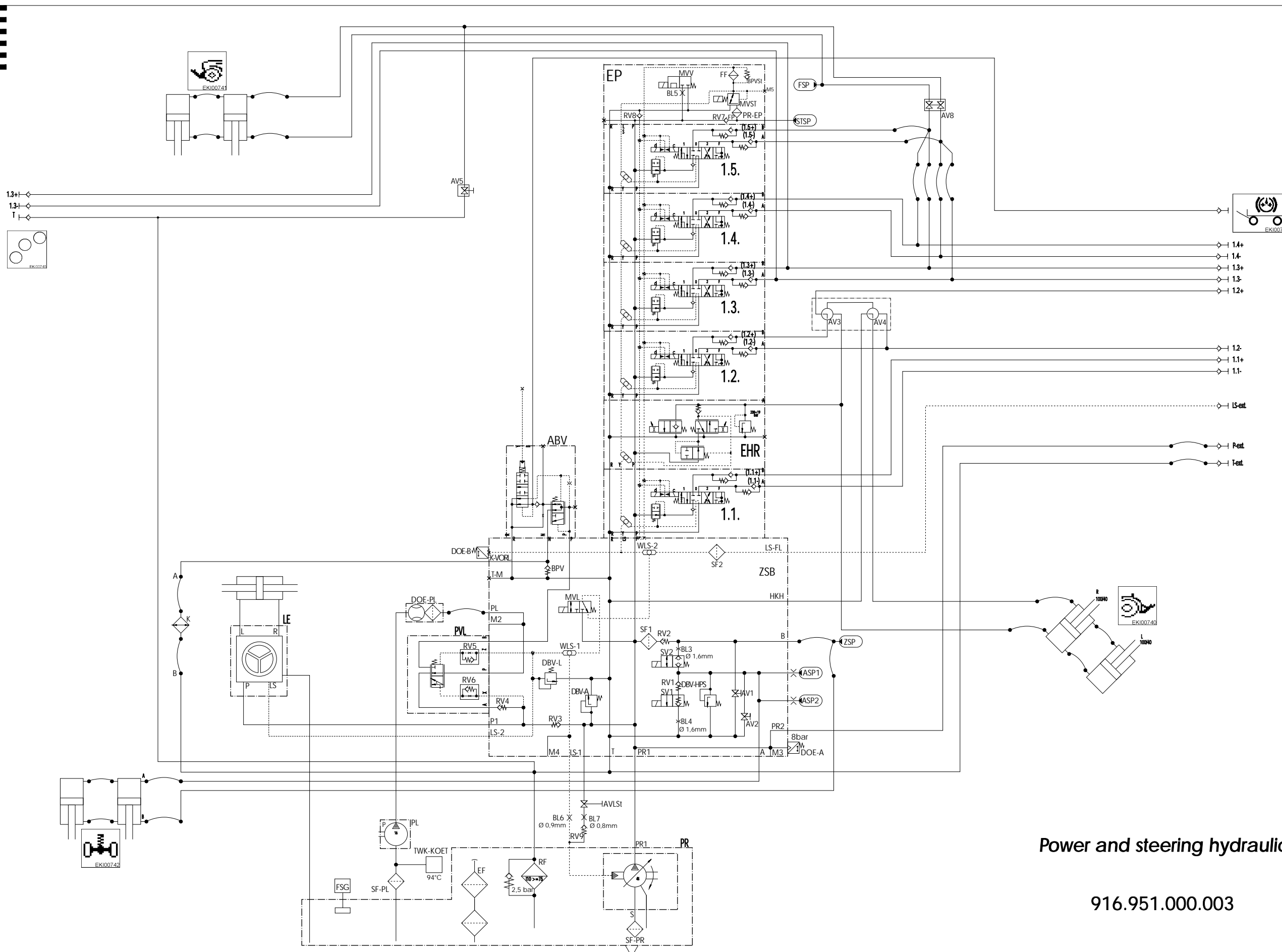
<b>Fav 900</b>	Hydraulic - Equipment / System in General <b>Hydraulic Diagam with legend</b>	<b>C</b>
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Date	Version	Page	Capitel	Index	Docu-No.
10/2000	<b>a</b>	1/5	<b>9600</b>	<b>C</b>	<b>000003</b>

<b>Fav 900</b>	<b>Hydraulic - Equipment / System in General</b> <b>Hydraulic Diagram with legend</b>	<b>C</b>
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1.1.	Y015	Spool Valve 1st Layer	MVV	Y033	Flush Solenoid Valve
1.2.	Y016	Spool Valve 2nd Layer	N on ABV		Return to Tank
1.3.	Y017	Spool Valve 3rd Layer	P		Output PR1 - Spool Valves
1.4.	Y018	Spool Valve 4th Layer	P on ABV		Connection PL (Auxilliary Pump) on ZSB
1.5.	Y019	Spool Valve 5th Layer	P on LE		Pressure Line Steering
A on ZSB		Suspension Lifting (ZSB)	P on PVL		Input PL (Auxilliary Pump)
A on PVL		Output PVL toward Steering	P on PR		Outlet Load Sensing Pump
A an K		Inlet Radiator	P ext.		Externeal Pressure Connection
ABV		Hydraulic Traler braking Valve	P1		Load sensing Pump toward Steering
ABV-external.		Connector hydraulic Traler braking Valve	PL		Auxilliary Pump
ASP1		Accumulator Suspension	PL1		Input Load Sensing Pump
ASP2		Accumulator Suspension	PR		Load Sensing Pump
AV1		Shutoff Pressure Relief Suspension	PR1		Input Load Sensing Pump
AV2		Shutoff Pressure Relief Suspension	PR2		Output P - external
AV3		Toggle Valve EPC - DA	PR-EP		Input PR (Load Sensing Pump) Final plate
AV4		Toggle Valve EPC - DA	PSt on ZSB		Control Pressure 22 bar on Main Control Bloc ZSB
AV5		Toggle Valve SA - DA Front Powerlift	PVL		Priority Valve
AV8		Shutoff valve FKH - Valve 1.3.	R		Return Additional Valvalve
B		Connection Lowering Suspension	R on ABV		Relief of Trailer Braking Valve
B on ABV		Connector hydraulic Tubing - Rear Connectors	R on LE		Steering Toward Steering Cylinder
B on PVL		Return over trailer Braking Valve	RF		Return Filter to tank
B on K		Radiator Output	RV1		Shutoff valve Suspension
BL3		Orifice 1,6mm Lifting Suspension	RV2		Shutoff valve Suspension
BL4		Orifice 1,6mm Lowering Suspension	RV3		Shutoff valve Auxilliary Pump toward Load sensing Pump
BL5		Orifice 1,5mm Oil Heating	RV4		Shutoff valve Load sensing Pump toward Auxilliary Pump
BPV		radiator Bypass Valve	RV5		Shutoff valve within Final Plate
BPVSt		Bypass Valve within Final Plate	RV6		Shutoff valve within Priority valve
DBV-A		Pressure Limiting Valve Load Sensing Pump 230 bar	RV7		Shutoff valve Final Plate
DBV-HPS		Pressure Limiting Valve 250 bar - Suspension	RV8		Shutoff valve Final Plate
DBV-L		Pressure Limiting Valve Steering 175 bar	S		Aspiration Load sensing Pump
DOE-A	S025	Pressure Switch 8 bar (Monitoring Load Sensing Pump)	SF1		Filter 0,200mm Suspension
DOE-B		Connection for Kick-out Switch B022	SF2		Filter 0,200mm LS - external
DOE-PL	S026	Flow Monitor (Monitoring Auxilliary Pump)	SF-PL		Filter upstream Auxilliary Pump
EF		Cover Filling Point Hydraulic tank	SF-PR		spiration Filter Load sensing Pump
EPC	Y021	EPC - Lifting	STSP		Accumulator Control Pressure
EPC	Y022	EPC - Lowering	SV1	Y013	Lowering - Suspension
EP		Final plate	SV2	Y014	Lifting - Suspension
FF		Filter in Final Plate (grid) 0,025 mm	SV3	Y030	electric switching EPC - DA locked
FF		Filter in Final Plate (grid) 0,025 mm	SV3	Y030	electric switching EPC - DA locked
FSP		Accumulator Front Powerlift	SV4-VS	Y031	EPC - DA Switching locked
HKH		Rear powerlift	T		Return - Tank
K		Hydraulic Oil Radiator	T-EP		Return MVV via Final Plate
K-Vorl.		Output Auxilliary Pump	T on LE		Return from Steering
L on LE		Steering toward steering Cylinder	T-M		Input - Return Multiple Coupler
LE		Steering	T-RH		Return Line external from Rear
LS		Output LS to Control Valve	TSt on ZSB		Return Pump Control Pressure on Main Control Bloc
LS-external.		LS - Connection, external	TWK -KOET	B013	Temperature Switch Hydraulic Oil
LS1		LS toward Load Sensing Pump	TWK-KOET	S040	Temperature Switch Hydraulic Oil 15°/25° C (Twin Control Module Fav 700)
LS2		LS toward Steering	VF		Filter in Final Plate
LS-FL		LS - external	WLS-1		Toggling Valve
M2		Mearuring Point Auxilliary Pump	WLS-2		Toggling Valve (external LS)
M3		Mearuring Point Load Sensing Pump	X on PVL		Input PR (Load Sensing Pump)
M4		Mearuring Point LS	Y on ABV		Connection Brake Control Hose
M5		Mearuring Point Control pressure 22 in Final plate	Z on PVL		Input LS - Pressure, Steering
MVL	Y012	Charge Valvel (Suspension, Oil Heating)	ZSB		Main Control Bloc
MVSt	Y032	Solenoid Valve Neutral (Valves)	ZSB		Main Control Bloc

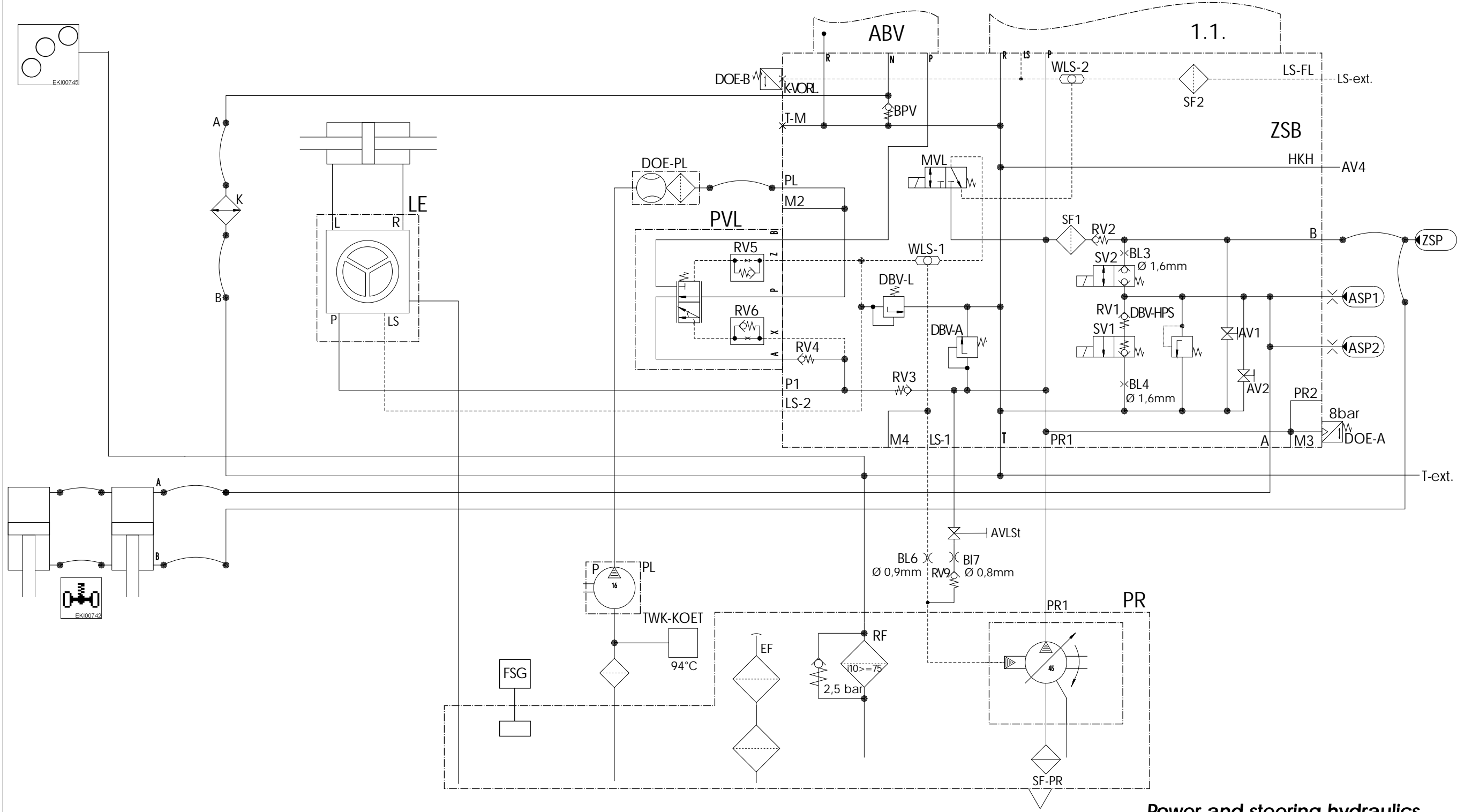
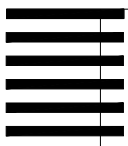
Date	Version	Page	<b>Hydraulic Diagram with legend</b>	Capitel	Index	Docu-No.
10/2000	a	2/5		9600	C	000003



**Power and steering hydraulics**

916.951.000.003

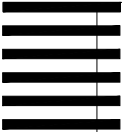
Fav 900 chassis number 23/... and up



**Power and steering hydraulics**

916.951.000.003

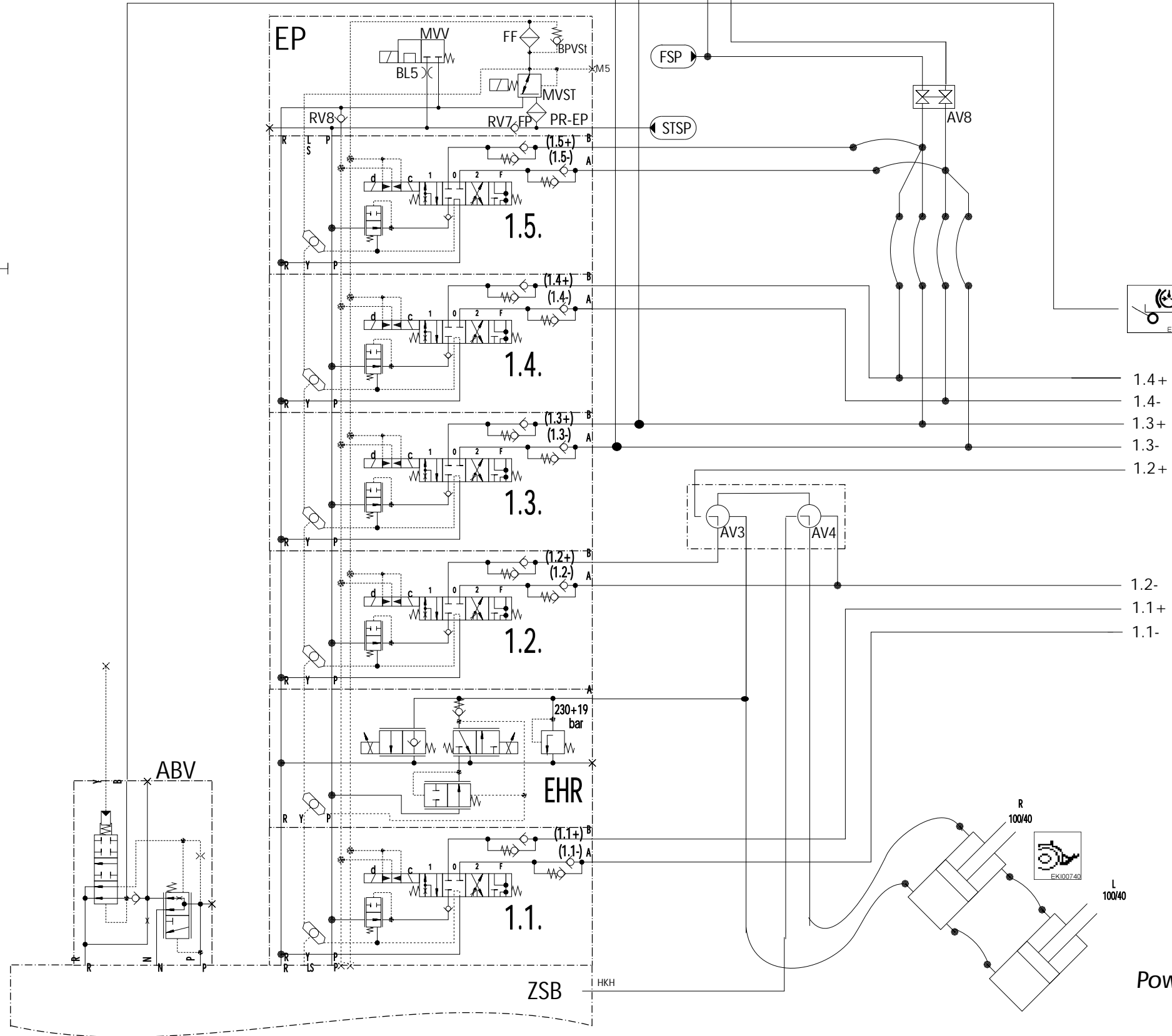
Fav 900 chassis number 23/... and up



1.3+  
1.3-  
T



AV5



1.4+  
1.4-  
1.3+  
1.3-  
1.2+

1.2-  
1.1+  
1.1-

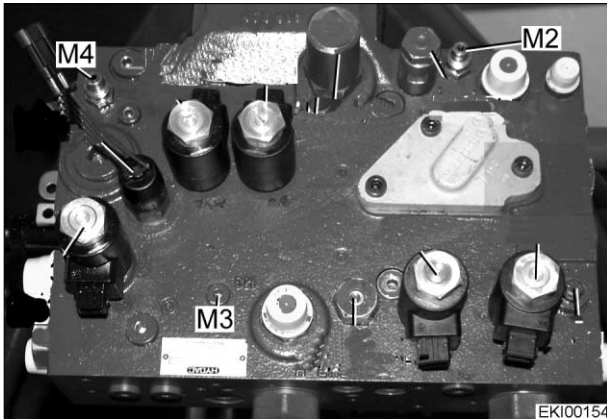
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Power and steering hydraulics

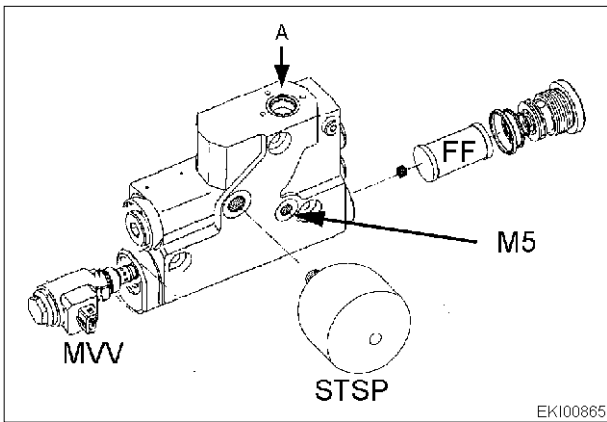
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Fav 900 chassis number 23/...and up

<b>Fav 900</b>	<b>Hydraulik Equipment / System in General</b> <b>Overview Measuring Points</b>	<b>D</b>
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- M2** = Meßstelle Hilfspumpe
  - M3** = Measuring Point Load Sensing Pump
  - M4** = Measuring Point Load Sensing Control Pressure
- Top Side of Main Control Bloc (ZSB)



- M5** = Control Pressure
- Lower Side of final Plate



More detailed Test Instructions, consult : "Test procedure and Protocol for hydraulic Functions";

M2	pPL	Values Test Instruction / case of necessity 1)	minimal Circulation Pressure (depeding on Oil Temperature and flow) in case of necessity 1 ) and full steering 190 bar Case of necessity is given when load sensing pump is "busy" with oil needs of actually active oil receptors and steering requires an higher oil-pressure as the momentarily operating pressure.
M3	pPR		all Pressures of Load Sensing Pump · min. Standby pressure · aktual Operating Pressure · max. Standby pressure Further functions (Speed, cold start , Hot Start ) are active during engine Start. More detailed description in " Starting Process und statuses of the Load Sensing Pump and " Hydraulic Oil Heating"
M4	p LS		LS- Pressure ( = Control / Signal) on Load Sensing Pump
M5	p St		Control Pressure for actuation of Spool Valves 1....5

<b>Fav 700</b> <b>Fav 900</b>	<b>Hydraulics / General system</b> <b>Test report - fax template</b>	<b>E</b>
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Fendt		Test report / overall hydraulics operation		Measurement no.
Chassis no.	Op. hrs. reading	Keyword	Name	Date
				Time

	Starting condition	LS pump pressure	LS pressure	Control pressure	Auxiliary pump pressure	Other results
	- engine idling - all valves in neutral	(bar) Measuring point M3 on central control block ZSB	(bar) Measuring point M4 on central control block ZSB	(bar) Measuring point M5 on end plate EP	(bar) Measuring point M2 on central control block ZSB	Oil temperature
	- no steering; suspension locked					

A	LS pump test	SETPOINT ACTUAL	SETPOINT ACTUAL	SETPOINT ACTUAL	SETPOINT ACTUAL	ACTUAL
A1	Min. standby pressure (for starting process see separate test)	42-45	22 +/-1	22 +/-1	Min	
A2	Free steering when stationary to left / right	Depending on resistance 22 +/-1		Min		
A3	Steering to stop to left / right	200 / 200 /	200 / 200 /	22 +/-1	Min	
A4	Control valve 1 Lift / Lower	200 / 200 /	200 / 200 /	22 +/-1	Min	
A5	Control valve 2 Lift / Lower	200 / 200 /	200 / 200 /	22 +/-1	Min	
A6	Control valve 3 Lift / Lower	200 / 200 /	200 / 200 /	22 +/-1	Min	
A7	Control valve 4 Lift / Lower	200 / 200 /	200 / 200 /	22 +/-1	Min	
A8	Control valve 5 Lift / Lower	200 / 200 /	200 / 200 /	22 +/-1	Min	
A9	Rear EPC with external pushbutton to stop	200	200	22 +/-1	Min	
A10	Front power lift with external pushbutton to stop	200	200	22 +/-1	Min	
A11	Suspension ON or during lifting	200	200	22 +/-1	Min	

Date	Version	Page	<b>Test report - fax template</b>	Capitel	Index	Docu-No.
12/2000	<b>a</b>	1/2		<b>9600</b>	<b>E</b>	<b>000001</b>

<b>Fav 700</b> <b>Fav 900</b>	<b>Hydraulics / General system</b> <b>Test report - fax template</b>	<b>E</b>
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Fendt		Test report / overall hydraulics operation		Measurement no.
Chassis no.	Op. hrs. reading	Keyword	Name	Date
				Time

	Starting condition	LS pump pressure	LS pressure	Control pressure	Auxiliary pump pressure	Other results
	- engine idling - all valves in neutral	(bar)	(bar)	(bar)	(bar)	
	- no steering; suspension locked	Measuring point M3 on central control block ZSB	Measuring point M4 on central control block ZSB	Measuring point M5 on end plate EP	Measuring point M2 on central control block ZSB	Oil temperature

B	Auxiliary pump test - short-circuit hose at valve p of P-ext - valve at max. volume or - raise power lift and meanwhile					
B1	free steering when stationary	Min. or after load	Min. or after load	22 ± 1	Depending on resistance	
B2	Steering to stop to left / right	Min / after load	Min / after load	22 ± 1	190 / 190	

C	Further measurements (special conditions / combinations / order / settings / implements)	Setpoint / Actual	Setpoint / Actual	Setpoint / Actual	Setpoint / Actual	
C1						
C2						
C3						



**Farmer 400**  
**Fav 700**  
**Fav 900**

Hydraulics / Central control block  
**Central control block**

**A**

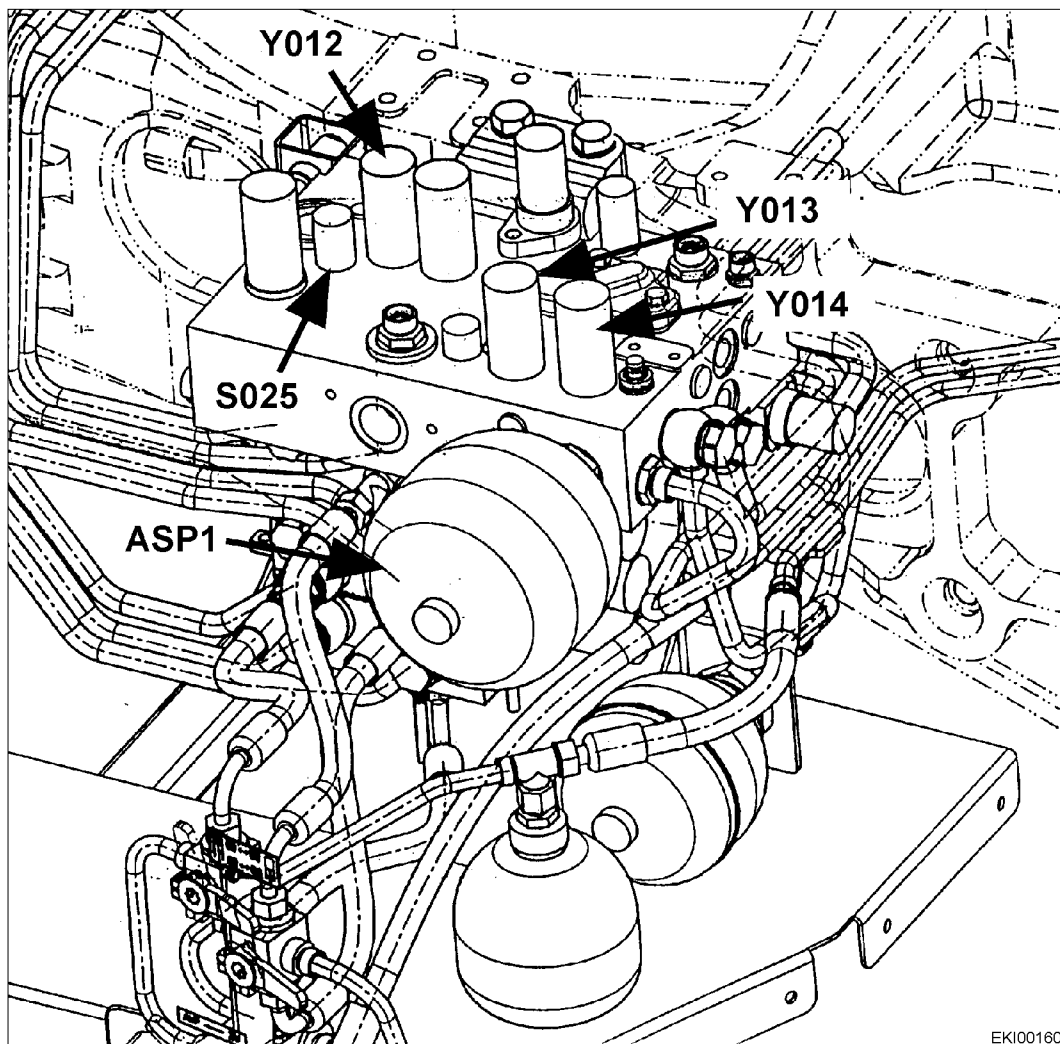
The central control block incorporates important hydraulic functions. This has enabled a large number of hydraulic hose connections to be saved.

The following components are integrated in the central control block (ZSB):

- Front-axle suspension valves
- Steering system valves
- Pressure-relief valves
- Shuttle valves (WLS 1+2)
- Non-return valves

The following are flange-mounted:

- Electrohydraulic control units SB 23 LS - EHS
- EPC valve
- Nitrogen accumulator for front-axle suspension
- External LS connection
- Measurement points M2, M3 and M4



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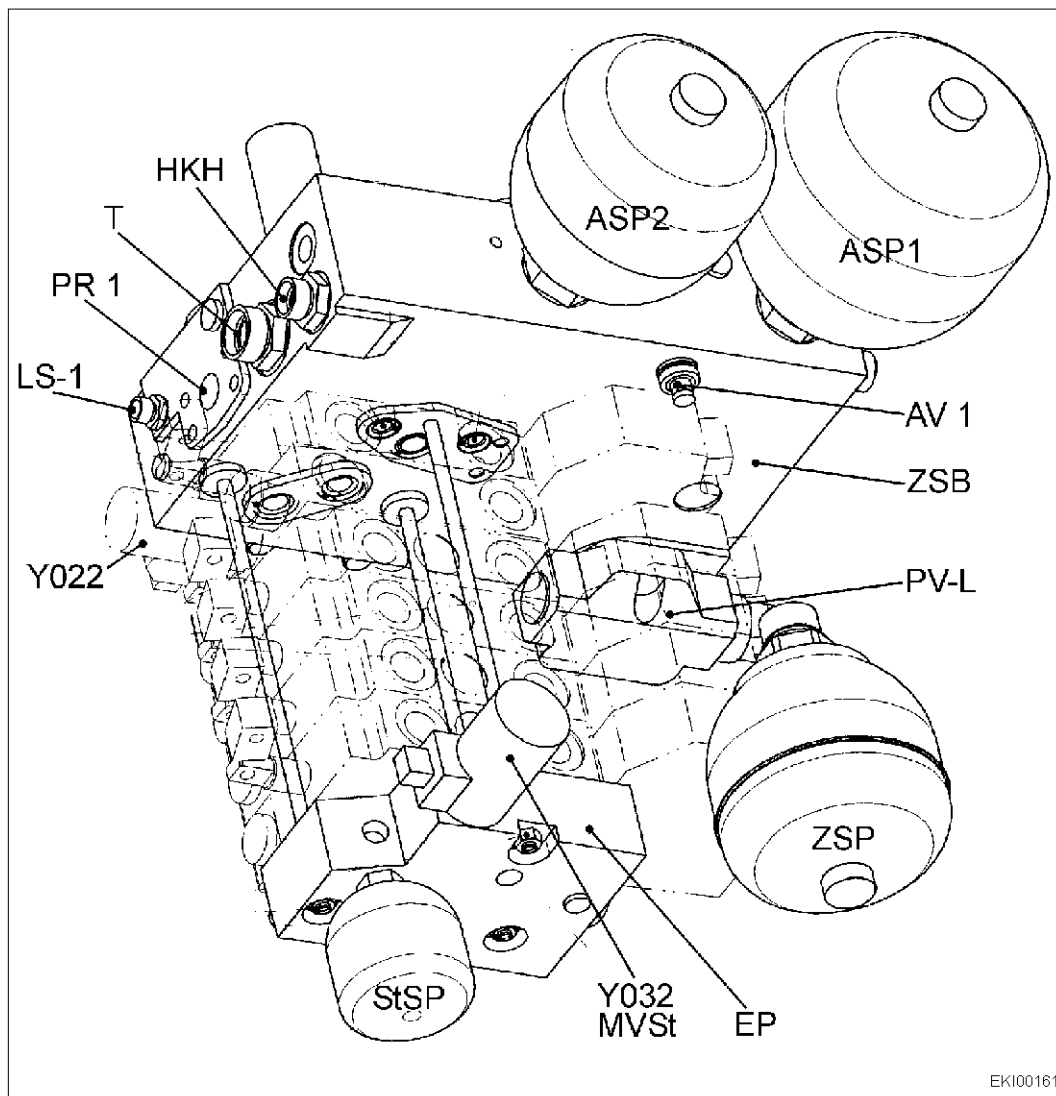
Date	Version	Page	Capitel	Index	Docu-No.
10/1999	a	1/3	9610	A	000001

**Farmer 400**  
**Fav 700**  
**Fav 900**

Hydraulics / Central control block  
**Central control block**

**A**

PR 1 = LS pump inlet  
 LS 1 = LS pump outlet  
 HKH = Rear power lift EPC/DA  
 T = Tank outlet  
 AV 1 = Pressure relief for front-axle suspension  
 ZSB = Central control block  
 PV-L = Steering priority valve (to connect auxiliary pump if required)  
 EP = End plate (22 bar control pressure)  
 Y022 = Lower EPC valve  
 Y032 = Pressure-reducing valve (22 bar control pressure)  
 ASP 1 = Suspension accumulator  
 ASP 2 = Suspension accumulator  
 ZSP = Auxiliary suspension accumulator  
 STSP = End plate nitrogen accumulator

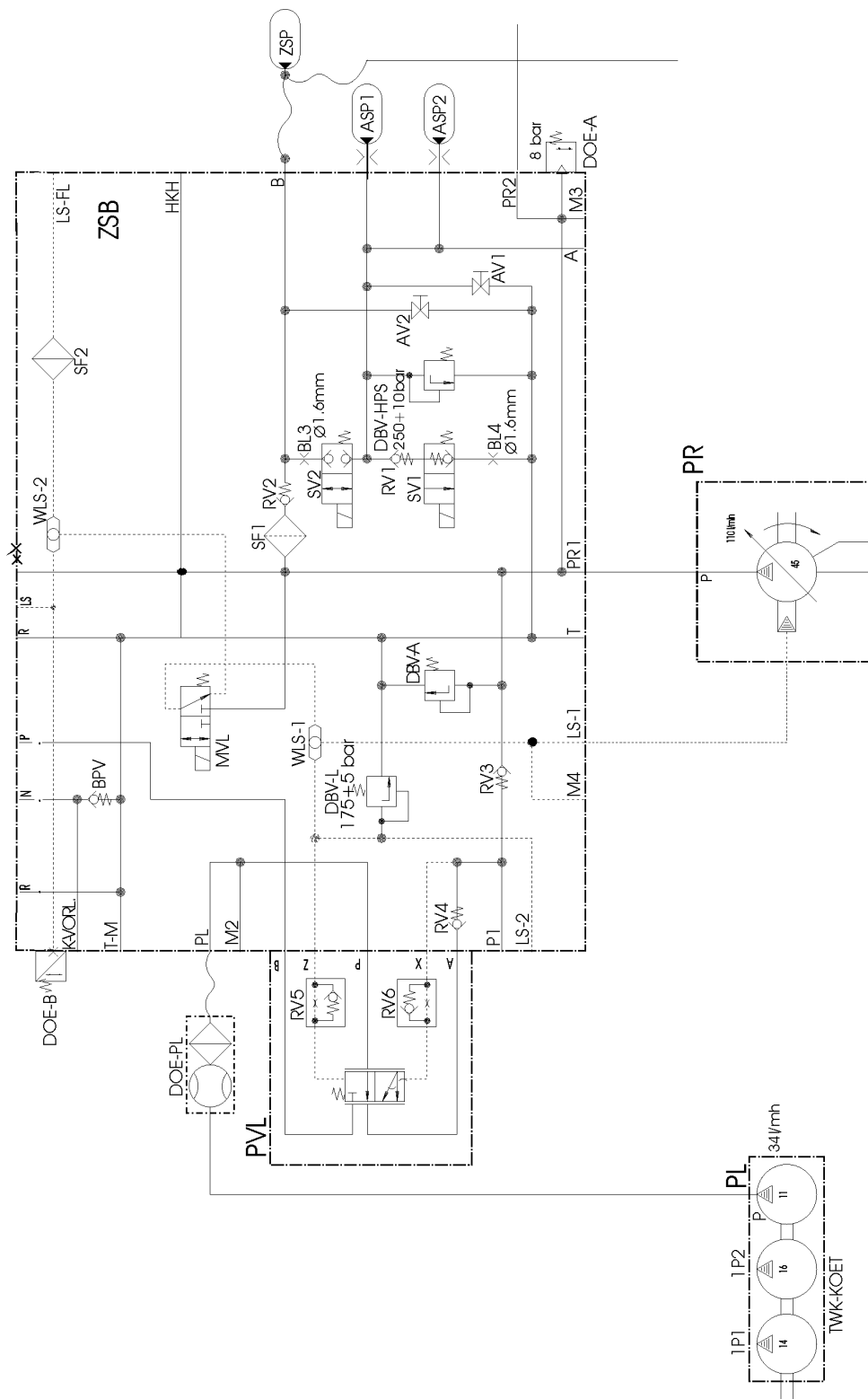


Date	Version	Page	Capitel	Index	Docu-No.
10/1999	a	2/3	9610	A	000001

Farmer 400  
Fav 700  
Fav 900

Hydraulics / Cetral control block  
**Central control block**

**A**



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Date	Version	Page	Capitel	Index	Docu-No.
10/1999	a	3/3	9610	A	000001

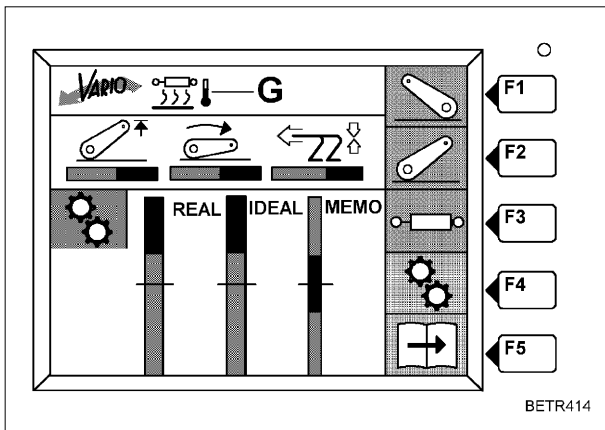
Central control block

<p>Fav 700 Fav 900</p>	<p>Hydraulics / Valve assemblies <b>Control valves SB 23 LS - EHS / Emergency mode</b></p>	<p><b>A</b></p>
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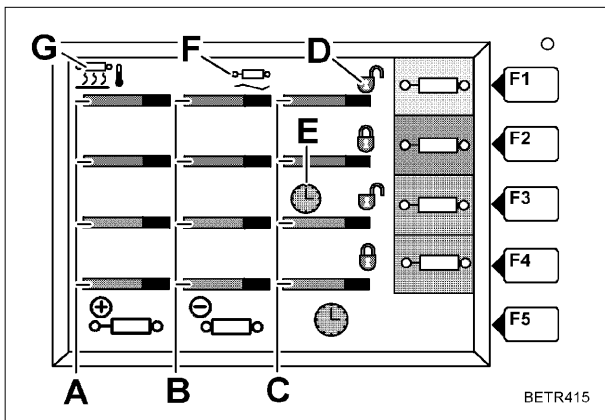
**Note:**

The SB 23LS electrical auxiliary control valves used in the Fav 700 are identical in terms of function to the auxiliary control valves for the Fav 900 of chassis number 23/... and higher but must not be fitted in the latter tractor type.

The electrical auxiliary control valves (Bosch SB 23LS - EHS with CAN actuation) are equipped with flow rate adjustment and a floating position and are therefore individually adaptable for any consumer. The valve functions are set via the control console.



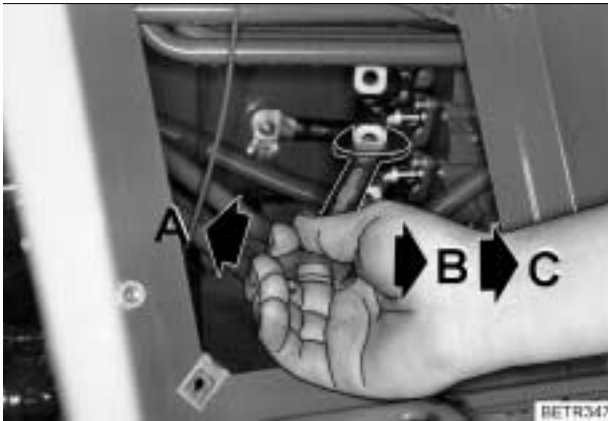
Press **key F3** and valve setting submenu seen at left is displayed.



- A = bar display, flow rate, lifting
- B = bar display, flow rate, lowering
- C = bar display, actuating time
- D = lock pictogram, valve locking ON/OFF
- E = clock pictogram, displayed when relevant valve is switched on by timer function
- F = cylinder pictogram, displayed while relevant valve is in floating position
- F1-F5 = move to submenu of individual valves

Date	Version	Page	Capitel	Index	Docu-No.
10/1999	b	1/6	9620	A	000002

<p>Fav 700 Fav 900</p>	<p>Hydraulics / Valve assemblies <b>Control valves SB 23 LS - EHS / Emergency mode</b></p>	<p><b>A</b></p>
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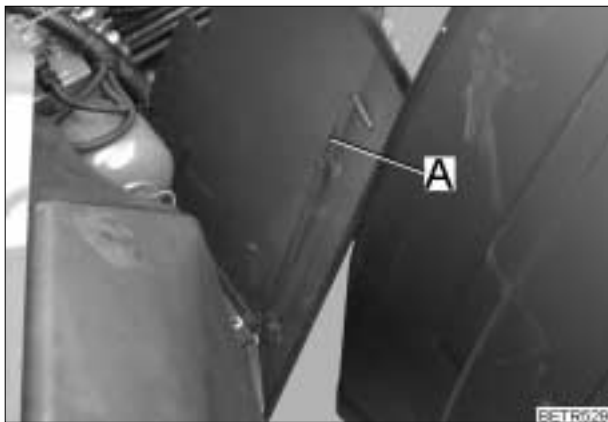
**Manual mode: Fav 700**

In the event of electronic failure, the individual valves can also be operated manually.

- Remove cover on right entrance step.
- Use spanner (22 mm) to actuate valve.

**Actuation directions:**

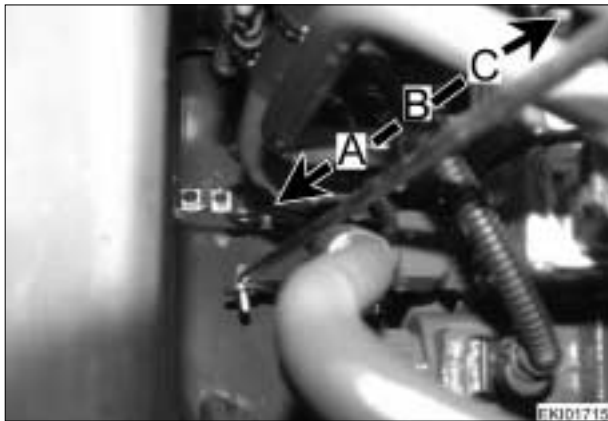
- A = Lifting
- B = Lowering
- C = Floating position



**Manual mode:**

**Fav 900 chassis number 23/3001 and up**

Linkage (A) behind cover at entrance step (right).



Actuate valves using linkage.

