

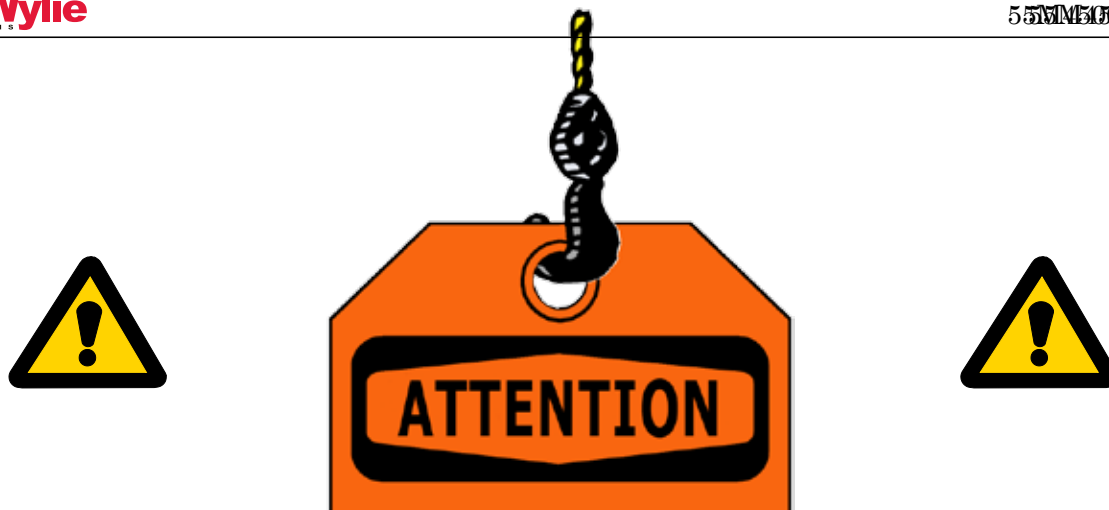


i4500 Crane information center

Rated Capacity Indicator System for
Telescopic Cranes
(America)

Instruction Manual

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The purpose of this manual is to provide the customer with the operating procedures essential for the promotion of proper machine operation for its intended use. The importance of proper usage cannot be overstressed. All information in this manual should be read and understood before any attempt is made to operate the machine.

Since the manufacturer has no direct control over machine application and operation, conformance with good safety practice in this area is the responsibility of the user and his operating personnel.

All procedures herein are based on the use of the system under proper operating conditions, with no deviations from the original design. Alteration and/or modification of the equipment are strictly forbidden without written approval from **RaycoWylie Systems**.

The **i4500 RaycoWylie Systems Crane Information Center** must be regarded only as an aid to the operator. When the parameters are set correctly, the indicator will warn the crane operator of an approaching overload condition that could cause damage to equipment, property, and/or injury to the operator or site workers in the vicinity of the crane and its load.

This system must **never** be used, under any circumstances, as a substitute for the good judgment of a crane operator when carrying out approved crane-operating procedures. Responsibility for the safe operation of the crane lies with the crane operator. The indicator equipment will not necessarily prevent crane damage due to overloading and related causes if not set properly.

Before operating a crane equipped with a **RaycoWylie** system RCI, the operator must carefully read the information in both this manual and the crane manufacturer operator's manual. He must also be aware of all the federal, state and local safety standard and regulations applicable to his job. Correct functioning of the system depends upon routine daily inspection.

Any suspected faults or apparent damage should be immediately reported to the responsible authority before using the crane.

Since safety of personnel and proper use of the machine is of primary concern, different symbols are used throughout this manual to emphasize certain areas.

The following definitions indicate the level of hazard when these symbols appear throughout this manual. Whenever one of these symbols appears in this manual, personnel safety is a concern. Please take time to read and understand these definitions!



DANGER: INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY.



CAUTION: INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, MAY RESULT IN MINOR OR MODERATE INJURY. IT MAY ALSO BE USED TO ALERT AGAINST UNSAFE PRACTICES.



IMPORTANT: INDICATES A SITUATION THAT MAY CAUSE MACHINE DAMAGE IF NOT CORRECTLY FOLLOWED.



NOTE: PROVIDES INFORMATION THAT MAY BE OF SPECIAL INTEREST.

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General Description of the System

1.1 Introduction

This manual contains **Operation, Troubleshooting and Maintenance** information for the i4500 system. When using the i4500 system, always observe the safety rules and regulations applicable in the country of operation to reduce the risk of personal injury or damage to the equipment. Each safety instruction throughout this manual must be taken into consideration when using the i4500 system. The information contained in this manual will enable qualified personnel to properly operate and efficiently perform maintenance.

1.2 Personnel qualification

The i4500 system shall be operated only by personnel without limitations in the physical abilities of the upper limbs and no visual or hearing impairment, who have completed all operator trainee qualification requirements and have read and fully understood the instructions in this manual. Operator requirements shall include: demonstrating the ability to read, write and comprehend and use arithmetic and read and understand the load / capacity charts in the language of the crane manufacturer's operating instruction materials. Maintenance of the system is intended only for fully qualified and trained personnel for this task.

1.3 Intended use

The i4500 system is intended to provide a valuable aid to the crane operator by indicating all relevant parameters typically shown on the duty chart of the crane. The i4500 system shall prevent the crane from supporting a load outside the limits of the permitted radii and outside the loads shown and described on the rated capacity chart or the permissible working load of the ropes when set and operated correctly.

1.4 Brief description of the i4500 System

The i4500 is a computerized crane monitoring system, designed as an operator aid. It comprises sensors fitted to the crane and a display located in the cabin of the crane. This version measures the boom cylinder pressure, the boom angle and length, and it indicates safe or critical conditions, while performing an authorized lift of loads. Optional sensors may also be fitted to monitor the slew angle and the rotation of the hoist drum to provide some extra information to the operator.

All the sensors are linked through a single CAN Bus (Controlled Area Network). The pressure sensors provide electrical signals that are proportional to the actual pressures in the hydraulic boom cylinder system of the crane. An inclinometer provides a signal that is proportional to the boom angle and a reeling drum provides a signal that is proportional to the boom extension. The radius and the load are calculated from these signals with the dimensional crane data preprogrammed in the i4500 system.

During operation the load lifted by the crane is calculated from the measured boom cylinder pressure and is automatically compared with corresponding data related to the maximum permissible crane loading.

The actual load is expressed as a percentage of the permitted load (% SWL). If this percentage exceeds a preset value, alarms and safety functions are activated. The values of the hook load, the permissible load, the main boom angle and the radius are displayed in a digital form on a graphic liquid crystal display (LCD).

If the additional sensors are fitted, then some information about the current slew angle and the hook height will also be available. The required crane duty charts are stored in a non-volatile memory and **can only be modified with the approval of the crane manufacturer**. The calculated crane parameters and calibration data are stored in an additional non-volatile memory. The calibration of the system is performed only with the use of known loads, boom angles, and other pre-determined data.

1.4.1 Audible alarms

An intermittent buzzer located in the i4500 system display warns the crane operator to take specific course of actions at the approach of the rated capacity. The threshold of the approach alarm has been fixed at 95% of the rated capacity. The buzzer will alert in a continuous way when the rated capacity is reached or exceeded ($\geq 100\%$). Personnel in the danger zone are warned by an external buzzer so that they can get out danger when the rated capacity limiter is activated or overridden.

(Continues on next page).

1.4.1 Audible Alarm



The crane operator will also be warned by the audible alarm when the operational limits or the range limiting function is activated and a selected limit is reached. See Table (1) for more details on audible signal operation..



When wearing ear protection safety devices or if using music earphones during crane operations, make sure that they will not impair your ability to hear the audible warning signals while operating the i4500 system.

1.4.2 Visual alarms

The display of the i4500 system has been equipped with a warning light of 3 different color to warn the operator and signal for a specific course of action.

A yellow light will blink along with the audible alarm at the threshold point of the approach alarm (at 95%) of the rated capacity.

A red light will illuminate when the rated capacity has been reached or exceeded.



External visual alarms are also provided with the external audible alarm to warn the personnel in the danger zone so that they can be aware of the danger when the rated capacity limiter is activated or overridden. Note that depending on system configuration, your system may be equipped with one or with three external lights. See tables 1 and 2 for external visual alarm operation.

System i4500 with 3 External Warning lights


Event	Internal alarms					External alarms			
						Green Light	Amber Light	Red Light	External Buzzer
No event	Off	Off	Off	Off		On	Off	Off	Off
Approach to SWL (Alarm 1)	Blinking	Off	Off	Intermittent		Off	On	Off	Off
Overload (Alarm 2)	On	On	Off	Continuous		Off	Off	On	On
Motion Cut (Alarm 3)	On	On	On	Continuous		Off	Off	On	On
Duty not calibrated	On	On	On	Continuous		Off	Off	On	On
Bypass Overload	On	On	Off	Continuous		Off	On	On	On
Bypass ATB	Off	Off	Off	Off		Off	On	On	On
Bridging Switch Activated	Off	Off	Off	Off		Off	On	Off	Off
A2B (Normal Mode)	Off	Off	On	Continuous		Off	Off	On	On
A2B (Calibration mode)	X	X	X	Continuous		Off	On	On	On
A2B (Rigging Mode)	Off	Off	Off	Off		Off	On	On	On
Calibration mode	X	X	X	Off		Off	On	Off	Off
Approach (Range Limiting)	Off	Off	Off	Intermittent		Off	On	Off	Off
Limit reached (Range limiting)	Off	Off	Off	Continuous		Off	Off	On	On
Rigging Mode	Off	Off	Off	Off		Off	On	Off	Off

Table 1

System i4500 with 1 warning external light





















Event	Internal Alarms					External Alarms	
						Red Light	External Buzzer
No event	Off	Off	Off	Off		Off	Off
Approach to SWL (Alarm 1)	Blinking	Off	Off	Intermittent		Off	Off
Overload (Alarm 2)	On	On	Off	Continuous		On	On
Motion Cut (Alarm 3)	On	On	On	Continuous		On	On
Duty Not calibrated	On	On	On	Continuous		On	On
Bypass Overload	On	On	Off	Continuous		On	On
Bypass A2B	Off	Off	Off	Off		On	On
Bridging Switch	Off	Off	Off	Off		Off	Off
A2B Normal Mode	Off	Off	On	Continuous		On	On
A2B Calibration Mode	X	X	X	Continuous		On	On
A2B Rigging Mode	Off	Off	Off	Off		On	On
Calibration Mode	X	X	X	Off		Off	Off
Approach (Range Limiting)	Off	Off	Off	Intermittent		Off	Off
Limit reached (Range Limiting)	Off	Off	Off	Continuous		On	On
Rigging Mode	Off	Off	Off	Off		Off	Off

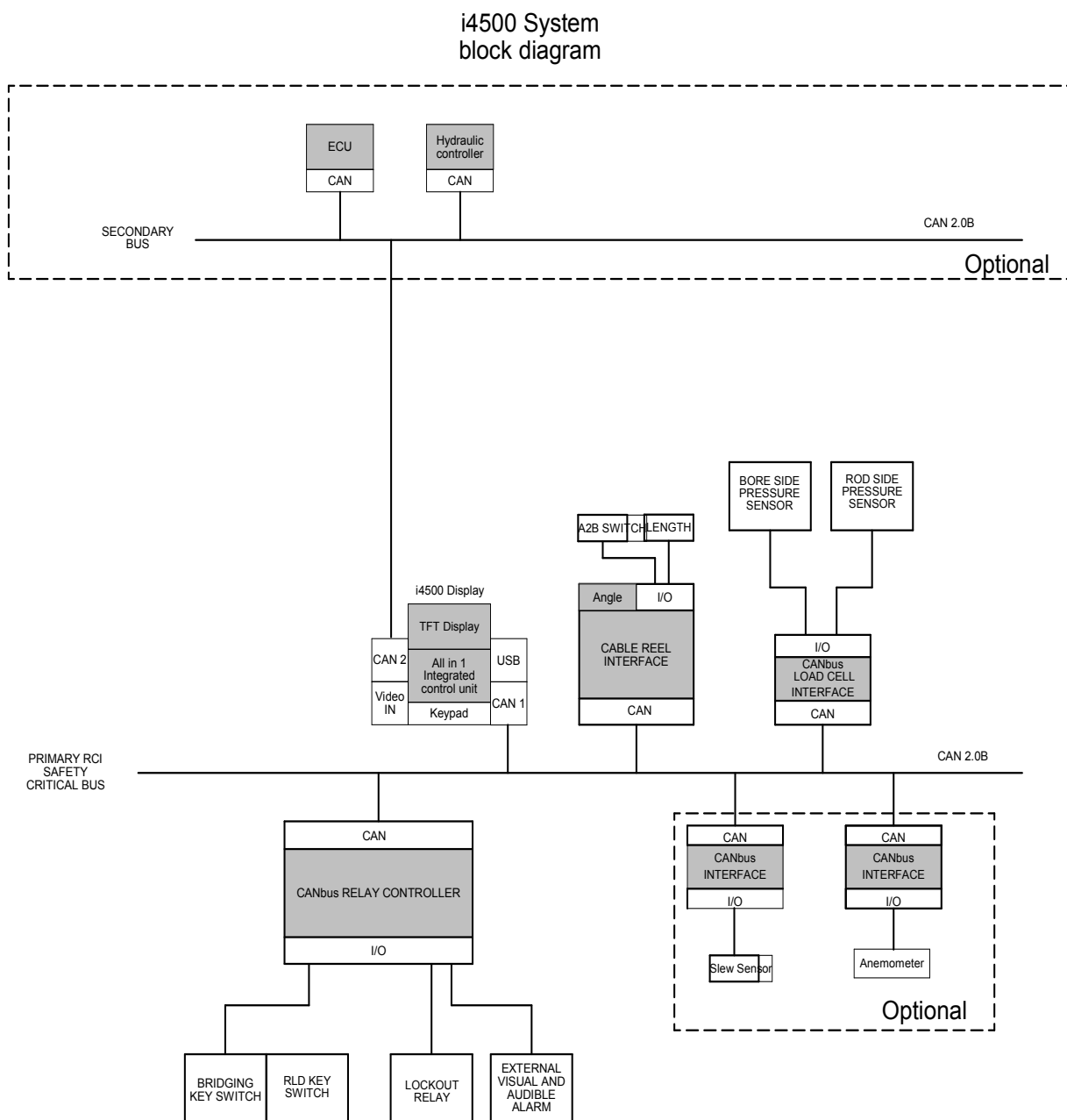
Table 2

1.5 Typical component location and description



- 1) **i4500 display box:** It is also the central processing unit (CPU) of the i4500 system. Its principal feature is a CAN Bus communication interface and graphical LCD screen.
- 2) **Central I/O interface:** This relay interface module is connected to individual external I/O devices to be controlled or monitored by the i4500 system.
- 3) **Load sensors:** The load sensor is used to calculate the load on hook. There is 2 types of the load sensor, pressure sensor connecting on the lifting cylinder or dynamometer installed on the lifting cable.
- 4) **Cable reel with angle and length sensor:** A solid state angle sensor is used to monitor the angle of the boom. A potentiometer is used to monitor the boom length.
- 5) **Anti-two block:** the anti-two block switch is normally closed (with weight hanging) spring-loaded switch (option).
- 6) **Wind speed sensor:** Shows wind speed value on the display (option).

