



# **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.

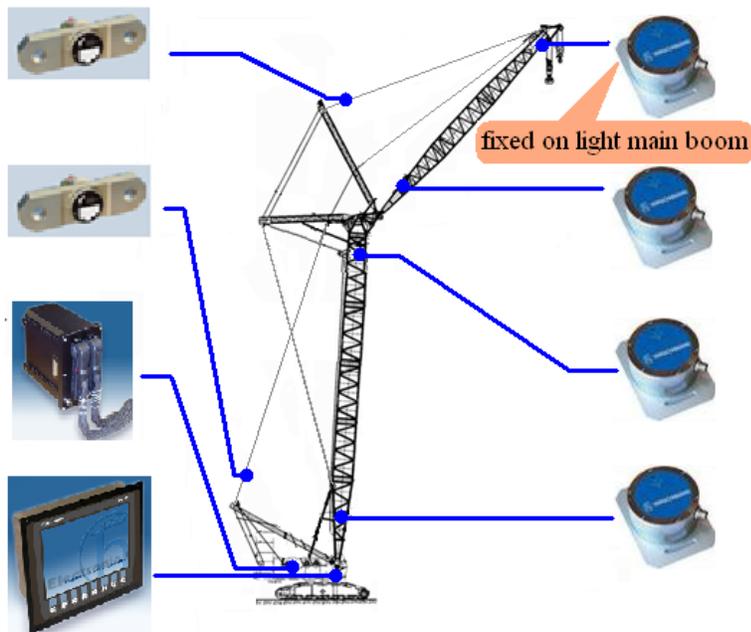
The LMI could only prevent overload of the crane boom in lengthwise vertical level but could not prevent accidents caused by inclined hoisting, wind loading, inclination or foundering of the road and rail or driving oversteps. So the operators and other people shall not ignore safe management and operating 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



4.3 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 KMD Force sensor



4.4 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 Angle sensor



4.5 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.