**Actuation directions:**

- A = Lifting
- B = Lowering
- C = Floating position



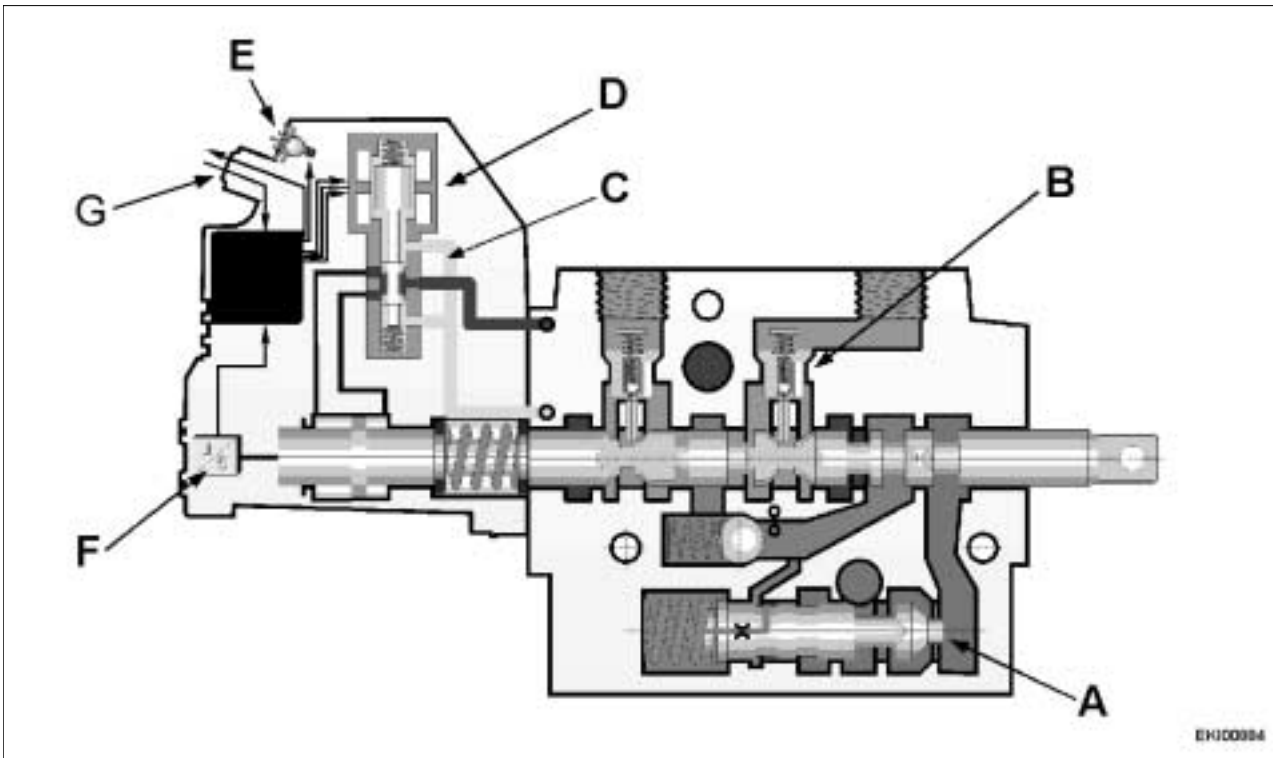
Pictogram shown at left is displayed during manual mode with engine running.

**Note:**

After manual mode, valves can only be actuated again using crossgate lever or joystick after resetting (engine ON/OFF).

Date	Version	Page	Capitel	Index	Docu-No.	
10/1999	b	2/6	Control valves SB 23 LS - EHS / Emergency mode	9620	A	000002

<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Hydraulics / Valve assemblies <b>Control valves SB 23 LS - EHS / Emergency mode</b></p>	<p><b>A</b></p>
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<p>A Pressure governor</p>	<p>E Diagnostics: optical display; fault signal</p>
<p>B Shutoff valve</p>	<p>F Inductive position sensor</p>
<p>C Control pressure 22 bar</p>	<p>G CAN setpoint</p>
<p>D Pilot valve</p>	

**The spool valves have four connecting leads:**

- **Pin 1** +Ub (connected via relay K 011 up to 714/716.../21/2000).
- **Pin 2:** Can -
- **Pin 3:** Can +
- **Pin 4:** earth

The valve supply and also the hydr. pilot pressure (pst.) of 22 bar (connected via pressure-reducing valve Y032 in the end plate EP) are only connected with the engine running.

When the engine is switched off, therefore, a valve can only be actuated via mechanical emergency control directly at the valve.

As far as valve diagnostics is concerned, this means that the power supply and the CAN-bus can only be tested (Fendias notebook) with the engine running.

Self-testing of the valves is transmitted to the ECU (e-box) solely via the CAN and then forwarded to the instrument panel (fault code).

Valve operation can be monitored visually using the LED on the valve connector. In the event of a fault, flashing codes are emitted in accordance with the Bosch coding system (see table).

Verification is possible by supplying Ub 12 V directly to the valve.

- Pin 1 = Ub
- Pin 4 = earth

If flashing code [1 pause 1] - only with direct power supply - appears, this means that the valve's electronics system is basically OK.

"Flashing code" fault code table

Date	Version	Page	Control valves SB 23 LS - EHS / Emergency mode	Capitel	Index	Docu-No.
10/1999	<b>b</b>	3/6		<b>9620</b>	<b>A</b>	<b>000002</b>

<b>Fav 700</b> <b>Fav 900</b>	Hydraulics / Valve assemblies <b>Control valves SB 23 LS - EHS / Emergency mode</b>	<b>A</b>
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<b>Flashing code</b>		
<b>Fault</b>		
First flashing sequence (after lengthy pause)	Second flashing sequence (after short pause)	
0	0	No fault (LED is off)
<b>Component or CAN fault</b>		
1	1	Receipt message 1 missing / e.g. ECU not at CAN, direct power supply to valve
1	2	Receipt message 2 missing
1	3	Implausible receipt message 1 / ECU sends incorrect message content
1	4	Implausible receipt message 2
1	5	Potentiometer / PWM fault / only if valve was wrongly programmed by Bosch
1	6	EEPROM inconsistent
1	7	No fault, but valve switched off for > 1s and may only switch back on after receipt of setpoint = neutral
<b>Minor faults</b>		
2	1	Undervoltage
2	2	Overvoltage, not dangerous
2	3	Slide does not reach required position
2	4	Slide is deflected too far
2	5	Floating position is not reached
2	6	Manual operation
<b>Only with CAN if faults 21 and 22 do not switch valve off</b>		
3	1	Undervoltage < 8V, valve switches off output stage
3	2	Overvoltage 36-45V, valve switches off output stage
<b>Serious faults with internal safety cutout</b>		
4	1	High overvoltage ( > approx. 45 V )
4	2	Output stage fault (output stage for pilot solenoid valve)
4	3	Position sensor fault
<b>Extremely serious faults with internal safety cutout, external shutoff required</b>		
8	1	Valve slide cannot be returned to neutral position
8	2	Valve slide not in neutral position when switching on

Date	Version	Page	Capitel	Index	Docu-No.
10/1999	<b>b</b>	4/6	<b>9620</b>	<b>A</b>	<b>000002</b>

<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Hydraulics / Valve assemblies <b>Control valves SB 23 LS - EHS / Emergency mode</b></p>	<p><b>A</b></p>
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**Shut down control valve (Emergency mode).**

If the electronics fail or if a control valve seizes mechanically, all the control valves lock.

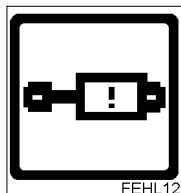
**The following steps must be taken if a control valve fails:**

Step	Purpose	Action
1	Determine which control valve has failed	Read and clear fault code Chapter 0000 Reg. B
2	Lower implement	Manual mode (see above)
3	Flush control valves hydraulically	Manual mode (see above)
4	If fault recurs and control valves lock	Shut down control valve (Emergency mode so that you can continue to work with remaining control valves)



**Procedure for shutting down control valve:**

Remove connector.



Start tractor.

Valve fault is shown on A007 - instrument panel (display with buzzer and warning light).

Cancel fault message:



A00462

Press key and hold.



A00458

Then press key.

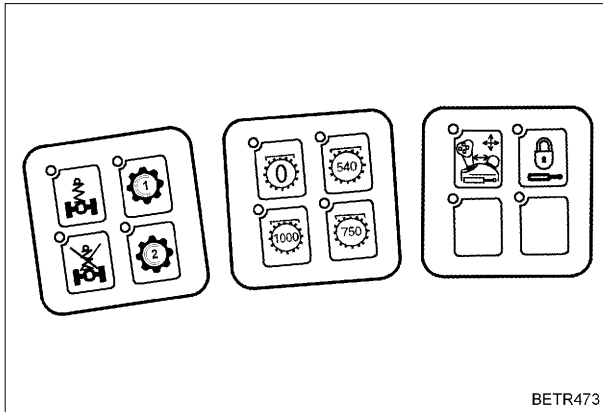
Stored fault messages must be cancelled individually. Cancelling fault message does not remove fault, it is simply no longer displayed.

Fault will be displayed again next time tractor is started.

Date	Version	Page	Control valves SB 23 LS - EHS / Emergency mode	Capitel	Index	Docu-No.
10/1999	b	5/6		9620	A	000002



Fav 700 Fav 900	Hydraulics / Valve assemblies <b>Control valves SB 23 LS - EHS / Emergency mode</b>	<b>A</b>
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BETR473



Unlock control valves with key and continue working with remaining control valves.

**Important:**

Control valve which has been shut down must remain in neutral position when engine is started.

**If not:**

- temperature can rise in hydraulic circuit
- noise in pump

**Note:**

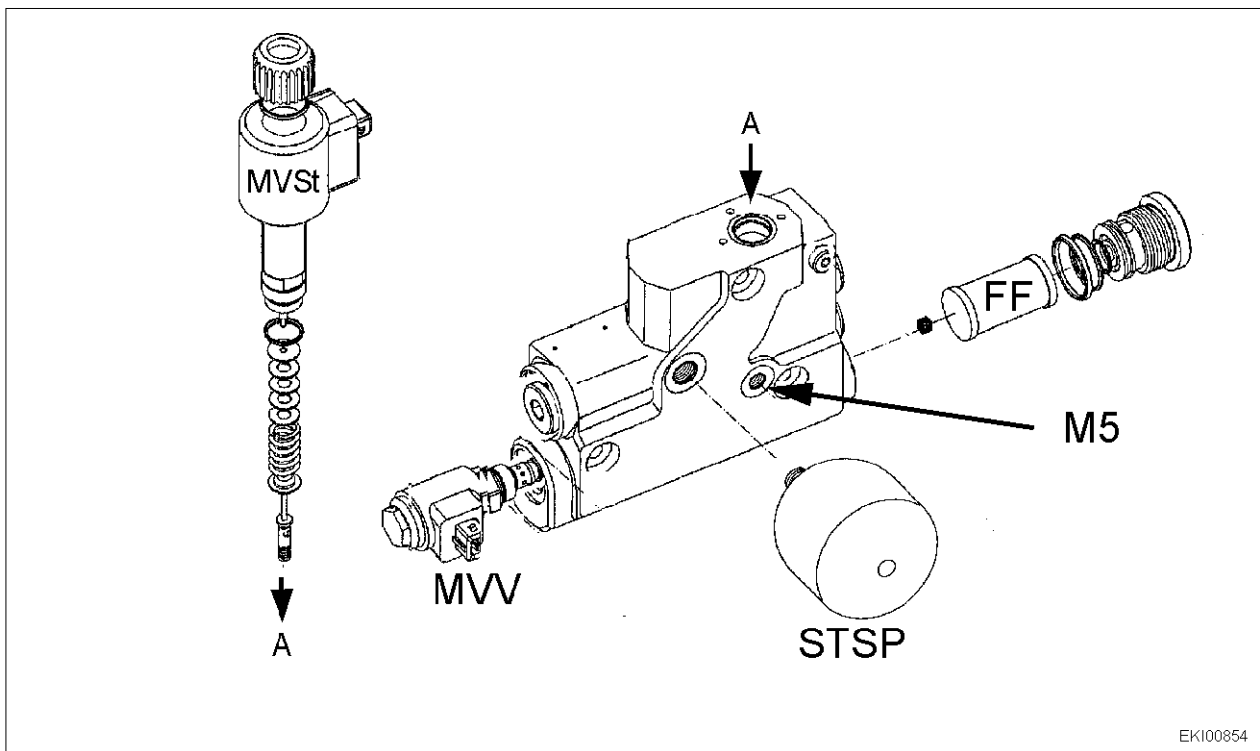
For further information on repairing and on troubleshooting with control valves see **Chapter 9600**

Date	Version	Page	Capitel	Index	Docu-No.
10/1999	<b>b</b>	6/6	<b>9620</b>	<b>A</b>	<b>000002</b>

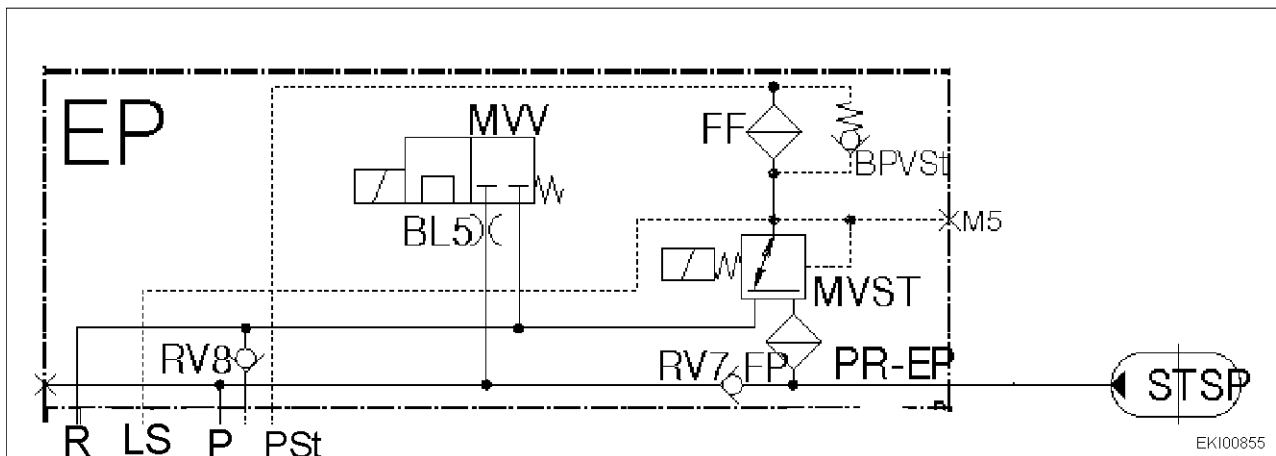
Fav 900	Hydraulic Equipment / Valves <b>Final Plate</b>	<b>A</b>
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**Final Plate ( EP )**

The final Plate is flanged below the last spool valve SB 23 - EHS . Solenoid Valve Neutral **MVSt** (Y032) and solenoid Valve **MVV** ( Y033 ) are mounted onto Final Plate.  
 Solenoid Valve **MVSt** Controls the Control Pressure 22 bar .  
 Measuring Point **M5** for checking Control Pressure 22 bar  
 Solenoid Valve **MVV** ist a flush valve with integrated orifice ( BL5 ) and will be activated for Oil heating.  
 Accumulatore **STSP** ensures continuity of Control Pressure.  
 Filter **FF** 0,025 mm is integrated upstream of Control Circuit. **Consult Maintenance schedule**  
 Electric Check of Solenoid Valves see Chapter 9000 Reg. E.  
 Diagram Register 9000 Sheet 24 and Sheet 29.



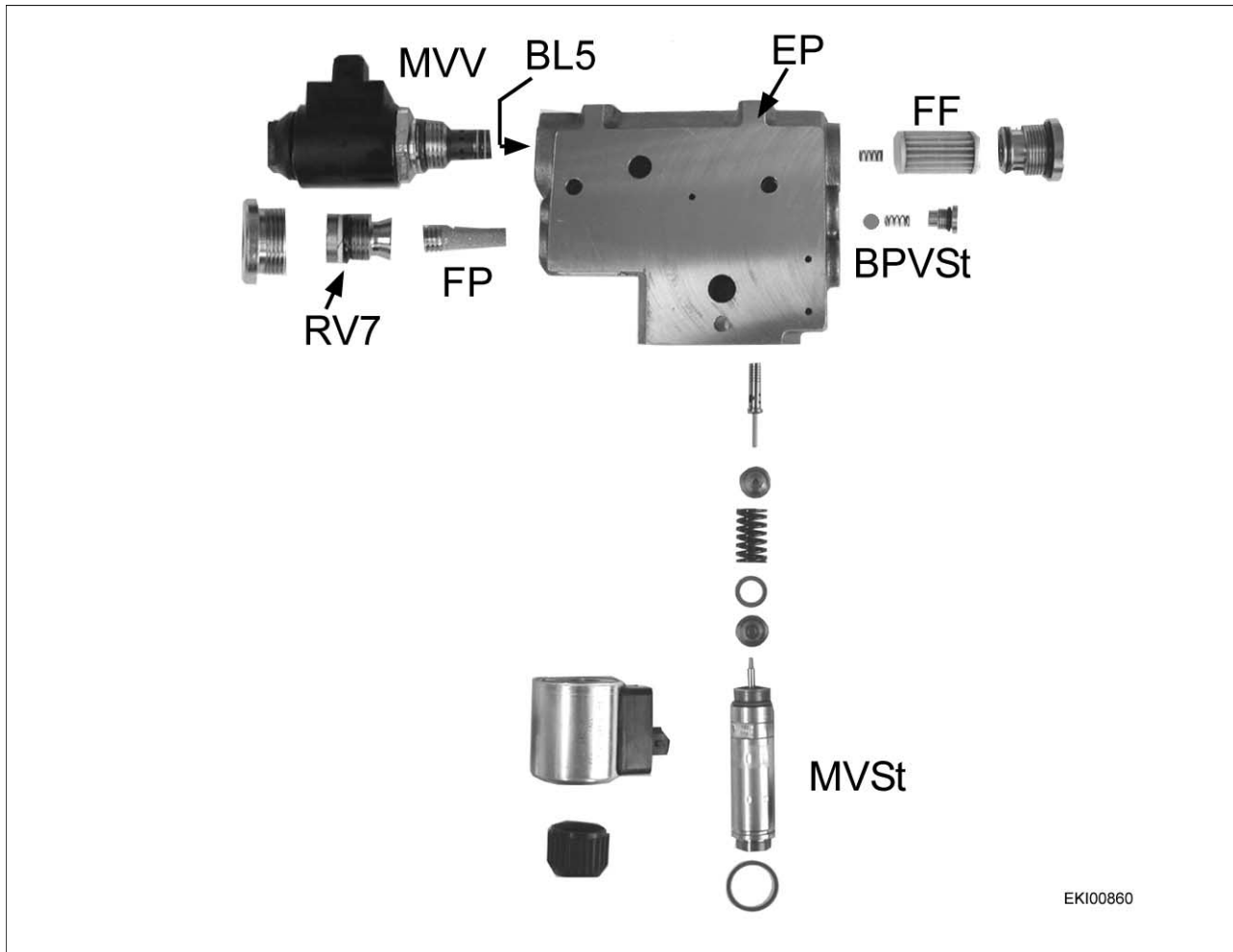
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Date	Version	Page	Capitel	Index	Docu-No.
6.12.2000	a	1/3	9620	A	000001

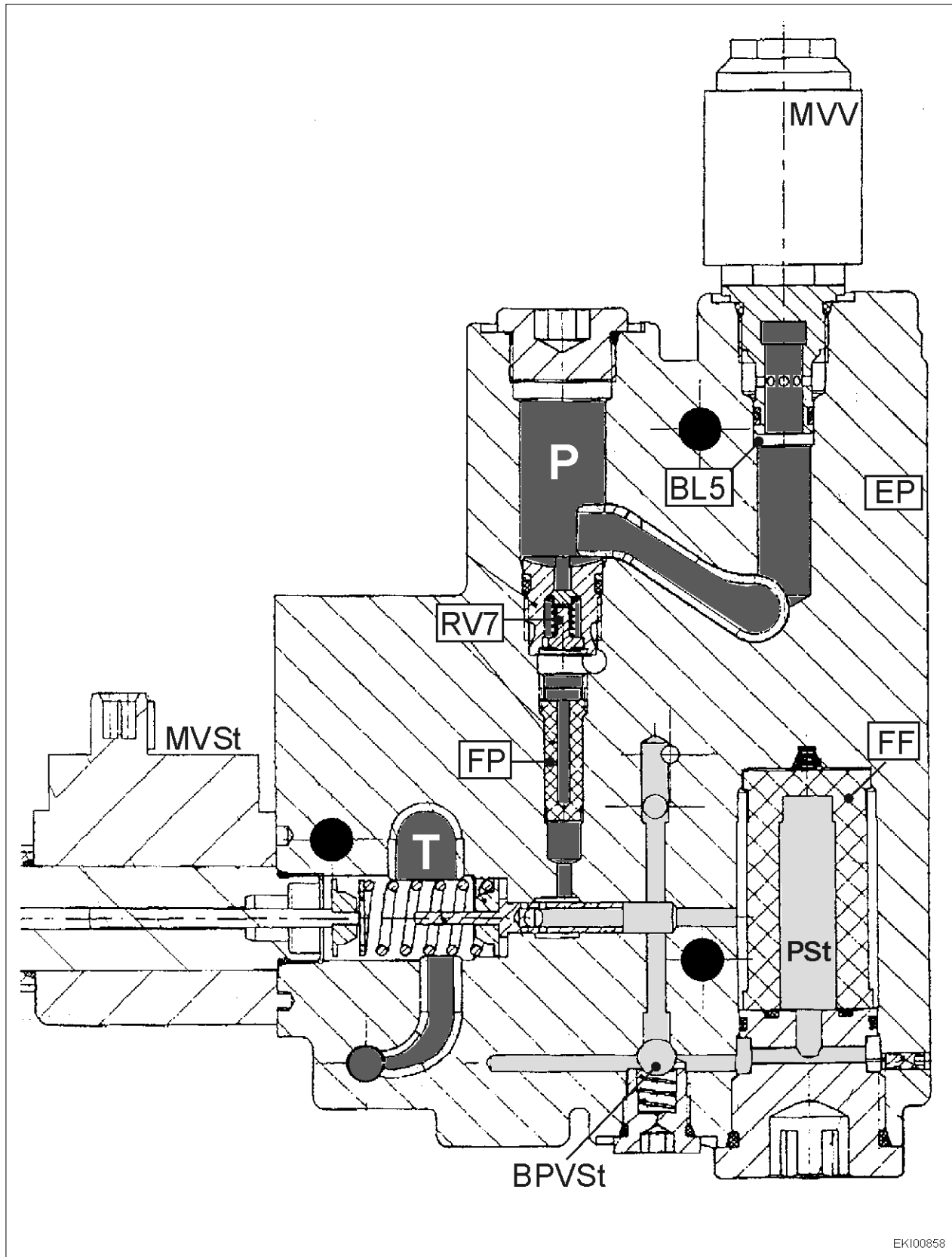
<b>Fav 900</b>	<b>Hydraulic Equipment / Valves Final Plate</b>	<b>A</b>
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Identification- hydraulic	Identification - electric	Component	Function
MVV	Y033	Flush Valve	Oil Heating
MVSt	Y032	Solenoid Valve Neutral (Spool Valves)	Control Pressure 22 bar
FF		Filter	Control Pressure 0,025 mm
FP		Filter	Pre - Filter 0,1 mm in P -Channel
BPVSt		Bypass valve	Safety for Filter
BL5		Orifice	Oil Heating
RV7		Non Return Valve	Accumulator Pressure
EP		Final Plate	

Date	Version	Page	<b>Final Plate</b>	Capitel	Index	Docu-No.
6.12.2000	a	2/3		9620	A	000001

Fav 900	Hydraulic Equipment / Valves Final Plate	A
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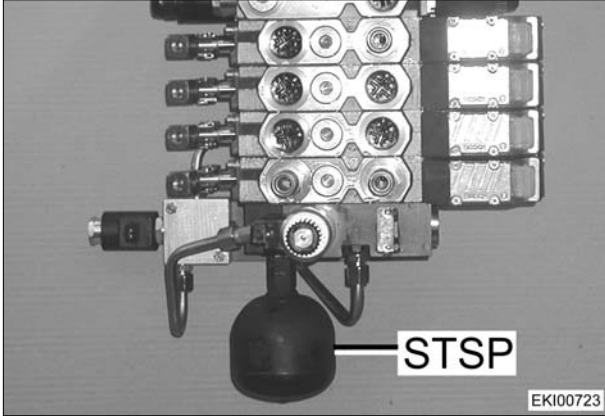
Date 6.12.2000	Version a	Page 3/3	Final Plate	Capitel 9620	Index A	Docu-No. 000001

<p>Fav 700 Fav 900</p>	<p>Hydraulics / Valve fitting <b>Nitrogen diaphragm accumulator - STSP</b></p>	<p><b>E</b></p>
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If the control pressure (pSt) falls to approx. 16 bar when actuating the SB 23 LS-EHS control valves, the control valves lock.

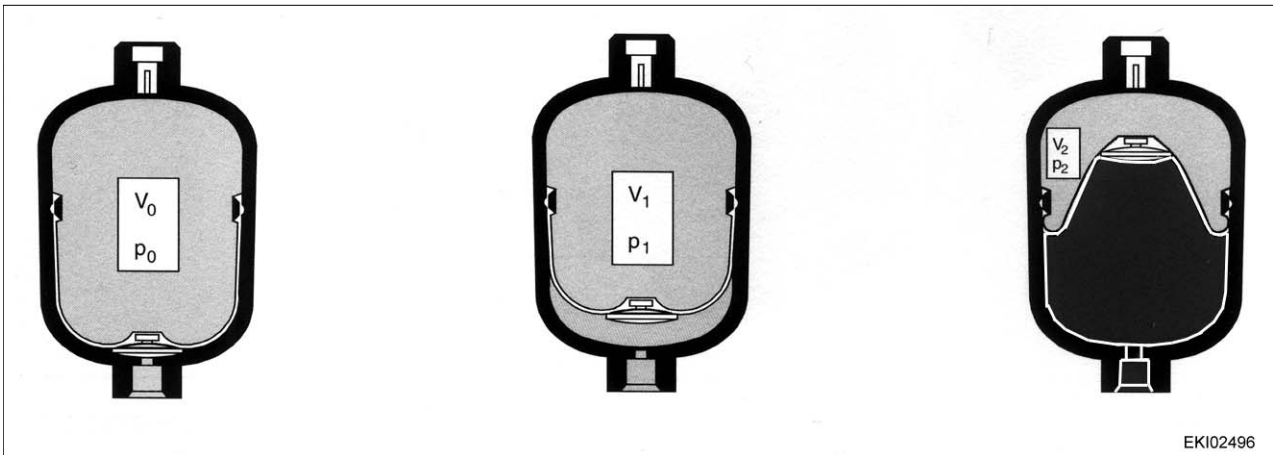
Possible cause: leaks in the diaphragm accumulator - STSP

The method for testing the diaphragm accumulator - STSP is described below.



Nitrogen diaphragm accumulator		
	Volume [litres]	Pressure [bar ]
Version A	0.16	16
Version B	0.32	16
When fitting a new diaphragm accumulator: Fit a version B diaphragm accumulator		

### Diaphragm accumulator operating principle



- V0** = Rated volume (0.32 litre)
- p0** = Initial gas pressure (16 bar)
- V1** = Discharged diaphragm accumulator
- P1** = Min. working pressure (approx. 17 bar)
- V2** = Full diaphragm accumulator
- p2** = Max. working pressure (200 bar)

Whereas in pneumatic systems the medium used - air - can be directly compressed to store energy, a hydraulic fluid is hardly compressible at all.

An inert gas (nitrogen) is used so that it can be stored under pressure nonetheless.

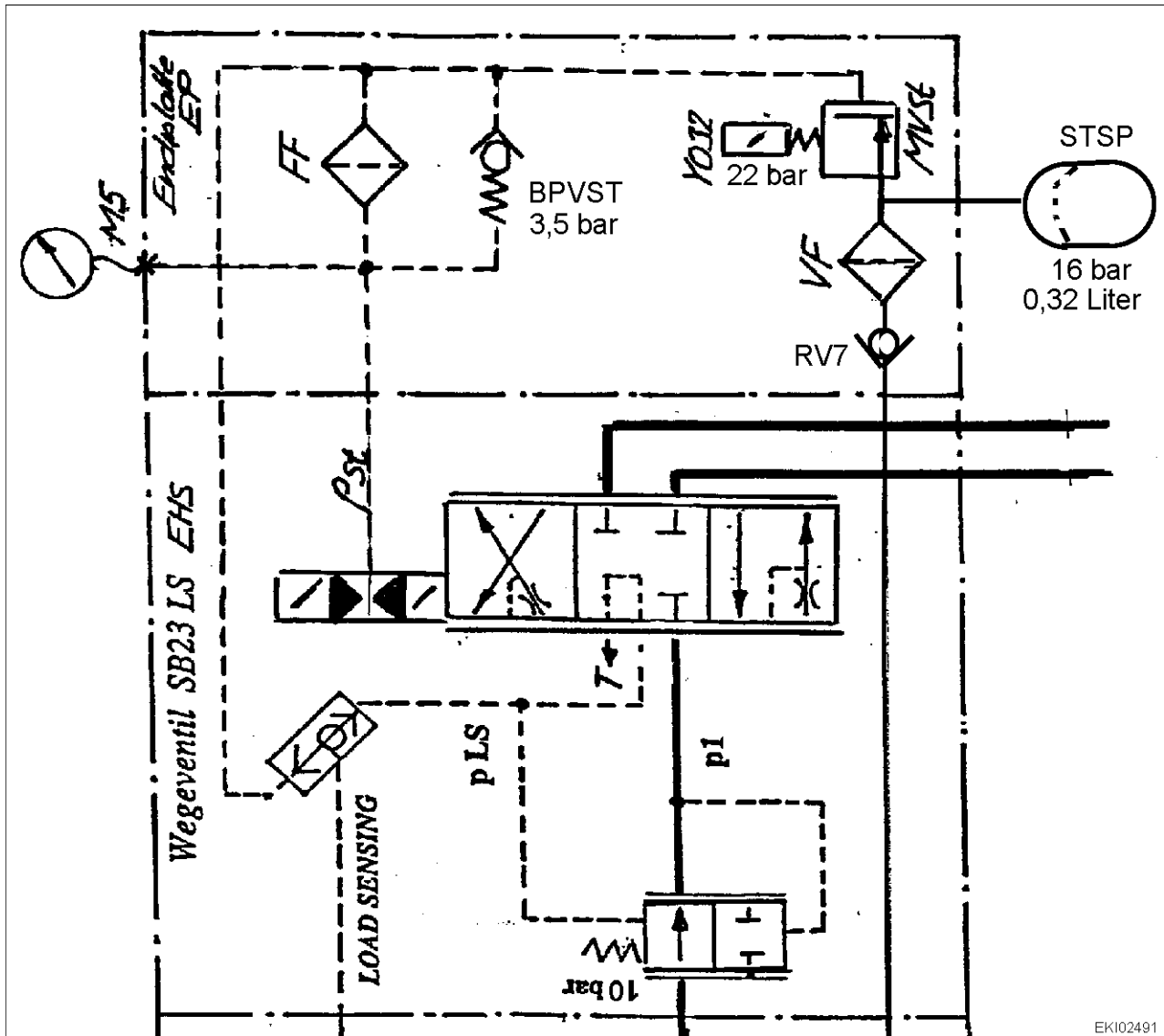
This is compressed by the hydraulic fluid in a pressure vessel and then expands, if necessary, when hydraulic fluid is discharged.

To ensure that the nitrogen does not mix with the hydraulic fluid (and produce foam), the accumulator is divided into two chambers by an elastic diaphragm (diaphragm accumulator).

Date	Version	Page	Nitrogen diaphragm accumulator - STSP	Capitel	Index	Docu-No.
04.12.2001	a	1/5		9620	E	000002

Fav 700 Fav 900	Hydraulics / Valve fitting <b>Nitrogen diaphragm accumulator - STSP</b>	<b>E</b>
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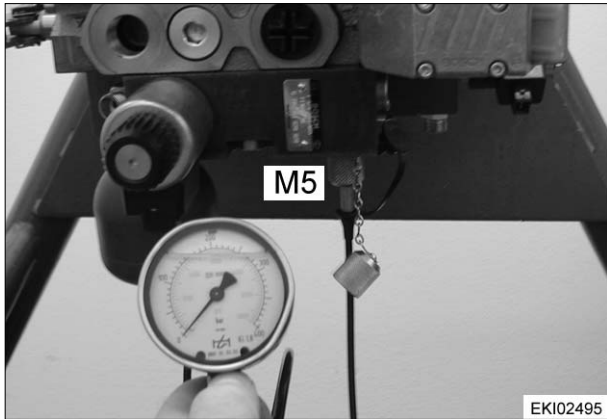
**Circuit diagram: end plate - EP with diaphragm accumulator - STSP**



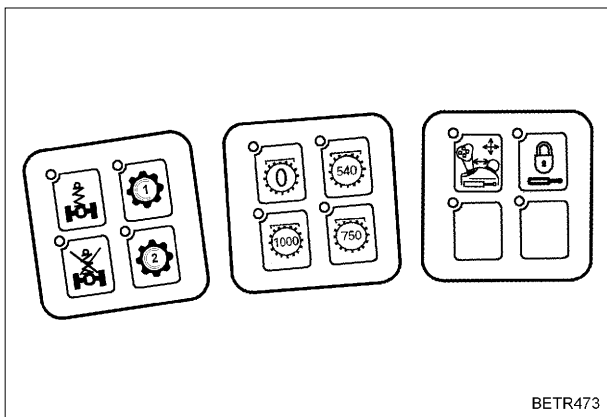
EKI02491

Item	Designation	Item	Designation
EP	End plate	FF	Microfilter (paper)
RV7	Non-return valve	M5	Pressure-measuring point
VF	Prefilter (sintered metal)	T	Return flow
STSP	Diaphragm accumulator	pSt	Control pressure (22 bar)
MVSt	Control pressure solenoid valve	PLS	Load-sensing pressure
Y032	Control pressure solenoid valve	P1	Pump pressure

<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Hydraulics / Valve fitting</p> <p><b>Nitrogen diaphragm accumulator - STSP</b></p>	<p><b>E</b></p>
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Connect pressure gauge (measurement range 40 bar) to measuring point M5.



Start tractor and unlock control valves by pressing key.

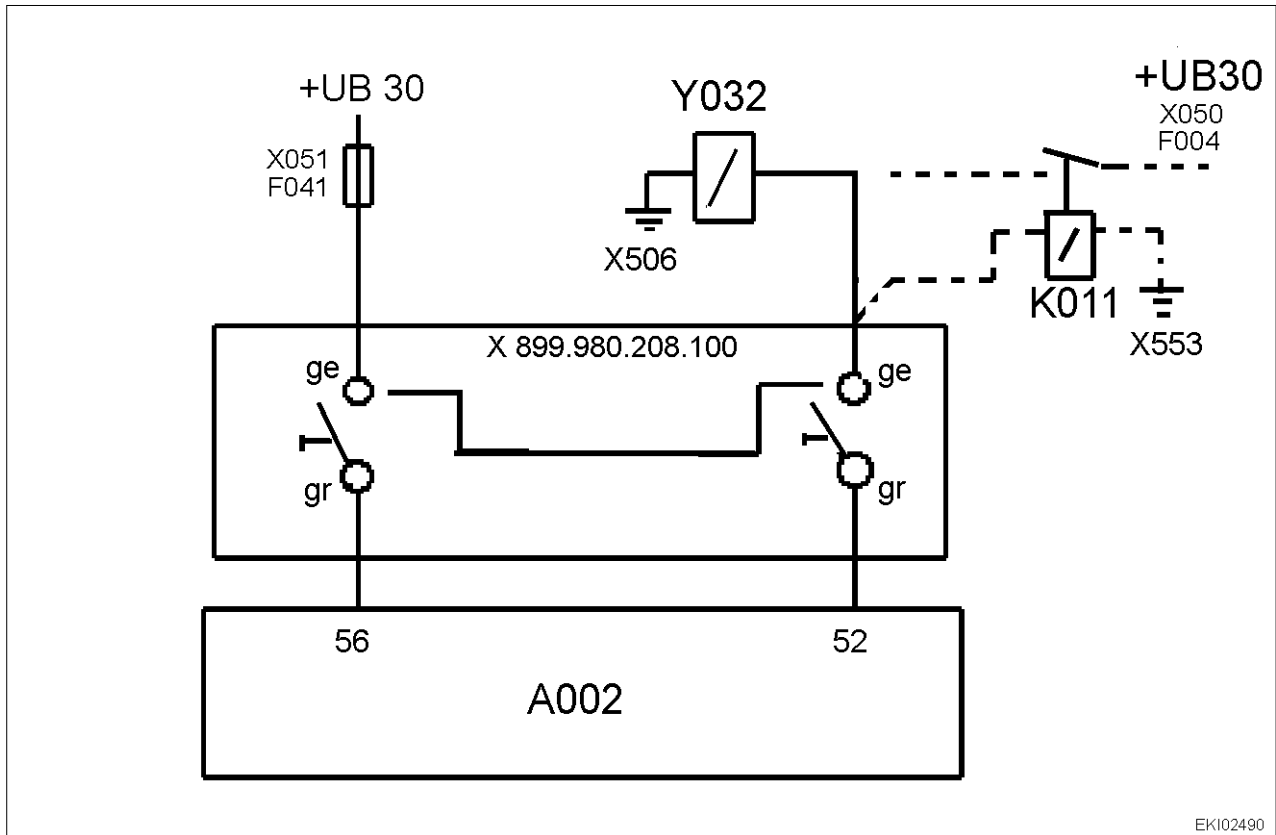
Y032 - control pressure solenoid valve is energised (control pressure of 22 bar is generated).

Switch tractor off (ignition OFF) and provide external power source for Y032 - control pressure solenoid valve.

Date	Version	Page	Nitrogen diaphragm accumulator - STSP	Capitel	Index	Docu-No.
04.12.2001	a	3/5		9620	E	000002

<p>Fav 700 Fav 900</p>	<p>Hydraulics / Valve fitting <b>Nitrogen diaphragm accumulator - STSP</b></p>	<p><b>E</b></p>
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**Drawing of external power source for Y032 - control pressure solenoid valve**



EKI02490

Fav 711/712 /21/ chassis number 1001 and up; 714/716 /21/ chassis number 2001 and up

Fav 900 /23/ chassis number 3001 and up

Fav 714/716 /21/ chassis number up to 2000 (Y032 - control pressure solenoid valve is actuated via K011 - relay)

- Connect e-adapter box X 899.980.208.100 directly to A002 ECU, enhanced controls.
- Isolate toggle switch pin 56 at e-adapter box.
- Isolate toggle switch pin 52 at e-adapter box.
- Provide external power source for Y032 - control pressure solenoid valve.

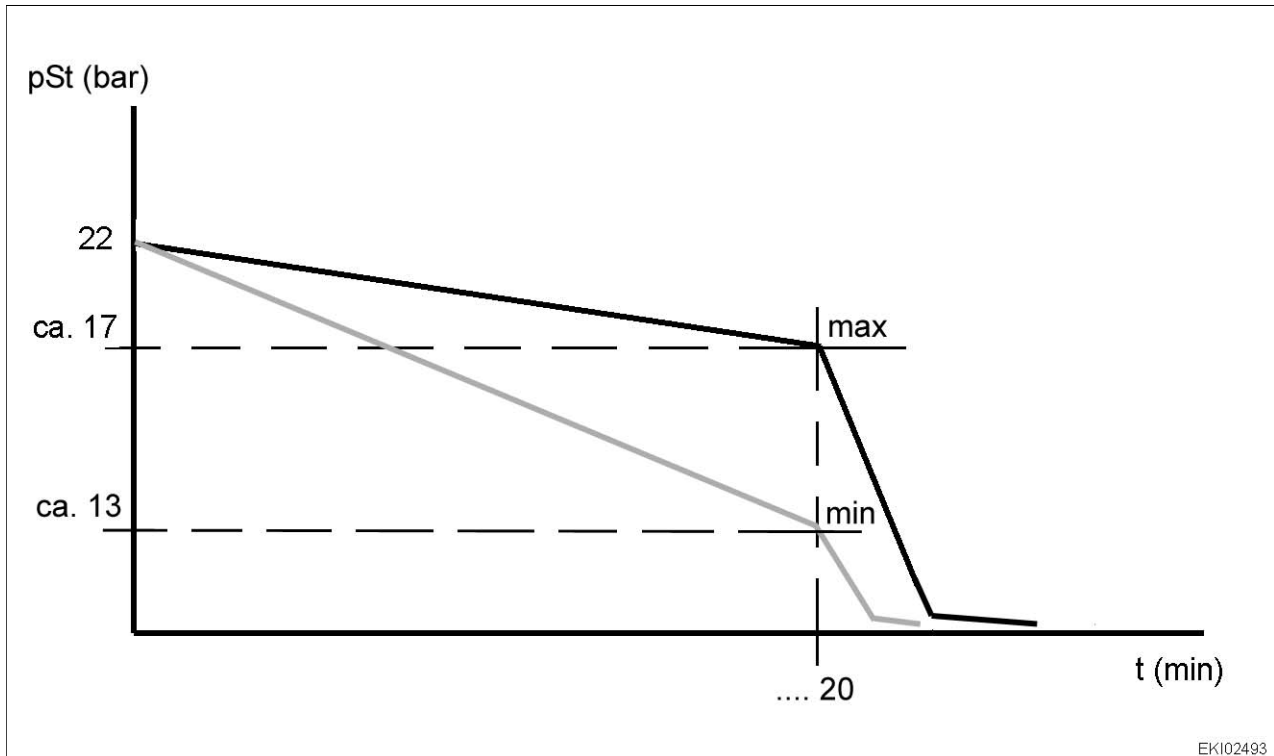
Date	Version	Page	Capitel	Index	Docu-No.
04.12.2001	a	4/5	<b>9620</b>	<b>E</b>	<b>000002</b>



Fav 700  
Fav 900Hydraulics / Valve fitting  
Nitrogen diaphragm accumulator - STSP

E

## Pressure curve at measuring point M5



EKI02493

pSt = Control pressure (measured at measuring point M5)

**Testing diaphragm accumulator - STSP**

- Start tractor and unlock control valves.
- Control pressure of 22 bar is generated.
- Switch tractor off (ignition OFF).
- Provide external power source for Y032 - control pressure solenoid valve.
- The nitrogen diaphragm accumulator feeds more oil so that the control pressure is maintained.
- The control pressure of 22 bar gradually dissipates via the pilot valves (in the electric control valves) and via the load-sensing line (over a period of approx. 20 min).
- Once the pressure in the diaphragm accumulator has been relieved, the control pressure falls quickly

**Target values:****Max. accumulator pressure (diaphragm accumulator relieved) approx. 17 bar****Min. accumulator pressure (diaphragm accumulator relieved) approx. 13 bar****If the accumulator pressure (diaphragm accumulator relieved) falls below approx. 13 bar:**

- internal leak in diaphragm accumulator - STSP
- leak in non-return valve - RV7
- leak in pilot valve of electric control valves
- leak in load-sensing line to LS pump - PR

**Note:****The time (t) in which the control pressure (pSt) falls depends on:**

- the tolerances in the pilot valve (electric control valves) and in the load-sensing line
- the hydraulic oil temperature

Date	Version	Page	Nitrogen diaphragm accumulator - STSP	Capitel	Index	Docu-No.
04.12.2001	a	5/5		9620	E	000002

<b>Fav 700</b> <b>Fav 900</b>	<b>Hydraulics / Valve fitting</b> <b>Setting valve number / Changing valve number</b>	<b>F</b>
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Pin	Function
1	+UB
2	CAN-low
3	CAN-high
4	Earth

**Note:**

The control valves of type SB 23LS used in the Fav 700 are identical in function to the control valves for Fav 900 chassis number 23/3001 and up but must not be fitted to this tractor type. Reason: The CAN-bus connections in the Fav 700 and Fav 900 chassis number 23/3001 and up have different transmission rates.

