

PAT
Angle-Length-Radius-Load
Indicator System
EI 65

OPERATOR'S HANDBOOK AND
CALIBRATION GUIDE

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OPRTHDB-EI65

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1 GENERAL INFORMATION

The PAT Length-Angle-Radius-Load Indicator System EI 65 has been designed to provide the crane operator with the essential information required to enable the machine to be used within its design parameters. The EI 65 System indicates the length and angle of the boom, tip height, working radius and the total calculated weight being lifted by the crane.

Using various sensing devices, the EI 65 System warns the crane operator of certain approaching hazardous conditions which could occur during the operation of his crane.

The purpose of this operator's manual is to provide information to help him operate, maintain and troubleshoot the PAT System.

The manual contains the system description and operating information as well as calibration procedures for each PAT operational aid.

2 WARNINGS

The EI 65 is an operational aid which warns a crane operator of certain approaching hazardous conditions which could cause damage to equipment and personnel.

The device is not, and shall not be, a substitute for good operator judgement, experience and use of accepted safe crane operating procedures.

The responsibility for the safe operation of the crane 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 the indicator and crane.

Proper functioning is dependent upon proper daily inspection and observations of the operating instructions set forth in this manual.

3 SYSTEM DESCRIPTION

The PAT EI 65 System consists of a operating console with central micro processor unit, length/angle sensor, force transducers and anti-two block switches.

Boom length and boom angle are registered by the length/angle sensor, mounted inside the cable reel which is mounted on the boom. The boom length is measured by the cable reel cable which also serves as an electrical conductor for the anti-two block switches.

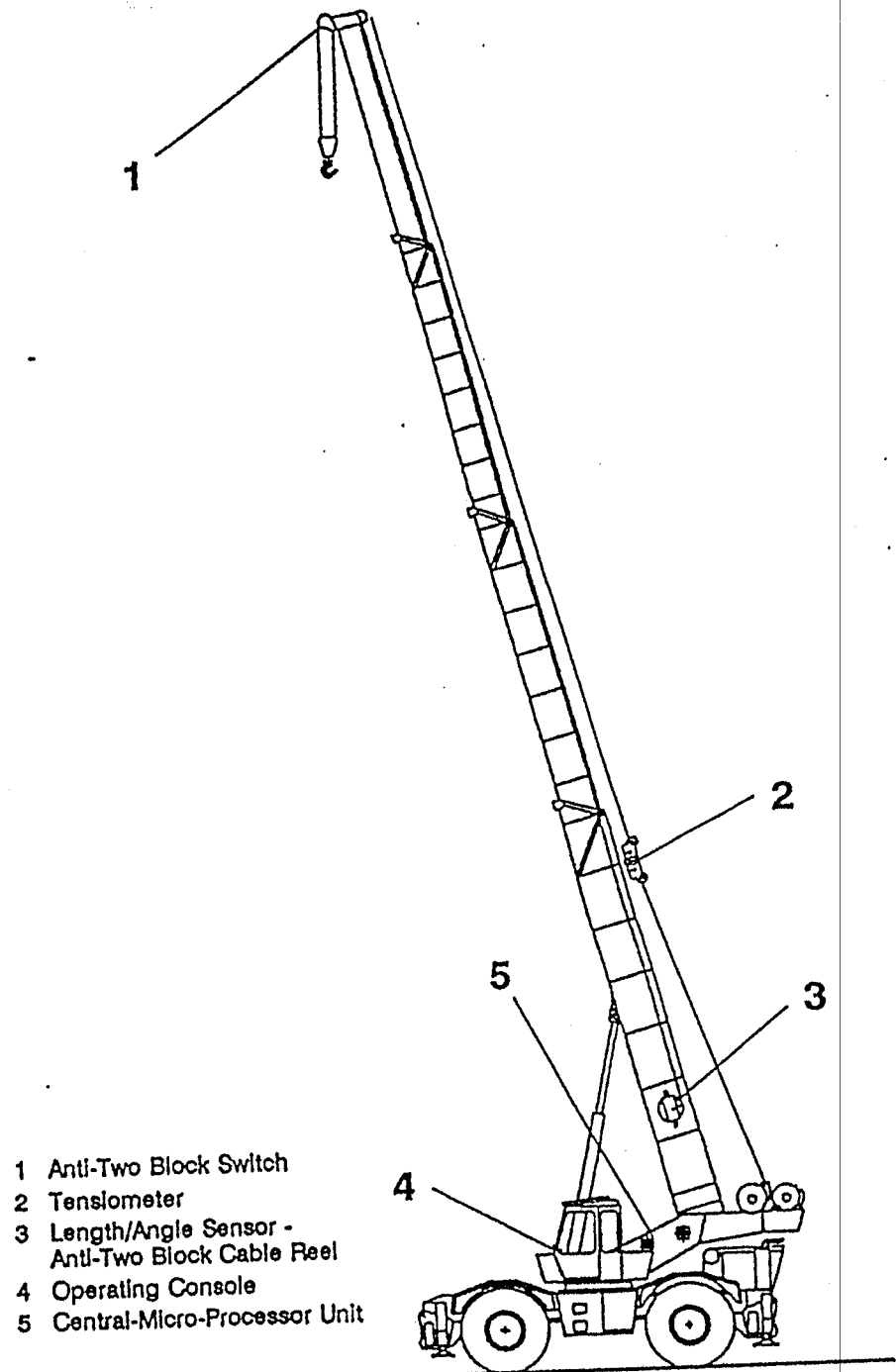
The crane load is measured by running line tensiometers attached to the upper side of the boom.

