



i4500 Crane Information Center

Rated Capacity Indicator for Lattice Cranes
with Load Sensor on Hoisting Rope

(America)

Instruction Manual

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Crane Warning Systems Atlanta

770-888-8083

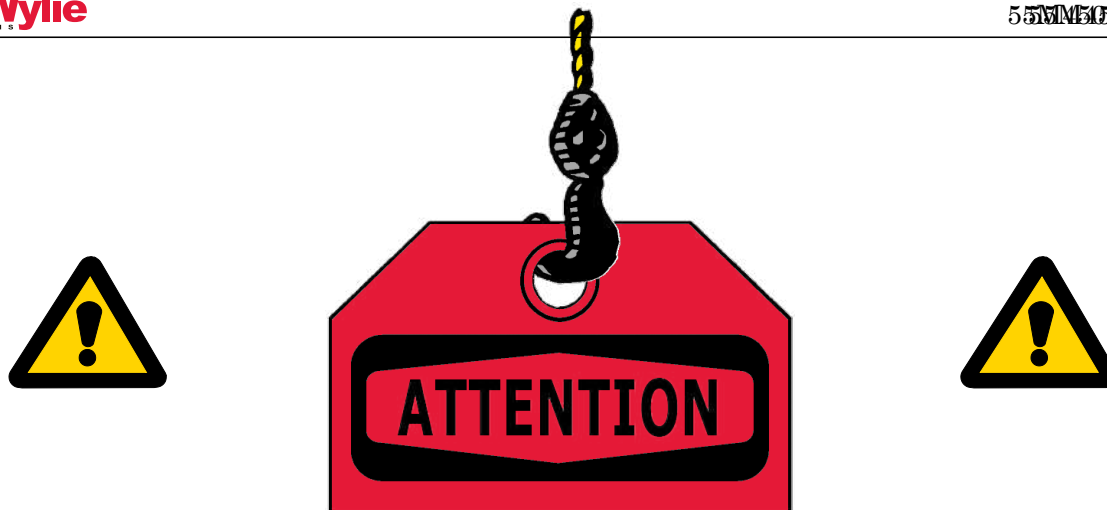
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The purpose of this manual is to provide the customer with the operating procedures essential for the promotion of proper machine operation for its intended use. The importance of proper usage cannot be overstressed. All information in this manual 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 of the 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 damage the equipment, property, and/or cause injury to the operator or people working near 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. The crane operator is responsible for the safe operation of the crane. 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 standards 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.

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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 the time to read and understand these definitions!



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



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



IMPORTANT: INDICATES A SITUATION THAT MAY CAUSE MACHINE DAMAGE.



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 where you operate the crane to reduce the risk of 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 the system and do the maintenance efficiently.

1.2 Qualifications

The i4500 system shall be only operated by personnel who have no limitations in the physical abilities of the upper limbs and no visual or hearing impairment. The personnel must have completed all operator trainee qualification requirements and have read and fully understood the instructions in this manual. Operator requirements include: demonstrating the ability to read, write and use arithmetic. He must also be able to read and understand the load / capacity charts in the language used in the crane manufacturer's operating instruction materials. Maintenance of the system is intended only for fully qualified and trained personnel..

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 loads shown and described on the rated capacity chart when set, calibrated and operated correctly.

1.4 Brief Description of the i4500 System

The i4500 “Rated Capacity Indicator” is a computerized crane monitoring system designed to help the operator to safely operate the crane and to respect the maximum load authorized by the crane manufacturer.

The indicator automatically monitors the load lifted by the crane and constantly compares it with the maximum load allowed for each position.

The display of the system allows the operator to see continuous information related to the actual load lifted by the crane. It also warns the operator when he approaches the limit or goes over the capacity of the crane.

The system has sensors installed on the machine in order to measure or verify:

- The boom angle
- The hook load
- The two-block condition (A2B)

The system takes this information to check overload conditions and to measure the operating radius and the crane capacity. A slew sensor (optional) can also be installed to measure the boom position (on 360 degrees) and give extra information to the operator. The display is located inside the operator’s cab to provide an easy access to the information. All the sensors are linked through a CAN bus network (Controlled Area Network).

The actual load is expressed as a percentage of the permitted load (maximum load or safe working load - % SWL). If this percentage exceeds a preset value, alarms and safety functions are activated. 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.

1.4.1 Audible Alarm



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 sound 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.

The crane operator will also be warned by the audible alarm when an operational limit is activated and reached.



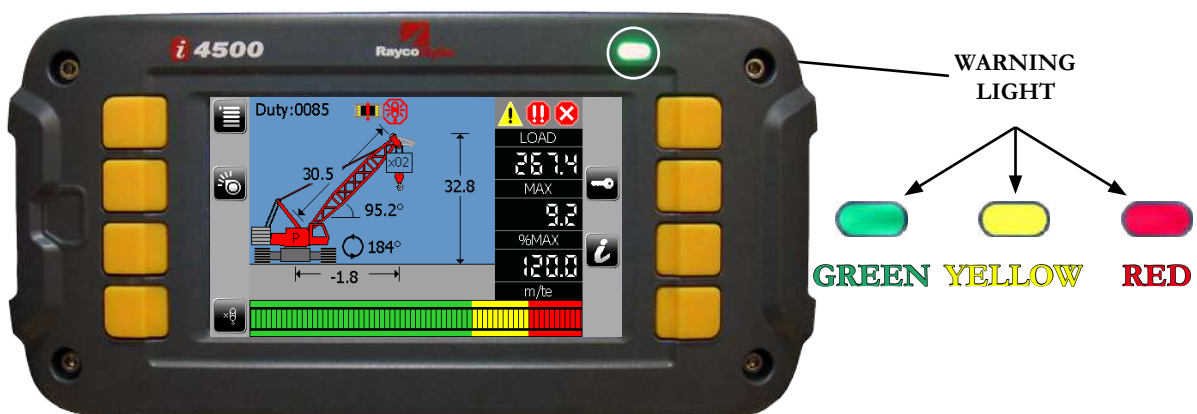
If you are wearing ear protection safety devices or music earphones during crane operations, make sure that they will not impair your ability to hear the audible warning signals of the i4500 system.

1.4.2 Visual Alarms

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

A yellow light will blink along with the audible alarm when the load reaches 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.

I4500 system with three warning lights

Event	Internal alarms					External alarms			
						Green Light	Yellow 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

I4500 system with 1 external warning 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

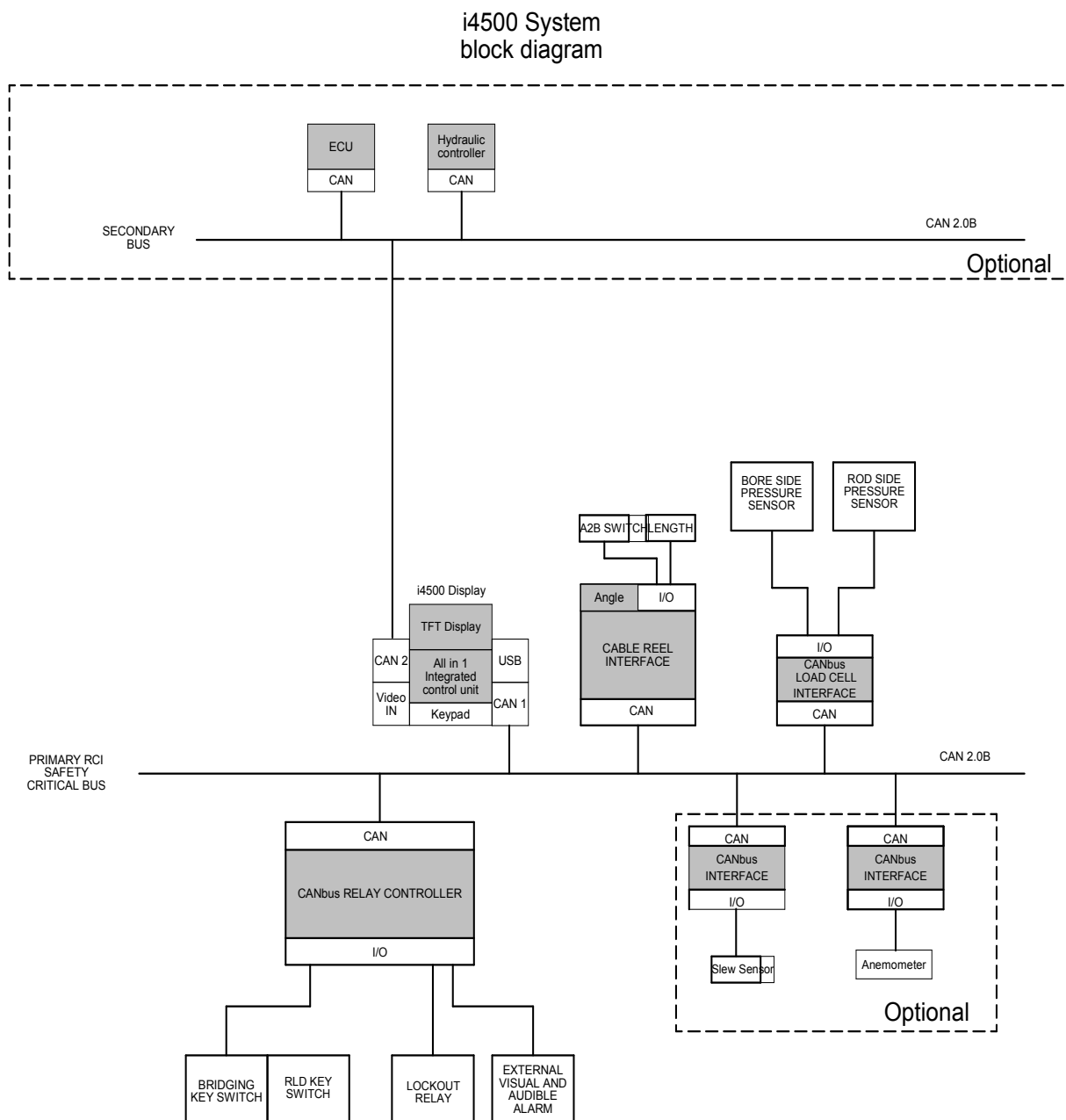
Table 2

1.5 Location and Description of Typical Components



- 1) **i4500 display box:** It is also the central processing unit (CPU) of the i4500 system. Its principal features are a CANBUS communication interface and a 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. It is a dynamometer installed on the hosting rope
- 4) **Anti-two block:** the anti-two block is used make sure the block does not hit the tip of the boom (optional).
- 5) **Wind speed sensor:** Shows wind speed value on the display (optional).

1.6 Block Diagram of the i4500 Communication Link Network



1.7 Technical Data

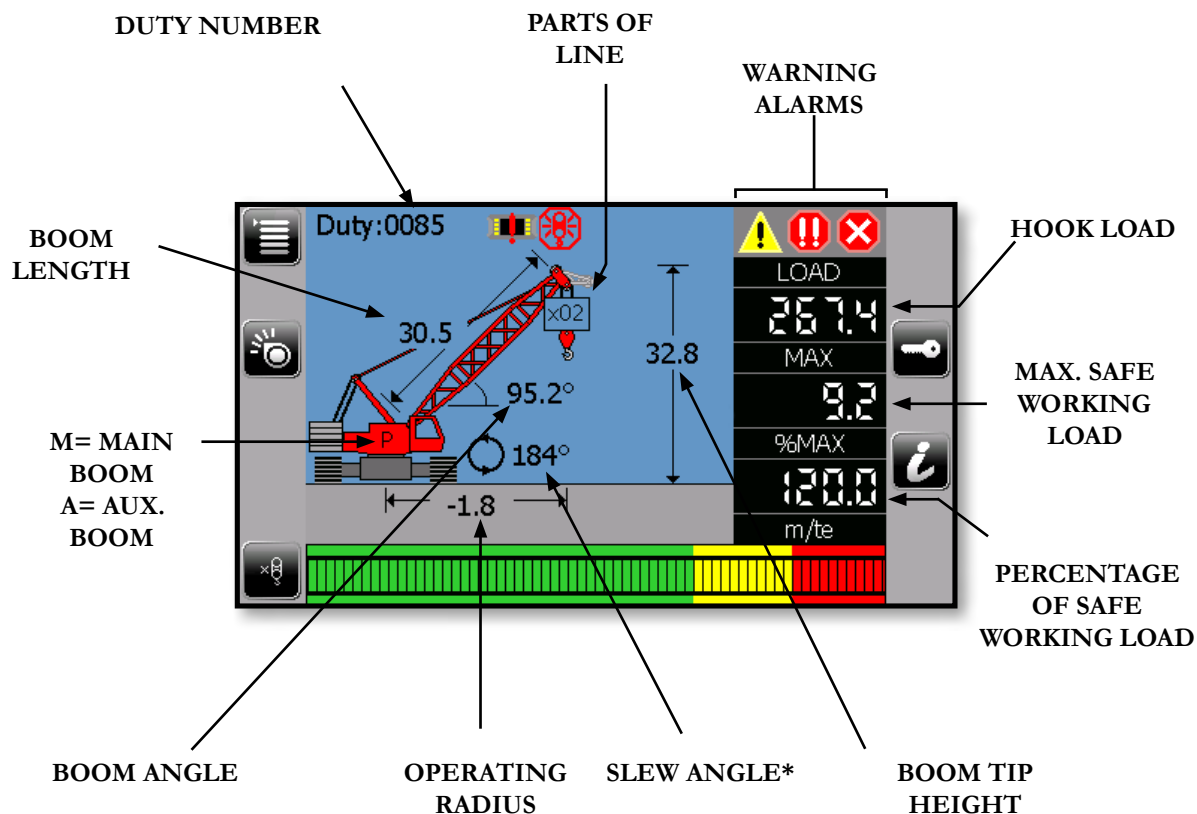
Accuracy:	In accordance with SAE J159 or EN13000: 2010
Operating temperature:	-20 °C to + 70 °C
Supply voltage:	9 to 32 VDC (maximum rating)
Display size:	Available in: 4.3" LCD Screen 7.0" LCD Screen 10.4" LCD Screen
Display sealing:	IP67
Memory capacity:	10,000 load/radius curves

