



QUY260 Load Moment Indicator

User Manual



Hirschmann Electronics (Shanghai) Co.,Ltd

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1. Brief introduction

This manual is made for the crawler cranes QUY260 of Zoomlion. Please read the manual carefully according to the collocation of different types.

2. General information

The Hirschmann load moment indicator (LMI) iFLEX5 has been designed to provide the crane operator with the essential information required to operate the machine within its design parameters. Using various sensing devices, the Load Moment Indicator monitors various crane functions and provides the operator with a continuous reading of the load capacity. The readings continuously change as the crane moves and lifts. The LMI provides the operator with information regarding the length and angle of the boom, tip height, working radius, rated load and total weight of actual lift.

If a non-permitted condition is approached, the iFLEX5 Load Moment Indicator will warn the operator by sounding an audible alarm, lighting a warning light and cutting off those functions that may aggravate the crane's condition.

3. Warnings

The LMI is an operational aid that warns a crane operator from approaching conditions of overloading and over-hoisting which would cause great damage to the equipment and personnel.

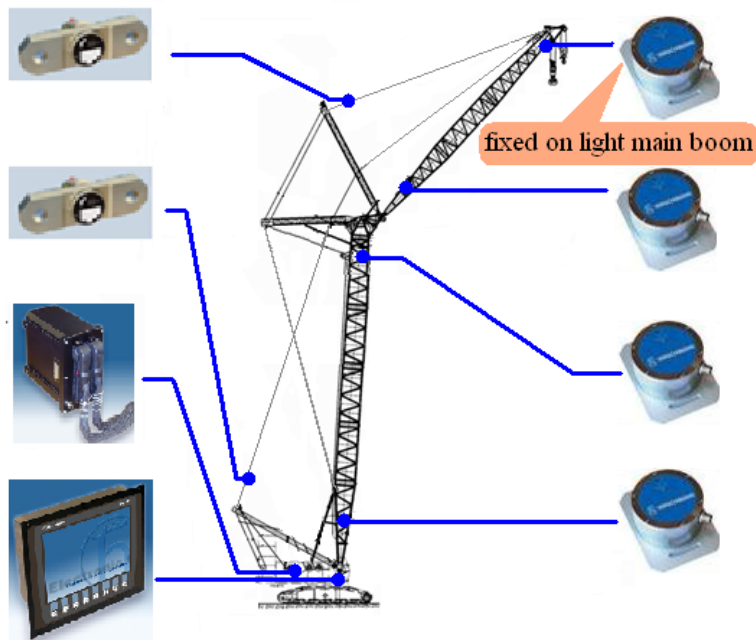
The LMI could only prevent overload of the crane boom in lengthwise vertical level but could not prevent accidents caused by inclined hoisting, wind loading, inclination or foundering of the road and rail or driving oversteps. So the operators and other people shall not ignore safe management and operating procedures of the crane because of the existence of the device. It is not, and shall not, substitute for a good operator's judgment, great experience or standard operating procedures. The responsibility for the safe crane operation shall remain with the crane operator who shall ensure that all warnings and instructions supplied are fully understood and observed.

Prior to operating the crane, the operator must carefully and thoroughly read and understand the information in this manual to ensure that he knows the operation and limitations of indicator and crane.



Notice: The LMI can only work correctly, if all adjustments have been properly set. For correct adjustment, the operator has to answer thoroughly and correctly all questions asked during the setup procedure in accordance with the real rigging state of the crane. To prevent material damage and serious or even fatal accidents, the correct adjustment of the LMI has to be ensured before starting the crane operation.

4. System configuration



4.1 System configuration

The system is composed of Expert console, iFLEX5 controller, KMD force sensor, angle sensor, etc.

When operator sets current OM and reeving according to the key of the display, the signal is transmitted to controller and display by pull sensor. The display shows the actual weight and rated weight. The actual weight and rated weight is compared in the controller. Once the rated weight is reached, the controller will indicate the overloading warning signal and send warning sound. At this moment, operator is forbidden to operate to dangerous direction.

4.1 Controller



4.2 Controller

Controller: 32 digit industrial control PLC system and high-powered processor qualify the requirements of bad environment for all kinds of industrial system. IFLEX5 module is composed of base board or base board add expansion board. Customers could choose different IFLEX5 module according to their own needs. Each module can be connected by CANBUS. Due to the building block mode, the IFLEX5 is not only applicable to medium and small control systems, but also to big and complicated control systems.

4.2 Console



Console: a 640*480 color LCD of industrial lattice screen graph liquid crystal. It can display all the operational data that you are concerned. The combination between the Graphical display and Genersys software achieve the on-line program for graph. The strong graph compiled capability is incomparable with other Industrial Control displays.

4.3 Console

4.3 KMD Force sensor



The system adopts shock-proof, anti-electromagnetic interference, and high precision and low zero drift. As the sensor has the compensated function of temperature, it can retain its own quality even with continuous and high-intensive operation.

Remarks: all the analog sensor for iFLEX5 system must be current type or with CAN-bus. Voltage sensor have to change to current sensor.

4.4 KMD force sensor

4.4 Angle sensor



The WGC angle sensor is for exact measurement for angle of all kinds of construction machines. Distinguished by its compact exterior, the sensor has the feature of simple installation, high efficiency and accuracy, no hysteresis, high protective class, long time service life and suited to extreme ambient condition.

