# i3000
# Rated Capacity Indicator
# Installation and Calibration

For
Telescopic cranes with hoist rope load sensors

Ref: PAS feb 2004

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## WARNINGS

In connection with the manufacture and sale of rated capacity indicators (automatic rated capacity indicators) to fulfil our obligations under BS 7262: 1990 no responsibility for the specification, installation and type testing of the product can be accepted by Wylie Systems unless the installation and calibration is completed by or under the supervision of its own engineers or directly authorised personnel.

ALWAYS REMEMBER!

A That the Automatic Indicator must be correctly set up in use and that wrong adjustments may cause the indicator system to show a safe condition in the event of an overload.

B That the Indicator system is purely an aid to the operator. Responsibility for the safe operation of the crane lies with the crane operator, and the indicator equipment will not necessarily prevent crane damage due to overloading and related causes.

C Proper functioning of the equipment is dependent upon proper daily inspection and observance of the operating instructions.

D During normal operation the Rated Capacity of a crane should not be exceeded. Therefore the indication of overload should not be used as a normal operating facility. It should be noted that certain statutory requirements do not permit the safe working load to be exceeded except for the purpose of testing.

E The crane should be operated at all times so that crane motions occur smoothly and at a safe speed.

F The Indicator in its standard form is not suitable for use in Hazardous (Explosive) atmospheres.

## Contents

# Section 1
# GENERAL DESCRIPTION

## 1.1 Introduction

This manual contains installation, calibration and troubleshooting information for i3000 system. Information in this manual will enable qualified personnel to install, calibrate and troubleshoot the i3000 system efficiently.

## 1.2 Personnel qualification and Scope of this manual

This manual is intended for use by field engineering and repair personnel, who are fully qualified and trained to perform the procedures described in this manual.
This manual is divided into the following sections:
SECTION 1 – GENERAL DESCRIPTION
SECTION 2 – INSTALLATION
SECTION 3 – CONFIGURATION AND CALIBRATION

## 1.3 Brief description of i3000 System

The i3000 is a computerized crane safety system. This version measures hook hoist load, boom length, angle and radius, and indicates safe or hazardous conditions. It comprises sensors fitted to the crane, a computer cabinet and a display located in the crane cabin. Optional additional sensors may also be fitted to monitor slew angle, cant, anti-two block condition etc. to provide extra information to the operator.
Load sensors are generally multi sheave dynamometer(s) that incorporate strain gauged load cell(s) and are located at the head of the base boom section, in some circumstances they may be fitted in other parts of the hoist rope system eg in the dead end of the hoist rope or built into a deflector sheave assembly. In all cases the electrical output from the load cell is proportional to the tension in the hoist rope of the crane. Separate load sensors are fitted to the main and auxiliary hoists on the crane as appropriate.
An extension drum with integral inclinometer provides signals that are proportional to the boom length and angle. Radius is calculated from the information provided by these sensors.
In operation the actual load lifted by the crane is automatically compared with corresponding data related to the maximum permissible crane loading. The permissible maximum load is

computed by the i3000 system from load tables pre-programmed into the system and taking into account the parts of line in use, the configuration set and the current boom length and angle/radius of the machine. The actual load is expressed as a percentage of permissible load, if this percentage exceeds a preset value, alarms and safety functions are activated. The values of hook load, permissible load, boom length, angle and hook radius are displayed in digital form on a graphic liquid crystal display (LCD). If additional sensors are fitted then information about current slew angle, cant, and anti-two block condition may also be available.

The required load-radius curves are stored in non-volatile memory and cannot be altered except by exchanging a factory programmed 'data eprom'. The calculated crane parameters and calibration data are stored in additional non-volatile memory. The calibration of the crane is performed by using known loads, boom angles, hook radii, and other pre-determined data.

# Section 2

# INSTALLATION

## 2.1 System Overview

The system consists of a graphical display unit in a heavy duty cast housing, a central processing unit (termination housing), and a number of sensors to monitor boom length, angle and the load in hoist system(s) of the machine.  All electrical connections are made via the main termination unit, all operator inputs are made using buttons on the display unit.

This manual does not address sensor mounting. The sensor installation must be done according to the manufacturer's recommendations.

## 2.2 Extension Drum Payout Setting

| WARNING |
|---|
| The recoil spring in the extension drum is very powerful, do not lose control of the drum when in this state as damage to personnel or equipment may result. |

To attach and set up the extension cable, which is supplied wound around this drum, proceed as described below.

Fit the drum on the boom with the mounting kit provided.  We recommend it to be fitted to the left hand side of the boom, viewed from the cab facing toward the load, if it must be right hand mounted then the wiring to the integral angle sensor must be modified according to the notes on the wiring connections drawing supplied.

Fit an extension cable guide at the top of each telescopic section, and a mounting post on the boom tip, all items to be in line so that the extension cable will remain in a straight line from fully retracted to fully extended.  If a manual section is fitted, the duty selection sheet supplied with the system will specify where the boom tip mounting post is to be fitted.

Remove the outer cover from the extension drum and disengage the extension potentiometer. If the potentiometer is not already disengaged with a peg inserted in the potentiometer engagement mechanism the mechanism should be swung into disengagement and a peg or stout wire inserted in the peg hole to maintain disengagement.

Fully telescope out the crane boom, including the manual section if applicable.

Tension the drum by pulling cable off the drum by hand, until either (1) The drum spring is fully wound up (spring is coilbound) or (2) The drum has just one turn of cable left on it.

If situation (1) occurs first then remove the excess turns of cable from the side of the drum until one cable turn remains, while carefully retaining the spring tension. If situation (2) occurs first then add extra turns until the recoil spring is coilbound with one turn of cable on the drum.

Ensuring the cable is not twisted, thread through each extension cable guide up to the boom tip mounting post. Now allow the drum to recoil one turn until just two turns of the extension cable are wound on the drum, and then attach the extension cable to the boom tip mounting post by wrapping at least three turns around the post and then binding the cable to itself by the use of Tyraps (plastic cable clamps) or equivalent. A sufficiently long "tail" of payout cable should be left after the mounting post to allow connection to the overhoist switch terminal box if this is required.

Fully retract the boom including the manual section if applicable. Check that the extension cable is not twisted, is neatly stored on the drum, and that sufficient tension remains in the fully retracted condition.

With the boom still fully retracted, re-engage the extension payout potentiometer sprocket with the extension drum sprocket, having first turned the potentiometer a half turn away from the fully clockwise position. (Defined as the position of the shaft relative to the potentiometer body, viewed from the shaft side).

Check that when the boom is fully extended the potentiometer has not reached its endstop.

## 2.3 Display Mounting

The display is mounted on a bracket assembly that enables the unit to be tilted for optimum viewing angle.

