



Crane safety instrumentation

Calibration Instructions

**i4500 Rated Capacity Limiter/Indicator
for
lattice boom cranes,
hoist rope load sensing**

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The purpose of this manual is to provide the calibration technician with the procedures essential for the promotion of proper machine operation for its intended purpose. The importance of proper usage cannot be overstressed.

The calibration technician should have read, and be familiar with, the instruction manual supplied with the system.

All information in this manual should be read and understood before any attempt is made to calibrate 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 Rated Capacity Indicator (RCI) is to 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. Prior to the calibration being completed the system will not provide correct warnings and it is essential that other means are used to establish safe use of the machine.

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 the i4500 operator 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.

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1 INTRODUCTION

This manual contains calibration information for the i4500 system. When performing calibration of 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 calibration.

1.1 Personnel qualification and scope of this manual

Installation of the i4500 system shall be performed by a qualified technician. Furthermore, calibration of the i4500 system **must be** performed by a **RaycoWylie** trained 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** trained technician to calibrate your system.

1.2 Using this manual





This manual must be used in conjunction with the Instruction Manual, refer to the instruction manual for description of the system operation, especially the section "Operating Buttons Description".

Screenshots used in this manual are taken from a 4.3" display and some screens may vary on larger display versions; calibration procedures, descriptions and functions are identical for all display versions. All numbers shown on sample screens are examples only and must be substituted with real information from the machine.

Navigating screens and editing data:

	UP button. Press to move up the screen when in a menu or to increase the value of a highlighted number.
	DOWN button. Press to move down the screen when in a menu or to decrease the value of a highlighted number.
	ESCAPE button. Press to exit a menu or to escape an option without saving.
	SELECT button. Press to enter a selection when in a menu or to accept a changed value. Note that most changed values must also be saved to permanently store them.

Additional buttons used in the calibration mode only, refer to relevant text for detailed use:

	SAVE button. Press to save all recent changes into memory.
	DELETE button. Press to delete a stage of some calibrations.
	CLEAR button. Press to clear the fault log or the event log.
	CHANGE SIGN button. Press to set a variable to negative or back to positive.

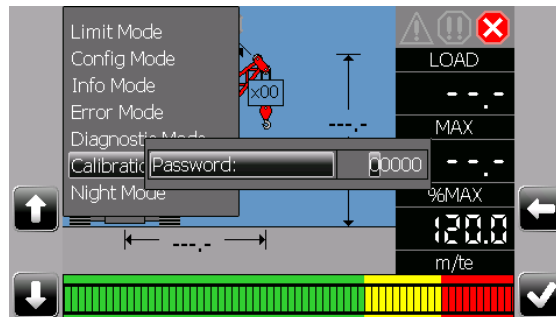
2 CONFIGURATION

To ensure a successful, first calibration follow each calibration step in sequence, do not miss out any steps unless they are marked as optional.

Many calibration screens show reminder notes or hints on the bottom line, remember to read these for guidance.

2.1 Step #1: Accessing the calibration menu

- 1- Press the Mode button.
- 2- Scroll to highlight "Calibration Mode" using "↑" or "↓".
- 3- Press "✓" to enter this menu.
- 4- The system will request a 5 digit password. The first digit will be highlighted, use "↑" or "↓" to select the first digit and press "✓" to confirm and move on to the second digit. Repeat this for all 5 digits, after confirming the 5th digit the system will enter the calibration menu provided the password is correct. If the password is not correct the system will return to the normal working screen.
- 5- If a mistake is made while entering the password, press "←" to return to the previous digit.



Some systems are installed with dual level password access, this manual includes information on all features accessible from the top level. Some features will not be available when the lower level password is entered and will not appear in the calibration menu. It will not normally be necessary to access these features after the initial installation is completed.

Provided the top level password is used the calibration menu will remain accessible until the system is powered off otherwise the password will be required every time the menu is selected.

2.2 Step #2: "Enable/Disable i/o" Setting

Note: these settings reflect the configuration of your system and will generally be made during factory testing prior to delivery and should not need changing.

- 1- In the calibration menu, scroll up or down to the menu "Enable/Disable i/o".
- 2- Press "✓" to enter this menu.
- 3- Scroll to select the I/O option to edit.
- 4- Press "✓" to highlight the value to edit. Scroll up or down to change to value then Press "✓" to confirm.
- 5- Any change made must be permanently registered by pressing the "save" button.
- 6- Press "←" at any time to abandon any changes not saved or to exit the menu when done.

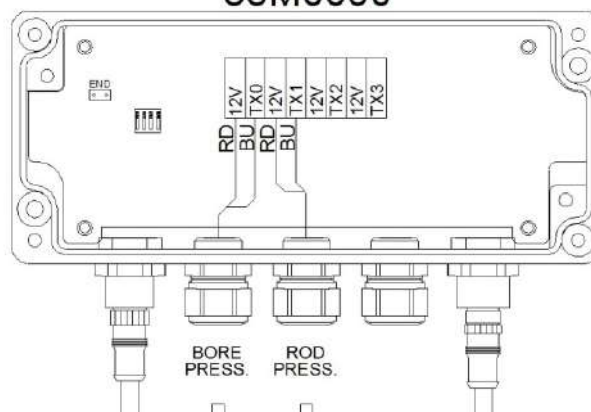
As a guide, the minimum requirements for a basic system are:

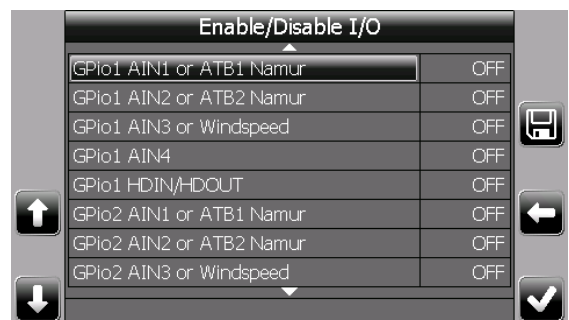
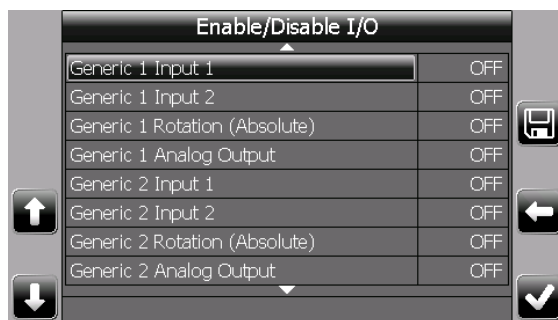
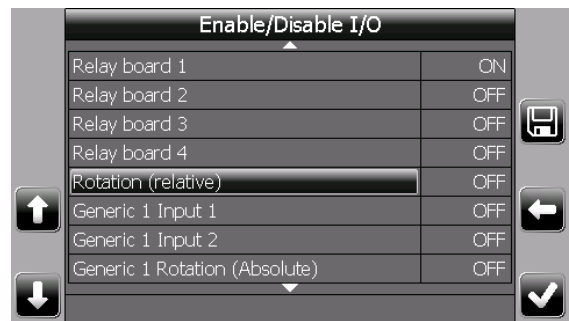
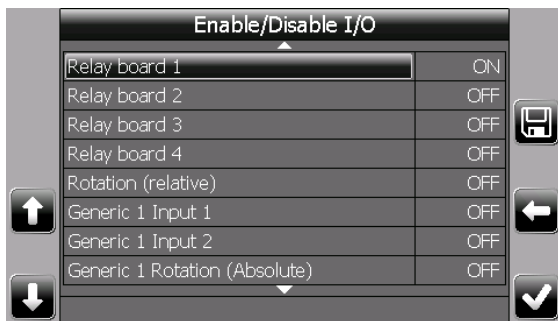
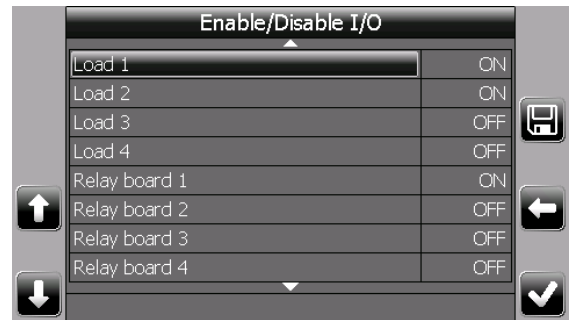
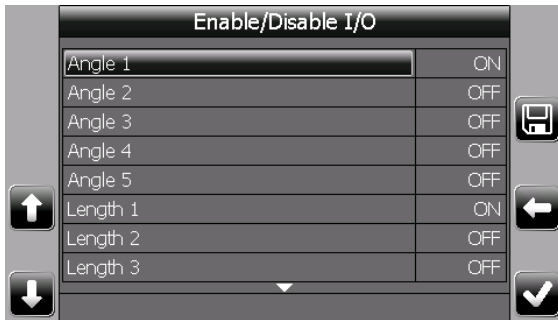
Angle 1	ON
Load 1	ON
Relay board 1	ON