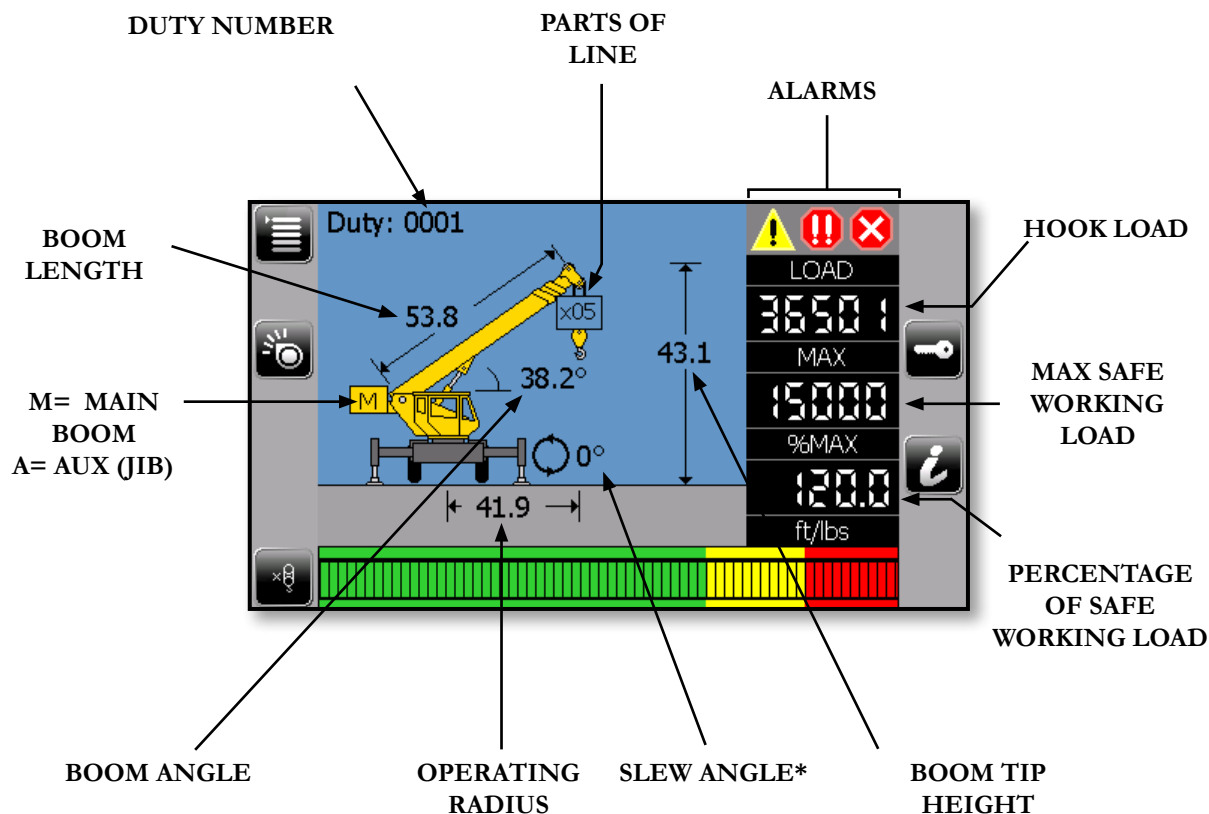
1.6 Block Diagram of the i4500 communication link network



1.7 Technical Data

Accuracy:	In accordance with SAE J159 or EN13000: 2010
Operating temperature:	-20 °C to + 70 °C
Supply voltage:	9 to 32 VDC (maximum rating)
Display size:	Available in: 4.3" LCD Screen 7.0" LCD Screen 10.4" LCD Screen
Display sealing:	IP67
Memory capacity:	10,000 load/radius curves

CAN Bus sensors / interface:	Default quantity	Maximal quantity
- Load or pressure sensor	2	6
- Angle, Length sensor	1	5
- Relay output	5	32
- Digital input	4	16
- Provision for other sensors		
Peripheral communication port	RS-232	

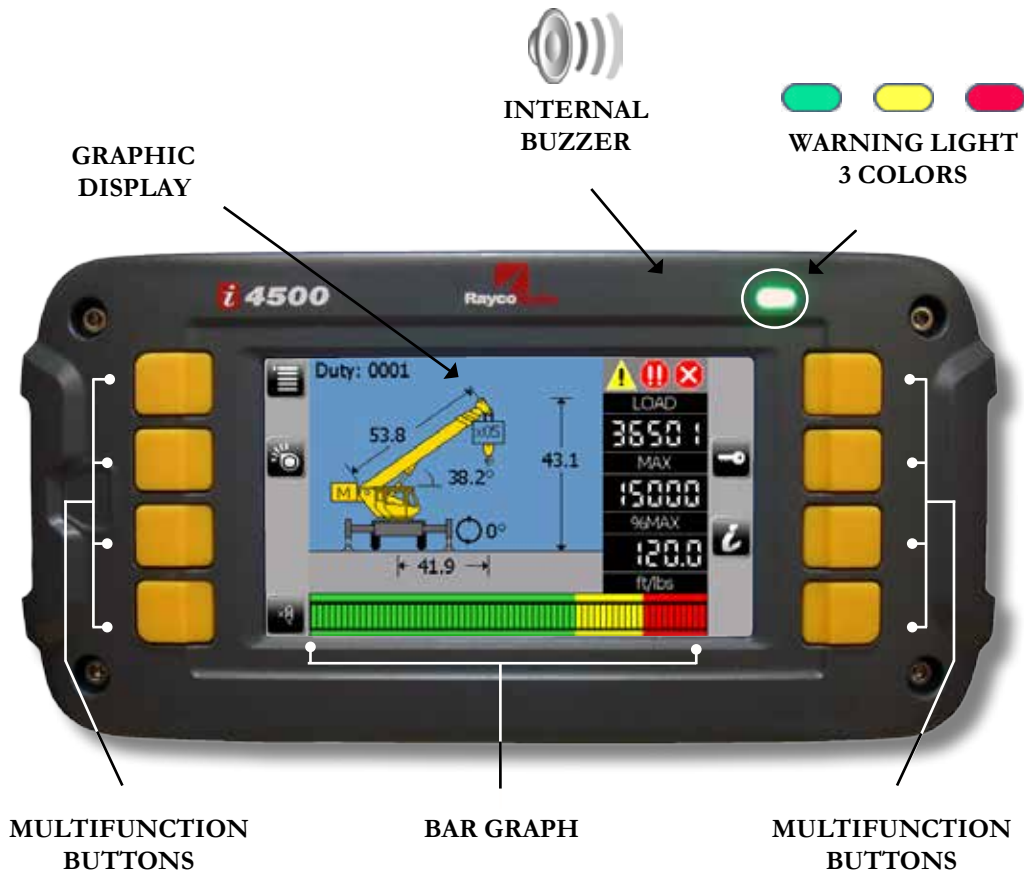
-2-Detailed description of the display unit**2.1 Main Display (default screen)**

The display should be used only as a guide, **NOT** as an indication that the crane would or would not pass under a structure of an accurately known height.



* The slew angle indicator (middle of the screen) is only present when the range limiting option is installed in the machine.

2.2 Display Box Overview



FUNCTION DESCRIPTION

MULTIFUNCTION BUTTONS

Each of these buttons allows you to select and/or execute the indicated function displayed on the screen in any given window. In this way, the task performed by a given multifunction button will vary depending on the menu or window.

GRAPHIC DISPLAY

This menu driven communication interface allows access to the various menus and options to control the i4500 unit system.

WARNING LIGHT

When operating within normal conditions the green LED warning light turns on. The yellow warning light turns on to indicate that a set operating limit is being approached. The red warning light turns on to warn the operator that an abnormal condition has occurred.

2.3 Operating Buttons Description



MODE BUTTON

Enables you to select the mode of operation. Select this button to choose one of these main operating modes:

- Limit Mode
- Diagnostic Mode
- Configuration Mode
- Calibration Mode (password protected)
- Info Mode
- Error Mode
- Night Mode



DUTY BUTTON

Choose this button to view the menu for the selection of the duty by crane configuration. Select this button to enable the selection of crane parameters such as the boom length, the head type and the counterweight, (if available).



UP BUTTON

Select this button to scroll up through menu options or to increase adjustable values.



DOWN BUTTON

Select this button to scroll down through menu options or to decrease adjustable values.



ESCAPE BUTTON

Select **Escape** button on display to exit a menu or any programming window without saving any changes and to go back to the previous screen.

Select repeatedly to return to the main screen.

2.3 Operating Buttons Description (cont'd)



BYPASS/ RIGGING BUTTON

Select this button to enable the Rigging Mode option.
(See sections 4.4.7 & 4.4.7.1 for complete details)



CLOSE WINDOW BUTTON

Select the close window button to close a menu window and go back to the main screen.



PARTS OF LINE BUTTON

Select this button to quickly access the parts of line (falls) menu for the selection of the number of parts currently in use.



SELECT BUTTON

Select this button to choose a highlighted item in any given menu and to accept new values into the system.



ESCAPE BUTTON

It allows you to exit any programming window menu without saving any changes and go back to the previous screen.



INFO BUTTON

Select this button to access all the information regarding the current crane configuration. Press it to access the operating system's information.



QUICK DUTY CHANGE BUTTON

Use the **Quick Duty Change Button** to alternatively select whether lifting the load with the main boom or the auxiliary jib.

2.4 Main Modes

LIMIT MODE WITH ROTATION*

Range Limiting		
	Limit high	Off
	Free zone	Off
	Variable limit height	Off
	Variable limit radius	Off

*optional

LIMIT MODE WITHOUT ROTATION

Limit Setting			
	Max. Angle	40.0	On
	Min. Angle	5.1	On
	Max. Length	32.8	On
	Max. Height	65.6	On
	Max. Radius	98.4	On
Value in degrees			

OR

MAIN MODE

Limit Mode	●
Config Mode	●
Info Mode	●
Error Mode	●
Diagnostic Mode	●
Calibration Mode	●
Night Mode	●

Units
Set tare
Language
Date and time
Backlight

CONFIGURATION MODE

Info	
Duty:	0001
Boom mode:	Standard
Attachment:	None
Outriggers:	Outriggers extended to min.
Counterweight:	No Counterweight
Deduct erected:	None
Deduct stowed:	Jib
Slew:	Outriggers extended to minimum
Rotation:	360°

INFO MODE

Errors	
Lost communication with Angle 1	
Lost communication with Angle 2	
Lost communication with Length 1	
Lost communication with Load 1	
Lost communication with Load 2	
Lost communication with Relay board 1	

ERROR MODE

Diagnostic		
ATB	OFF	Connected
Angle 1	45.00	Connected
Angle 2	50.20	Connected
Extension 1	11.58	Connected
Load 1	761.23	Connected
Load 2	579.93	Connected
Relay Board 1	---	Connected
Detected Address	---	N/A

DIAGNOSTIC MODE

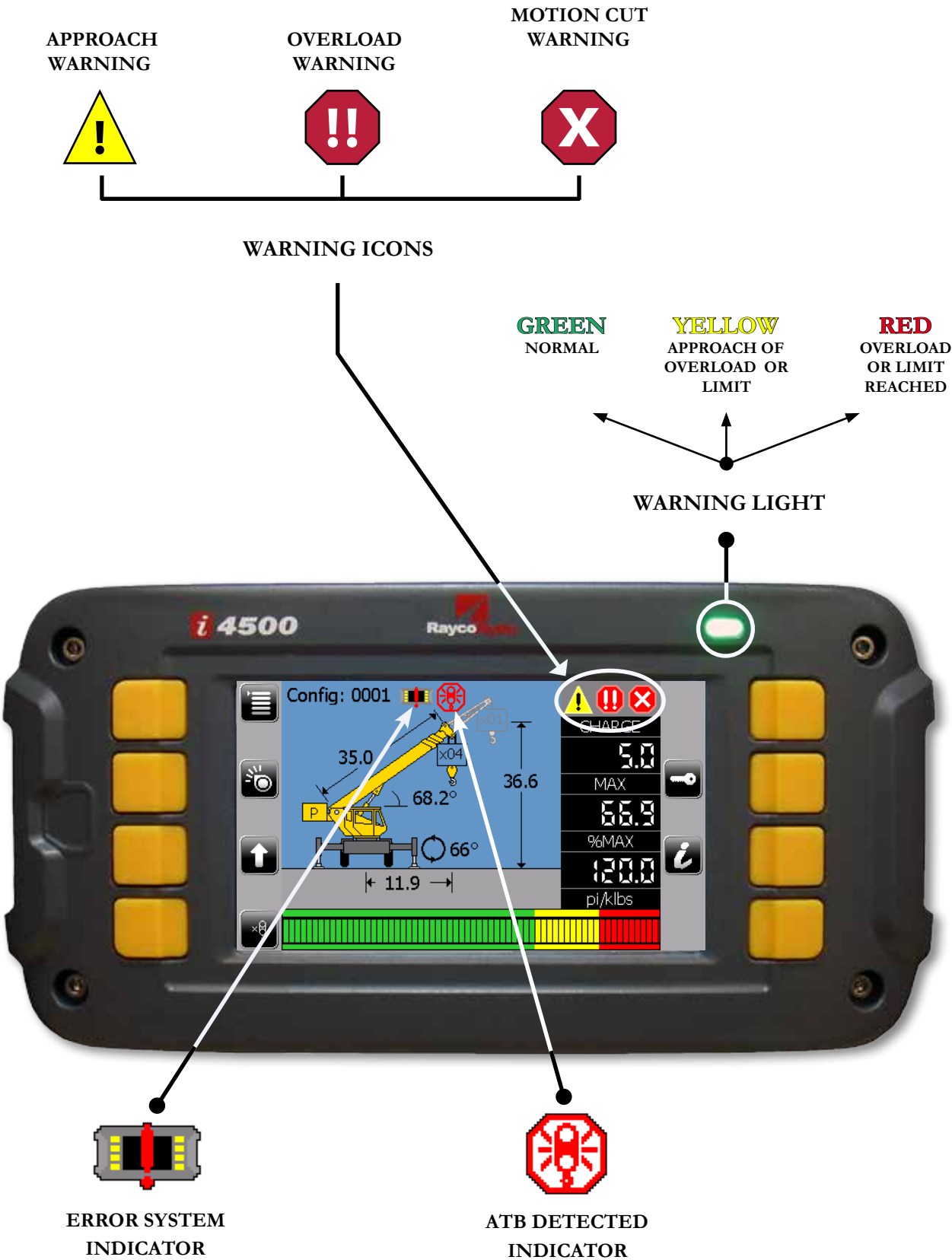
Mode Calibration	
Select sensors	
Zero sensor	
Span sensor or Side of boom angle	
Select pressure transducer	
Zero pressure	
Span pressure	
Block capacities and Block weights	
No load calibration	
Loaded boom deflection	

CALIBRATION MODE

Limit Mode
Config Mode
Info Mode
Error Mode
Diagnostic Mode
Calibration Mode
Night Mode

NIGHT MODE

2.5 Warning Lights and Indicators Location



2.6 Warning Icons



The approach warning icon (yellow in color) lights up when the load on the hook is between 90% and 99.9% of the rated capacity (adjustable value; EN13000:2010: 90% and 97.5%). This is accompanied by an audible warning device that is fitted inside the display unit. This icon will also turn on if you are approaching of a predetermined limit set in the limits setting mode.



Operate with caution !
The crane is working near its
maximum operating capacity.



The overload warning icon (red in color) illuminates at or above 100% (adjustable value) of the rated capacity. This icon will also turn on if you are reaching a predetermined limit set in the limits setting menu.



The crane's maximum capacity has
been reached or exceeded.



The motion cut warning icon (red in color) illuminates at or above 100.1% (adjustable value) of the rated capacity. This is usually associated with, for example, booming down, telescoping out or hoisting up. The exact operation is specific to the crane model.



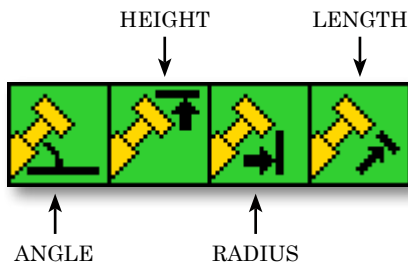
The crane has exceeded safe
operational ratings and is now in an
unsafe condition. Hoist up, telescope
out and boom down functions will be
stopped if a motion cut solenoid is
connected to the system.



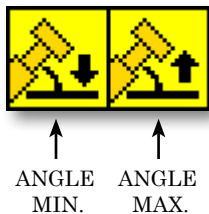
The Rope Limit indicator appears on the i4500 lcd screen to indicate that the maximum load is limited by the rated strength and the number of parts of line of the hoist rope. Increasing the number of falls (parts of line) reeved and set in the display is normally required to reduce a rope limit.



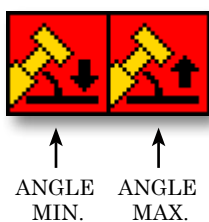
The Two-Block condition indicator appears on the i4500 lcd display when such a condition is detected by the system. This may block the hoist function, depending on crane model and/or on the options fitted on the machine.



One of these indicators appears on the top-left corner of the i4500 lcd screen, when at least one preset limit is active on the system. This is not a warning! It is just there to remind you that an angle, radius or height limit has been set in the limits setting mode.



One of these indicators appear on the screen when a preset **Maximum or Minimum Angle Limit** is about to be reached. The approach warning icon will blink and the internal buzzer will turn sound on and off.



One of these indicators appear on the screen when a preset **Maximum or Minimum Angle Limit** has been reached. If you have reached a predetermined maximum or minimum angle limit, the overload warning icon will be activated and the buzzer will sound continuously.



This indicator appears on the screen when a preset **Maximum Height Limit** is about to be reached. If you are approaching a predetermined maximum height limit, this indicator will appear on the screen, the approach warning icon will blink and the internal buzzer will sound on and off.



This indicator appears on the screen when a preset **Maximum Height Limit** has been reached. If you have reached a predetermined maximum height limit, the overload warning icon will light up and the buzzer will sound continuously.



This indicator appears on the screen when a preset **Maximum Radius Limit** is about to be reached. If you are approaching a predetermined maximum radius limit, this indicator will appear on the screen, the approach warning icon will blink and the internal buzzer will turn sound on and off.



This indicator appears on the screen when a preset **Maximum Radius Limit** has been reached. If you have reached a predetermined maximum radius limit, the overload warning icon will light up and the buzzer will sound continuously.



This indicator appears on the screen when a preset **Maximum Boom Length Limit** is about to be reached. If you are approaching a predetermined maximum boom length limit, this indicator will appear on the screen, the approach warning icon will blink and the internal buzzer will turn sound on and off.



This indicator appears on the screen when a preset **Maximum Boom Length Limit** has been reached. If you have reached a predetermined maximum boom length limit, the overload warning icon will light up and the buzzer will sound continuously.