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

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Detailed Description of the Display Unit

2.1 Main Display (Default Screen)

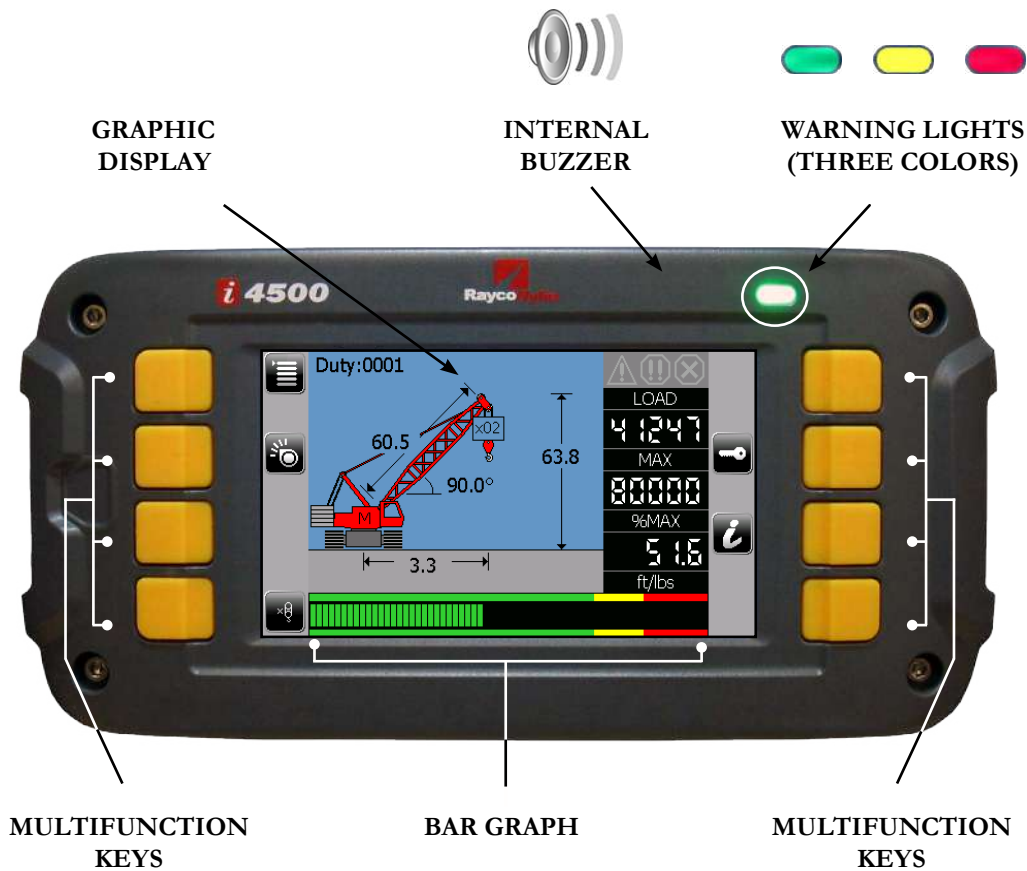


The parameter showing the boom height should be used only as a guide, **NOT** as an indication that the crane would or would not pass under a structure of which we precisely know the height.



**You can see the slew angle indicator (middle of the screen) only when the range limiting option is installed on 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. 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 operation mode. Select this button to choose one of these main operating modes:

- Limit Mode
- Diagnostic Mode
- Config. Mode
- Calibration Mode (protected by a password)
- Info Mode
- Error Mode
- Night Mode



DUTY BUTTON

Choose this button to access the menu for the selection of the duty number. 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 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 or to bypass. (See section 4.4.7).



CLOSE WINDOW BUTTON

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



PARTS OF LINE BUTTON

Select this button to quickly access the parts of line menu for the selection of the number of parts of line 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	On
	Free zone	Off
	Variable limit height	Off
	Variable limit radius	Off

*optional

LIMIT MODE WITHOUT ROTATION

Limit Setting			
	Max. Angle	0.0	Off
	Min. Angle	0.0	Off
	Max. Height	0.0	Off
	Max. Radius	0.0	Off
Value in degrees			

OR

MAIN MODE

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

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

NIGHT MODE

Units
Set tare
Language
Date and time
Backlight

CONFIG. MODE

Info	
Duty:	0086
Boom mode:	standard
Boomlength:	110 ft
Head type	standard head
Attachment:	None
Outriggers:	crawler extended
Counterweight:	54900 + 14700 lbs
Deduct erected:	30' jib at 30° offset
Slew:	not used

INFO MODE

Errors	
Lost communication with Angle 1	
Lost communication with Load 1	
Lost communication with Relay board 1	
Lost communication with rotation encoder	

ERROR MODE

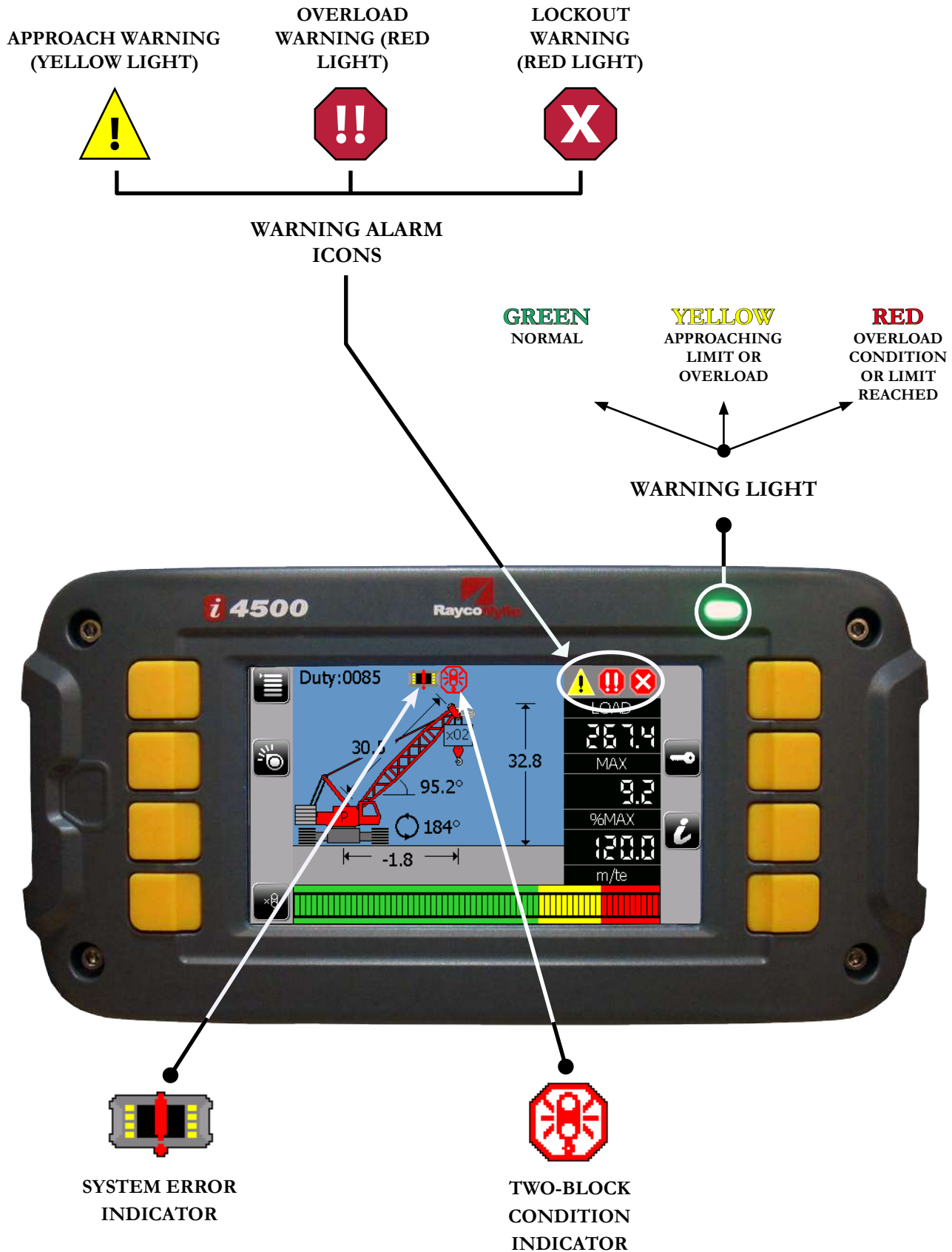
Diagnostic		
ATB	ON	Connected
Angle 1	31.70	Connected
Load 1	4.53	Connected
Load 2	0.00	Lost
Relay Board 1	---	Connected
Rotation, Relative Encoder	146.00	Connected
Detected Address	---	N/A
System	---	N/A

DIAGNOSTIC MODE

Mode Calibration	
Select sensors	
Zero sensor	
Span sensor or Side of boom angle	
Select load sensor	
Zero load	
Span load	
Loaded boom deflection	
Memory	
Calibration data	

CALIBRATION MODE

2.5 Warning Lights and Indicators Location



2.6 Warning Lights and Indicators Detailed Description



The approach warning light (yellow) turns on when the hook load is between 90% and 99.9% of the rated capacity (adjustable value). This comes with an audible warning device that is fitted inside the display unit. This light will also turn on if you are approaching within the calibrated approaching distance (feet, meters or degrees) of a predetermined limit set in the limits setting mode.



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



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



The crane maximum capacity has been reached or exceeded.



The lockout warning light (red) turns on at or above 100.1% (adjustable value) of the rated capacity. Booming down and hoisting up functions are usually blocked. The exact operation is specific to the crane model.



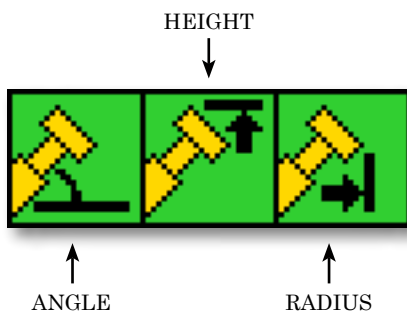
The crane has exceeded safe operational ratings and is now in an unsafe condition. Hoisting up and booming down functions will be stopped if a motion cut solenoid is connected to the system.



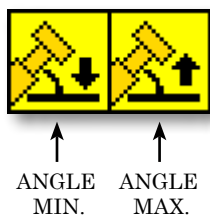
The rope limit indicator appears on the i4500 screen to indicate that the maximum load is limited by the rated strength and the number of parts of line of the hoist rope. Increase the number of parts of line between the sheave on the boom tip and the block and change the number of parts of line on the i4500 system to make this indicator disappear and to reduce a rope limit.



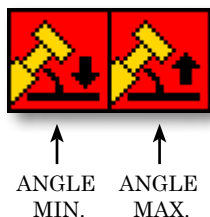
The Two-Block condition indicator appears on the i4500 display when such a condition is detected by the system. This may block the hoist function, the booming down and the boom extension depending on crane model and/or on the options fitted on the machine.



One of these indicators (or many of them) appear in the top-left corner of the i4500 screen when at least one operational 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.



If you are approaching a predetermined maximum or minimum angle limit, one these indicators will appear on the screen, the yellow approach warning light will blink and the internal buzzer will sound on and off.



If you have reached a predetermined maximum or minimum angle limit, one these indicators will appear on the screen, the red overload warning red light will be activated and the buzzer will sound continuously.



If you are approaching a predetermined maximum height limit, this indicator will appear on the screen, the yellow approach warning light will blink and the internal buzzer will sound on and off.



If you have reached a predetermined maximum height limit, this indicator will appear on the screen, the red overload warning light will turn on and the buzzer will sound continuously.



If you are approaching a predetermined maximum radius limit, this indicator will appear on the screen, the yellow approach warning light will blink and the internal buzzer will sound on and off.



If you have reached a predetermined maximum radius limit, this indicator will appear on the screen, the overload warning light will turn on 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 values are defined during the tests performed by the technician during the calibration of the system.

Limits values are not active when the 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 lockout.

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Installation and Calibration

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



Failure to properly calibrate the system can result in overloading the crane. This can cause 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 upon request at **RaycoWylie**. Please note that the installation and calibration instructions have intentionally not been included in this instruction manual.*

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Operating Instructions

4.1 Safety Instructions

When operating the i4500 system, always respect the safety rules and regulations applicable in the country where you operate the crane to reduce the risk of 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 working site and to the configuration of the crane. A wrong set-up can cause the i4500 indicator system to show unreliable information which may cause hazardous conditions such as an overload.
2. The i4500 system is only 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 depends upon proper daily inspection and conformity to the operating instructions described in this manual.
4. During normal operation, the rated capacity of a crane should not be exceeded. The overload indication should not be used as a normal operating feature.
5. The crane should always be operated smoothly and at a safe speed.
6. In order to have a proper rated capacity and radius, the system must be properly configured. 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 the configuration and number of parts of line will change simply by changing the hoist from main to auxiliary.



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 lockout 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 if there are power lines in the crane working area, causing the risk of operating the crane near power lines that could result in injury or death.
- The system gives no indication whether the outriggers have been fully extended. It can cause machine breakage or tipping that could result in injury or death.
- The system gives no indication of the crane level. It can cause machine breakage or tipping that could result in injury or death.
- The system gives no indication of poor ground stability. It can cause machine breakage or tipping that could result in injury or death.

4.3 Power On

When the i4500 system is powered on, it performs a self-test during which it verifies with the installed sensors the communication on the CAN bus network. It loads in its user memory all the informations stored in its read-only memory. The RaycoWylie logo is shown on the screen. When the test is over and the random access memory is loaded, the red warning light turns on and the controls of the cranes are blocked if there is an electrical or hydraulic lockout. The i4500 system then shows the duty selection menu.



The crane operator must confirm that the duty given by the system is the one he really wants to use or he must choose another one among the duties shown. Once his choice is made, he must press the **Select** button and the system goes to the normal operating 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 the length of the main boom, the length of the jib, the counterweight, the outriggers-/crawlers/tires, the hoists etc. Afterwards this duty is associated to a corresponding duty number by the system.

If you need assistance, contact **RaycoWylie** with the technical file number of your system.