All remaining items in the list are optional and set to OFF if not used.

Refer to the wiring diagram supplied with your system to determine which I/O should be enabled, this will be indicated by a table or a notation adjacent to each component. See example below: (Ref Load 1 and Load 2) means that these two I/O items need to be ON.

CANbus LOAD CELL INTERFACE (Ref Load 1 and Load 2) 33M0090



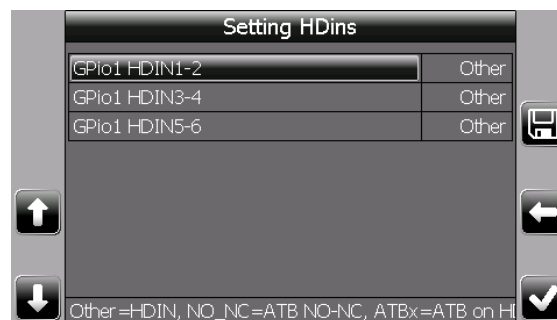


For the Generic and GPIO items there are various configuration options available once enabled, refer to the system wiring drawing for details of which selection to set.

GPio HDIN's configuration

If GPio HDIN/HDOOUT is set to ON in any of the above screens then an extra menu option will appear in the main calibration menu to configure the use of the HDIN/HDOOUT connections.

Scroll to "GPio Hdins configuration" and press "✓" to enter, the screen will show options to set each GPio that has HDIN/HDOOUT set to ON:



Select the pair of inputs required, press "✓" to highlight the option currently set, use "↑" or "↓" to scroll through the available options and then press "save" when the required option is displayed. Refer to the wiring drawing supplied for the necessary settings for your system.

Warning: these settings must match the relevant wiring drawing for proper operation of the i4500 system.

2.3 Step #3: "Calibration units" setting



- 1- In the calibration menu, scroll up or down to the item "Calibration units:".
- 2- Press "✓" to toggle between metric and imperial.

imperial: use x1000lbs and feet.
metric: use metric tons and metres (1 metric ton = 1000 kg).

2.4 Step #4: "Calibration data" Entry

Some or all of this information may be pre-loaded prior to delivery but all entries should be verified and edited as required before proceeding. Length units in use will be feet or metres depending on the setting made for 'calibration units' in step #3, a reminder is shown on the bottom line of this display. **Remember to save any changes made.** Please advise Rayco Wylie of any changes required in this section.

- 1- In the calibration menu, scroll down to the item "Calibration data:".
- 2- Press "✓" to enter this menu.
- 3- Scroll to select the item to edit from the list below.
- 4- Press "✓" to highlight the value to edit. Scroll up or down to change the value then Press "✓" to confirm.
- 5- Any change made must be permanently registered by pressing the "save" button.
- 6- Press "←" at any time to abandon any changes not saved or to exit the menu when done.

- **Rope limit H1:** This is the maximum tension that the cable is rated for per fall or part of line (rope SWL) for the main rope.
- **Rope limit H2:** This is the maximum tension that the cable is rated for per fall or part of line (rope SWL) for the auxiliary rope.
- **Rope limit H3:** This is the maximum tension that the cable is rated for per fall or part of line (rope SWL) for the first whip rope.
- **Rope limit H4:** This is the maximum tension that the cable is rated for per fall or part of line (rope SWL) for the second whip rope.
- **Max parts of line:** This is the maximum number of parts of line that can be rigged on the crane and applies to all hoists.
- **Percent per part:** This value allows a reduction in the SWL of the hoist rope when reeved to more than 1 part, the factor is applied to all hoists.
For example: entering a value of 1.0 in this field will mean that the maximum load on 1 part will be the rope limit described above, the maximum load on 2 parts will be two times the rope limit less 1.0%, the maximum load on 3 parts will be three times the rope limit less 2%, the maximum load on 4 parts will be four times the rope limit less 3% etc. Note that this value will be monitored simultaneously with the relevant load table and the hook capacity, the lowest of these figures will be used as the current SWL for alarm purposes.
- **Rig angle:** If available, this is the boom angle below which the rigging condition can be selected provided the SWL is also zero, the default value is 5° and should not normally be increased.

- **Alarm 1:** Is the %SWL approach limit. If the %SWL is greater than Alarm 1, an intermittent audible alarm will be activated and the yellow display LED will blink. The external yellow lamp output will be ON.

Note: $\%SWL = (\text{Load} / \text{Capacity}) \times 100$.

- **Alarm 2:** Is the %SWL overload limit. If the %SWL is greater than Alarm 2, a continuous audible alarm will be activated and the red display LED will be ON. The external red lamp and audible alarm output will be ON.
- **Alarm 3:** Is the %SWL motion cut limit. If the %SWL is greater than Alarm 3, a continuous audible alarm will be activated and the red display LED will be ON. The external red lamp and audible alarm output will be ON. The motion cut output will be in the stop condition (cut active).
- **Outside duty radius:** This variable represents a transition distance between the maximum radius rating and zero capacity, the SWL will decay evenly from the last point on the chart to zero over the distance set by this variable and applies to all charts.
Note: This option is valid only if the chart interpolation (in the system options menu) is set to "ON".
- **Outside duty angle:** This variable works in the same way as 'outside duty radius' but is used for charts where the SWL is determined by boom angle and not radius.
- **Outside duty length:** This variable represents an upper tolerance on the automatic selection of the relevant load capacity chart for the actual boom length.
- **Number of hoists:** Set to the number of hoists (winches, or hooks) fitted to the crane, 1 for main hoist only or 2 for main and auxiliary hoists etc. up to 4 hoists are available.
- **Duty change >20% SWL:** If set to ON this option allows duty and parts settings to be changed while a load is suspended, if set to OFF these changes will not be permitted unless the load is less than 20% of the SWL.
Warning: This option must be set to **OFF** for European operation.
- **Sensitivity coefficient (5-50%):** The % value will determine how much variation is required in order for the load variation to be outside the range of the filter, this should be left at the default value of 35. The filter will only be functional in the normal operating mode.
- **Low frequency Coefficient (10-75):** Adjusts the number of samples the filter will use, this should be left at default value of 35. The filter will only be functional in the normal operating mode.