The zones where the system will warn the operator that a Preset Limit is being approached can be changed as required. These value are defined during the test performed by the technician during the calibration of the system.

In some systems, Limits values are not active when electric power is first applied to the i4500 and they are automatically disabled if electric power is removed.

Reaching an operator's Preset Limit (set in the Limits Setting Mode) will not result in crane motion cut-off.

-3-

Installation & Calibration

Installation of the i4500 system shall be performed by a qualified technician. Furthermore, calibration of the i4500 system **must be** performed by a **RaycoWylie** certified technician. The **RaycoWylie** technician will perform a complete and structured verification of the whole system before beginning the system's calibration.



Failure to calibrate the system properly can result in overloading of the crane risking machine breakage or tipping that could result in serious injury or death. Always refer to a **RaycoWylie** certified technician to calibrate your system.



*Installation and calibration manuals are available at **RaycoWylie** upon request. Please note that the installation and calibration instructions have intentionally not been included in this instruction manual.*

-4-

Operating Instructions

4.1 Safety Instructions:

When operating the i4500 system, always observe the safety rules and regulations applicable in the country of operation to reduce the risk of personal injury or damage to the equipment. Read the following safety instructions before attempting to operate this system.

1. The i4500 **Rated Capacity Indicator** must be properly set-up according to the crane's configuration and operating work site situation. Wrong Set-up can cause the i4500 indicator system to show unreliable information which may result in hazardous conditions arising such as an overload.
2. The i4500 system is purely an aid to the operator. Responsibility for the safe operation of the crane lies with the crane operator. The i4500 system will not necessarily prevent crane damage due to overloading and/or other related causes.

4.1 Safety Instructions (cont'd)

3. Proper functioning of the equipment is dependent upon proper daily inspections and compliance to the operating instructions described in this manual.
4. During normal operation, the rated capacity of a crane should not be exceeded. Therefore the overload indication should not be used as a normal operating feature.
5. The crane should be operated at all times in such a way that the crane's motion occurs smoothly and at a safe speed.
6. In order to have the proper rated capacity and radius, the system must be configured properly. Failure to properly configure the system can result in machine breakage or tipping which could lead to serious injury or death.
7. The operator must verify the crane configurations and number of parts of line for each available hoist every time he/she enters the crane and every time the crane is rigged.

Note: each hoist has its own configuration set-up kept in memory and simply by changing the hoist from main to auxiliary the configuration and number of parts of line will change to suit.



Improper configuration of the i4500 system may also cause a "Zero Capacity" if no chart is found to match the configuration set by the operator.

4.2 Residual Risks

In spite of the application of all relevant safety regulations and the implementation of safety devices, certain residual risks cannot be avoided:

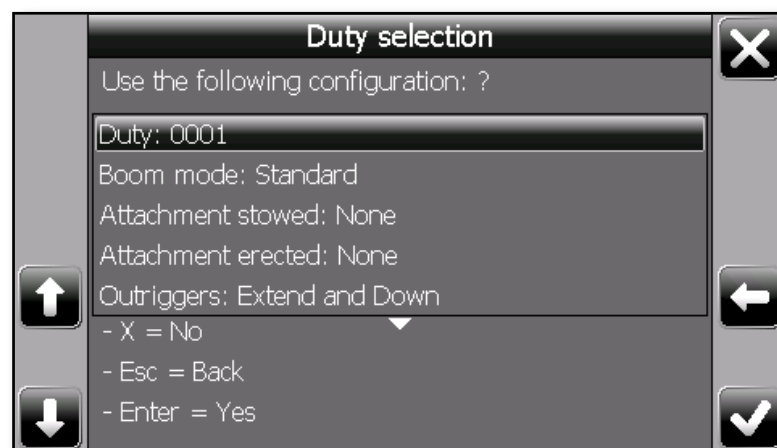
- Risks caused by no indication of malfunction of the output relays avoiding cut off motion to operate in overload conditions, causing machine breakage or tipping that could result in injury or death.

4.2 Residual Risks (Cont'd)

- The system gives no indication of the presence of power lines in the crane working area, causing the risk of operating the crane in the proximity of power lines that could result in injury or death.
- The system gives no indication whether the outriggers have been fully extended, causing the risk of machine breakage or tipping that could result in injury or death.
- The system gives no indication of the crane level, causing risk of machine breakage or tipping that could result in injury or death.
- System gives no indication of poor ground stability causing risk of machine breakage or tipping that could result in injury or death.

4.3 Power On

When the system i4500 is switch on, it performs a self-test during which time it checks the communication on the CAN Bus network as well as all sensors installed, then its load in its working memory all information stored in its ROM. During this stage, the logo RaycoWylie is displayed on the screen. When the test is finished and the working memory is loaded, the warning light turns red and the crane controls are disabled if an electric or hydraulic lock is installed. The system then presents to the operator the i4500 configuration screen.



The crane operator must confirm that the proposed configuration of the system is that it wishes to use or he can choose another from the other configurations available. When its choice is done, the operator must press the confirmation button and the i4500 system switches in its normal mode.

4.4 System Configuration

4.4.1 Duty Selection



Carefully read and understand these instructions before selecting a duty number. Selecting the wrong duty number can result in overloading of the crane risking machine breakage or tipping that could result in serious injury or death. Never select a duty number if you have any doubts, instead seek the advice of a qualified technician. Make sure that the duty number displayed in the normal mode screen matches the current configuration of the machine.



Use the **Duty button** to select all the crane configuration details (such as boom, jib, counterweight, outrigger, crawler, tires, hoist) relative to a particular duty. Thereafter, this duty is associated to a corresponding duty number by the system.

In case of need of assistance, contact **RaycoWylie** with the technical file number of your system for technical advice.

The current duty number associated by the i4500 system is displayed in the upper left corner of the normal display and additional configuration information can be seen by pressing the **Info** button (see fig.1)

Change is not permitted with a load suspended

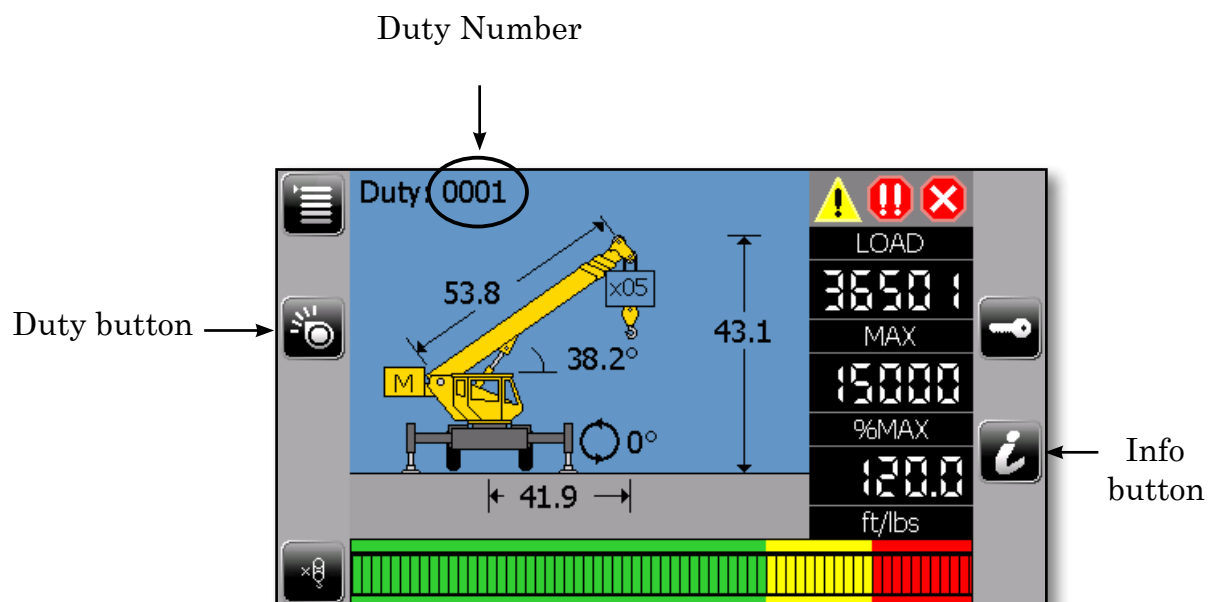


Fig. 1

4.4.1 Duty Selection (cont'd)

We need to provide the i4500 system with the proper variables information in the form of a series of questions in order to choose the proper duty that matches your crane configuration.

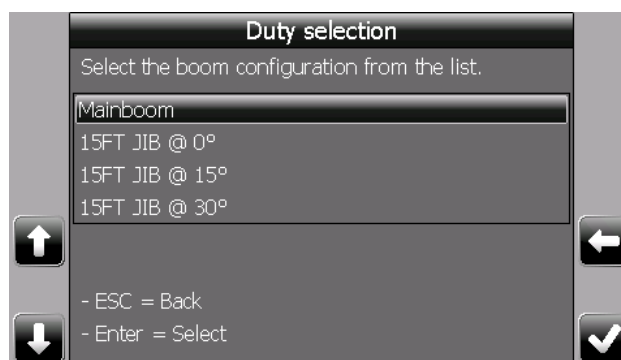


1. Select the **Duty button**.



2. Answer each question by selecting the right parameter information and press the **Select (Enter) button** to accept new values into the system and go to the next question.

4.4.2 Working with Main Boom only (1 or 2 Hoists)



1. Select the **Duty button**.



or



2. Use the **Up** or **Down buttons** to select the **Boom** configuration from the menu list. Select «Main Boom».

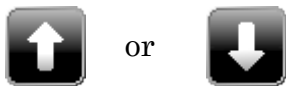
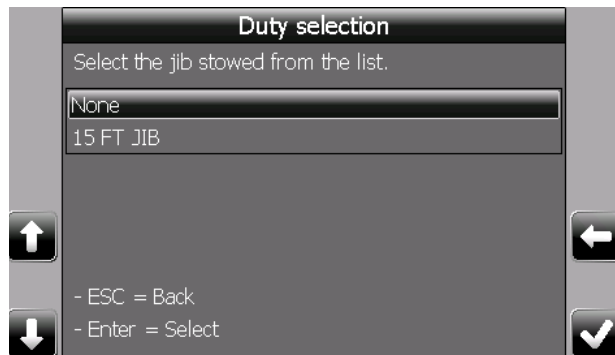


or

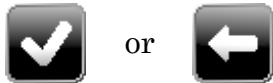


3. Choose the **Select button** to accept new value into the system or press the **Escape button** to return to the main operating screen.

4.4.2 Working with Main Boom only (cont'd)



or

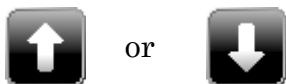
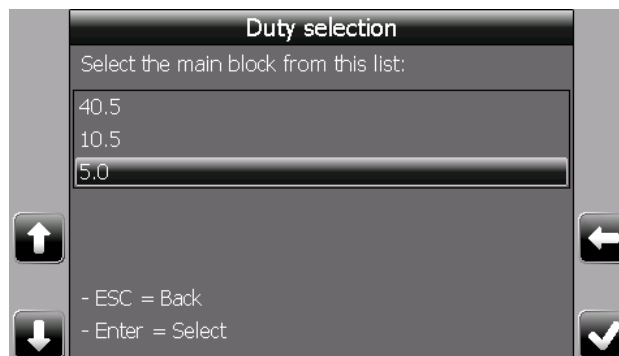


or

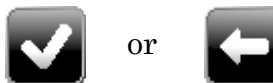
1. Use the **Up** or **Down** buttons to select the proper jib stowed configuration from the menu list if there is one. Otherwise, Select the «None» option.
2. Press the **Select button** to accept new value into the system or press the **Escape button** to return to the previous screen.



If you have a version with load sensor installed on the hoist line, this screen will not be displayed.



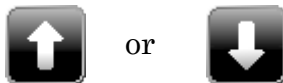
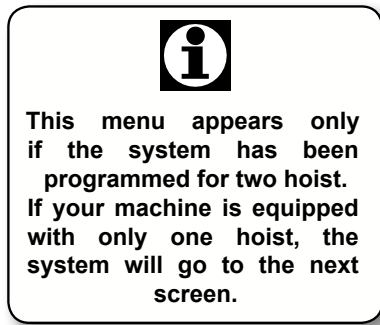
or



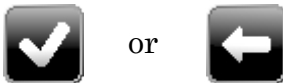
or

1. Select now the weight of the main block. Use the **Up** or **Down** buttons to select the correct value from the menu list.
2. Choose the **Select** button to accept new value into the system and go to the next parameter or press the **Escape** button to return to the previous screen.

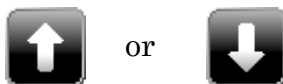
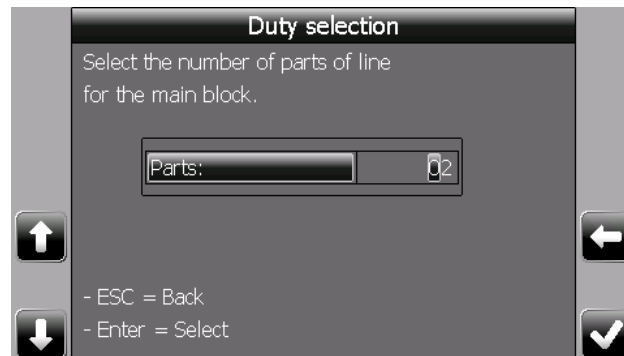
4.4.2 Working with Main Boom only (cont'd)



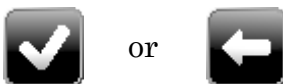
1. Use the **Up** or **Down** buttons to Select the main hoist from the menu list, typically **H1**.



2. Choose the **Select** button to accept new value into the system or press the **Escape** button to return to the previous screen.

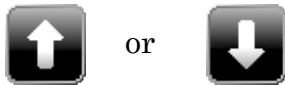
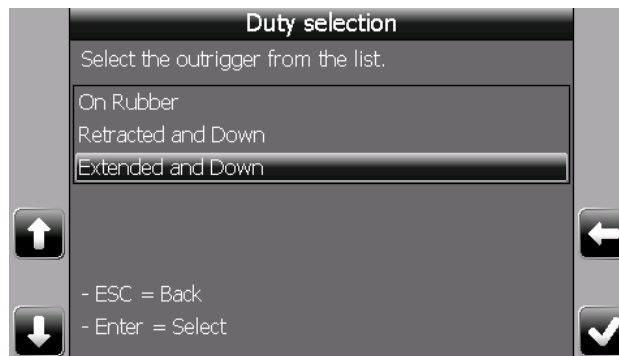
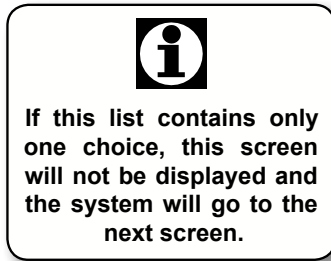


1. Select now the parts of line for the main block. Use the **Up** or **Down** buttons to select the correct value from the menu list.

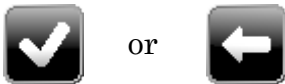


2. Choose the **Select** button to highlight the first digit value. Use the **Up** or **Down** buttons to select the first digit then, press the **Select** button to highlight the second digit. Use the **Up** or **Down** buttons to select the correct value. Press the **Select** button to accept the new value or press the **Escape** button to return to the previous screen.

4.4.2 Working with Main Boom only (cont'd)



1. Use the **Up** or **Down** buttons to select the correct **outrigger configuration** from the list.



2. Choose the **Select button** to accept new value into the system and go to the main operating screen or press the **Escape button** to go back the previous screen.