The display should be located at the front of the cab, where it is readily visible from the operator's control position but does not interrupt the external view of the load working area. Take care not to obscure any crane instruments, control levers, or switches etc. Locate the best area and drill 4 x mounting holes to match one of the optional sets of holes in the bracket. Fix the bracket to the console using 4 bolts, do not over-tighten them.

The viewing angle of the display can be adjusted using the two quick release levers on the bracket.

## 2.4 Display Cable Connections

Cable connections to the display are made using the 8 screw terminals on the display processing board. These terminals are shown on figure 2.4.2. Use the following instructions to connect the i3000 display.

1. Unscrew the four back screws to remove the rear cover. Proceed gently in order not to damage the processing board, graphic LCD and keypad.

2. All cable shields should be grounded to the cable gland of the central processing controller box. Therefore the cable shield of the display **should not** be grounded to the cable gland using

the brass ring. The cable gland is assembled as shown in figure 2.4.1.

3. Wire according to the supplied drawing on figure 2.4.2. Connect the wires by stripping off 6 mm of insulation, inserting the wire into the proper terminal and tightening the screw firmly.

4. Make sure all connections are properly made and completed before refitting the rear cover or switching on the power to the display.

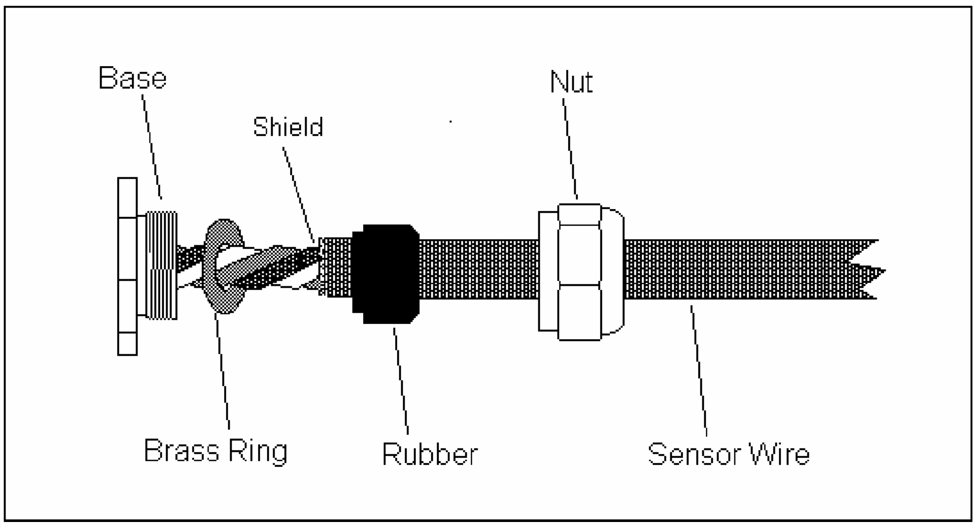



**Figure 2.4.1 Cable gland assembly without grounded shield**

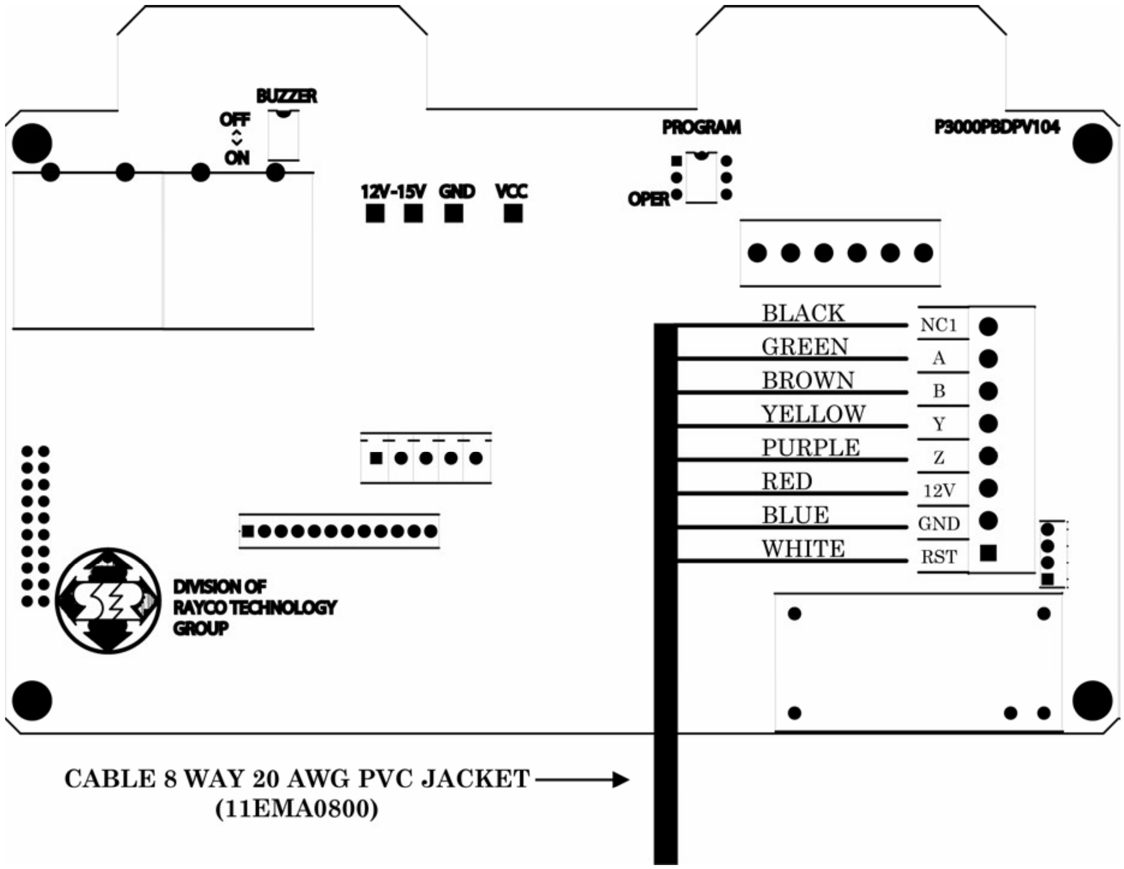



**Figure 2.4.2 Display terminal block connection**

## 2.5 IO Board And Terminal Blocks

The i3000's display, all sensors and options are connected to the i3000 central processing controller box. The terminal blocks are located on the IO board in the bottom of the controller box. The IO board is reached as follows:

1. Unscrew the 14 top screws of the i3000 central processing controller box.

2. Loosen the 10 spring screws of the central processing panel, and carefully lift the panel out of the box to get access to the IO board. This panel is connected to the I/O board via two ribbon cables, these cables may be temporarily disconnected to improve access to the terminations below but take care to protect the loose assembly from damage. The IO board is described on figure 2.5.