4.5 Angle sensor

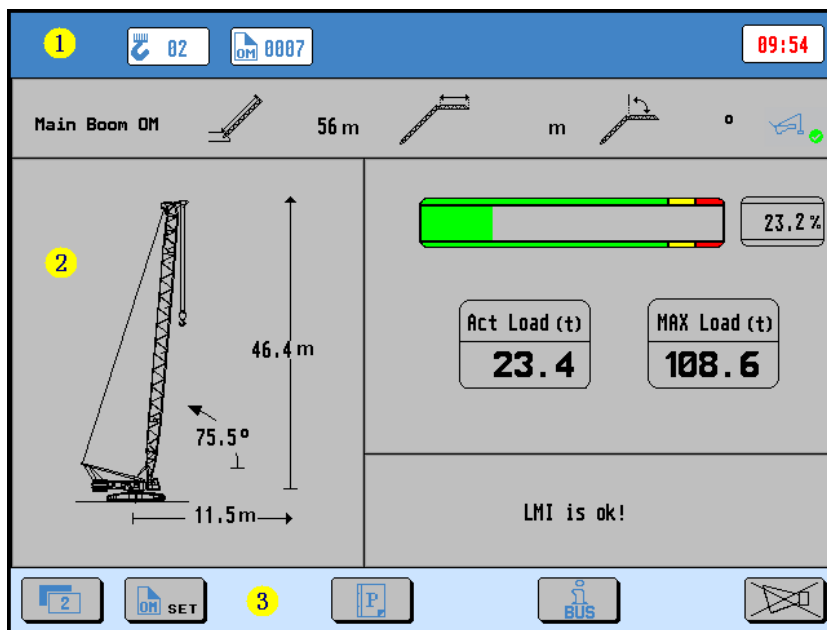
5. System introduction

When the iFLEX5 control system is power on, the console will display *QY260 crawler crane* as below:



5.1 Welcoming interface

After 4~5 seconds, main interface—the LMI interface will present as below:



5.2 LMI main interface

At 5.2, from the top to the bottom is:

Part 1: Operate State column; Part 2: main interface; Part 3: function key column

5.1 OM icon

Operators could learn present crane state through the working mode icon on top part of the console.

A.Error code icon



To indicate which part of the LMI is abnormal. Operators then can remove difficulties accordingly, and the LMI will back to normal condition.

B.Reeving icon



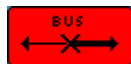
To display present reeving.

C.OM code icon



To display current OM code.

D.CAN-bus mode icon



To display the CAN communication mode between the console and the controller. When the light is on, the CAN communication is abnormal.

E.A2B alarming icon



This means the hook is reaching to the ultimate height, operators shall stop movement of the hook right away.

F.Pre-warning icon



This means the moment percentage is over 90%, operators shall be aware of that.

G.Stop movement icon



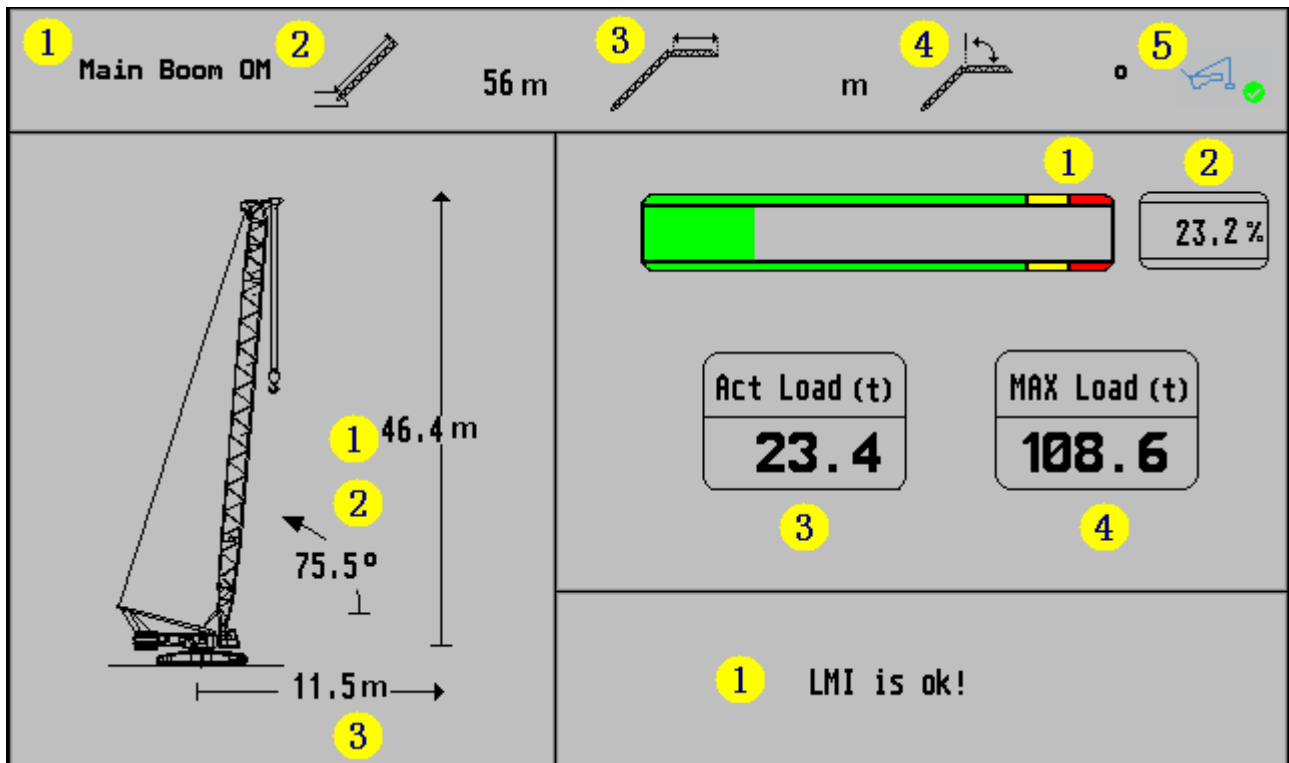
This means the movement of the crane is very dangerous, operators shall back to the safe side. Or the LMI is abnormal, the problem shall be solved immediately.