**Colour coding of control valves**

1st layer (standard) = yellow

2nd layer (standard) = blue

3rd layer (standard) = red

4th layer (optional extra) = green

5th layer (optional extra) = Enhanced control front power lift

Date	Version	Page	<b>Setting valve number / Changing valve number</b>	Capitel	Index	Docu-No.
30.07.2001	a	1/7		<b>9620</b>	<b>F</b>	<b>000001</b>

Fav 700 Fav 900	Hydraulics / Valve fitting <b>Setting valve number / Changing valve number</b>	<b>F</b>
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**Fendt diagnostics program - "Fendias" (programming and diagnostics)**

Software-Version: 4.8  
 Anwender: Fendt/EKI-5  
 Etiketten drucken: On/Off

**Schleppertyp**

FARMER 300, FAVORIT 900, FARMER 400, XYLON, FAVORIT 500, FAVORIT 700, FAVORIT 800

**Grundprogrammierung von**

Schlepper, EHR-Heck, Kombiinstrument, EHR-Front, Grund-EST, Ventile, Zusatz-EST, Bedienkonsole, Getriebe-EST, Bedienterminal, Komfort-EST

Ausgewählter Schlepper-Typ: FAVORIT 700  
 Ausgewählte Programmierung: Sonderfunktion

Auswahl bestätigen, Sonderfunktion, Ende

EKI01817

**Note:**

For further information on "Fendias" see "Fendias" operating manual ( EOLwin - UNIwin - VARIOwin )

**End of line program (EOL)**

- Select tractor type.
- Select "Special functions" submenu item

Date	Version	Page	Capitel	Index	Docu-No.
30.07.2001	a	2/7	Setting valve number / Changing valve number	9620	F 000001

<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Hydraulics / Valve fitting <b>Setting valve number / Changing valve number</b></p>	<p><b>F</b></p>
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**"Special functions" submenu**

**Sonderfunktion**

Fahrzeugdaten	EEPROM-Inhalt EST
Umwandlung EST	EEPROM-Inhalt Kombiinstrument
Fehlerspeicher löschen	EEPROM-Inhalt EHR
Ventil-Nr. setzen	EEPROM-Inhalt Bedienkonsole
Ventil-Nr. ändern	EEPROM-Inhalt Bedienterminal
Terminal-FLASH programmieren	

**Zurück**

**Vorgang**

EKI01814

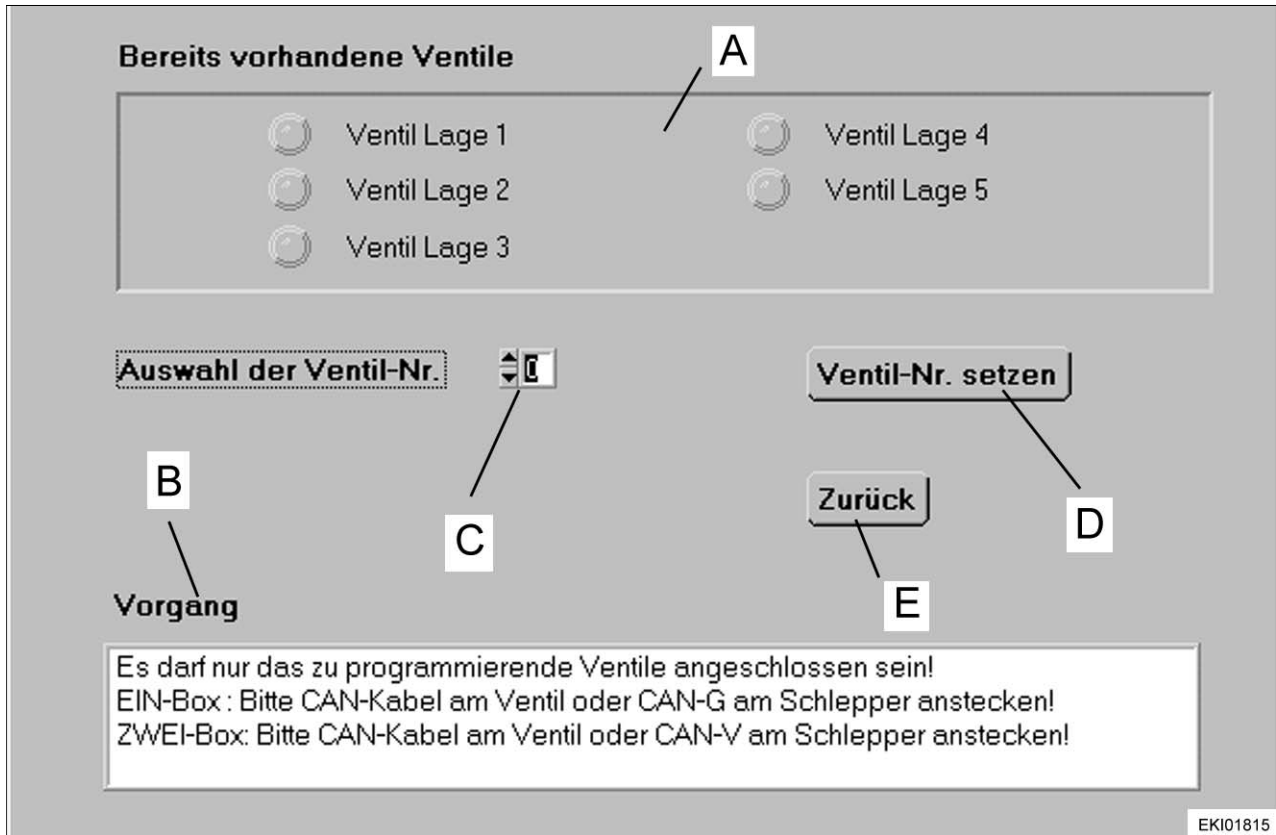
**Selection**

- Setting valve number
- Changing valve number

Date	Version	Page	Setting valve number / Changing valve number	Capitel	Index	Docu-No.
30.07.2001	a	3/7		<b>9620</b>	<b>F</b>	<b>000001</b>

Fav 700 Fav 900	Hydraulics / Valve fitting <b>Setting valve number / Changing valve number</b>	<b>F</b>
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**"Setting valve number" submenu**



Item	Designation	Item	Designation
A	Display of already available valves	D	Confirm here to start valve programming
B	Programming process (sequence)	E	Back to "Special functions" submenu
C	Valve number to be set (programmed)		

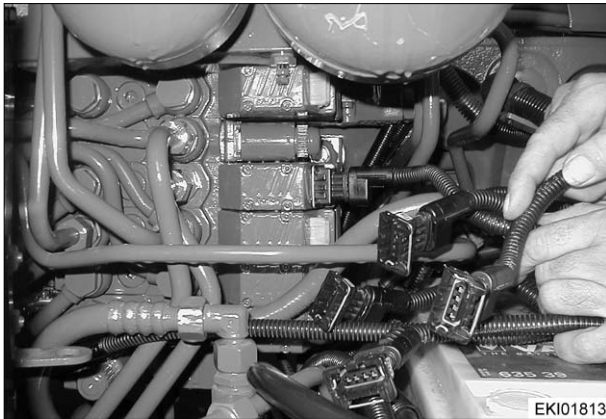
**Note:**

Irrespective of its position, enhanced control front power lift (optional extra) should always be set to address 5.

In Fav 714/716 chassis number up to 21/2000 (twin e-box) engine must be running to set/change valves.

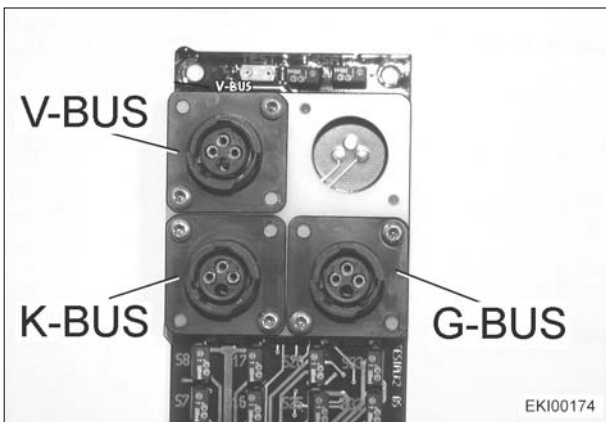
Date	Version	Page	Setting valve number / Changing valve number	Capitel	Index	Docu-No.
30.07.2001	a	4/7		9620	F	000001

<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Hydraulics / Valve fitting</p> <p><b>Setting valve number / Changing valve number</b></p>	<p><b>F</b></p>
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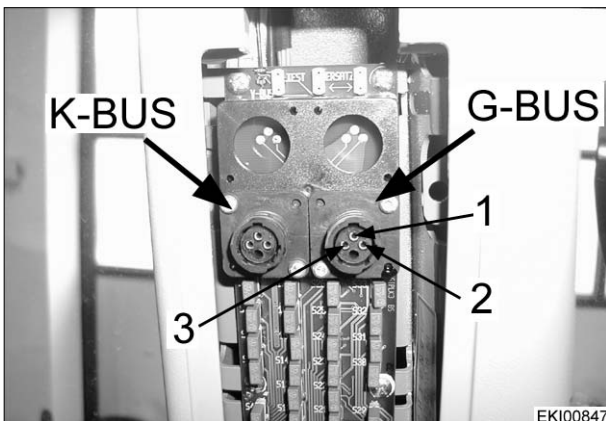
**Setting valve number**

To set (program) electric control valves  
**Only the control valve to be set may be connected. All other valves must be disconnected.**



**Fav 714 / 716 up to 21/2000**

Connect CAN cable to V-bus (valve bus).



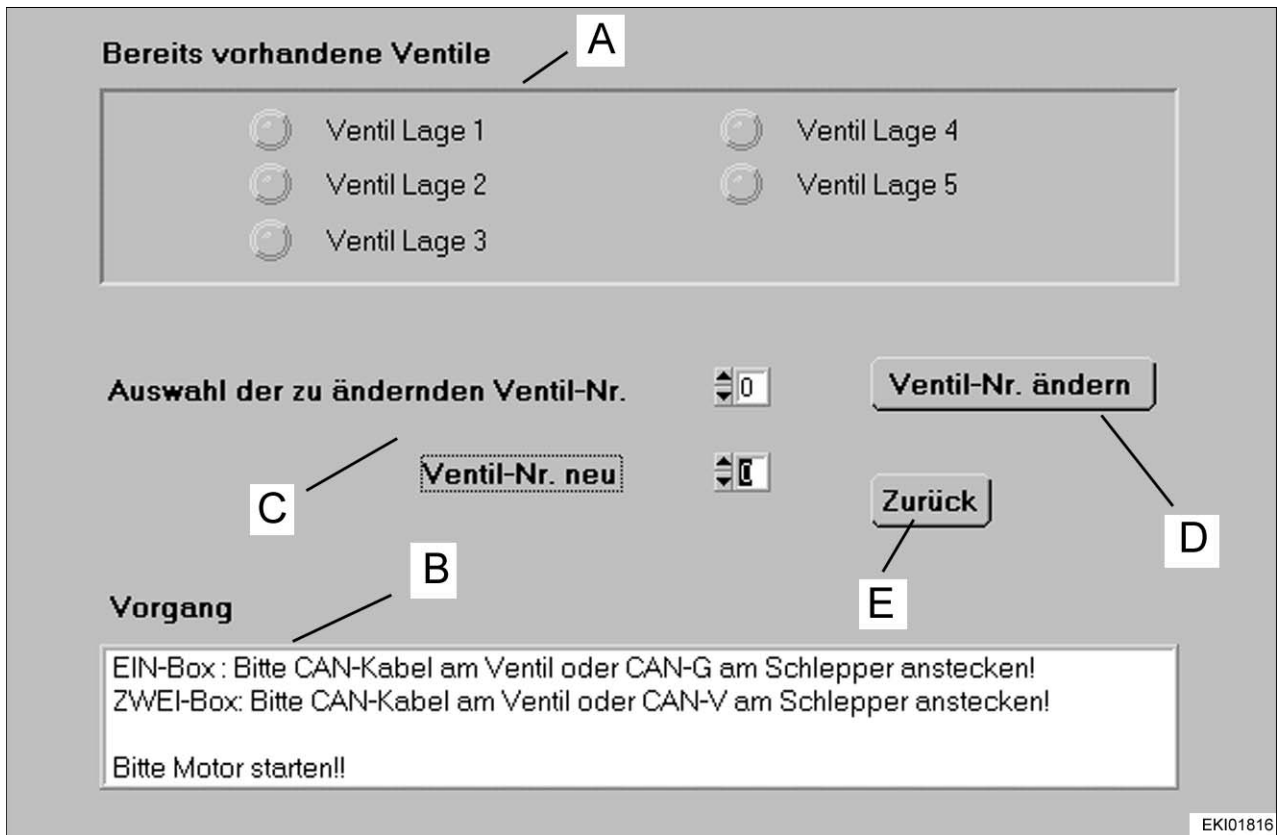
**Fav 711/712 chassis number 21/1001 and up  
 and Fav 714/716 chassis number 21/2001 and up**

**Fav 900 chassis number 23/3001 and up**  
 Connect CAN cable to G-bus (transmission bus).

Date	Version	Page	Setting valve number / Changing valve number	Capitel	Index	Docu-No.
30.07.2001	a	5/7		9620	F	000001

<b>Fav 700</b> <b>Fav 900</b>	<b>Hydraulics / Valve fitting</b> <b>Setting valve number / Changing valve number</b>	<b>F</b>
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**"Changing valve number" submenu**



Item	Designation	Item	Designation
A	Display of already available valves	D	Confirm here to start valve programming
B	Programming process (sequence)	E	Back to "Special functions" submenu
C	Valve number to be set (programmed)		

**Note:**

Irrespective of its position, enhanced control front power lift (optional extra) should always be set to address 5.

In Fav 714/716 chassis number up to 21/2000 (twin e-box) engine must be running to set/change valves.

Date	Version	Page	<b>Setting valve number / Changing valve number</b>	Capitel	Index	Docu-No.
30.07.2001	a	6/7		<b>9620</b>	<b>F</b>	<b>000001</b>

<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Hydraulics / Valve fitting</p> <p><b>Setting valve number / Changing valve number</b></p>	<p><b>F</b></p>
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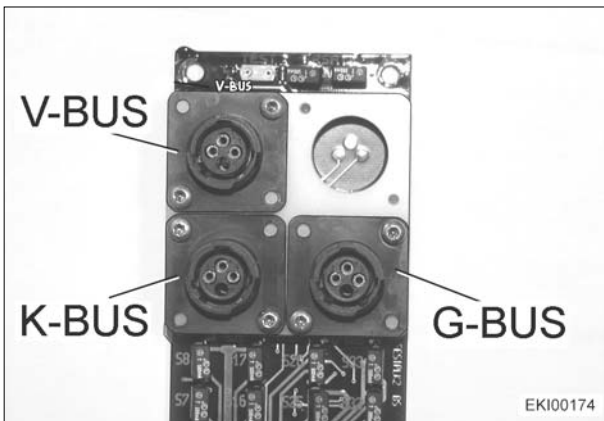
**Changing valve number**

All control valves remain connected.

- If control valves are not preset (programmed) when supplied, their address is "0". Once such a control valve has been fully installed, it can be moved from its "0" address to its new address.
- A further option is when troubleshooting, for example if you wish to swap the 3rd layer control valve for the 4th layer control valve. However, this requires the use of a third unoccupied address, as described in the example below.

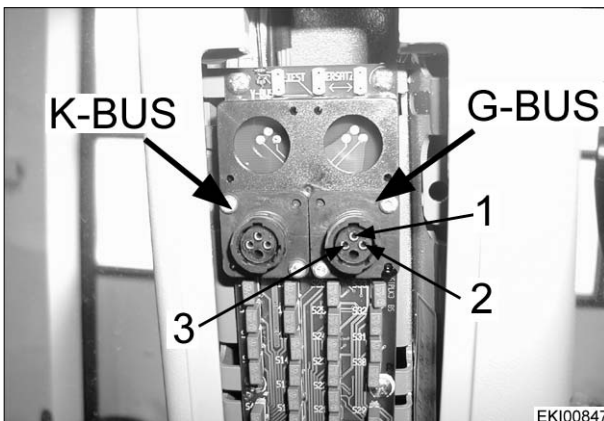
**"Changing valve number" procedure**

1. Change valve 3 to valve 0.
2. Change valve 4 to valve 3.
3. Change valve 0 to valve 4.
4. Reprogramming to the original settings is carried out in the same way via address 0.



**Fav 714 / 716 up to 21/2000**

Connect CAN cable to V-bus (valve bus).



**Fav 711/712 chassis number 21/1001 and up and Fav 714/716 chassis number 21/2001 and up**

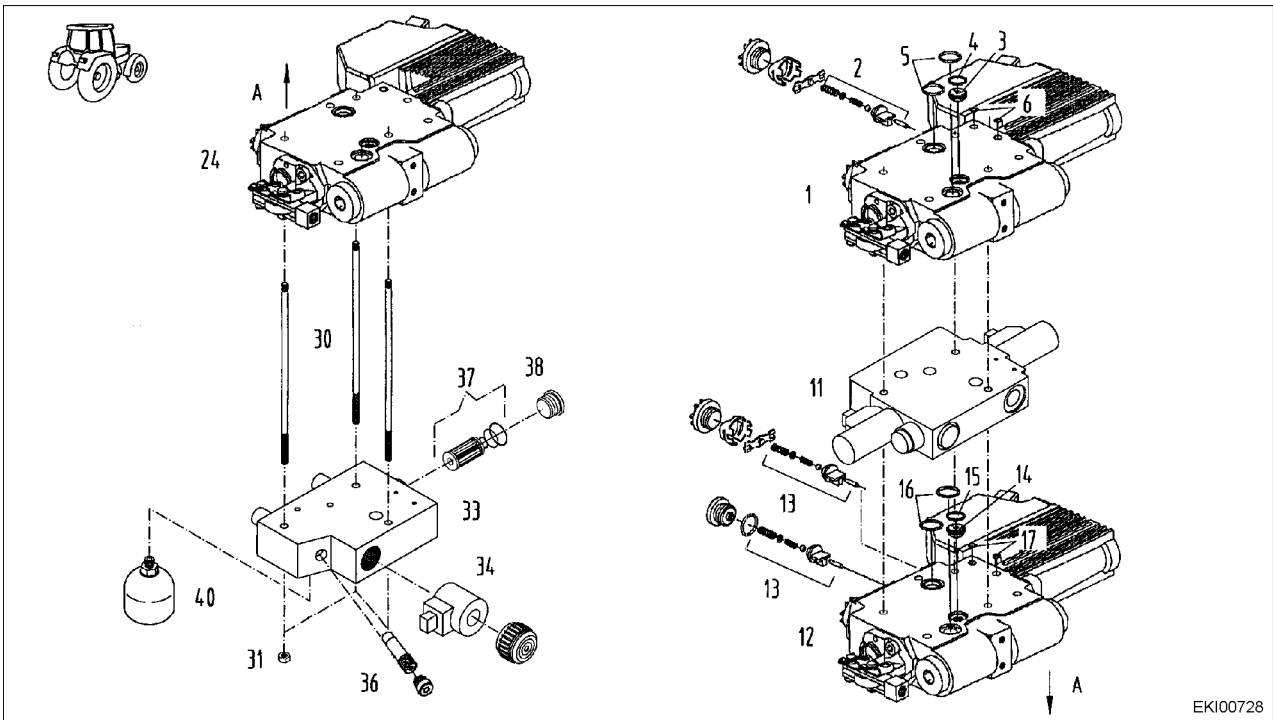
**Fav 900 chassis number 23/3001 and up**

Connect CAN cable to G-bus (transmission bus).

Date	Version	Page	Setting valve number / Changing valve number	Capitel	Index	Docu-No.
30.07.2001	a	7/7		9620	F	000001



<p>Fav 700 Fav 900</p>	<p>Hydraulics / Valve fitting <b>Fitting and removing SB 23 LS-EHS control valves</b></p>	<p>G</p>
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Item	Designation	Item	Designation
1	Directional control valve	16	O-ring
2	Parts set	24	Directional control valve
3	Shuttle valve	30	Stud bolt
4	O-ring	31	Hexagon nut
5	O-ring	33	End plate
11	EPC valve	34	Solenoid
12	Seal set	36	Filter
13	Parts set	37	Filter
14	Shuttle valve	38	Drain plug
15	O-ring	40	Diaphragm accumulator

**Note:**

Retrofitting and repair work on the service hydraulics must be carried out with very great attention to cleanliness. The smallest particles of dirt in the control circuit can prevent the control movement or cause an unintentional movement.

**Note:**

The control valves of type SB 23LS used in the Fav 700 are identical in function to the control valves for Fav 900 chassis number 23/3001 and up but must not be fitted to this tractor type. Reason: The CAN-bus connections in the Fav 700 and Fav 900 chassis number 23/3001 and up have different transmission rates.

**Note:**

The work was carried out on a Fav 700. Carry out work on the Fav 900 chassis number 23/3001 and up in the same way.

Date	Version	Page	Fitting and removing SB 23 LS-EHS control valves	Capitel	Index	Docu-No.
23.07.01	a	1/8		9620	G	000002

<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Hydraulics / Valve fitting <b>Fitting and removing SB 23 LS-EHS control valves</b></p>	<p><b>G</b></p>
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**Colour coding of control valves**

- 1st layer (standard) = yellow
- 2nd layer (standard) = blue
- 3rd layer (standard) = red
- 4th layer (optional extra) = green
- 5th layer (optional extra) = Enhanced control front power lift



**Removing control valve (2nd layer "blue")**

**Fav 900 chassis number 23/3001 and up**

Remove auxiliary fuel tank.

**Note:**

See Fav 900 Workshop Manual.  
Chapter 1050 Index G - Detaching the clutch/gearbox housing



Loosen 6 screws and remove entire battery case.



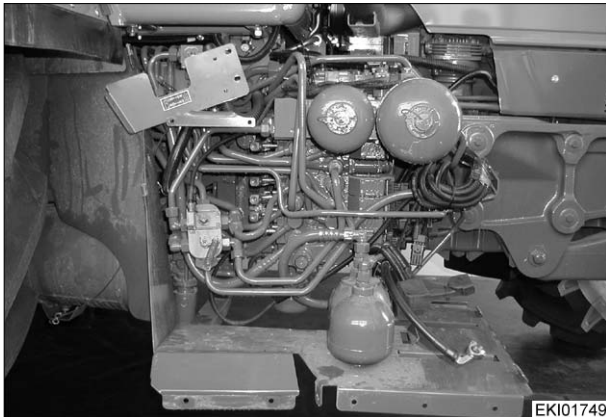
Remove G001 - battery.

Date	Version	Page	Capitel	Index	Docu-No.
23.07.01	a	2/8	Fitting and removing SB 23 LS-EHS control valves	9620	G 000002

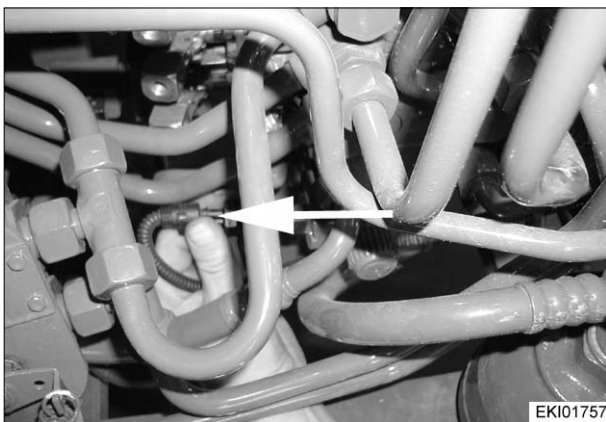
**Fav 700**  
**Fav 900**

**Hydraulics / Valve fitting**  
**Fitting and removing SB 23 LS-EHS control valves**

**G**



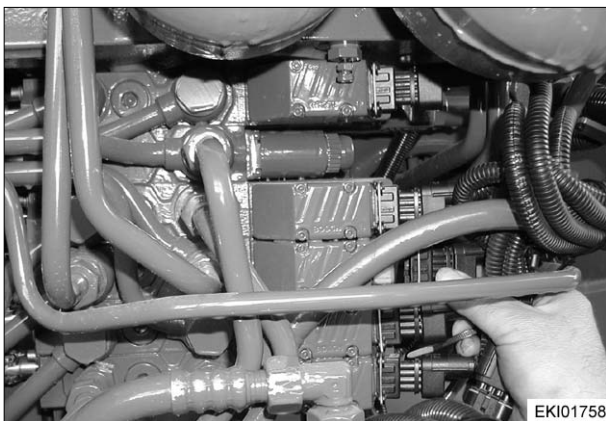
Remove entrance step.



At end plate - EP:

Label and disconnect connector Y032 - control pressure solenoid valve.

Label and disconnect connector Y033 - preheater solenoid valve.



Disconnect connectors Y015 - Y019.

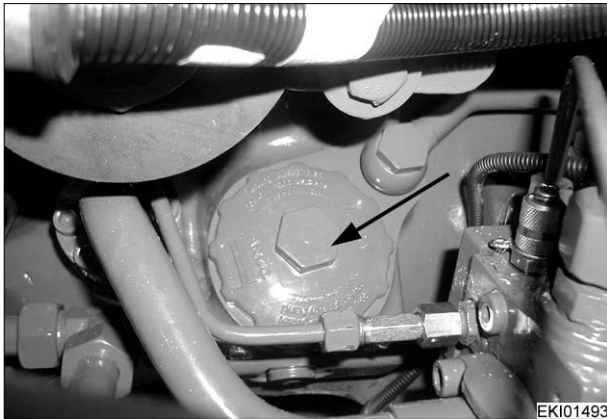


**Fav 700**

Remove hydraulic tank cover. This prevents hydraulic oil from continuing to run.

Date	Version	Page	Capitel	Index	Docu-No.	
23.07.01	a	3/8	<b>Fitting and removing SB 23 LS-EHS control valves</b>	<b>9620</b>	<b>G</b>	<b>000002</b>

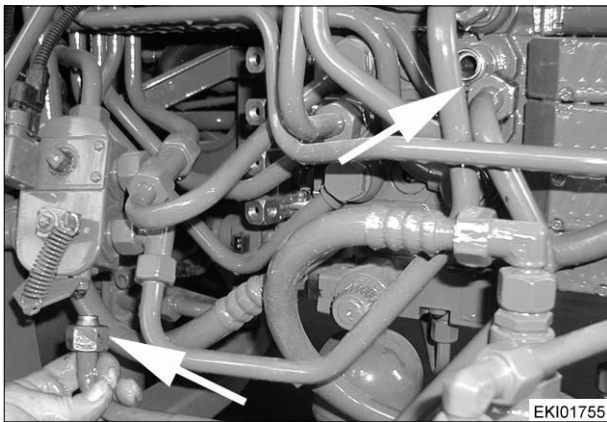
<p>Fav 700 Fav 900</p>	<p>Hydraulics / Valve fitting Fitting and removing SB 23 LS-EHS control valves</p>	<p>G</p>
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EKI01493

**Fav 900**

Remove hydraulic tank cover. This prevents hydraulic oil from continuing to run.



EKI01755

Remove obstructing hydraulic line.



EKI01754

Remove diaphragm accumulator - STSP.



EKI01763

Remove end plate - EP.

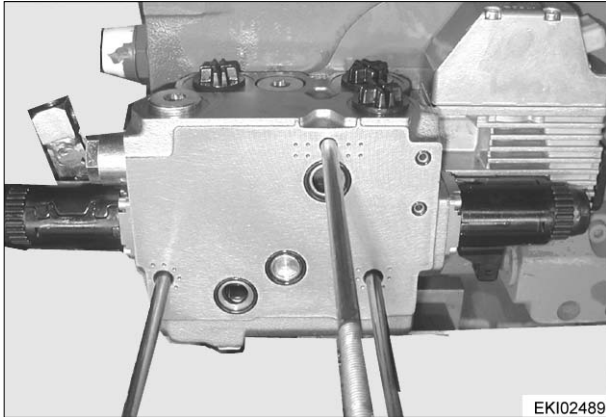
**Note:**  
Shuttle valves of control valve may drop out!!

Date	Version	Page	Capitel	Index	Docu-No.
23.07.01	a	4/8	Fitting and removing SB 23 LS-EHS control valves	9620	G 000002

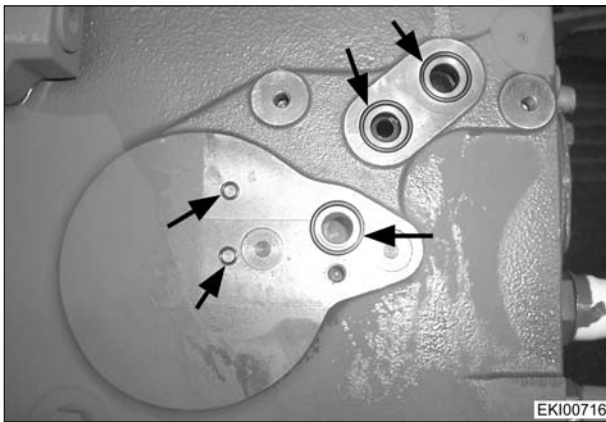
Fav 700  
Fav 900

Hydraulics / Valve fitting  
Fitting and removing SB 23 LS-EHS control valves

G

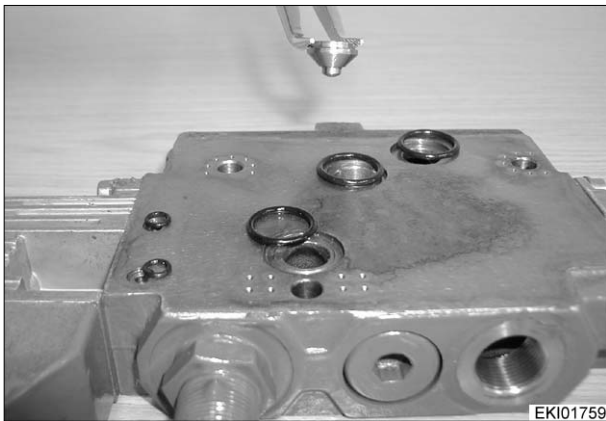


Remove all control valves and EPC valve.



**Fitting control valve**

Locate new O-ring on flange surface of central control block - ZSB and grease.



**Note:**

The control valves of type SB 23LS used in the Fav 700 are identical in function to the control valves for Fav 900 chassis number 23/3001 and up but must not be fitted to this tractor type.

Reason: The CAN-bus connections in the Fav 700 and Fav 900 chassis number 23/3001 and up have different transmission rates.

Insert O-rings.

Insert shuttle valve.



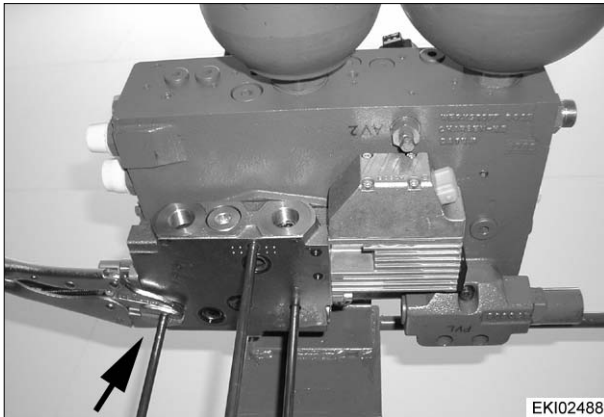
Grease O-rings and shuttle valve.

Date	Version	Page	Capitel	Index	Docu-No.
23.07.01	a	5/8	Fitting and removing SB 23 LS-EHS control valves	9620	G 000002

Fav 700  
Fav 900

Hydraulics / Valve fitting  
Fitting and removing SB 23 LS-EHS control valves

G



- Locate control valve (first layer).
- Grip control valve with locking clamp (arrowed).

**Note:**

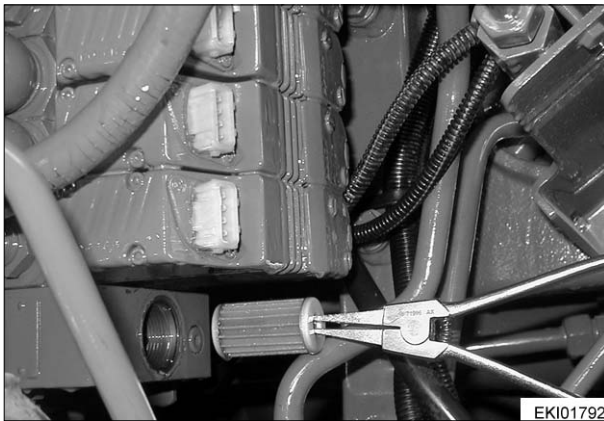
**Take care not to damage flange surfaces of control valves.**

**Take care also not to damage O-rings and shuttle valve.**

- Screw hydraulic lines to control valve (hydraulic lines hold control valve).
- Release locking clamp.
- Locate EPC valve and other control valves in same manner.

**Note:**

**Shown on model for greater clarity.**



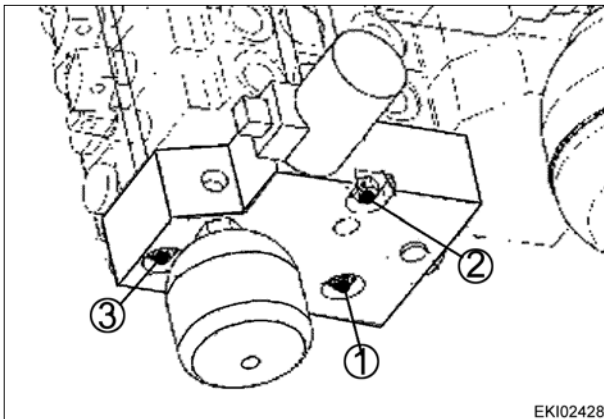
**Note:**

**Before fitting end plate - EP change microfilter - FF. <**

**Thoroughly clean filter housing and control-pressure bores in end plate - EP.**

**Chapter 9620 Index A - End plate - EP**

**Chapter 9620 Index G - Removing and fitting control pressure microfilter FF**



Lightly oil stud bolt threads.

Locate end plate - EP.

Tighten **M8-10.9** hexagon nuts in order (see photo).

- Move control valves to stop.
- Tighten M8-10.9 hexagon nuts to **30 +3 Nm** .

Date	Version	Page	Capitel	Index	Docu-No.
23.07.01	a	6/8	9620	G	000002

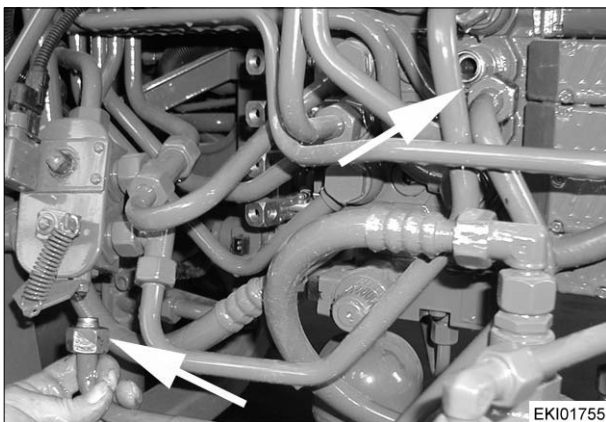
Fav 700  
Fav 900

Hydraulics / Valve fitting  
Fitting and removing SB 23 LS-EHS control valves

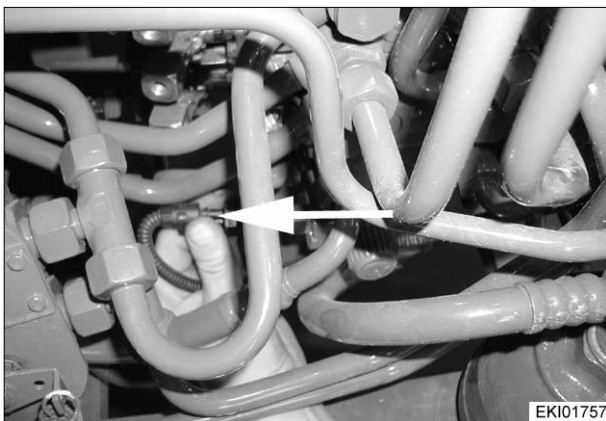
G



Fit diaphragm accumulator - STSP.



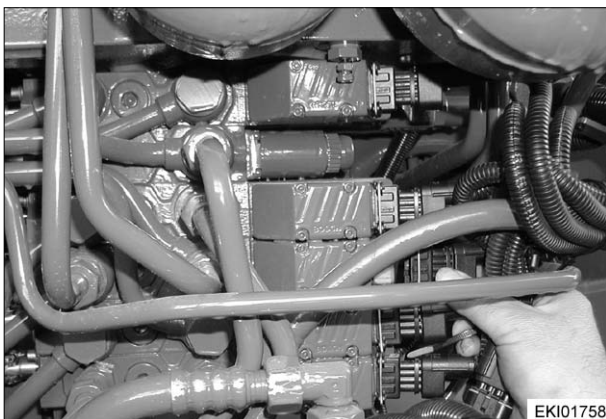
Fit other hydraulic lines.



At end plate - EP:

Connect connector X336 to Y032 - control pressure solenoid valve.

Connect connector X335 to Y033 - preheater solenoid valve.



Connect connectors to control valves Y015 - Y019.

X326 = Y015 (1st layer)

X327 = Y016 (2nd layer)

X328 = Y017 (3rd layer)

X329 = Y018 (4th layer)

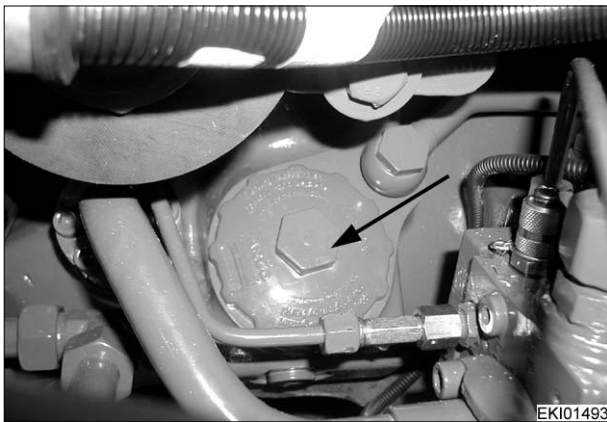
X330 = Y019 (5th layer = enhanced control front power lift)

Date	Version	Page	Capitel	Index	Docu-No.	
23.07.01	a	7/8	Fitting and removing SB 23 LS-EHS control valves	9620	G	000002

<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Hydraulics / Valve fitting <b>Fitting and removing SB 23 LS-EHS control valves</b></p>	<p><b>G</b></p>
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**Fav 700**  
Fit hydraulic tank cover.



**Fav 900**  
Fit hydraulic tank cover.



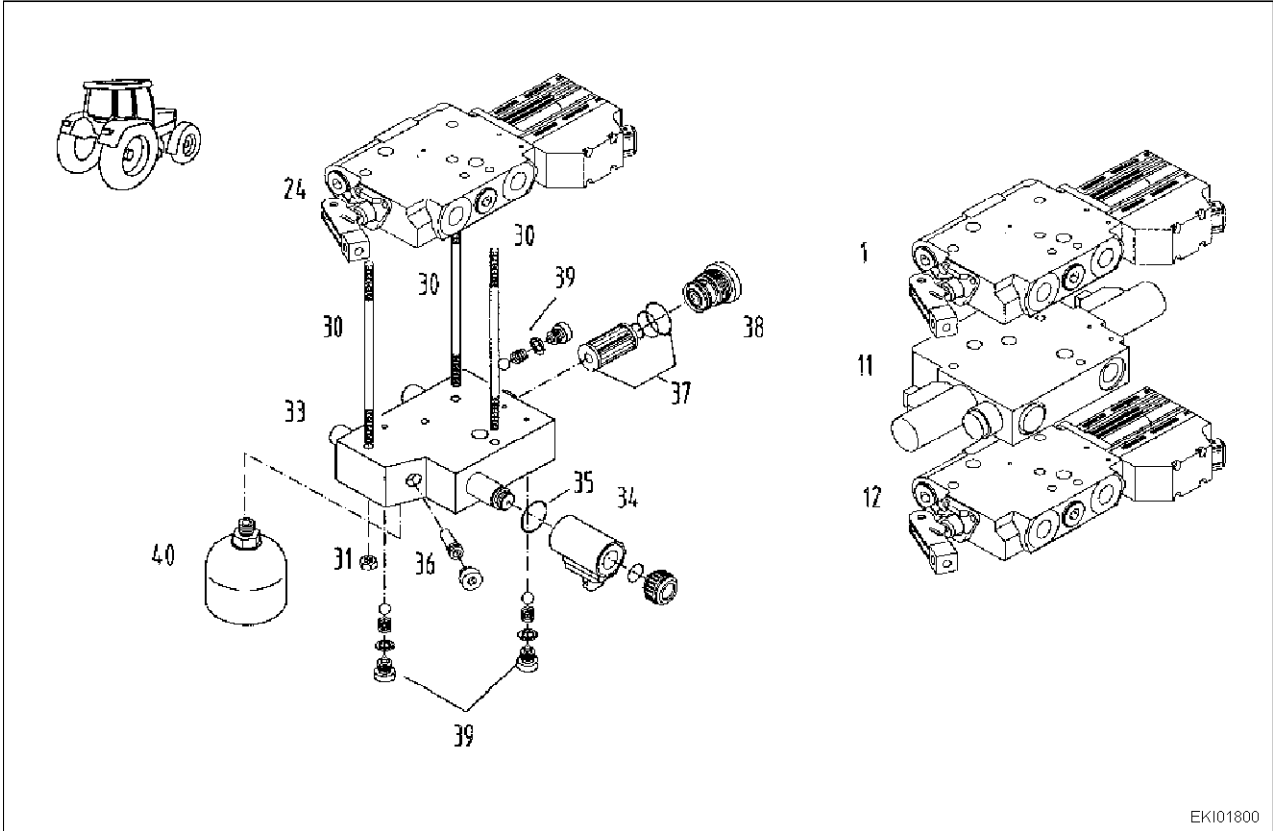
**Note:**  
**New control valves are set (programmed) to "Address 0".**  
**Setting (programming) control valve**  
**Chapter 9620 Index F - Setting control valve /**  
**Changing valve number**  
Test control valves Y015 - Y019 for tightness against leaks and operation.  
Fit G001 - battery, battery case and entrance step.

Date	Version	Page	Capitel	Index	Docu-No.
23.07.01	a	8/8	<b>9620</b>	<b>G</b>	<b>000002</b>



<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Hydraulics / Valve fitting</p> <p><b>Removing and fitting control pressure microfilter - FF</b></p>	<p><b>G</b></p>
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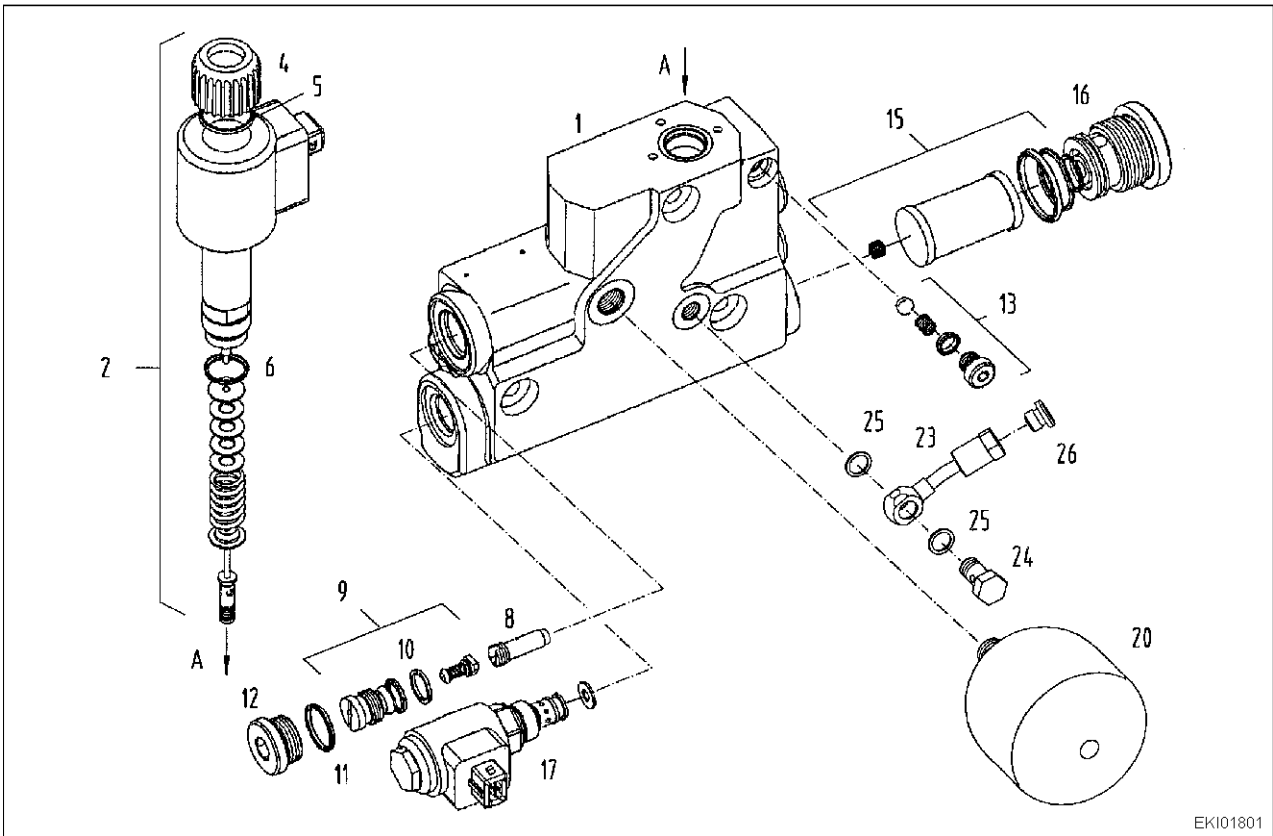
**Fav 700 end plate (external oil heater circuit)**



Item	Designation	Item	Designation
1	Control valve, 1st layer	34	Y032 - control pressure solenoid valve
11	EPC valve	35	O-ring
12	Control valve, 2nd layer	36	Prefilter - VF (sintered metal)
24	Control valve, 3rd layer	37	Microfilter - FF (paper) and O-rings
30	M8-10.9 stud bolt (depending on number of control valves)	38	Drain plug
31	M8-10.9 hexagon nut	39	Parts set
33	End plate - EP	40	Diaphragm accumulator

<p>Fav 700 Fav 900</p>	<p>Hydraulics / Valve fitting</p> <p>Removing and fitting control pressure microfilter - FF</p>	<p>G</p>
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**Fav 700 / Fav 900 chassis number 23/3001 and up (integral oil heater circuit)**



EKI01801

Item	Designation	Item	Designation
1	End plate - EP	13	Parts set
2	Y032 - control pressure solenoid valve	15	Microfilter - FF (paper) and O-rings
4	Gland nut	16	Drain plug
5	O-ring	17	Y033 - preheater solenoid valve
6	O-ring	20	Diaphragm accumulator
8	Prefilter - VF (sintered metal)	23	Pressure pipe
9	Non-return valve - RV7	24	Hollow-core screw
10	O-ring	25	Sealing ring
11	O-ring	26	Drain plug
12	Drain plug		

**Note:**

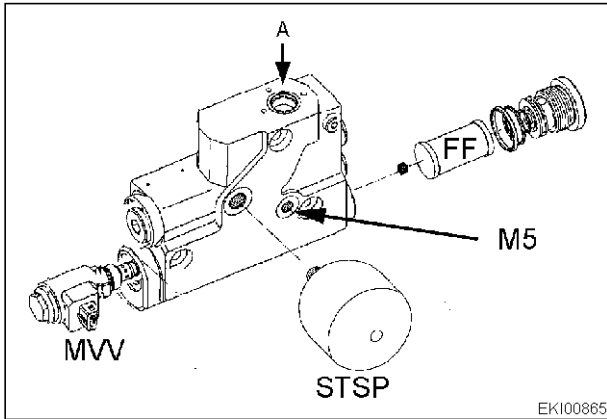
Retrofitting and repair work on the service hydraulics must be carried out with very great attention to cleanliness. The smallest particles of dirt in the control circuit can prevent the control movement or cause an unintentional movement.