2.5 Step #5: “Dimensions” Data entry

This menu contains crane dimensions that are necessary for the calculation of the load radius and height of the boom tip.

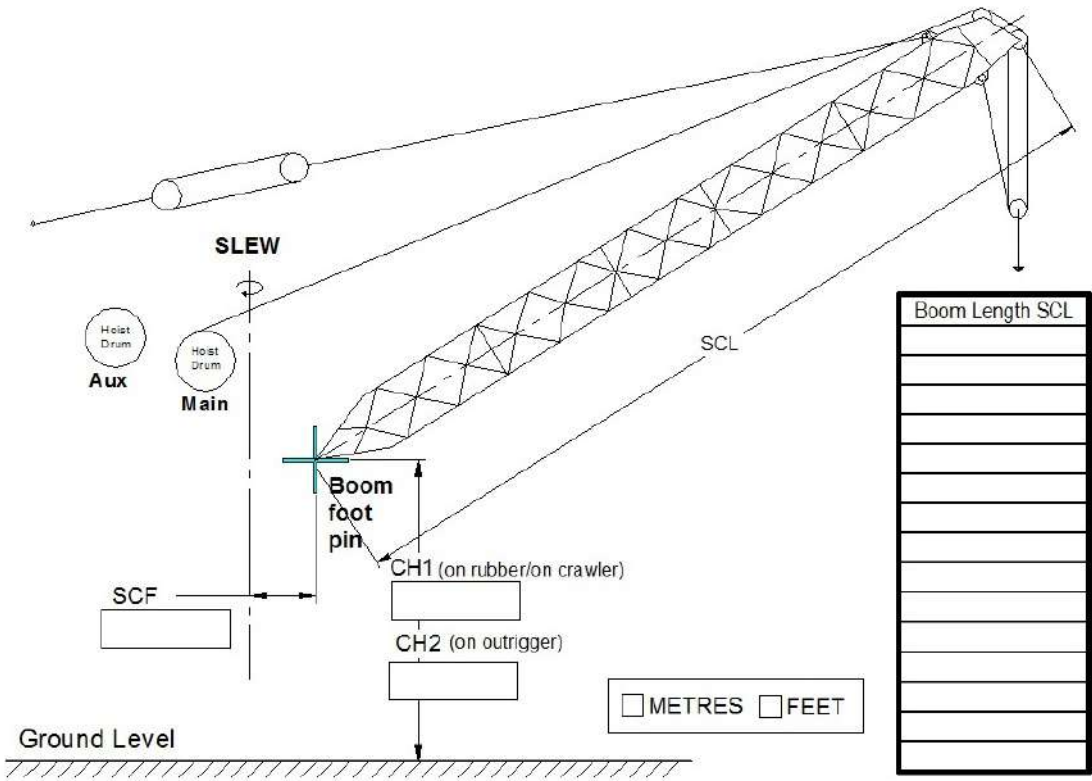
Some or all of this information may be pre-loaded prior to delivery but all dimensions should be verified and edited as required before proceeding. Units in use will be feet or metres depending on the setting made for ‘calibration units’ in step #3, a reminder is shown on the bottom line of this display. To enter a negative value, enter the number and press “+/-” to change the sign. Press “+/-” again to toggle back to a positive value.

Remember to save any changes made. Please advise Rayco Wylie of any changes required in this section.

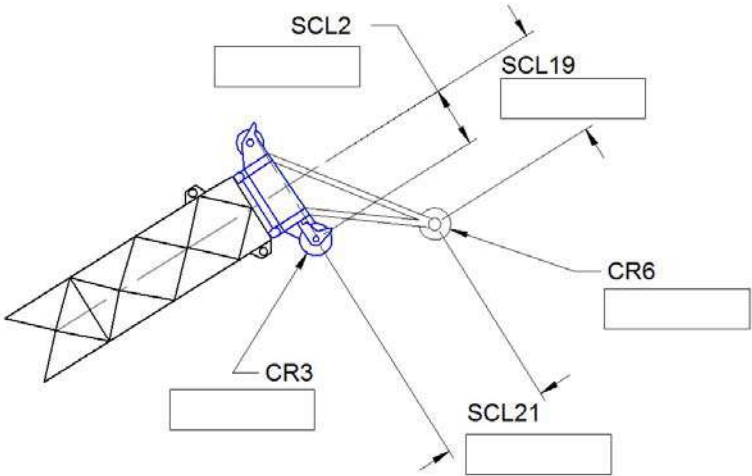
Dimensions relating to boom tip attachments and the boom lengths are stored in the chart file and are not editable in this menu, **see note 1*

- **SCF (slew offset)** – horizontal distance between the boom foot pin and the centerline of rotation of the machine. If the boom foot pin is behind the centerline of rotation then the distance is negative, otherwise it is positive.
- **CH1 (height rubber)** – vertical distance between the boom foot pin and the ground when on tires or crawlers.
- **CH2 (height outrigger)** – vertical distance between the boom pivot pin and the ground when on outriggers. For crawler based machines set to the same value as CH1.

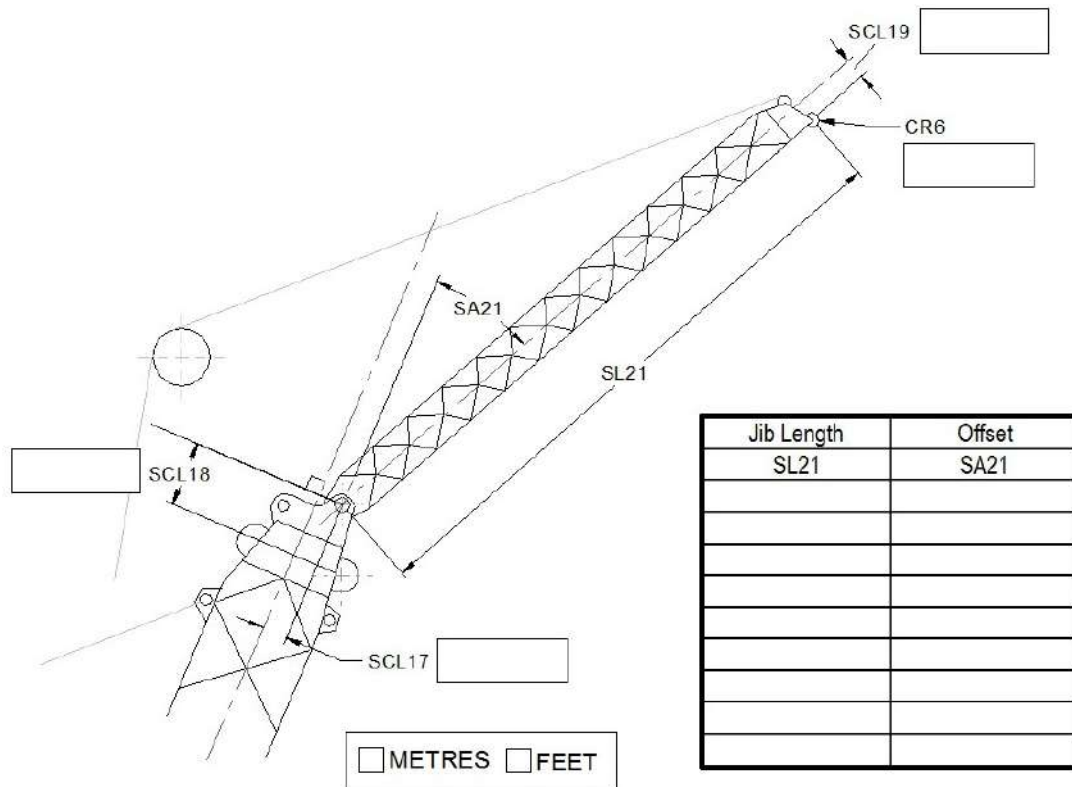
**Note 1: The chart file that contains all the relevant load charts and duty information for the machine also contains dimensions for the boom lengths and all the boom top attachments (fly jibs etc.). In some cases some of this data may not have been available during the system configuration at the factory. In these cases it will be necessary to obtain the information by surveying the hardware on site, the attending Rayco Wylie technician will be equipped to update the load chart file with this data. In the event of a Rayco Wylie technician not attending please refer to the sketches below and contact Rayco Wylie Systems technical service and provide them with the missing dimensions. The load chart file will be updated with the verified information and returned via email. Before calling please take note of the technical file reference (TF-xxxxx) and serial number located on the serial number label of the display, alternatively, go to the diagnostics screen, select ‘system’ and note the full name of the load chart file given there. This will enable our Technical Service representative to efficiently access all the information about the system.*