H.Time display icon



To display the local time.

5.2 Main interface



5.3 Presenting main interface

①OM introduction ②Main boom length ③jib length ④Installed angle of the fixed jib ⑤Mode display

①operating height
 ②main boom angle
 ③operating radius
 Still presenting luffing jib
 angle at luffing jib OM

①Moment percentage barcode ②Moment percentage value
 ③Actual load capacity ④Rated load capacity

①LMI Operate State display (presenting normal OM or error
 code information and trouble shooting when it is abnormal)

⚠ Notice: when operating the crane, operators shall observe changes of the aboved datas at this interface

5.3 Function key

At the bottom of the main interface is the function key column, from F1-F8 are as below:

1st interface function key:



F1: Main interface shift key, press to enter into 2nd interface;



F2: OM & Reeving setting key (details refer to 5.3.1) ;



F3: Data checking, press to check analog input & digit output of iFLEX5 (details refer to 5.3.2)



F4: System setting key, (details refer to 5.3.3)



F5: CAN-Bus checking, press to check the bus mode between controller and console (details refer to 5.3.4)



F8: Alarm stop key, press to stop the alarming sound of the system

2nd interface function key:



F1: Main interface shift key, press to enter into 1st interface;



F3: Angle limitation setting key (details refer to 5.3.5)

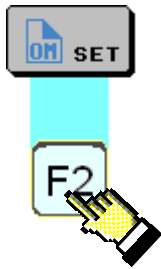


F4: Time setting key (details refer to 5.3.5)



F8: *Alarm stop* key, press to stop system alarming

5.3.1 OM & Reeving setting



Press F2 OM & Reeving setting key at 1st interface to enter into OM & Reeving setting interface

| Main Boom OM Code | | | | | |
|-------------------|---------|-----------|---------|-----------|---------|
| MB length | OM Code | MB length | OM Code | MB length | OM Code |
| 20 | 000101 | 44 | 000109 | 68 | 000117 |
| 23 | 000102 | 47 | 000110 | 71 | 000118 |
| 26 | 000103 | 50 | 000111 | 74 | 000119 |
| 29 | 000104 | 53 | 000112 | 77 | 000120 |
| 32 | 000105 | 56 | 000113 | 80 | 000121 |
| 35 | 000106 | 59 | 000114 | 83 | 000122 |
| 38 | 000107 | 62 | 000115 | | |
| 41 | 000108 | 65 | 000116 | | |

| Light Main Boom OM Code | | | |
|-------------------------|---------|-----------|---------|
| MB length | OM Code | MB length | OM Code |
| 86 | 000223 | 92 | 000225 |
| 89 | 000224 | 95 | 000226 |

Set OM & Reev

AAAAAA
 AA

Current OM & Reev

ABCDAB
 12

OH SET

SET

5.4 OM & Reeving setting



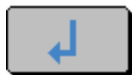
F1: OM code checking key



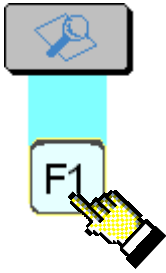
F4: OM code setting key



F6: Reeving setting key



F8: Enter key



Press F1 (continuously press to turn pages) at OM selecting interface to check the OM code. System will display main OM code separately into 4 pages as follows:

| Main Boom OM Code | | | | | |
|-------------------------|---------|-----------|---------|-----------|---------|
| MB length | OM Code | MB length | OM Code | MB length | OM Code |
| 20 | 000101 | 44 | 000109 | 68 | 000117 |
| 23 | 000102 | 47 | 000110 | 71 | 000118 |
| 26 | 000103 | 50 | 000111 | 74 | 000119 |
| 29 | 000104 | 53 | 000112 | 77 | 000120 |
| 32 | 000105 | 56 | 000113 | 80 | 000121 |
| 35 | 000106 | 59 | 000114 | 83 | 000122 |
| 38 | 000107 | 62 | 000115 | | |
| 41 | 000108 | 65 | 000116 | | |
| Light Main Boom OM Code | | | | | |
| MB length | OM Code | MB length | OM Code | | |
| 86 | 000223 | 92 | 000225 | | |
| 89 | 000224 | 95 | 000226 | | |

5.5 (a) Main boom OM code

| Main Boom Runner OM Code | | | | | |
|--------------------------------|---------|-----------|---------|-----------|---------|
| MB Length | OM Code | MB Length | OM Code | MB Length | OM Code |
| 20 | 000701 | 44 | 000709 | 65 | 000716 |
| 23 | 000702 | 47 | 000710 | 68 | 000717 |
| 26 | 000703 | 50 | 000711 | 71 | 000718 |
| 29 | 000704 | 53 | 000712 | 74 | 000719 |
| 32 | 000705 | 56 | 000713 | 77 | 000720 |
| 35 | 000706 | 59 | 000714 | 80 | 000721 |
| 38 | 000707 | 62 | 000715 | 83 | 000722 |
| 41 | 000708 | | | | |
| Light Main Boom Runner OM Code | | | | | |
| MB Length | OM Code | MB Length | OM Code | MB Length | OM Code |
| 86 | 000823 | 92 | 000825 | 95 | 000826 |
| 89 | 000824 | | | | |