**Note:**

The work was carried out on a Fav 700.  
Carry out work on the Fav 900 chassis number 23/3001 and up in the same way.

Date	Version	Page	Capitel	Index	Docu-No.
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<p>Fav 700 Fav 900</p>	<p>Hydraulics / Valve fitting Removing and fitting control pressure microfilter - FF</p>	<p>G</p>
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**Maintenance interval for control pressure microfilter FF**

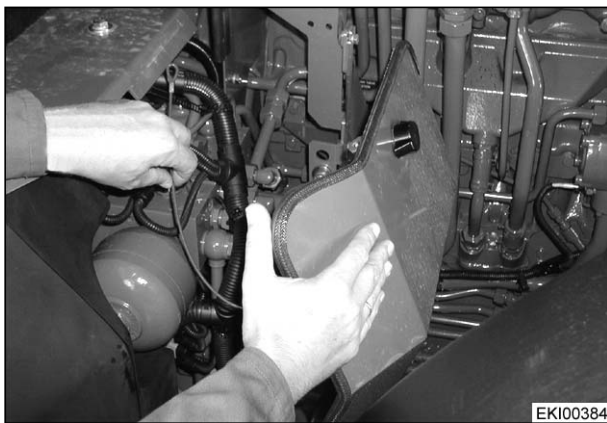
- every 4 years
- after repair to/replacement of a control valve

**Note:**  
Operating Manual - Maintenance Schedule



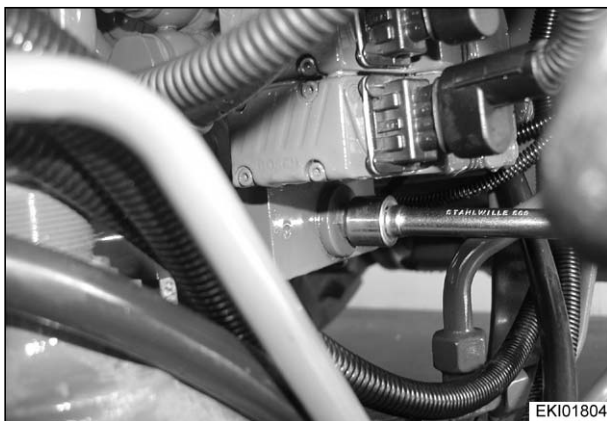
**Preliminary work for Fav 700:**

- Remove battery case.
- Remove G001 - battery.



**Preliminary work for Fav 900:**

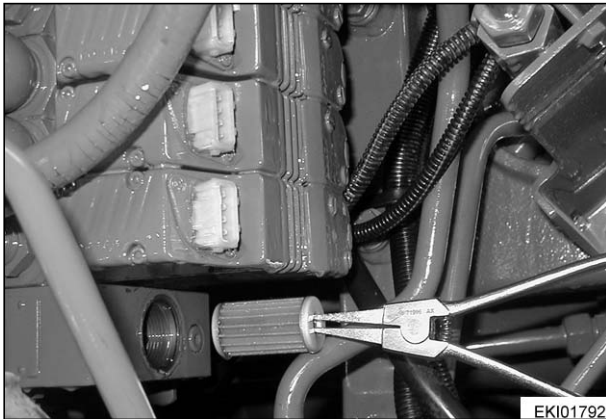
- Remove front panel.



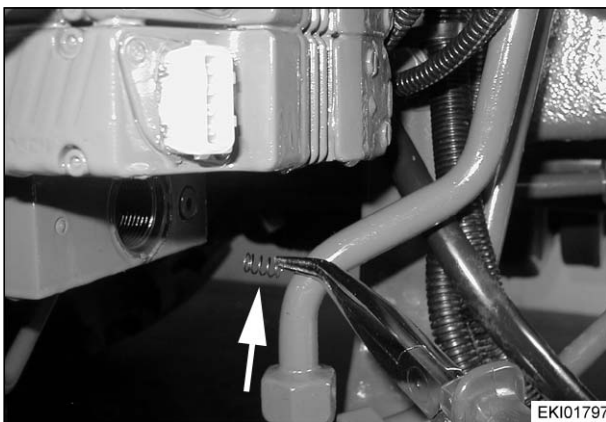
Loosen drain plug.

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25.07.2001	a	3/7	Removing and fitting control pressure microfilter - FF	9620	G 000003

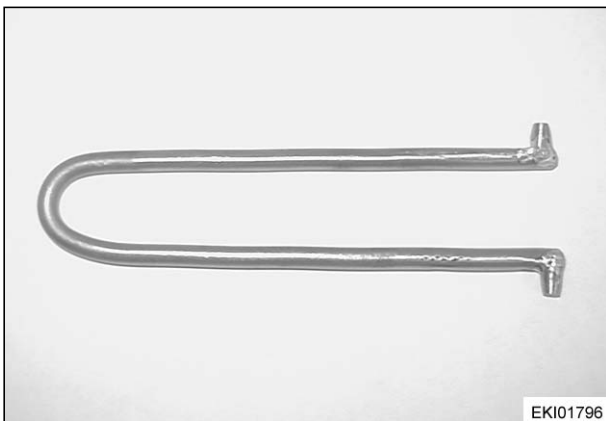
<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Hydraulics / Valve fitting <b>Removing and fitting control pressure microfilter - FF</b></p>	<p><b>G</b></p>
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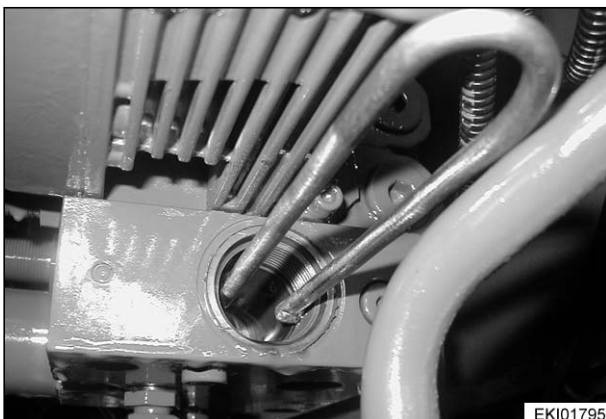
Carefully withdraw microfilter - FF.



Withdraw compression spring.



Special tool



**Fav 700**

**End plate - EP with external heater circuit (hydraulic oil preheater)**

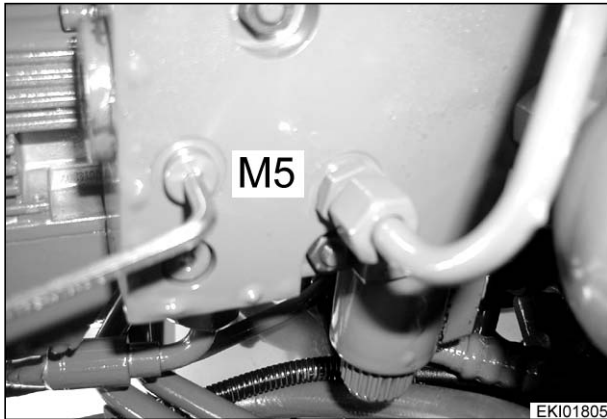
Close control-pressure bores with special tool.

**Note:**

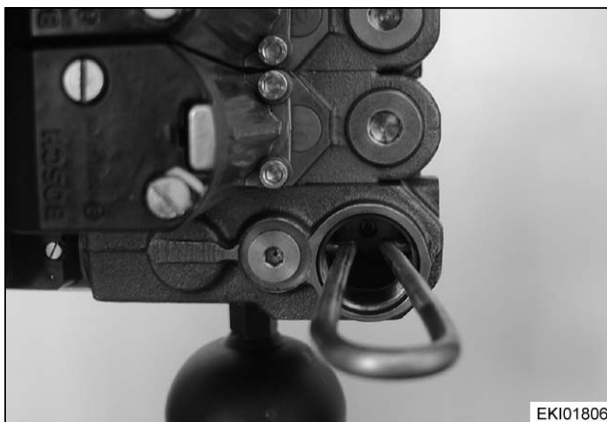
**Chapter 9620 Index A - End plate - EP**

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25.07.2001	a	4/7	9620	G	000003

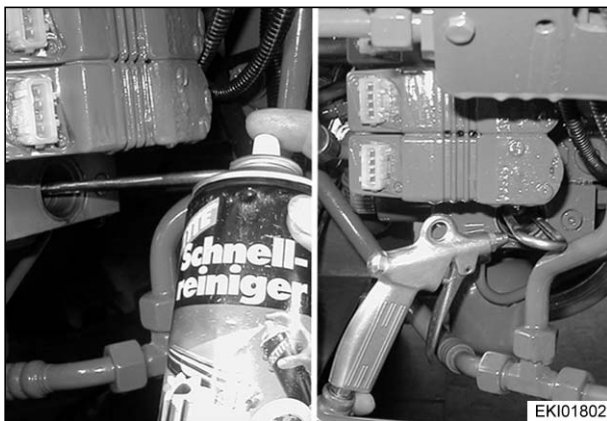
<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Hydraulics / Valve fitting <b>Removing and fitting control pressure microfilter - FF</b></p>	<p><b>G</b></p>
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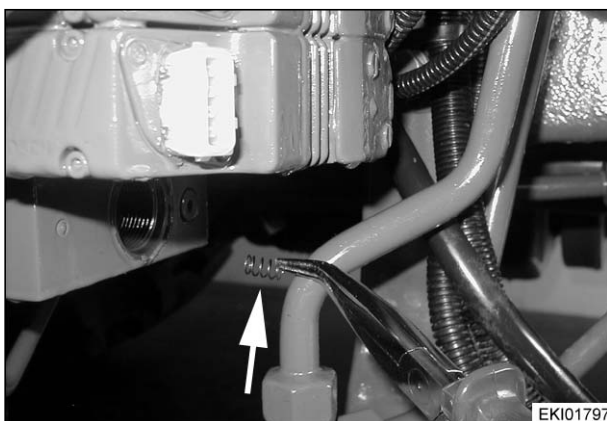
**Fav 700**  
**End plate with external heater circuit (hydraulic oil preheater)**  
Open measuring point M5.



**Fav 700 and Fav 900 chassis number 23/3001 and up**  
**End plate with integral heater circuit (hydraulic oil preheater)**  
Close control-pressure bores with special tool.



Clean threaded bore and filter housing with spray cleaner.



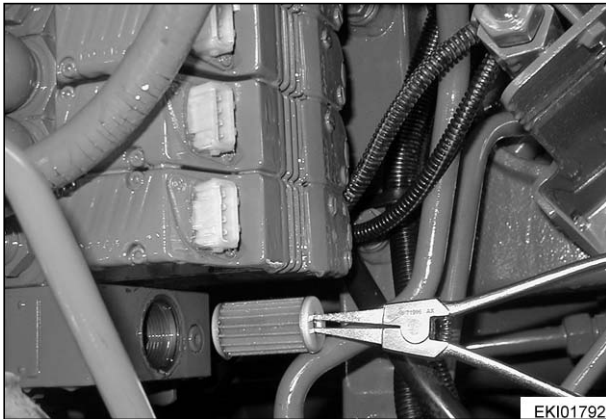
Remove special tool.  
Insert compression spring with a little grease.

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**Fav 700**  
**Fav 900**

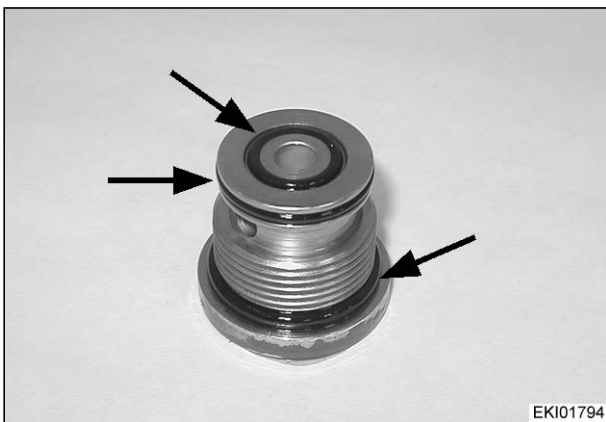
**Hydraulics / Valve fitting**  
**Removing and fitting control pressure microfilter - FF**

**G**



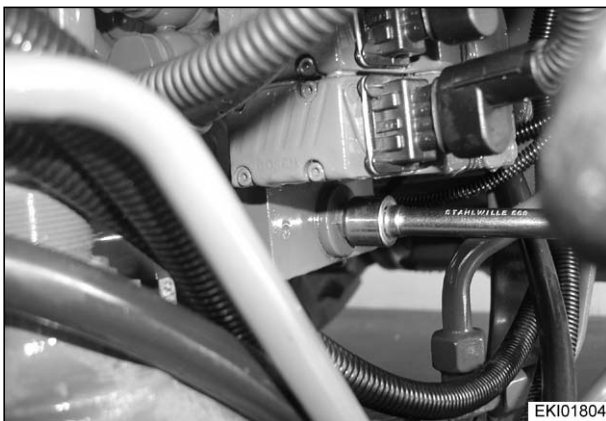
EKI01792

Insert microfilter - FF.



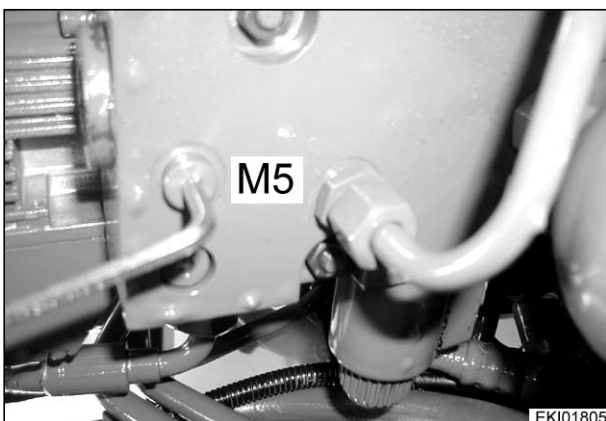
EKI01794

Fit new O-rings to drain plug.



EKI01804

Tighten drain plug to **125 +40** Nm.



EKI01805

**Fav 700**  
**End plate with external heater circuit**  
**(hydraulic oil preheater)**  
Tighten drain plug of measuring point M5 to **20 +5** Nm .

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<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Hydraulics / Valve fitting <b>Removing and fitting control pressure microfilter - FF</b></p>	<p><b>G</b></p>
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Test tractor for tightness against leaks.  
Refit other items removed from tractor.

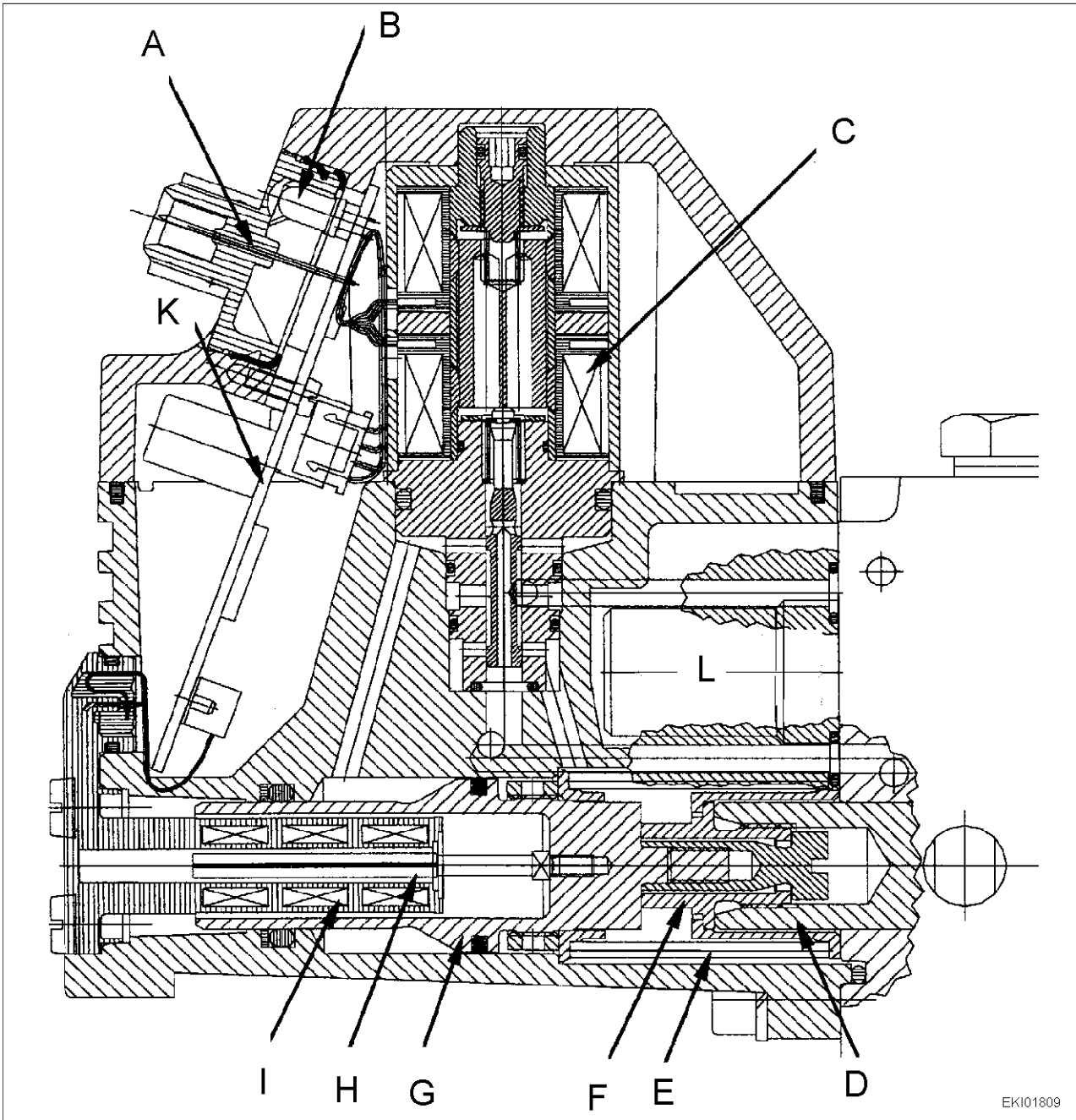
Date	Version	Page		Capitel	Index	Docu-No.
25.07.2001	<b>a</b>	7/7	<b>Removing and fitting control pressure microfilter - FF</b>	<b>9620</b>	<b>G</b>	<b>000003</b>

Fav 700  
Fav 900

Hydraulics / Valve assemblies  
**Installation and removal of pilot valve**

**G**

**Electrohydraulic actuator unit for control valve SB 23 LS-EHS**



EK101809

Item	Designation	Item	Designation
A	4-pin plug (supply and CAN-bus)	G	Actuating piston
B	Diagnostics LED	H	Bar core position sensor
C	Pilot valve	I	Coil position sensor
D	Directional control valve slide	K	PCB
E	Return spring	L	Space for pressure-relief valve
F	Adapter		



<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Hydraulics / Valve assemblies <b>Installation and removal of pilot valve</b></p>	<p><b>G</b></p>
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**Pilot valve may not be removed and installed during warranty period!!**

**Note:**

Retrofitting and repair work on service hydraulics must be carried out with very great attention to cleanliness. Smallest dirt particles in control circuit can prevent control motion or cause unintentional action.

**Note:**

The SB 23LS electrical control valves used in the Fav 700 are identical in terms of function to the control valves for the Fav 900 of chassis number 23/3001 and higher but must not be fitted in the latter tractor type.

Reason: CAN-bus connections for Fav 700 and Fav 900 chassis number 23/3001 and up have different transmission rates.



**Preliminary work in Fav 700:**

- Remove battery case.
- Remove G001 - battery.



**Preliminary work in Fav 900 chassis number 23/3001 and up**

- Remove front panel.

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<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Hydraulics / Valve assemblies <b>Installation and removal of pilot valve</b></p>	<p><b>G</b></p>
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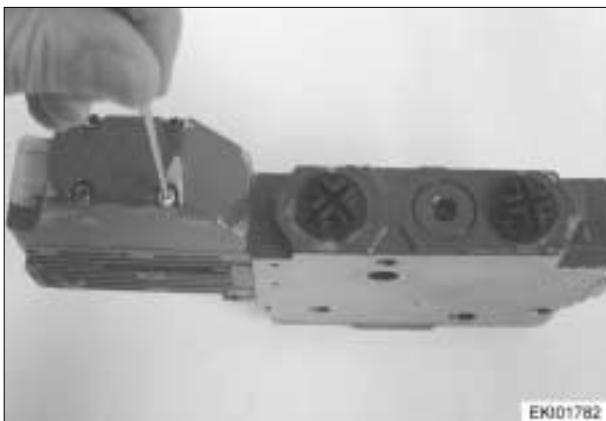


Label and disconnect control valve connector.



Remove control valve.

**Note:**  
**Chapter 9620 Reg. G - Installation and removal of control valves SB 23 LS-EHS**



Remove cover from electrohydraulic actuator unit.

**Note:**  
**Take care not to damage PCB (K) (see sectional view).**



Remove connector from pilot valve and remove pilot valve.

**Note:**  
**Pull plug in straight line out of connector (pilot valve). Plug is not clipped in place!!**

**Note:**  
**Take care not to damage connector of position sensor (I) (see drawing).**

Date	Version	Page	Installation and removal of pilot valve	Capitel	Index	Docu-No.
25.07.2001	a	3/6		9620	G	000004

<p>Fav 700 Fav 900</p>	<p>Hydraulics / Valve assemblies <b>Installation and removal of pilot valve</b></p>	<p><b>G</b></p>
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**Installing pilot valve**

Check plunger of pilot valve for ease of movement.



Locate O-rings on pilot valve.



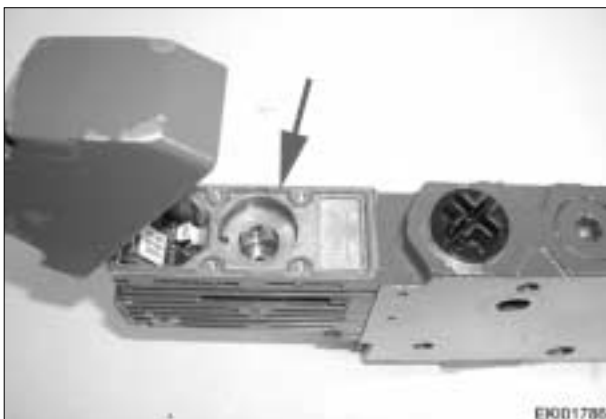
Insert pilot valve and connect pilot valve connector.

**Note:**

**Offer plug in straight line to connector (pilot valve). Plug is not clipped in place!!**

**Note:**

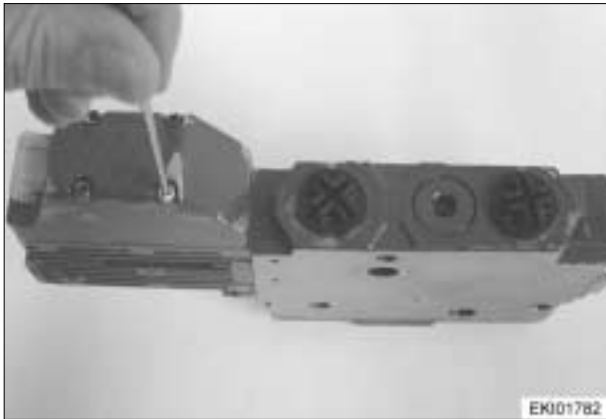
**Check that connector of position sensor (I) is correctly seated (see drawing).**



Check cover seal for damage.

Date	Version	Page	Installation and removal of pilot valve	Capitel	Index	Docu-No.
25.07.2001	a	4/6		9620	G	000004

<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Hydraulics / Valve assemblies <b>Installation and removal of pilot valve</b></p>	<p><b>G</b></p>
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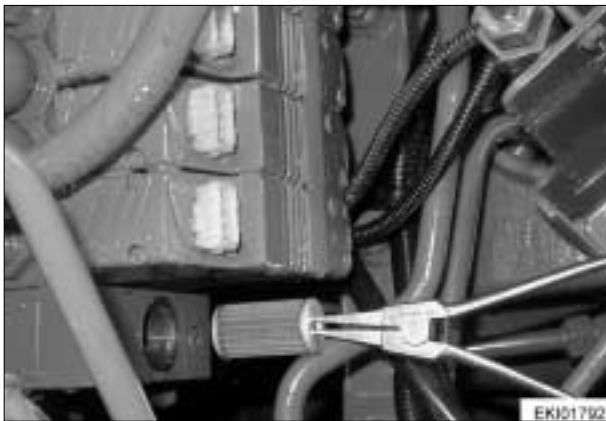


Tighten cover of electrohydraulic actuator unit.



Insert control valve.

**Note:**  
**Chapter 9620 Reg. G - Installation and removal of control valves SB 23 LS-EHS**



**Note:**  
**Change microfilter - FF before fitting end plate - EP.**

Thoroughly clean filter housing and control-pressure bores in end plate - EP.  
**Chapter 9620 Reg. A - End plate - EP**  
**Chapter 9620 Reg. G - Installation and removal of control pressure microfilter FF**



Connect control valve connector.

- X326 = Y015 (1st layer)
- X327 = Y016 (2nd layer)
- X328 = Y017 (3rd layer)
- X329 = Y018 (4th layer)
- X330 = Y019 (5th layer = enhanced control front power lift)

Date	Version	Page	Installation and removal of pilot valve	Capitel	Index	Docu-No.
25.07.2001	a	5/6		9620	G	000004

<p><b>Fav 700</b> <b>Fav 900</b></p>	<p>Hydraulics / Valve assemblies <b>Installation and removal of pilot valve</b></p>	<p><b>G</b></p>
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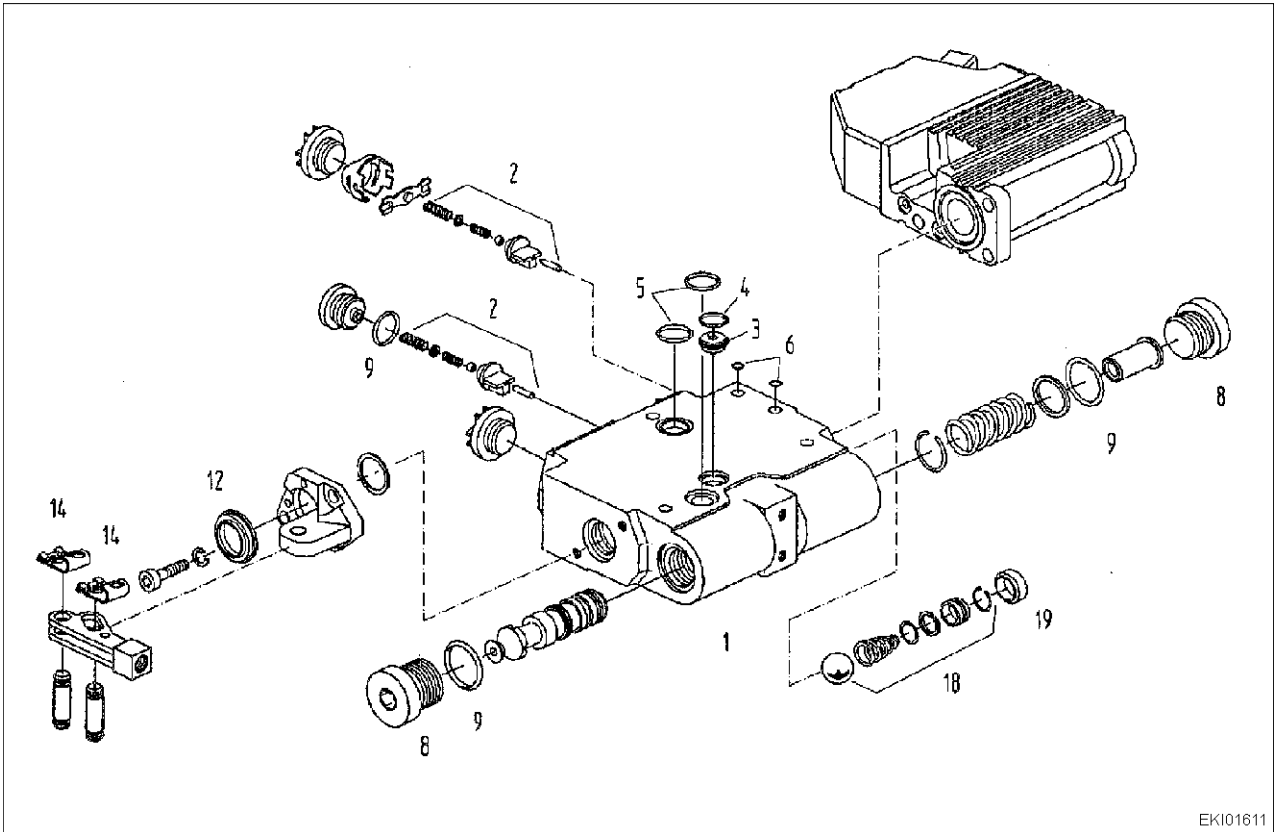
Carry out performance test on control valve.  
Check tractor for leaks.  
Refit all other items removed from tractor.

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Farmer 400  
Fav 700  
Fav 900

Hydraulics / Valve fitting  
Removing and fitting a shutoff valve

G



EK101611

Item	Designation	Item	Designation
1	Control valve	8	Drain plug
1	Seal set	9	O-ring
2	Parts set (shutoff valve)	12	Scraper ring
3	Shuttle valve	14	Locating spring
4	O-ring	18	Parts set
5	O-ring	19	Sealing plug
6	O-ring		

**Note:**

Retrofitting and repair work on the service hydraulics must be carried out with very great attention to cleanliness. The smallest particles of dirt in the control circuit can prevent the control movement or cause an unintentional movement.

**Note:**

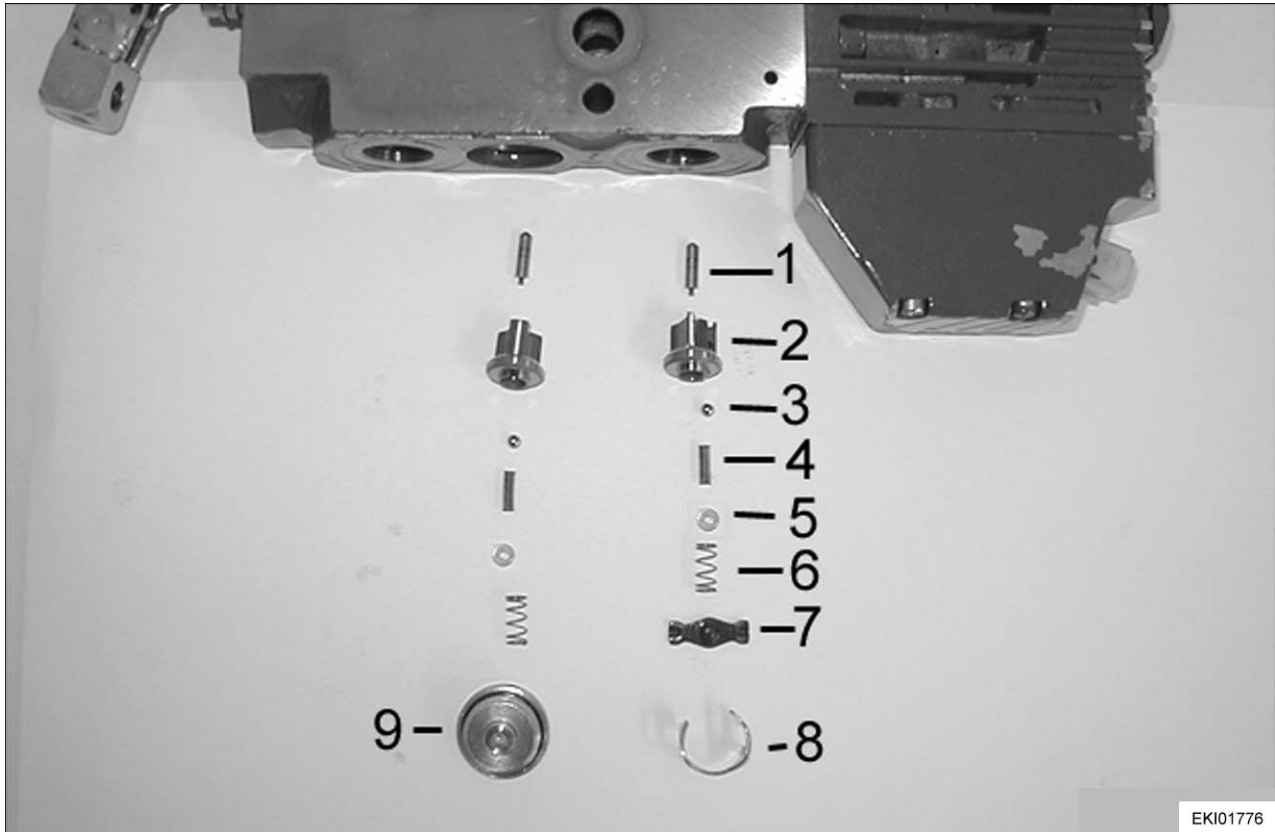
The control valves of type SB 23LS used in the Fav 700 are identical in function to the control valves for Fav 900 chassis number 23/3001 and up but must not be fitted to this tractor type. Reason: The CAN-bus connections in the Fav 700 and Fav 900 chassis number 23/3001 and up have different transmission rates.

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**Farmer 400**  
**Fav 700**  
**Fav 900**

Hydraulics / Valve fitting  
**Removing and fitting a shutoff valve**

**G**



EKI01776

**Removing shutoff valve**

- Move control valve slide to neutral position.
- Press hoop of circlip (8) upwards.
- Turn circlip (8) through 90° to left.
- Press retaining plate (7) downwards, turn through approx. 90° (turning circlip at same time) and withdraw diagonally upwards.
- Remove closing spring (6), washer (5), spring (4), ball (3), valve cone (2) and clamping bolt (1).
- Clean connection bore.

**Fitting shutoff valve**

- Insert clamping bolt (1) with lug facing upwards.
- Insert valve cone (2).
- Insert ball (3).
- Insert spring (4).
- Insert washer (5).
- 

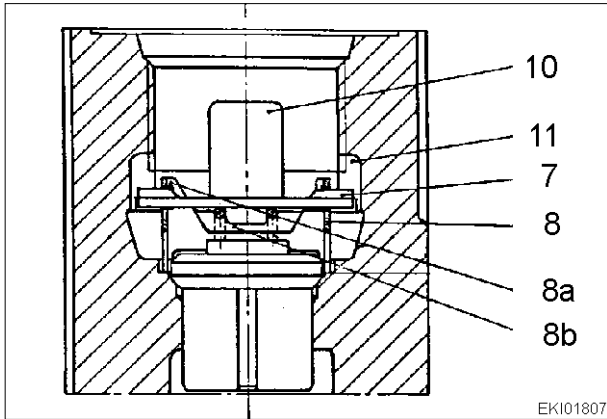
**Note:**

**Grease parts set (1-6) to aid fitting.**

- Locate circlip (8) such that open side is parallel to control valve slide axis (pointing to mechanical actuation system).
- Place closing spring (6) on washer (5).
- Insert retaining plate (7) (lug for spring guide pointing downwards) diagonally over large cast pockets (parallel to control valve slide axis). Press closing spring (6) downwards with retaining plate (7) and turn through approx. 90° to right with circlip (8) until lugs engage in small cast pockets.
- Turn circlip (8) back to left until hoops are vertically above retaining plate. Press hoops downwards as far as stop (to secure).

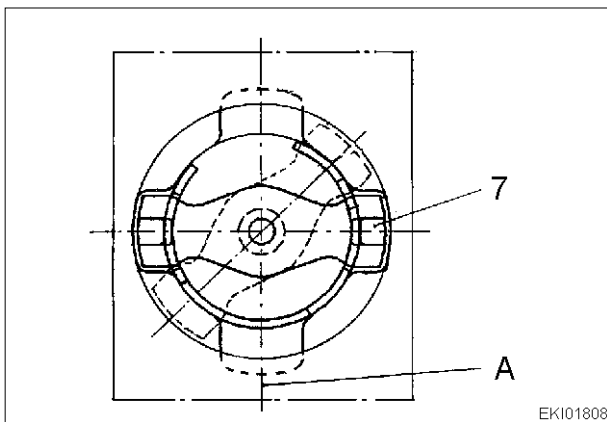
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<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Hydraulics / Valve fitting  <b>Removing and fitting a shutoff valve</b></p>	<p><b>G</b></p>
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EKI01807

- 10 = Large cast pockets
- 11 = Small cast pocket
- 7 = Retaining plate
- 8 = Circlip
- 8a = Hoop of circlip (8)
- 8b = Recess in circlip (8)



EKI01808

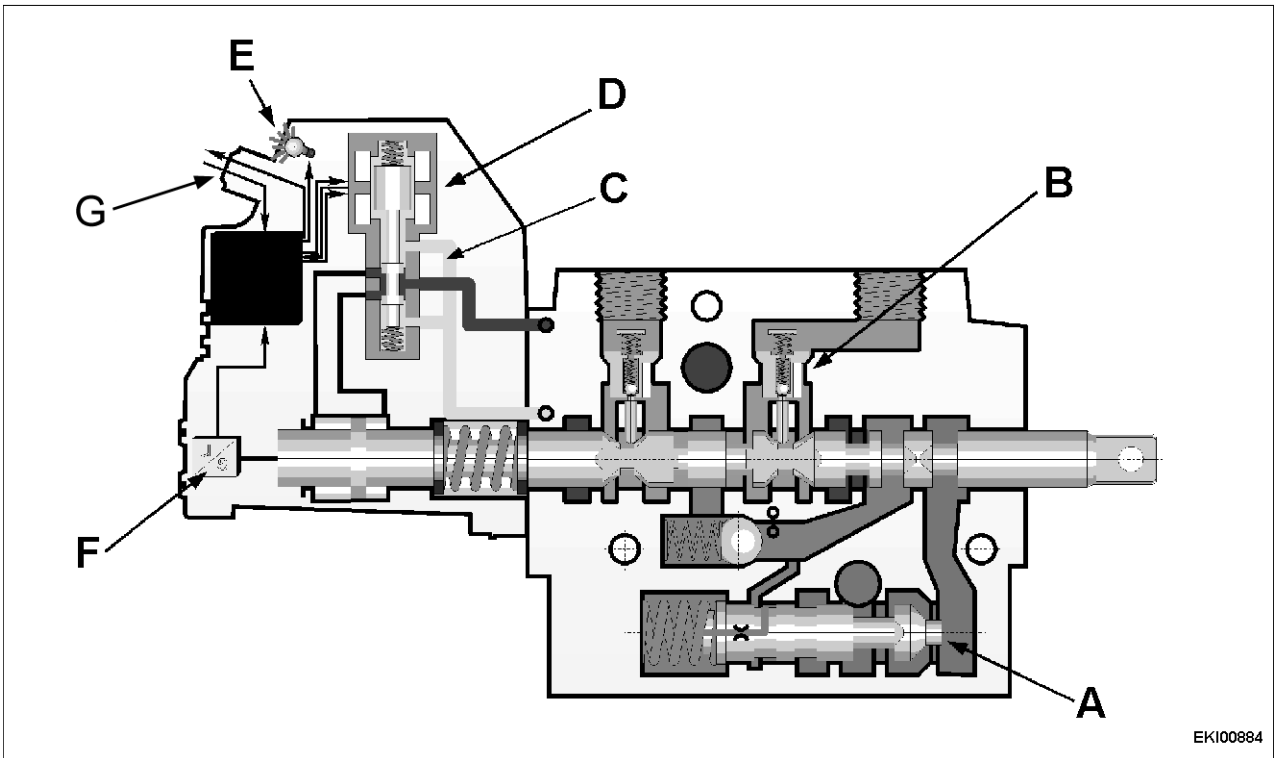
- A = Control valve slide axis
- 7 = Retaining plate

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Farmer 400 Fav 700 Fav 900	Hydraulics / Valve fitting <b>Removing and fitting a shutoff valve</b>	G
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**Default setting of shutoff valve (B)**

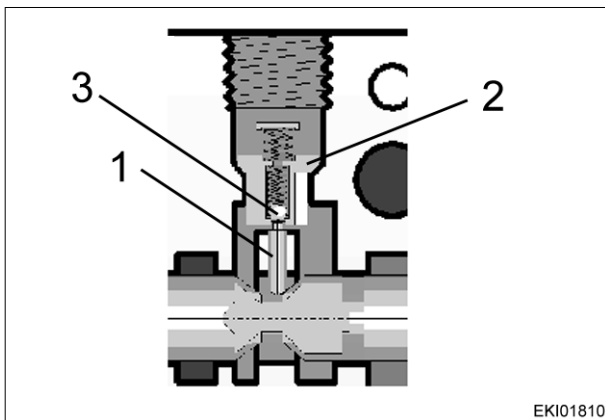


EKI00884

A Pressure governor	E Diagnostics: optical display; fault signal
B Shutoff valve	F Inductive position sensor
C Control pressure 22 bar	G CAN setpoint
D Pilot valve	

**Measuring play between valve cone (2) and clamping bolt (1)**

Determine length of clamping bolt (1).



EKI01810

Clamping bolt (1) must be adapted when replacing or fitting new shutoff valve for first time.