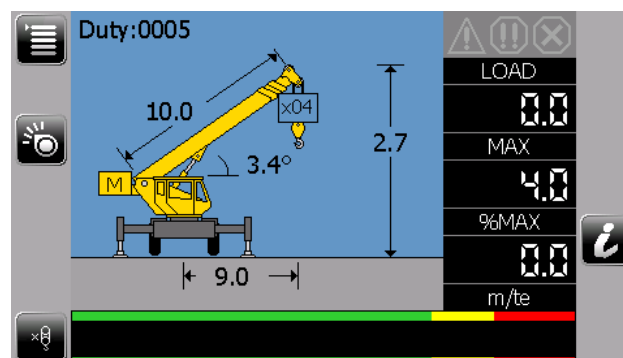
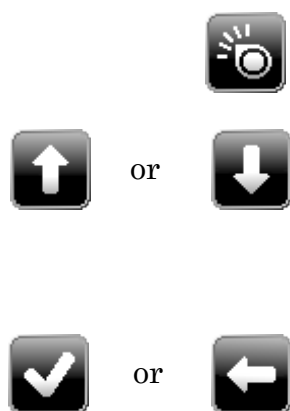
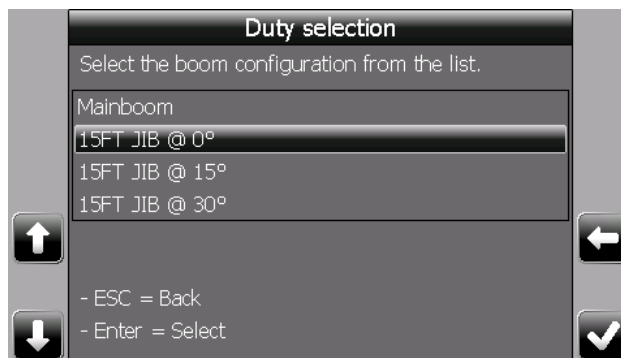
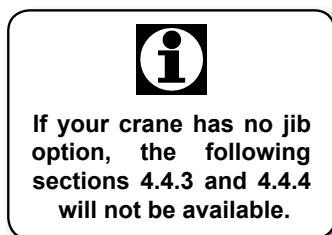
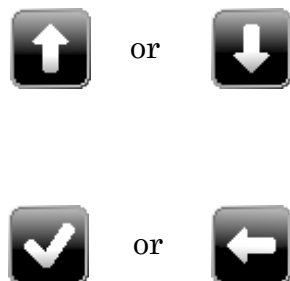
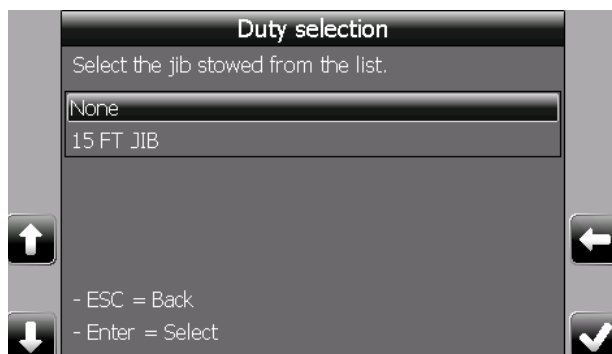
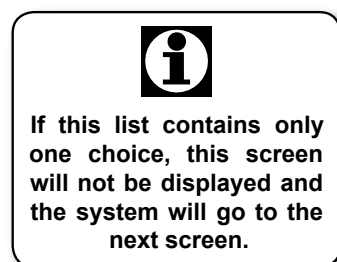


Fig 2a

4.4.3 Working with Jib only (1 Hoist)

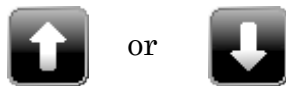
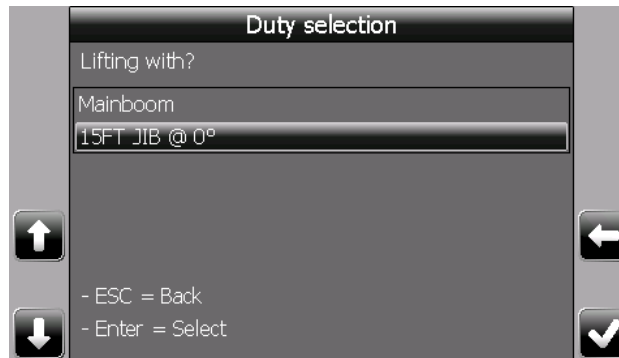


1. Select the **Duty** button.
2. Select the appropriate jib configuration used with the Main Boom. Use the **Up** or **Down** buttons to select the appropriate choice from the menu list.
3. Choose the **Select** button to accept new value into the system and go to the next parameter or press the **Escape** button to return to the main operating screen.

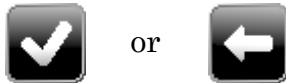


1. Indicate if there is a jib stowed.
Use the **Up** or **Down** buttons to select the appropriate choice from the menu list.
2. Use the **Select** button to accept new value into the system and go to the next parameter or press the **Escape** button to return to the previous operating screen.

4.4.3 Working with Jib only (cont'd)

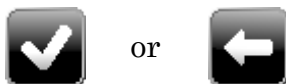
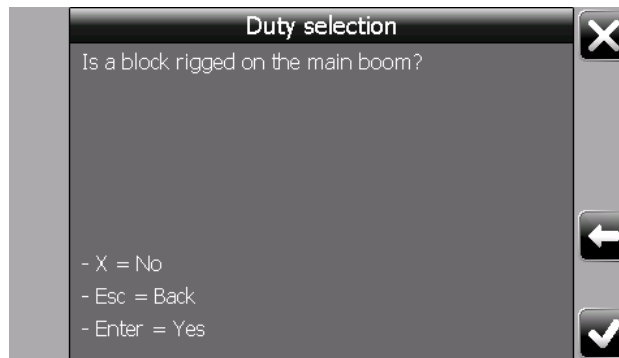
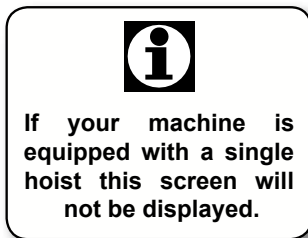


or



or

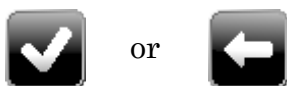
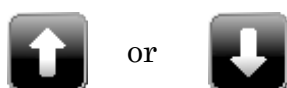
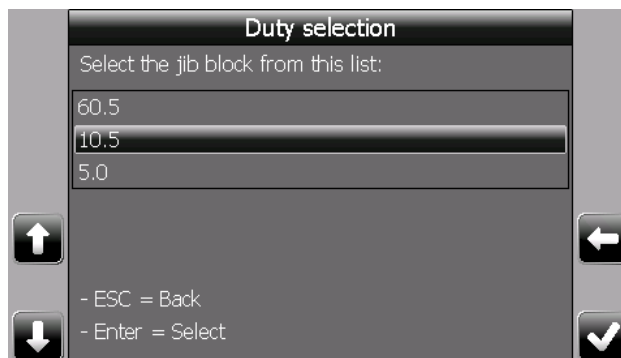
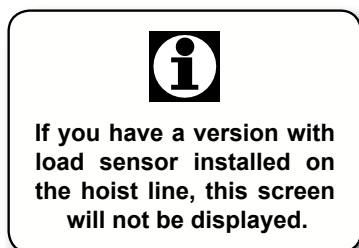
1. Indicate which jib configuration will be used for lifting the load.
Use the **Up** or **Down** buttons to select the appropriate choice from the menu list.
2. Choose the **Select** button to accept new value into the system and go to the next parameter or press the **Escape** button to return to the previous operating screen.



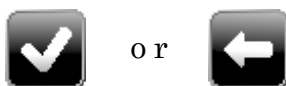
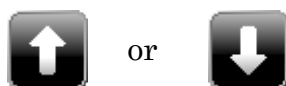
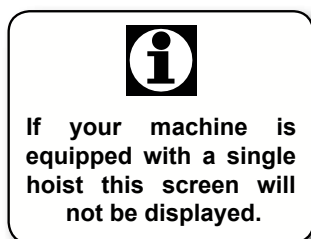
or

1. Press the (X) **button** to answer “NO” to the question: is a block rigged on the main boom?
2. Choose the **Select** button to accept new value into the system and go to the next parameter or press the **Escape** button to return to the previous operating screen.

4.4.3 Working with Jib only (cont'd)

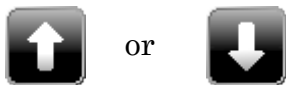
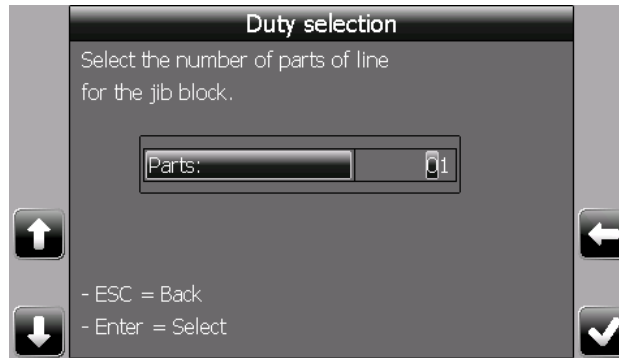


1. Select the weight of the jib block.
Use the **Up** or **Down** buttons to select the appropriate choice from the menu list.
2. Use the **Select** button to accept new value into the system and go to the next parameter or press the **Escape** button to return to the previous operating screen.



1. Choose now the auxiliary hoist.
Use the **Up** or **Down** buttons to select the appropriate choice from the menu list.
2. Press the **Select** button to accept the new value into the system or press the **Escape** button to return to the previous screen.

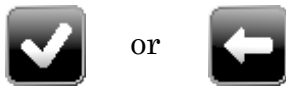
4.4.3 Working with Jib only (cont'd)



1. Select the number of parts of line for the jib block. Choose the **Select button** to highlight the first digit value.

Use the **Up** or **Down buttons** to select the first digit then, press the **Select button** to highlight the second digit.

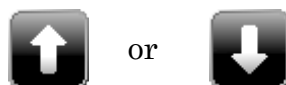
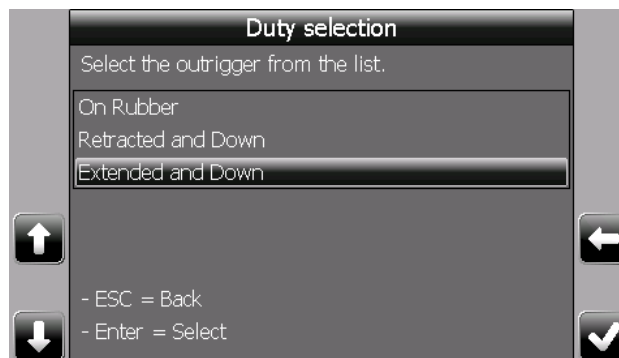
Use the **Up** or **Down buttons** to select the correct value.



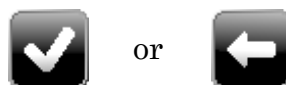
2. Choose the **Select button** to accept new value into the system or press the **Escape button** to return to the previous screen.



If this list contains only one choice, this screen will not be displayed and the system will go to the next screen.



1. Indicate the outrigger configuration. Use the **Up** or **Down buttons** to select the appropriate choice from the menu list.



2. Press now the **Select button** to accept the new value or press the **Escape button** to return to the previous operating screen.

4.4.3 Working with Jib only (cont'd)

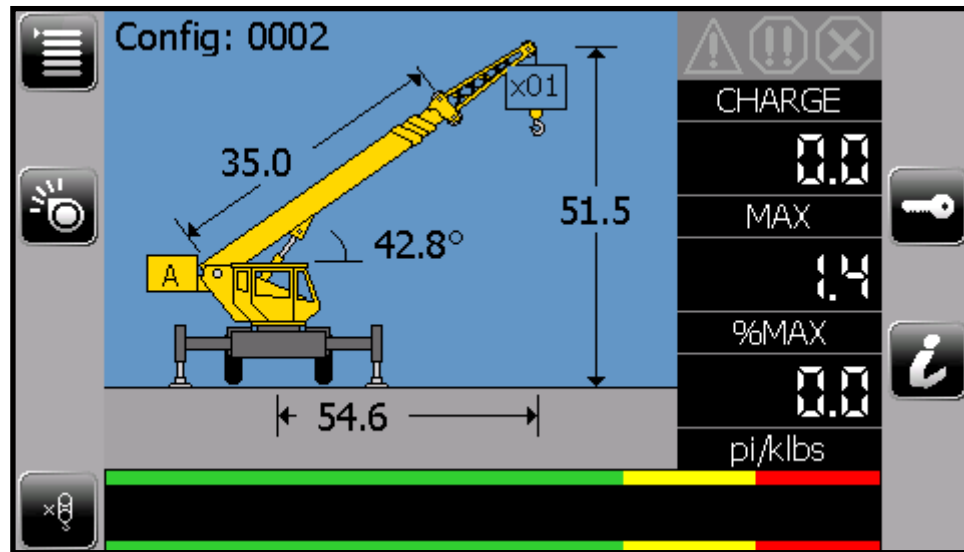
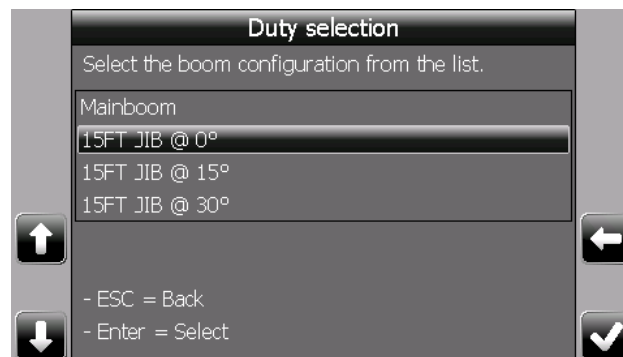


Fig 2b

4.4.4 Working with Main Boom or Jib (2 Hoists)

i
This configuration is possible only if your crane is equipped with two hoists.



1. Select the **Duty** button.



or



2. Select your jib configuration rigged on the main boom. Use the **Up** or **Down** buttons to select the appropriate choice from the menu list.

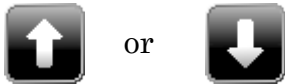
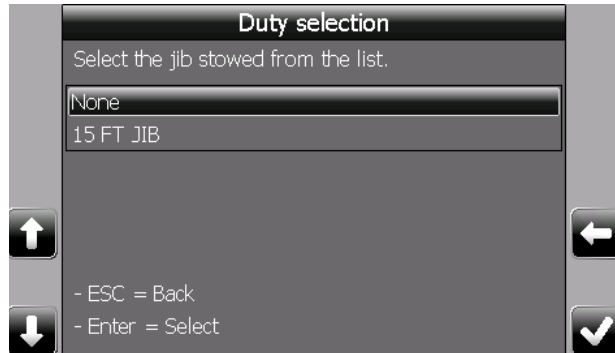


or

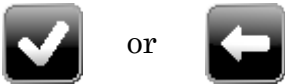


3. Use the **Select** button to accept new value into the system and go to the next parameter or press the **Escape** button to return to the previous operating screen.

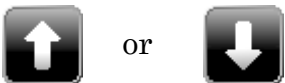
4.4.4 Working with Main Boom or Jib (cont'd)



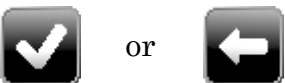
1. Indicate that there is no stowed jib.
Use the **Up** or **Down** buttons to select the appropriate choice from the menu list. Select «None»



2. **Select** button to accept the new value or press the **Escape** button to return to the previous operating screen.

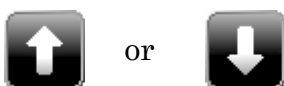
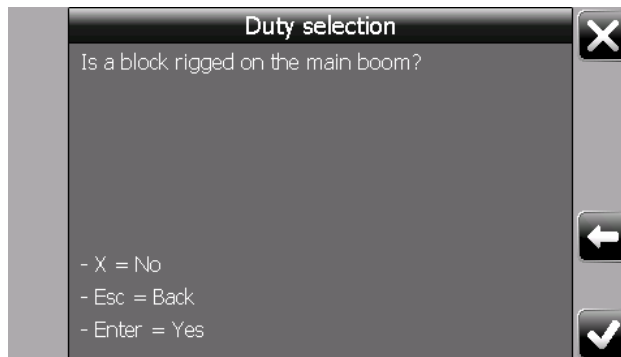


1. Indicate whether the load will be lifted using the Main boom or the jib. Use the **Up** or **Down** buttons to select the appropriate choice from the menu list.
Note that it will possible to alternate between the Main Boom and the Jib in the main screen.

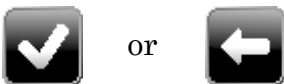


2. Choose the **Select** button to accept new value into the system and go to the next parameter or press the **Escape** button to return to the previous operating screen.

4.4.4 Working with Main Boom or Jib (cont'd)



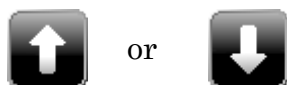
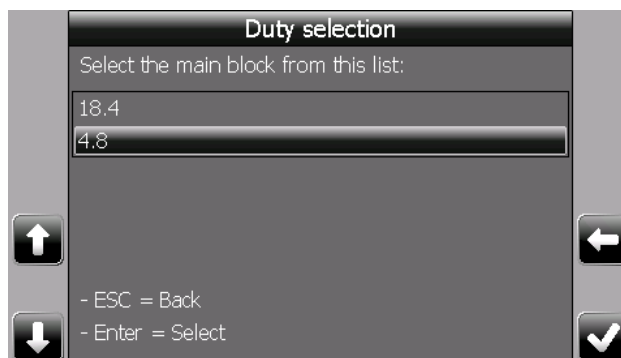
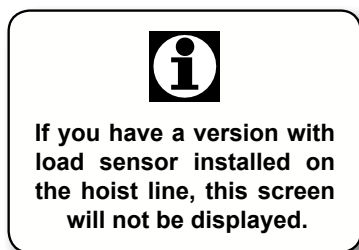
or



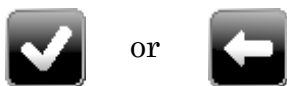
or

1. Indicate that there is a block rigged on the main boom.

2. Press the **Select button** to answer “Yes” or press the **Escape button** to return to the previous screen.



or

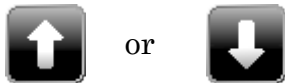
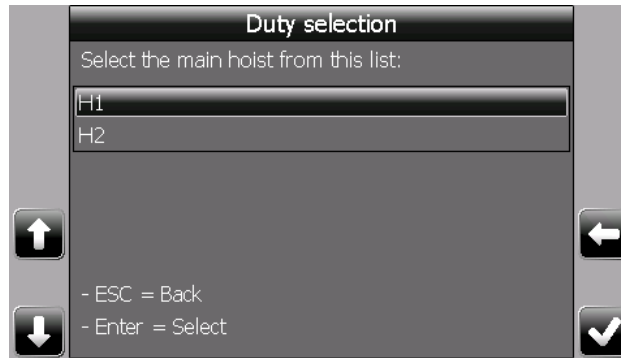


or

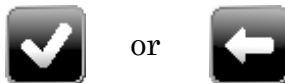
1. Select now the main block's weight.
Use the **Up** or **Down buttons** to select the appropriate value from the menu list.