5.5 (b) Main boom runner OM code

| Fixed Jib OM Code | | | | | | | |
|-------------------|--------------|---------|----|--------------|----|--------------|----|
| FJ Angle | FJ Length(m) | OM Code | AB | MB Length(m) | AB | MB Length(m) | AB |
| 10° | 12 | 0010AB | | 29 | 04 | 56 | 13 |
| | 18 | 0011AB | | 32 | 05 | 59 | 14 |
| | 24 | 0012AB | | 35 | 06 | 62 | 15 |
| | 30 | 0013AB | | 38 | 07 | 65 | 16 |
| 30° | 12 | 0014AB | | 41 | 08 | 68 | 17 |
| | 18 | 0015AB | | 44 | 09 | 71 | 18 |
| | 24 | 0016AB | | 47 | 10 | 74 | 19 |
| | 30 | 0017AB | | 50 | 11 | 77 | 20 |
| | | | | 53 | 12 | | |

5.5 (c) Fixed jib OM code

| Luffing Jib OM Code | | | | | | | | |
|---------------------|---------|-----------|---------|----|-----------|----|-----------|----|
| LJ Length | OM Code | LJ Length | OM Code | AB | MB Length | AB | MB Length | AB |
| 21 | X020AB | 42 | X027AB | | 23 | 02 | 44 | 09 |
| 24 | X021AB | 45 | X028AB | | 26 | 03 | 47 | 10 |
| 27 | X022AB | 48 | X029AB | | 29 | 04 | 50 | 11 |
| 30 | X023AB | 51 | X030AB | | 32 | 05 | 53 | 12 |
| 33 | X024AB | 54 | X031AB | | 35 | 06 | 56 | 13 |
| 36 | X025AB | 57 | X032AB | | 38 | 07 | 59 | 14 |
| 39 | X026AB | 60 | X033AB | | 41 | 08 | 62 | 15 |

* The "X" will change itself(1/2/3) with the MB angle changed(85°/75°/65°)

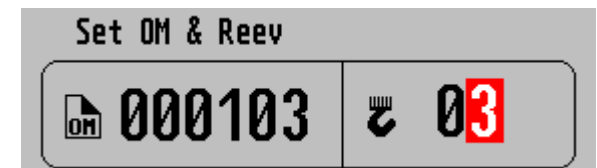
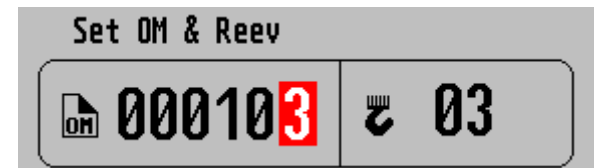
5.5 (d) Luffing jib OM code



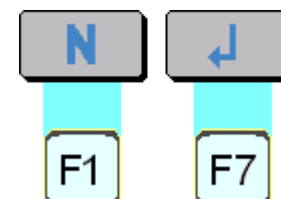
Press F4 at OM selecting interface to set OM:



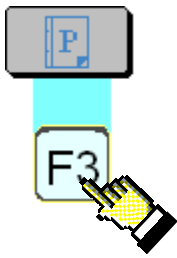
Press F6 at OM selecting interface to set reeving:



After finish the setting, press F8 backing to OM & Reeving interface, press F8 once again will come out dialogue frame of confirmation, press F7 to safe this operation or press F1 to cancel.



5.3.2 I/O Port checking



Press F3 at **1st interface** to check the I/O port information

| Analog Inputs | | | | |
|---------------|-------|-------------------------|-----|--------|
| | | Analog channel | A/D | Actual |
| Ain 0 | X1-34 | Jib angle foot point | | |
| Ain 3 | X1-37 | Force MB Pendant left | | |
| Ain 5 | X1-39 | Force Jib Pendant left | | |
| Ain 6 | X1-40 | MB angle tip point | | |
| Ain 7 | X1-41 | MB angle foot point | | |
| Ain 2 | X2-36 | Force jib pendant right | | |
| Ain 3 | X2-37 | Force MB pendant right | | |
| ① | ② | ③ | ④ | ⑤ |

5.6 Analog input

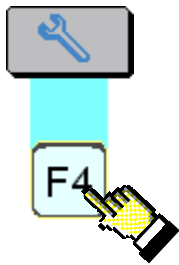
- ① Analog channel
- ② Base board (X1) expanded board (X2) stitch No.
- ③ Analog description
- ④ Analog A/D exchange value
- ⑤ Analog actual measuring value