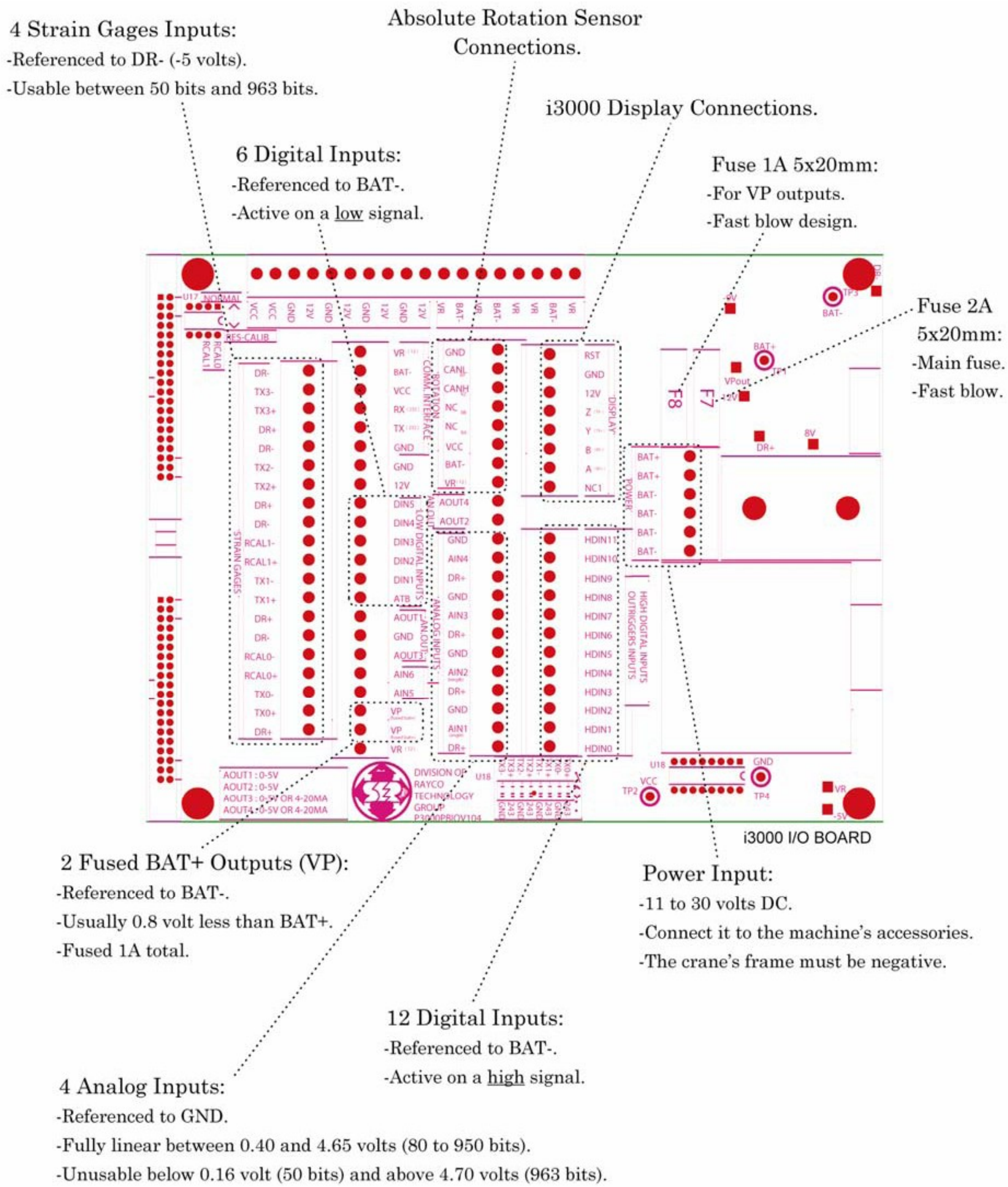



**Figure 2.5: IO board and terminal blocks description**

## 2.6 Central Processing Controller Cable Connection

All cable shields must be grounded to the cable gland of the central processing controller box only. Fold the shield over the rubber sleeve in order to get contact with the brass ring as shown in figure 2.6.

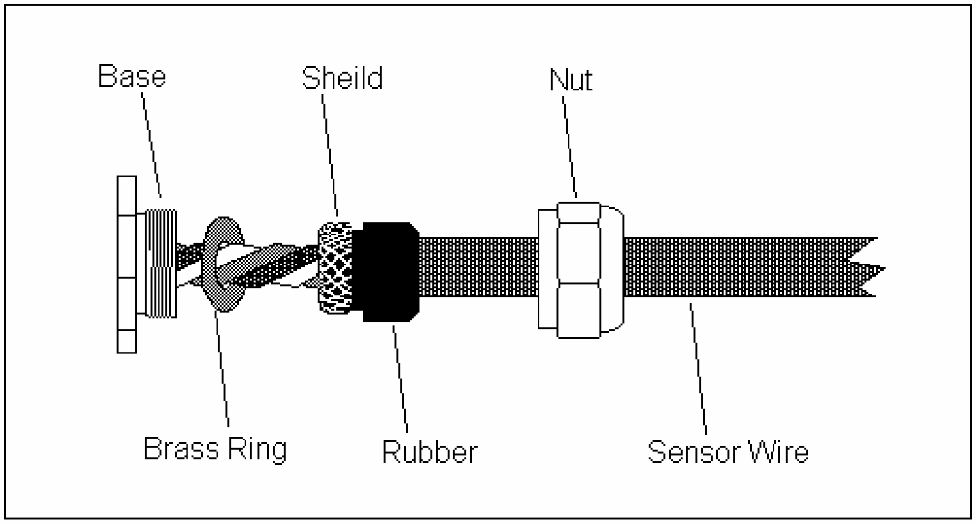



**Figure 2.6: Cable gland assembly with grounded shield**

**Note:** The following wiring connections are for general guidance only. If a system specific connections drawing is provided it should take precedence over this manual.

### 2.6.1 12/24VDC Power input

Connect either a +12VDC or +24VDC power source to Power terminal as show in figure 2.6.1. Supply voltage must be a minimum of 11 volts and must not be greater than 30 volts otherwise over-voltage protection will be activated and will blow the protective input fuse F7.