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

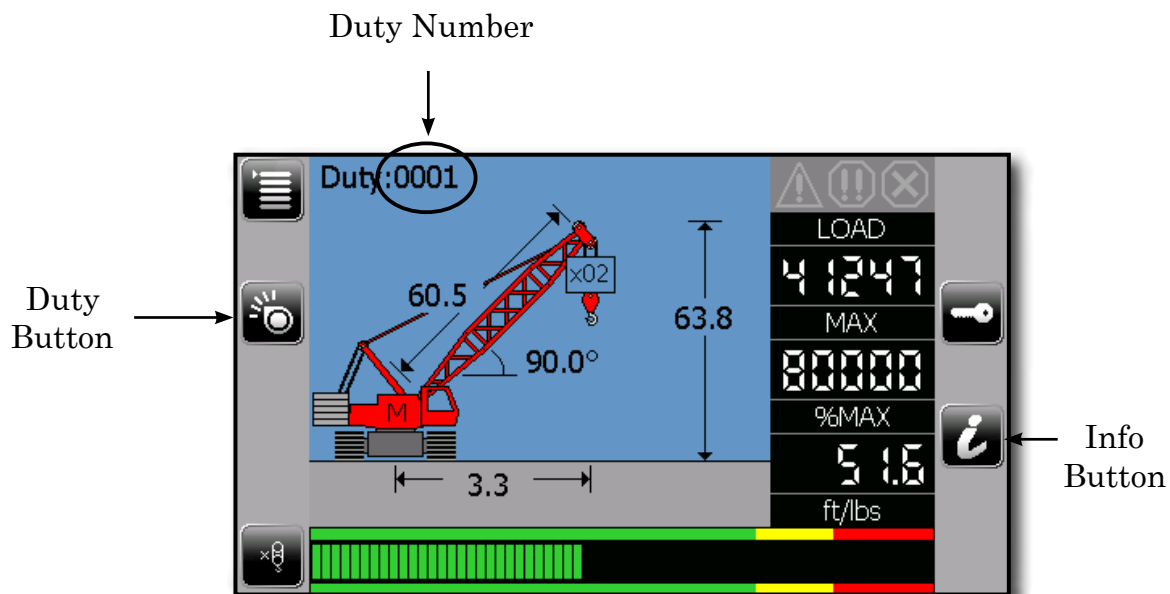


Figure 1

4.4.1 Duty Selection (Cont'd)

We need to provide the i4500 system with the proper information by answering 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 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 length of the main boom among the choices on the list.

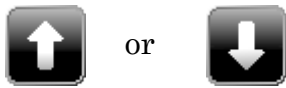


or

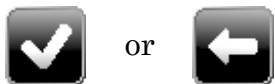


3. Choose the **Select** button to accept new value into the system or press the **Escape** button to return to the main operating screen.

4.4.2 Working with the Main Boom, 1 ou 2 Hoists (Cont'd)



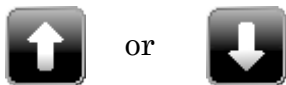
4. Use the Up or Down buttons to select the main boom among the choices on the list.



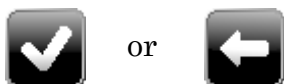
5. Press the **Select** button to confirm your choice or press the **Escape** button to go back to the previous screen.



This menu only appears if the system was set up with two hoists. Go to the next menu if your machine has only one hoist.

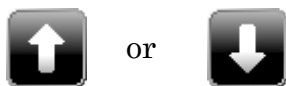
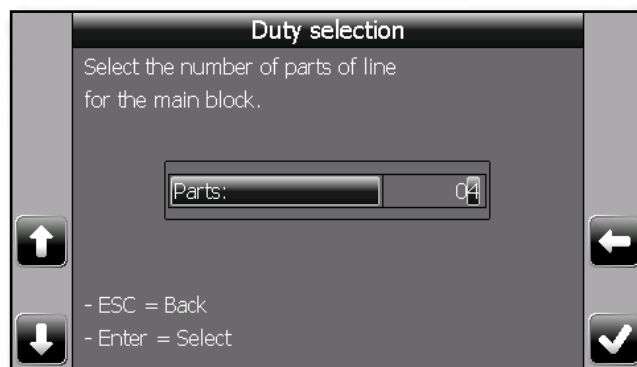


6. Now select the hoist. **H1** = Hoist 1 (main) or **H2** = Hoist 2 (auxiliary). Use the **Up** or **Down** buttons to select the right value among the choices on the list.



7. Press the **Select** button to confirm your choice, accept new value in the system and go to the next parameter or press on the **Escape** button to go back to the previous screen.

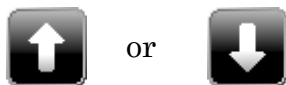
4.4.2 Working with the Main Boom, 1 ou 2 Hoists (Cont'd)



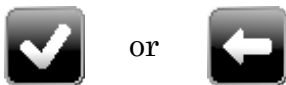
8. Now enter the number of parts of line for the main block. Use the **Up** or **Down** button to enter the value of the first digit.



9. Use the **Select** button to underline the second digit.



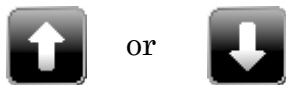
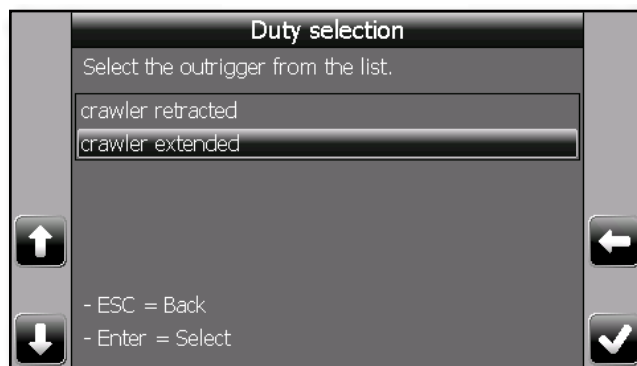
10. Use the **Up** or **Down** button to select the required value.



11. Use the **Select** button to enter the new value or press on the **Escape** button to go back to the previous screen.

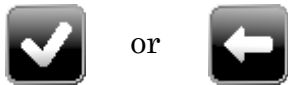


If there is only one choice on this list, this menu will not appear and the system will go on to the next menu.



12. Use the **Up** or **Down** buttons to select the position of the outriggers among the list.

4.4.2 Working with the Main Boom, 1 ou 2 Hoists (Cont'd)



or

13. Press the **Select** button to accept the new value in the system or press on the **Escape** button to go back to the previous screen.

Once the duty selection is over, the i4500 automatically returns to the main screen (normal operating mode). You can use the «**Info**» button to see at a glance the configuration of the crane.



You might have to answer extra questions according to your crane and its load chart, or for example if you have a counterweight that you need to configure. Keep answering the questions until you see the main screen.

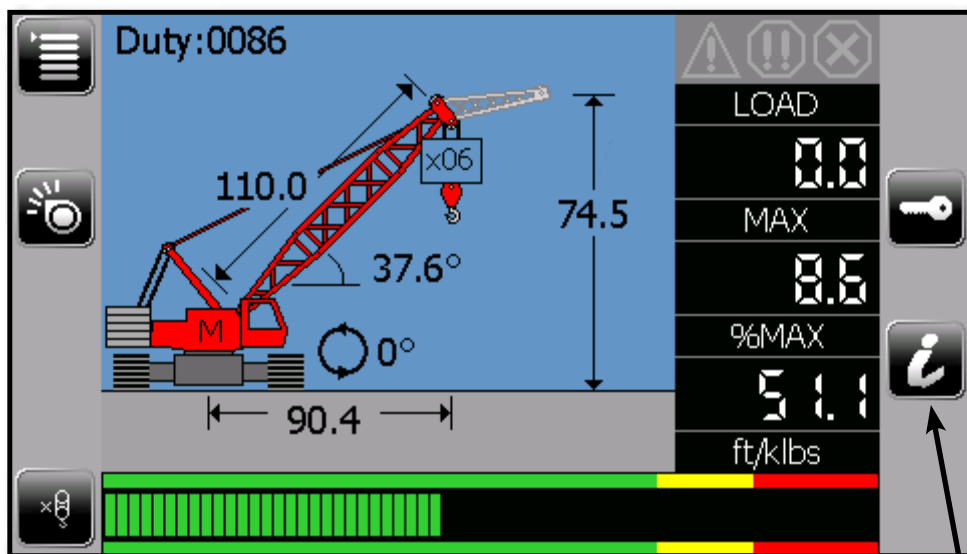


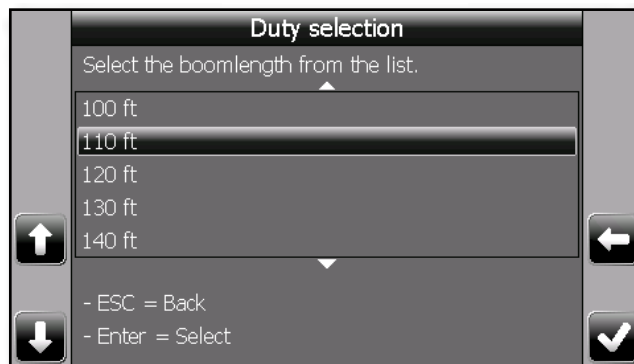
Figure 2a

Info button

4.4.3 Working with Jib, One Hoist



The menus in the sections 4.4.3 and 4.4.4 will not be available if your crane has no jib.



1. Press the **Select** button..



or



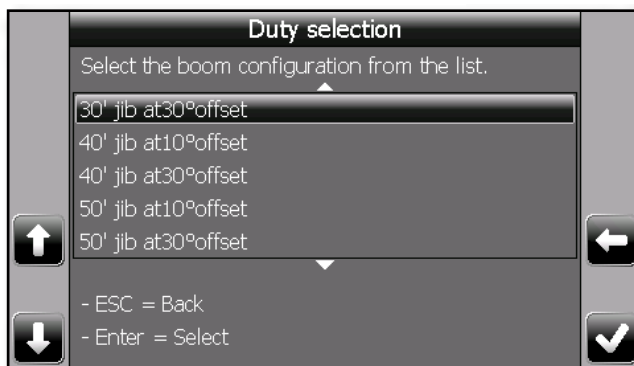
2. Use the **Up** or **Down** button to select the main boom length from the list.



or



3. Press the **Select** button to confirm your choice or press the **Escape** button to go back to the main screen.



or



4. Use the **Up** or **Down** button to select the jib configuration from the list.

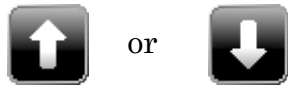


or



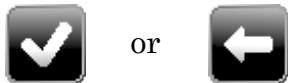
5. Press the **Select** button to confirm your choice or press the **Escape** button to go back to the main screen.

4.4.3 Working with Jib, One Hoist (Cont'd)



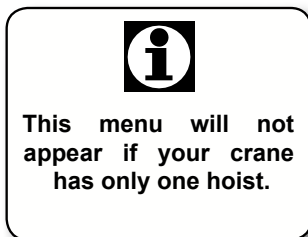
or

6. Specify that you want to use the jib to lift the load. Use the **Up** or **Down** button to highlight the configuration of the jib you chose at point 4.

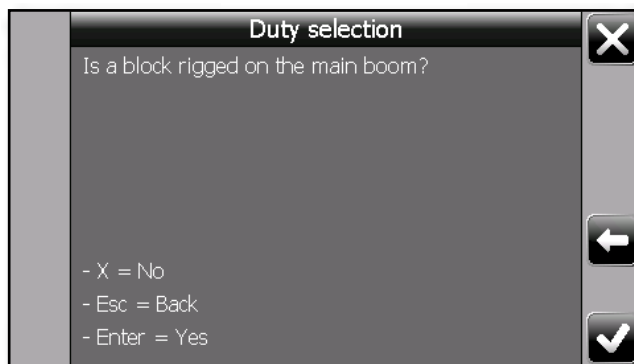


or

7. Press the **Select** button to accept new value in the system and to go to the next parameter or press the **Escape** button to go back to the main screen.

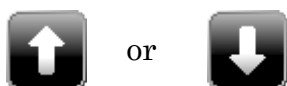
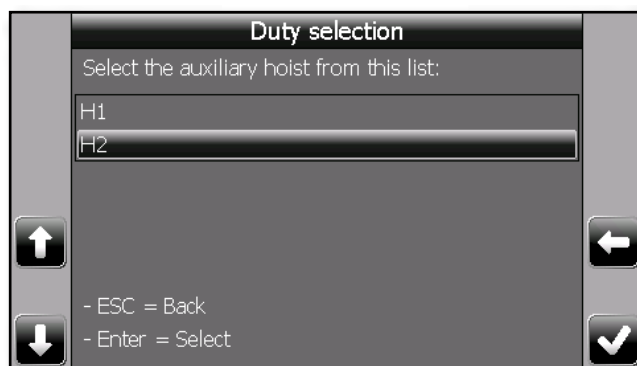
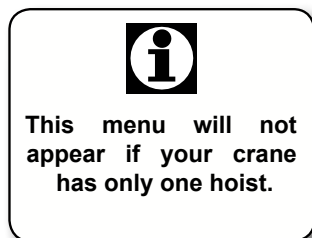


This menu will not appear if your crane has only one hoist.

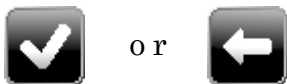


8. Press the **X** button to answer “**NO**” to the following question: Is a block rigged on the main boom ?

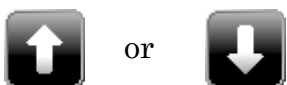
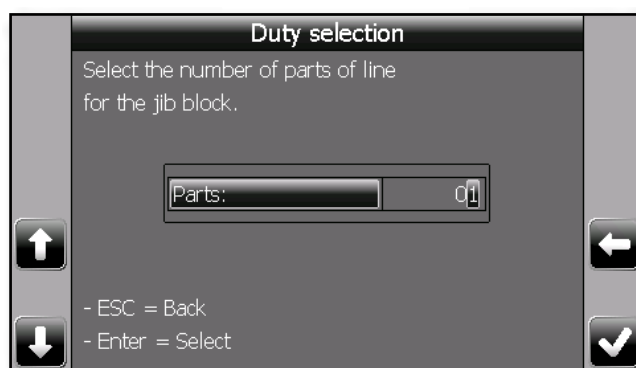
4.4.3 Working with Jib, One Hoist (Cont'd)



9. You now have to select the hoist currently in use. **H1**= Hoist 1 (Main) or **H2**= Hoist 2 (auxiliary) Use the **Up** or **Down** button to select the right value (usually H2 for the jib) from the list.