| | | | |
|----|---|---|------------------|
| 01 | Moment Percent $\leq 90\%$ | | Digit outputs |
| 02 | $102\% \geq$ Moment Percent $> 90\%$ | | |
| 03 | Moment Percent $> 102\%$ | | |
| 04 | MB OM : MB angle $\geq 83^\circ$ | | |
| 05 | LJ OM : MB angle $85^\circ \pm 1^\circ / 75^\circ \pm 1^\circ / 65^\circ \pm 1^\circ$ | | |
| 06 | LJ OM : MB angle $< 65^\circ$ | | |
| 07 | LJ OM : MB angle - LJ angle $< 10^\circ$ | | |
| 08 | LJ OM : Angle between MB angle and LJ angle $< 90^\circ$ | | |
| 09 | LJ OM : LJ angle $< 15^\circ$ | | |
| 10 | Redundancy $> 10\%$ in force pedance LJ or MB Left/Right | | |
| 11 | MB angle $>$ upper limit setting in Virtual wall | | |
| 12 | MB angle $<$ Lower limit setting in virtual wall | | |
| 13 | LJ angle $>$ upper limit setting in Virtual wall | | |
| 14 | LJ angle $<$ Lower limit setting in virtual wall | | |
| 15 | MB OM : MB angle $\geq 78^\circ$ | | |
| 16 | MB angle $\geq 80^\circ$ | | |
| 17 | LJ OM : MB angle - LJ angle $< 15^\circ$ | | |
| ① | ② | ③ | |

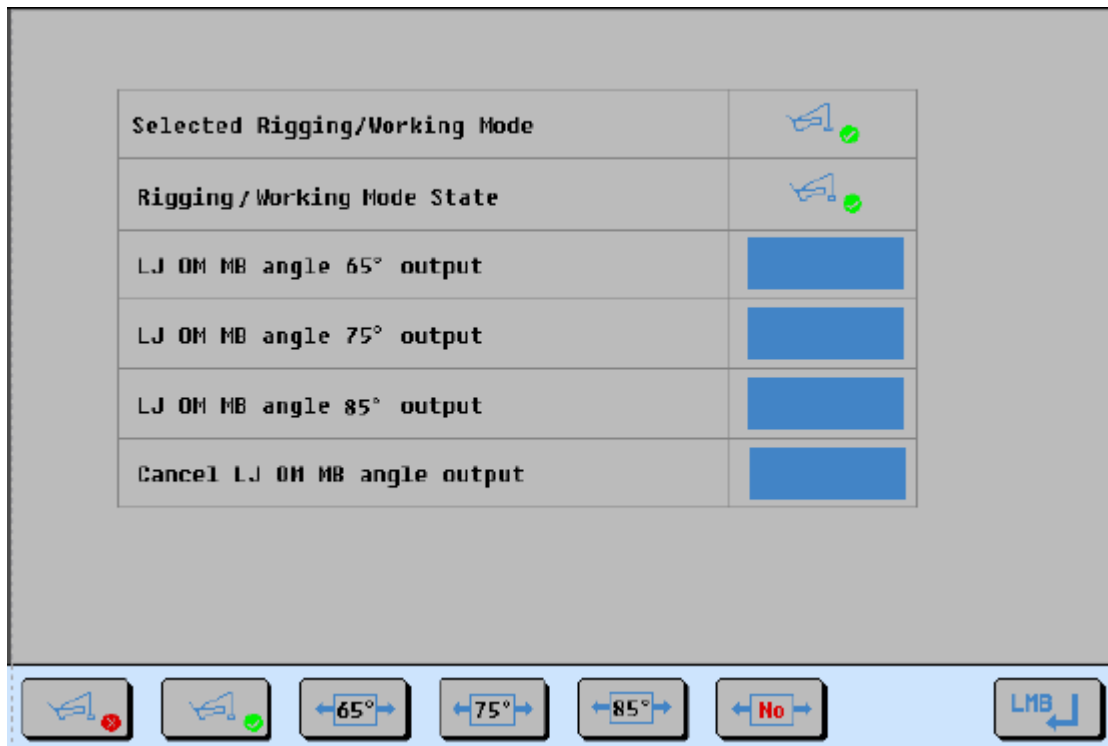
5.7 Digital value output

- ① Digital value No.
- ② Function description
- ③ Port mode (Blue means output existing)

5.3.3 System setting



Press F4 at **1st interface** to enter into system setting interface



5.8 System setting interface

- F1: Rigging mode key
- F2: Working mode key
- F3: Choose main boom angle 65° key (at Luffing jib OM)
- F4: Choose main boom angle 75° key (at Luffing jib OM)
- F5: Choose main boom angle 85° key (at Luffing jib OM)
- F6: Cancel setting key

(1) Selected Rigging/Working Mode:

Operators can press F1 and F2 to select rigging/working mode, the related mode icon will be present at right column.

(2) Rigging/Working Mode State:

Present working mode of the crane



Rigging mode



Working mode

After rigging mode is selected, the controller will judge whether the mode could shift to rigging mode according to the present crane OM, if it could, Rigging/Working Mode State will show rigging mode; if not, Rigging/Working Mode State will show working mode.

(3) LJ OM angle 65° output:

Press F3 will appear that present main boom angle is 65°. If SET icon present at the top of F3 means F3 key is pressed down and when the main boom angle is $65\pm 1^\circ$ means one switching value channel put out. If the F3 key is not pressed, when the main boom angle is $65\pm 1^\circ$, no output exist. Output mode is: LJ OM angle 65° output.

(4) LJ OM angle 75° output:

Press F4 will appear that present main boom angle is 75°. If SET icon present at the top of F4 means F4 key is pressed down and when the main boom angle is $75\pm 1^\circ$ means one switching value channel put out. If the F4 key is not pressed, when the main boom angle is $75\pm 1^\circ$, no output exist. Output mode is: LJ OM angle 75° output.