2. Use the **Select button** to accept new value into the system and go to the next parameter or press the **Escape button** to return to the previous operating screen.

4.4.4 Working with Main Boom or Jib (cont'd)

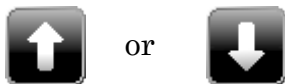
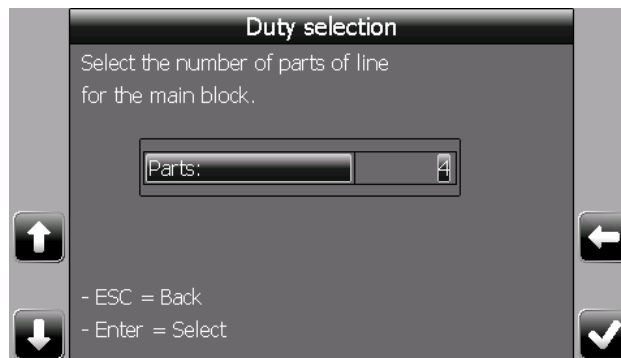


or

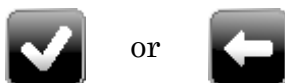


or

1. Select the Main hoist (H1).
Use the **Up** or **Down buttons** to select the appropriate choice from the menu list.
2. **Select button** to accept the new value or press the **Escape button** to return to the previous operating screen.



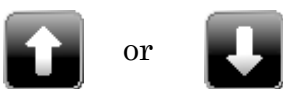
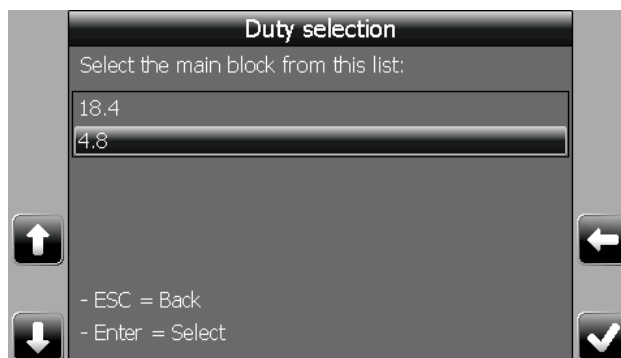
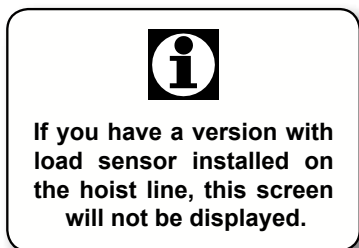
or



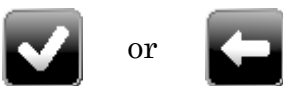
or

1. Indicate the number of parts of line for the main block.
Choose the **Select button** to highlight the first digit value. Use the **Up** or **Down buttons** to choose the first digit. Press the **Select button** to highlight the second digit. Use the **Up** or **Down buttons** to choose the second digit.
2. Press now the **Select button** to accept the new value or press the **Escape button** to return to the previous operating screen.

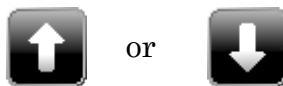
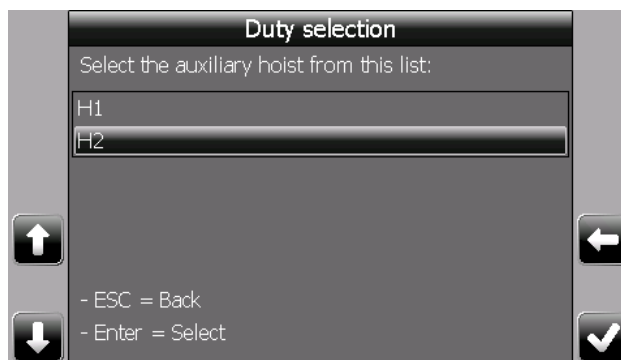
4.4.4 Working with Main Boom or Jib (cont'd)



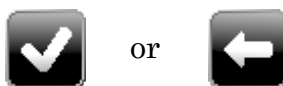
1. Choose the main block's weight.
Use the **Up** or **Down** buttons to select the appropriate choice from the menu list.



2. **Select button** to accept the new value or press the **Escape button** to return to the previous operating screen.

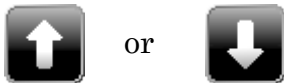
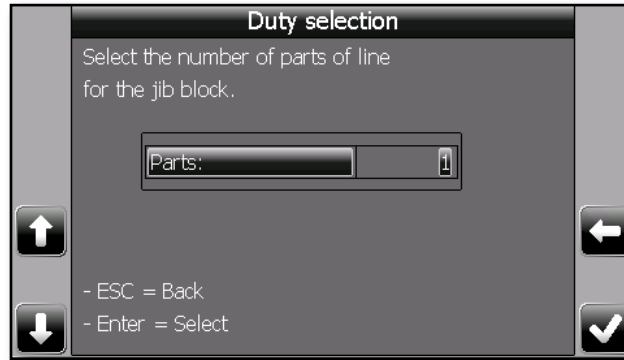


1. Select the auxiliary hoist (H2).
Use the **Up** or **Down** buttons to select the appropriate choice from the menu list.



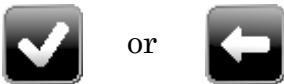
2. **Select button** to accept the new value or press the **Escape button** to return to the previous operating screen.

4.4.4 Working with Main Boom or Jib (cont'd)



or

1. Indicate the number of parts of line for the jib block.
Choose the **Select button** to highlight the first digit value. Use the **Up** or **Down buttons** to set the first digit. Press the **Select button** to highlight the second digit. Use the **Up** or **Down buttons** to set the second digit.

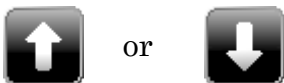
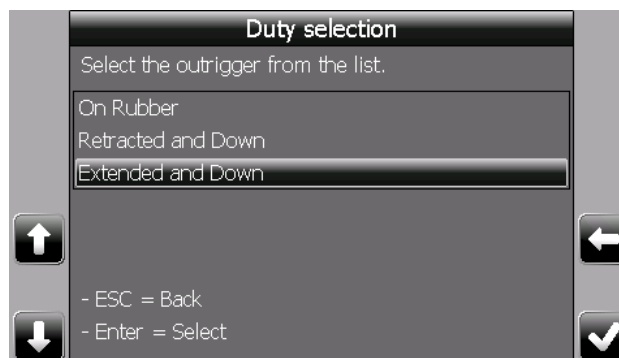


or

2. Press now the **Select button** to accept the new value or press the **Escape button** to return to the previous operating screen.

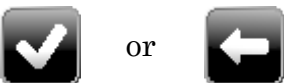


If this list contains only one choice, this screen will not be displayed and the system will go to the next screen.



or

1. Indicate the **outrigger configuration**.
Use the **Up** or **Down buttons** to select the appropriate choice from the menu list.



or

2. Press now the **Select button** to accept the new value or press the **Escape button** to return to the previous operating screen.

4.4.4 Working with Main Boom or Jib (cont'd)

Use the **Quick Duty Change Button** to alternatively select whether lifting the load with the main boom or the auxiliary jib.



Quick Duty Change Button

4.4.5 System Configuration Information Screen

Simply pressing the **Info** button is a convenient way to verify the current configuration of your crane. At a glance, you can check the settings for numerous parameters such as the outrigger state, boom length, jib selection etc. If all the data under the chart info screen is correct and if you had previously set the correct hoist and parts of line number, then your system should be configured correctly. You can also access the info mode by using the **Mode button** (see steps below).



Press the **Info** button to display the current crane configuration.



Press the **Escape** button to return to the normal mode screen.

Or



1) Select the **Mode** button.



2) Use the **Up / Down buttons** to highlight the **info Mode**.



3) Press the **Select button** to confirm your choice and enter the info menu screen

Info	
Duty:	0001
Boom mode:	Standard
Attachment:	None
Outriggers:	Outriggers extended to min.
Counterweight:	No Counterweight
Deduct erected:	None
Deduct stowed:	Jib
Slew:	Outriggers extended to minimum
Rotation:	360°

Chart Info screen

4.4.5 System Configuration Information Screen (cont'd)

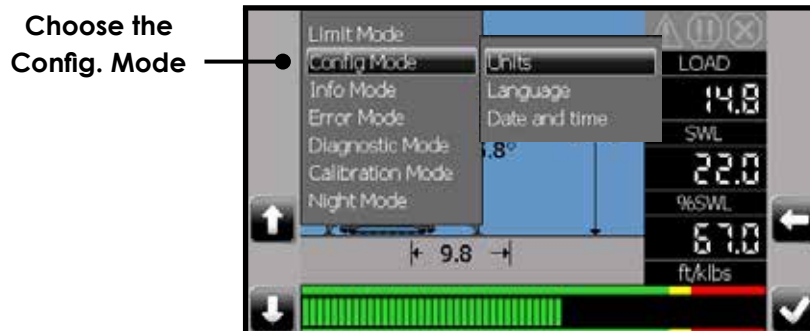


Once your system is properly configured, the i4500 Rated Capacity Indicator is ready to use.



The chart info screen is different for each crane model. The representation depicted in this manual may not be identical to the chart info screen shown on your system.

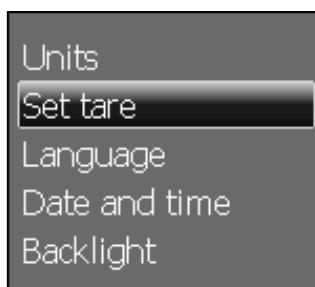
4.4.6 System Setup Configuration Mode



Config. Mode Selection Menu

Various display parameters can be configured by the operator. These parameters are grouped in the system **Config. Mode menu** and they include:

- **Units selection**
- **Set Tare**
- **Language**
- **Date & time**
- **Backlight**



4.4.6 System Setup Configuration Mode (cont'd)



Repeat these steps to modify any of the system setup options, you must first access the system's Configuration Mode:



1) Press the **Mode** button.



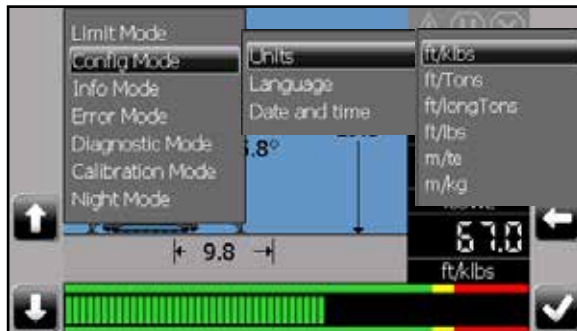
2) Scroll down with the **Down** button to highlight the Config. mode line.



3) Press the **Select** button to confirm your choice and enter the desired menu.

4.4.6.1 Units Selection

It is possible to choose between 6 unit combinations. Each measure of length and load will be displayed on the main display.



To set the units proceed as follows:

1. Repeat steps 1 to 3 of the system set-up section (see above, section 4.4.6).
2. Select the **Units Menu**.
3. The Units menu line should be highlighted on the display by now. If not, scroll up or down with the Up or Down buttons to highlight the desired unit combination.
4. Choose the **Select** button to confirm your choice into the system.

4.4.6.2 Language Selection

All of the i4500's text messages can be displayed in multiple languages: English (default), as specified in the following illustration (available languages may vary depending on software version):



To set the language proceed as follows:

- 1) Repeat steps 1 to 3 of the system setup options section (see page 42 of this manual).

Select the **Config. Mode**.

- 2) The language menu line should be highlighted on the display by now. If not, scroll up or down with the **Up** or **Down** buttons to highlight the desired language.

- 3) Choose the **Select** button to confirm your choice.

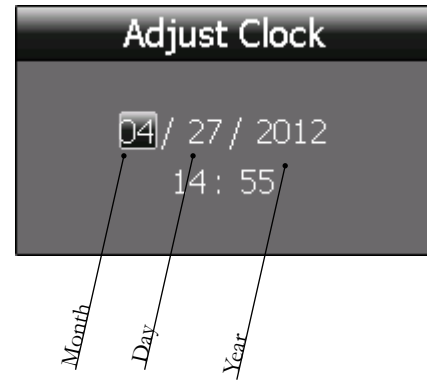
4.4.6.3 Date & Time Setting

This sub-menu allows you to adjust the system date and time. This step is important for the data logger.

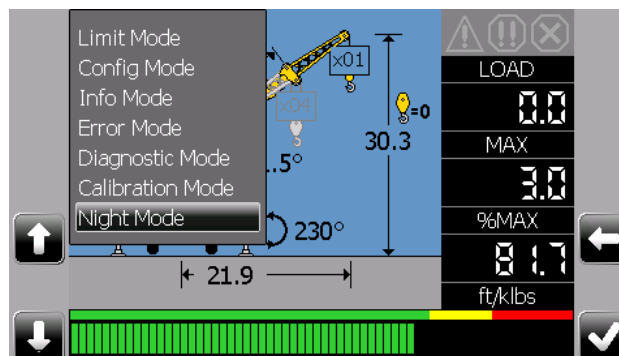


To adjust the date & time proceed as follows:

1. Repeat steps 1 to 3 of the preceding section (see section 4.4.6 page 42).
2. Select the **Date and Time** menu.
3. Choose **Select** button to confirm your choice.
4. The Adjust Clock window should appear on the display by now. Scroll up or down with the **Up** or **Down** buttons to select the desired month value.
4. Choose **Select** button to accept new value into the system. Once selected, the highlight automatically moves to the next value for adjustment
5. Repeat procedure to adjust the day and year. Choose Select button to accept new values
6. Now adjust the clock. Scroll up or down with UP and Down button to select the desires hour value. Repeat procedure to adjust the minutes.
7. Choose Select button to saves changes and go back to main menu.

**4.4.6.4 Night / Day light mode**

This menu allows access to the screen brightness pre-sets. Select a setting that matches prevailing lighting conditions. Please note that the screen brightness levels are set in the Backlight menu (see **Backlight** mode on the following page).

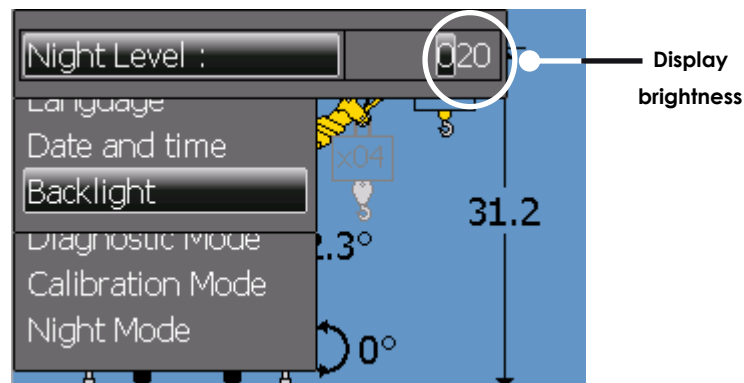


To change Night/Day light mode, proceed as follows:

1. Press the **Mode** button.
2. Scroll down with the Down button to highlight the Night or Day mode line.
3. Press the Select button to confirm your choice and enter the desired menu.

4.4.6.5 Backlight Mode

You can modulate the screen brightness levels to aid in viewing the display under various lighting conditions. Please note that the screen brightness levels set here will automatically display when activating the day and night modes.

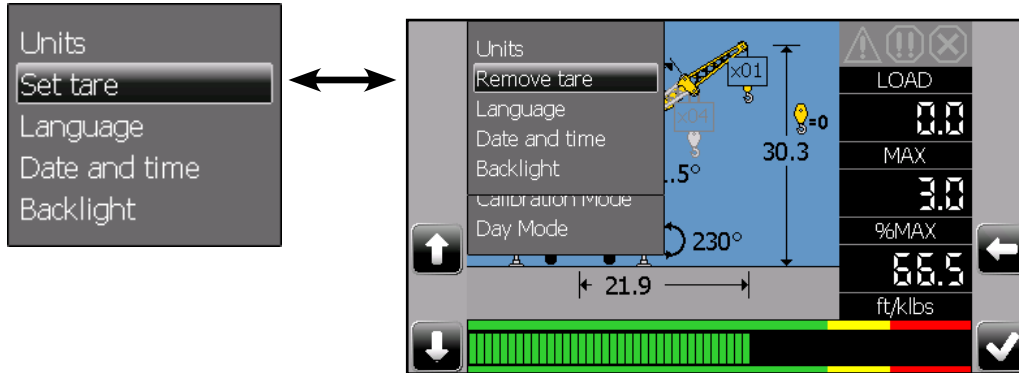


To adjust the display brightness, proceed as follows:

1. Repeat steps 1 to 3 of the system setup options section (see section 4.4.6 page 42).
2. Select menu «**Backlight**».
3. The window setting of «Night» level should appear on screen. The «Day» level is 100% (maximum brightness). For the «Night» level, a brightness between 30% and 60% is recommended.
4. Scroll up and down with the «**Up**» and «**Down**» buttons to select the hundreds. Press the **Select** button.
5. Repeat this procedure to adjust the tens and the units.