10. Press the **Select** button to accept this new value in the system or press the **Escape** button to go back to the main screen

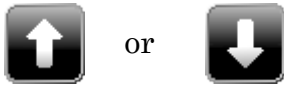


11. Now enter the number of parts of line used between the jib block and the head sheave. Use the **Up** or **Down** button to enter the first digit.



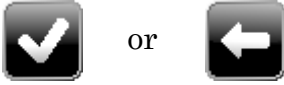
12. Press the **Select** button to highlight the second digit.

4.4.3 Working with Jib, One Hoist (Cont'd)



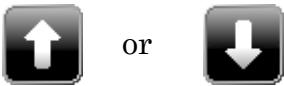
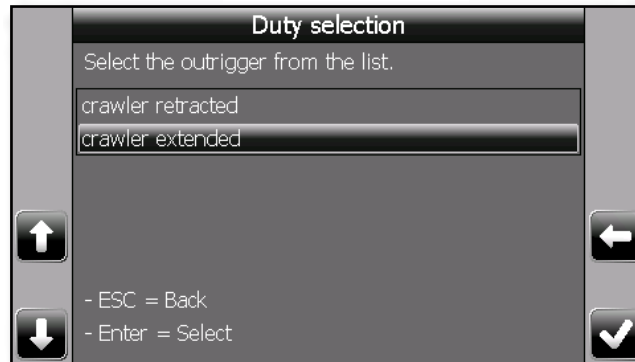
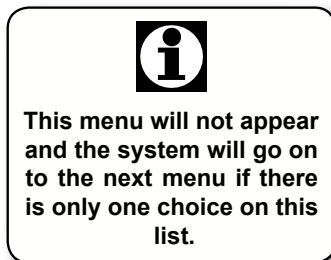
or

13. Use the **Up** or **Down** button to select the desired value.



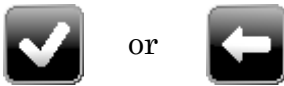
or

14. Press the **Select** button to accept this new value in the system or press the **Escape** button to go back to the main screen.



or

15. Use the **Up** or **Down** button to select the outriggers position from the list.



or

16. Press the **Select** button to accept this new value in the system or press the **Escape** button to go back to the main screen.

Once the selection of the configuration is over, the system automatically goes back to the main screen (normal operating mode). You can use the **Info** button to see at a glance the configuration of the crane.



You may have to answer extra questions according to your crane and its load chart, or for example if you have a counter-weight that you need to configure. Keep answering the questions until you see the main screen.

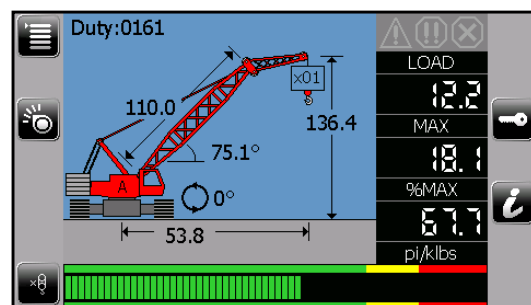


Figure 2b

4.4.4 Working with the Main Boom or Jib



This configuration is only possible if the crane is equipped with two hoists



1. Press the **Select** button.



or



2. Use the **Up** or **Down** button to select the main boom length from the list..



or



3. Press the **Select** button to confirm your choice or press the **Escape** button to go back to the main screen.



or



4. Use the **Up** or **Down** button to select the jib configuration from the list.

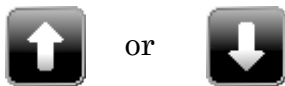
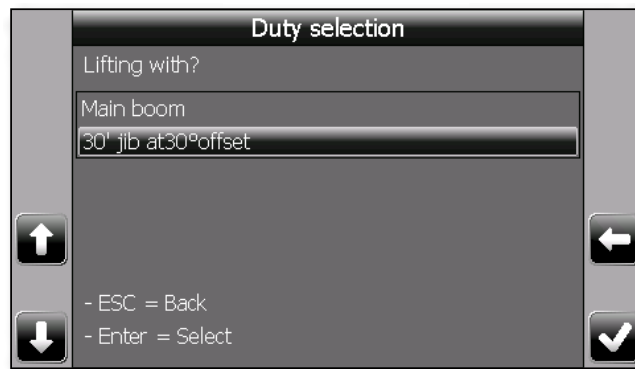


or

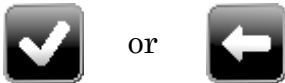


5. Press the **Select** button to confirm your choice or press the **Escape** button to go back to the main screen.

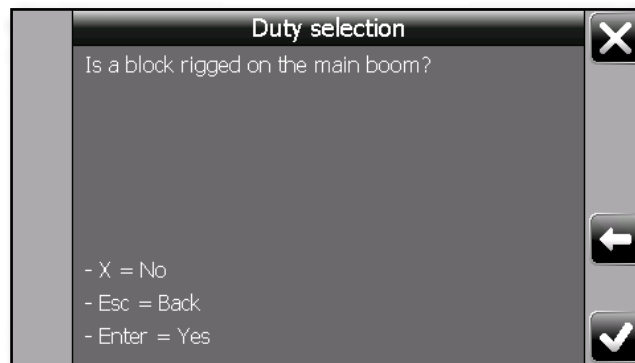
4.4.4 Working with the Main Boom or Jib (Cont'd)



6. Specify if you want to use the jib or the main boom to lift the load. Use the **Up** or **Down** button to highlight the configuration needed to lift the load.



7. Press the **Select** button to enter the new value in the system and to go to the next parameter or press the **Escape** button to go to the previous screen.

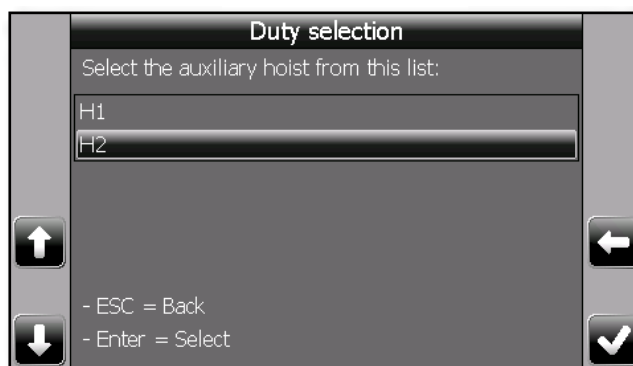


8. Press the **Select** button (the check mark) to answer “YES” to the following question: Is there a block rigged on the main boom ? This question will appear on the screen if you have decided to lift the load with the jib at step # 6. If you have decided to lift the load with the main boom, the following question will appear: Is there a block on the attachment? You need to answer “YES” in both cases.

4.4.4 Working with the Main Boom or Jib (Cont'd)



According to your choice at step # 6, the system will either start by the main hoist or by the auxiliary hoist.



or



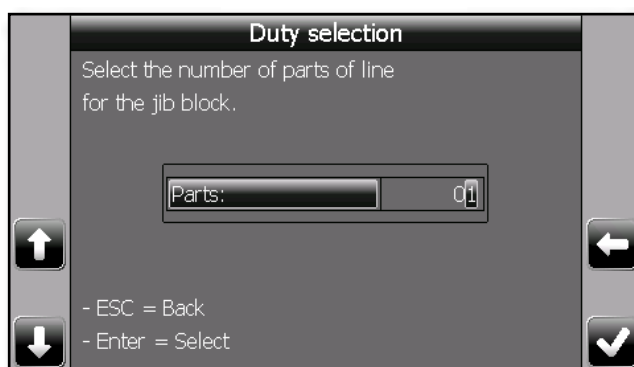
9. You now have to select the hoist used on the jib (usually H2) from the list. Use the **Up** or **Down** button to select the good value among the choices on the list.



or



10. Press **Select** button to accept the new value in the system or press the **Escape** button to go back to the previous screen.



or

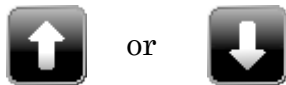


11. Now enter the number of parts of line used between the block of the jib and the head sheave. Use the **Up** or **Down** button to enter the first digit.

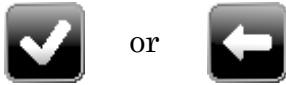


12. Press the **Select** button to highlight the second digit.

4.4.4 Working with the Main Boom or Jib (Cont'd)



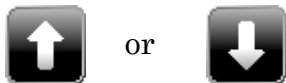
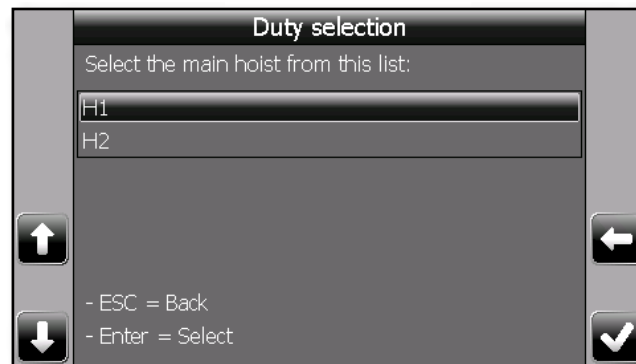
or



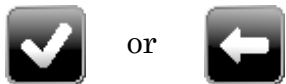
or

13. Use the **Up** or **Down** button to select the desired value.

14. Press the **Select** button to accept the new value or press the **Escape** button to go back to the previous screen.



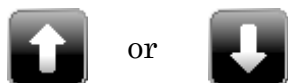
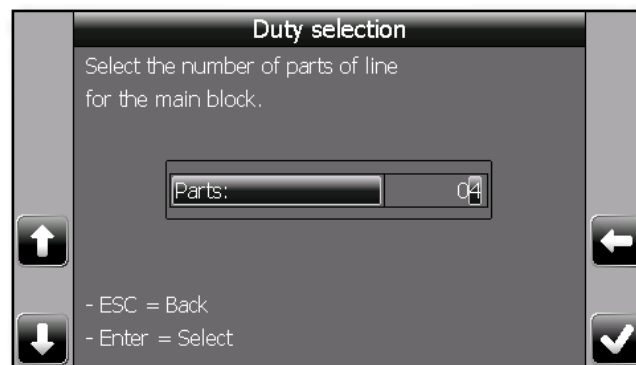
or



or

15. You now have to select the hoist used on the main boom (usually H1). Use the **Up** or **Down** button to select the right value from the list.

16. Press **Select** button to accept the new value in the system and go to the next parameter or press the Escape button to return to the previous screen



or

17. Now enter the number of parts of line for the main block. Use the **Up** or **Down** button to enter the first digit.

4.4.4 Working with the Main Boom or Jib (Cont'd)



18. Press the Select button to highlight the second digit.



or



19. Use the Up or Down button to select the desired value.



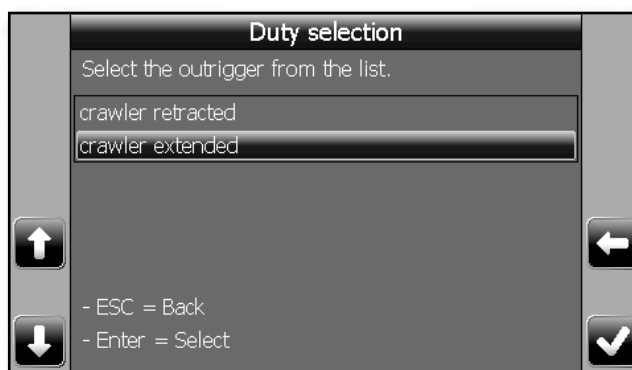
or



20. Press the Select button to accept the new value or press the Escape button to go back to the previous screen.



If there is only one choice on this list, this menu will not appear and the system will go on to the next menu.



or



21. Use the **Up** or **Down** button to select the outriggers position from the list.



or



22. Press the **Select** button to accept the new value in the system or press the Escape button to return to the previous screen

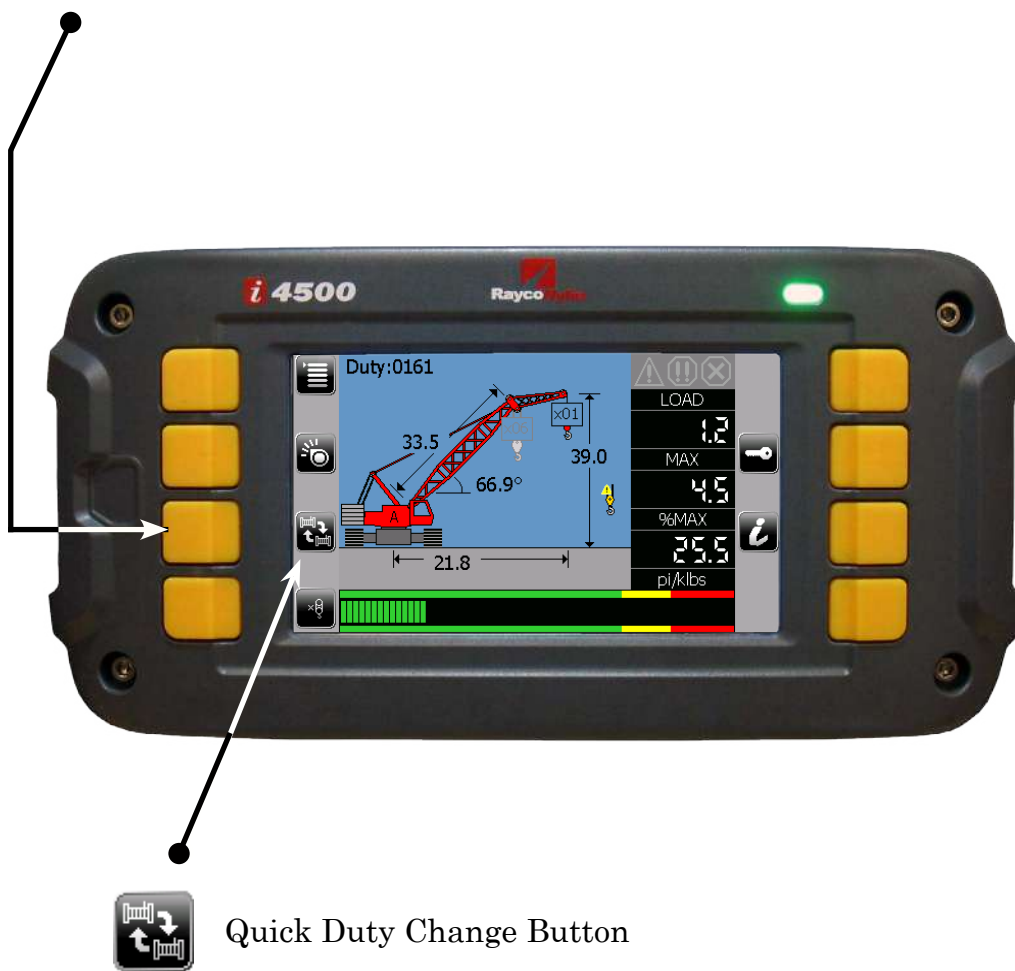
Once the selection of the configuration is over, the system automatically goes back to the main screen (normal operating mode). You can use the **Info** button to see at a glance the configuration of the crane.