3.1 System Function

After Ignition of the engine, the system starts with an automatic test of all lamps, the audible alarm and the complete system.

After the system has passed through the system test without errors, the system is ready for operation. The console will indicate the actual load on display (9), the tip height on display (10), the boom length on display (11), the boom angle on display (12), and the radius on display (13).

Fig. 1: Components of PAT System EI 65

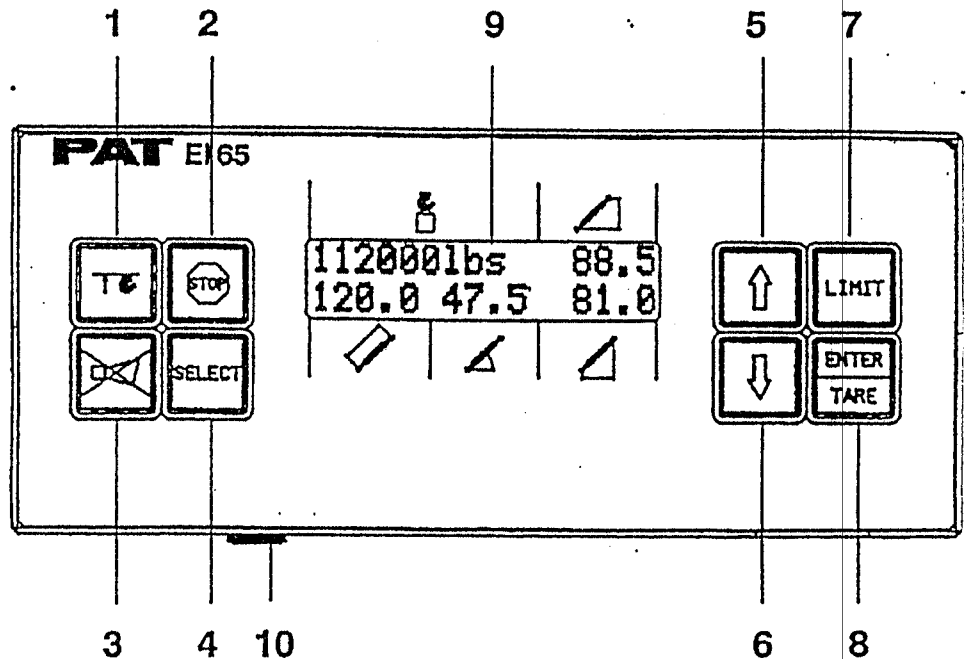


3.2 Operating Console

The console has 2 functions:

- terminal for Input of Instructions and Informations to the system by the crane operator
- display of crane data and information

The operating console is located in the operator's cabin in front of the operator. This unit contains different displays and controls which are described in chapter 3.3.



- 1 Anti-Two Block Alarm Light
- 2 Overload Alarm Light
- 3 Button "HORN OFF" and Alarm Light
- 4 Button "SELECT"
- 5 Button "UP"

- 6 Button "DOWN"
- 7 Limit Alarm Light and Button "LIMIT"
- 8 Button "ENTER/TARE"
- 9 Data Display
- 10 Audible Alarm

3.3 Control Identification

The above figure illustrates the controls and displays of the EI 65 Operating Console. The numbers of the illustration correspond to the numbers in the following list, which describes the function of each control.