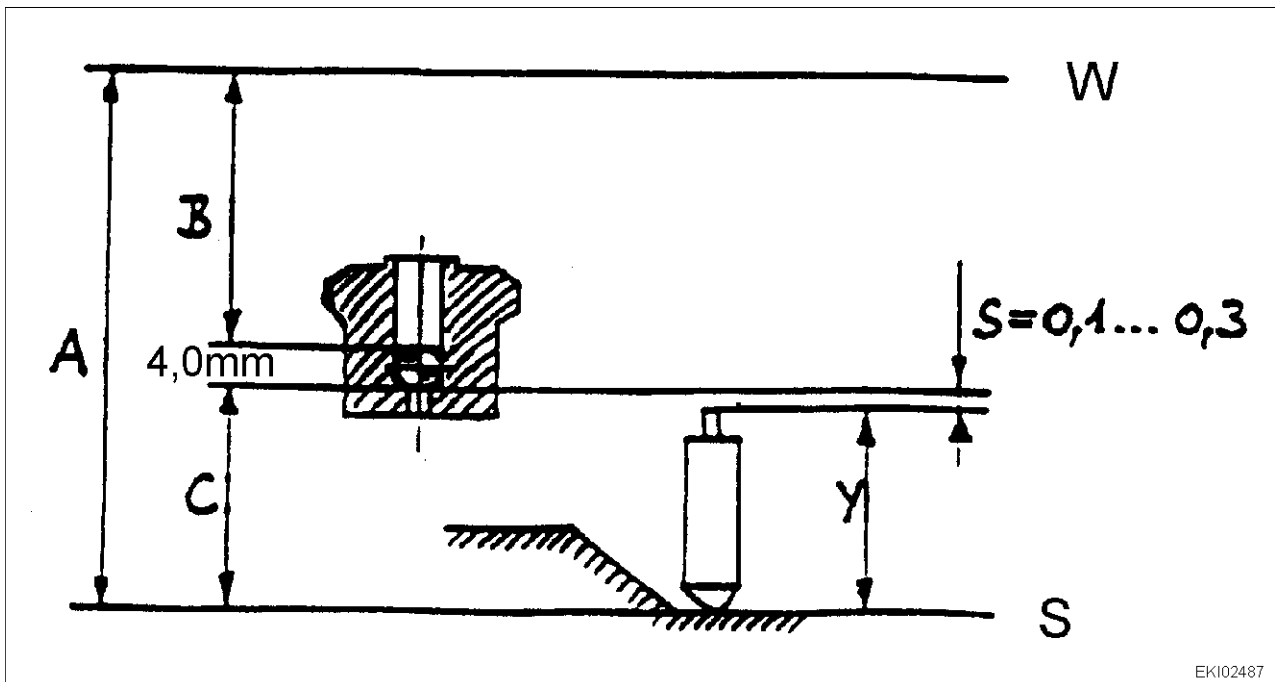
Date	Version	Page	Removing and fitting a shutoff valve	Capitel	Index	Docu-No.
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Farmer 400  
Fav 700  
Fav 900

Hydraulics / Valve fitting  
Removing and fitting a shutoff valve

**G**

Drawing showing how to determine clamping bolt length Y



EK102487

W = Top edge of control valve  
S = Top edge of control valve slide

- Control valve is in neutral position!!
- Measure distance A (from top edge of control valve to control valve slide).
- Insert valve cone with ball (diameter = 4mm) into housing.
- Measure distance B (from top edge of control valve to ball).
- Determine clamping bolt length Y.

Fitting space:  $C = A - (B + 4\text{mm})$

Clamping bolt length:  $Y = C - (0.1\text{mm} - 0.3\text{mm})$

- Remove valve cone.
- Insert calculated clamping bolt.
- Fit shutoff valve in accordance with fitting instructions.

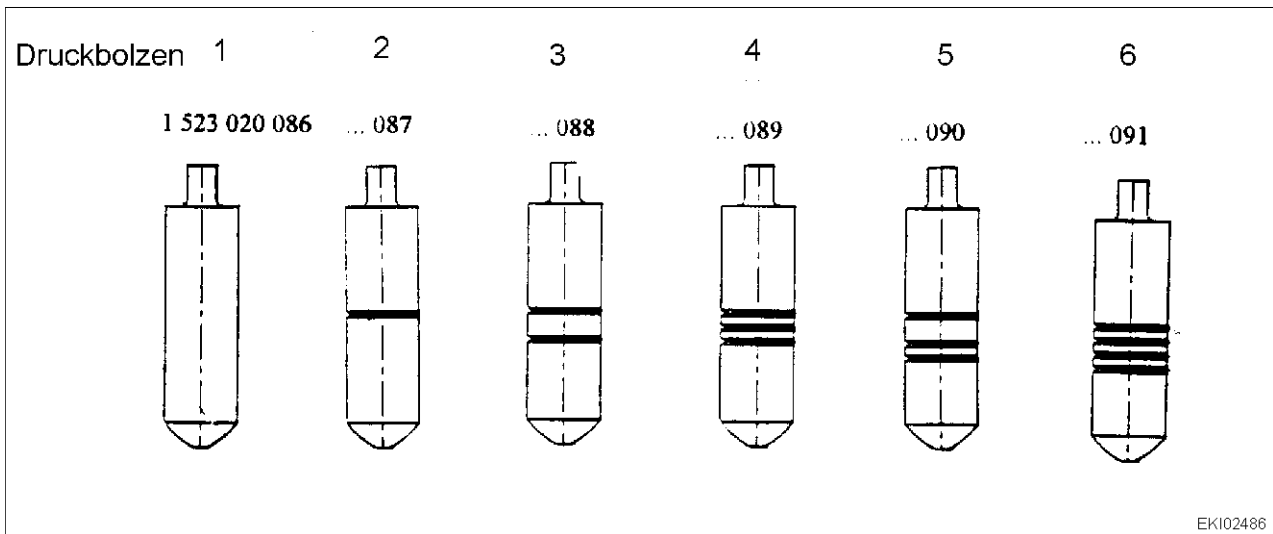
Date	Version	Page	Capitel	Index	Docu-No.
26.07.2001	a	5/8	9620	G	000005

**Farmer 400**  
**Fav 700**  
**Fav 900**

Hydraulics / Valve fitting  
**Removing and fitting a shutoff valve**

**G**

**Markings on clamping bolts**



	Part no. Bosch	Length of clamping bolt	Marking
Clamping bolt 1	1 523 020 086	Y=15.55 -0.1mm	No groove
Clamping bolt 2	1 523 020 087	Y=15.70 -0.1mm	One groove
Clamping bolt 3	1 523 020 088	Y=15.85 -0.1mm	Two grooves
Clamping bolt 4	1 523 020 089	Y=16.00 -0.1mm	Three grooves
Clamping bolt 5	1 523 020 090	Y=16.15 -0.1mm	Three grooves
Clamping bolt 6	1 523 020 091	Y=16.30 -0.1mm	Four grooves

**Note:**

Order parts set for shutoff valve in accordance with FENDOS spare parts catalogue.

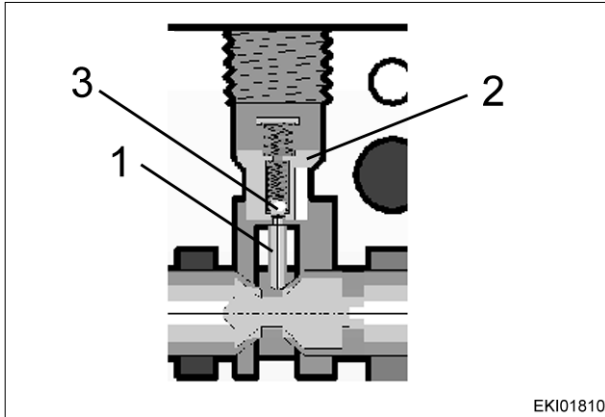
Date	Version	Page	Capitel	Index	Docu-No.
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Farmer 400  
Fav 700  
Fav 900

Hydraulics / Valve fitting  
**Removing and fitting a shutoff valve**

**G**

**Test opening points of shutoff valve.**

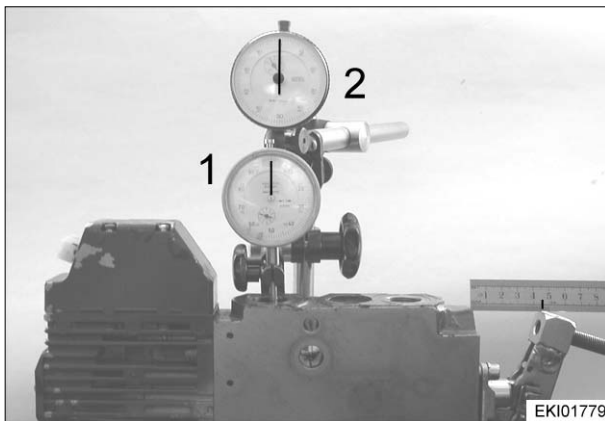


**Testing opening points of shutoff valve**

Default setting for shutoff valve is achieved via clamping bolts (1) of different lengths.

**Note:**

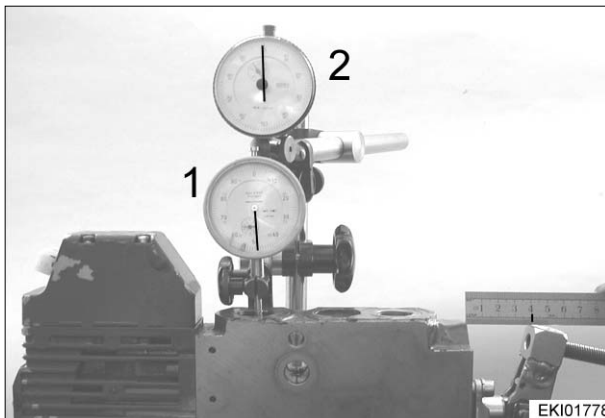
- Step 1: Ball (3) (pressure-relief valve) opens.**
- Step 2: Valve cone (2) (shutoff valve) opens.**



Place gauge (item 1) on retaining plate (7).

Place gauge (item 2) on valve cone (2).

Set both gauges to "0".



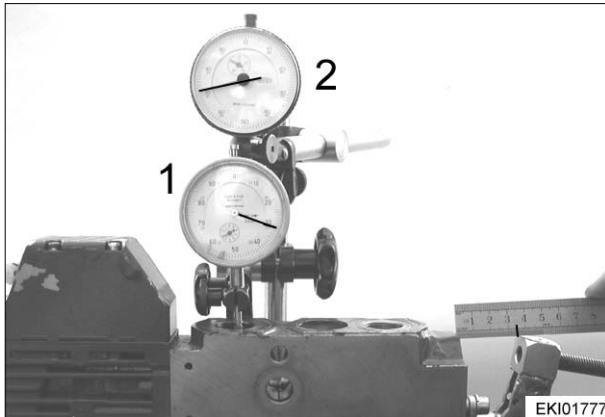
Deflect control valve slide with manual control.

Clamping bolt (1) runs up edge of control valve slide. Ball (3) (pressure-relief valve) is raised.

**Farmer 400**  
**Fav 700**  
**Fav 900**

Hydraulics / Valve fitting  
**Removing and fitting a shutoff valve**

**G**



Deflect control valve slide further with manual control.

Valve cone (2) (shutoff valve) is raised.

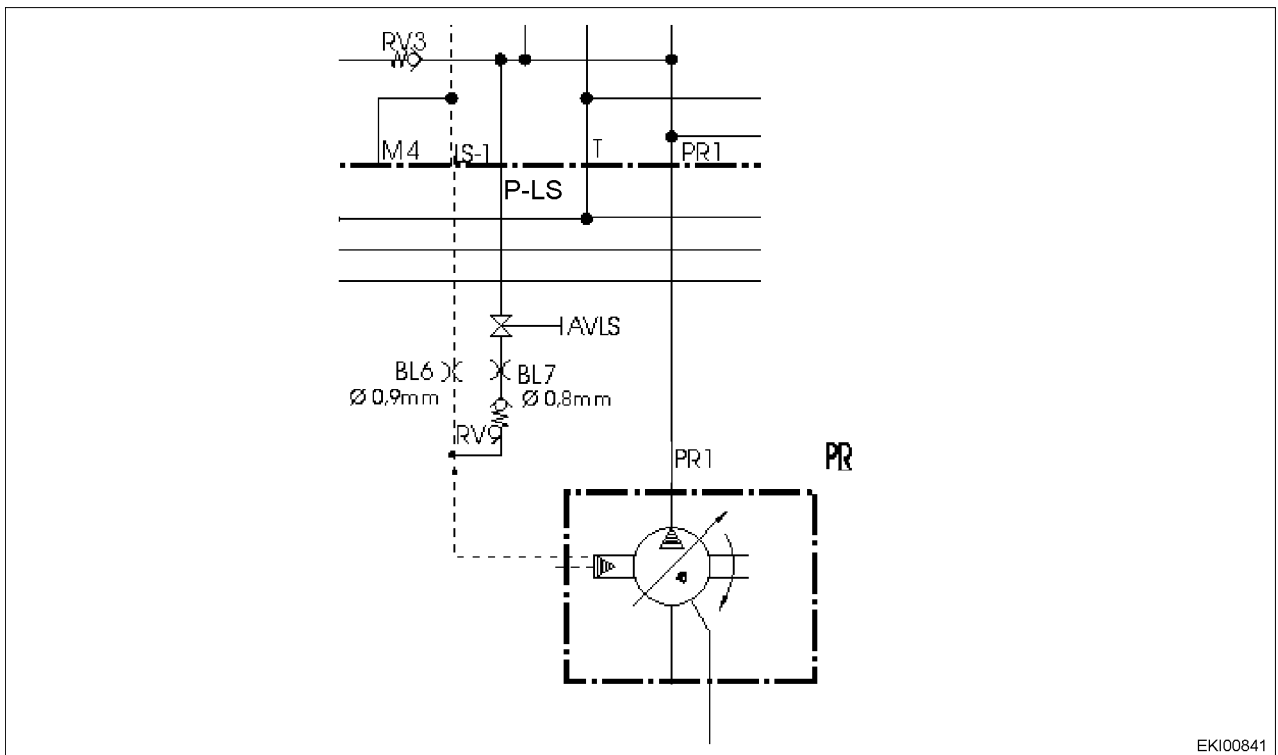
Date	Version	Page	Capitel	Index	Docu-No.
26.07.2001	a	8/8	9620	G	000005

Fav 900	Hydraulic Equipment / External Pressure Control <b>LS-Pressure Enhancement</b>	<b>A</b>
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**Generalities:**

Further Names: (e.g Operating Manual)	"External Pressure increase"
Applications:	All Tractors with the Option "External Pressure Control"
Reason:	Hydraulic hoses are creating substantial pressure losses within P - Hose, in such an extend that the Difference of control Pressure (Control - delta - p) on the Implement Control Bloc will not be sufficient. As a result the Load Sensing Pump will not generate full Power.
Goal :	Increasing Control Pressure difference on external Valve
Prinzip:	By opening shutoff valve AVLS, load sensing pump Pressure will be partially (approx 8 bar) led to the LS - Pressure. Advantage: Basic hydraulic settings will not be modified. Pressure Increase is independant of the control Pressure.
Detailed - Function:	A small oil flow of the load sensing pump is led via the Orifice BL 7 to LS - Line. Due to the added flow, the Control Pressure Level will be offset upstream of the LS Pump by approx. 8 bar on top of the losses in the LS line.
Detailed - Function: Orifice Bl 6 in LS:	generates the Pressure difference of approx. 8 bar
Orifice Bl 7 in P:	Flow 1 - 1,5 l/min
Non Return Valve RV9	Reliability of steering (Without RV9, steering Pressure could fail in case of an overloaded Load Sensing Pump)
Monitoring:	None

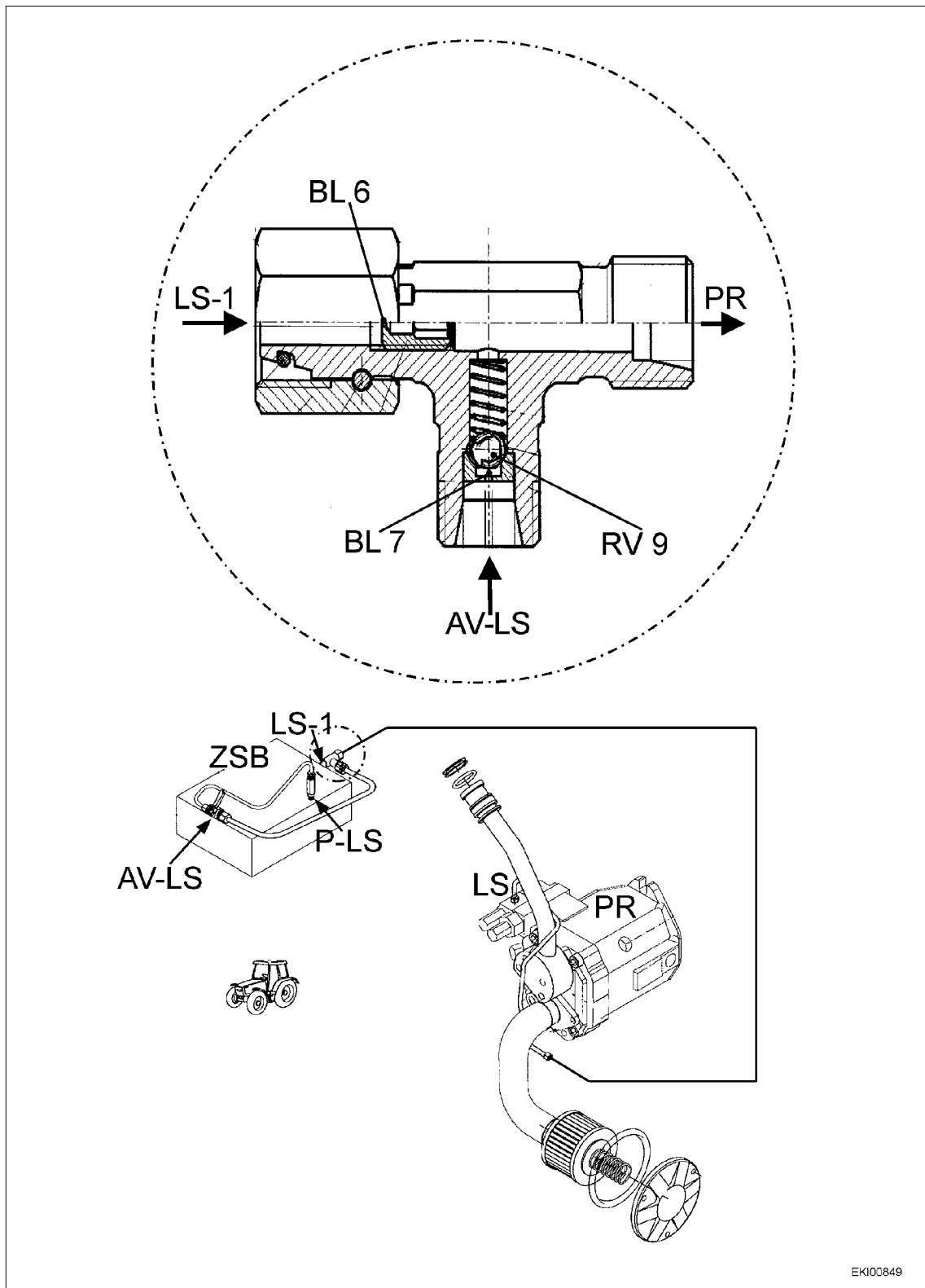
**Detailed Diagram**



EKI00841

Date	Version	Page	LS-Pressure Enhancement	Capitel	Index	Docu-No.
06.12.2000	a	1/3		9666	A	000001

**Location and "L-Stub"**



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06.12.2000	a	2/3	9666	A	000001
<b>LS-Pressure Enhancement</b>					

<b>Fav 900</b>	<b>Hydraulic Equipment / External Pressure Control LS-Pressure Enhancement</b>	<b>A</b>
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**References:**

	Location (Short Description)	Consult Document:
Measuring Points: M3 and M4:	Top Side of Main Control Bloc (ZSB)	9600/D/...
Measuring Points: M5	Lower side of the final Plate of the Valves Stack.	9600/D/...
Non Return Valve RV9	Integrated within L Stub (LS-Line on the Top Side of the main control Bloc ZSB)	
Orifice BI 6		
Orifice BI 7		

**Note:**

**Connection on Load Sensing Pump:**

**up to Chassis Number 21/3000:**

**(????) Bajonett - Connector Flange / Tube**

**ab Fg 23/3001:**

**see Graphic, Tube and Flange are one piece**

**Short Test Procedure:**

Tractor - Hydraulics		still locked	unlocked
	In operation for:	Steering, Suspension, Rear Powerlift and external Control Bloc	additional for Spool Valves; among others Front Powerlift Bloc

**Per Default: Shutoff Valve AVLS Shut**

Tractor - Hydraulics			still locked	unlocked
Control Pressure Valve MVSt / Y032			not activated	12 Volt activated
Measuring Point				
Pressure Load sensing Pump	pP	M3	20...23 bar	42...45 bar
LS - Pressure	pLS	M4	0	22 bar
Control Pressure	pSt	M5	0	22 bar

**Pressure enhancement active / Shutoff valve AVLS opened valid for Oil temperature approx. 50° C.**

Tractor - Hydraulics			locked	unlocked
Pressure Control Valve MVSt / Y032			not activated	12 Volt activated
Prssure Load sensing Pump	pP	M3	30...37 bar	60...75 bar
LS-Pressure	pLS	M4	3...5 bar	30...42 bar
Control Pressure	pSt	M5	0	22 bar

Date	Version	Page	LS-Pressure Enhancement	Capitel	Index	Docu-No.
06.12.2000	a	3/3		9666	A	000001





Farmer 400  
Fav 700  
Fav 900

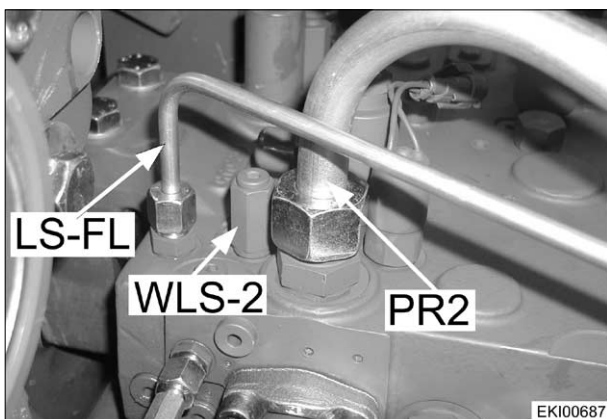
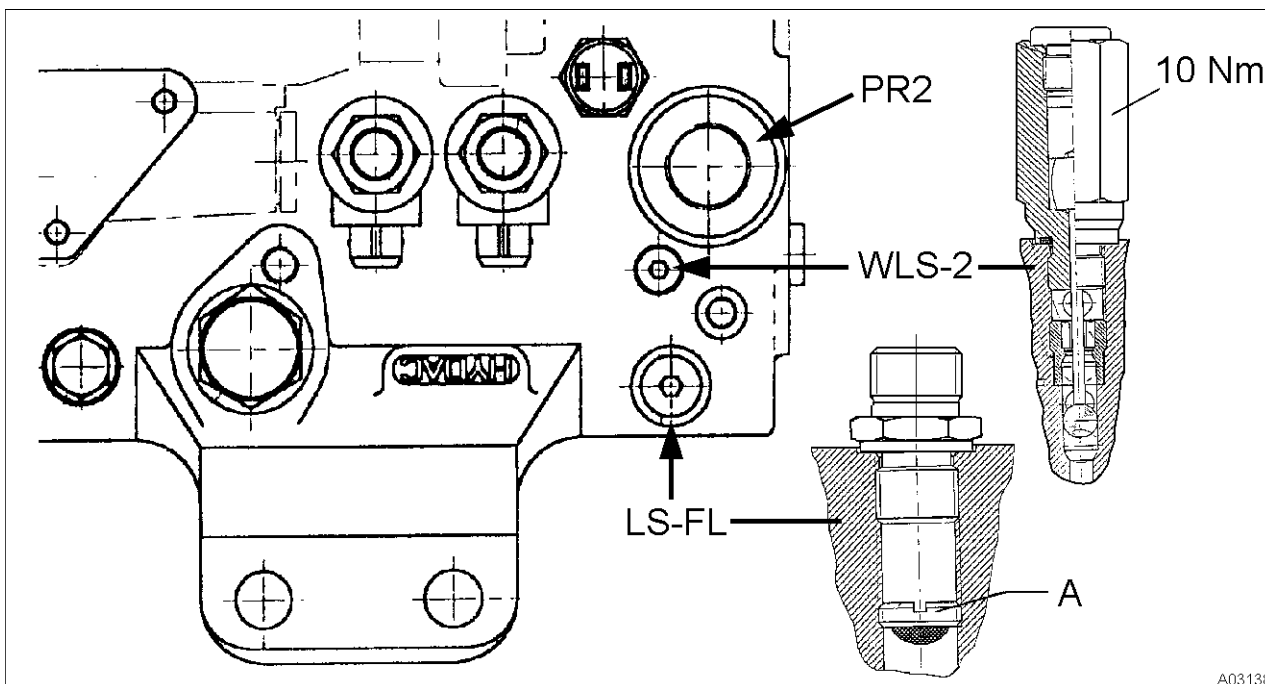
Hydraulic systems / external pressure supply  
**Fitting instructions for external pressure supply**

# G

## CONTENTS

1. Central control block
2. Farmer 400
3. Favorit 700
4. Favorit 900 from serial no. 3001

### 1. Central control block



- Screw strainer (A) into mount (LS-FL) and hand-tighten using screwdriver.

- LS-FL = To external LS mount.  
 WLS-2 = Tighten shuttle valve no. 2 to 10 Nm (lever shuttle valve).  
 PR2 = To external pressure supply mount.

EKI 08.01 Schr en  
**AGCO GmbH & Co.**  
 Johann-Georg-Fendt-Str. 4 D-87616 Marktobendorf

Date	Version	Page	Capitel	Index	Docu-No.
24.08.2001	a	1/6	9666	G	000001

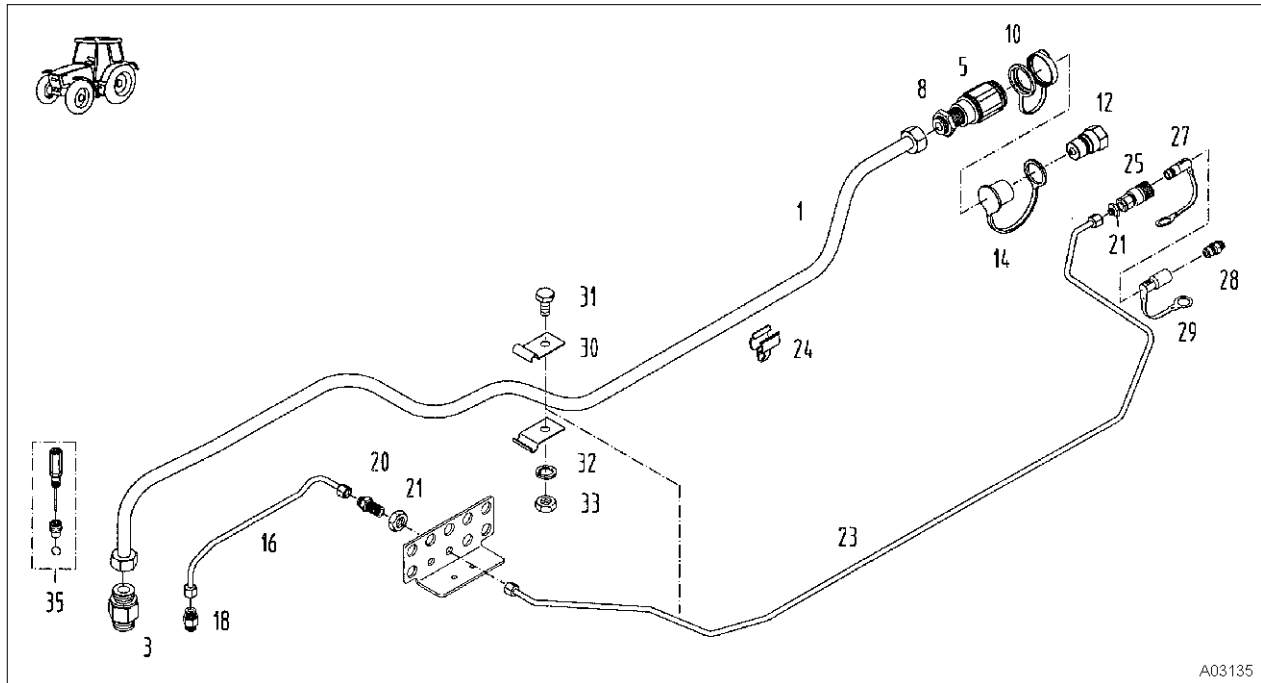


Farmer 400  
Fav 700  
Fav 900

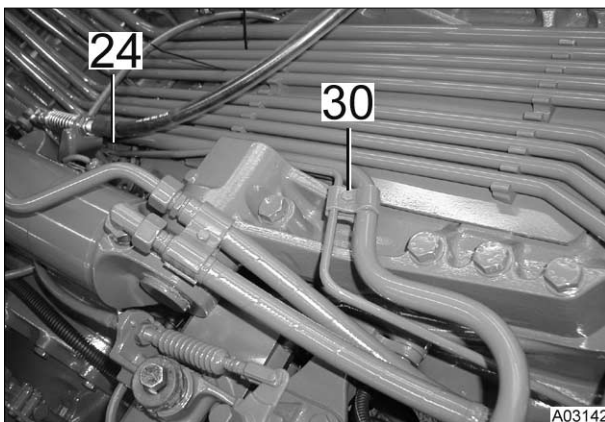
Hydraulic systems / external pressure supply  
**Fitting instructions for external pressure supply**

# G

## 2. Farmer 400



A03135

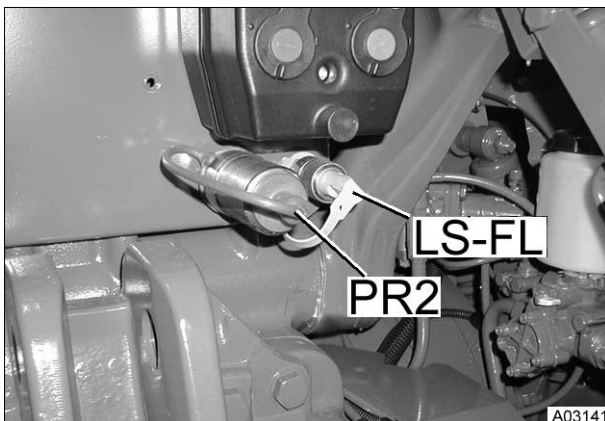


A03142

- Screw 2 clips (30) to LS control line (23) and external pressure supply (1).

1x M6x28 8.8 hexagon bolt  
1x M6 hexagon bolt  
1x spring washer

- Attach LS control line (23) with cable fastener (24).



A03141

LS-FL = External LS mount  
PR2 = External pressure supply mount

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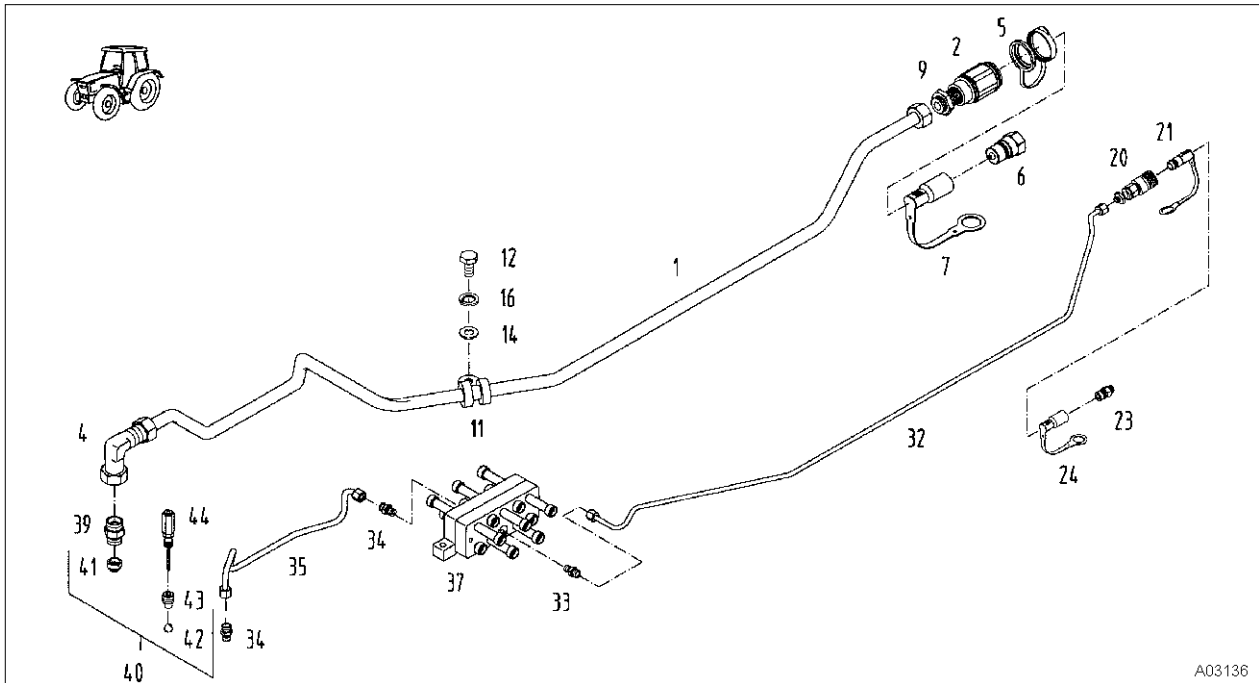


Farmer 400  
Fav 700  
Fav 900

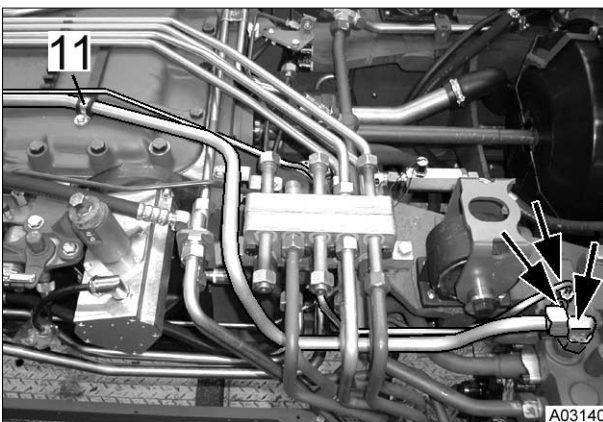
Hydraulic systems / external pressure supply  
**Fitting instructions for external pressure supply**

# G

## 3. Favorit 700



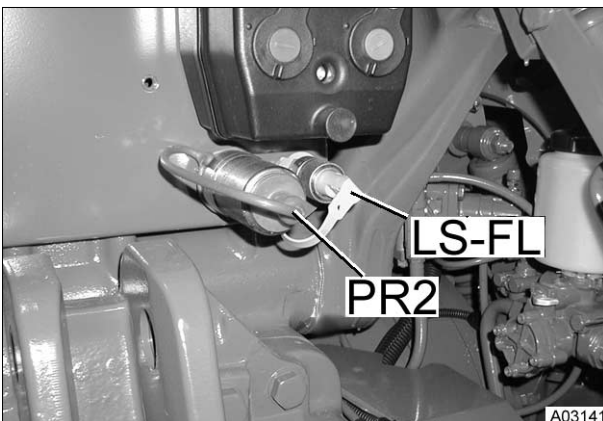
A03136



A03140

- Screw on external pressure supply (1) with pipe collar (11).

- 1 x M6x16 8.8 hexagon bolt
- 1 x washer
- 1 x spring washer



A03141

- LS-FL = External LS mount
- PR2 = External pressure supply mount

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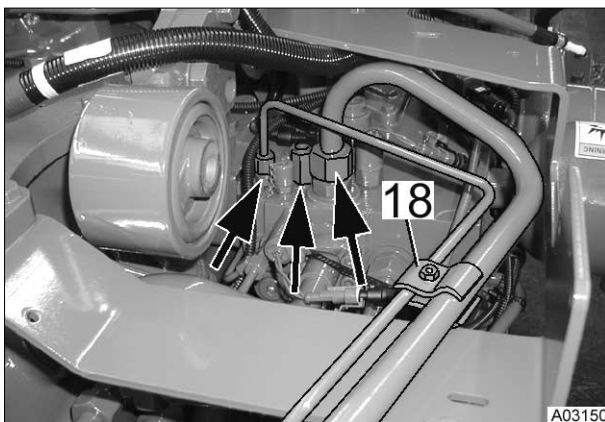
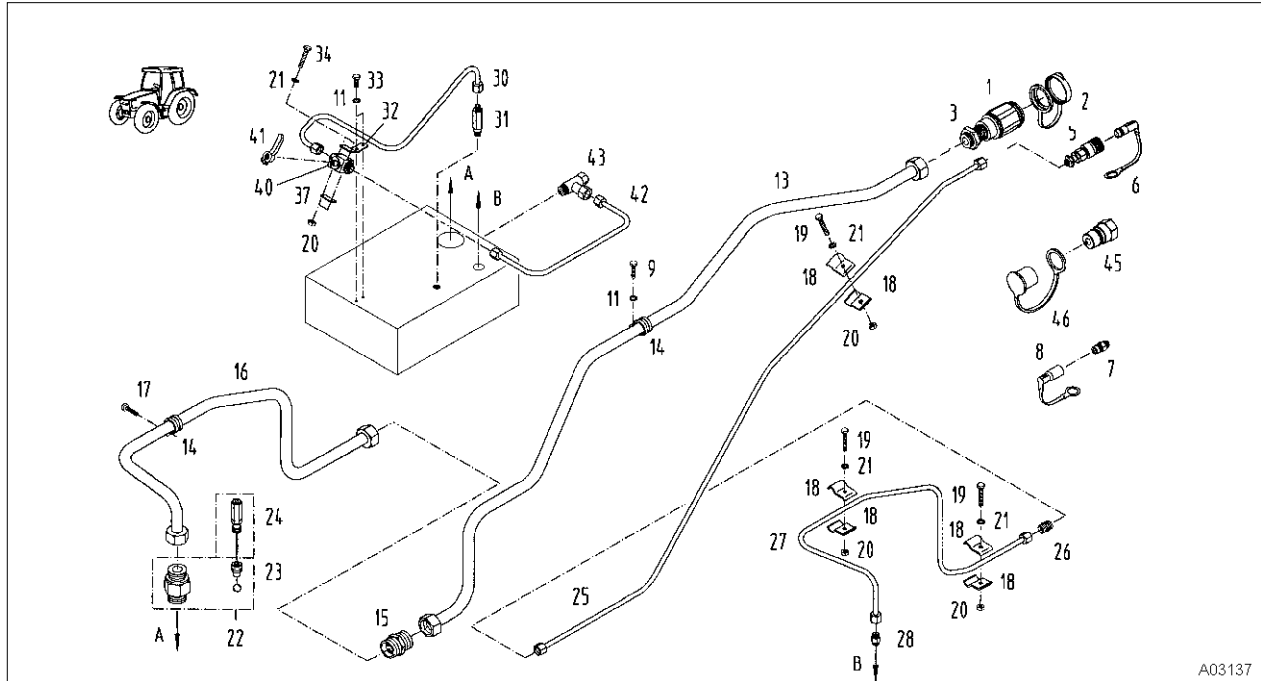


Farmer 400  
Fav 700  
Fav 900

Hydraulic systems / external pressure supply  
**Fitting instructions for external pressure supply**

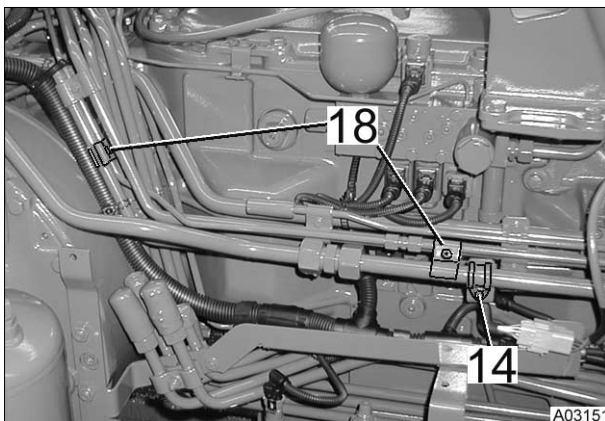
# G

## 4. Favorit 900 from serial no. 3001



- Screw 2 clips (18) to LS control line and external pressure supply.

1x M6x20 8.8 hexagon bolt  
1x M6 hexagon bolt  
1x spring washer



- Screw on pipe collar (14).
- Screw 2 clips (18) in place in each case.

1x M6x20 8.8 hexagon bolt  
1x M6 hexagon bolt  
1x spring washer

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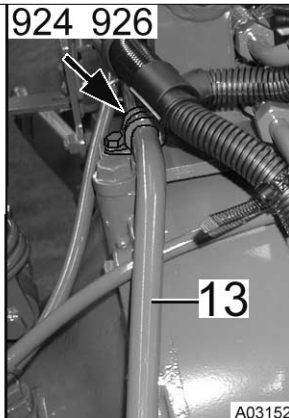
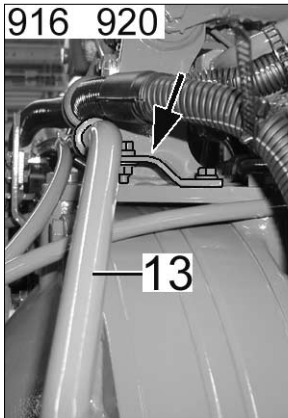
# Fitting instructions

Repair

Farmer 400  
Fav 700  
Fav 900

Hydraulic systems / external pressure supply  
**Fitting instructions for external pressure supply**

**G**



- Screw pressure pipe (13) to right rear axle.

**916, 920**

- 1x angle
- 1x M8x16 8.8 hexagon bolt
- 1x spring washer
- 1x pipe collar
- 1x M8x20 8.8 hexagon bolt
- 1x M8 hexagon bolt
- 1x spring washer

**924, 926**

- 1x pipe collar
- 1x M8x20 8.8 hexagon bolt
- 1x spring washer



- LS-FL = External LS mount
- PR2 = External pressure supply mount

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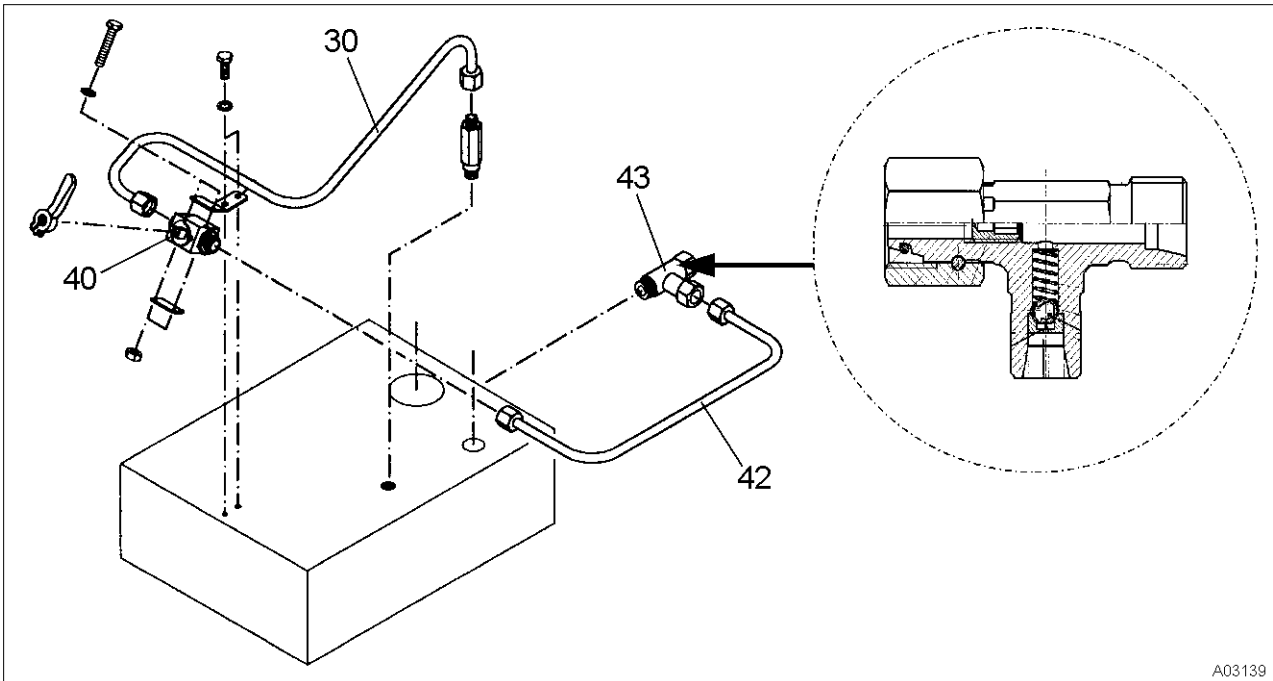


Farmer 400  
Fav 700  
Fav 900

Hydraulic systems / external pressure supply  
**Fitting instructions for external pressure supply**

# G

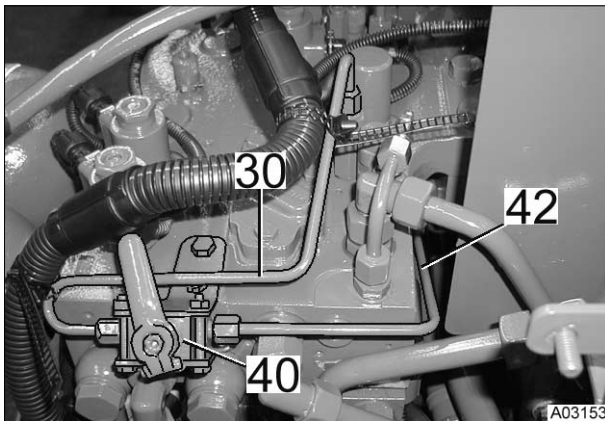
## LS pressure increase



A03139

### Note:

For a detailed description of the LS pressure increase please refer to the Favorit 900 workshop manual, chapter 9666 A 00001.