You might have to answer extra questions according to your crane and its load chart, or for example if you have a counterweight that you need to configure. Keep answering the questions until you see the main screen.

4.4.4 Working with the Main Boom or Jib (Cont'd)

Press this button to choose to whether lift the load with the main boom or with the jib.



4.4.5 System Configuration Information Screen

Simply pressing the **Info** button is a convenient way to verify the current configuration of your crane. You can check at a glance the settings for many parameters such as the outriggers state, the boom selection, the 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 pressing the **Mode** button (see steps below).



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



Press the **Escape** button to return to the main screen.

Or



1) Select the **Mode** button.



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



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

Info	
Duty:	0086
Boom mode:	standard
Boomlength:	110 ft
Head type	standard head
Attachment:	None
Outriggers:	crawler extended
Counterweight:	54900 + 14700 lbs
Deduct erected:	30' jib at 30° offset
Slew:	not used

Chart Info Screen

4.4.5 System Configuration Information Screen (Cont'd)

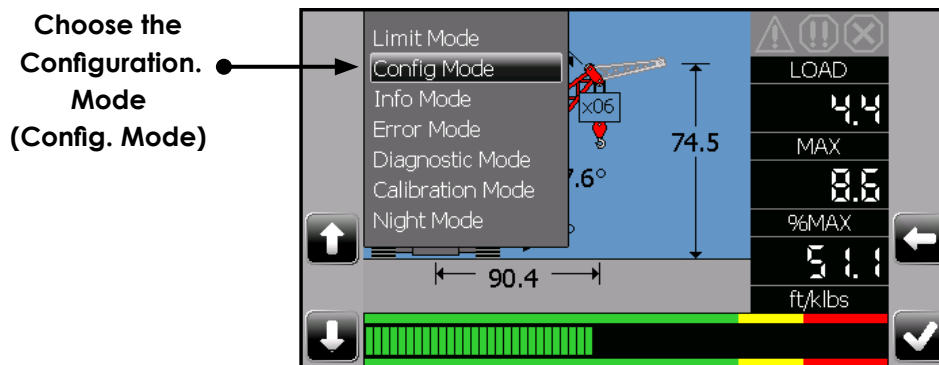


Once your system is properly configured, the i4500 Rated Capacity Indicator is ready to use.



The info screen is different for each crane model. The representation shown 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:

- 1- Unit selection
- 2- Set tare
- 3- Language
- 4- Date and time
- 5- 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.



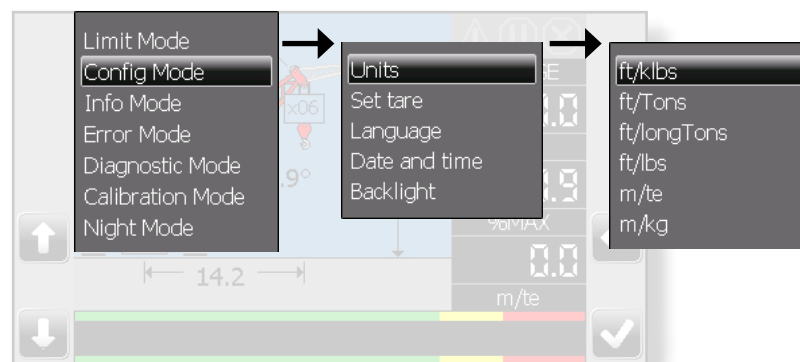
2) Scroll down with the **Down** button to highlight the config. mode line



3) Press the **Select** button to confirm your choice and access the config. mode menu.

4.4.6.1 Unit Selection

It is possible to choose among 6 measurement units combinations.
Each length and load measure will be displayed on the main display

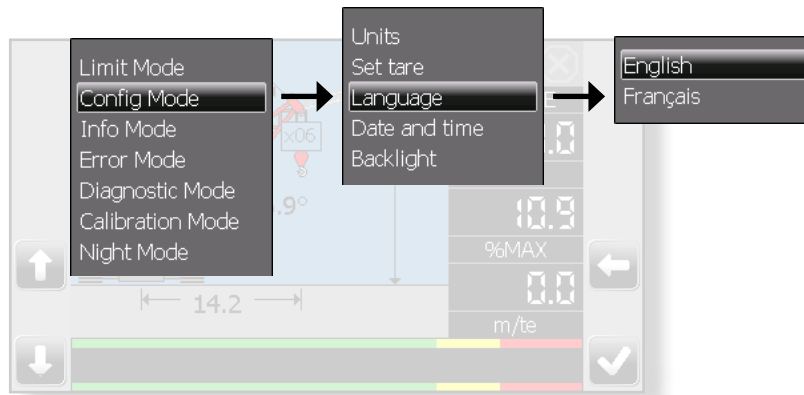


To set the units proceed as follow:

1. Repeat steps 1 to 3 of the system setup configuration mode section (see above, section 4.4.6)
2. Select the line "Units".
3. Use the **Up** or **Down** button to highlight the desired unit combination
4. Press the Select button to select the desired unit combination.

4.4.6.2 Language Selection

The text on the i4500 can be displayed in many languages. The languages available can vary depending on the software version.

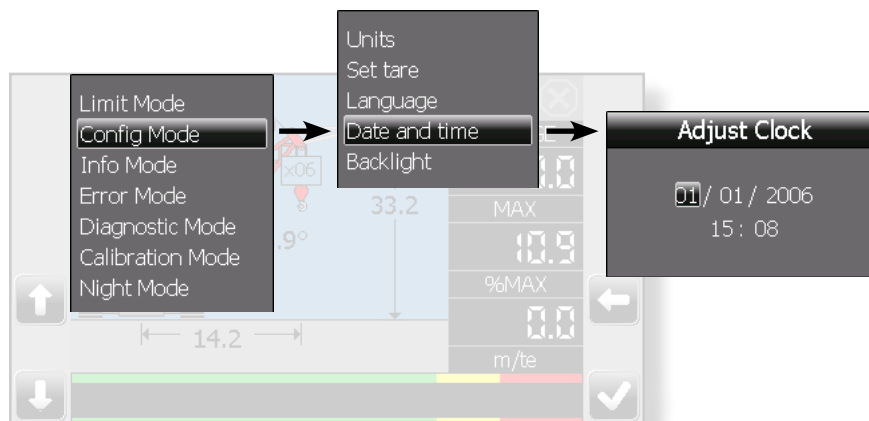


To set the language, proceed as follows:

1. Repeat steps 1 to 3 of the system setup configuration mode section (see section 4.4.6 on page 51)
2. Select the Language menu
3. Use the **Up** or **Down** buttons to highlight the desired language.
4. Press the **Select** button to confirm your choice.

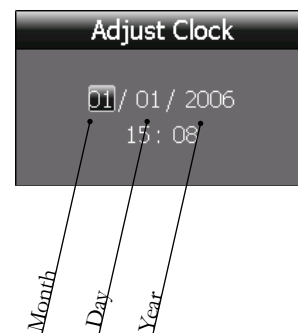
4.4.6.3 Date and time setting

This sub menu allows you to adjust the date and time in the system. This is an important step for the data recorder.

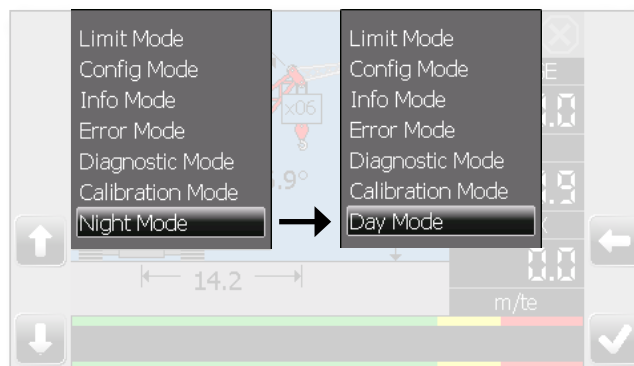


To set the date and the time, proceed as follows:

1. Repeat steps 1 to 3 of the system configuration section (see section 4.4.6 on page 51).
2. Select the Date and Time menu.
3. Press the **Select** button to confirm your choice.
4. The adjust clock window should appear on the screen. Scroll up or down with the **Up** or **Down** buttons to select the desired month value.
5. Press the **Select** button to accept this new value into the system.
6. Repeat procedure to adjust the day and the year. Press the Select button to confirm your choice.
7. To adjust the clock, scroll up or down with the **Up** or Down buttons to select the desired hour value. Repeat procedure to enter the minutes.
8. Choose the **Select** button to save 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 level for the night mode is set in the backlight menu (see backlight mode on the following page).

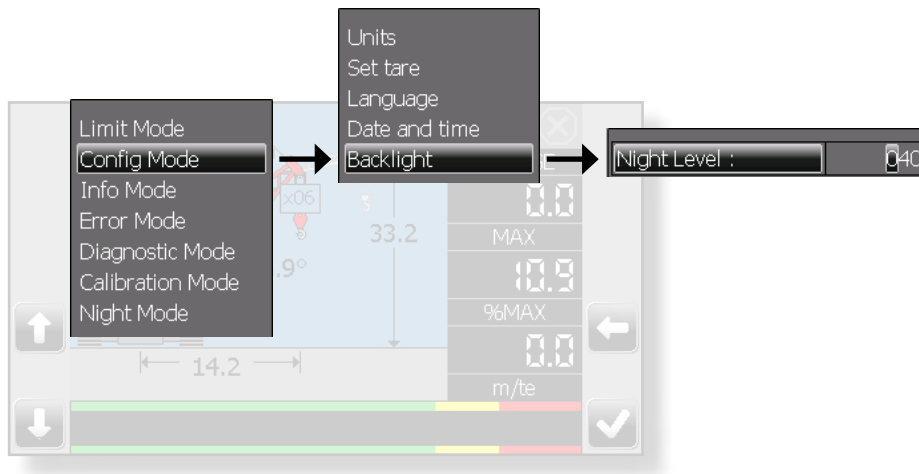


To set the backlight mode, proceed as follow:

1. Press the **Mode** button..
2. Scroll down with the **Down** button to highlight the Night or Day mode
3. Press the **Select** button to change the backlight mode (to switch from day light mode to night light mode or vice versa).

4.4.6.5 Backlight Mode

You can modify the screen brightness levels (of the night mode) to help you read the screen under various lighting conditions.

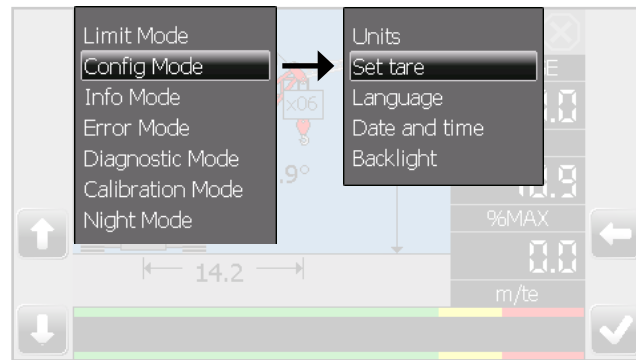


To adjust the display brightness, proceed as follow:

1. Repeat steps from 1 to 3 of the system setup option section (see section 4.4.6 on page 51 of this manual)
2. Select the backlight menu.
3. The «night level» window should appear on the screen. The «day» level is at 100 % (maximum brightness). For the «night» level, a 30 % to 60 % backlight is suggested.
4. Use the **Up** or **Down** buttons to select the hundreds. Press the **Select** button.
5. Repeat the procedure to set the other digits.

4.4.6.6 Set and Remove Tare Mode

Select the **Tare Mode** option to display the actual load on hook during a lifting operation. This mode is used to remove the weight of the block, hook and hoisting rope. This way it only shows on the screen the weight of the lifted load.



To set the tare mode, proceed as follow:



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.

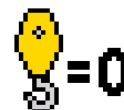
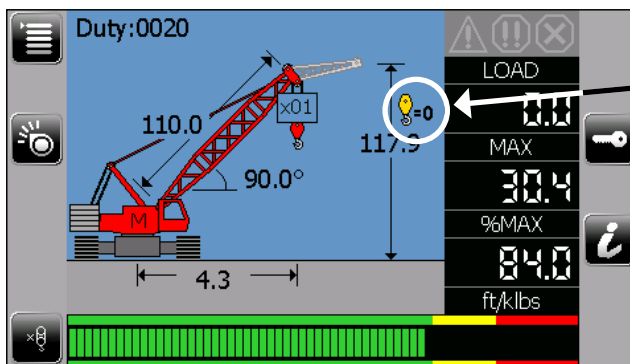


4. Scroll down with the **Down** button to highlight the Set Tare line.

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



6. Repeat these steps to remove tare and to go back to normal mode.



The tare indicator appears on the screen when some weight have been removed on the load displayed.