1 Anti-Two Block Warning Light



This red warning light (1) will light up when the anti-two block limit switch contacts open, indicating that a two-blocking condition is approaching. At the same time the audible alarm will sound.

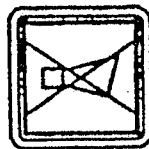
The following crane movements will be stopped simultaneously: hoist up, telescope out, boom down.

2 Overload Alarm Light



This red warning light (2) will light up when the preprogrammed load limit is reached. At the same time the audible alarm will sound, the Alarm Light (3) will light up, and the corresponding crane movements will be stopped.

3 Button "Horn Off" and Alarm Light



The HORN-OFF BUTTON (3) allows the audible alarm to be silenced for approx. 25 seconds by pressing this button. At the same time the corresponding Alarm Light (3) goes out.

4 Button "Select"

The button "Select" (4) is used for indicating and setting the values of the Operating Mode conditions.



After pressing this button the display indicates a part of the "Select Menu". It is possible to move through the different points and pages of the menu step by step by pushing the button "DOWN" (6).

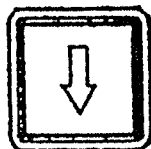
The procedure for indicating and setting the OM-Conditions is described in chapter 4.1

5 Button "Up"



The button "Up" (5) is used to get an increase of a numerical value at the display during the setting procedure of limits and operating conditions.

6 Button "Down"



The button "Down" (6) is used to move through the different menus in "Down"-direction and to get a decrease of a numerical value at the display during the programming and setting procedures.

7 Limit Alarm Light and Button "Limit"



This control (7) serves a dual purpose.

First it is a red warning light, which will light up when one of the preprogrammed limits are reached. At the same time the audible alarm will sound and the corresponding crane movements will be stopped. The limits are minimum and maximum limits of boom angle, boom length, boom height, working radius.

Second, it is a button, which is used for activating the setting procedure of the above limits.

The procedure for setting the limits is described in chapter 4.4

8 Button "Enter/Tare"



This button (8) serves a dual purpose.

First it is used to confirm values and data which are used as input for the system. The instruction to use this button will always be given on the display.






Second the button is used to indicate the *net load* on the display. Net load is the actual load, less lifting tackle and hook block. The "Tare button" has to be activated before lifting.

After pushing the button before lifting the display of load will be set to zero (taring). After lifting a load the display shows the net load (pay load).

After pushing the "Tare Button" the load display shows alternating "lbs" and "TARE".

The net load display will change to the normal working display when the boom radius is changed (either by angle or length) or when the tare button is pressed a second time.

9 Display

		
112000lbs		88.5
120.0	47.5	81.0
		

Display will be in units corresponding to load capacity charts

The Display (9) will show technical information as well as operating information and instructions for the operator.

During crane operation the readout will display the actual load, the height, the boom length, the boom angle, and the radius.

During the setting procedure of the OM-Conditions and the limit setting procedure the display shows the setting values and informations for the operator.

10 Audible Alarm

The Audible Alarm (10), which sounds during the following conditions:

- approaching two-block condition
- preset angle, height, length or radius limits are reached
- preset load limit is reached.

The alarm can be silenced for 25 seconds by pushing the button (3).

4 PROGRAMMING PROCEDURE

During the startup phase the PAT System EI 65 automatically starts with a programming procedure which relies on the correct entry by the crane operator.

This procedure consists of three parts:

- Startup Procedure
- Programming of the PAT System EI 65 to the operating configuration of the crane
- Activating and programming of the preset limits (if desired)

After ignition of the engine the system starts with a Startup Procedure.

4.1 Startup Procedure

During the Startup Procedure the crane operator can compare the preset Operating Configuration Values with the actual crane configuration.

If there is a difference between the indicated and the actual condition, the operator has the possibility for a correction during the *Procedure of Setting the Operating Conditions* which is described in chapter 4.2.

The system stores the preset values for minimal 2 hours when the crane voltage is switched off. After a loss of the preset values the system skips the Startup Procedure and starts with the *Procedure of Setting the Operating Conditions* (chapter 4.2)

Step 1

JIB LGTH2: 32.0
PUSH↓

If the crane is equipped with a jib, the display indicates the nominal length of the jib.