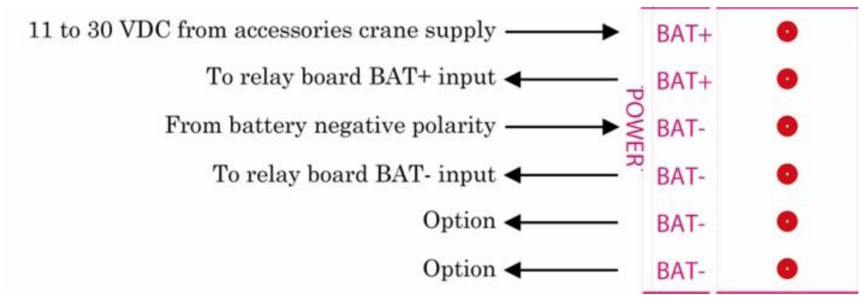



**Figure 2.6.1 Input power**

### 2.6.2 Wire connection of display

Connect the 8 way shielded cable from i3000 display to DISPLAY terminal blocks as shown in Figure 2.6.2

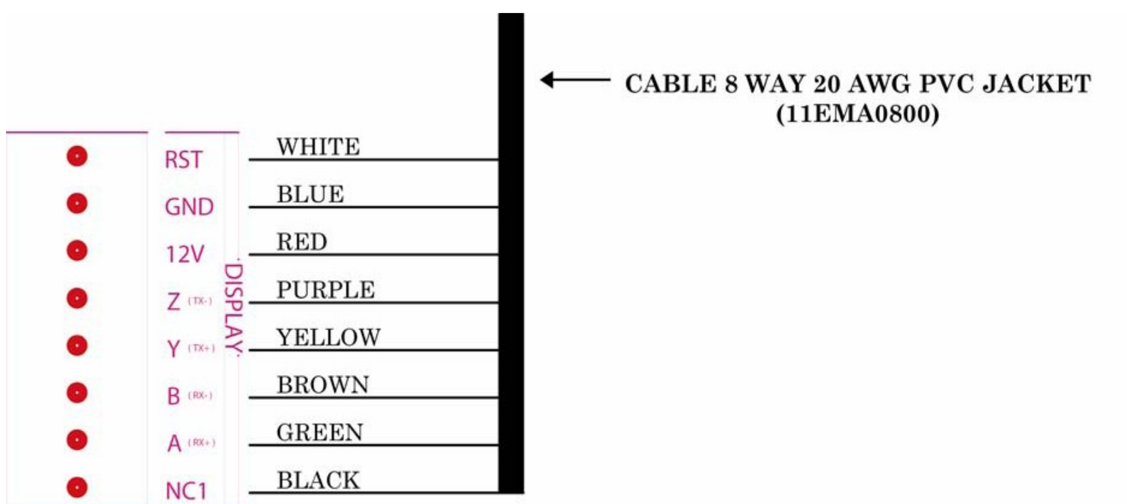



**Figure 2.6.2 Display terminal block**

### 2.6.3 Three wire Analog Input

The ‘ANALOG INPUTS’ terminals are used to connect 3 wire sensors to the system. 2 Wires are used to supply the sensor and the third gives the sensor’s signal. The basic connection is shown in Figure 2.6.3

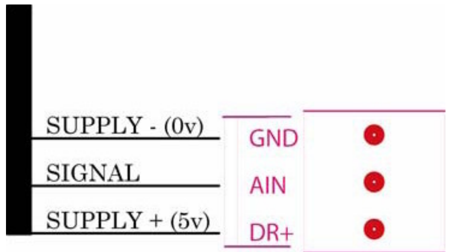



**Figure 2.6.3 – Three wire analog input**

The analog input description is given in the following table 2.6.3

| | |
|---|---|
| AIN1 | Angle sensor |
| AIN2 | Length sensor |
| AIN3 | Cant sensor (option) |
| AIN4 | General analog input (option) |
| AIN5 | General analog input (option) |
| AIN6 | General analog input (option) |

**Table 2.6.3: Analog input description**

### 2.6.3.1 Boom angle sensor

Connect the boom angle sensor to the terminals as shown in Figure 2.6.3.1

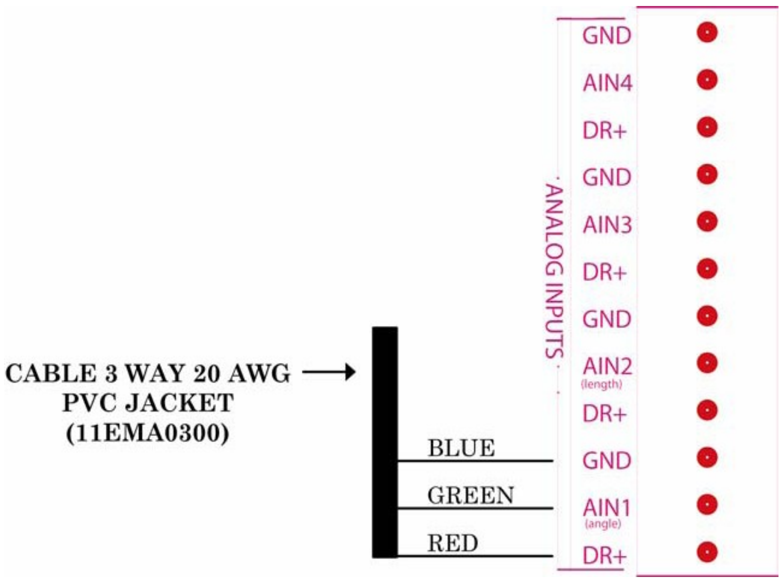



**Figure 2.6.3.1 Boom angle sensor connection**

### 2.6.3.2 Boom length sensor

Connect the boom length sensor to the adjacent terminals marked GND, AIN2, and DR+ as above ensuring that the signal line (green) is connected to AIN2.
Note: All terminals marked GND are common with each other, similarly all terminals marked DR+ are also common with each other.

### 2.6.3.3 Option sensors

If other 3 wire analog sensor options are fitted to your system, connect the option sensors to the terminals as described in section 2.6.3 and refer to table 2.6.3 to determine which analog input to use.