4.4.7 Bypass/Rigging



Warning! When in rigging mode, the motion cut and overload alarms are disabled. In this condition, the crane is not fully protected by the i4500, therefore it's absolutely essential to follow the crane manufacturer's advice regarding lifting the block, the rotation or the use of the outriggers.



The **Bypass/Rigging** button is used to access the **Rigging Mode, to override an Overload Condition or to override an ATB condition.** In the case of an emergency the operator can override the system (lockout) by pressing the **Bypass / Rigging** button. The **Bypass/Rigging** button must be released and pushed again after 10 seconds.

4.4.7.1 Rigging Mode (Maintenance / Erection Mode)

It is often necessary to go outside the "safety zone" for which the crane manufacturer provides ratings when stowing or erecting the machine. For example, the boom stowed position may be outside the maximum load radius or minimum boom angle specified on any load chart.

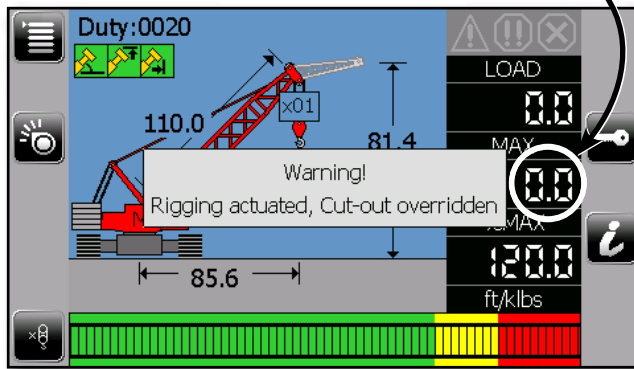
For this reason, **the i4500** provides a Maintenance/ Erection mode where the boom may be lowered to the horizontal position without having the external alarm continuously sounding or the motion cut operating.

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

- There are no lockouts
- The ATB switch is still monitored but will not active the lockout system.
- No audible alarms.
- The yellow light is on.
- The speed of the movements is not limited .
- A flashing rigging message is shown on the display.
- The rigging mode can only be accessed when the SWL is zero..

4.4.7.2 Accessing Rigging Mode

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

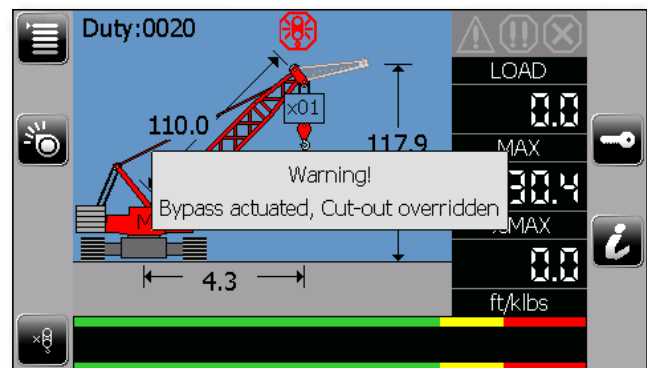


At this point when pressing the Bypass / Rigging button the system automatically enters in rigging mode and an override message flashes on the system display.

- **The rigging mode is automatically exited when:**
- The operator selects another mode.
- The boom returns in the working zone, capacity higher than zero
- The system is powered off .

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 yellow and red warning lights are activated. There is also an override message that flashes on the display indicating that the lockout system is bypassed.



The lockout can be overridden when:

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

The bypass is automatically cancelled when:

- The load is below the percentage of the capacity setted to activate the lockout system (120 % by default)
- There is no more occurence of an ATB condition; or
- The **system** 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 the following four (4) operational limits in addition to those automatically provided by the i4500 system.

Here are the limits



1) The minimum boom angle limit



2) The maximum boom angle limit



3) The maximum boom tip height limit

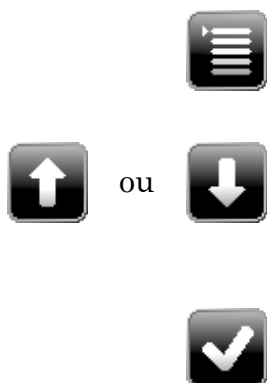


4) The maximum operating radius limit.

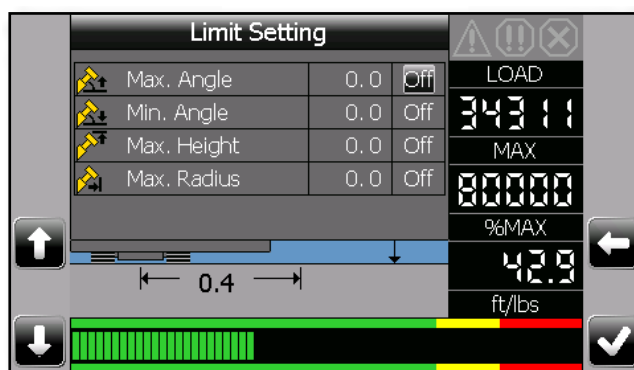
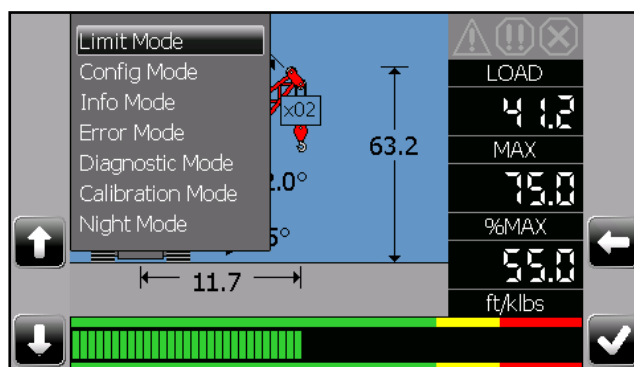


Important: Please note that if your machine is equipped with the range limiting option, the operational limits setting mode will not be available for selection (refer to section 4.6 of this manual for more details on the range limiting device).

4.5.1 Accessing the Operational Limits Setting Mode



1. Press the Mode button.
2. The line «Limit Mode» should be highlighted by default. If it is not the case, use the Up or Down buttons to highlight this line.
3. Choose the **Select** button to confirm your choice and access the operational limits mode.



Limit setting menu

4.5.2 Limit Value Adjustment

Limit Setting			
	Max. Angle	0.0	Off
	Min. Angle	0.0	Off
	Max. Height	0.0	Off
	Max. Radius	0.0	Off
Value in degrees			



1. Repeat steps 1 to 3 in the accessing the operational limits setting mode section (see section 4.5.1 on page 59).



or



2. Use the **Up** and **Down** buttons 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



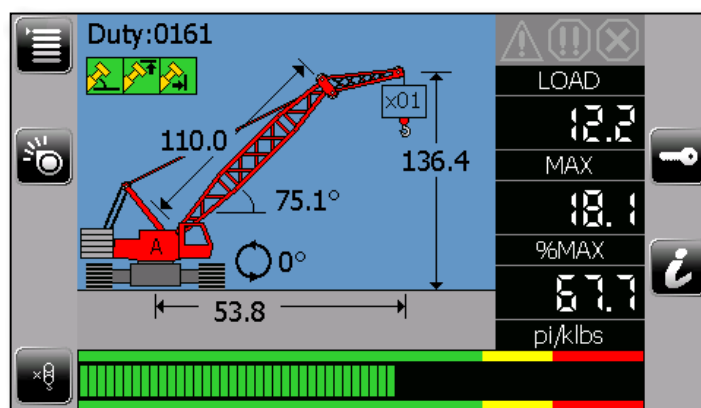
4. Press the **Up** and **Down** buttons to select the desired value for this particular limit.



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	0.0	On
	Min. Angle	0.0	On
	Max. Height	0.0	On
	Max. Radius	0.0	On

Limit status
On/Off



1. Repeat steps 1 to 3 in the accessing the operational limits setting mode section (see section 4.5.1 on page 59).



2. Press many times the Down button until the first line of the limit state column (column On/Off) is highlighted (see picture at the bottom of the page).



or



3. Use the Up or 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 this limit.



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

Limit Setting			
	Max. Angle	0.0	On
	Min. Angle	0.0	On
	Max. Height	0.0	On
	Max. Radius	0.0	On

Maximum angle limit enabled

Limit Setting			
	Max. Angle	0.0	Off
	Min. Angle	0.0	Off
	Max. Height	0.0	Off
	Max. Radius	0.0	Off
Value in degrees			

Maximum angle limit disabled



When the value of a given operational limit is changed (see section 4.5.2), the modified limit is automatically activated.

4.6 Range Limiting Option



Carefully read and understand these instructions before setting an operational range limit. Setting the wrong operational range limit 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 limits must be reprogrammed everytime the crane is moved



RaycoWylie recognizes that operating cranes near power lines or equipment is an extremely hazardous practice that requires extra precautions. To avoid the risk of being electrocuted, 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 electricity. 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 near power lines.

4.6 Range Limiting Option (Cont'd)



A red icon indicates that a limit has been reached.

Shows which zone is programmed

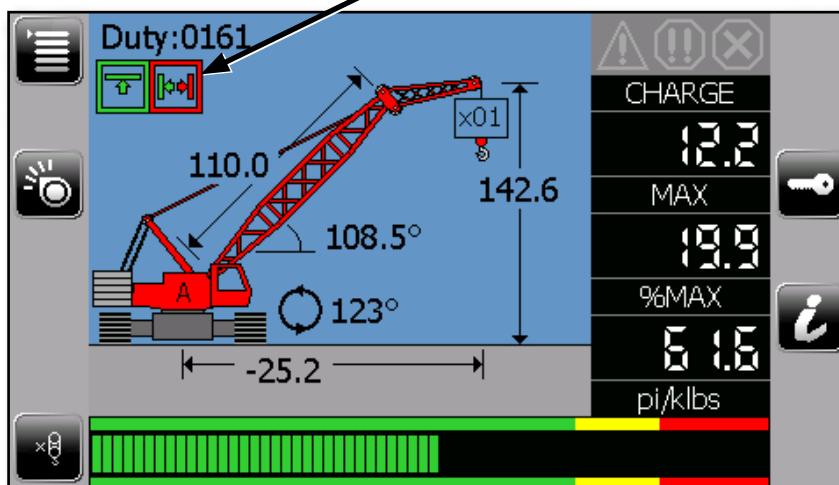


Height Limit

Free Zone (two walls)

Variable height limit

Variable radius limit



Menu options :

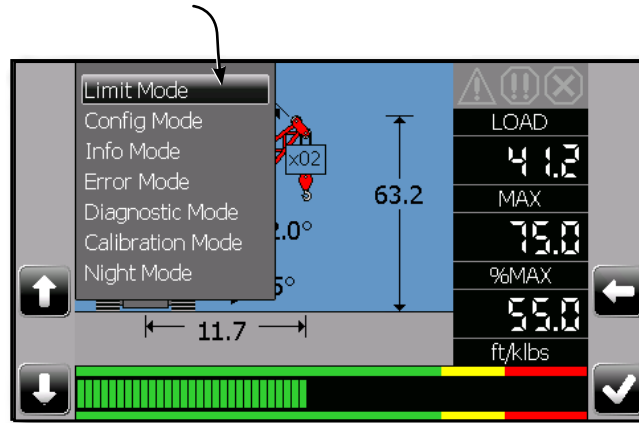
When there is a range limiting option and a slew sensor installed on the crane, the i4500 automatically selects the range limiting mode as the only possible choice. In this case, the following “limit mode” menu options are offered:

- Height limit
- Free zone
- Variable height limit
- Variable radius limit

4.6.1 Accessing Range Limiting Mode



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



If it's not the case, use the **Up** or **Down** button to highlight the line.



or



3. Press the **Select** button to confirm your choice and to access the range limiting mode.

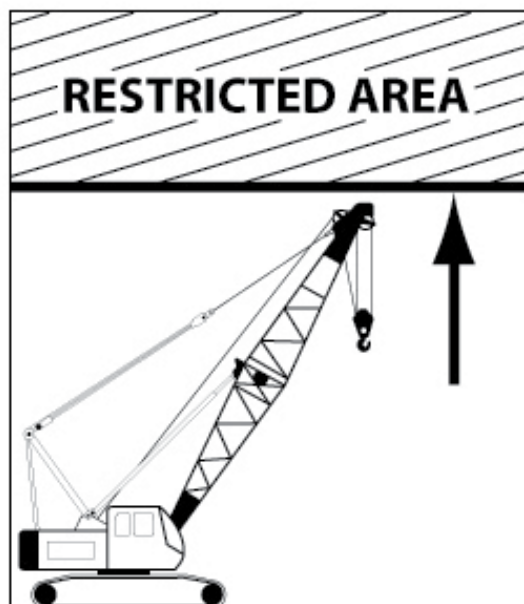
Range Limiting		
	Limit high	On
	Free zone	Off
	Variable limit height	Off
	Variable limit radius	Off

Range Limiting Mode Screen

4.6.2 Height Limit

The height limit is a limit on the maximum height of the tip of the boom or jib. We can also say that it is a height limit with a 360° degrees fixed height .

1. Repeat steps 1 to 3 in the accessing range limiting mode section (see section 4.6.1 on p. 64).
2. The line «Height limit» is highlighted by default. If it is not the case, use the **Up** or **Down** buttons to highlight it.
3. Press the **Select** button to confirm your choice.
4. Boom up to the desired boom tip height limit.



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

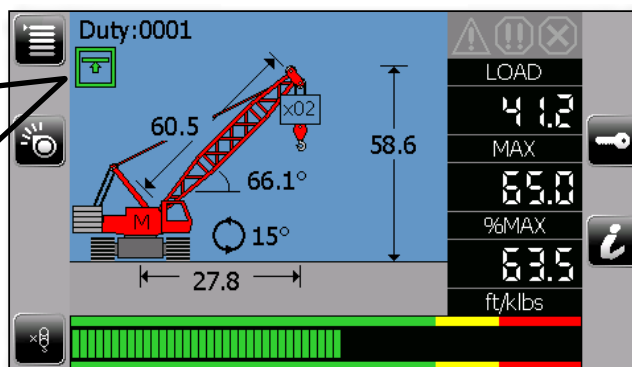
5. Press **Select** button to confirm the maximum height of the boom tip. As you release **Select** button, a 10-second countdown will allow you to boom down before your programmed height limit becomes active.