In the example the jib length is 32 ft. If the jib is not used, the value must be 0.0.

Push Button DOWN (6) for next step.

Step 1 will be skipped, if the crane is not equipped with a jib.

Step 2

JIB OFFSET: 0.0
PUSH↓

If the crane is equipped with a jib, the display shows the offset angle of the jib.

In the example the offset angle is 0.0 degrees. If the jib is not used, the value must always be 0.0.

Push Button DOWN (6) for next step.

Step 2 will be skipped, if the crane is not equipped with a jib.

Step 3

PARTS OF LINE 8
PUSH↓

The display shows the number of parts of line.

In the example the number of parts of line is 8.

Push Button DOWN (6) for next step.

Step 4

**AUXILIARY HOIST
PUSH ↓**

The display shows the selected hoist winch of two, either the Main Hoist or the Auxiliary Hoist.

In the example the selected hoist winch is the Auxiliary Hoist

Push Button DOWN (6) for next step.

Step 4 will be skipped, if the crane is not equipped with an Auxiliary Hoist.

Step 5

**MAIN BOOM
PUSH ↓**

The display shows the selected boom of two, either the Main Boom or the Boom Extension.

In the example the selected boom is the Main Boom.

Push Button DOWN (6) for next step.

Step 5 will be skipped, if the crane is not equipped with a Boom Extension.

Step 6

**CONDITION VALID?
YES: ENTER NO: ↓**

The crane operator has the possibility to accept the conditions displayed on Step 1 to 5, or to correct the values.

If the displayed conditions are o.k. the crane operator has to push Button ENTER (8). Then the display will show the actual crane data.

For correction of the preset conditions the Button DOWN (6) has to be pushed. In this case the system starts automatically the Setting Procedure of the Operating Conditions (Chapter 4.2).

4.2 Setting of Operating Conditions

During the Setting Procedure the crane operator can program the system EI 65 with the data of the actual crane configuration.

For simple operation, the computer guides the operator through the procedure step by step. The operator has to read the information displayed and is instructed to answer questions by using appropriate buttons of the keyboard. During the Setting Procedure the lamp in the particular button lights up.

The Setting Procedure can be activated by the crane operator by pushing the Button SELECT (4).

After a loss of the preset values the system automatically starts the Setting Procedure. This can happen, when the system is more than 2 hours without supply voltage.

Step 1

OM - SETTING?
PUSH ↓ OR ENTER

This message appears after pushing the Button SELECT (4). For activating the Setting Procedure the operator has to push Button ENTER (8).

Push Button ENTER (8) for next step.

Step 1 will be skipped, if the Setting Procedure is released automatically after a loss of stored data.

Step 2

SELECT OPERATING
CONDITIONS PUSH↓

This message informs the crane operator that the Procedure of Setting the Operating Conditions is activated.

Push Button DOWN (6) for next step.

Step 3

```
JIB LGTH?  32.0
USE  ↑↑ OR  ENTER
```

The length of the actual used jib is displayed.

To enter a new jib length, the operator has to select one of the preset values by pushing the buttons UP (5) or DOWN (6). If no jib is used the value 0.0 has to be selected.

If the operator wants to continue with the displayed length of jib he has to confirm by pushing the button ENTER (8).

Push Button ENTER (8) for next step.

Step 3 will be skipped, if the crane is not equipped with a jib.

Step 4

```
JIB OFFSET?  0.0
USE  ↑↑ OR  ENTER
```

The offset angle of the actual used jib is displayed.

To enter a new offset angle, the operator has to select one of the preset values by pushing the buttons UP (5) or DOWN (6).

If the operator wants to continue with the displayed offset angle of jib he has to confirm by pushing the button ENTER (8).

Push Button ENTER (8) for next step.

Step 4 will be skipped, if the crane is not equipped with a jib.

Step 5

SELECT THE BOOM
IN USE PUSH ↓

The crane operator is requested to enter the actual boom.

Push Button DOWN (6) for next step.

Step 5 will be skipped, if the crane is not equipped with a Boom Extension.

Step 6

MAIN BOOM?
PUSH ↓ OR ENTER

The display shows the selected boom.