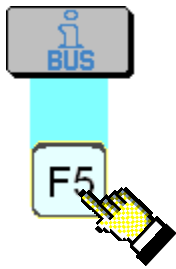
(5) LJ OM angle 85° output:

Press F5 will appear that present main boom angle is 85°. If SET icon present at the top of F5 means F5 key is pressed down and when the main boom angle is $85\pm 1^\circ$ means one switching value channel put out. If the F5 key is not pressed, when the main boom angle is $85\pm 1^\circ$, no output exist. Output mode is: LJ OM angle 85° output.

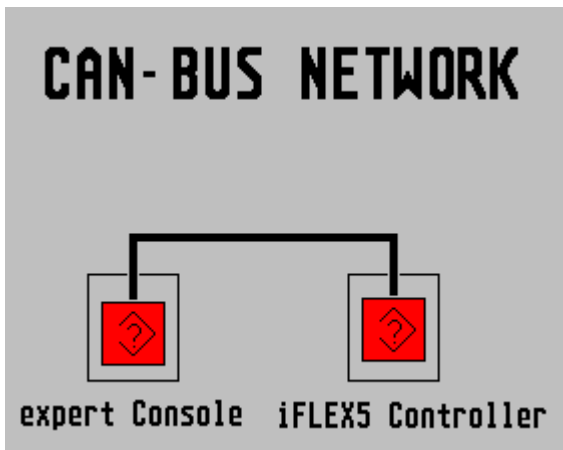
(6) Cancel LJ OM MB angle output:

Press F6, if SET icon present at the top of F6 means F6 key is pressed down. At that time cancel the setting of 3,4 and 5, the output mode is: Cancel LJ OM MB angle output, and the main boom angle is approved as $85\pm 1^\circ$ with one switching value channel put out, the output mode is: LJ OM angle 85° output.

5.3.4 CAN-bus checking



Press F5 at 1st interface to check CAN-bus mode:



CAN-bus mode:

Left column console state

Right column Controller state



State icon and introduction:

Operational mode

Preoperational mode

Lost mode

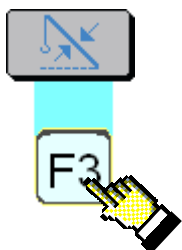
Stopped mode

Hardware failure

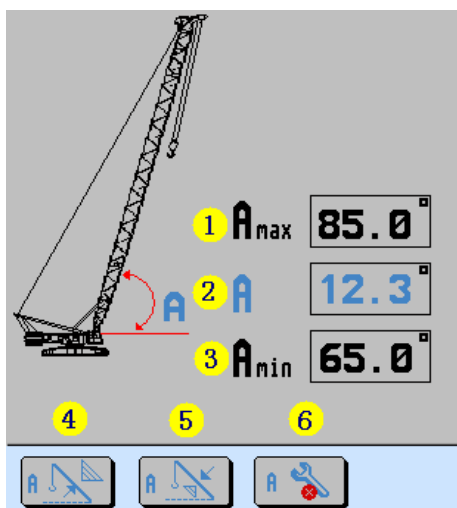
5.3.5 Angle limitation & Time setting

Angle limitation and Time setting is processed at 2nd interface. Press F1 at 1st interface to enter into 2nd interface:

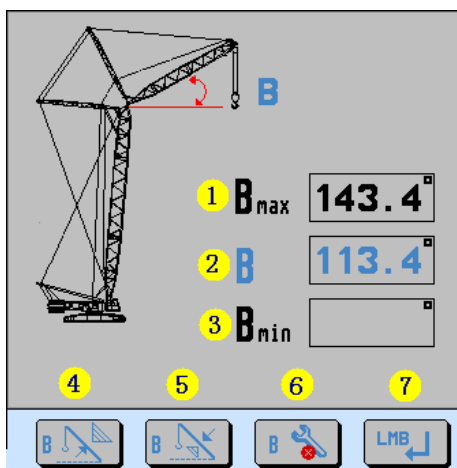
(1) Angle limitation



Press F3 at 2nd interface to set the limitation of main boom angle and Luffing jib angle:



- ① Main boom angle upper limit display
- ② Main boom angle display
- ③ Main boom angle lower limit display
- ④ Main boom angle upper limit setting key
- ⑤ Main boom angle lower limit setting key
- ⑥ Main boom setting cancel key



- ① Luffing jib upper limit display
- ② Luffing jib angle display
- ③ Luffing jib lower limit display
- ④ Luffing jib upper limit setting key
- Luffing jib lower limit setting key
- ⑥ Luffing jib setting cancel key
- ⑦ Back to main interface

At this interface, operators can set angle limitation of main boom and luffing jib. When the crane boom approached the limitation, press the related key, it will present SET icon on top of the key which means the key is already pressed down. At that time, the ultimate angle will be recorded and when the boom reach to this angle next time, system will alarm.

For example, when the main boom angle is not allowed to exceed 78° due to the operating environment, lift the main boom to 78° and press angle limitation setting key to set the upper limit. After finish the setting, when main boom angle exceed 78°, system will alarm operators to stop any dangerous movement. Press F3 the setting will be canceled.

(2) Time setting



Operators can adjust time when the time displayed is not local time .Press F4 at **2nd interface** to set time:



F4: Turn left key



F5: Turn right key



F6: Value add key



F7: Value reduce key



F8: Confirm and back to main interface key

After finish the related setting, press F8 to confirm and back to main interface.

6. Trouble shooting

In case of any improper operation or LMI malfunction during the crane's operation it will display some certain code (error code) for the user's information. Some errors are caused by illegal operation, some by people's cause and some are caused by other factors.