Limits will be active in
10

Height limit
programmed



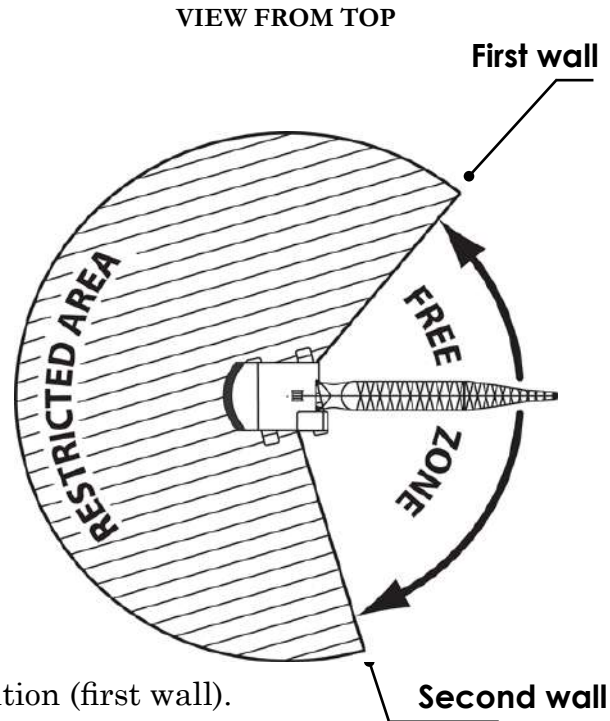
Height limit
reached



4.6.3 Free Zone

The free zone is a zone without height limits. It is limited by side walls. The boom can't go beyond these walls.

1. Repeat steps 1 to 3 in the accessing range limiting mode section (see section 4.6.1 on p. 64)
2. Press the **Down** button to highlight «**Free Zone**» and press the Select button to confirm your choice.
3. Rotate the crane to the first limit position (first wall).



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

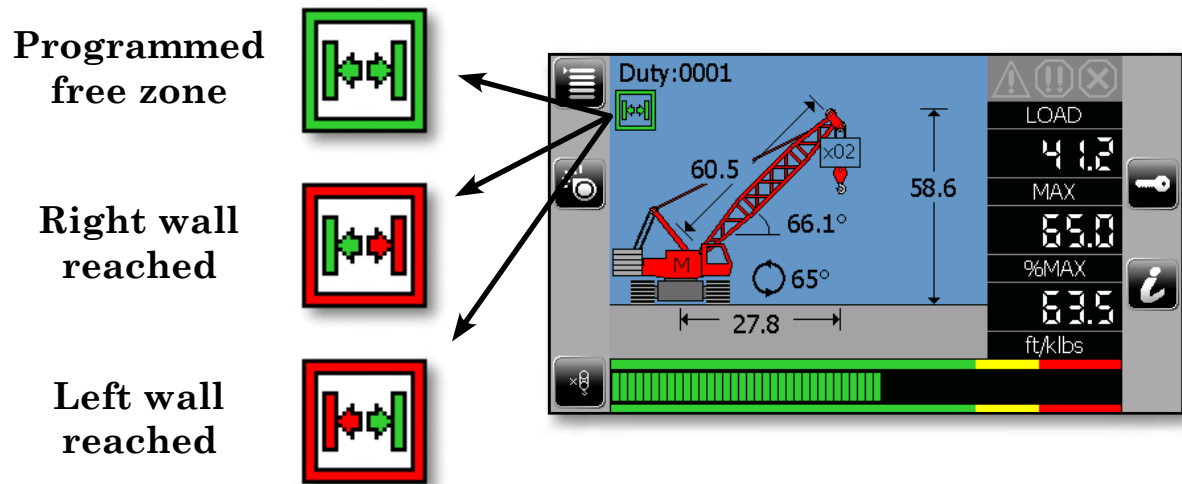
4. Press the **Select** button to confirm the position of the first wall.
5. Rotate the crane to the second limit position (second wall).

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

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

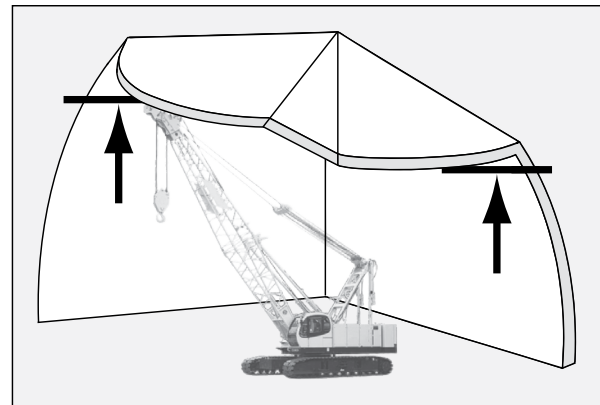
Limits will be active in
10

4.6.3 Free Zone (Cont'd)



4.6.4 Variable Height Limit

A variable height limit is a height limit which varies according to the boom position on rotation (variable height limit). According to the obstacle, we can need a limit at a certain height at a specific place and at another height somewhere else.



1. Repeat steps 1 to 3 in the accessing range limiting mode section (see section 4.6.1 on p. 64).
2. Press the **Down** button to highlight the variable height limit line.
3. Press the **Select** button to confirm your choice.
4. Rotate the crane towards the first limit position (first wall).
5. Press **Select** button to confirm the position of the first wall.

Press Enter to place
first wall
press ESC to cancel

4.6.4 Variable height limit (cont'd)

6. Rotate the crane towards the second limit position (second wall) with the boom tip always at the maximum height permitted by the surrounding environment.
7. Press **Select** button to confirm the position of the second wall.
8. As you release **Select** button, a 10-second countdown will allow you to return

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

between the two walls and boom down below the height limit before your programmed variable height limit becomes active.

Limits will be active in
10

Variable
height limit
programmed



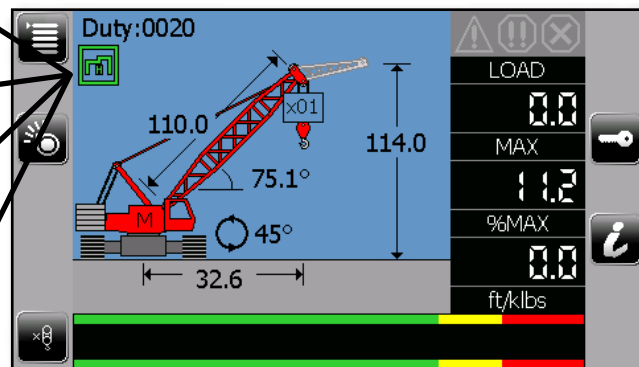
Right wall
reached



Left wall
reached

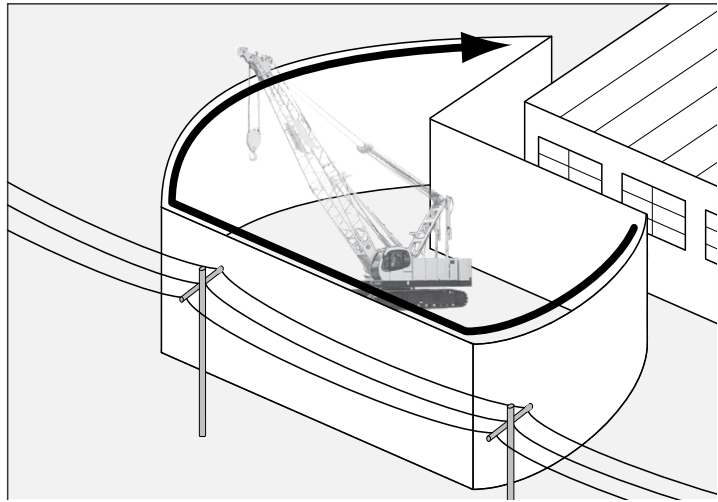


Height limit
reached



4.6.5 Variable Radius Limit

A variable radius limit is a radius limit which varies according to the boom position on rotation. According to the obstacle, we can need a radius limit at a specific place and another radius limit somewhere else.



1. Repeat steps 1 to 3 in the accessing range limiting mode section (see section 4.6.1 on p. 64).
2. Use the Down button to highlight the variable radius limit line
3. Press **Select** button to confirm your choice.
4. Rotate the crane to the first limit position (first wall).
5. Press Select button to confirm that this will be the position of the first wall..

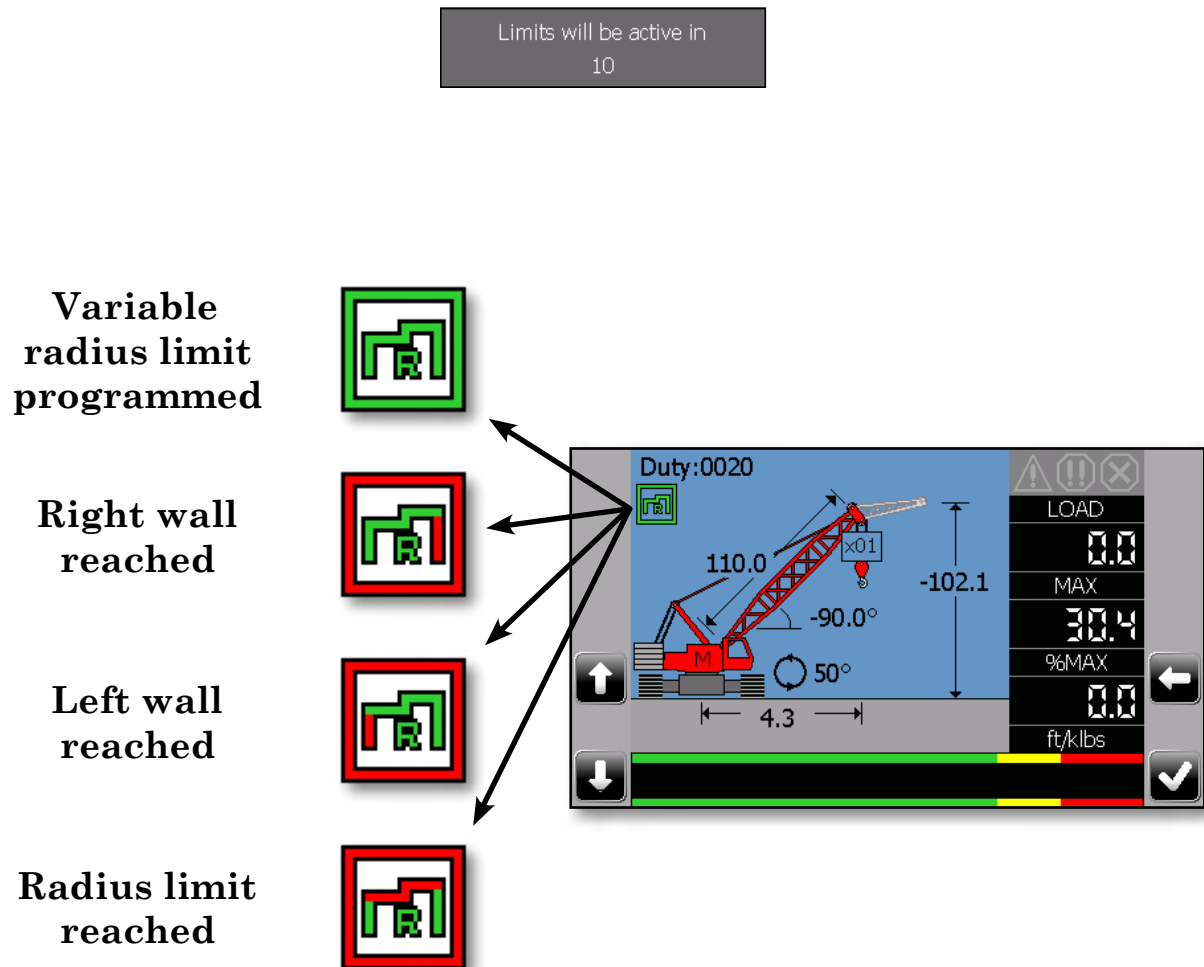
Press Enter to place
first wall
press ESC to cancel

6. Rotate the crane towards the second limit position (second wall) with the boom always at the maximum radius permitted by the surrounding environment. Note that you can change the maximum radius during this operation.

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 the **Select** button to confirm the position of this 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 below the allowed radius limit before your programmed variable radius limit becomes active.



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-5-

Diagnostic & Troubleshooting



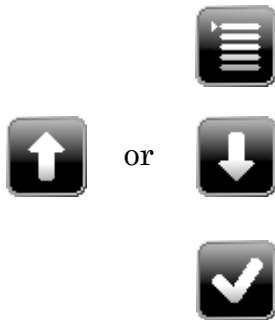
Warning! Troubleshooting shall be performed by a qualified technician or by an operator assisted by a **RaycoWylie** Service technician

This section provides technical troubleshooting support. It will answer the 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 status of the system and on the state of all connected sensors.

To access the diagnostic menu:



Press the **Mode** button

Use the **Up** or **Down** button to highlight the diagnostic option.

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

By pressing the **Select** button, each line of the diagnostic menu gives access to another page. Each page applies to one type of sensor or one particular type of information.



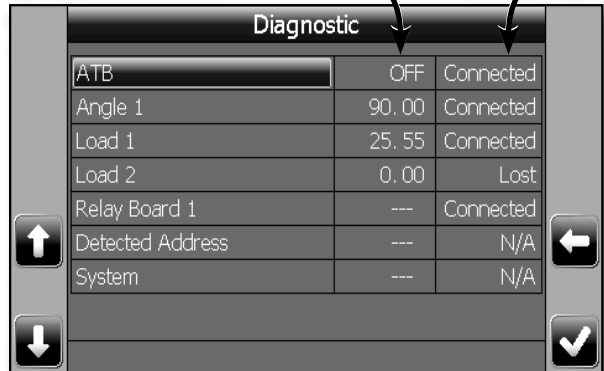
*Press the **Escape** button to return to the previous menu or to exit the diagnostic mode*

5.1 Diagnostic Mode (cont'd)

This is the typical displayed information in the diagnostic menu:

Value transmitted by sensor

State of the connection with sensor



Diagnostic		
ATB	OFF	Connected
Angle 1	90.00	Connected
Load 1	25.55	Connected
Load 2	0.00	Lost
Relay Board 1	---	Connected
Detected Address	---	N/A
System	---	N/A

Some applications have more than one angle or length sensor.