Note sign convention: All dimensions shown positive, if the boom foot pin is behind the centreline of rotation then SCF will be negative.

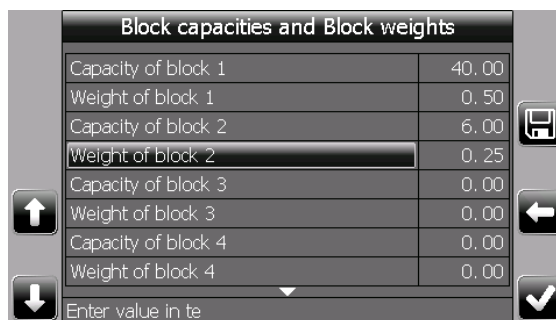


Main boom head and short jib (rooster)



2.6 Step #6: “block capacities and block weights” setting

This menu contains the capacities and weights of all the available hooks for the crane, the hook(s) in use must be entered here for subsequent selection in the configuration setting of the system. The capacity of each hook will be used by the i4500 system to determine whether the current SWL for the configuration and position of the machine is limited by the load curve, the parts of line or the hook capacity. After selecting “block capacities and block weights” from the main calibration menu the screen will show:



Set the capacity and weight of each hook block in turn using the calibration units set earlier (noted at the bottom of this screen). Remember to press “save” once all the data is entered. Numbers shown are for illustration purposes only and must be set to show real data from the machine.

2.7 Step #7: “system options” setting

The system options menu allows various features to be turned on and off and may vary depending on the version of software installed in the i4500 system. **These settings will normally be pre-set before delivery and will not require changing.**

Navigate through the calibration menu using “ \uparrow ” or “ \downarrow ” to highlight “system options” and press “ \checkmark ” to enter.

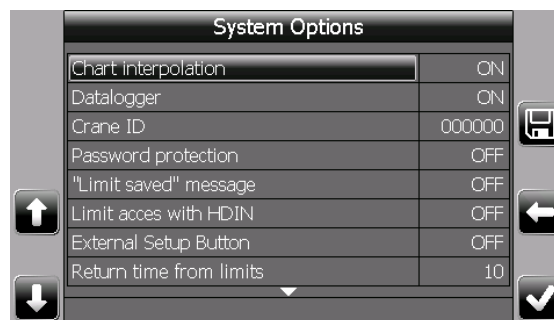


Chart interpolation. Determines whether or not the i4500 system interpolates the crane capacity charts with respect to radius/angle or whether it steps from one capacity to the next. If chart interpolation is ON, the system will display a smooth transition between rated points. If it is OFF, then once the radius/angle exceeds a listed value on the chart the capacity will drop to the next rated capacity, this is known as a stepped chart. Refer to the crane manufacturer’s load chart to determine if the charts should be interpolated or stepped.

Datalogger. Allows the datalogger, if fitted, to be switched ON or OFF.

Crane ID. This is only used if a datalogger is installed and is a unique identifier for the crane. It is used in conjunction with the Rayco Wylie data logger software for PC to manage ‘whole life’ data for the machine and acts as an identifier for files once downloaded and removed from the machine.

Password protection. This is only used if a datalogger is installed and, when set to ON, will set the system to ask for a pass code number to be entered each time the system is switched on. See also “user id” settings (page 31).

“Limit saved” message. Optional feature, if enabled then setting this to ON will display a message on start up indicating a limit is saved if a limit has previously been set.

Limit access with HDIN. When set to ON, Limits menu is accessed via an external input rather than the normal menu button. Refer to the wiring diagram for details if relevant.

External setup button. Optional feature, if enabled then setting this to ON will allow the setup bypass feature to be available via an external digital input.

Return time from limits. Not enabled unless the range limiting feature is fitted. This value represents the time allowed between setting a range limit and the limit becoming active to allow the machine to be moved back into the permitted working zone.

2.8 Step #8: “bridging/bypass output”

This item is an option depending on the version of the software installed. When available it allows the parameters to be set for the PWM output used to reduce the machine speed during bridging or bypass functions.

2.9 Step #9: “picture”

This setting allows the graphic of the crane shown in the normal working window to be set to a version that looks similar to the machine to which the system is fitted. It can be set to any of the available choices at any time without changing the performance of the system.

3 CALIBRATION

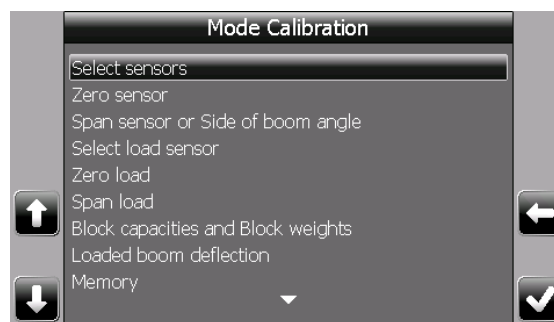
3.1 Step #10: “Zero sensor/Side of boom angle” angle sensor calibration

Address selection dip switch:

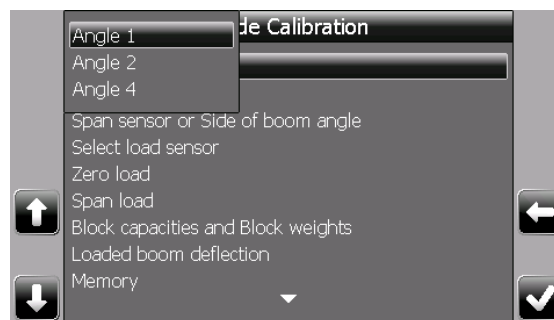
Every angle sensor installed has its own dedicated address. These switches are factory set prior to dispatch and will not normally require changing. Please refer to the wiring diagram to see the address dip switch setting for each angle sensor interface.

Angle Sensor Side of Boom:

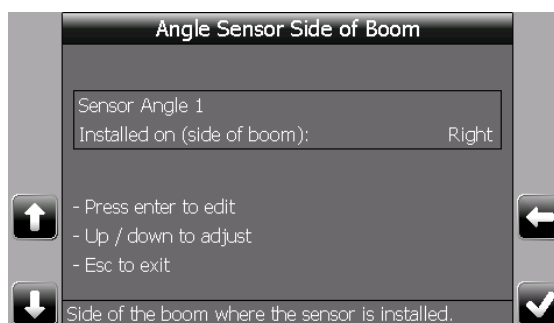
- 1) Use “↑” or “↓” to choose “select sensors” and press “✓”.