The following codes can be an aid and help for how to use and maintenance the LMI system:



Notice

If you cannot solve the problem according to the following contents,
please contact us as soon as possible at

Tel: 021-51082780 Fax: 021-52375899

| Error code | Malfunction | Cause | Solution |
|------------|--|---|---|
| E01 | Fallen below the radius range or angle range exceeded | Due to the too much hoist up of the boom which result in lower than the min. radius or exceed the max. angle in the capacity chart. | Boom down to a permitted radius or angle in the load chart. |
| E02 | Exceed the max. radius or lower than the min. angle. | Due to the too much hoist down which result in exceed the max. radius or lower than he min. angle. | Boom up to a permitted radius or angle in the load chart. |
| E04 | OM not exist or exceed the motion of rotary range | Improper OM setting or enter into prohibited slewing area | Properly choose the OM according to actual operation and slew back to a permitted range. |
| E05 | Prohibited length range | Choose a main boom length that is not exist. | Choose a proper main boom length. |
| E06 | Fallen below the Minimum angle range when luffing down or luffing up | The jib luffing down too much result in the actual angle is lower than the permitted value in the capacity chart. | Luffing up the jib to a permitted radius or angle in the capacity chart |
| E07 | Over load relay checking | Over load relay act and controller switching value NO.20 input channel open | Check the over load relay and cable of the controller switching value NO.20 input channel |
| | | Over load relay not act and controller switching value NO.20 input channel close | Check the over load relay |
| | | | Check the controller switching value NO.20 input channel |

| Error code | Malfunction | Cause | Solution |
|-------------------|---|---|-----------------------------|
| E12 | “Main boom right KMD channel” voltage is lower than the min. limitation | Sensor cable defective or plug water inside | Change cable or plugs |
| | | KMD fault | Change KMD of main boom |
| | | Channel measuring parts broken | Change KMD parts |
| E13 | “Jib right KMD channel” voltage is lower than the min. limitation | Sensor cable defective or plug water inside | Change cable or plugs |
| | | KMD fault | Change KMD of jib |
| | | Channel measuring parts broken | Change KMD parts |
| E14 | “Main boom left KMD channel” voltage is lower than the min. limitation | Sensor cable defective or plug water inside | Change cable or plugs |
| | | KMD fault | Change KMD of main boom |
| | | Channel measuring parts broken | Change KMD parts |
| E14 | “Right KMD of luffing jib” voltage is lower than the min. limitation. | KMD of luffing jib defective | Change KMD of luffing jib |
| | | Cable of the checking channel defective | Change cable of the channel |
| E15 | “Main boom foot angle sensor channel” voltage is lower than the min. limitation. | Sensor cable defective or plug water inside | Change cable or plugs |
| | | KMD fault | Change luffing jib KMD |
| | | Channel measuring parts broken | Change KMD parts |
| E16 | “Luffing jib foot angle sensor channel” voltage is lower than the min. limitation. | Refer to E15 | Refer to E15 |
| E17 | “Left KMD of Luffing jib” voltage is lower than the min. limitation. | Refer to E14 | Refer to E14 |
| E18 | “Main boom backstop pressure sensor channel” voltage is lower than the min. limitation. | Refer to E14 | Refer to E14 |
| E1B | “Luffing jib top angle sensor channel” voltage is lower than the min. limitation. | Refer to E15 | Refer to E15 |

| Error code | Malfunction | Cause | Solution |
|-------------------|---|--|---|
| E1C | “Top angle sensor of main boom” voltage is lower than the min. limitation. | Top angle sensor of main boom defective. | Change head angle sensor of main boom |
| | | Cable of the checking channel defective or unconnected | Connect or change Cable of the checking channel |
| E1D | “Super lift mast angle (if support) channel” voltage is lower than the min. limitation. | Refer to E15 | Refer to E15 |
| E1E | “KMD channel of luffing system” voltage is lower than the min. limitation. | Refer to E14 | Refer to E14 |
| E1F | “Super lift mast angle sensor channel” voltage is lower than the min. limitation. | Refer to E15 | Refer to E15 |
| E22 | “Main boom right KMD channel” voltage exceed the limitation. | Refer to E12 | Refer to E12 |
| E23 | “Jib right KMD channel” voltage exceed the limitation. | Refer to E14 | Refer to E14 |
| E24 | “Main boom KMD channel” voltage exceed the limitation. | Refer to E14 | Refer to E14 |
| E25 | “Main boom foot angle sensor channel” voltage exceed the limitation. | Refer to E15 | Refer to E15 |
| E26 | “Luffing jib foot angle sensor channel” voltage exceed the limitation. | Refer to E15 | Refer to E15 |
| E27 | “Angle sensor channel of Luffing jib” voltage exceed the limitation. | Refer to E14 | Refer to E14 |
| E28 | “Main boom Main boom backstop pressure sensor channel” voltage exceed the limitation. | Refer to E14 | Refer to E14 |
| E2B | “Luffing jib Top angle sensor channel” voltage exceed the limitation. | Refer to E15 | Refer to E15 |
| E2C | “Top angle sensor of main boom” voltage exceed the limitation. | Refer to E15 | Refer to E15 |
| E2D | “Super lift mast angle (if support) channel” voltage exceed the limitation. | Refer to E15 | Refer to E15 |