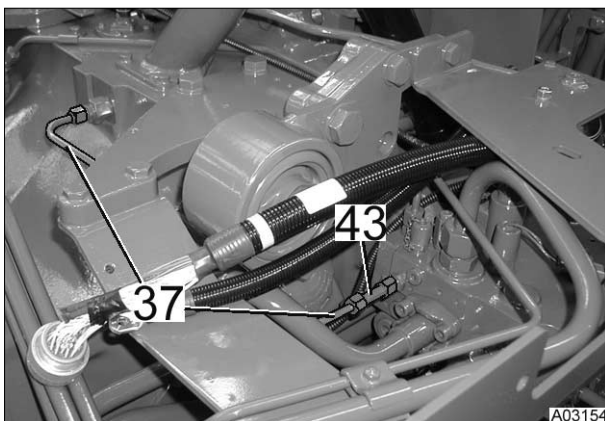


A03153

- Screw on 2-way ball valve (40).

1x support  
2x M8x12 8.8 hexagon bolt  
2x spring washer  
1x shackle  
2x M6x40 8.8 hexagon bolt  
2x M6 hexagon bolt  
2x spring washer

- Screw on pressure pipes (30, 42).



A03154

- Unscrew existing pressure pipe (37).
- Screw on L-coupling (43).
- Screw supplied pressure pipe and pressure pipe from 2-way ball valve (42) to L-coupling.

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## Single e-box

Fav 900 Chassis Number 23/3001 and up

Testing

<b>Fav 700</b> <b>Fav 900</b>	<b>Hydraulic Equipment / Additional Valves</b> <b>Hydraulic Oil Heating</b>	<b>E</b>
----------------------------------	--	----------

### Alterations compared to Twin EST Control Modules Version

- Temperature Switch S040 obsolete
- Additional Valve MVV/Y033 will be supplied directly

#### 1. Activating Conditions

- Temperature Sensor from Spool Valve 1.1 indicates  $< 0^{\circ}\text{C}$  (Temperature can only be read via FENDIAS ) and...
- Engine Speed (Speed Sensor B010) indicates more than 650 Rpm for at least 30 second.

#### 2. Procedure

- Additional Valve MVV/Y033 will be supplied directly from EST Control Module A002 .
- Charge Valve MVL/Y012 is supplied by the same EST PIN via Diod Group V005 and Relay K016
- Charge Valve triggers Load sensing Pump PR to 200 bar.
- This Pressure generates a flow of approx. 20 l/Min. via Orifice BI5 toward Return Pressure.
- This pressure loss generates approx . 8 kW heating energy.
- Hot oil flushes the Valves stack toward the tank. This justifies the expression "Fluish Valve" wich appears in FENDIAS.
- During Oil Heating a distinct noise can be heard.
- A slight engine speed Loss will be noticed during Oil Heating since the Energy mut be generated by the Engine.

#### 3. Eventual Interruption of the Oil Heating.

- If Engine Speed (Engine Speed sensor B010 )drops below 500 Rpm
- Heating will automatically resume if Engine Speed reaches for at least 30 Seconds  $> 650$  Rpm.

#### 4. Duration of Oil Heating . Switch Off conditions

- If Temperature Sensor within Spool Valve 1.1 indicates  $> 5^{\circ}\text{C}$  (Temperatur only to be read with FENDIAS r)
- Approx. 15....20 Minutes will be needed for an initial Oil Temperature of  $- 20^{\circ}\text{C}$ .

#### 5. Failure Codes:

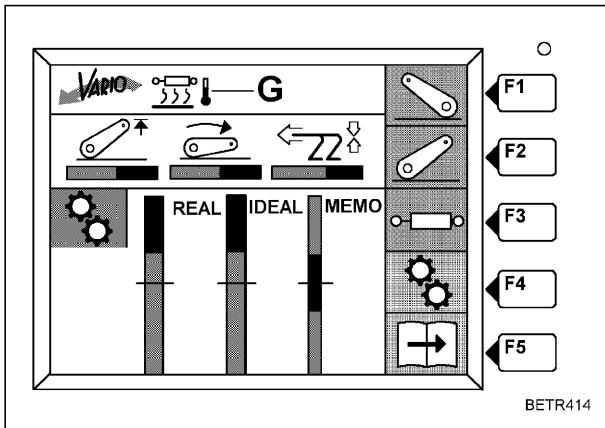
- Only one Failure Code will be possible since Solenoid Valve MVV/Y033 is directly supplied from the single EST Control Module
- Failure Code A.1.F1 appears , If the contol Module cannot supply the valve (e.g. discontinued Wire) or if current exceeds max value of the corresponding output (In this case the control Module limits the max. Current and deactivates the output)

#### 6. Tes Instructions and Simulation of Oil Heating

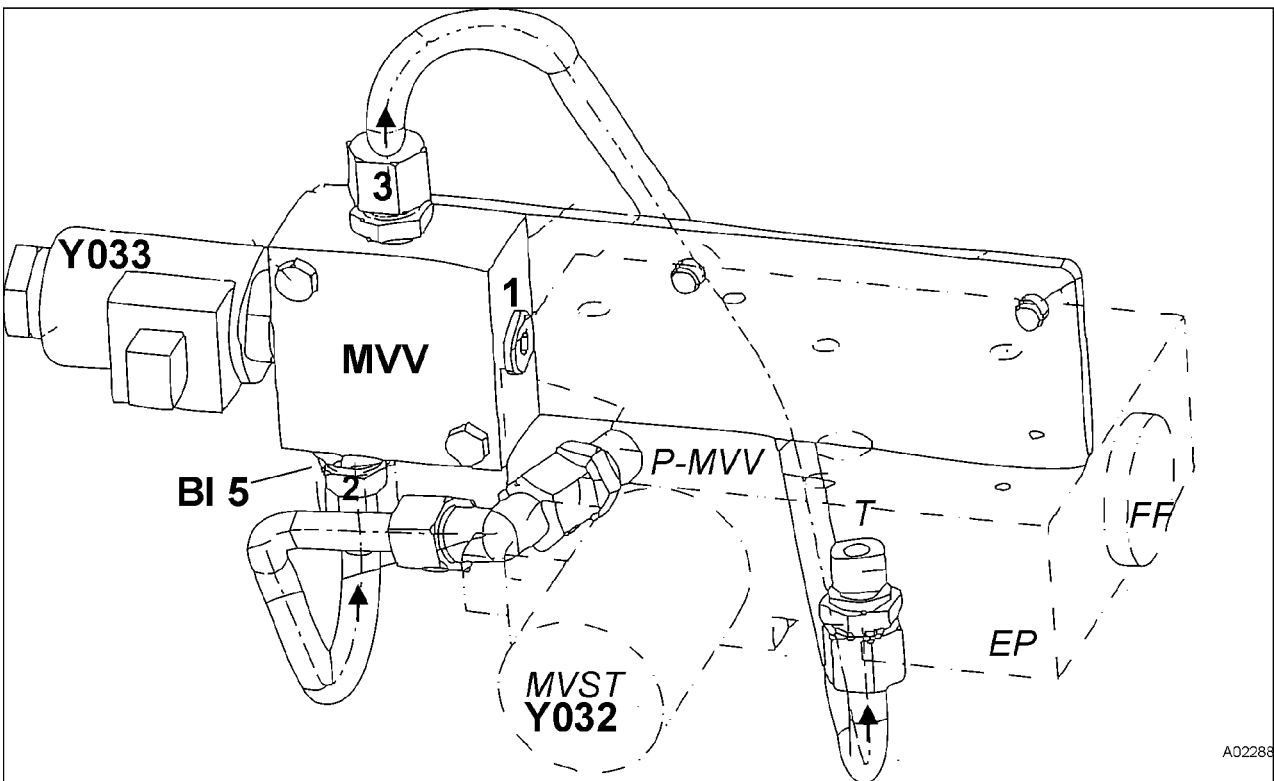
- Temperature Sensors within Spool Valves cannot be "fooled " Oil Heating can only be simulated by....
- supplying simoultaneously both solenoid valves Y012 und Y033.
- Connect 68pole -Adaptor Module to ESZ Control Module E-Box A002 ; Open both switches wich are controlling the valves and lead 12 V to the yellow socket e.g. from Pin 56,
- The hydraulic Part of Oil Heating is a part of the test sequences in the Document "Test Instruction and Protocol for the Hydraulic functions"

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<p>Fav 700 Fav 900</p>	<p>Hydraulic Equipment / Additional Valves <b>Hydraulic Oil Heating</b></p>	<p><b>E</b></p>
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Display in Terminal during Oil Heating

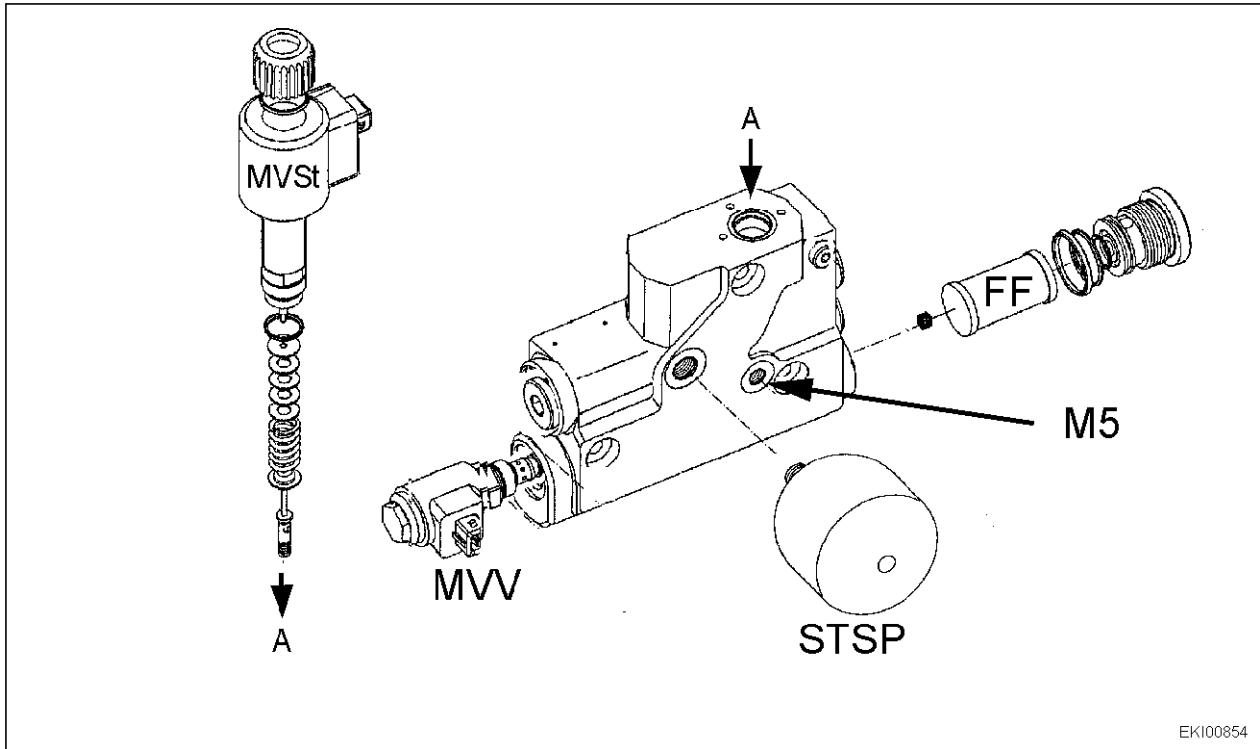


Location of Additional Valve MVV/Y033, valid for Fav 700 Single and twin EST Control Module versions

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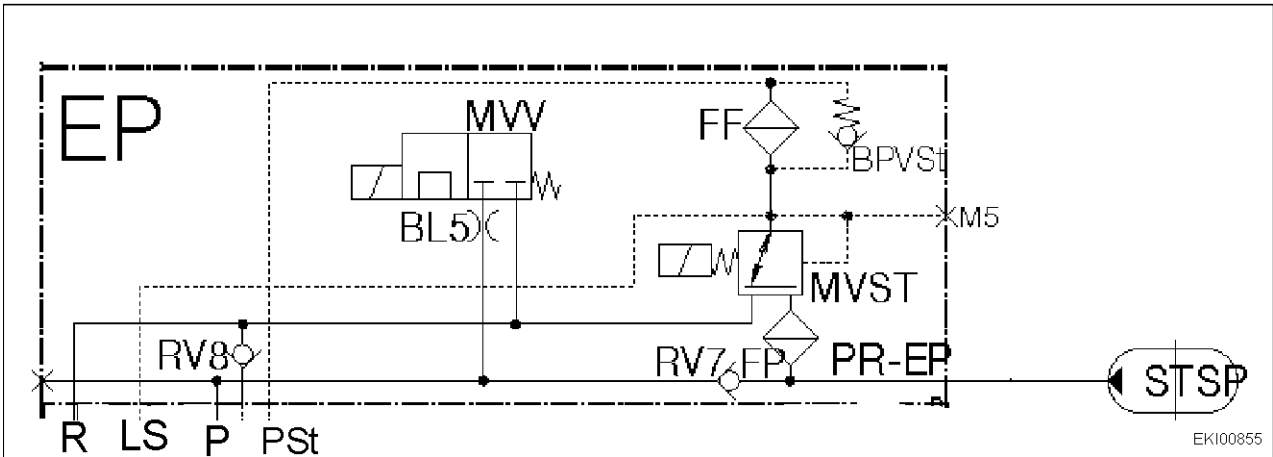


<p>Fav 700 Fav 900</p>	<p>Hydraulic Equipment / Additional Valves <b>Hydraulic Oil Heating</b></p>	<p><b>E</b></p>
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EK100854

Fav 900 / Final Plate with integrated Additional Valve MVV/Y033 (Picture shows equally : MVSt= Control Pressure Valve ; FF=Filter; M5= Measuring Point Control Pressure

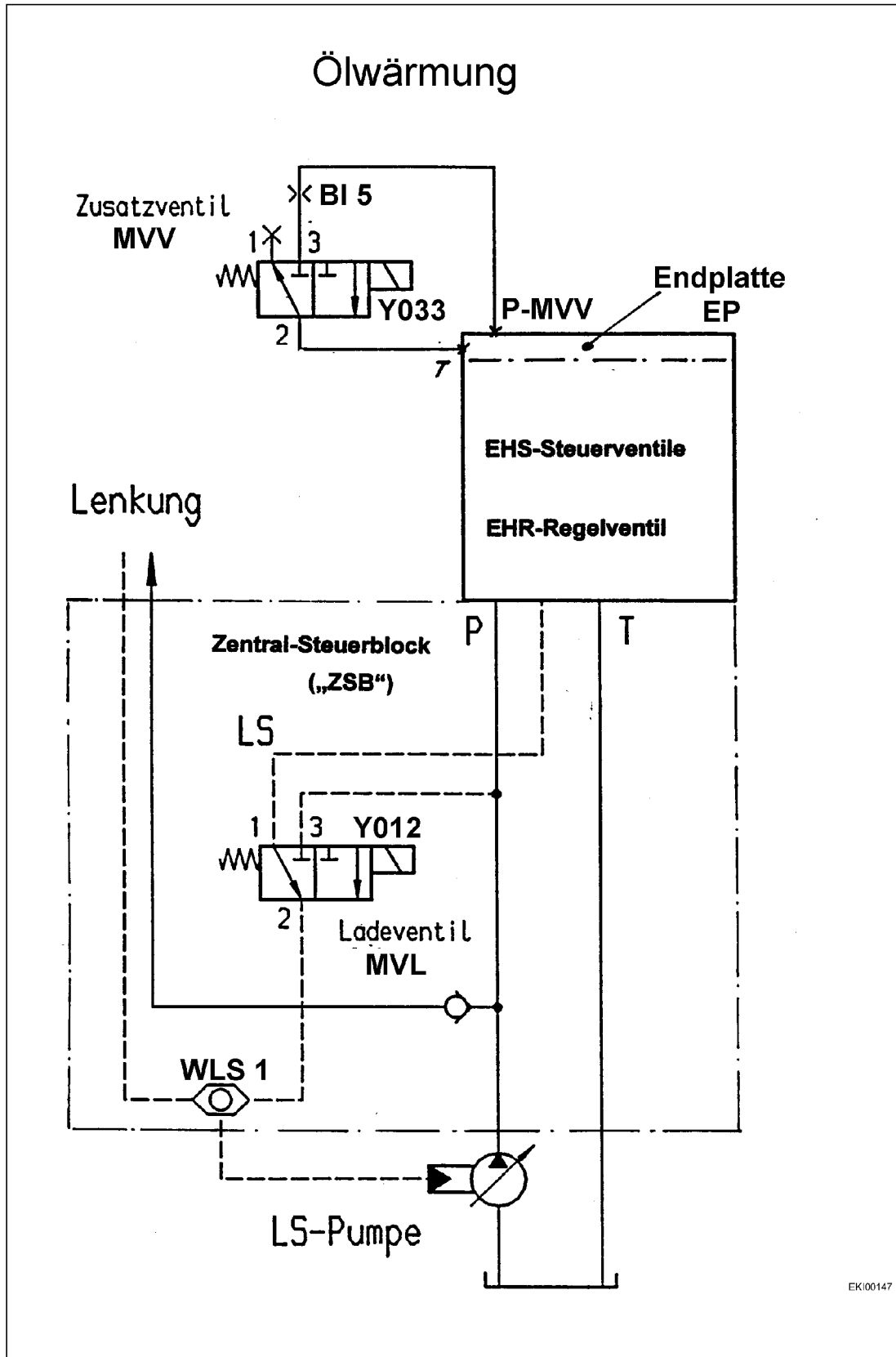


EK100855

Detailed Diagram of the final Plate with integratd Additional Valve MVV for Fav 900

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<p>Fav 700 Fav 900</p>	<p>Hydraulic Equipment / Additional Valves <b>Hydraulic Oil Heating</b></p>	<p><b>E</b></p>
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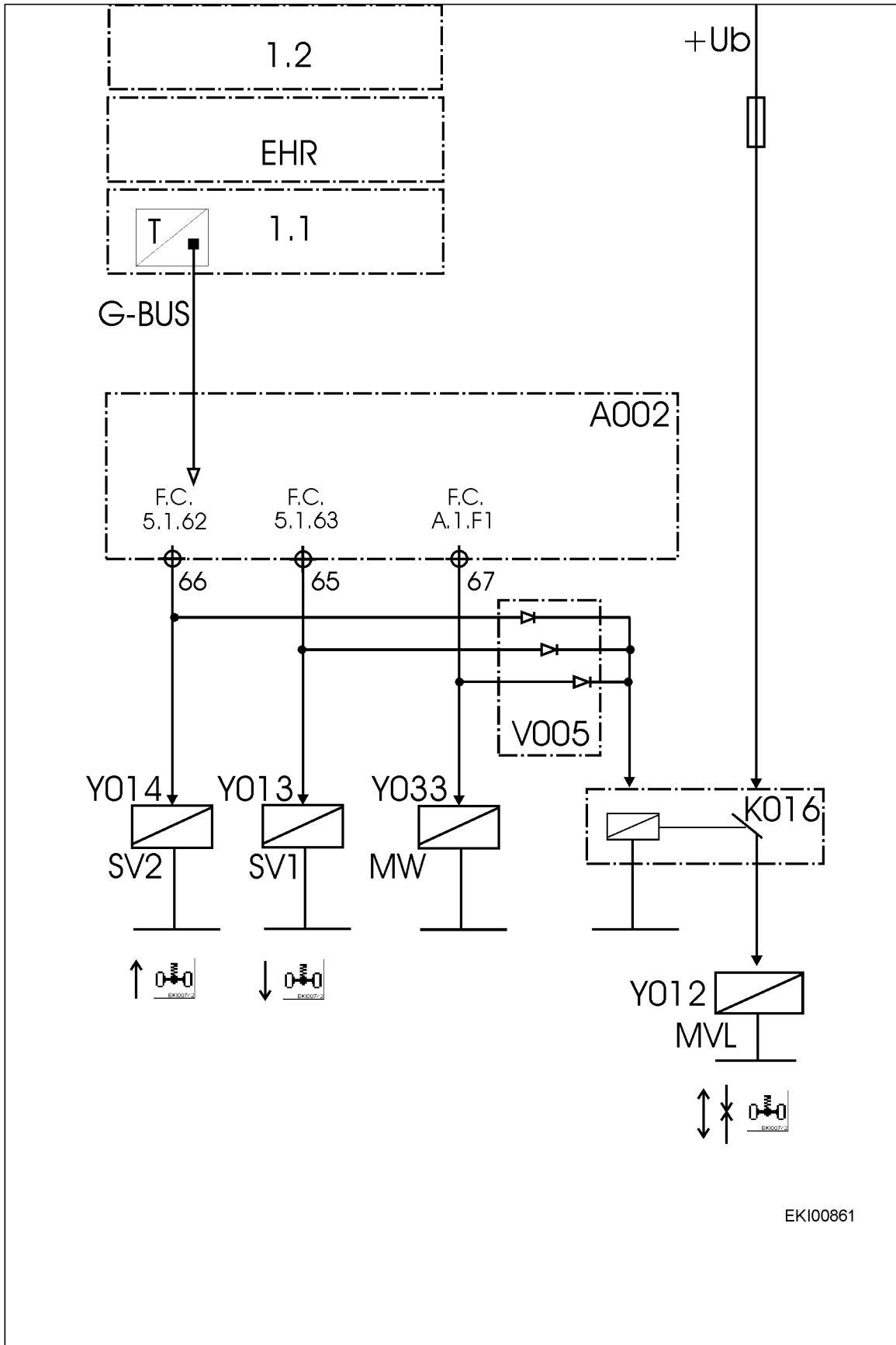


Hydraulic Principle diagram

Remarks to Fav 900: Additional Valve MVV and Orifice BI5 are integratd within the final Plate.

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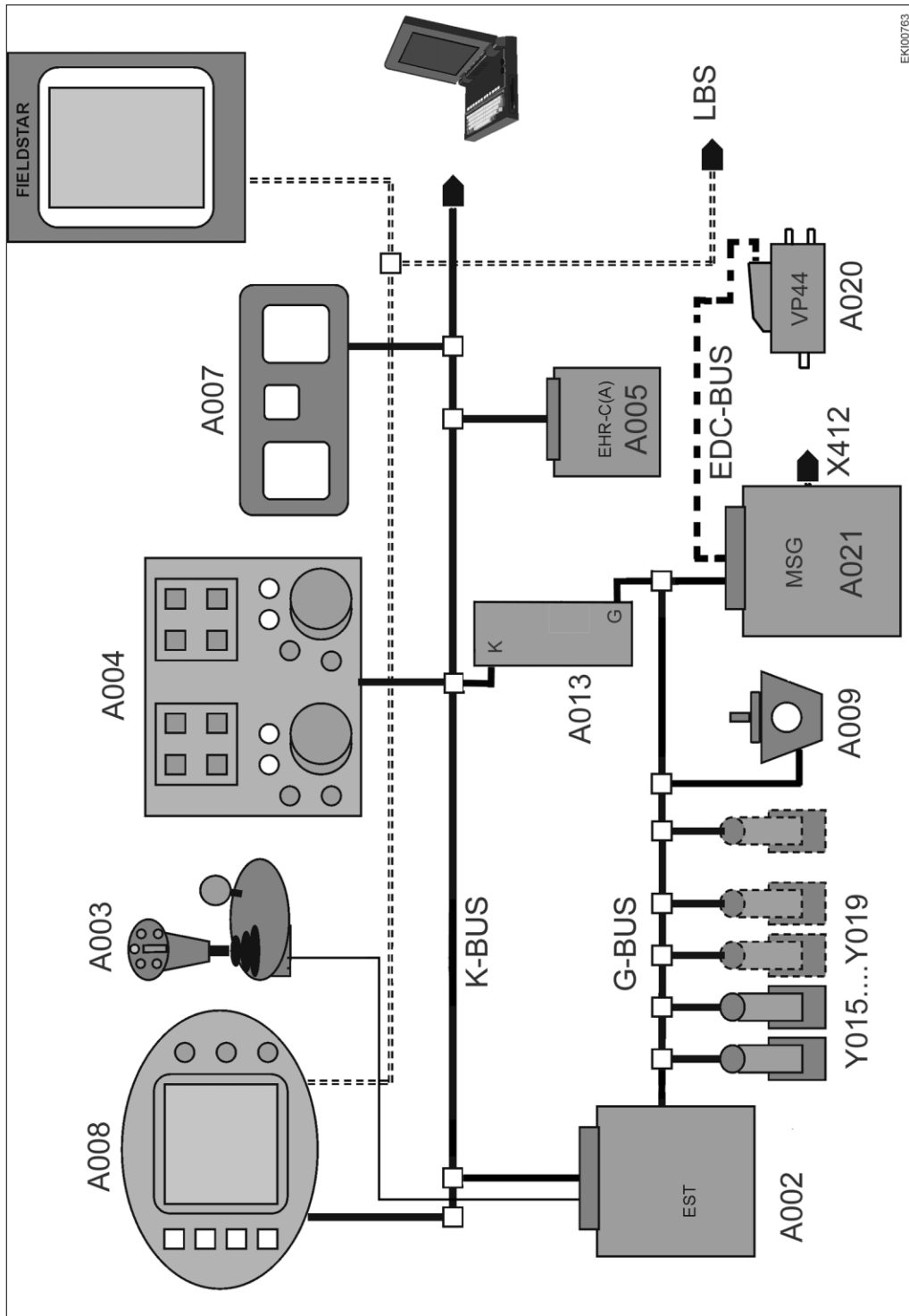
<p>Fav 700 Fav 900</p>	<p>Hydraulic Equipment / Additional Valves <b>Hydraulic Oil Heating</b></p>	<p><b>E</b></p>
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Elektric Principle Diagram

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<b>Fav 900</b>	<b>Elektronics / Systems in General</b> Concept of Electronics Fav.900/23/... with LBS (Fieldstar) terminal	<b>A</b>
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EK000763

A002	EST Comfort Control Module	A020	Injection Pump VP 44
A003	Joystick	A021	EDC Control Module
A004	Side Console	X412	Diagnostic A020/A021
A005	EPC Control Module	G-BUS	Transmission-BUS
A007	Dashpanel	K-BUS	EST Comfort - BUS
A008	Terminal	EDC-BUS	EDC-BUS
A009	Transmission Control Module	LBS	LBS - Fieldstar (optional)
A013	Fuse Board		

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24.10.2000	a	1/1	9700	A	000007

<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electronics / General system <b>Functional description of sensors and ECU A002</b>	<b>A</b>
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## Functional description of components with frequency inputs on ECU

### Sensors with frequency inputs

B002	Front PTO Hall-effect sensor
B010	Engine Hall-effect sensor 1
B011	Engine Hall-effect sensor 2
B014	Hydrostat speed sensor
B015	Bevel pinion speed sensor
B020	Rear PTO Hall-effect sensor
B021	Rear PTO clutch Hall-effect sensor

The enhanced controls ECU **A002** delivers a basic signal voltage of **7.3 VDC**.

This basic signal voltage is reduced when Hall-effect sensors are connected: to **1.1 VDC or 5.4 VDC** (depending on the ratchet wheel setting) by resistor circuits in the Hall-effect sensor.

The ECU calculates the rotational frequency of the shaft (rotational speed) from the number of voltage fluctuations (1.1 VDC and 5.4 VDC).

## Functional description of components with digital inputs on ECU

### Switches and buttons at digital inputs

A003	Joystick, v +
A003	Joystick, mid-position
A003	Joystick, v -
A003	Joystick, activating key
A003	Joystick, rapid reversing
A003	Joystick, cruise control
A003	Operating range Neutral
A003	Speed range I / II
S014	Rapid reversing control
A003	Crossgate lever, mid-position
S019	PTO ON key, rear left
S020	PTO ON key, rear right
B014	Bevel pinion speed sensor / rotational direction
B015	Hydrostat speed sensor

The enhanced controls ECU **A002** delivers a basic signal voltage of **8.0 VDC**.

Depending on the position of the switch, the basic signal voltage from the ECU is reduced: to **2.4 VDC** (internal resistance of component 121 ohms) or **5.1 VDC** (internal resistance of component 510 ohms).

The desired function is carried out in the ECU because of the voltage level.

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<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Electronics / General system <b>Functional description of sensors and ECU A002</b>	<b>A</b>
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## Functional description of components with digital output on ECU

### Sensors with digital output

Y002	Speed range I solenoid valve
Y003	Speed range II solenoid valve
Y010	Diff. lock solenoid valve
Y009	4WD solenoid valve
Y013	Lower suspension solenoid valve
Y014	Raise suspension solenoid valve
Y033	"Charge/flush suspension" solenoid valve
Y028	PTO stage III solenoid valve

The enhanced controls ECU **A002** delivers a voltage of:

**0 VDC or 12 VDC (black - white)** to energise the solenoid valves.

In the event of a mechanical or electrical fault in the component or cable loom, the component is briefly energised, then the ECU detects the fault and switches the voltage off.

## Functional description of components with an ECU pulse width output

### Sensors with pulse width output

Y004	Neutral / turboclutch solenoid valve
Y005	Speed governor solenoid valve
Y006	Exhaust brake solenoid valve
Y008	Rear PTO clutch solenoid valve
Y011	Front PTO clutch solenoid valve
Y026	PTO stage I solenoid valve
Y027	PTO stage II solenoid valve
Y032	Solenoid valve for control pressure of spool valves

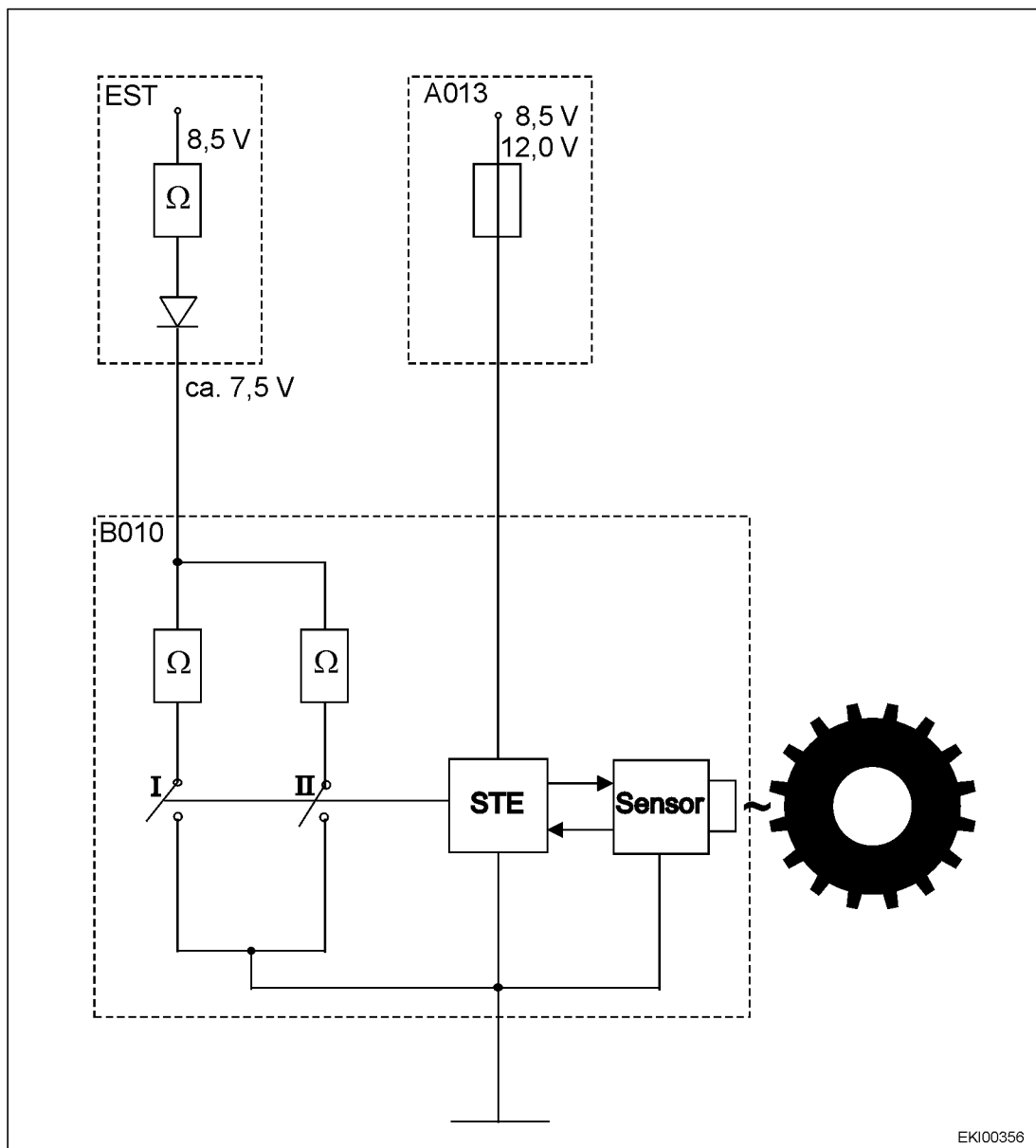
The enhanced controls ECU **A002** delivers a voltage of

**0 VDC or 12 VDC** to energise the solenoid valves.

The **voltage increase to 12 VDC** or the **voltage shutoff to 0 VDC** is **proportional** .

In the event of a mechanical or electrical fault in the component or cable loom, the component is briefly energised, then the ECU detects the fault and switches the voltage off.

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EKI00356

**EST** - electronic control unit (ECU)      **A013** - fuse board (X200, X201, X202)  
**B010** - engine Hall-effect sensor 1      **STE** - control unit  
 (example)

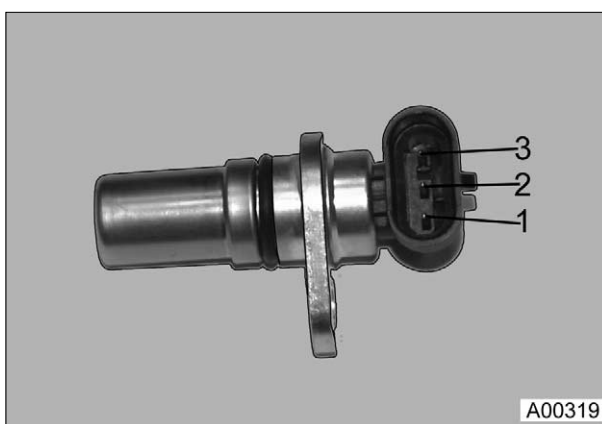
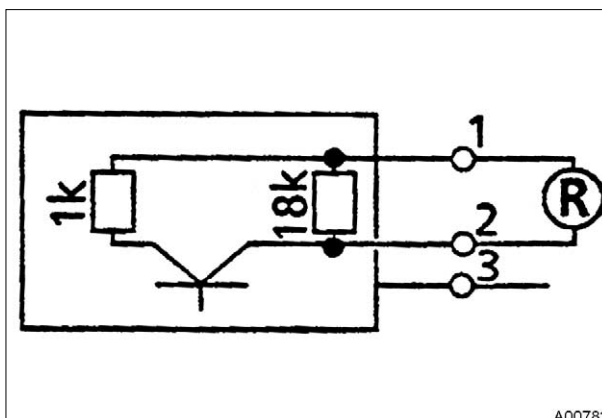
	Switch I	Switch II	Fault code
Supply voltage OK	Closed	Closed / open	No
Fault in supply voltage	Open	Open	Yes

If there is an interruption in the signal line or a short-circuit in the signal line after earth, a fault code is displayed in both cases. (Load on power source in the ECU is outside the tolerance.)

Farmer 400  
Fav 700  
Fav 900

Electronics / Sensors  
Electrical circuit diagram - speed sensor

**A**



### Speed sensor pin assignment

- 1 = Earth
- 2 = Speed signal
- 3 = + supply 12 to 14 VDC

### Measure resistance at pin 2 and pin 1

Hall-effect sensor disconnected (no + supply)

Resistance R = 18 kohms

### Measure signal voltage at pin 2 and pin 1

ECU A002 supplies basic signal voltage of approx. **7.3 VDC** to pin 2.

#### Ratchet wheel setting A

Signal voltage = **approx. 5.4 VDC** , resistance 18 kohms

#### Ratchet wheel setting B

Signal voltage = **approx. 1.1 VDC** , total resistance (parallel connection) from 18 kohms and 1 kohm

### Measure + supply at pin 3 and pin 1

Voltage = **12 to 14 VDC** (depending on on-board power supply)

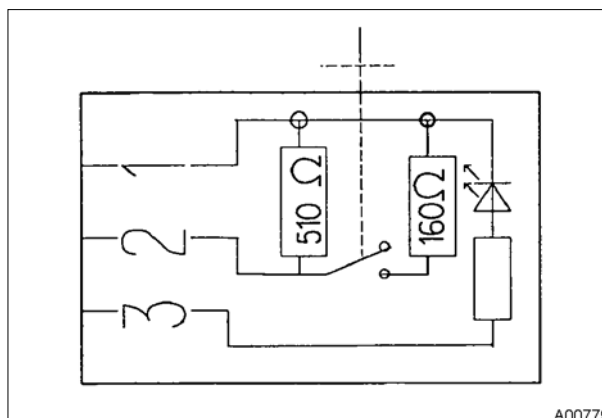
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Farmer 400  
Fav 700  
Fav 900

Electronics / Sensors  
Electrical circuit diagram - switches/buttons/controls

**A**



### Switch pin assignment

- 1 = Earth
- 2 = Switch on / off
- 3 = Light switch on / off

### Measure resistance at pin 2 and pin 1

#### Switch open

Resistance R = 510 ohms

#### Switch closed

Resistance R =  $1 / (1/510 + 1/160) =$  121 ohms

### Measure signal voltage at pin 2 and pin 1

ECU A002 supplies basic signal voltage of approx. **8.0 VDC** to pin 2.

#### Switch open

Resistance R = 510 ohms => signal voltage (between pins 2 and 1) = **5.1 VDC**

#### Switch closed

Resistance R = 121 ohms => signal voltage (between pins 2 and 1) = **2.4 VDC**

### Measure "Lighting switch" voltage at pin 3 and pin 1.

Voltage = 0 VDC or 12 VDC (depending on switch position )



#### Note:

Functional description of sensors and ECU A002 - Chapter 9700 Index A

Electrical circuit diagrams - Chapter 9000 Index C

Electrical / electronic components - Measuring and testing - Chapter 9000 Index E

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	<b>Service Information</b> <b>Description of Damage for Fault Messages</b> <b>4.1.A1, 4.1.A5</b>	<b>Group</b> <b>8</b>	<b>KDM</b> <b>24/01</b>	
<b>Farmer 400, Favorit 700, 900</b>		<b>Chap. No.</b> <b>9700</b>	<b>Reg.</b> <b>H</b>	<b>Doc. No.</b> <b>000001</b>

To determine the cause of damage when fault messages **4.1.A1**, **4.1.A5** occur, we need a more detailed description of the damage.

We must be able to replicate your fault search from the data in the guarantee claim form. Please follow the procedure below during your fault search.

Deviations from the data and measurement values given below must be noted on the guarantee claim form.

If no data is given, we will return the guarantee claim unprocessed.

For this detailed fault search, to replace the actuator we will reimburse for 2.5 hours plus 0.5 - 1.0 hours depending on the fault.

**How often, and at what intervals do the fault messages occur**

Number:	Time interval:
---------	----------------

**Under what conditions of use do the fault messages occur**

Starting, engine	warm	cold
External temperature	approx. °C	
Cooling OK	yes	no
Warning message gear box temperature too high (95° in drive range II only)	yes	no
Fault message repeated after restart after a waiting time of around 30 seconds	yes	no

For the workshop

**The following test routines must also be performed:**



**1. Faults 4.1.A1 and/or 4.1.A5 are permanently active**

- Open cover in cab floor and check play on emergency control (slight play approx. 1 mm), reset if necessary.
- If there is no play, release bolts on emergency control and repeat the drive test.
- Otherwise perform the following test routine.

**2. Faults 4.1.A1 and/or 4.1.A5 occur occasionally**

To determine the fault more precisely, a special test routine must be performed on the actuator.

The same ambient conditions should be present during testing as when the fault occurred (e.g. temperature).

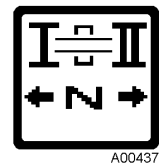
	<b>Service Information</b> <b>Description of Damage for Fault Messages</b> <b>4.1.A1, 4.1.A5</b>	<b>Group</b> <b>8</b>	<b>KDM</b> <b>24/01</b>	
<b>Farmer 400, Favorit 700, 900</b>		<b>Chap. No.</b> <b>9700</b>	<b>Reg.</b> <b>H</b>	<b>Doc. No.</b> <b>000001</b>

**Perform the following preparatory work:**



- Connect ammeter,  
Remove fuse F043 and connect meter (measurement range at least 3A) between the contacts.
- Connect voltmeter,  
Connect actuator adapter cable (X899.980.246.207, 8-pin) to actuator connection.  
Connect meter to Pin 4 (+UB of fuse F043) and Pin 8 (earth).
- You should be able to read the two meters at the same time. If you do not have two meters, measure the current and voltage in succession.
- Connect PC and in the Gearbox menu, select diagnosis window Gearbox Adjustment. When the fault occurs, you can determine the adjustment angle.

For the workshop

- Start engine.
- Select neutral on gearbox.
- Adjust range selection (adjustment code 4003).  
If picture A00437 is output, press neutral button.
- Select acceleration 'Ramp' I and set minimum acceleration (0.02 or 0.03 km/h) (see Operating Instructions Favorit 700 Chapter 7.3).  
This adjustment then causes the actuator to move through its range in the smallest possible steps. Engine speed approx. 1400 rpm.
- Release hand brake (chock tractor wheels).  
Press neutral button.  
Press Activation button, push drive lever forwards and hold. The gearbox ratio is adjusted in the forward direction until the maximum setting is reached (takes around 7 minutes) or a fault occurs.



The gearbox adjustment can be monitored on the terminal. During the adjustment process, the current consumption (heavily temperature-dependent) in good condition is up to approx. 100 mA +/- 50 mA. Beware, meter display will jump.