- 2) Use “↑” or “↓” to choose the relevant angle sensor and press the “✓”.



- 3) Use “↑” or “↓” to choose “span sensor or side of boom angle” and press “✓”.



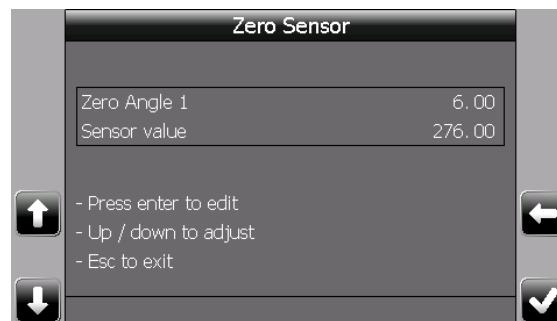
- 4) Press “✓” to highlight the value to edit and use “↑” or “↓” to edit the location of the angle sensor, press the “✓” to confirm and then “←” to exit.

Note, “right” indicates right hand side of boom (or inside left hand side facing right) when viewed from the operator’s cab.

Zero angle calibration:

Ensure the correct side of boom setting has been made before setting the zero datum, if the side of boom setting is changed then the zero setting must be repeated.

- 1) Use “↑” or “↓” to choose “Zero sensor” and press “✓”.



- 2) Boom down to zero degrees (main boom horizontal) using a precision angle measure to accurately establish the true angle of the base boom section. The angle is displayed in degrees and the sensor value is in bits. This value must be above 100 bits. If smaller, turn the sensor to increase the value.
- 3) Press “✓” to edit the angle value using “↑” or “↓”.
- 4) Press “✓” again to confirm the zero.
- 5) Press “←” to return to the main calibration menu.

The boom angle need not be zero but it’s true value must be accurately known and entered as described.

Note that the angle sensor(s) do not require a span calibration.

Repeat step #10 for each angle sensor in turn.

3.2 Step #11: “Zero load/Span load” sensor calibration

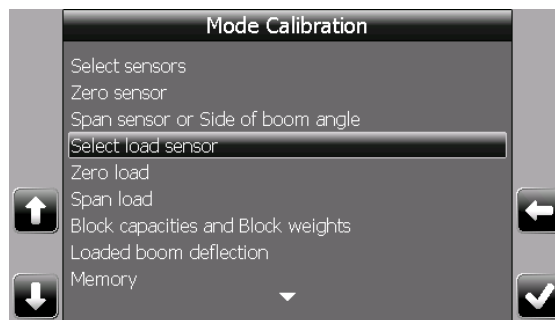
When calibrating load sensors, always slowly hoist and stop the test loads smoothly in order to eliminate errors in the load reading due to frictional effects. The frictional effect on dynamometer (line rider) systems will cause the displayed load to decrease when lowering the load and to increase when hoisting the load. On dead-end load cell systems this effect is reversed. These friction effects can be minimised by ensuring boom head sheaves and hook block are in good condition and properly maintained before proceeding.

Warning: The system does not store the ZERO LOAD into permanent memory until the SPAN LOAD calibration has been completed. If a ZERO LOAD calibration is done, then a SPAN LOAD calibration must also be done.

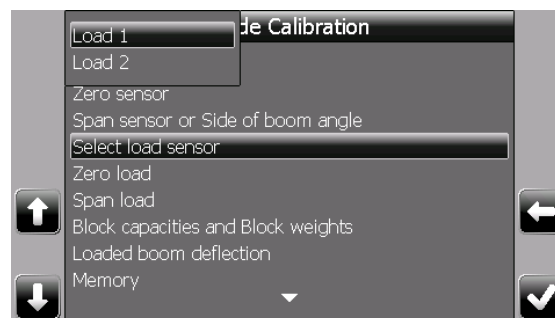
Load sensor calibration must be done with two, accurately known test loads, a small load and a large load. The large calibration load should provide between 50-90% line pull on the hoist line while using as many parts of line as is feasible. If a large enough load cannot be found, the crane can be reeved to fewer parts to increase the line pull for a given calibration load. The smaller load should be approximately 5-10% of the larger load and in many cases the block weight alone may be sufficient. The calculated test loads should normally include the weight of the hook block and any slings, shackles etc. that are used.

Select the load sensor to be calibrated

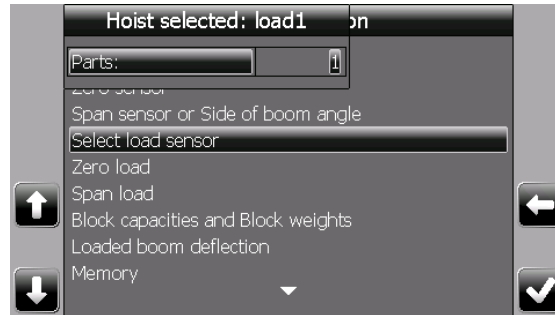
- 1) Use “↑” or “↓” to choose “Select load sensor” and press “✓”.



- 2) Use “↑” or “↓” to select the relevant load sensor and press “✓”.

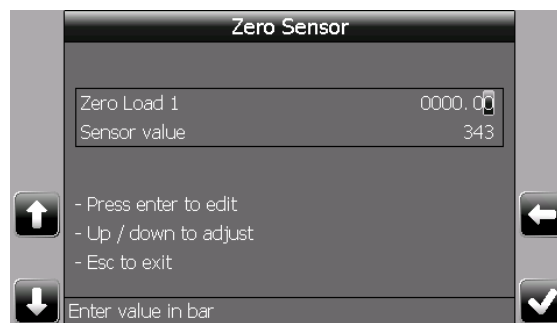


- 3) Use “↑” or “↓” to select the parts of line currently rigged on the hook to be calibrated and press “✓” to confirm the selection and return to the main calibration menu.



Zero load calibration:

- 1) Use “↑” or “↓” to choose “Zero load” and press “✓”.



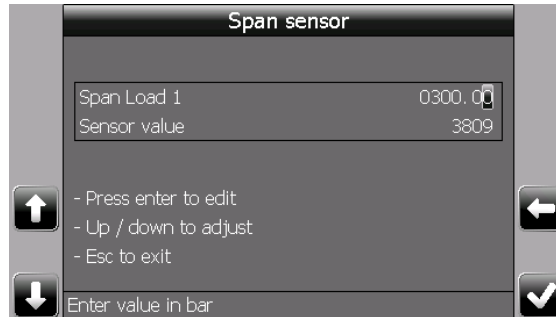
To zero the load sensor, position the boom at a safe radius for the large test load but attach and slowly lift the small test load until it is just clear of the ground.

The reading on the Sensor value is in bits and the maximum scale value is 4095. For the zero setting the display should read between 175 and 300 bits. The units for calibration are shown at the bottom of the screen.

- 2) Press “✓” to edit the zero value.
- 3) Edit the zero value to read the value of the suspended test load, then press “✓” to confirm the value. Note the indicated value will return to it’s earlier state temporarily, the new zero value will be stored after the next step.
- 4) Press “←” to return to the main calibration menu.

Span load calibration:

- 1) Use “↓” to choose “Span load” and press “✓”.



To span the load sensor, position the boom at the same safe radius for the large test load as above and slowly lift the large test load until it is just clear of the ground.