EXTENSION?
PUSH ↓ OR ENTER

To select either the Main Boom or the Extension the operator has to use the buttons UP (5) or DOWN (6).

If the operator wants to continue with the displayed boom he has to confirm by pushing the button ENTER (8).

Push Button ENTER (6) for next step.

Step 6 will be skipped, if the crane is not equipped with an Extension.

Step 7

SELECT ACTUAL
REEVING PUSH ↓

The crane operator is requested to enter the actual number of parts of line.

Push Button DOWN (6) for next step.

Step 8

PART OF LINE? 12
USE ↑↓ OR ENTER

The actual number of parts of line is displayed.

To enter a new number of parts of line, the operator has to push the button UP (5) for increase and the DOWN (6) for decrease the displayed value.

If the crane operator wants to continue with the displayed number of parts of line, he has to confirm by pushing the button ENTER (8).

Push Button DOWN (8) for next step

Step 9

SELECT THE HOIST
IN USE PUSH ↓

The crane operator is requested to enter the actual hoist winch.

Push Button DOWN (6) for next step.

Step 9 will be skipped, if the crane is not equipped with an auxiliary hoist.

Step 10

MAIN HOIST?
PUSH ↓ OR ENTER

AUXILIARY HOIST?
PUSH ↓ OR ENTER

The display shows the selected hoist winch.

To select either the Main Hoist or the Auxiliary Hoist the operator has to use the buttons UP (5) or DOWN (6).

If the operator wants to continue with the displayed hoist he has to confirm by pushing the button ENTER (8).

Push Button ENTER (6) for next step.

Step 10 will be skipped, if the crane is not equipped with an Auxiliary Hoist.

Push Button DOWN (6) for next step.

Step 11

105550.1bs 35.2
43.5 65.8 28.6

The Setting Procedure is completed. The display shows the actual crane data.

Step 11 will be skipped, if the Setting Procedure is released automatically after a loss of stored data. In this case the system changes to the Startup Procedure (Chapter 4.1) for verification of the previously set Operating Conditions

4.3 Activating and Setting of Preset Limits

The PAT System EI 65 is equipped with the following presets:

- limit for maximum hook load
- limits for maximum and minimum boom hoist, boom angle, boom length and working radius.

The operator has the possibility to activate the load limit and/or the maximum and minimum limit of one of the above geometric dimensions.

For simple operation the computer guides the operator through the procedure step by step. The operator has to read the information displayed and is instructed to answer questions by using appropriate buttons of the keyboard. During the Setting Procedure the lamp in the particular button lights up.

After a loss of the preset values the system sets the values of the Preset Limits on maximum or minimum and deactivates all Preset Limits. This can happen, when the system is longer than 2 hours without supply voltage.

The Activating and Setting Procedure can be started by the crane operator by pushing the Button LIMIT (7).

4.3.1 Setting of Boom Length Presets

Step 1

TO SELECT LIMIT
OPTION PUSH ↓

This message appears after pushing the Button LIMIT (7). For activating the Setting Procedure the operator has to push Button DOWN (6).

Push Button DOWN (6) for next step.

Step 2

LENGTH LIMIT?
PUSH ↓ OR ENTER

To select the Boom Length Preset Programming Procedure push the button ENTER (8).

To skip the length preset limit push the button DOWN (6).

Push Button ENTER (8) for next step.

Step 3 to 6 will be skipped, when the Button DOWN is pressed. The system continues with Angle Limit Preset Programming Procedure (see chapter 4.3.2)

Step 3

MIN. LIMIT: 10.0
USE ↑ OR ENTER

The actual value of the Minimum Boom Length Preset is displayed.

To enter a new value of the Minimum Boom Length Preset, the operator has to push the button UP (5) for increase and the button DOWN (6) for decrease the displayed value.

If the crane operator wants to continue with the displayed value, he has to confirm by pushing the button ENTER (8).

Push Button ENTER (8) for next step.

Step 4

MAX. LIMIT: 85.7
USE ↑ OR ENTER

The actual value of the Maximum Boom Length Preset is displayed.

To enter a new value of the Maximum Boom Length Preset, the operator has to push the button UP (5) for increase and the button DOWN (6) for decrease the displayed value.

If the crane operator wants to continue with the displayed value, he has to confirm by pushing the button ENTER (8).

Push Button ENTER (8) for next step.