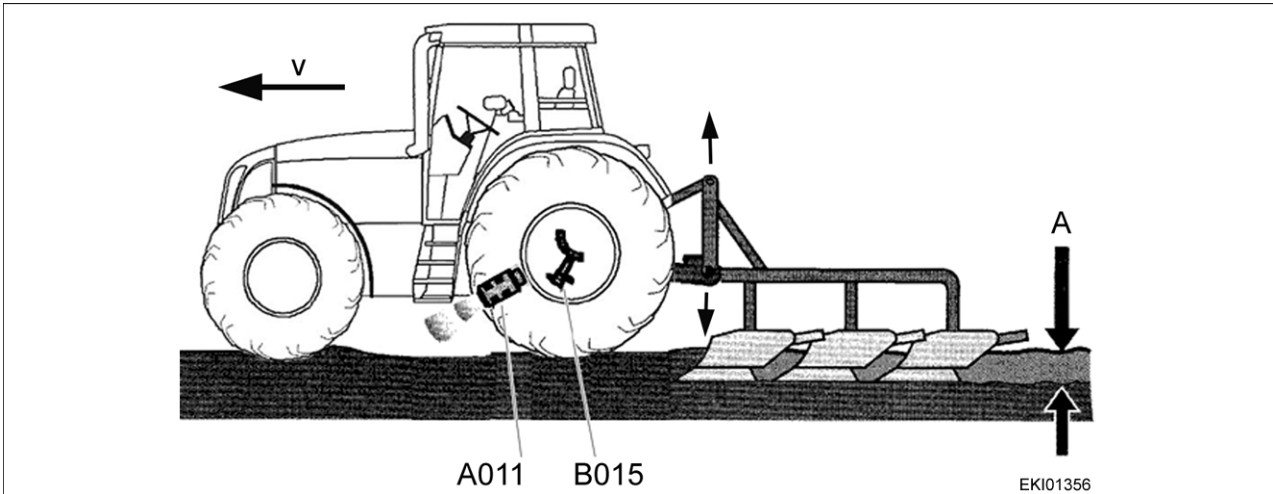
	<b>Service Information</b> <b>Description of Damage for Fault Messages</b> <b>4.1.A1, 4.1.A5</b>	<b>Group</b> <b>8</b>	<b>KDM</b> <b>24/01</b>	
<b>Farmer 400, Favorit 700, 900</b>		<b>Chap. No.</b> <b>9700</b>	<b>Reg.</b> <b>H</b>	<b>Doc. No.</b> <b>000001</b>

The following table describes the electrical effects which can occur during checking and their possible fault causes.

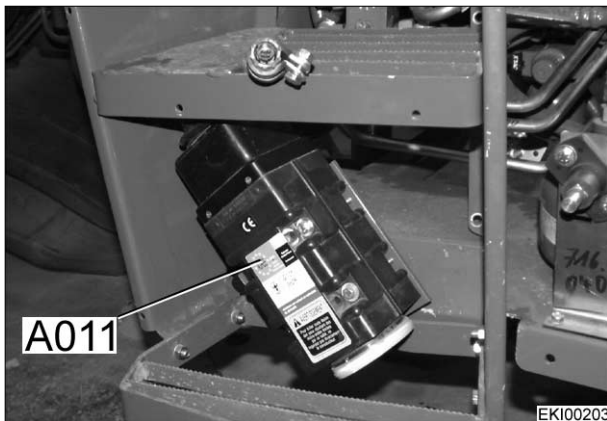
For the workshop

Voltage constant and current moves towards zero	Yes →	Change actuator unit
no ↓		
Voltage falls suddenly	Yes →	Check power supply to actuator (+Ub)
No ↓		
Voltage constant and current rises (up to 2500 mA)	Yes →	a) Play in emergency control Test actuator over entire adjustment range (slight play approx 1mm) and reset if necessary.  b) Repeat adjustment process. If fault persists, establish adjustment angle. If the actuator always cuts out at 120°, the speed limiter valve may be faulty.  c) If the actuator cuts out at another angle, carefully remove the actuator from the gearbox block (without twisting the control shaft) and use your fingers to check the control shaft for ease of movement. If difficult to move, then open gearbox and check mechanically.  d) If the gearbox has no movement difficulty, replace the actuator.
No ↓  Release emergency control on suspicion and refit with slight play. Release tractor again.		

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Electronics / Radar sensor  <b>Description of A011 - radar sensor</b></p>	<p><b>A</b></p>
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A011 = radar sensor  
 B015 = bevel pinion speed sensor  
 A = working depth  
 V = travel speed



Drawing shows Fav 700  
 A011 - radar sensor (optional extra)

**Note:**

See:

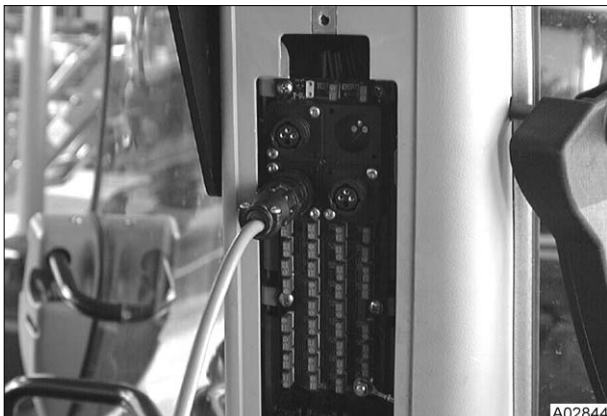
- Chapter 8610 Reg. A - Operation and function of electronic slip control
- Chapter 8610 Reg. A - Activating LCD for radar sensor A011 and compressed air
- Chapter 8610 Reg. B - Faults - slip control (radar sensor A011)
- Chapter 8610 Reg. E - Slip control performance test
- Chapter 9000 Reg. E - X007 - implement socket
- Chapter 9000 Reg. E - A011 - radar sensor
- Chapter 9000 Reg. E - A005 - EPC ECU

Date	Version	Page	Capitel	Index	Docu-No.
10.07.2001	a	1/1	9730	A	000001

Fav 900

## Electronic / Control unit

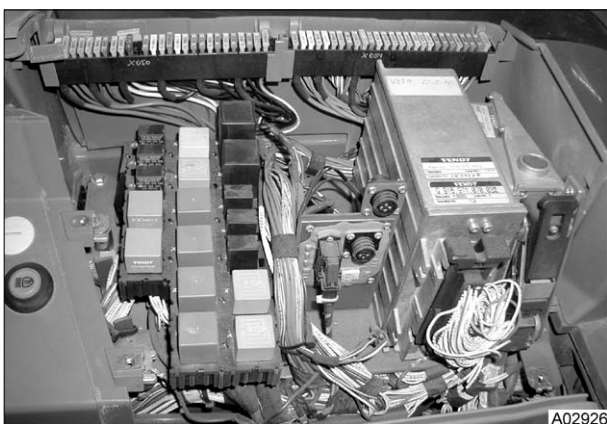
### Replacing Eproms in A002 - EST Control module

**G**

A02844

**Preliminary operations**

- Connect CAN-Cable onto K-Bus .
- Before starting work, read Vehicle Data with diagnostic PC and memorize vehicle features .



A02926

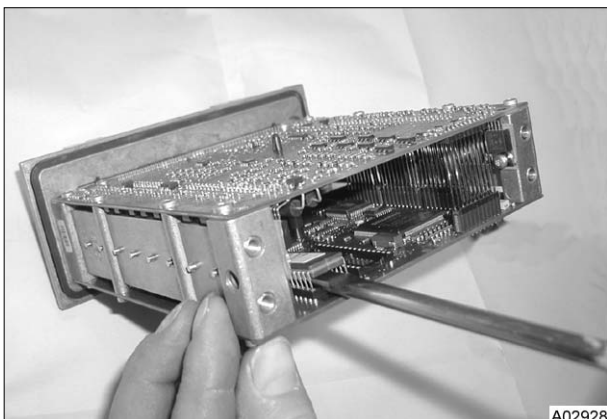
**Extraction and putting the E-Prom into place**

- Disconnect and dismount EST Control module (A002).



A02927

- Loosen 4 screws.



A02928

- Cut the 2 Cable ties.
- Loosen softly E-proms with a screw driver and extract E- Proms.

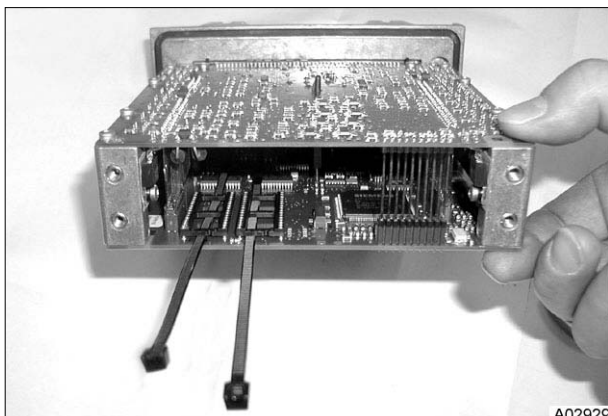
**Note:**

**Avoid any touching of the printed circuits with fingers.**

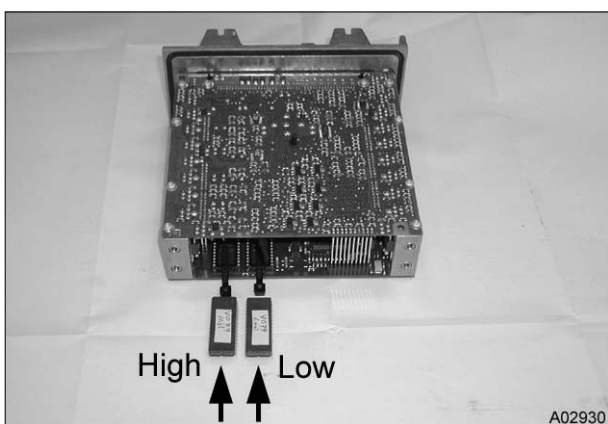
Date	Version	Page	Capitel	Index	Docu-No.
05.07.2001	a	1/2	9740	G	000002

Fav 900

Electronic / Control unit  
**Replacing Eproms in A002 - EST Control module**

**G**

- Insert new cable ties.



- Put in place new E-proms and secure them with the cable ties.

(Notice notch see arrow)

**Replacement E-proms**

High = Vario V0\_90

Low = Vario V0\_90



**Programming the tractor.**

- End Of Line (EOL) software min. 4.8
- Calibrate transmission (consult Service-Training ML-200).

**Important:**

**Data will only be memorized after the "Click" of the Relay in EST Control Module can be heard.**

**Check all functions of the Side Console (A004), Terminal (A008) and Joystick (A003) .**

Date	Version	Page	Capitel	Index	Docu-No.
05.07.2001	a	2/2	9740	G	000002

Fav 900

## Electronic / Control unit

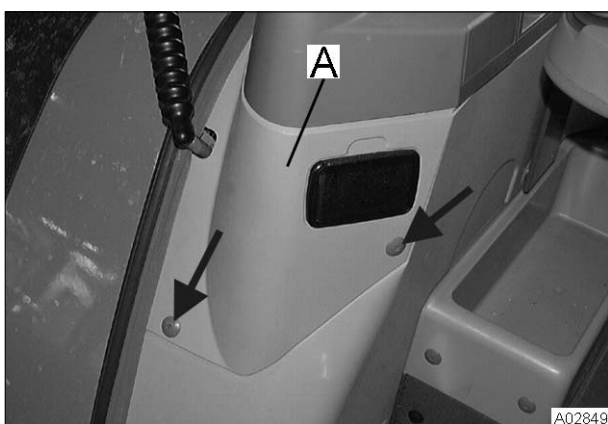
### Replacing Eproms in A004 - Control console

G



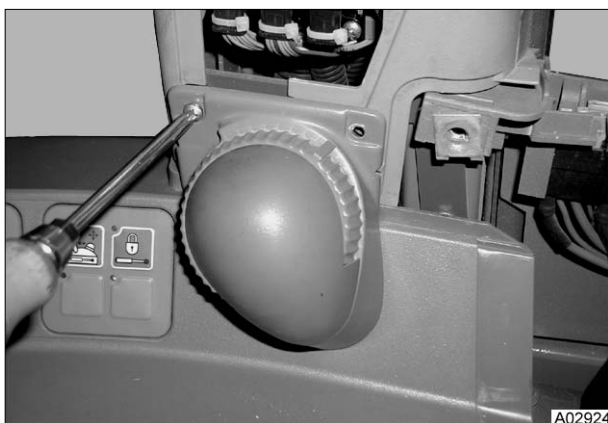
#### Preliminary operations

- Connect CAN-Cable onto K-Bus .
- Before starting work, read Vehicle Data with diagnostic PC and memorize vehicle features.

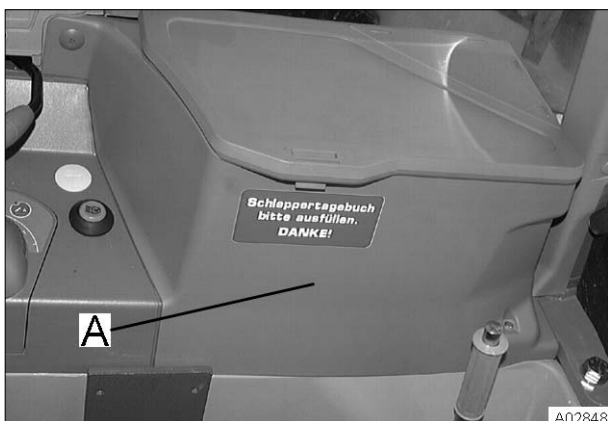


#### Extraction and putting the E-Prom into place

- Loosen screws (arrows).
- Dismantle lining (A).



- Remove the console of manual accelerator.



- Remove cover (A).

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05.12.2001	a	1/3	9770	G	000005

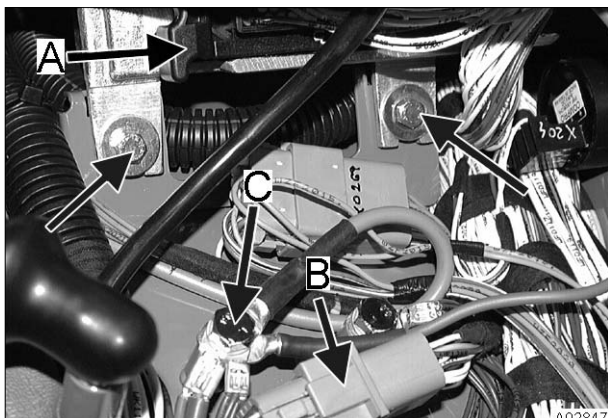


Fav 900

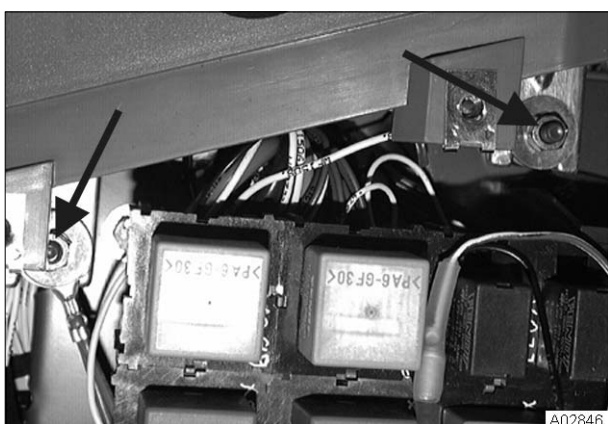
## Electronic / Control unit

### Replacing Eproms in A004 - Control console

G

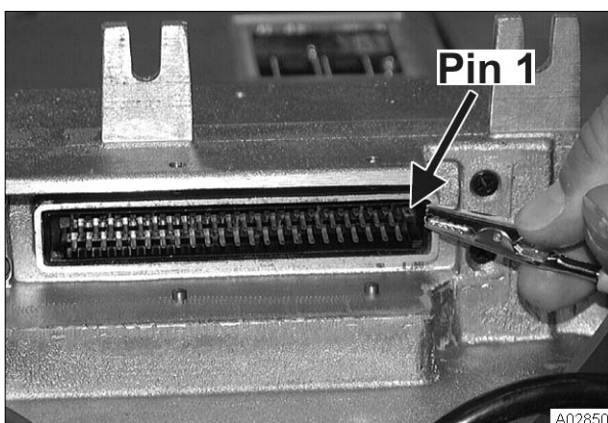
**Remove Side Console.**

- Loosen screws (arrows).
- Separate connectors (A/B).
- Loosen Earth cable (C) .



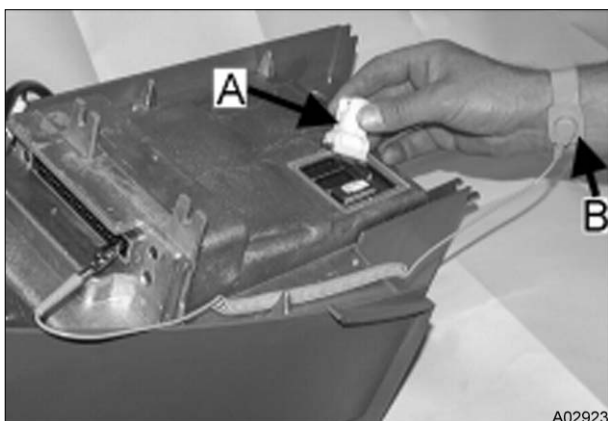
- Loosen Nuts (arrows).

**Note:**  
**Notice Earth cable assembly.**

**Important:**

**Uniquely extract an replace E-Proms with an Earthing Bracelet (B) and the appropriate Extracting Tool (A) .**

- Connect Earthing bracelet onto Pin 1 of the side console.

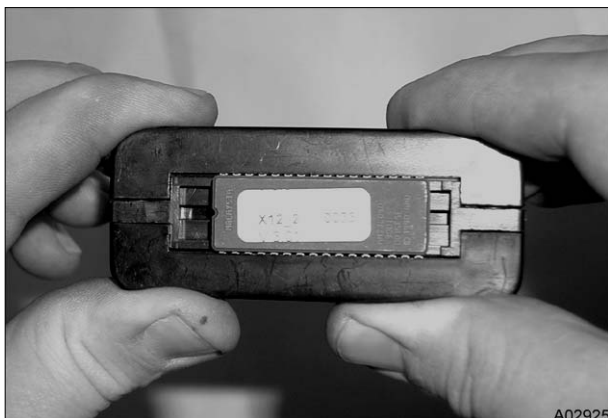


- Extract E-proms with Extracting Tool. While replacing E- proms notice the respective identification numbers (last digits).

Date	Version	Page	Capitel	Index	Docu-No.
05.12.2001	a	2/3	9770	G	000005

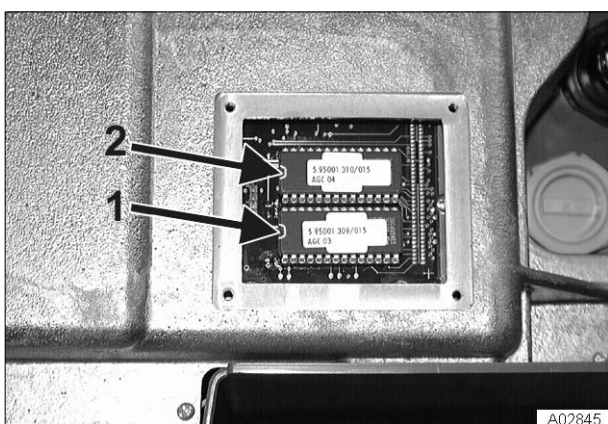
Fav 900

Electronic / Control unit  
**Replacing Eproms in A004 - Control console**

**G**

A02925

- Align E-proms with clamp rail.

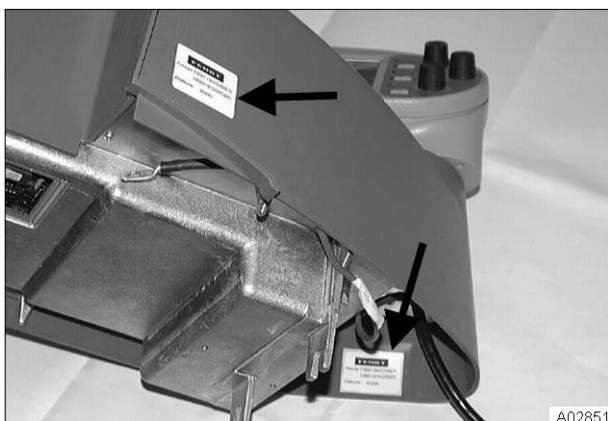


A02845

- Replacing E-proms .  
 Watch proper positioning of replacment E-proms.  
 The **Notch** (see Arrows) of the socket must correspond to notch in E-prom.

**Replacement E-proms**

- 1 = AGCO 21 EVN
- 2 = AGCO 21 ODD



A02851

- Put sticker into place on the side console (see Arrows).

**Important:**

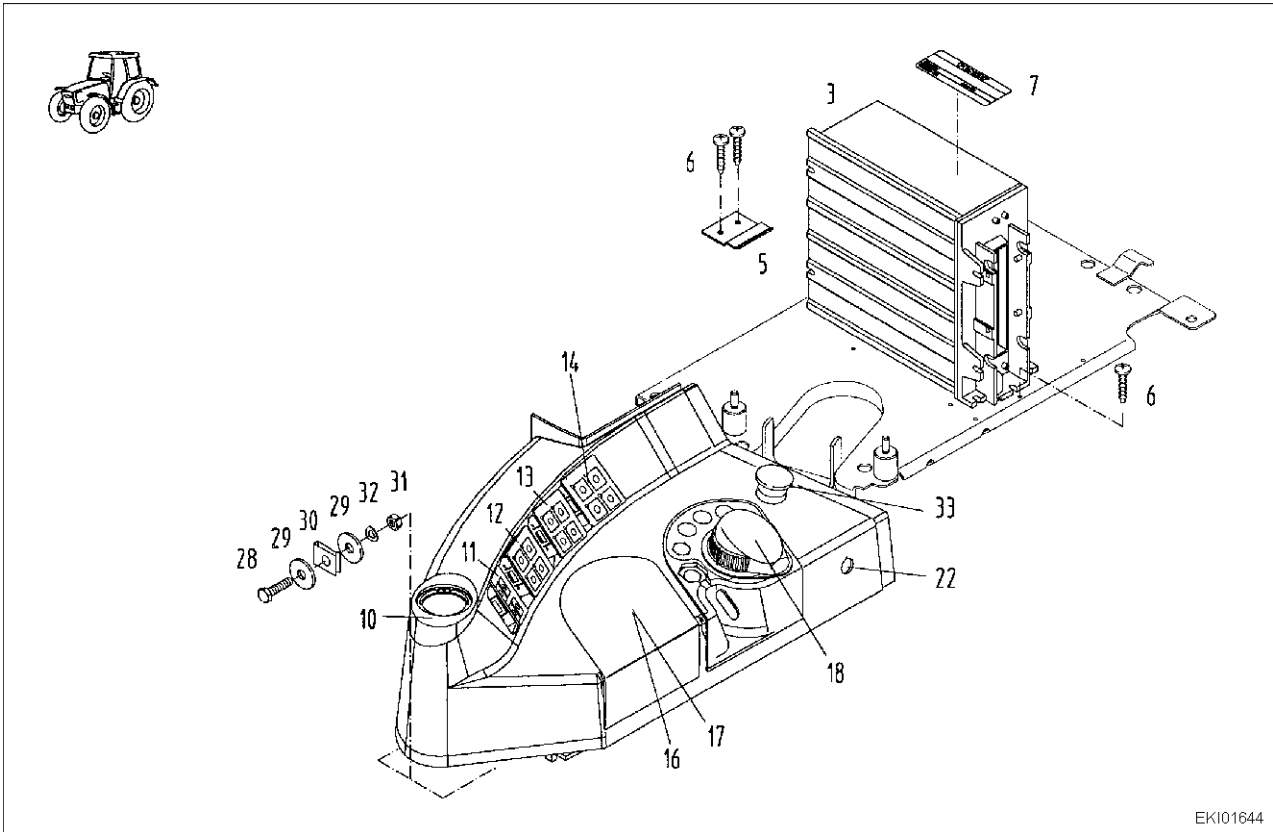
**Check all functions of the Side Console (A004) , Terminal (A008) and Joystick (A003) .**

Date	Version	Page	Capitel	Index	Docu-No.
05.12.2001	a	3/3	9770	G	000005

**Farmer 400**  
**Fav 700**  
**Fav 900**

**Power lift / Electrohydraulic control EPC**  
**Removing and fitting rear module in A004 - control console**

**G**

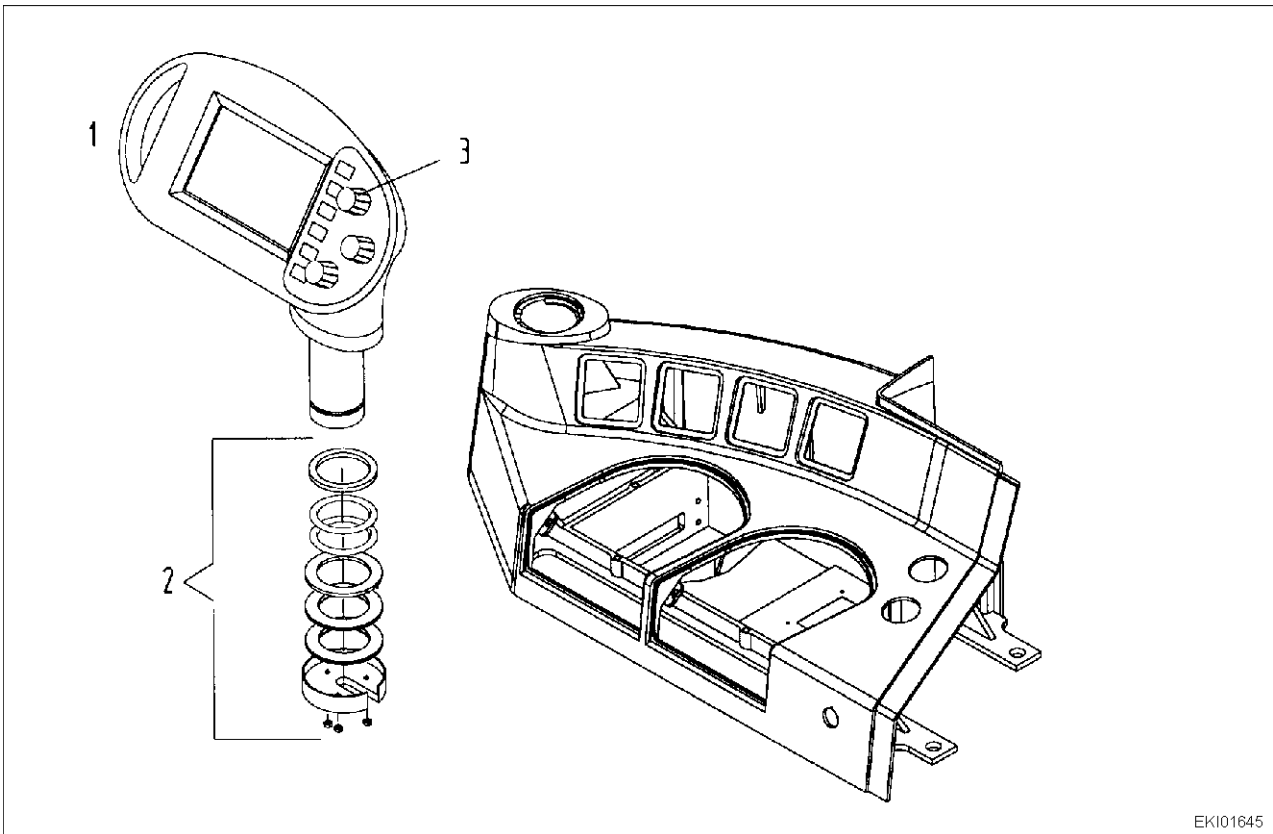


Item	Designation	Item	Designation
3	A002 - ECU	16	Joystick (Farmer 400)
5	Leaf spring	17	Blanking cover
6	Self-tapping screw	18	Rear module
7	Adhesive sign	22	Cover
10	A008 - control console	28	Hexagon screw
11	4WD / diff. lock	29	Washer
12	Cruise control / suspension	30	Sheet-metal nut
13	PTO	31	Hexagon nut
14	Spool valves	32	Spring washer
16	Front module	33	Blanking plug

**Farmer 400**  
**Fav 700**  
**Fav 900**

**Power lift / Electrohydraulic control EPC**  
**Removing and fitting rear module in A004 - control console**

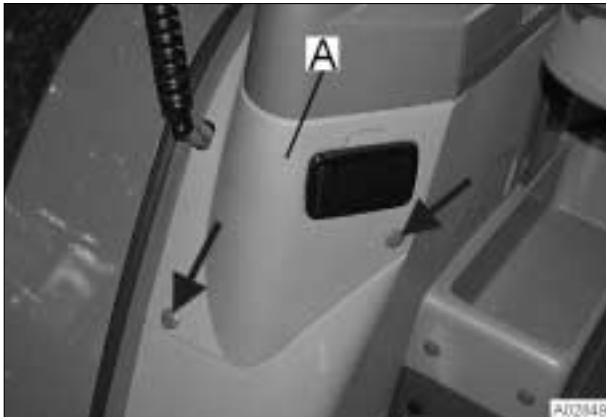
**G**



EKI01645

Item	Designation	Item	Designation
1	A008 - terminal	3	Repair kit (rotary control)
2	Repair kit (flange)		

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift / Electrohydraulic control EPC                  Removing and fitting rear module in A004 - control console</p>	<p><b>G</b></p>
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**Removing rear module**

**Note:**  
 Front module is removed and fitted in same manner.

**Note:**  
 Fitting sequence illustrated using Fav 900 chassis number 23/3001 and up.  
 Fitting sequence on Farmer 400 and Fav 700 should be carried out in same manner.

- Loosen screws (arrowed).
- Remove side panel (A).



**Only in Fav 900 chassis number 23/3001 and up**

remove two screws, if present, for hand throttle support.



Remove cover (A).



**Removing A004 - control console**

- Loosen screws (see arrows).
- Disconnect plug-and-socket connection (A/B).
- Release earth cable (C).

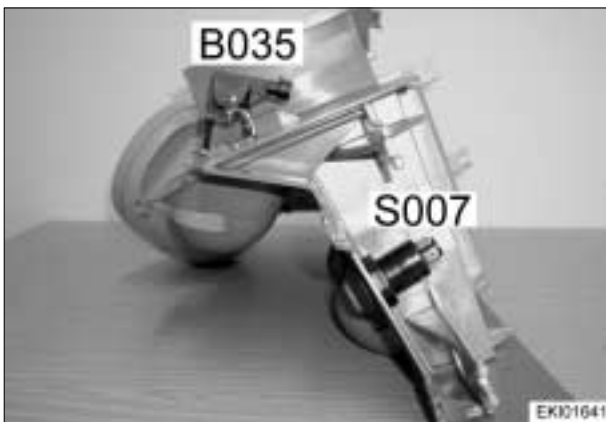
Date	Version	Page	Capitel	Index	Docu-No.
02.07.2001	a	3/10	9770	G	000004

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift / Electrohydraulic control EPC                  Removing and fitting rear module in A004 - control console</p>	<p><b>G</b></p>
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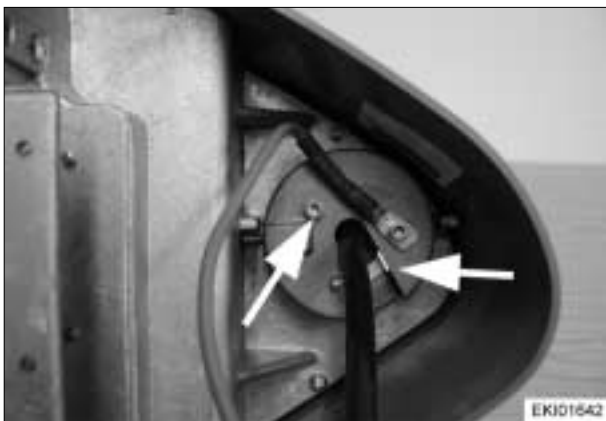


Loosen nuts (see arrows).

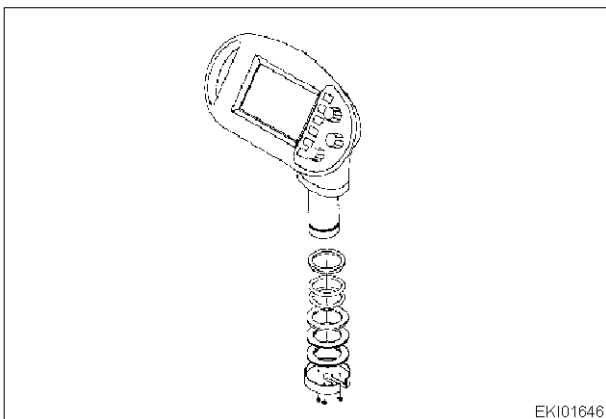
**Note:**  
 Ensure that earth cable is connected when fitting unit.



Disconnect B035 - sensor (hand throttle) connector.  
 Disconnect S007 - switch (auxiliary lighting) connector  
 and remove A004 - control console.



Mark position of cover for A008 - terminal.  
 Loosen three hexagon socket screws.



Remove A008 - terminal.

Date	Version	Page	Capitel	Index	Docu-No.
02.07.2001	a	4/10	Removing and fitting rear module in A004 - control console	9770	G 000004

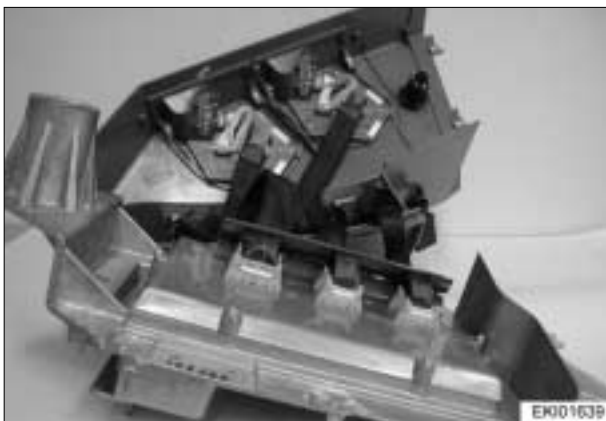
<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift / Electrohydraulic control EPC  <b>Removing and fitting rear module in A004 - control console</b></p>	<p><b>G</b></p>
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Loosen screw coupling between upper and lower sections.



**Only in Farmer 400**  
 Loosen two hexagon socket screws (joystick attachment).



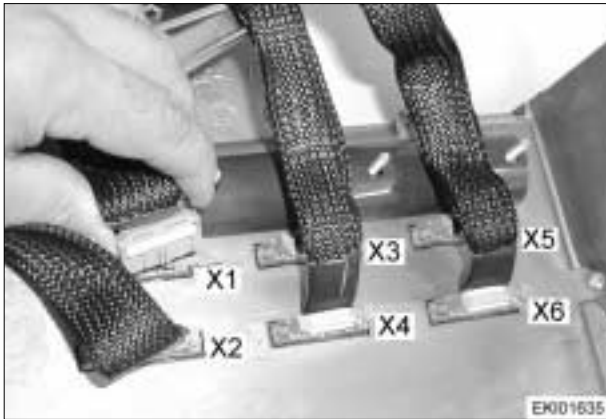
Remove upper housing section.



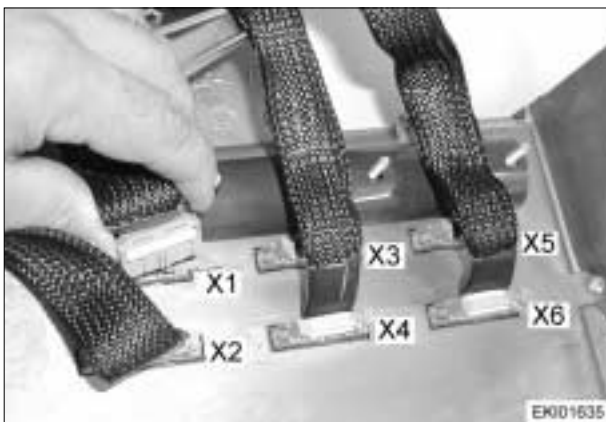
Remove clamping rail.

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02.07.2001	a	5/10	9770	G	000004

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p align="center"><b>Power lift / Electrohydraulic control EPC</b></p> <p><b>Removing and fitting rear module in A004 - control console</b></p>	<p align="center"><b>G</b></p>
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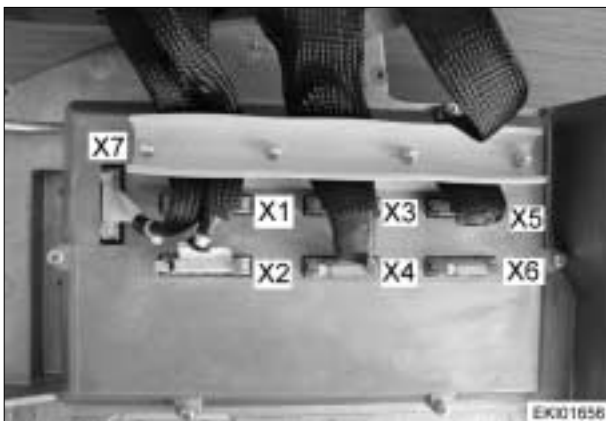


Detach connector (X1) at control unit.



**Pin assignment: Fav 700 and Fav 900**

- X1 = Connector, rear module
- X2 = Connector, front module
- X3 = Connector, 4WD / diff. lock
- X4 = Connector, cruise control / suspension
- X5 = Connector, PTO
- X6 = Connector, spool valves



**Pin assignment: Farmer 400**

- X1 = Connector, rear module
- X2 = Connector, joystick
- X3 = Connector, 4WD / diff. lock
- X4 = Connector, cruise control / suspension
- X5 = Connector, PTO
- X6 = Not assigned
- X7 = Connector, joystick



Release Velcro fastener.

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02.07.2001	a	6/10	9770	G	000004



<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift / Electrohydraulic control EPC  <b>Removing and fitting rear module in A004 - control console</b></p>	<p><b>G</b></p>
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Loosen two screws

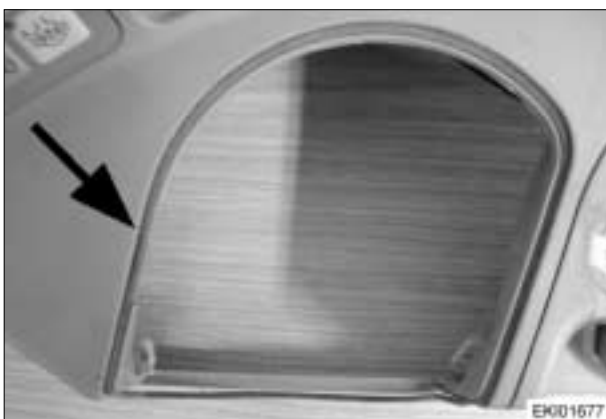


Remove rear module.



**Fitting rear module**

Check seal of rapid lift control for damage.



Check seal for damage.

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02.07.2001	a	7/10	9770	G	000004

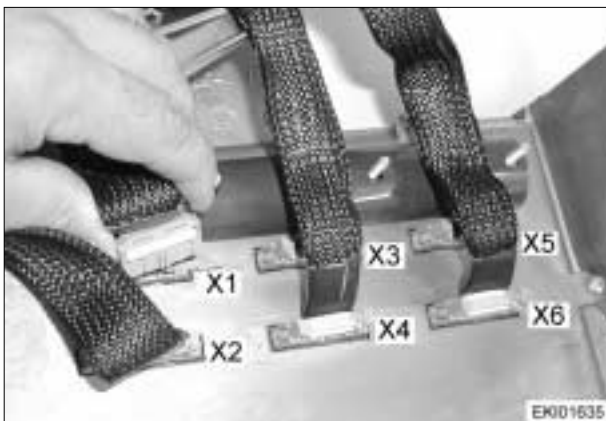
<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift / Electrohydraulic control EPC  <b>Removing and fitting rear module in A004 - control console</b></p>	<p><b>G</b></p>
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Fit new rear module.  
 Align rear module such that width of gap between rear module and upper housing section, seen from front, is as uniform as possible.  
 Fit two fastening screws.



Fit Velcro tape to cable.



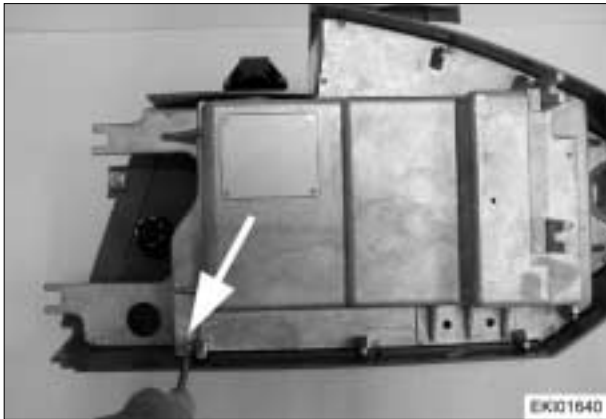
Attach connector to control unit.  
**Note:**  
**Ensure proper engagement of connector!**  
 Attach cable to housing using Velcro.



Fit clamping rail.  
**Note:**  
**Check cable for clearance!**  
**Do not squash cable!**

Date	Version	Page	Capitel	Index	Docu-No.
02.07.2001	a	8/10	9770	G	000004

<p><b>Farmer 400</b>  <b>Fav 700</b>  <b>Fav 900</b></p>	<p>Power lift / Electrohydraulic control EPC  <b>Removing and fitting rear module in A004 - control console</b></p>	<p><b>G</b></p>
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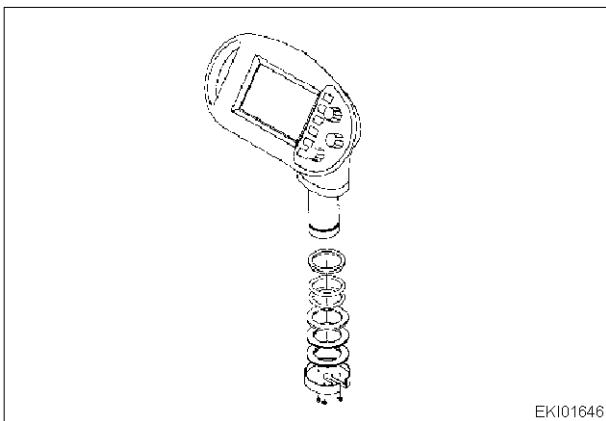


Screw lower and upper housing sections together.

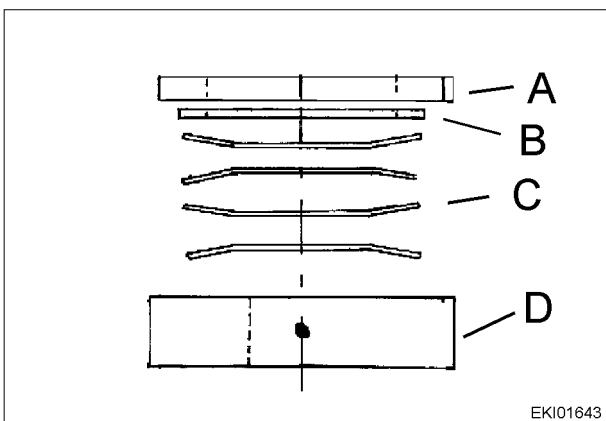


**Only in Farmer 400**

Screw two hexagon socket screws home (joystick attachment).



Fit A008 - terminal.



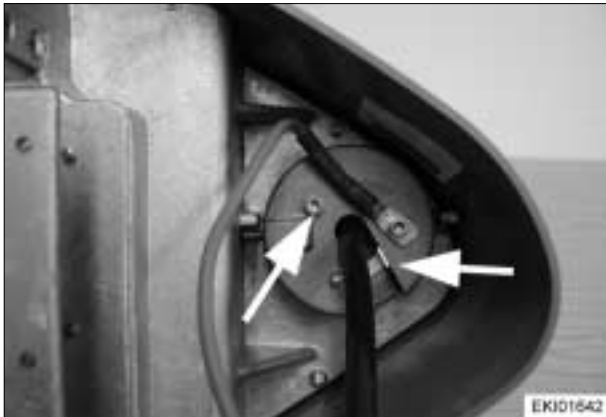
**Note position of belleville springs when fitting A008 - terminal.**

- A = Thrust ring
- B = Washer
- C = Belleville spring
- D = Cover

**Note:**  
 Note installation position of dowel pin.  
 Lightly grease thrust ring (A).

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02.07.2001	a	9/10	Removing and fitting rear module in A004 - control console	9770	G 000004

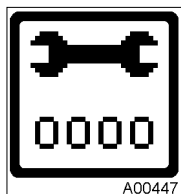
<b>Farmer 400</b> <b>Fav 700</b> <b>Fav 900</b>	Power lift / Electrohydraulic control EPC <b>Removing and fitting rear module in A004 - control console</b>	<b>G</b>
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Tighten three hexagon socket screws.