As above, the reading on the bottom line represents the current bits value of the sensor, for the span setting the reading should not be greater than the values shown in the following table depending on the size of the calibration load but should be as close to these figures as possible. Note, values for test loads greater than 90%SWL are shown for reference only and should not be used for calibration purposes.

Test load	50%	60%	70%	80%	90%	100%	120%
Max Bits value	1765	2100	2430	2765	3100	3430	4095

If the reading is unacceptable then adjust the gain setting jumpers in the transducer interface unit to achieve the closest possible setting, refer to the label inside the interface unit for guidance. The standard gain setting number is 325, other options are 219, 253, 413, 579 and 630; a higher gain setting will result in a larger span setting value.

Warning: If the gain value is changed then redo the zero load calibration before continuing with the span load calibration.

- 2) Press “✓” to edit the span load value.
- 3) Edit the span value to read the value of the suspended load, then press “✓” to confirm.
- 4) Press “←” to return to the main calibration menu.

Repeat step #11 for each load sensor in turn.

3.3 Step #12: “Loaded boom deflection”

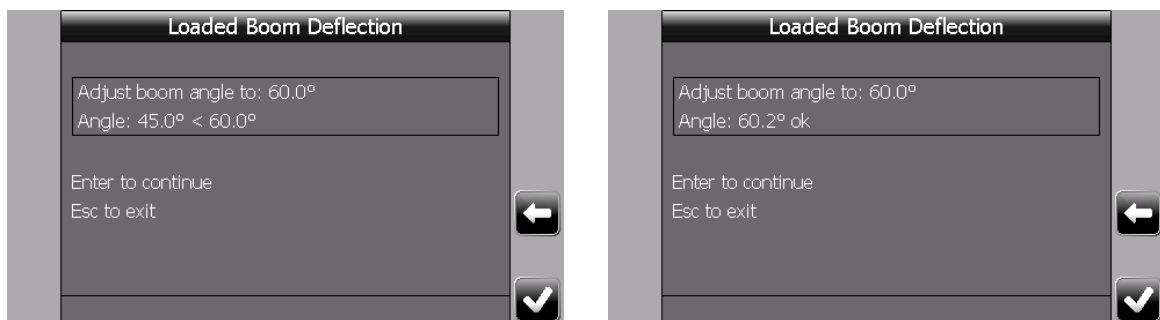
This procedure is optional depending on the accuracy of the radius indication, it is used to add an allowance into the calculation of the hook radius to compensate for main boom and/or chassis deflection due to a suspended load. A separate calibration is available for each and every boom length.

This procedure should only be used with machine configurations on outriggers or on crawlers.

A known test weight is required to carry out this calibration, the weight should be between 50% and 90% of the SWL for the configuration being calibrated and should be based on the SWL with the boom at approximately 60° boom angle. The calculated test load should normally include the weight of the hook block and any slings, shackles etc. that are used.

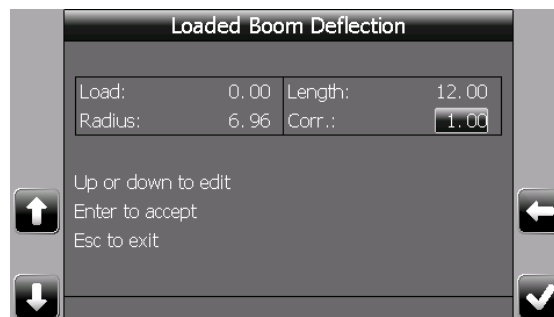
Ensure the current duty selection matches the actual crane configuration to be calibrated.

1) Use “↑” or “↓” to highlight “Loaded boom deflection” and press “✓” to enter. The display will show the current boom angle followed by a target boom angle for calibration, normally 60°.



Adjust the boom angle to the target angle, when the boom is at the correct angle for calibration, the display will change to show ok.

2) Press “✓”, the display will change to show:



Carefully lift the test load until it is just clear of the ground. Accurately measure the actual radius of the suspended load from the centre line of slew of the machine.

- 3) Use “↑” or “↓” to adjust the Corr.: x.xx value until the displayed radius equals the measured radius, note that the indicated radius can only be increased, not decreased. Press “✓” to accept the change, the system will confirm the calibration is saved.
- 4) Press “←” to return to the main calibration menu.

Carefully set the test load on the ground.

3.4 Step #13: “Friction compensation”

This feature is optional and only available if additional sensors have been fitted to sense rope direction. If no sensors are fitted then all values in this step must be set to 0.00 (default value).

The feature allows for the effect of friction in multi part reeving systems to be calibrated to give a more consistent load reading on the display irrespective of direction of hoisting of the load.

Friction compensation should only be done once the load calibration and deflection calibrations have been completed. Two friction compensation value sets are available, one for the main hoist and one for the aux hoist. Friction compensation is not available for other hoists.

Calibration is achieved using the large load as described in step #11 and is done in three stages:

Stage 1 – record the load indication errors

The basic calibration performed in step #11 is done with the load static after hoisting and the rope system friction characteristics for this condition are incorporated automatically. Three other friction characteristics can be set as required, they are: dynamic hoisting, dynamic lowering, and static after lowering.

Slowly hoist the test load and note the displayed value of load while the load is in motion, repeat the test several times until an acceptable average figure is established. Record this average reading. Repeat this test while slowly lowering the test load and record the average reading established for lowering. Repeat the test again and, this time, record the average reading of the load display when the load remains suspended but static after lowering.

Stage 2 – calculate the compensation factors

For each of the three test records calculate the compensation factor using the following formula:

$$\text{Factor (\%)} = \frac{(\text{test load} - \text{indicated load}) \times 100}{\text{test load} \times \text{parts of line}}$$

Worked example:

Test load (including hook block and slings etc.) = 40te

Parts of line = 8

Average load reading when hoisting = 42.0 te

Average load reading when lowering = 37.0 te

Average load reading when static after lowering = 39.0te

$$\text{Hoisting factor (\%)} = \frac{(40.0 - 42.0) \times 100}{40.0 \times 8} = -0.63\%$$

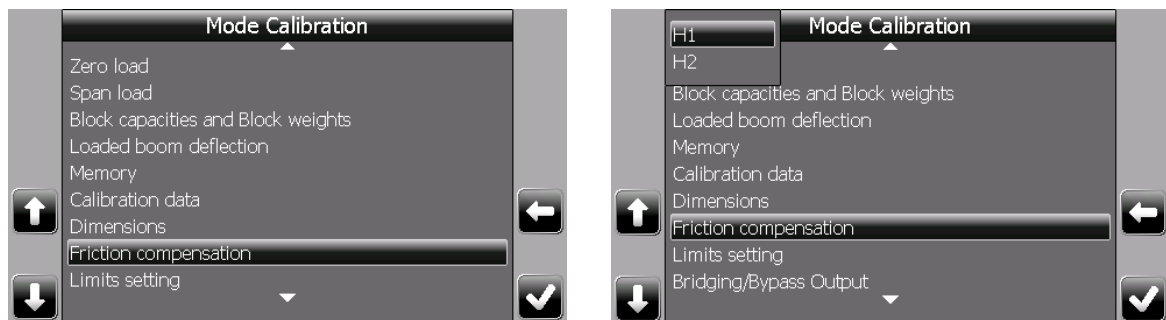
$$\text{Lowering factor (\%)} = \frac{(40.0 - 37.0) \times 100}{40.0 \times 8} = +0.94\%$$

$$\text{Lower static factor (\%)} = \frac{(40.0 - 39.0) \times 100}{40.0 \times 8} = +0.31\%$$

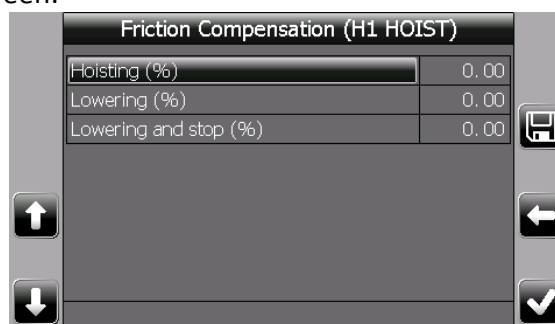
note negative value for dynamic hoisting.