Step 5

MAX. LIMIT: 70.0
MIN. LIMIT: 10.0

For verification of the previously set values the Maximum and Minimum Boom Length Preset is displayed.

Push Button DOWN (6) for next step.

Step 6

115320 lbs 45.7
48:7 70.2 10.5

The Setting Procedure for the Boom Length Presets is completed. The display shows the actual crane data. To remind the crane operator of the activated Boom Length Preset the display of the actual boom length shows a intermittent colon.

4.3.2 Setting of Boom Angle Presets

Step 1

TO SELECT LIMIT
OPTION PUSH ↓

This message appears after pushing the Button LIMIT (7). For activating the Setting Procedure the operator has to push Button DOWN (6).

Push Button DOWN (6) for next step.

Step 2

LENGTH LIMIT?
PUSH ↓ OR ENTER

To select the Boom Angle Preset Programming Procedure push the button DOWN (6).

Push Button DOWN (6) for next step.

Step 3

ANGLE LIMIT?
PUSH ↓ OR ENTER

To select the Boom Angle Preset Programming Procedure push the button ENTER (8).

To skip the Angle preset limit push the button DOWN (6).

Push Button ENTER (8) for next step.

Step 4 to 7 will be skipped, when the Button DOWN is pressed. The system continues with the Radius Limit Preset Programming Procedure (see chapter 4.3.3)

Step 4

MIN. LIMIT: 10.0
USE ↓↑ OR ENTER

The actual value of the Minimum Boom Angle Preset is displayed.

To enter a new value of the Minimum Boom Angle Preset, the operator has to push the button UP (5) for Increase and the button DOWN (6) for decrease the displayed value.

If the crane operator wants to continue with the displayed value, he has to confirm by pushing the button ENTER (8).

Push Button ENTER (8) for next step.

Step 5

MAX. LIMIT: 85.7
USE ↓↑ OR ENTER

The actual value of the Maximum Boom Angle Preset is displayed.

To enter a new value of the Maximum Boom Angle Preset, the operator has to push the button UP (5) for Increase and the button DOWN (6) for decrease the displayed value.

If the crane operator wants to continue with the displayed value, he has to confirm by pushing the button ENTER (8).

Push Button ENTER (8) for next step.

Step 6

MAX. LIMIT: 70.0
MIN. LIMIT: 10.0

For verification of the previously set values the Maximum and Minimum Boom Angle Preset is displayed.

Push Button DOWN (6) for next step.

Step 7

115320 lbs	45.7
48.7 70:2	10.5

The Setting Procedure for the Boom Angle Presets is completed. The display shows the actual crane data. To remind the crane operator of the activated Boom Angle Preset the display of the actual boom angle shows a intermittent colon.

4.3.3 Setting of Boom Radius Presets

Step 1

TO SELECT LIMIT
OPTION PUSH ↓

This message appears after pushing the Button LIMIT (7). For activating the Setting Procedure the operator has to push Button DOWN (6).

Push Button DOWN (6) for next step.

Step 2

LENGTH LIMIT?
PUSH ↓ OR ENTER

To select the Boom Radius Preset Programming Procedure push the button DOWN (6).

Push Button DOWN (6) for next step.

Step 3

ANGLE LIMIT?
PUSH ↓ OR ENTER

To select the Boom Radius Preset Programming Procedure push the button DOWN (6).

Push Button DOWN (6) for next step.

Step 4

**RADIUS LIMIT?
PUSH ↓ OR ENTER**

To select the Boom Radius Preset Programming Procedure push the button ENTER (8).

To skip the Radius preset limit push the button DOWN (6).

Push Button ENTER (8) for next step.

Step 5 to 8 will be skipped, when the Button DOWN is pressed. The system continues with the Height Limit Preset Programming Procedure (see chapter 4.3.4)

Step 5

**MIN. LIMIT: 10.0
USE ↑↓ OR ENTER**

The actual value of the Minimum Boom Radius Preset is displayed.

To enter a new value of the Minimum Boom Radius Preset, the operator has to push the button UP (5) for increase and the button DOWN (6) for decrease the displayed value.

If the crane operator wants to continue with the displayed value, he has to confirm by pushing the button ENTER (8).

Push Button ENTER (8) for next step.

Step 6

MAX. LIMIT: 85.7 USE ↓↑ OR ENTER

The actual value of the Maximum Boom Radius Preset is displayed.