**Mount A004 - control console on tractor.**  
**Fitting sequence as for removing A004 - control console.**



**Note:**  
**Calibration - rear EPC,**  
**code 8001 and 8002 (rear module)**  
**or**  
**calibration - enhanced-control front power lift,**  
**code 9001 and 9002 (front module)**  
**Check functions of A004 - control console.**

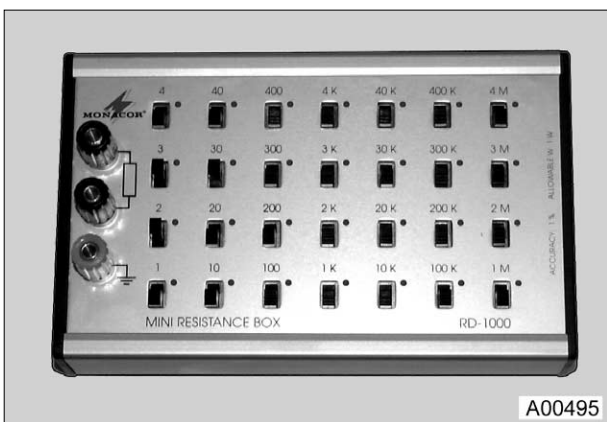
Date	Version	Page	Capitel	Index	Docu-No.
02.07.2001	a	10/10	Removing and fitting rear module in A004 - control console	9770	G 000004

	Service / Special tools <b>Special tools</b>	<b>A</b>
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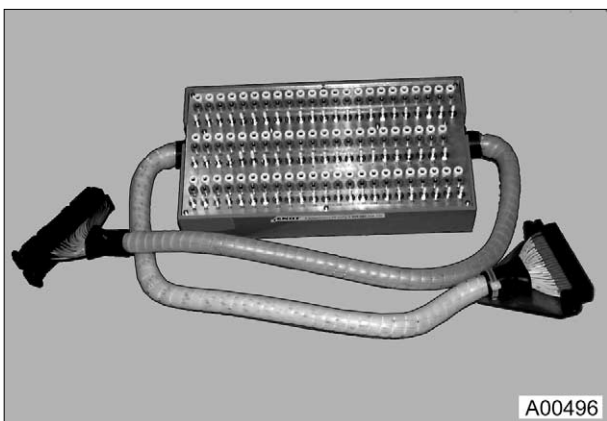
A00493

**X 899.980.188**  
 Hose-clamp hook for sealing hose assemblies



A00495

**X 899.980.224**  
 Resistor decade for testing electronic display instruments



A00496

**X 899.980.208.100**  
 E-adapter box for universal testing of electrical and electronic systems

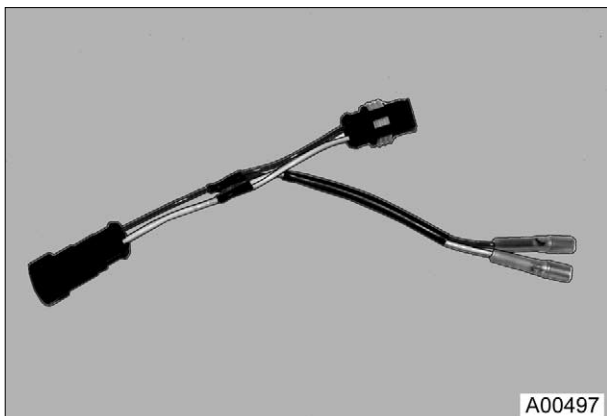


A00498

**X 899.980.208.205**  
 Adapter cable, 31-pin to 68-pin

Date	Version	Page	Special tools	Capitel	Index	Docu-No.
22.03.2001	<b>b</b>	1/4		<b>9920</b>	<b>A</b>	<b>000001</b>

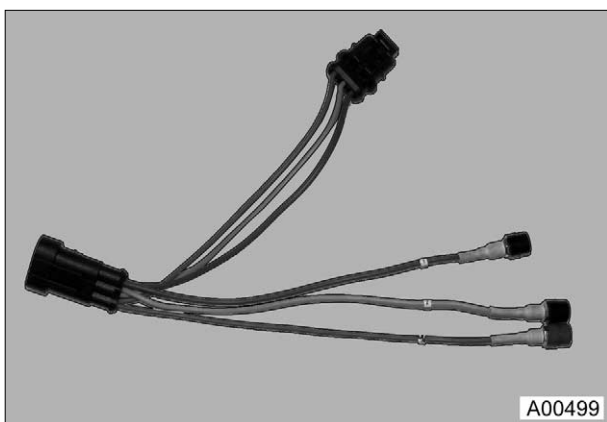
	Service / Special tools <b>Special tools</b>	<b>A</b>
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A00497

**X 899.980.246.204**

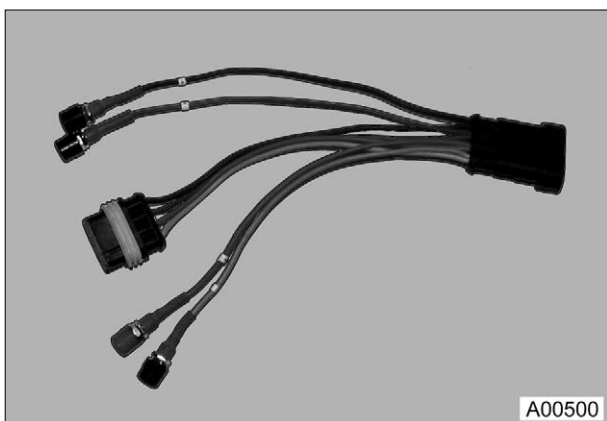
Adapter cable for 2-pin cable coupler



A00499

**X 899.980.246.205**

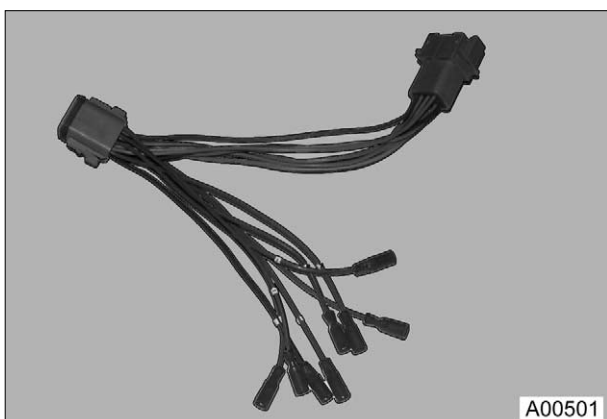
Adapter cable for 3-pin cable coupler



A00500

**X 899.980.246.206**

Adapter cable for 4-pin cable coupler



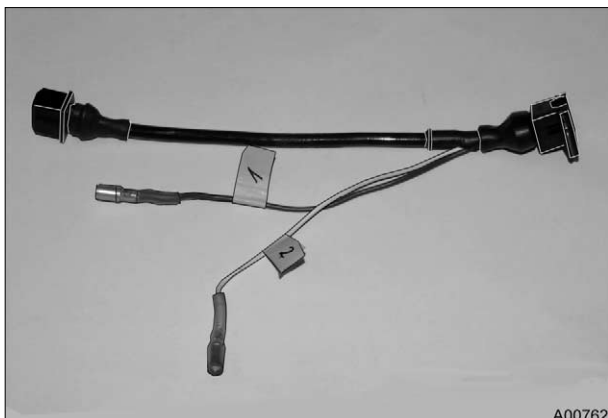
A00501

**899.980.246.207**

Adapter cable for 8-pin cable coupler

Date	Version	Page	Special tools	Capitel	Index	Docu-No.
22.03.2001	<b>b</b>	2/4		<b>9920</b>	<b>A</b>	<b>000001</b>

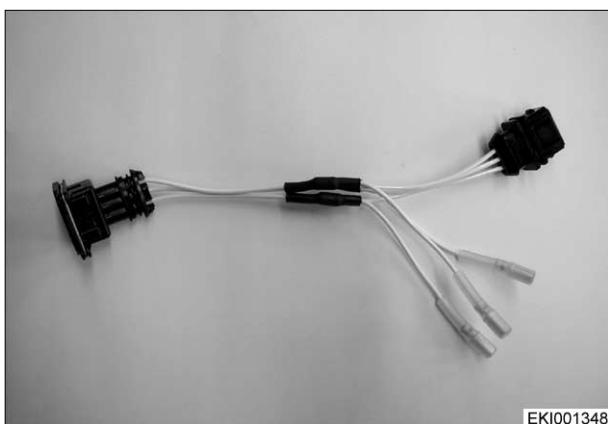
	Service / Special tools <b>Special tools</b>	<b>A</b>
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A00762

**X 899.980.246.201**

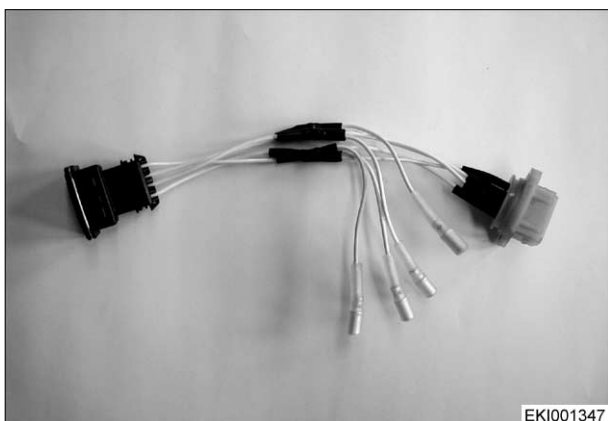
Adapter cable for 2-pin cable couplers, e.g. solenoid valves (4WD, PTO, diff. lock, EPC, front-axle suspension)



EKI001348

**X 899.980.246.202**

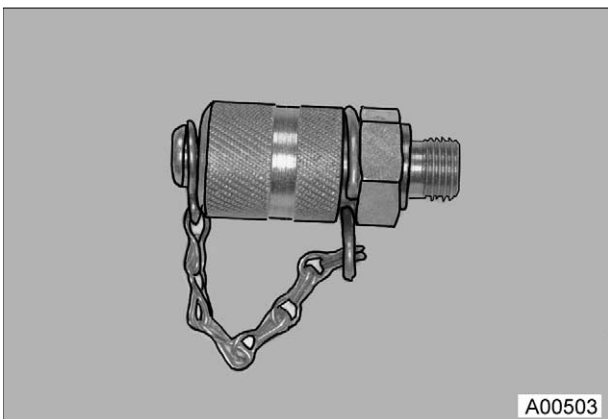
Adapter cable for 3-pin cable couplers, e.g. solenoid valves (4WD, PTO, diff. lock, EPC, front-axle suspension)



EKI001347

**X 899.980.246.203**

Adapter cable for 4-pin cable couplers, e.g. solenoid valves (4WD, PTO, diff. lock, EPC, front-axle suspension)



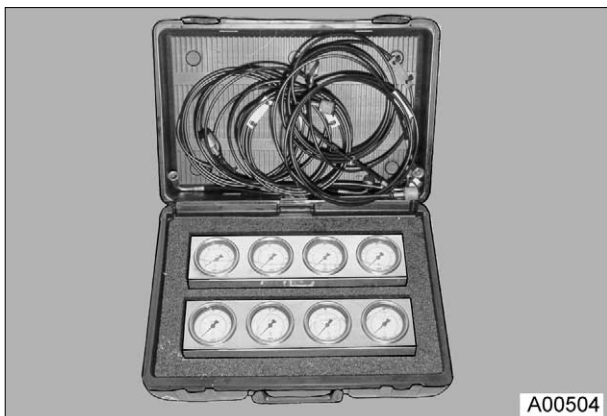
A00503

**X 598.303.000**

Screw coupling with M10x1 thread for measuring hydraulic pressures

Date	Version	Page	Capitel	Index	Docu-No.
22.03.2001	<b>b</b>	3/4	<b>Special tools</b>	<b>9920</b>	<b>A</b>
					<b>000001</b>

	Service / Special tools <b>Special tools</b>	<b>A</b>
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A00504

Portable test set containing 8 pressure gauges, 8 high-pressure hoses, 8x M10x1 screw couplings and 2x M10x1 - M12x1.5 adapters. Pressure gauge ranges: 1x 16 bar, 5x 40 bar, 2x 600bar  
Obtainable from: Hydrotechnik GmbH, Holzheimer Str. 94-96, D-65549 Limburg, Germany, Tel.: +49 (0)6431/40040, order no. 3101-69-04.00



EKI02492

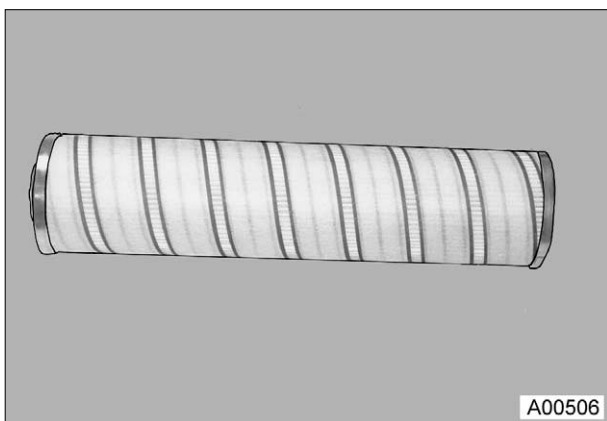
External oil-filling unit with super-fine pressure filter; always required if high-pressure circuit in ML transmission has been opened

**X 899.980.255.000**

Oil filling unit

**X 899.980.255.100**

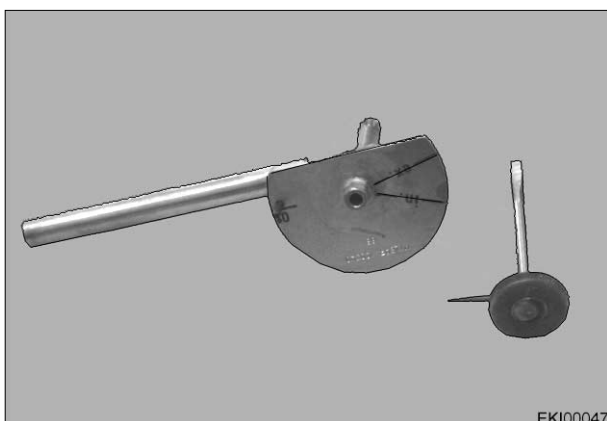
Superfine filter element



A00506

**X 899.980.221.100**

Superfine filter element in oil-filling unit (Fa. Pall)  
NOTE: New oil-filling unit is supplied without super-fine filter element.



EKI00047

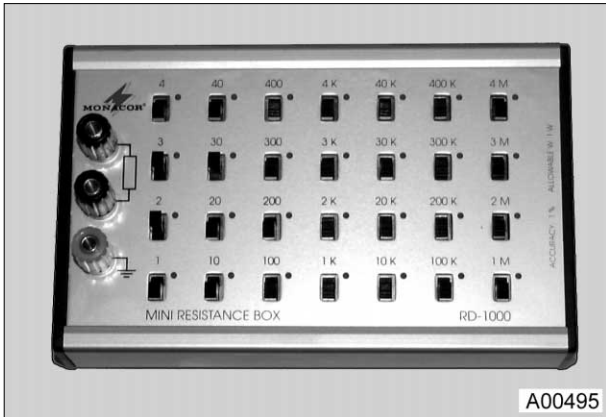
**X 899.980.236**

Valve clearance setting tool

Date	Version	Page	Special tools	Capitel	Index	Docu-No.
22.03.2001	<b>b</b>	4/4		<b>9920</b>	<b>A</b>	<b>000001</b>



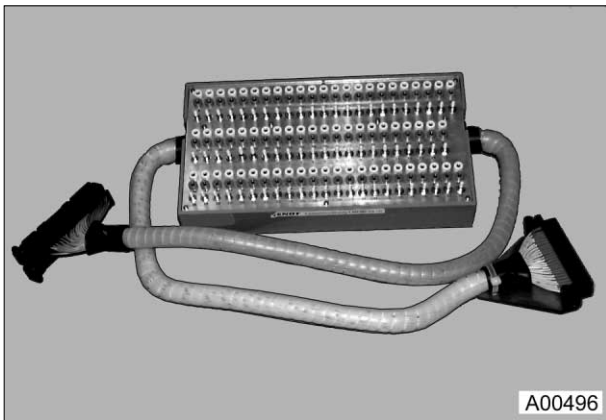
<b>Fav 900</b>	<b>Service / Special tools</b> <b>Special tools EDC - Injection System</b>	<b>A</b>
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A00495

**X 899.980.224**

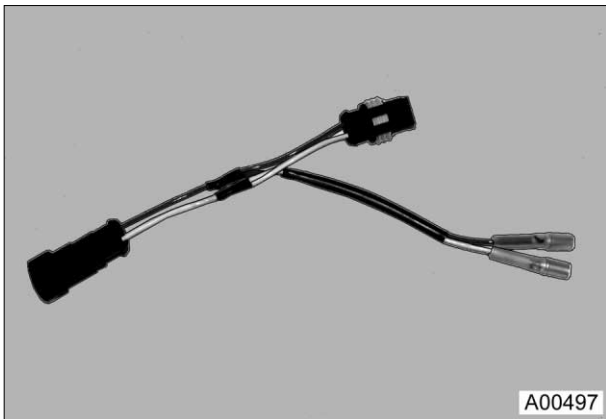
Resistors Decade for testing Instruments



A00496

**X 899.980.208.100**

E-Adaptor Module for universal electric and electronic testing



A00497

**X 899.980.246.204**

Adaptor Connector for Twin Pole Connectors

**X 899.980.251.105**

**Neues Foto**

**New picture**

EKI00871

**X 899.980.251.105**

Adaptor Connector for Speed Sensors EDC (B025)

Date	Version	Page	Capitel	Index	Docu-No.
13.12.2000	a	1/4	<b>Special tools EDC - Injection System</b>	<b>9920</b>	<b>A</b>
			<b>000003</b>		

<b>Fav 900</b>	Service / Special tools <b>Special tools EDC - Injection System</b>	<b>A</b>
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**X 899.980.251.104**

Neues Foto  
New picture

EKI00872

**X 899.980.251.104**  
 Adaptor Connector for Needle Motion Sensor (B026)

**X 899.980.251.102**

Neues Foto  
New picture

EKI00873

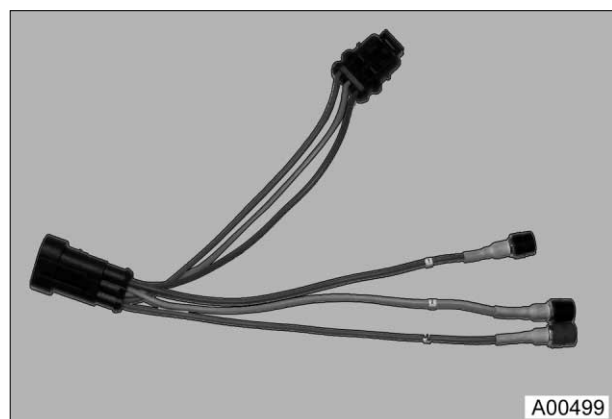
**X 899.980.251.102**  
 Adaptor Connector for Coolant Temperature Sensor EDC (B027)

**X 899.980.251.103**

Neues Foto  
New picture

EKI00874

**X 899.980.251.103**  
 Adaptor Connector for Intake Pressure Sensor (B028)



**X 899.980.246.205**  
 Adaptor Connector for 3-pole Connectors

Date	Version	Page	Special tools EDC - Injection System	Capitel	Index	Docu-No.
13.12.2000	<b>a</b>	2/4		9920	A	000003

<b>Fav 900</b>	<b>Service / Special tools</b> <b>Special tools EDC - Injection System</b>	<b>A</b>
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**X 899.980.251.101**

**Neues Foto**  
**New picture**

EKI00875

**X 899.980.251.101**  
Adaptor Connector for Pump Control Module A020



**X 899.980.251.106**  
Adaptor Connector for EDC COntrl Module A021

- Adaptor Connector for Connector X047
- Adaptor Connector for Connector X048
- Adaptor Connector on X 899.980.208.100 (E-Adaptor Module)



**X 899.980.245.000**  
Adaptor for Dial Gauge on Injection Pump VP44

**Meßuhr für Einstellung VP44**

**Neues Foto**  
**New picture**

EKI00877

Dial Gauge (100 / Division)  
Extension 30 mm  
Measuring-Top, Ball  
(Accessories - trade)

Date	Version	Page	Special tools EDC - Injection System	Capitel	Index	Docu-No.
13.12.2000	a	3/4		9920	A	000003

<b>Fav 900</b>	<b>Service / Special tools</b> <b>Special tools EDC - Injection System</b>	<b>A</b>
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**X 899.980.217.000**

**Neues Foto**  
**New picture**

EKI00878

**X 899.980.217.000**

Test Case (Pre pressure , Internal pressure) for Rotating Injection pumps (all Types)

**Inhalt**

- Pressure Gauges Range 0 bar absolute to 1,5 bar Relative
- Pressure Gauges Range 60 bar
- Minimes connector M10 x1
- Test Tube
- Twin stub Screws
- Stub Screws
- Hollow screw M12 x 1,5
- Hollow screw M14 x 1,5
- Ring stub 14 mm
- Adaptor M10 x 1 (X 596.135.000.000)
- Tube (X 596.340.400.000)
- Insert (395.100.070.650)

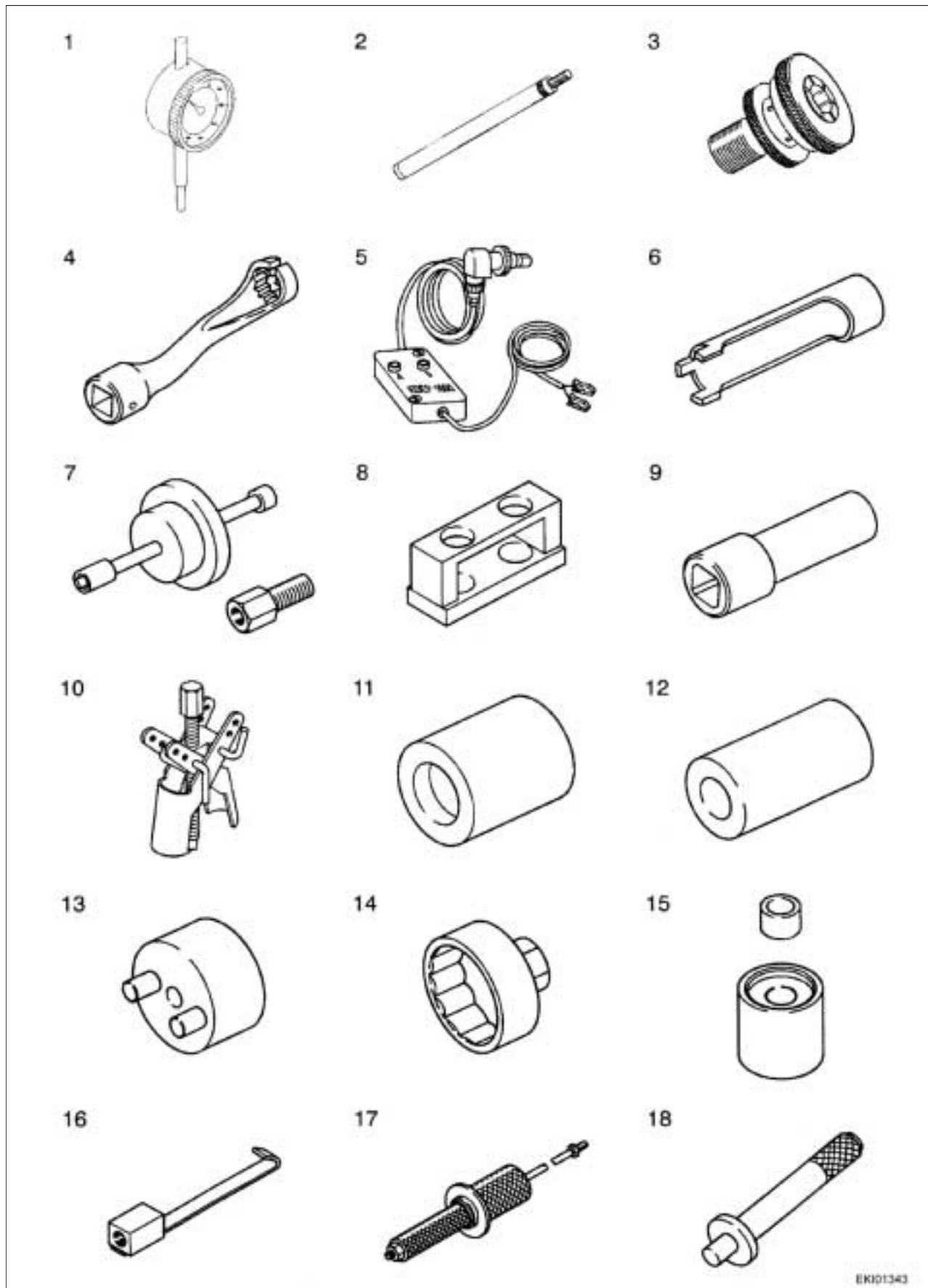


**X 899.980.204.000**

Injector Wrench for Injector with needle Motion Sensor

Date	Version	Page	Capitel	Index	Docu-No.
13.12.2000	<b>a</b>	4/4	<b>Special tools EDC - Injection System</b>	<b>9920</b>	<b>A</b>
			<b>000003</b>		

<b>Fav 900</b>	<b>Engine / Generalities</b> <b>Special tools</b>	<b>A</b>
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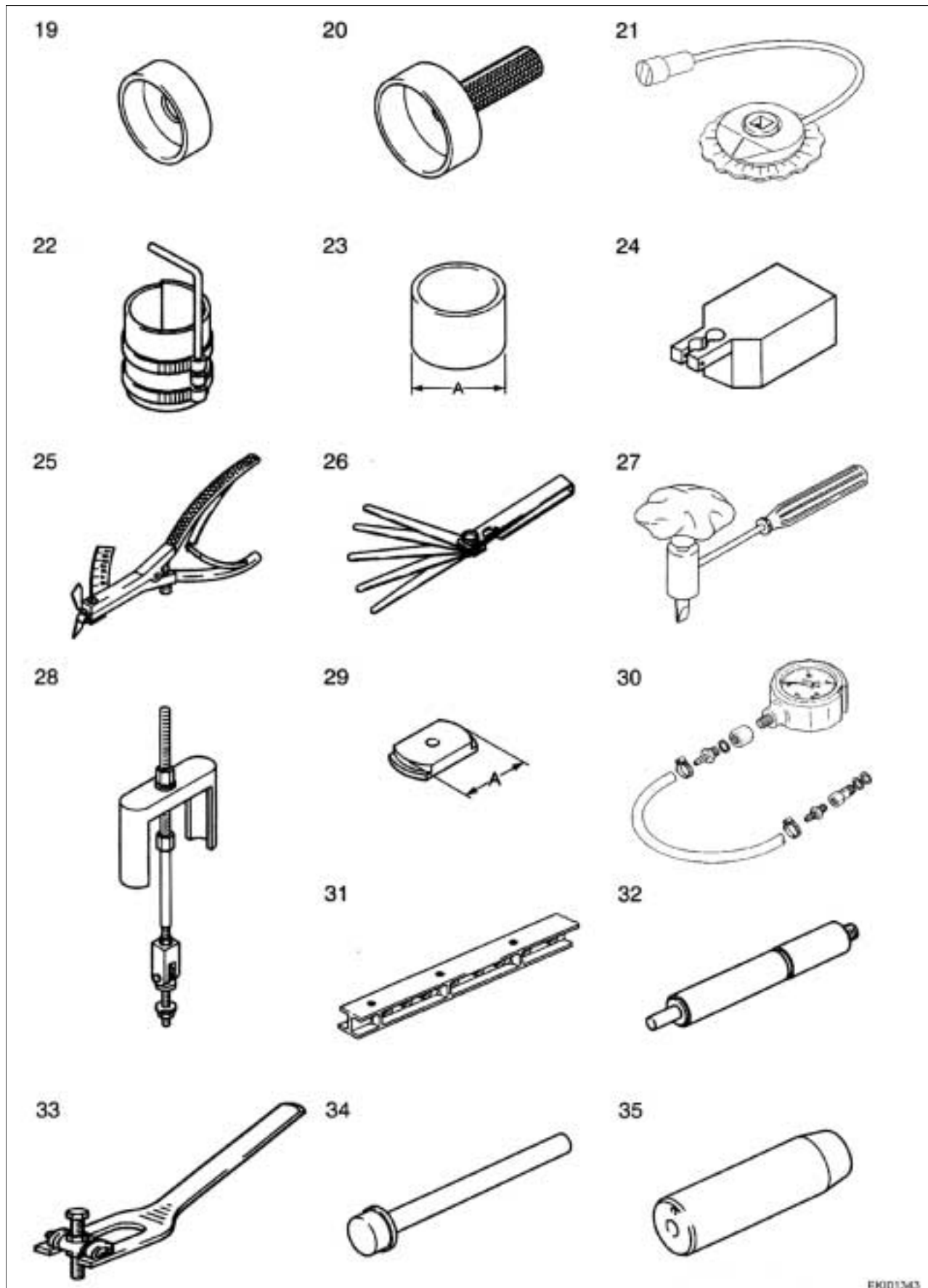
Date	Version	Page	Special tools	Capitel	Index	Docu-No.
19/03/2001	a	1/7		9920	A	000004

<b>Fav 900</b>	<b>Engine / Generalities</b> <b>Special tools</b>	<b>A</b>
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Schema - Nr.	Description	Reference
1	Dial gauge for checking and setting start of delivery.	08.71000-1205*
2	Scanning extension for 1	80.99605-0266*
3	Adaptor for 1	X 899.980.245.00-0**
4	Special wrench (SW 17) for injection pressures lines	80.99605-6002*
5	Optical Signal generator for setting start of delivery	80.99605-6002*
6	Tenon wrench for injection valve holder , with opening needle motion sensor.	80.99603-0240*
7	Puller for injection valves. Adaptor	80.99602-0011* 80.99602-0059*
8	Fitting tool for injection valve	80.99606-0008*
9	Socket wrench for injection valve	80.99603-0024*
10	Extractor for water pump pulley and flange	83.09143-6060*
11	Pressing bush for sliding ring gasket in water pump	80.99617-0091*
12	Pressing bush for water pump bearing shaft	80.99635-0008*
13	Pressing plate for water pump impeller	80.99614-0016*
14	Wrench for Oil filter cartridge	80.99603-0254*
15	Pressing device for valve guides for oil pump camshaft Consist of Contact bush Spacer bush	80.99604-0055* 80.99604-0056* 80.99604-0057*
16	Extractor hook percussion type extractor	80.99602-0127*
17	Percussion type extractor to 16	80.99602-0016*
18	Slip-on grip for all pressing plates	80.99617-0129*

Date	Version	Page	<b>Special tools</b>	Capitel	Index	Docu-No.
19/03/2001	<b>a</b>	2/7		<b>9920</b>	<b>A</b>	<b>000004</b>

<b>Fav 900</b>	<b>Engine / Generalities</b> <b>Special tools</b>	<b>A</b>
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EK01343

Date 19/03/2001	Version <b>a</b>	Page 3/7	<b>Special tools</b>	Capitel <b>9920</b>	Index <b>A</b>	Docu-No. <b>000004</b>
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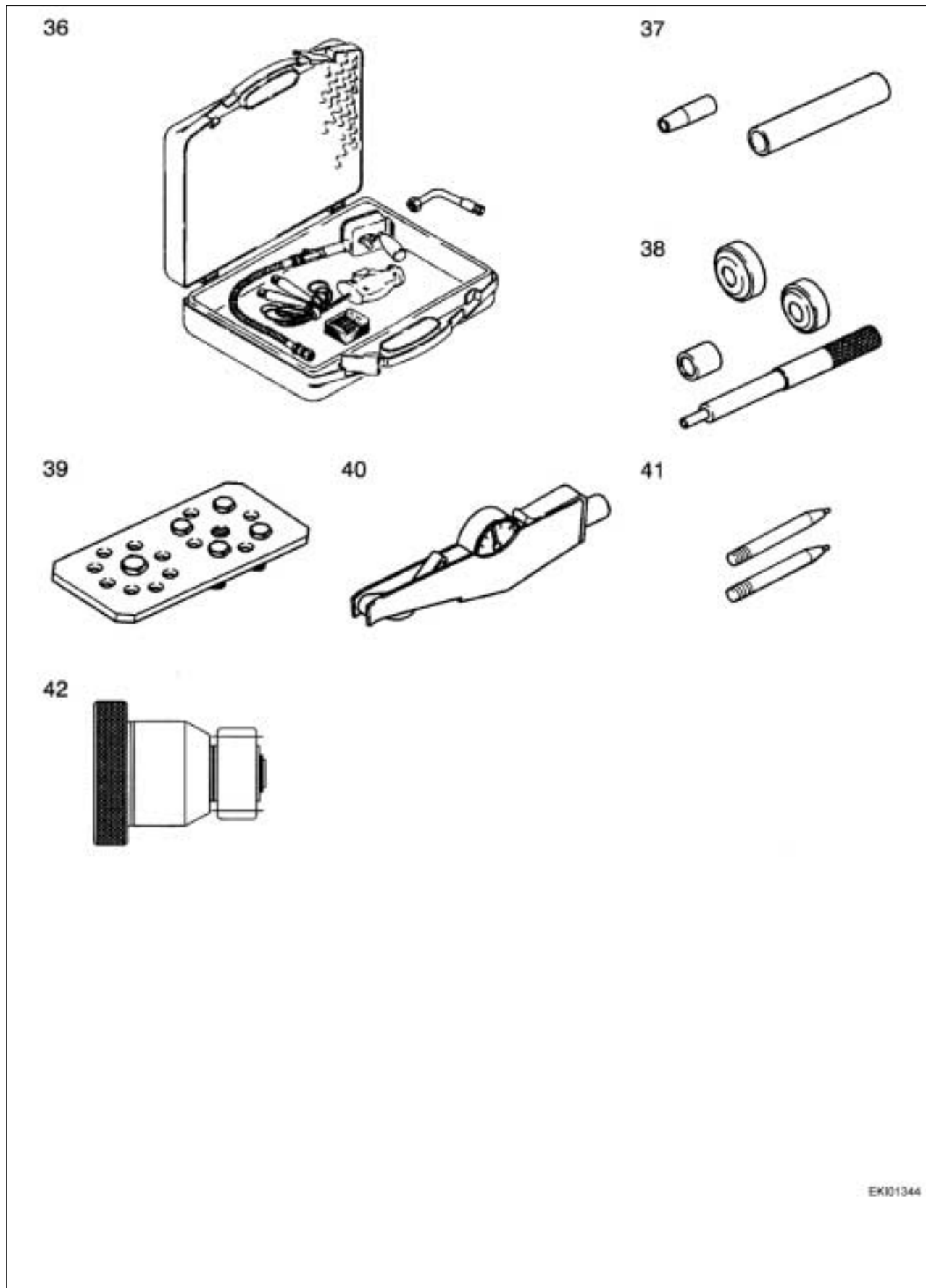
<b>Fav 900</b>	<b>Engine / Generalities</b> <b>Special tools</b>	<b>A</b>
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Diagram Nb.	Description	Reference
19	Percussion type extractor to 18	80.99602-0016*
20	Slip-on grip for all pressing plates	80.99617-0129*
19	Pressing plate for front crankshaft seal	80.99617-0073*
20	Pressing plate for front crankshaft seal, flywheel end	80.99614-0032*
21	Dial for torque wrench and torque angle.	80.99607-0134*
22	Piston ring clamp	80.99613-0035*
23	Sliding bush Ø 108 mm	83.09144-0057*
24	Dial gauge bracket	80.99605-0172*
25	Piston ring pliers	83.09144-6090*
26	Scanner gauge 0,2 / 0,25 / 0,35 / 0,4 / 0,5, for valve setting	80.99607-0076*
27	Valve setting wrench	80.99603-6007*
28	Cylindre liner extractor, (Set).	80.99602-0019*
29	Extractor plate Ø 107,8 mm	80.99602-0123*
30	Intake air pressure gauge 0 to 2,5 bar, (Set).	80.99605-6010*
31	Ruler for Cylinder heads	80.99607-0044*
32	Test connector for compression recorder.	X899.980.205**
33	Valve fitting lever	80.99606-0301*
34	Mandrel for inserting camshaft	80.99617-0060*
35	Mandrel for pressing camshaft bearing bushes in and out	A5.00026-1136*

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19/03/2001	a	4/7		9920	A	000004



<b>Fav 900</b>	<b>Engine / Generalities</b> <b>Special tools</b>	<b>A</b>
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EK101344

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<b>Fav 900</b>	<b>Engine / Generalities</b> <b>Special tools</b>	<b>A</b>
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Diagram -	Description	Reference
Nb.		
36	Compression recorder	80.99605-0164*
	- Angle adaptor	81.98110-0099*
	- Diagram discs (Packs.of 100 pieces)	80.99605-0165*
37	Mounting tube for valve rod bushings	80.99606-0287*
	Press tube for valve rod bushings	80.99604-0106*
38	Press in and out device for valve guides including pressing plate for valve seat rings	80.99604-0050*
	Device consisting of:	
	Press mandrel for valve guides	80.99604-0051*
	Pressing bush (spacer bush)	80.99604-0052*
	pressing plate for inlet valve seat ring	80.99604-0114*
	pressing plate for exhaust valve seat ring	80.99604-0054*
39	Mounting plate for compressor drive gear. necessary	80.99606-0078*
	4 Screws M 8*22 DIN 933	06.01304-7114*
	1 Screw M 12*30 DIN 933	06.01304-7317*
	Belt tension gauge (typ1; 200 - 600N)	X899.980.218**
40	Belt tension gauge (typ1; 500 - 1500N)	X899.980.219**
41	Guide mandrel (2 off) for fitting flywheel, see sketch for manufacturing.	
42	Crankshaft actuating device.	X899.980.220.0-00**

**Note:**

\* MAN-tools without a Fendt-spare part number can be ordered by MAN-Service-Centres.

\*\* Fendt-spare part number

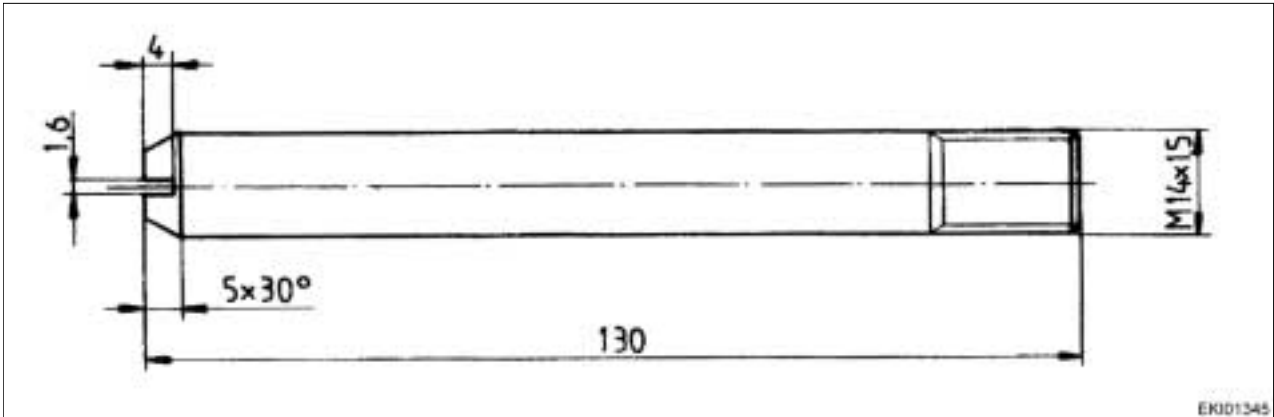
Date	Version	Page	<b>Special tools</b>	Capitel	Index	Docu-No.
19/03/2001	<b>a</b>	6/7		<b>9920</b>	<b>A</b>	<b>000004</b>

Fav 900	Engine / Generalities <b>Special tools</b>	<b>A</b>
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**Tools to be manufactured**

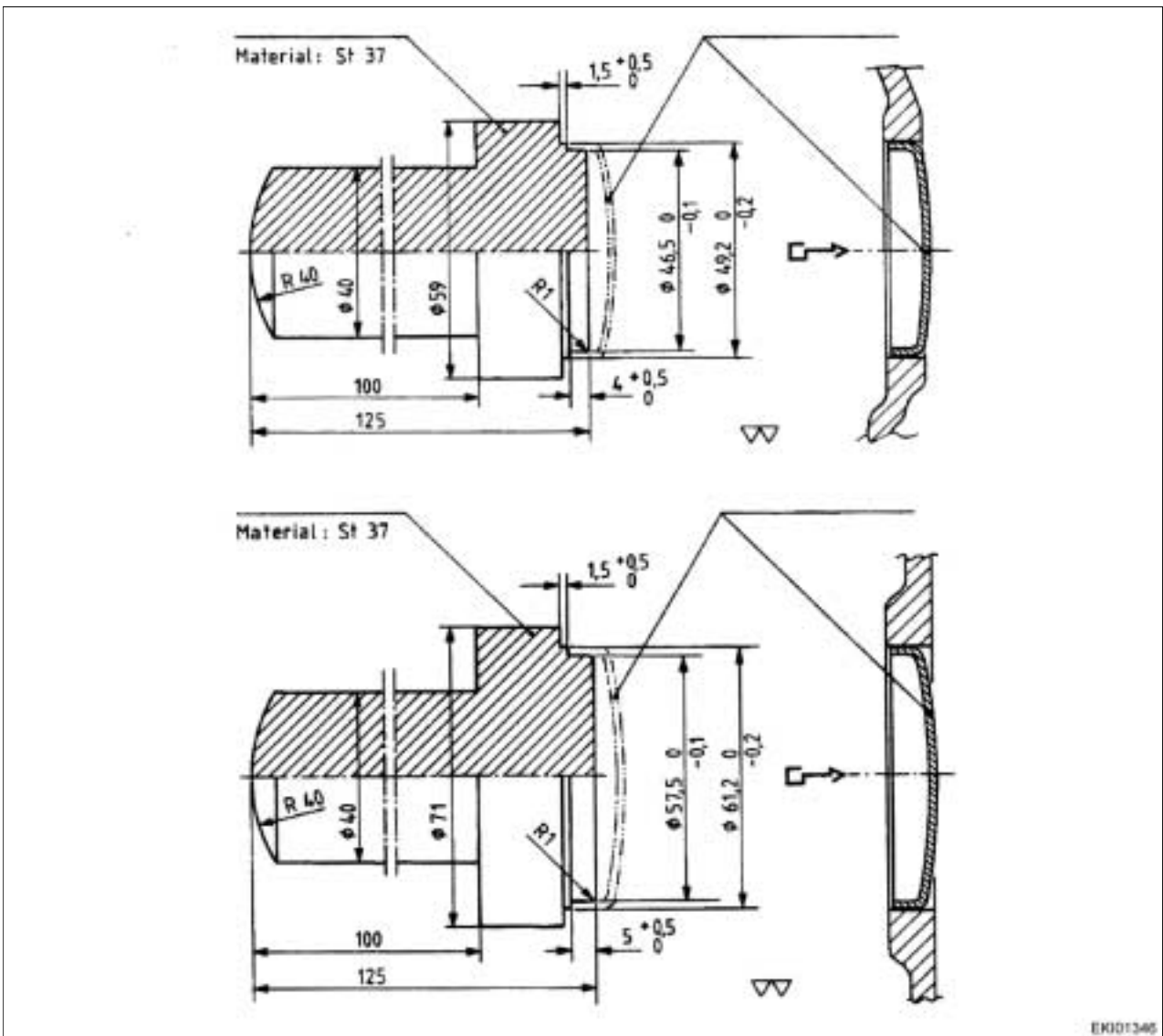
Guide mandrel for flywheel assembly

Material: made from M14\*140



Pressing mandrels for sealing caps

Ø 50,1 mm, Ø 62,1 mm



Date	Version	Page	Special tools	Capitel	Index	Docu-No.
19/03/2001	a	7/7		9920	A	000004