Stage 3 – enter the compensation factors into the calibration

- 1) Use “↑” or “↓” to highlight “friction compensation” and press “✓” to enter.



- 2) Use “↑” or “↓” to highlight the required hoist and press “✓” to select and move to the next screen:

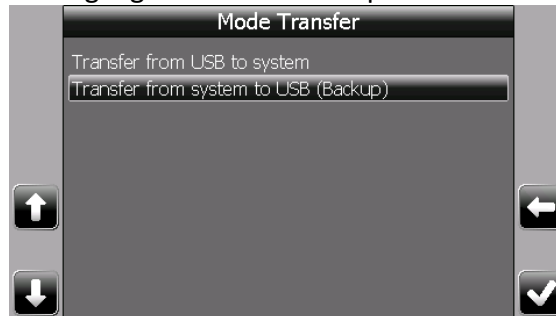


- 3) the value for editing, 0.00 indicates that no friction compensation is applied. Change the values to those calculated above and press “✓” to confirm.
- 4) Press “save” to record the changes.
- 5) Press “←” to exit the calibration mode and retest the performance to establish the effect, return to the friction calibration and modify if required.

3.5 Step #14: "Transfer" Calibration backup

A copy of the calibration file can be made at any time after completing a calibration step and should be made once the final calibration is completed. **Note** a USB memory stick must be connected to connector 'B' of the i4500 display unit using a Deutsch to USB converter lead (RaycoWylie part no. 33V0414) before proceeding.

- 1) Use "↑" or "↓" to highlight "transfer" and press "✓" to enter.



- 2) Select "transfer from system to USB (backup)" and press "✓"



- 3) Select "calibration -> USB stick" and press "✓", a copy of the calibration information will be created in a file called "cranename_000000.cal" located in the root folder of the USB memory stick. If a file of this name already exists ie a previous backup has been made then the new file will become "cranename_000000-1.cal" etc.

The final completed calibration file should be renamed:

"cranename_serialnumber_date_tech.cal" where serialnumber is the serial number of the i4500 system, the date is the date the calibration file is completed/downloaded and tech is the initials of the calibrating technician.

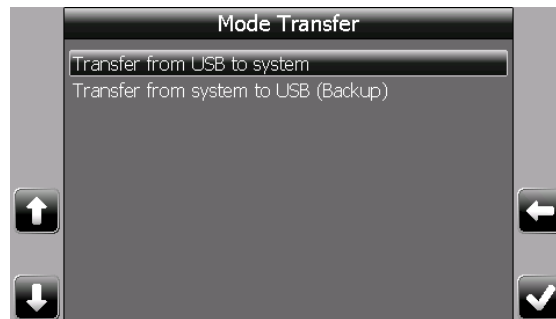
A copy of this file should be sent to Rayco Wylie for archive purposes.

3.6 “Transfer” restoring calibration and load chart files

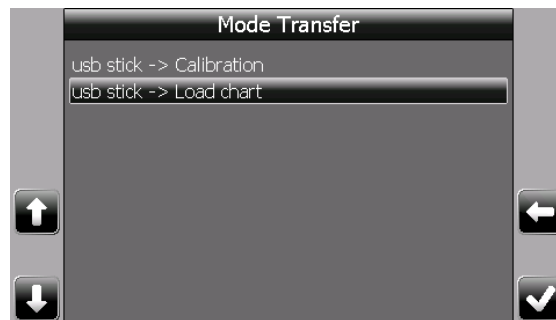
Warning: This procedure will overwrite the existing data in the i4500 system and the existing data will be lost. It is advisable to archive copies of the existing data using the procedure in step #14 as a precaution before continuing. If in doubt consult Rayco Wylie.

A copy of the calibration and/or load chart files can be restored to the i4500 system at any time. **Note** a USB memory stick must be connected to connector ‘B’ of the i4500 display unit using a Deutsch to USB converter lead (RaycoWylie part no. 33V0414) before proceeding. Ensure the file required to be restored is saved in the root folder of the USB stick.

Navigate through the calibration menu using “↑” or “↓” to highlight “transfer” and press “✓” to enter.



Select “transfer from USB to system” and press “✓”



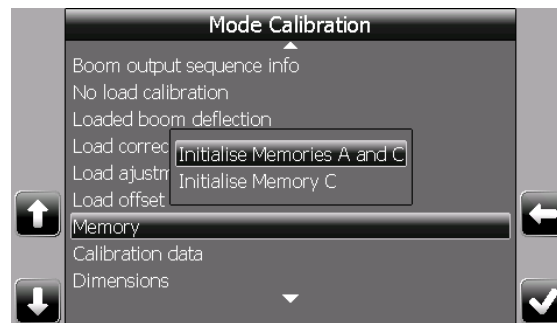
To restore a load chart file select “usb stick -> Load chart” and press “✓” or to restore a calibration file select “usb stick -> Calibration” and press “✓”,



A list of files will be displayed, either “**xxxx.cf**” or “**xxxx.cal**” depending on the choice above. Note that only files located in the root folder of the USB stick will be displayed. Select the relevant file from the list displayed and press “✓”, the selected file will be copied to the i4500 system and will replace any existing data. Once done, it is advisable to reboot the system (power off and on again) and reselect a valid configuration, **do not** accept the existing default duty presented on start up.

3.7 “Memory”

Warning: Initialising memory A will delete all the information stored in the calibration memory, be sure you have made a backup copy of the calibration file before using this option – **if in doubt, don’t!**



initialize memories A and C

Select this option to re-initialize the system memory, a warning screen will be displayed to ask for confirmation, if confirmed all calibration data will be deleted.

initialize memory C

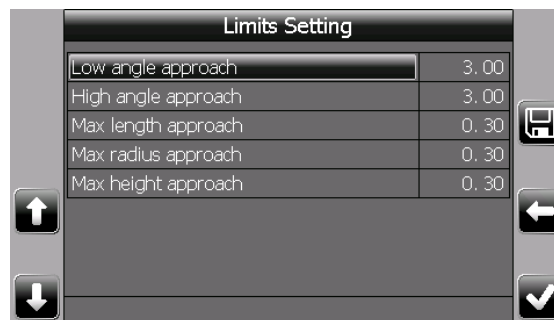
Select this option to re-initialize the memory for the current configuration, only data related to the current operator settings will be deleted ie duty number, parts of line settings etc. Reset the duty configuration immediately after initializing memory C.

4 OPTIONS

4.1 “Limits setting” parameters

This menu contains the approach warning gaps for all the limits that can be set by the operator in normal mode. Note: if range limiting is fitted then this menu is not available and the limit parameters should be set using the rotation data menu below (p31).

After selecting “limits setting” from the main calibration menu the screen will show:



Set the approach gap for each limit in turn, angle approach gaps are in degrees, radius and height gaps are set using the calibration units. Remember to press “save” once all the data is entered.