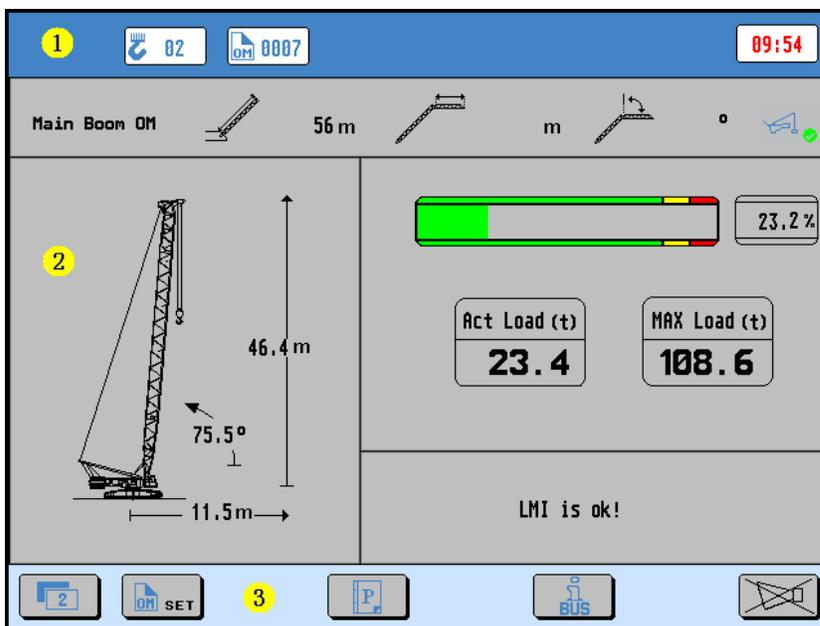
## 5. System introduction

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



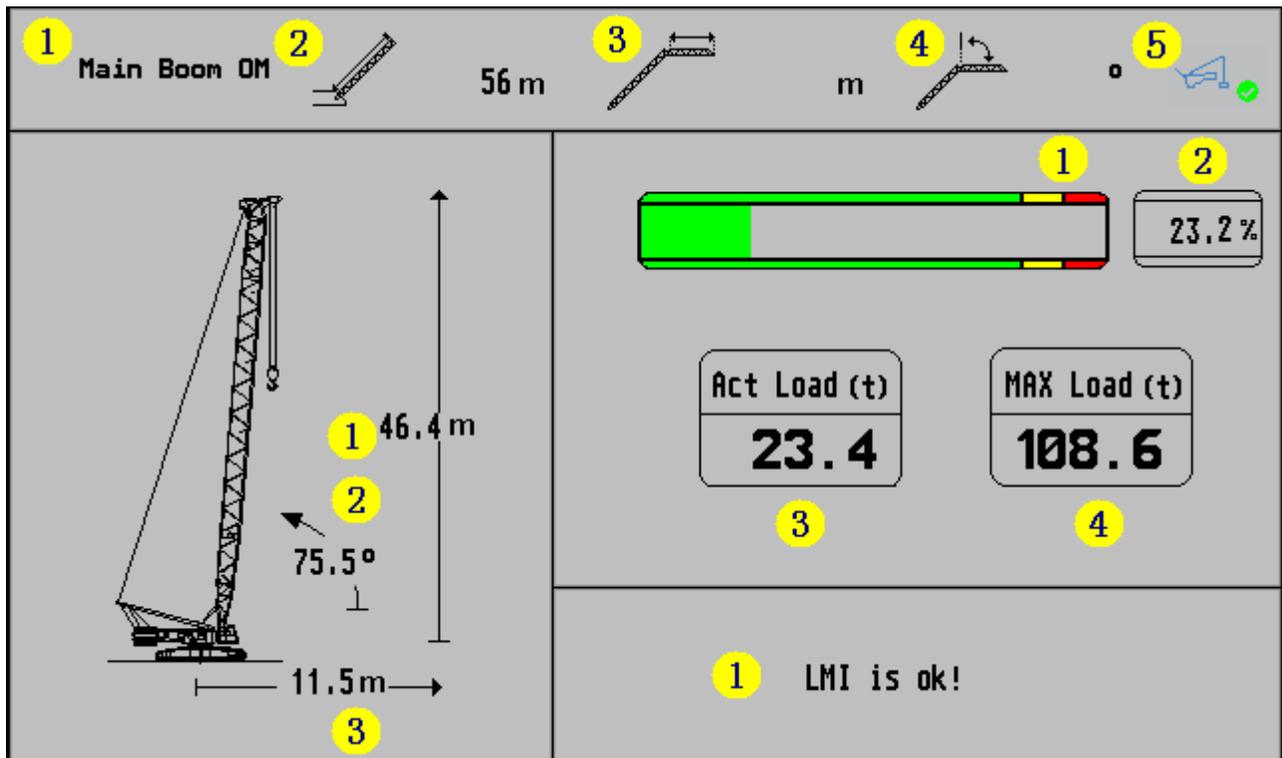
This means the movement of the crane is very dangerous, operators shall back to the safe side. Or the LMI is abnormal, the problem shall be solved immediately.

### 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:

1<sup>st</sup> interface function key:



F1: Main interface shift key, press to enter into 2<sup>nd</sup> interface;



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



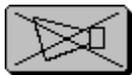
F3: Data checking, press to check analog input & digit output of iFLEX5 (details refer to 5.3.2)



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

2<sup>nd</sup> interface function key:



F1: Main interface shift key, press to enter into 1<sup>st</sup> interface;



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

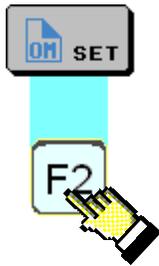


F4: Time setting key (details refer to 5.3.5)



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

### 5.3.1 OM & Reeving setting



Press F2 OM & Reeving setting key at 1<sup>st</sup> 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