To enter a new value of the Maximum Boom Radius Preset, the operator has to push the button UP (5) for increase and the button DOWN (6) for decrease the displayed value.

If the crane operator wants to continue with the displayed value, he has to confirm by pushing the button ENTER (8).

Push Button ENTER (8) for next step.

Step 7

MAX. LIMIT: 70.0 MIN. LIMIT: 10.0

For verification of the previously set values the Maximum and Minimum Boom Radius Preset is displayed.

Push Button DOWN (6) for next step.

Step 8

115320 lbs	45.7
48.7 70.2	10:5

The Setting Procedure for the Boom Radius Presets is completed. The display shows the actual crane data.

To remind the crane operator of the activated Boom Radius Preset the display of the actual boom radius shows a intermittent colon.

4.3.4 Setting of Boom Height Presets

STEP 1

TO SELECT LIMIT
OPTION PUSH ↓

This message appears after pushing the Button LIMIT (7). For activating the Setting Procedure the operator has to push Button DOWN (6).

Push Button DOWN (6) for next step.

Step 2

LENGTH LIMIT?
PUSH ↓ OR ENTER

To select the Boom Radius Preset Programming Procedure push the button DOWN (6).

Push Button DOWN (6) for next step.

Step 3

ANGLE LIMIT?
PUSH ↓ OR ENTER

To select the Boom Radius Preset Programming Procedure push the button DOWN (6).

Push Button DOWN (6) for next step.

Step 4

RADIUS LIMIT?
PUSH ↓ OR ENTER

To select the Boom Radius Preset Programming Procedure push the button DOWN (6).

Push Button DOWN (6) for next step.

Step 5

HEIGHT LIMIT?
PUSH ↓ OR ENTER

To select the Boom Height Preset Programming Procedure push the button ENTER (8).

To skip the Height preset limit push the button DOWN (6).

Push Button ENTER (8) for next step.

Step 6 to 9 will be skipped, when the Button DOWN is pressed. The system continues with the Load Limit Preset Programming Procedure (see chapter 4.3.5)

Step 6

MIN. LIMIT: 10.0
USE ↑ OR ENTER

The actual value of the Minimum Boom Height Preset is displayed.

To enter a new value of the Minimum Boom Height Preset, the operator has to push the button UP (5) for increase and the button DOWN (6) for decrease the displayed value.

If the crane operator wants to continue with the displayed value, he has to confirm by pushing the button ENTER (8).

Push Button ENTER (8) for next step.

Step 5

HEIGHT LIMIT?
PUSH ↓ OR ENTER

To select the Load Preset Programming Procedure push the button DOWN (6).

Push Button DOWN (6) for next step.

Step 6

LOAD LIMIT?
PUSH ↓ OR ENTER

To select the Load Preset Programming Procedure push the button ENTER (8).

To skip the Load Preset Limit push the button DOWN (6).

Push Button ENTER (8) for next step.

Step 7 to 10 will be skipped, when the Button DOWN is pressed.

Step 7

MAX. LIMIT: 85.7
USE ↑ OR ENTER

The actual value of the Maximum Boom Load Preset is displayed.

To enter a new value of the Maximum Boom Load Preset, the operator has to push the button UP (5) for increase and the button DOWN (6) for decrease the displayed value.

If the crane operator wants to continue with the displayed value, he has to confirm by pushing the button ENTER (8).

Push Button ENTER (8) for next step.

Step 7

MAX. LIMIT: 85.7
USE ↑ OR ENTER

The actual value of the Maximum Boom Height Preset is displayed.

To enter a new value of the Maximum Boom Height Preset, the operator has to push the button UP (5) for increase and the button DOWN (6) for decrease the displayed value.

If the crane operator wants to continue with the displayed value, he has to confirm by pushing the button ENTER (8).

Push Button ENTER (8) for next step.

Step 8

MAX. LIMIT: 85.7
MIN. LIMIT: 10.0

For verification of the previously set values the Maximum and Minimum Boom Height Preset is displayed.

Push Button DOWN (6) for next step.

Step 9

115320 lbs 45:7
48.7 70.2 10.5

The Setting Procedure for the Boom Height Presets is completed. The display shows the actual crane data. To remind the crane operator of the activated Boom Height Preset the display of the actual boom height shows a intermittent colon.