### 2.6.4 Four wire Analog Input

The 'STRAIN GAUGE' terminals are used to connect 4 wire sensors to the system. 2 Wires are used to supply the sensor and two to return the sensor signals. The basic connection is shown in Figure 2.6.4

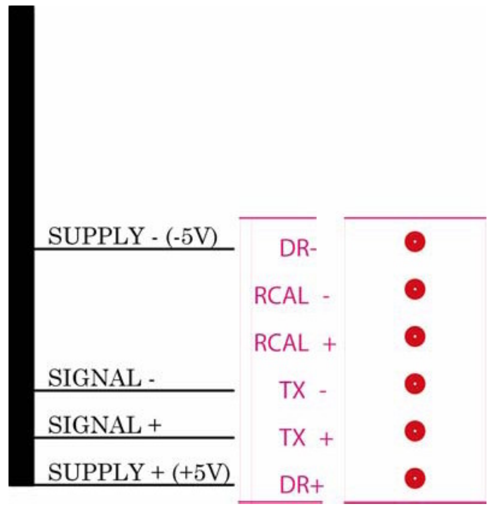



**Figure 2.6.4 – Four wire analog input**

The strain gauge input description is given in the following table 2.6.4

| | |
|---|---|
| TXO+ | Main hoist load signal + |
| TX0- | Main hoist load signal - |
| TX1+ | Auxiliary hoist load signal + |
| TX1- | Auxiliary hoist load signal - |
| TX2+ | Not used |
| TX2- | Not used |
| TX3+ | Not used |
| TX3- | Not used |

**Table 2.6.4: Strain gauge input description**

### 2.6.4.1 Main hoist load sensor

Connect the main hoist load sensor to the terminals shown in Figure 2.6.4.1

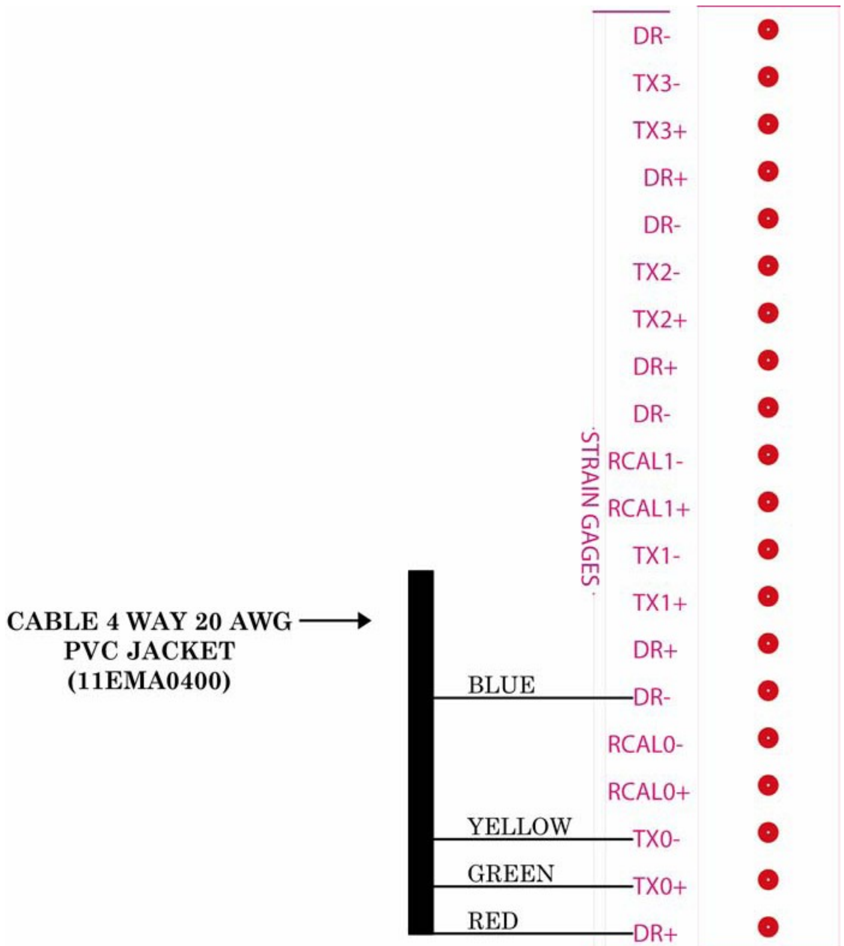



**Figure 2.6.4.1 Main hoist load sensor connection**

### 2.6.4.2 Auxiliary load sensor

If an auxiliary load sensor is fitted to your system, connect it to it's respective terminals as described in section 2.6.4 and refer to table 2.6.4 to determine which strain gauge input to use.

### 2.6.5 ATB connection

The ATB signal is a pull-up signal, during normal operation the signal must be grounded. When an ATB condition occurs the ground on ATB Signal must be released. If the ATB is not used, you must install a jumper between ATB and GND. Connect the ATB sensor to the terminals described in Figure 2.6.5.

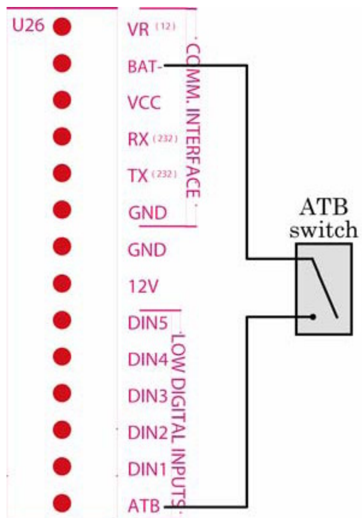



**Figure 2.6.5 ATB sensor connection**
(shown in alarm state)

### 2.6.6 Terminal Block for extra options

The terminal blocks in table 2.6.6 are used for extra options. Connections for these options will be detailed in the connections drawing supplied with the options.

| |
|---|
| TRANSMISSION |
| ROTATION |
| RPM |
| OUTRIGGERS |

**Table 2.6.6: Terminal blocks for extra options**

### 2.6.7 Relay board and Terminal Blocks

The relay board is located just beside the i3000 IO board and is used to control the Lockout system and all alarms. The relay board is described in Figure 2.6.7.