### 5.4 OM & Reeving setting



F1: OM code checking key



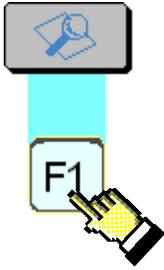
F4: OM code setting key



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



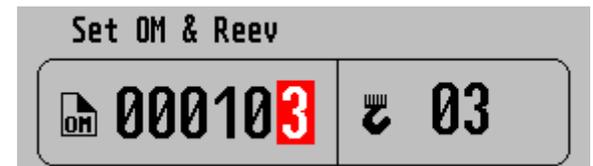
F4

Press F4 at OM selecting interface to set OM:

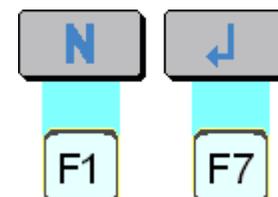


F6

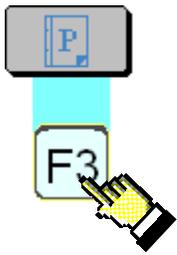
Press F6 at OM selecting interface to set reeving:



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 **1<sup>st</sup> 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

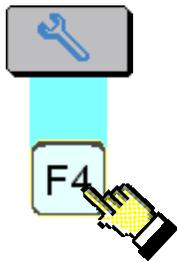
- ① Analog channel
- ② Base board (X1) expanded board (X2) stitch No.
- ③ Analog description
- ④ Analog A/D exchange value
- ⑤ Analog actual measuring value

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 angel - 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 angel - LJ angle $< 15^\circ$		
①	②	③	

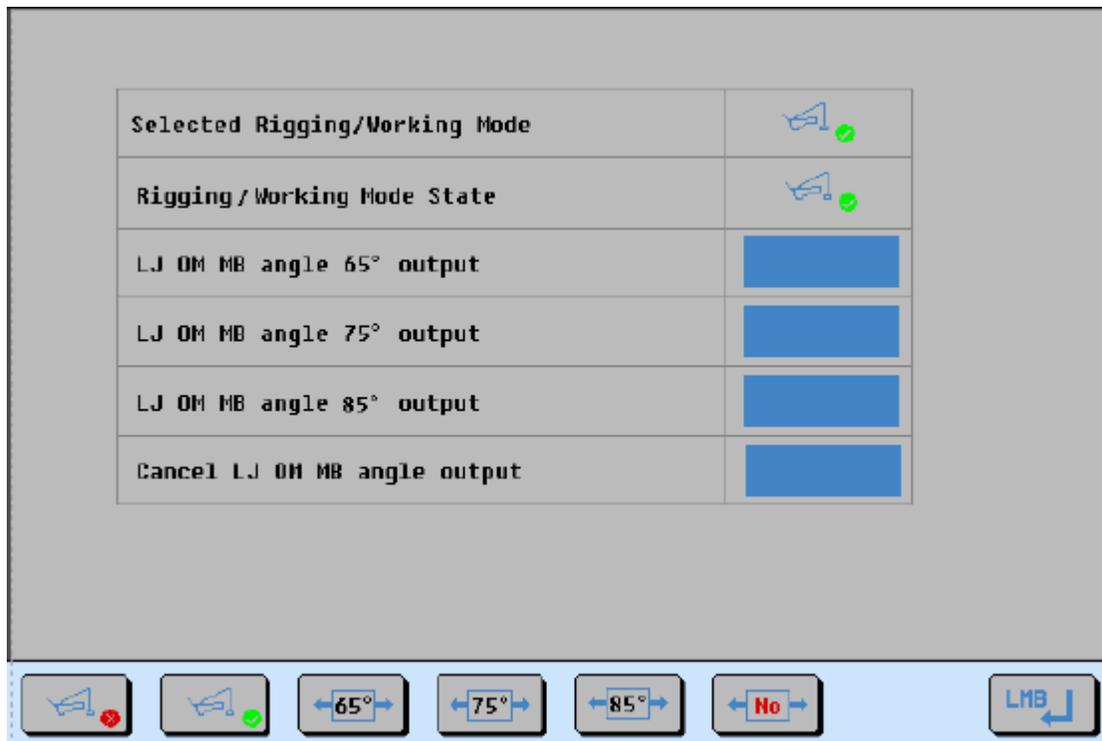
## 5.7 Digital value output

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

### 5.3.3 System setting



Press F4 at **1<sup>st</sup> 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.