Step 3

ANGLE LIMIT?
PUSH ↓ OR ENTER

To select the Deactivation of Limits Procedure push the button DOWN (6).

Push Button DOWN (6) for next step.

Step 4

RADIUS LIMIT?
PUSH ↓ OR ENTER

To select the Deactivation of Limits Procedure push the button DOWN (6).

Push Button DOWN (6) for next step.

Step 5

HEIGHT LIMIT?
PUSH ↓ OR ENTER

To select the Deactivation of Limits Procedure push the button DOWN (6).

Push Button DOWN (6) for next step.

Step 6

LOAD LIMIT?
PUSH ↓ OR ENTER

To select the Deactivation of Limits Procedure push the button DOWN (6).

Push Button DOWN (6) for next step.

Step 7

**CANCEL LIMITS?
PUSH ↓ OR ENTER**

All Limit Presets can be canceled by pushing the button ENTER (8). In this case the system sets all limits on their default values. The Load Limit and Maximum and Minimum Angle Limit are activ. All other Limits are deactivated.

The default value of the load limit is 200.000 lbs. The default value of the Maximum Angle Limit is 80°, of the Minimum Angle is 10°. The default values of all other Limits are 200 ft for the Maximum Limit and 10 ft for the Minimum Limit.

Push Button ENTER (8) for next step.

Step 11 will be skipped, when the Button DOWN (6) is pressed. The system returns to Step 2 for verification or correction of Limit Presets

Step 8

**115320 lbs 45.7
48.7 70:2 10.5**

The Deactivation and Cancellation Procedure for the Limits is completed. The display shows the actual crane data.

5 PRE-OPERATION INSPECTION

Prior to operating the crane, the following checks must be made:

1. Check the cabling connecting the various parts of the system for physical damage.
2. Check the anti-two block switches and weights for free movement.
3. Check the spring-loaded cable reel to be sure it is free to rotate, has tension and the cable is reeled properly.

WARNING

The following tests shall be performed with care to prevent damage to the machine or injury to personnel. Proper functioning of the system requires successful completion of these tests.

If the operator cannot clearly see the hookblock approaching the boom head, he shall have an assistant watch the hookblock. The operator shall be prepared to stop the machine immediately should the LMI system not function properly by lighting the red warning light, sounding the audible alarm and locking the dangerous crane movements.

1. Check the anti-two block alarm light (6) and the audible alarm by manually lifting the weight attached to the anti-two block switches.
2. Slowly raise the main boom hookblock to bring it into contact with the switch weight. When the hookblock lifts the weight, the audible alarm should sound, the anti-two block alarm light (6) should light and the motion of the hookblock should be stopped. Lower the hookblock slightly to eliminate this condition.

3. Then slowly lower or extend the boom to create a potential two-block condition. When the hookblock lifts the weight, the audible alarm should sound, the anti-two block alarm light (6) should light and the boom lowering and/or boom extension function should be stopped.

NOTE: *If the light and audible alarm do not function as described and the crane movements are not stopped the system is not working properly. The malfunction shall be corrected before operating the crane.*

4. Check that the display of the main boom length agrees with the actual boom length.
5. Check that the display of the main boom angle agrees with the actual angles.
6. Check that the display of the operating radius of the crane agrees with the actual radius.

Operation

After being properly set, the operation of the LMI is fully automated. Therefore, the operator shall be thoroughly familiar with all controls of the LMI and he shall properly set each switch before operating the crane. All settings shall be checked by lifting a load of known weight and comparing the load to the information displayed on the load moment indicator.

Rated loads include the weight of slings and auxiliary lifting devices and their weights shall be subtracted from the listed ratings to obtain the net load to be lifted.

6 SERVICE AND MAINTENANCE

Maintenance of the load moment Indicator consists of inspecting:

1. The cabling connecting the various parts of the system: If a cable is damaged, it shall be replaced immediately.
2. The insulation of the length sensor cable and the cable guides: If the insulation is worn or the cable guides damaged, these parts shall be replaced.
3. Check the anti-two block limit switches for freedom of movement.
4. The cable reel shall be under tension to operate properly.
5. Check the pressure transducers at the hoist cylinders and the connecting hoses for oil leakage.

Other than correcting the problems identified in the Malfunctions Table and replacing faulty mechanical parts and cables, no other repairs shall be performed by non-expert personnel.