4.4.6.6 Set and Remove Tare Mode

Select the **Tare Mode** option to display the actual load on hook weight during a lifting operation. This function is used to subtract (cancel) the weight of the block, hook and rope and thus display on the screen of i4500 only the weight of the load lifted.



To Set a Tare Load, proceed as follows:



1. Press the **Mode** button.



2. Scroll down with the **Down** button to highlight the **Config** mode line.



3. Press the **Select** button to enter menu.

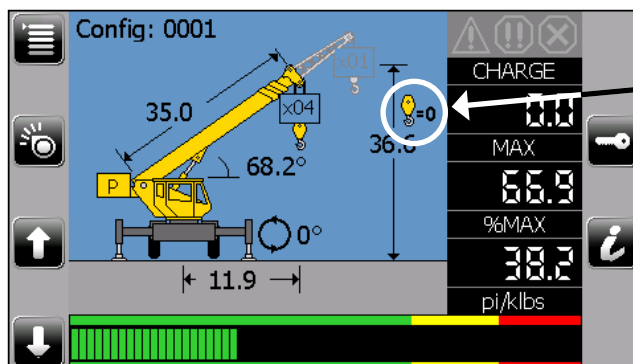


4. Scroll down with the **Down** button to highlight the **Set Tare** line



5. Press the **Select** button to enable the **Tare** feature.

6. Repeat these steps to Remove Tare and go back to normal mode.



A Tare load indicator appears on the i4500 screen when a tare load has been applied to the load during a lifting operation.

4.4.7 Bypass / Rigging



Warning! When in Rigging mode, the motion cut and overload alarms are disable. In this condition, the crane is not fully protected by the i4500, therefore it's absolutely essential to obey the crane manufacturer's advice regarding lifting the hook block, slewing or outriggers use.



The **Bypass/Rigging** button will be used to access the following functions: To access the **Rigging Mode, to override an Overload Condition and/or to override an ATB condition**. The operator can override the system (lockout) by pressing the **Bypass / Rigging** button. The **Bypass/Rigging** button must be pushed again after 10 seconds.

4.4.7.1 Rigging Mode (Maintenance / Erection Mode)

It is often necessary with many cranes, when stowing or erecting the machine to go outside the working “envelope” for which the crane manufacturer provides ratings. For example, the boom stowed position may be outside the maximum load radius or minimum boom angle specified on any load chart.

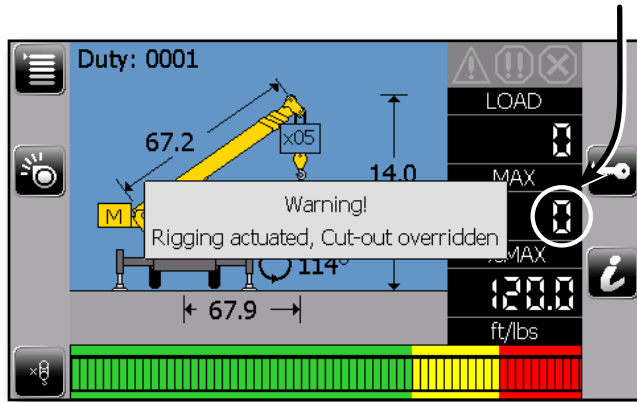
For this reason, **RaycoWylie** systems provide a Maintenance/ Erection mode, where the boom may be lowered to or raised from the horizontal position without the external alarm continuously sounding or the motion cut operating

It is important to note the following points when in rigging mode:

- There are **No** lock-outs
- The ATB switch is still monitored but will not active the lockout system
- **No** audible alarms
- The Amber Light is on
- The speeds of the movement are not limited.
- A flashing rigging message is shown on the display.
- The rigging mode can be accessed when the **SWL** is **zero**.

4.4.7.2 Access to Rigging Mode

When the boom is positioned outside the maximum radius of operation or at the minimum angle specified in the capacity load charts, the capacity drops to zero (0).



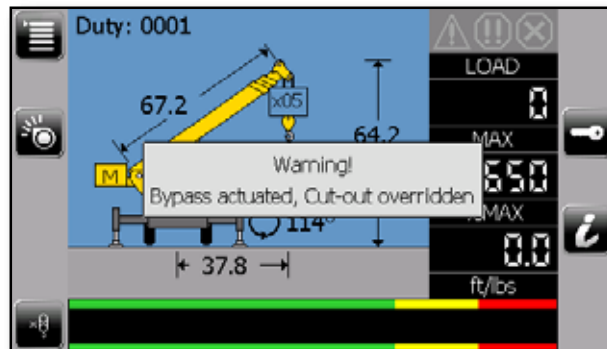
At this point when pressing the Bypass/Rigging button the system automatically enters in rigging mode and an override message flashes on the system display.

The rigging mode is automatically exited when:

- The operator selects another mode or
- The system is powered off or
- The **SWL** is greater than zero.

4.4.7.3 Override Lockout System (Bypass)

When overriding the motion cut during an overload or ATB condition, the external alarm and the external amber and red warning lights are activated. Also, the override message flashes on the display indicating that the lockout system is bypassed.



The overload and ATB condition can be overridden when:

- The load is greater than or equal to the percentage of the established capacity to activate the lockout system (by default 120%); or
- There is a faulty sensor or interface; or
- There is an ATB condition.

The override is automatically cancelled when:

- The load is below the percentage of the established capacity to activate the lockout system; or
- There is no more occurrence of an ATB condition; or
- The **RCI/LMI** resets.

4.5 Operational Limits Setting



Carefully read and understand these instructions before setting the Operational Limits. Setting the wrong Operational Limits can result in accidentally running into obstacles which could lead to serious injury or death.

In the Operational Limits Setting Mode, the operator can set and activate/deactivate five (5) operational limits in addition to those automatically provided by the i4500 RCI system.

These are as follows:



1) The Minimum Boom Angle Limit.



2) The Maximum Boom Angle Limit.



3) The Maximum Boom Length Limit



4) The Maximum Boom Tip Height Limit.







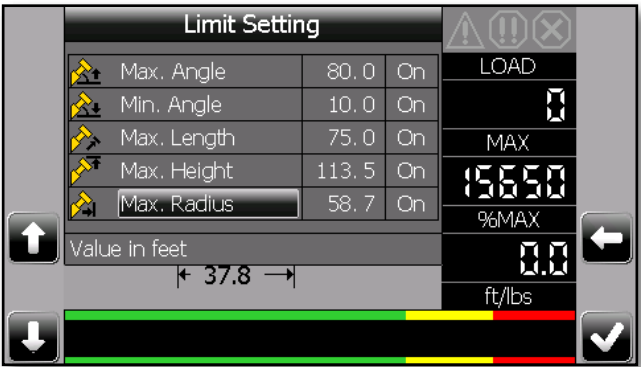
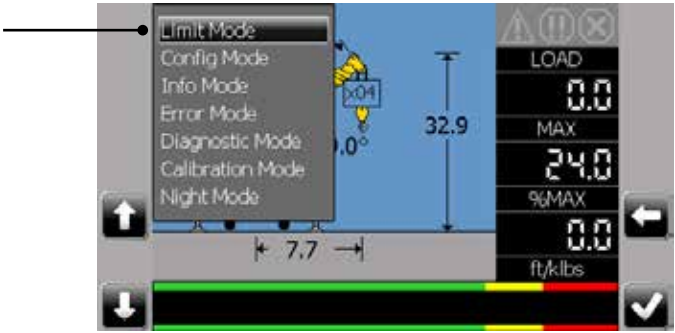
5) The Maximum Operating Radius Limit.



Important: Please note that if your machine is equipped with the Range limiting key switch option, the Operational Limits setting mode will Not be available for selection (refer to section 4.6 of this manual for more details).






4.5.1 Accessing the Operational Limits Setting Mode









- 
 or 

1. Select the **Mode** button.
 2. Scroll up and down with the **UP/Down** button to highlight the **Limit Mode** line .
 3. Choose the **Select** button to confirm your choice and enter into the Limit Mode.

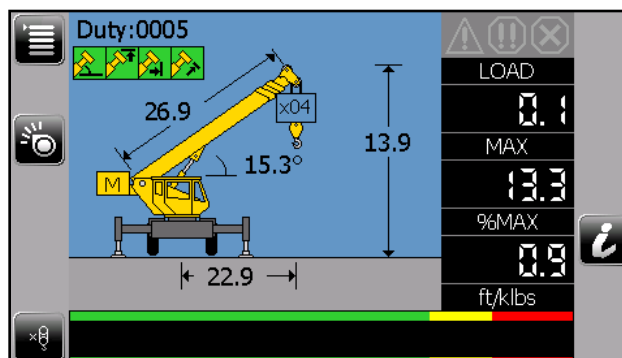


Limits configuration screen

4.5.2 Limit Value Adjustment

Limit Setting			
	Max. Angle	40.0	On
	Min. Angle	5.1	On
	Max. Length	32.8	On
	Max. Height	65.6	On
	Max. Radius	98.4	On
Value in degrees			

- 
 1. Repeat step 1 to 3 at the section Accessing the Operational Limits Setting Mode (see section 4.5.1 at page 59).
-  or 
 2. Use the **Up** and **Down** button to scroll up and down Through the menu options and to highlight the limit setting you want to edit.
- 
 3. Press Select button to confirm your choice. The cursor will automatically go to the next column.
-  or 
 4. Press the Up and Down buttons to select the desired value for this particular limit.
- 
 5. Press Select button to confirm the selected value.
- 
 6. Press Escape button to return to the normal operating mode.



4.5.3 Enable / Disable a Limit

Limit Setting			
	Max. Angle	40.0	On
	Min. Angle	5.1	On
	Max. Length	32.8	On
	Max. Height	65.6	On
	Max. Radius	98.4	On
Value in degrees			

Limit
Status
On/Off



1. Repeat step 1 to 3 at the section Accessing the Operational Limits Setting Mode (see section 4.5.1 at page 59).



2. Press the **Down** button until the highlight area moves to the first line of the status column (On/Off)



or



3. Use the **Up** and **Down** buttons to highlight the current state (On or Off) of the limit you want to activate or deactivate.



4. Press **Select** button to toggle between the On and OFF state of the limit.



5. Press Escape button to return to the normal operating mode.

Limit Setting			
	Max. Angle	80.0	On
	Min. Angle	10.0	Off
	Max. Length	75.0	Off
	Max. Height	113.5	Off
	Max. Radius	58.7	Off

The Maximum Boom Angle Limit Activated

Limit Setting			
	Max. Angle	80.0	Off
	Min. Angle	10.0	Off
	Max. Length	75.0	Off
	Max. Height	113.5	Off
	Max. Radius	58.7	Off

The Maximum Boom Angle Limit Deactivated



When the value of a given Operational Limit is changed (see section 4.5.2) then, the modified Limit becomes automatically active.

4.6 Range Limiting Option



Carefully read and understand these instructions before setting the Operational Range Limits. Setting the wrong Operational Range Limits can result in accidentally running into obstacles which could lead to serious injury or death.



Crane travel is prohibited when Range Limiting is activated.



The Operational Range Limits settings must be reprogrammed every time the crane is moved.



RaycoWylie recognizes that operating cranes in proximity to power lines or equipment is an extremely hazardous practice that requires extra precautions. It is therefore essential to operate the crane outside the minimum clearances allowed in such a way that there is no possibility of the crane, load line or load becoming a conductive path, to avoid the risk of being electrocuted. The crane shall not be used to handle material stored under electrical power lines unless any combination of boom, load, load line, or machine cannot enter the prohibited zone. The range limiting option provided by the i4500 system shall not be used to delimit the prohibited zone. Refer to federal, state, local safety standards and regulations applicable in your country regarding operating cranes in proximity to power lines.

4.6 Range Limiting Option (cont'd)



A red icon indicates that a limit has been reached.

Shows which zone is programmed:

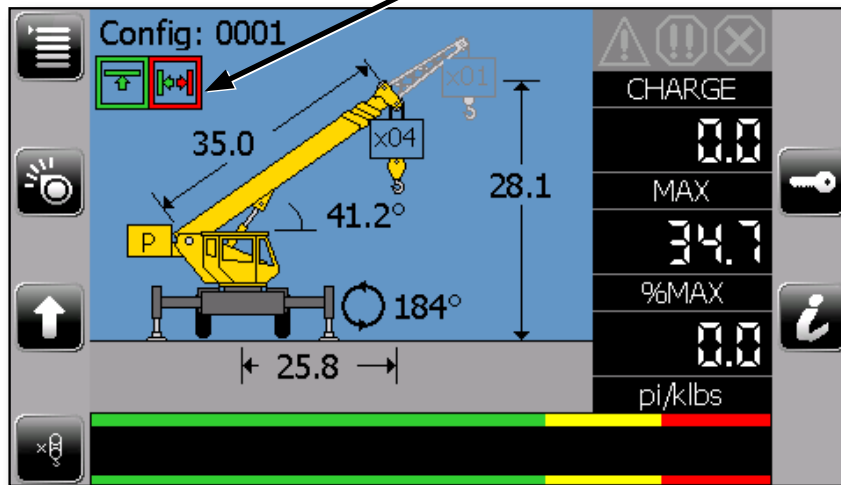


Limit high (roof)

Free Zone (two walls)

Variable limit height

Variable limit radius



Menu options:

When the system is equipped with the Range Limiting key switch option, the system automatically selects the Range Limiting mode as the only possible choice. In that case, the following menu options* are offered:

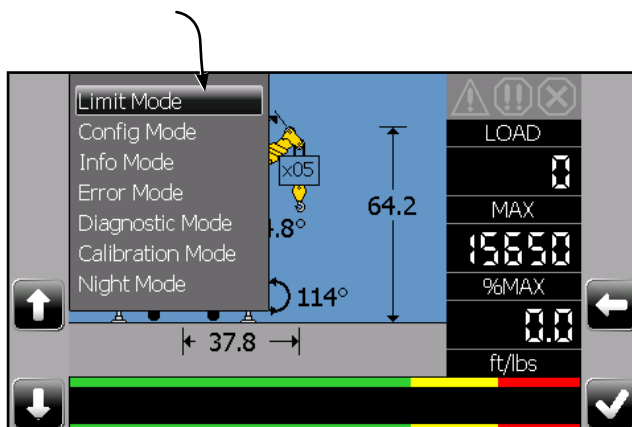
- Height Limit
- Free Zone
- Variable Height Limit
- Variable Radius Limit

**** In most systems, only one menu option can be chosen at the time; however, this may vary depending on software version.***

4.6.1 Accessing Range Limiting Mode



1. Press the **Mode** button.
2. The line **Limit Mode** should be highlighted by default.



or



3. If it is not the case scroll up and down to highlight the line.



4. Press the Select button to validate your choice and to get access to the Range Limiting Mode.

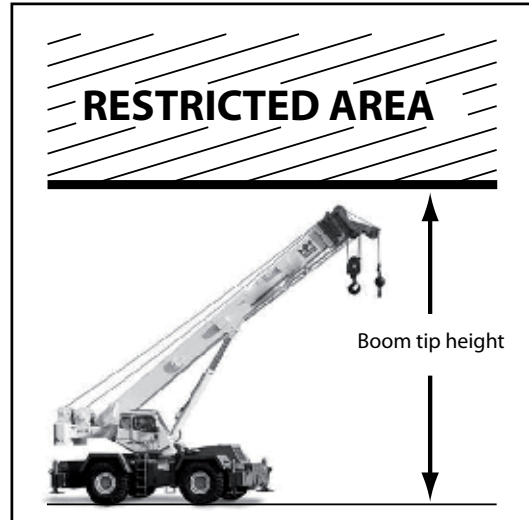


Screen of the Range Limiting Mode

4.6.2 Height Limit

The height limit is the maximum boom tip height desired. We can also consider that is a ceiling of fixed height on 360 °.

1. Repeat steps 1 to 3 of the section Accessing Range Limiting Mode (see section 4.6.1 at page 65).
2. The line «**Height Limit**» is highlighted by default. If it is not the case scroll up and down to highlight this line.
3. Press the **Select** button to confirm your choice.
4. Boom up to the desired boom tip height limit.
5. Press the **Select** button to confirm the maximum boom tip height position. As you release the **Select** button, a 10 seconds countdown will allow you to boom down before your programmed height limit becomes active.