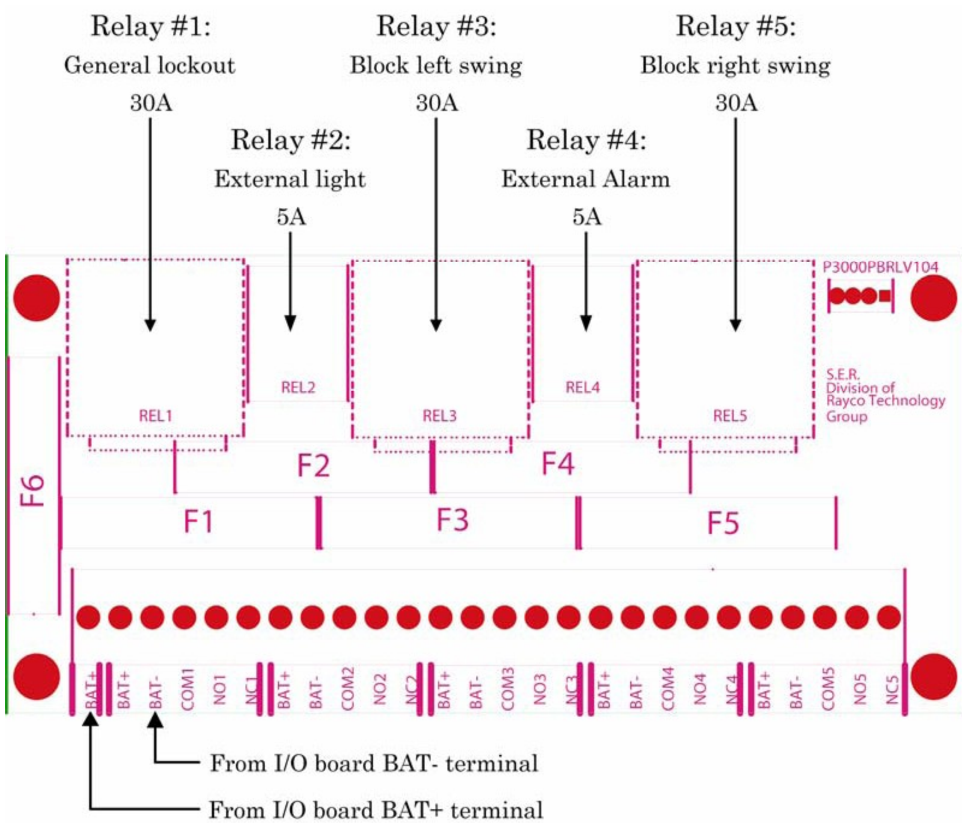



**Figure 2.6.7 Relay board and terminals description**

#### 2.6.7.1 Lockout connection

The relay board must be connected to the battery supply voltage from the terminals of the IO board as shown in figure 2.6.7
The lockout connection is according to your specific lockout configuration. The relays are controlled in ‘Fail Safe ‘ mode, that is they will be closed during normal operation, relay status of COM-NO, and open during alarm or power-off, relay status of COM-NC. All terminals of each relay are available for maximum flexibility in configuring and using their outputs.

Fuse F6 is used to protect the input power of the Relay board (BAT+). Fuses F1 to F5 are used to protect the common of each of the corresponding relays.

### 2.6.7.2 Typical connection for sourcing external lockout device

The following Figure 2.6.7.2 shows the typical connection of an external lockout device using sourcing configuration.

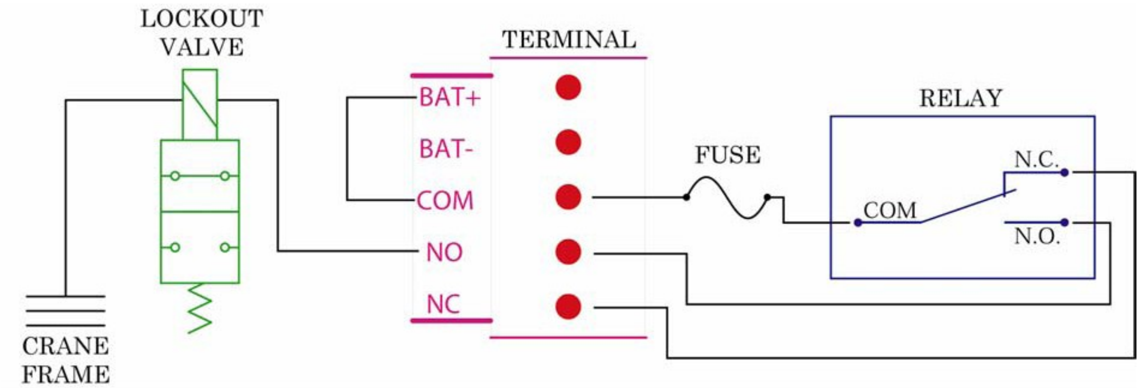



**Figure 2.6.7.2 Typical connection for sourcing lockout valve**

### 2.6.7.3 Typical connection for sinking external lockout device

The following Figure 2.6.7.3 shows the typical connection of an external lockout device using sinking configuration.

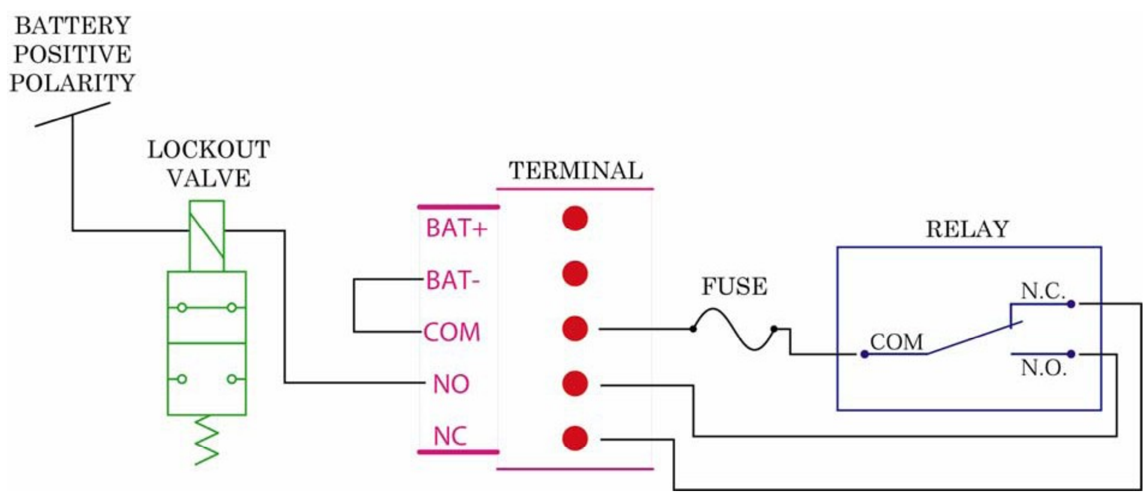



**Figure 2.6.7.3 Typical connection for Sinking lockout valve**

### 2.6.7.4 Typical connection for sourcing external alarm device

The following Figure 2.6.7.4 shows the typical connection of an external alarm device using sourcing configuration.

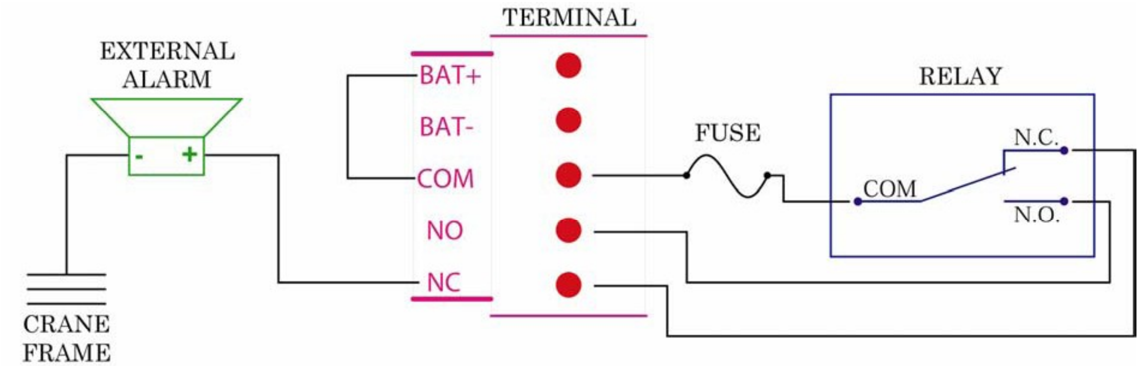



**Figure 2.6.7.4 Typical connection for sourcing external alarm**

**Caution**

The function of each relay given in Figure 2.6.7 is for standard software versions only. Relay functions may differ from these if your system is fitted with custom software, an addendum sheet will be included with this manual if this is relevant.