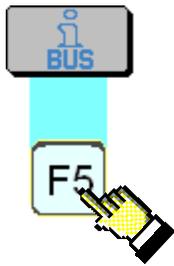
## (5) LJ OM angle 85° output:

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.

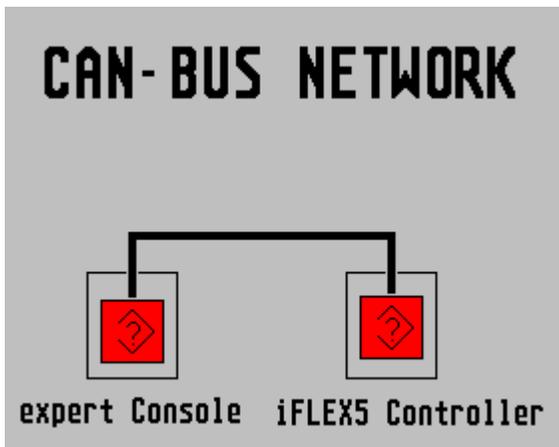
## (6) Cancel LJ OM MB angle output:

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 1<sup>st</sup> 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

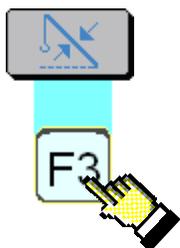
Stopped mode

Hardware failure

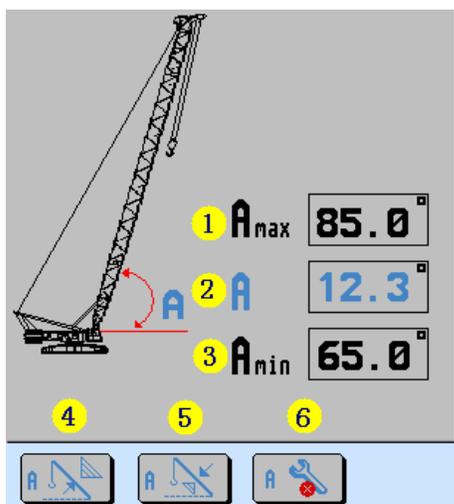
### 5.3.5 Angle limitation & Time setting

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

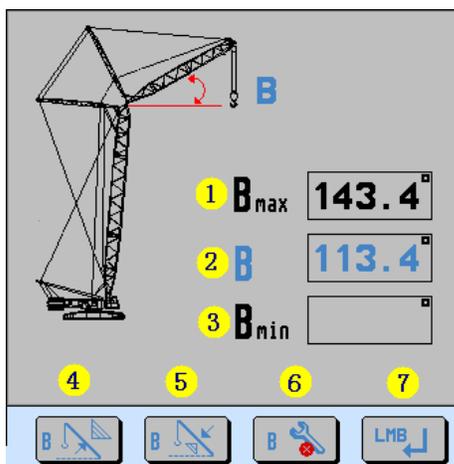
#### (1) Angle limitation



Press F3 at 2<sup>nd</sup> 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 **2<sup>nd</sup> 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

<b>Error code</b>	<b>Malfunction</b>	<b>Cause</b>	<b>Solution</b>
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

<b>Error code</b>	<b>Malfunction</b>	<b>Cause</b>	<b>Solution</b>
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

<b>Error code</b>	<b>Malfunction</b>	<b>Cause</b>	<b>Solution</b>
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

<b>Error code</b>	<b>Malfunction</b>	<b>Cause</b>	<b>Solution</b>
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

<b>Error code</b>	<b>Malfunction</b>	<b>Cause</b>	<b>Solution</b>
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