| Error code | Malfunction | Cause | Solution |
|-------------------|--|--|--|
| E2E | “Luffing jib system force channel” voltage exceed the limitation. | Refer to E14 | Refer to E14 |
| E2F | “Super lift mast angle sensor checking channel” voltage exceed the limitation. | Refer to E14 | Refer to 14 |
| E37 | Logical programming fault | Programming file fault | Update effective software of the system |
| | | Flash-EPROM fault | Change controller |
| E38 | System program does not comply with crane data file | The LMI system program is different from crane data file | Update effective system software or crane data file |
| E39 | System program does not comply with performance table | The LMI system program is different from performance table | Update effective system program or performance table |
| E3A | Crane data file does not comply with performance table | Crane data file is different from performance table | Change data file or performance table |
| E43 | RAM fault | RAM or controller fault | Change controller |
| E51 | Crane data file fault | No readable crane data file | Up date crane data file |
| | | Flash-EPROM defective | Change Flash-EPROM |
| E52 | Crane performance file fault | No readable crane performance table | Update crane performance table |
| | | Flash-EPROM fault | Change Flash-EPROM |
| E56 | Crane data file fault | No effective data file during adjustment | Resume and update effective crane data file |
| | | Flash-EPROM fault | Change controller |
| E57 | Crane serial data file fault | No effective data file in the adjusting data file | Update effective data file |
| | | Flash-EPROM fault | Change controller |
| E60 | None-identified base file NO. and programming value | No effective data in performance file | Update effective performance file |
| | | Unprogrammed Base file NO. | Program correct base file NO(1 is base1, 2 is base 2) |
| | | Performance table programming fault | Checking the performance file of program base file |
| E61 | CAN-bus data communication fault | CAN-bus cable between controller and sensor defective or unconnected | Check the connecting cable between controller and sensor |
| | | Controller CAN-bus port fault | Change controller |
| | | CAN-bus cable short circuit | Change Can-bus cable |

| Error code | Malfunction | Cause | Solution |
|-------------------|---|---|--|
| E80 | Luffing jib system force too big | Exceed the limitation of destructive force | Reduce force of luffing system |
| E81 | Top angle and foot angle of main boom differ too much | Top or foot angle sensor of main boom defective | Change top or foot angle sensor of main boom |
| | | Top or foot angle sensor cable of main boom defective | Change top or foot angle sensor cable of main boom |
| E82 | Top angle and foot angle of Luffing jib differ too much | Top or foot angle sensor of Luffing jib defective | Change top or foot angle sensor of Luffing jib |
| | | Top or foot angle sensor cable of Luffing jib defective | Change top or foot angle sensor cable of Luffing jib |
| E83 | Main boom force value exceed limitation of rope destructive force | Main boom force too big | Reduce main boom force |
| | | Cable of checking channel defective | Change channel cable |
| E84 | Wrong rigging condition. | The selected rigging condition is not contained in the crane data file. | Select another rigging condition |
| | | | Check the programming in the crane data file. |
| E85 | Wrong setting of range | Setting range of computer is too small (negative deviation) | Check program of crane data file |
| E88 | Main boom position abnormal at Luffing jib OM | Main boom angle abnormal | Main boom angle luff to allowed range |
| | | cable of main boom angle channel defective | Change channel cable |
| E89 | Luffing jib angle abnormal at fixed or Luffing jib OM | Luffing jib angle exceed allowed range when jib luffing | Luffing jib to allowed range |
| | | Wrong measurement of Luffing jib angle | Check measurement of Luffing jib angle |
| E94 | No data transfer from controller to console | CAN-bus abnormal | Re-start the system |
| | | System data communication abnormal | Check CAN-bus cable |
| E98 | LMI watch dog open | LMI operated overtime | Re-start the system |
| | | | Connect computer ports and observe wrong information |
| EAB | A2B switch short circuit | A2B switch short circuit | Change A2B switch |
| | | A2B switch cable short circuit | Change A2B switch cable |
| EAC | A2B switch disconnect | A2B switch disconnect | Change or connect A2B switch |
| | | A2B switch cable disconnect | Change or connect A2B switch cable |
| EAD | A2B switch inefficacy | Sensor function fault | Change A2B switch |
| | | CAN-bus delay | Change A2B switch cable |

| Error code | Malfunction | Cause | Solution |
|-------------------|--|--|---|
| EB1 | “Length checking channel of the hoist steel wire” voltage is lower than the min limitation | No steel wire on hoist | Adjust length of steel wire |
| | | No measurable sensor exist for hoisting | Install sensor and revise this function at program data |
| | | Steel wire length no adjust well | Adjust steel wire length and surface |
| | | Wrong steel wire/hoist parameter at program data | Check parameter of program data |
| | | No counter input defined at configuration | Change I/O configuration |
| | | Counter input fault | Change Iflex |
| EB2 | “Length checking channel of steel wire on hoist” voltage exceed the limitation | Steel wire completely twining hoist (only possible at EB2) | Adjust length of steel wire |
| | | Refer to EB1 | Refer to EB1 |
| EB3 | “Checking channel of hook height” voltage exceed the limitation | No steel wire between hook and forward oriented wheel | Refer to EB1 |
| | | Refer to EB1 | |
| EDD | Battery empty | Check out low voltage of the two ports of battery | Setting RTC and change battery Temporary measurement: press alarm stop key when Operation without data loader |
| EFD | LMB watch dog overtime | This function shall be started over 5 min. like writing flash PROM | After finish programming, information is not automatically started |

7. System connection