# SECTION 3

# CONFIGURATION AND CALIBRATION

The calibration section will guide the technician and explain the procedures to follow, in order to calibrate the i3000 system rapidly and efficiently.
The calibration of the sensors is performed using software by entering data using the display's keypad. The only exception is that the amplifier jumpers are set manually.

| | |
|---|---|
| Necessary Calibrating Tools | Steel measuring tape of 30m (100ft) capacity with accuracy of 1cm or better.<br>Angle indicator with accuracy of 0.5 º or better.<br>Test load that produces a line pull of approximately 90% of line pull.<br>Each test load weight must be known accurately to within ± 1%. |
| Necessary Calibration Information | The rated line pull of each hoist line.<br>The maximum number of parts of line.<br>The weight of each block, slings and attachment used for calibration. |

## 3.1 Internal amplifier

The i3000 system has an internal amplifier built into the system that is used to amplify the signal coming from load sensors. Some applications where the load sensor is a significant distance away from the termination unit will also be fitted with an external amplifier to ensure a reliable load signal is obtained.

### 3.1.1 Setting the amplifier gain

When no external amplifier is required, it is necessary to adjust the gain of the internal amplifier. The internal amplifier gain setting is done using the 'MAIN' and 'AUX' values in the Diagnostic Mode. While in the diagnostic mode (refer to diagnostic mode section in the i3000 Operator's Manual), go to Diagnostic Mode Screen #3 and check these values. These values represent the amplified main and aux hoist load inputs in volts.

On the CPU board of the i3000 CPU Box, locate the amplifier jumpers as shown on table 3.1 They are noted as JA, JB, JC. Note the arrangement and refer to the table 3.1 below to determine the current amplifier gain level.

With no load suspended on the hook, the ‘Main’ voltage should be between 0.2V and 1.5V. When lifting a load that generates maximum line pull, the ‘Main’ voltage should not exceed 4.2V. This can be determined by using some general information about the crane and the following formula.

$$V1 + LP/L1 (V2 - V1) = Vmax$$

Where: V1 = voltage displayed on Main with no load on the hook
V2 = voltage displayed on Main with a load suspended
L1 = weight of test load divided by the number of falls
LP = maximum line pull rating of the crane
Vmax = maximum voltage on Main

The calculated value of Vmax should be between 3.5 and 4.0 volts, and must not exceed 4.2 volts. It the voltage is too small, the gain factor must be increased. If the value exceeds 4.2 volts, the gain factor must be decreased.
If the displayed value is outside the required range, then adjust the gain settings on the CPU board according to the table below.

| JA | JB | JC | GAIN Level |
|---|---|---|---|
| 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 100 |
| 2 | 2 | 1 | 125 |
| 2 | 4 | 1 | 137 |
| 2 | 4 | 3 | 188 |
| 3 | 1 | 1 | 200 |
| 3 | 3 | 1 | 250 |
| 3 | 2 | 1 | 333 |
| 3 | 1 | 2 | 375 |
| 4 | 1 | 1 | 500 |
| 4 | 1 | 2 | 624 |
| 4 | 4 | 2 | 688 |
| 4 | 1 | 3 | 831 |
| 4 | 3 | 3 | 1000 |

**Table 3-1. Amplifier gain level**

Repeat the gain calculations for the auxiliary load sensor if fitted.

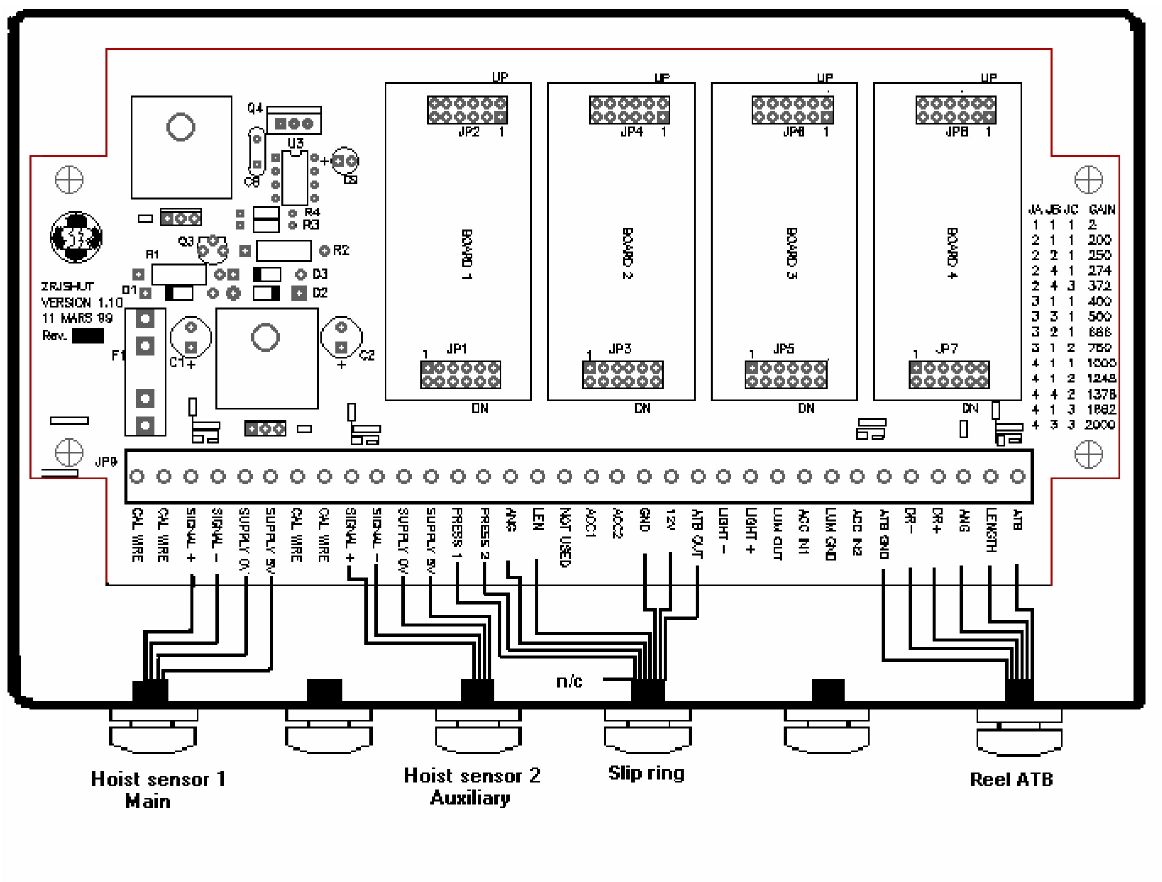
Both load sensor inputs use the same internal amplifier/gain setting and the final jumper setting must be made so that neither of the load sensor inputs exceed 4.2 volts. This means it may be necessary to have one of the load sensor inputs with a lower gain then is calculated.