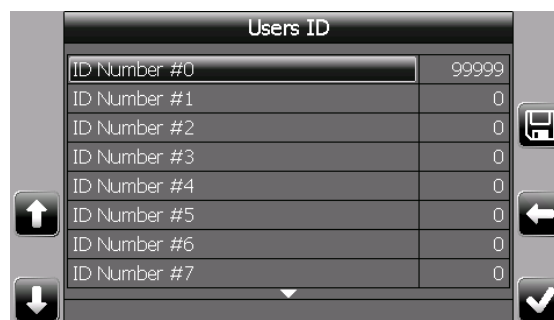
4.2 “special calibration”

This section will contain calibration settings for special features if enabled and will be described in a separate addendum to this manual.

4.3 “Users ID” Setting user pass codes for the data logger

This feature is only used if the data logger feature is fitted to the system and password protection is set to ON. It is a list of password numbers used to log into the i4500 on startup and can be used in conjunction with the Rayco Wylie data logger software for PC to record individual user data for each working session of the machine. Where this feature is not used the default login number is “99999”.

Navigate through the calibration menu using “↑” or “↓” to highlight “users id” and press “✓” to enter.



Scroll down to the first “0” entry and press “✓” to highlight the value for editing, (0 indicates an unset value and is not a valid login number) change the 5 digit number to the required code and press “save” to accept the change, press “←” to return to the main calibration menu. There are 100 different code numbers available to set including the default value.

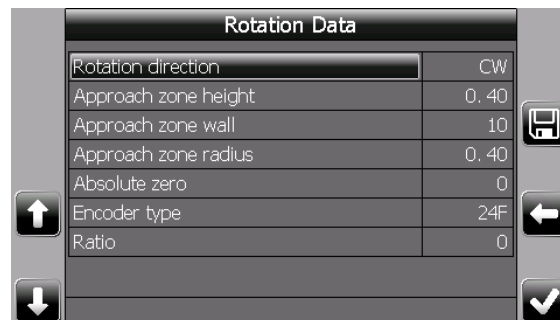
To delete a number, change it to “00000” which is not a valid id number.

Note: It is recommended that the default value of “99999” is retained and new entries made from position 2 onward but if the default value is changed remember to safely record the new value. The i4500 system must have a valid number entered before it will go to the normal working screen if password protection is set to ON.

4.4 “rotation data”

This feature is only available if the range limiting feature is fitted to the system or a sensor is used to monitor the slew position of the crane for duty selection.

Navigate through the calibration menu using “↑” or “↓” to highlight “rotation data” and press “✓” to enter.



Rotation direction: set to CW (clockwise) or CCW (counter-clockwise) as required to ensure that the slew angle reading increases when the machine is slewed to the right as viewed from the operators’ position.

Approach zone height: this value represents the approach warning gap for the height limit in the units set for calibration.

Approach zone wall: this value represents the approach warning gap for the slew limit in degrees.

Approach zone radius: this value represents the approach warning gap for the radius limit in the units set for calibration.

Absolute zero: This is used to set the zero datum point when an absolute encoder or single turn, twin wiper potentiometer is fitted as the slew sensor. To set the zero datum:

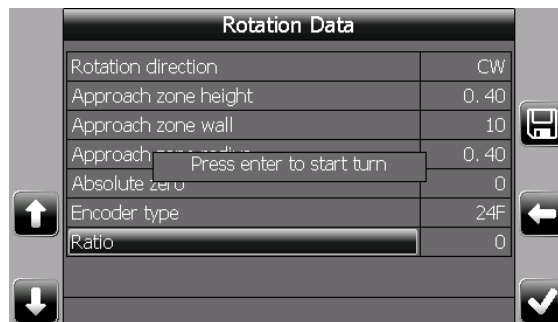
Rotate the machine to the zero datum point, normally centred over the front of the machine, and press “✓” to set the slew angle reading to zero and permanently store this point.

If the encoder is a multi-turn type then set the ratio first before setting this zero point (see below).

Encoder type: This will be factory set and should not be changed. It represents the type and manufacturer of the encoder that is fitted.

Ratio: This value will only be available if a multi-turn encoder is specified above and represents the number of turns that the encoder rotates for a single 360° rotation of the crane. To set this ratio:

- 1) Position the crane at an identifiable slew position and check that it will be safe to rotate the machine for a full circle.
- 2) Select “**ratio**” and press “✓”. When ready to start the recording process press “✓” again and rotate the machine 360° and return to the exact start point.



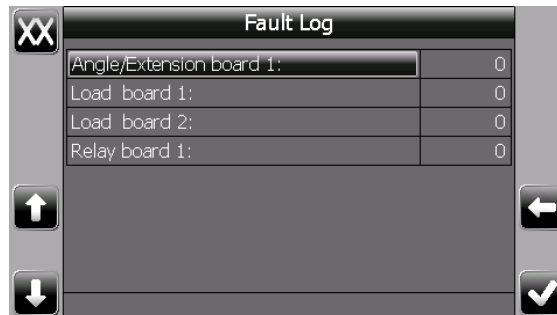
- 3) When satisfied that the machine is exactly one turn from the start, press “✓” to confirm the position and press “**save**” to store it to memory.
- 4) Press “←” to return to the main calibration menu.

5 AUTOMATIC LOGS

5.1 “Fault log”

The fault log screen is a diagnostic tool used to record intermittent errors detected in various parts of the system. The numbers on the right hand side of this screen represent a count of the number of individual faults detected for each component and can be useful in tracing system faults.

Navigate through the calibration menu using “↑” or “↓” to highlight “fault log” and press “✓” to enter.

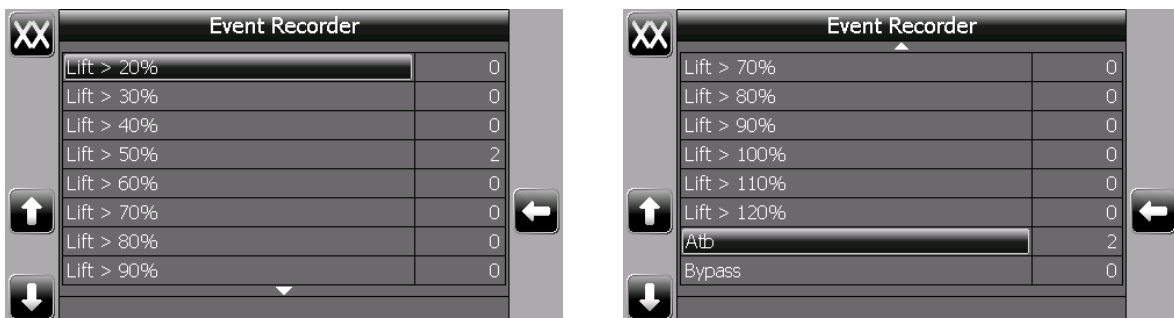


Note the fault status, press “←” to return to the main calibration menu or press “XX” to reset all the counters to zero.

5.2 “Event recorder”

The event recorder provides a summary of lifts performed in each 10% band of SWL, it also provides a count of ATB and bypass activations. **Note:** the event recorder does not replace the data logger feature as no date and times are recorded, the counters can be reset at any time and event data is not downloadable for external analysis.

Navigate through the calibration menu using “↑” or “↓” to highlight “event recorder” and press “✓” to enter.



Note the event status, these sample screens show 2 lifts performed between 50 and 60% SWL and also 2 ATB alarms recorded. Press “←” to return to the main calibration menu or press “XX” to reset all the counters to zero.