The first angle sensor displayed is the one installed closer to the main boom base.

For sensors, the second column gives the value of the parameter calculated by the interface connected to the CanBus network and the third column gives the state of the sensor connection to the CanBus network.

Concerning the A2B, it is its activation status that 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 CanBus network is given in the third column

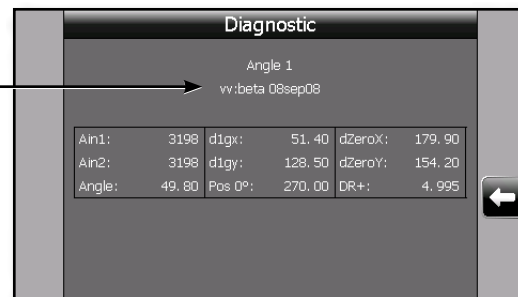
5.2 Angle Sensor



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 like 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.



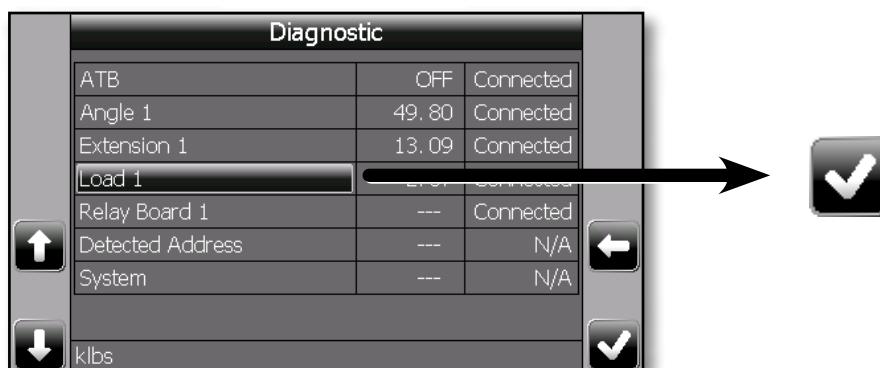
If the angle sensor is not functioning properly, note these values and give them to a **RaycoWylie** technician.



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

5.3 Load Sensor

To see the software version of the load sensor and its calibration state, press the **Select** button when Load 1 is highlighted.



5.3 Load Sensor (Cont'd)

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 be close to 5,00 volts (DC).

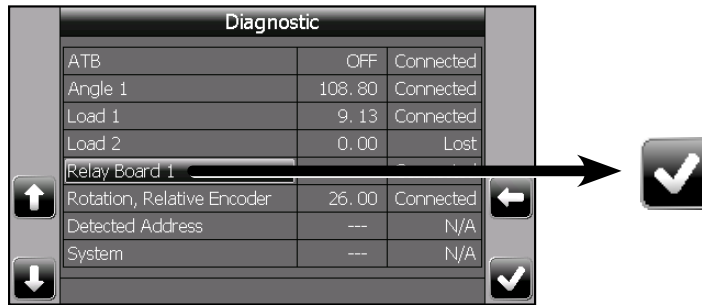


Press the **Escape** button to go back to the main screen of the diagnostic mode.

5.4 Relays

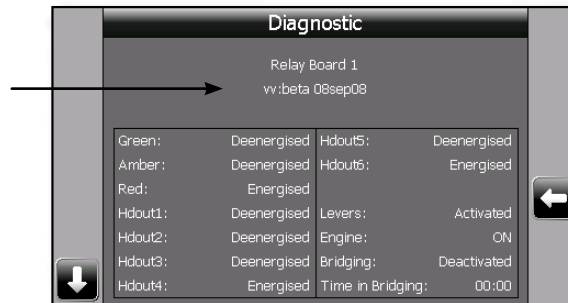
The information displayed for relay cards is divided into two screens. The first screen is mainly about the state of the relays and digital outputs (Hdout). It indicates the status of each individual relays and whether the relay coil is energized or not. The second screen shows the state of the 16 digital inputs (Hdin) and it indicates 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.

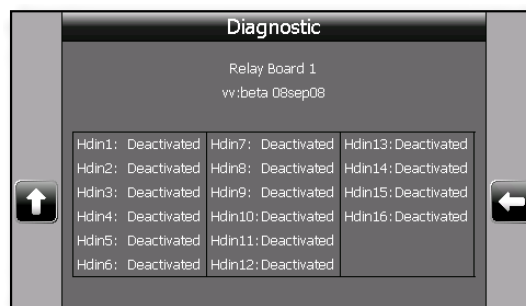


The system shows the first screen of the relay card diagnostic. It will look like this::

The second line indicates the name and the software version of the relay interface. It also shows its creation date.



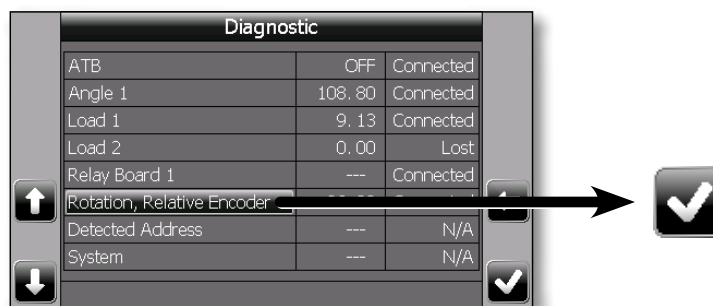
By pressing the **Down** button, you get access to the Input block. The displayed information will look like this:



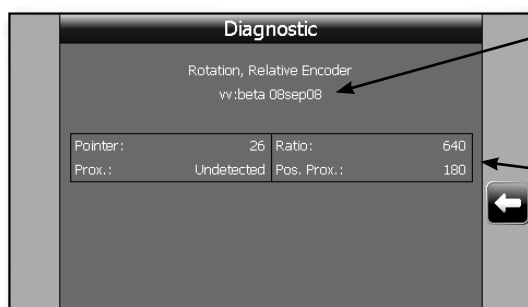
Press the **Escape** button to go back to the main screen of the diagnostic mode.

5.5 Slew Sensors (Range Limiting Option)

In the diagnostic menu, press the **Select** button when the line «Rotation relative encoder» is highlighted.



The displayed information will look similar to this:



The second line indicates the software version of the rotation interface and its creation date.

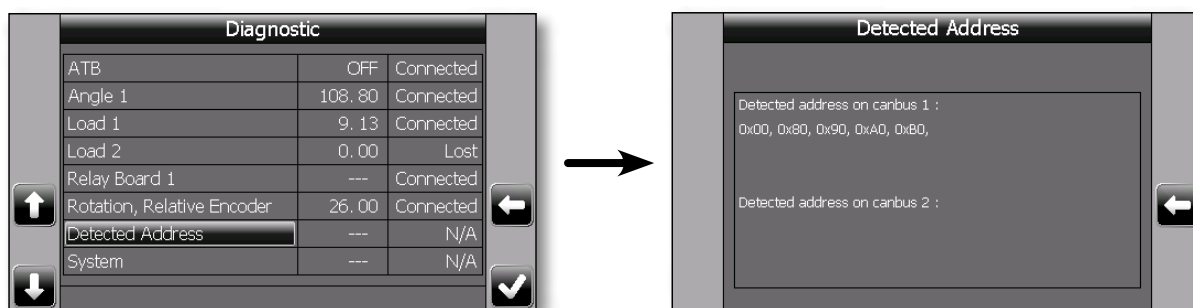
These values will allow the **RaycoWylie** technician to diagnose a problem coming from the slew sensor.



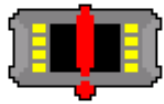
The information shown here may differ depending on the slew sensor used.

5.6 Detected addresses

This menu of the diagnostic menu provides the addresses of the different sensors on the **CAN network** detected by the i4500 system. Even if a sensor stops communicating, addresses remain in memory as long as the system is on.



5.7 Error messages



**SYSTEM
ERROR
INDICATOR**

During start up and other operation processes, the i4500 system analyses all interactions between internal peripherals (memories, controllers, extension cards, etc.) and external peripherals (various interfaces connected to the Canbus network). An error message will appear on the main screen if an error is detected.

5.7.1 Internal Peripherals

*If you have any questions or need technical assistance, please contact our technical service department at **RaycoWylie**.*

Error Messages	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 engine board	There is a problem with the flash memory on the engine board located in the i4500 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 engine Board.	There is a problem with the RAM memory on the engine board 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 mother board 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. Because of this, the clock may 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
•Canbus 1 is defective, or Canbus 2 is defective.	The CanBus controller verification	There is a problem with the CANbus controller on the Mother Board,
Not calibrated	No calibration has been found for the selected duty.	1) Verify if the load chart corresponding to the crane has been calibrated. 2) Does the load chart depend on rotation? 3) Does the load chart depend on DIN inputs?
No 2nd duty found	The load chart must be programmed in order to compare two charts. One of them is based on the angle and the other one is based on the radius. The smallest value will be selected.	The Angle/Radius option must be activated during the compilation of the load chart
No Parameter	The crane dimensions must be correctly entered in the system otherwise the load value will be non existant or wrong.	CL3, CL4 and CL7 values should never be at zero.

5.7.2 External Peripherals

A) Angle / Length and ATB Interface Errors

The i4500 system can support up to **5** angle 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 (1 volt to 4 volts).	1) The accelerometer or the 12 bits converter is defective.
Angle x is in Pre-calibration.	Indicates that angle card is in pre-calibration mode.	1) In normal operation mode, the “Cal” jumper must be taken out from the circuit board. 2) Verify that the calibration value of the accelerometer is valid.
• Lost communication with angle X	The i4500 system has not received data from angle interface. If “time out” delay is reached, then a communication error is displayed.	1) The angle interface is defective, 2) The cable that links the interface to the canbus network is defective.
Angle X is not calibrated		Angle sensor is not calibrated.
Angle X Dr+ is defective	The 5 volts reference voltage is not valid (if < 4.5 volts or 5.5 volts).	1) The angle interfacet board is defective.

B) Load Interface Errors

The i4500 system can support up to 4 load interfaces. 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).	1) The amplifier or converter 12 bits is broken 2) The cable that links the interface to the canbus network is broken.
Load X is not calibrated		Load sensor X 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 interface is broken.
Lost communication with Load X	The i4500 system has not received a valid message from the load interface on time.	1) The load interface is defective, 2) The cable that links the interface to the canbus network is broken

C) Relay and Digital Input Interface Errors

The i4500 system can support up to 4 interface cards and digital input. Activation of every relay interface 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 interface. If “time out” delay is reached, then a communication error is displayed.	1) The relay interface is defective, 2) The cable that links the interface to the canbus network is broken.



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

D) Generic Interface Errors

The i4500 system can support up to 4 generic interfaces. Each one can support a wind speed sensor, an inclination level sensor and an 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 X	The i4500 system does not receive data from generic interface. If “ time out ” delay is reached, then a communication error is displayed	1) The generic interface is broken 2) The cable that links the interface to the canbus network is defective.
Cant X on generic X	Waiting for a valid value of the Cant X from the interface	1) The X axis of the inclinometer is not calibrated 2) A wire between the cable that links the interface to the canbus network is cut.
Cant Y on generic X	Waiting for a valid value of the Cant Y from the interface	1) The generic interface is broken. 2) A wire between the cable that links the interface to the canbus network is cut.
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	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 interface. There are two different kinds of slew sensors: a relative one and an absolute one. Activation of rotation interface 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 interface is not cut. If the cable breaks, the rotation interface will send an error message to the i4500 system.	Replace cable between encoder and rotation interface.
Rotation encoder's ratio	No ratio has been detected..	No ratio has been entered or calibrated in the system.
Rotation encoder's prox. switch.	Proximity sensor is not detected at the configured position.	1) The proximity sensor is defective.
Lost communication with rotation encoder	The i4500 system does not receive anything from the rotation interface. If the “ timeout ” delay is reached, then a communication error is displayed	1) The Rotation interface 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.	No ratio has been entered or calibrated in the system
Lost communication with rotation encoder	The i4500 system does not receive anything from the rotation interface. 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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Inspection & Maintenance

6.1 Frequent Inspections

(At the beginning of each shift during which the crane is used)

- When you power on the system, check if all visual and audible alarms are on, and if the lockout is activated.
- Make sure 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 the last time you checked).
- Verify the radius according to the boom selection. The displayed radius must be between 0 and 10% greater than the actual radius or it must be in accordance with current regulation.
- Verify that the capacity displayed conforms to the capacity chart of the crane manufacturer.
- Make sure the A2B functions well.



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

6.2 Periodical inspections (every 6 months)

Inspect at regular intervals the following:

- All cables (make sure they are no cuts or damages) as well as connectors (make sure they are no corroded contacts).
- The plunger of the ATB switch for excessive corrosion.
- If the lockout relay works well.

6.3 Rated Load Test

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

6.4 Maintenance



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

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 sensors, load cells or on any connectors. This could result in moisture in the connectors and can cause eventual sensor failure.

- To clean the surface of the display, 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. Make sure the connector contacts are not too corroded.
- Replace ATB switch if the plunger shows excessive corrosion.



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

6.5 Maintenance Procedure



Before starting repairs or adjustments on a crane, you should take the following precautions.

- Place the crane where it won't get in the way of other equipment or operations in the area.
- Block all controls and ensure all operating features are secured from inadvertent motion.
- Make sure the starting means are inoperative.
- Lower the boom to the ground, if possible, or otherwise secure against dropping
- Lower the block to the ground or otherwise secure against dropping
- Release hydraulic 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 repairs have been made, the crane shall not be used until all safety devices are reactivated and trapped air removed from the hydraulic system. The instructions for the removal of air from hydraulic circuits should be provided by the crane manufacturer.

6.6 Adjustments and repairs

- Any hazardous conditions noticed during the inspection shall be corrected before you start using the crane.



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

Any adjustment shall meet RaycoWylie's specified tolerances in order to maintain the correct functioning of all components.

- Please contact our service department at RaycoWylie if you need replacement parts for maintenance and repairs on our equipments.



*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.*

Notes

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