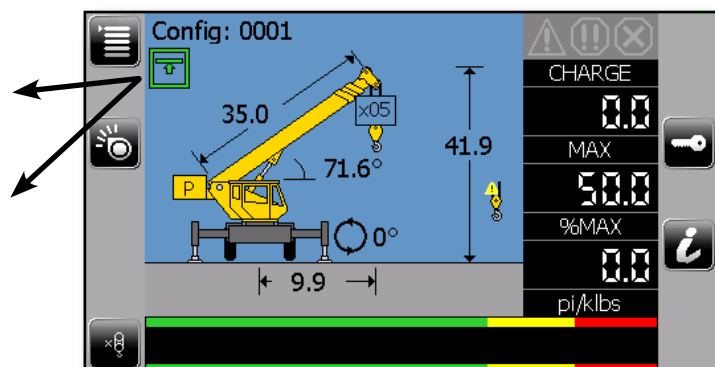
Boom up to max height
press Enter to accept
press ESC to cancel

Limits will be active in
10

Height Limit
programmed



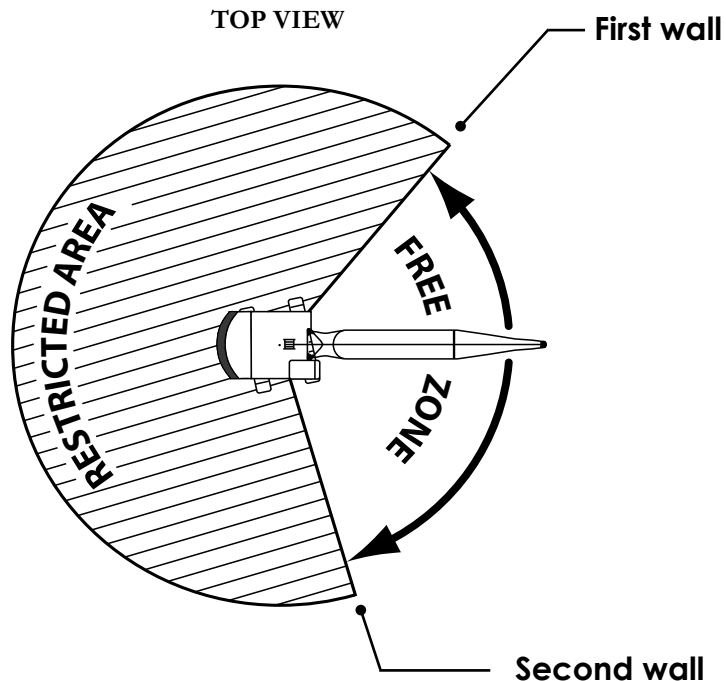
Height Limit
Reached



4.6.3 Free Zone

The free zone is a zone without height limit. The free zone is limited by 2 walls each side where the boom cannot access over these walls.

1. Repeat steps 1 to 3 of the section Accessing Range Limiting Mode (see section 4.6.1 at page 65).
2. Press the Down button to highlight the line «Free Zone» and press the Select button to confirm your choice.



3. Rotate the crane until you reach the position of your first limit (First wall).

Turn and push Enter to
place first wall
press ESC to cancel

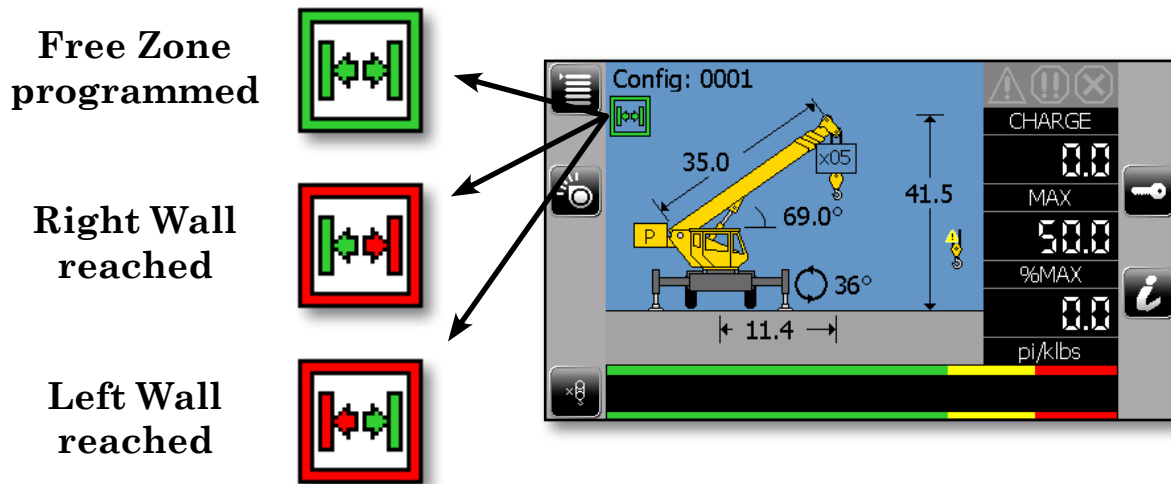
4. Press the **Select** button to confirm the position of your first limit.
5. Rotate the crane until you reach the position of your second limit (Second wall).

Turn and push Enter to
place second wall
press ESC to cancel

6. Press the **Select** button to confirm the position of your second limit.
7. As you release the **Select** button, a 10 seconds countdown will allow you to rotate the crane between the two walls before your programmed Free Zone Limits becomes active.

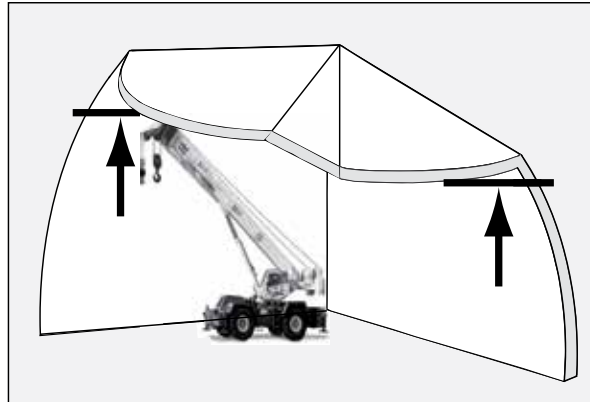
Limits will be active in
10

4.6.3 Free Zone (cont'd)



4.6.4 Variable Height Limit

A variable height limit is a height limit which can vary in function of the rotation of the boom (variable ceiling). Depending on the configuration of the obstacle, it may be necessary to limit to a certain height for a position and at different height for another position.



1. Repeat steps 1 to 3 of the section Accessing Range Limiting Mode (see section 4.6.1 at page 65).
2. Press the **Down** button to highlight the line «**Variable Height Limit**» .
3. Press the **Select** button to confirm your choice.
4. Rotate the crane until you reach the position of your first limit (first wall).

Press Enter to place
first wall
press ESC to cancel

4.6.4 Variable Height Limit (cont'd)

5. Press the **Select** button to confirm the position of your first limit.
6. Rotate the crane toward the second limit position (second wall) with the boom tip always at the maximum height permitted by the surrounding environment .

Turn and boom up or down
then press Enter to place
second wall
press ESC to cancel

7. Press **Select** button to confirm the position of the second wall.
8. As you release the **Select** button, a 10 seconds countdown will allow you to return between the two walls and boom down before your programmed Variable Height Limit becomes active.

Limits will be active in
10

Variable
Height Limit
programmed



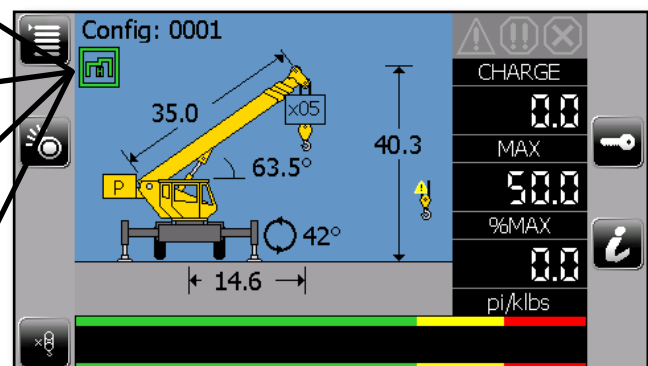
Right Wall
reached



Left Wall
reached

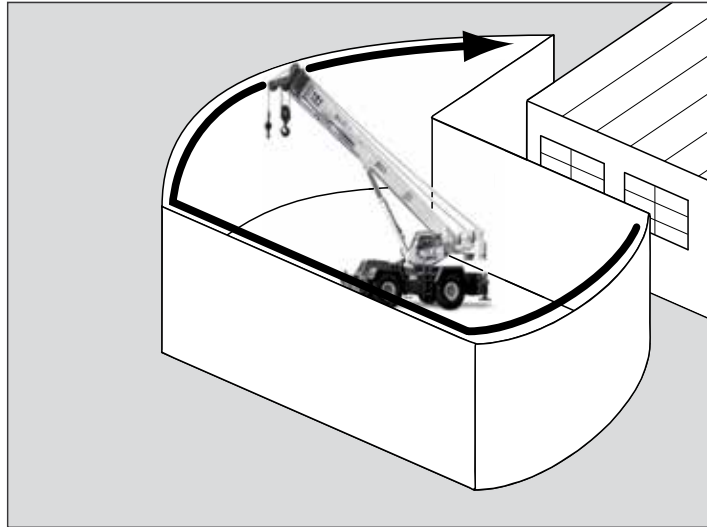


Height Limit
reached



4.6.5 Variable Radius Limit

A variable radius limit is a radius limit which can vary in function of the rotation of the boom. Depending the configuration of the obstacle, it may be necessary to limit to a certain radius for a position and another radius for another position.



1. Repeat steps 1 to 3 of the section Accessing Range Limiting Mode (see section 4.6.1 at page 65).
2. Press the **Down** button to highlight the line «**Variable Radius Limit**» .
3. Press the **Select** button to confirm your choice.
4. Rotate the crane until you reach the position of your first limit (first wall).

Press Enter to place
first wall
press ESC to cancel

5. Press the **Select** button to confirm the position of your first limit.
6. Rotate the crane toward the second limit position (second wall) with the boom tip always at the maximum radius permitted by the surrounding environment .

Turn and extend or retract
then press Enter to place
second wall
press ESC to cancel

4.6.5 Variable Radius Limit (cont'd)

7. Press **Select** button to confirm the position of the second wall.
8. As you release the **Select** button, a 10 seconds countdown will allow you to return between the two walls and boom up within the allowed radius limit before your programmed Variable Radius Limit becomes active.

Limits will be active in
10

Variable
Radius Limit
programmed



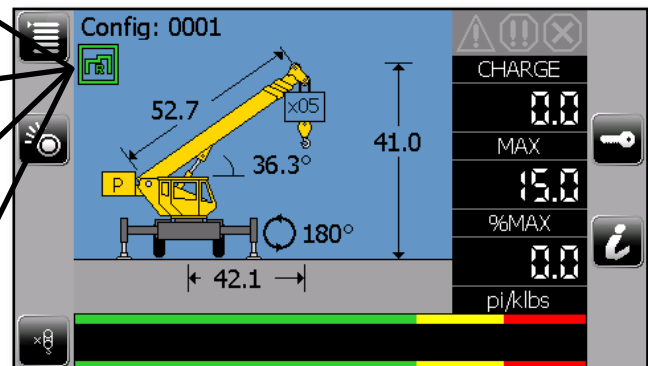
Right Wall
reached



Left Wall
reached



Radius Limit
reached



-5-

Diagnostic & Troubleshooting



Warning! Troubleshooting shall be performed by a qualified technician or by an operator with assistance of a **RaycoWylie** Service technician.

This section provides technical troubleshooting support. It will address most frequently asked questions that repair personnel may have when installing, repairing or performing maintenance on the i4500 system.

5.1 Diagnostic Menu

A diagnostic menu provides information on the state of the system and gives the status of all connected sensors

Accessing the diagnostic menu:



Press the **Mode** button



or



Press the **Down** button to highlight the line «**Diagnostic**».



Press the Select button to access to the diagnostic menu.

Each line of the diagnostic menu give access to a menu page by pressing the Select button. Each page applies to one type of sensor at the time or one particular type of information. Regardless of the system configuration a minimum of 7 menu pages are always accessible: ATB, Angle, Extension, Load, Relay interface, addresses detected and System.

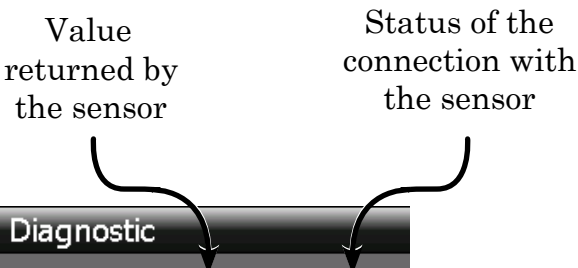
Additional pages are optional and are only shown if one or more sensors are enabled (refer to the option **Enable/Disable I/O** in the calibration menu). The use of the **Up/Down** buttons will allow the user to scroll through the menu.



*Pressing the **Escape** button takes you to the previous menu or exits the diagnostic mode.*

5.1 Diagnostic Menu (cont'd)

In the diagnostic menu, this is the typical displayed information:



Diagnostic		
ATB	OFF	Connected
Angle 1	41.50	Connected
Extension 1	0.00	Connected
Load 1	660.37	Connected
Load 2	0.00	Connected
Relay Board 1	---	Connected
Generic 1, Rotation,	230.70	Connected
Detected Address	---	N/A

Some applications have more than one angle or length sensor. In this case, the ATB and the angle sensors are listed first then length or extension sensors following by the load sensor. The first angle sensor to be listed is the one installed closest to the main boom base.

For sensors, the second column gives the value of the parameter calculated by the interface connected to the CAN Bus network and the third gives the state of the sensor connection to the CAN Bus network. Regarding the ATB its status of activation is displayed. If the interface is not a sensor, such as the relay interface, and therefore does not return a specific value, no value is displayed in the second column, however, the state of connection to the CAN Bus network is given in the third column

5.2 Angle and Extension Sensor



Angle 1 and Length 1 sensors are physically located on the same electronic board.



Press the **Select** button when “**Angle 1**” is highlighted to see the software version of the angle sensor and it’s calibration state. The displayed information will look similar to this:

The second line indicates the software version of the angle/length sensor and also its creation date.

The following values will allow the RaycoWylie technician to diagnose a problem coming from the sensor.

In the case of a malfunction of the angle sensor, take note of these values and communicate them to a RaycoWylie Systems technician.

Diagnostic					
Angle 1					
v3.04 14apr11					
Ain1:	2750	d1gx:	841.50	dZeroX:	2067.5
Ain2:	1619	d1gy:	821.50	dZeroY:	2040.0
Angle:	28.70	Pos 0°:	-210.4	DR+:	5.005



Press the **Escape** button to return at the main screen of the diagnostic mode.



To view the software version of the length sensor or it’s calibration state, press the **Select** button when **Length 1** is highlighted.

The displayed information will look similar to this:

Diagnostic					
Extension 1					
vv:beta 08sep08					
Ain:	135	Offset:	00	Scale:	0.029
Extension:	3.96	DR+:	4.995		

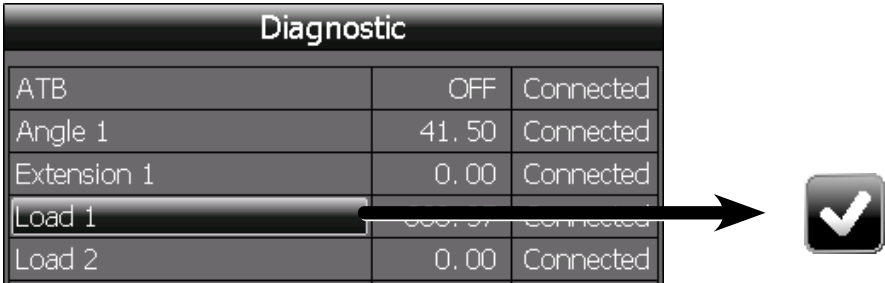
The basic criteria for a proper functioning of the angle sensor are:

The scale value must be smaller than 1.0.

DR+ must close of 5 Volts DC

5.3 Load Sensors

Press the **Select** button when “**Load 1**” is highlighted to see the software version of the load sensor and it’s calibration state.



The displayed information will look similar to this:



The basic criteria for a proper functioning of the load sensor are:
The scale value must be smaller than 1.0.
DR+ must close of 5 Volts DC

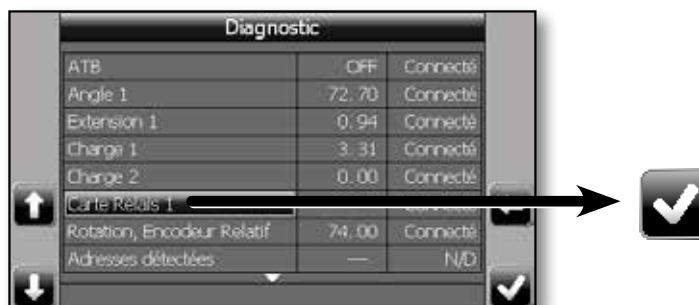


Press the Escape button to return at the main screen of the diagnostic mode.

5.4 Relays

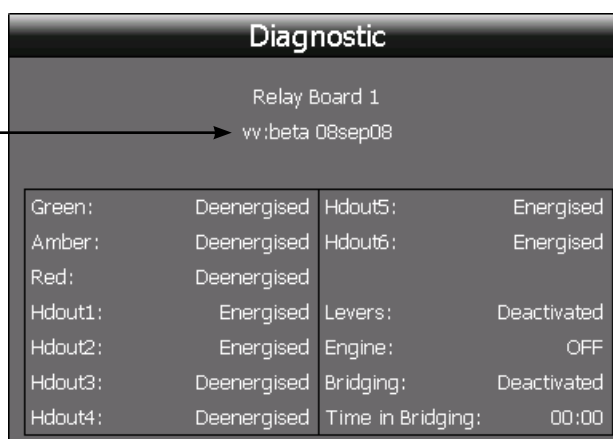
The information displayed for relay cards is divided into two blocks: Output and Input. The relay block is the output block, it indicates the status of each individual relays indicating whether the relay coil is energized or not. The second block is the input block, it has the status of 16 inputs DIN indicating whether the input is active or not. Up to 4 relay cards can be installed.

In the diagnostic menu
Press the **Select** button
when **Relay board 1** is
highlighted.



The information shown for the relay board 1 (fig. below) will look similar to this:

The second line indicates
for the relay interface the
name and the revision
of the software and its
creation date



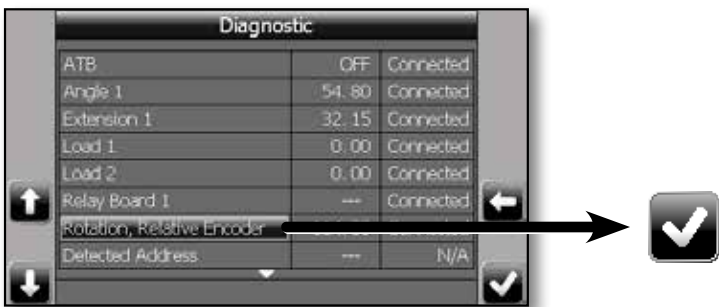
By pressing the **Down** button, you get access to the Input block. The displayed Information will look similar to this:



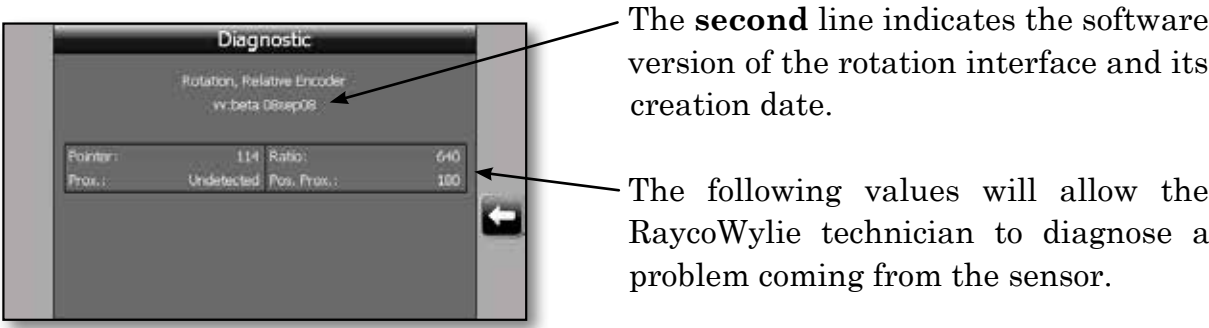
Press the **Escape** button to return at the main screen of the diagnostic mode.


5.5 Slew sensor (Range Limiting Option)

In the diagnostic menu , Press the **Select** button when the line «**Rotation, Relative Encoder**» is highlighted.



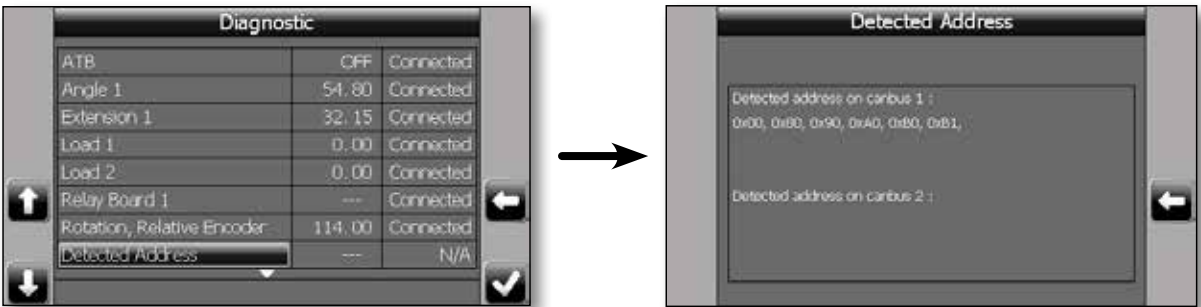
The displayed information for the slew sensor will look similar to this:



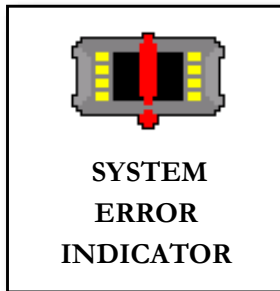
 The information depicted here may differ depending on the rotation sensor used.

5.6 Detected addresses

This menu page provides the sensor addresses on the **CAN network** detected by the i4500 system. Addresses remain in memory as long as the system is powered even if a sensor stops communicating.



5.7 Error Messages



During start up and other operation processes, the i4500 system analyses all interactions between internal peripherals (memories, controllers, extension cards, etc.) and also external ones (various interface connected to the CAN Bus network)

5.7.1 Internal Peripherals

*If you have any questions or need technical assistance, please contact our Technical Service Department at **RaycoWylie**.*

Error message	Execution process	Cause of error
Calibration's data memory is defective, or Operator's data memory is defective, or Load chart data memory is defective, or Data Logger memory is defective	When starting system, there is a verification (writing/reading) of the whole flash memory on the Motherboard	There is a problem with the flash memory on the Motherboard located in the 4500 Display Contact the Technical Service Department at RaycoWylie
RAM memory is defective	When starting system, there is a verification (writing/reading) of the RAM memory on the Motherboard	There is a problem with the RAM memory on the Motherboard located in the Display Contact the Technical Service Department at RaycoWylie
Clock is defective	The System regularly verifies if the seconds are moving. If time does not change then there is a problem.	1) Verify if the battery on the Motherboard in the display is well inserted. 2) The Clock chip is defective on the Mother board
Low battery	The System detected that the Lithium battery is low. This may cause clock to stop or lose precision.	The lithium battery is out. Replace the battery on the Mother board

5.7.1 Internal peripherals (cont'd)

Error Message	Execution process	Cause of error
CAN Bus 1 is defective, or CAN Bus 2 is defective.	The CAN Bus controller verification has failed	There is a problem with the CAN Bus controller on the Mother Board,
Not calibrated	No calibration has been found for the selected duty.	There is no calibration for the selected duty. A calibration must be done for the selected duty
No 2nd duty found	The Comparison angle/ radius ” option must be activated. Thus a jib capacity is evaluated by its angle (offset) against the jib’s chart, in comparison to the same jib’s capacity evaluated by its radius against the Main boom chart. The smallest will be selected.	The Load chart must be programmed for this kind of application. “ One touch ” field is used in the load chart for this option
No Parameter	The Crane dimensions must be entered in the system. The Load value will be null or wrong.	CL3, CL4 and CL7 values should Not be at zero

5.7.2 External peripherals

A) Angle / Length and ATB interface circuit board errors

The i4500 system can support up to **5** angle/length interfaces. Activation of every angle sensor is done in the calibration menu section **“Enable/Disable I/O”**.

Error message	Execution process	Cause of error
Angle sensor X is defective	The angle sensor value in volts is not valid (if < 1 volt or > 4 volts).	1) The Accelerometer or the 12 bits converter is defective.
Length X is out of range	A 0xFFFF code is sent by angle/length card to indicate that length sensor is not present.	1) The Length sensor is not installed 2) A wire is cut between length sensor and circuit board.
Angle x is in Pre-calibration.	Indicates that angle/length card is in pre-calibration mode.	1) In operation mode, the jumper must be taken out from ‘Cal’ jumper located on the circuit board. 2) Verify that calibration value in bits of the accelerometer is valid.
Lost communication with angle X, or Lost communication with length X	The i4500 system does not receive data from angle or length sensor. If “ time out ” delay is reached, then a communication error is displayed.	1) The angle/length circuit board is defective, 2) The Can bus network cable is broken.
Length X is not calibrated		Length sensor is not calibrated.
Angle X is not calibrated		Angle sensor is not calibrated.
Angle/length X Dr+ is defective	The 5 volts reference voltage is not valid (if < 4.5 volts or 5.5 volts).	1) The Angle/length circuit board is defective.

B) Load interface errors

The i4500 system can support up to 4 load circuit boards. Activation of every load sensor is done in the calibration menu section **“Enable/Disable I/O”**.

Error message	Execution process	Cause of error
Load X is out of range	The Angle sensor value in bits is not valid (if < 150 or > 3935).	A wire is cut between length sensor and circuit board.
Load X is not calibrated		The Load sensor is not calibrated.
Load X Dr+ is defective	The 5 volts reference voltage is not valid (if < 4.5volts or > 5.5 volts).	The Load card is defective.
Lost communication with Load X	The i4500 system does not receive data from pressure sensor. If “time out” delay is reached, then a communication error is displayed.	1) The Load card is defective, 2) The Can Bus network cable is broken.

C) Relay and digital input interface errors

The i4500 system can support up to 4 relay cards. Activation of every relay card is done in the calibration menu section **“I/O activate/deactivate”**.

Error message	Execution process	Cause of error
Lost communication with Relay board X	i4500 system does not receive data from relay card. If “time out” delay is reached, then a communication error is displayed.	1) The Relay card is defective, 2) The Can Bus network cable is broken.



There is no automatic test for the relay contacts on the relay circuit board. Therefore, if a relay becomes defective there may not be a warning. Periodically, the operator should test the lockout system.

D) Generic interface errors

The i4500 system can support up to 4 generic Interfaces. Each one having feature to support wind speed sensor, inclination level sensor and absolute rotation encoder . Activation of every generic card is done in the **calibration menu** section “**Enable/Disable I/O**”.

Error message	Execution process	Cause of error
Lost communication with generic card 1	The i4500 system does not receive data from generic card. If “ time out ” delay is reached, then a communication error is displayed	1) The Generic card is defective. 2) The Can Bus network cable is broken.
Cant X on generic X	Waiting for a valid value of the Cant X from the interface	1) The X axis of the Cant sensor is not calibrated 2) A wire is cut between the sensor and the interface
Cant Y on generic X	Waiting for a valid value of the Cant Y from the interface	1) The Y axis of the Cant sensor is not calibrated 2) A wire is cut between the sensor and the interface
AIN 1 on generic X	Waiting for a valid value of the AIN 1 input from the interface	1) The AIN 1 input of the generic interface is not calibrated 2) A wire is cut between the sensor connected to AIN 1 input and the interface
AIN 2 on generic X	Waiting for a valid value of the AIN 2 input from the interface	1) The AIN 2 input of the generic interface is not calibrated 2) A wire is cut between the sensor connected to AIN 2 input and the interface
Absolute rotation encoder	Waiting for a valid signal from the absolute interface	Absolute encoder is defective
Rotation encoder's 0 ref	The proximity switch has been detected when encoder did not receive a pulse	Rotation encoder is defective
Generic Dr +	The 5 volts reference voltage is not valid (if < 4.5 volts or > 5.5 volts)	The Generic card is defective

E) Rotation Interface Errors

Relative rotation

The i4500 system can support only one (1) rotation card. There are two different kinds: a relative one and an absolute one. Activation of rotation card is done in the calibration menu section “**Enable/Disable I/O**”.

Error message	Execution process	Cause of error
Rotation encoder's cable	A GND wire indicates that the cable between the encoder and the rotation card is not cut. If the cable breaks, this wire will become open. Then the rotation card will send an error message to the i4500 system	1) Replace cable between encoder and rotation card.
Rotation encoder's ratio	No ratio has been entered.	1) Put a different value than 0 .
Rotation encoder's prox. switch.	Proximity is not detected in configured position by i4500 system.	1) The Proximity is defective.
Lost communication with rotation encoder	The i4500 system does not receive anything from the rotation card. If the “ time out ” delay is reached, then a communication error is displayed	1) The Rotation card is defective. 2) The Can Bus network cable is broken

Absolute rotation: (a generic card is used for this type of interface)

Error message	Execution process	Cause of error
Rotation encoder's ratio	Ratio is not programmed.	1) The ration is not calibrated 2) The Encoder is defective.
Lost communication with rotation encoder	i4500 system does not receive anything from rotation card. If “ time-out ” delay is reached, then a communication error is displayed.	1) The Rotation interface is defective, 2) The Can Bus network cable is broken.

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Inspections, Testing & Maintenance

6.1 Frequent Inspections (At the beginning of each shift during which a crane is used)

- At system power up, check if all alarm lights are on, buzzer sounds and lockout are activated.
- Verify that the system has been properly configured.
- Verify the accuracy of the clock.
- Verify that no error has been detected by the system.
- Verify the weight of the hook block (must be consistent with last check).
- Verify the radius according to the boom selection. The displayed radius must be between **0** and **10%** greater than the actual radius or in accordance with current regulations.
- Verify that the capacity displayed conforms to the capacity chart of the crane manufacturer.
- Verify the functionality of the ATB if fitted.



Warning! Any deficiencies shall be examined and a decision must be made as to whether they constitute a hazard before using the machine.

6.2 Periodical Inspections (every 6 months)

Inspect at regular intervals the following:

- All cables for cuts or damage as well as all connectors for corroded contacts.
- The attachment of the cable reel at the end of the boom.
- The plunger of the ATB switch for excessive corrosion.
- Excessive wear of brushes in the reeling drum.
- Evidence of leakage at the pressure transducer connection.
- Functionality of the bridging device.
- Operation of the lockout relays.

6.3 Rated Load Test

- Position and level the machine.
- Testing personnel must be a qualified person for the crane and the i4500's system.
- The crane and the system must be configured properly.
- The load chart must be respected.
- A known weight accurate to $\pm 1\%$ and equal to the maximum capacity at near maximum radius should be used to test the alarm and the accuracy of load indication.
- Another known weight accurate to $\pm 1\%$ and equal to the maximum capacity at near minimum radius should be used to test the alarm and the accuracy of load indication.
- Rig with enough parts of line to lift a large weight.
- Measure and record the radius and the hook weight.
- Note the displayed radius, length, hook weight, parts of line and capacity on the i4500 display unit.
- Lift the large weight.
- Record the actual weight with the hook and rigging attachment.
- Note the average, the low and the high value.
- Perform a hoist up and stop and note the same data.
- Note the actual and displayed radius.
- Lower the load.
- **RaycoWylie** recommends as a good practice that all test records are signed and dated, and that a copy of the latest test be available at all times.

6.4 Maintenance



Replacement parts must be obtained from RaycoWylie as original parts, unless approved and authorized as an equivalent by a Service technician of RaycoWylie.

Preventive maintenance

- Your i4500 system has been designed to operate over long periods of time with minimum maintenance. However, continuous satisfactory operation depends upon system's care and cleaning.



Important: Do not use pressure steam on the i4500 display box, junction boxes, angle sensor, load cells or on any connectors. This could result in moisture in the connectors and can cause eventual sensor failure.

- To clean the display's surface, use mild soap or mild window cleaners and a clean soft cloth.



Important: If condensation appears in the screen of the display unit, open the cover in a dry place and let it air dry for a day.

- Replace all cables showing cut or damage or corroded connector contacts.
- Replace reeling drum's brushes if they show excessive wear.
- Replace ATB switch if the plunger shows excessive corrosion.



- *To keep the i4500's display waterproof, the back cover must be tightened following an X pattern.*
- *Your i4500 system requires no additional lubrication.*

6.5 Maintenance Procedure



Before adjustments and repairs are started on a crane, the following precautions shall be taken as applicable:

- Place crane where it will cause the least interference with other equipment or operations in the area.
- Set all controls in the off position and ensure all operating features are secured from inadvertent motion.
- Render starting means inoperative.
- Lower the boom to the ground, if possible, or otherwise secure against dropping.
- Lower the load block to the ground or otherwise secure against dropping.
- Relieve hydraulic oil pressure from all hydraulic circuits before loosening or removing hydraulic components.
- “Warning” or “Out of Order” signs shall be placed on the crane controls and be removed only by authorized personnel.
- After adjustments and repair have been made, the crane shall not be returned to service until all guards have been reinstalled, trapped air removed from the hydraulic system and safety devices reactivated. The instructions shall be provided by the crane manufacturer for the removal of air from hydraulic circuits.

6.6 Adjustments and Repairs

- Any hazardous conditions disclosed by the inspection requirements shall be corrected before operation of the crane is resumed.



Important: Adjustments and repairs shall be done only by qualified personnel.

- Adjustment shall be made within **RaycoWylie's** specified tolerance to maintain the correct functioning of all components.
- Should you need replacement parts for maintenance and repairs on our equipment, please contact our Service Department at **RaycoWylie**.



*If you have any questions or need technical assistance, please contact our Technical Service Department at **RaycoWylie** quoting the information found on the serial number label of your i4500 system.*

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