If the amplifier gain requires changing, recalculate the Vmax value(s) to verify the new settings are correct.

## 3.2 Multi-channel Amplifier (optional)

The amplifier must be installed on the upper works (slewing portion) of the crane.

Connections must be made as shown in the diagram below. (Refer also to the customer connection drawing supplied with this equipment)




### 3.2.1 Gain Settings

Set the gain of the display unit to <1> (Refer to section 3.1.1)

Follow the procedure for gain settings as defined in section 3.1.1 but use the following table for jumper settings. In this case each load input has its own gain value, the jumpers for the main load sensor are to be found on board 1 and for the auxiliary load sensor on board 2.

### 3.2.1 External Amplifier Gain Setting Table

| Ja | Jb | Jc | Gain |
|---|---|---|---|
| 1 | 1 | 1 | 2 |
| 2 | 1 | 1 | 200 |
| 2 | 2 | 1 | 250 |
| 2 | 4 | 1 | 274 |
| 2 | 4 | 3 | 372 |
| 3 | 1 | 1 | 400 |
| 3 | 3 | 1 | 500 |
| 3 | 2 | 1 | 666 |
| 3 | 1 | 2 | 750 |
| 4 | 1 | 1 | 1000 |
| 4 | 1 | 2 | 1248 |
| 4 | 4 | 2 | 1378 |
| 4 | 1 | 3 | 1882 |
| 4 | 3 | 3 | 2000 |

## 3.3 System initialization

Before starting the system calibration, sensors need to be verified for good working order through the diagnostic mode (refer to 'Diagnostic Mode' section in the i3000 Operator's Manual).
When each sensor has been verified for its full functionality the system can be initialized in order to start the calibration procedure. This will obliterate all calibration data from the calibration memory, and therefore should be done only when a system is installed for the first time.
Perform a system initialization as follows:
Ensure that the calibration switch is set to the ON position (see section 3.4.1).
Press button #1 and #4 at the same time
While holding button #1 and #4, press both buttons #2 and #5 at the same time.
Release buttons #1 and #4, the system will display the reset mode.
Use HOIST/ SCROLL UP (#2) or PARTS/ SCROLL DOWN (#3) buttons to select 'YES' to confirm system initialization.
Press Select (#4) to confirm your choice. When the initialization is done, the system will return to its normal operation.

Note that the system can be restarted at any time by pressing and releasing buttons #1 and #4 at the same time, this will not affect any stored data such as load tables, geometric information, or calibration.

i3000 display and keypad:

## 3.4 Calibration mode

The calibration mode is a separate entity of the i3000 system. It is totally independent of the regular operating mode as if it was a different system. The purpose of the calibration mode is to set the angle, length, and load sensors to provide meaningful signals, to configure application specific factors and to ‘teach’ the i3000 the boom deflection characteristics both loaded and unloaded.
Select ‘calibration’ from the Mode menu in normal operation to access the calibration mode, a password is required to enter the calibration menu.
The calibration mode displays a series of items over several pages, the HOIST/ SCROLL UP (#2) or PARTS/ SCROLL DOWN (#3) buttons will allow you to navigate through these items. Each item is numbered sequentially, the numbers shown against specific calibration functions in your system may be different from those shown in this manual depending on the version of the software fitted and any optional features provided. Although in calibration mode it is possible to navigate and access any stage of the calibration, it is recommended (and sometimes essential) that the system is calibrated in the order described in this manual.
If an item is selected by mistake, use button (#5) ESC to return to the previous menu.

### 3.4.1 Memory protection

The i3000 system has both a hardware and software key to protect the calibration data. The hardware key protection is implemented by the calibration switch located on the CPU board and noted ‘Calibration switch ON <-> OFF. When you slide the calibration switch to the ON position, the hardware protection is disabled and you are allowed to enter or modify calibration data in the system memory.

**MAKE SURE THAT THE CALIBRATION SWITCH IS SET TO THE ON POSITION BEFORE STARTING CALIBRATION OF THE SYSTEM.**
**WHEN THE CALIBRATION IS FINISHED SET THE SWITCH TO THE OFF POSITION TO PREVENT THE CALIBRATION DATA FROM BEING CORRUPTED.**

### 3.4.2 Entering the calibration mode

To enter the calibration mode

1. Push the MODE (#1) button
2. Scroll down with the PARTS/ SCROLL DOWN (#3) button to highlight «CALIBRATION»
3. Push the Select (#4) button to confirm the choice
4. The system will ask for a password. The password will have a maximum of 10 numbers. The reference numbers can be found on each push button on the keyboard. Enter the numbers in sequence.
5. Your password is 1 – 2 – 3 – 4 or 1 – 2 – 3 – 4 – 5 unless a different number has been previously requested. The password cannot be altered except by changing the crane data eprom which is factory supplied.
6. If an error is made, Press the Escape (#5) button and repeat the complete procedure.

Once the system receives the exact password, it will automatically display the Calibration mode menu. The System password will remain activated until the system is turned off, ie it will not be necessary to re-enter the password each time you enter the calibration mode unless power is lost to the system.
The calibration of the system can now be performed.

## 3.5 System configuration and calibration data

Before starting the calibration of any sensors, it is necessary to perform the system configuration and enter calibration data.

### 3.5.1 System configuration

For each possible sensor that can be connected to the system it is possible to set the system to ignore it (disable) or monitor it (enable). Following a system initialization, the commonly used inputs are set to Enable by default. Unused inputs should be Disabled to prevent error messages being generated for these functions. The description of the system inputs is given in table 3.5.1

| | |
|---|---|
| TXO | Main load sensor |
| TX1 | Auxiliary load sensor |
| TX2 | Unused |
| TX3 | Unused |
| AIN1 | Boom angle sensor |
| AIN2 | Boom length sensor |
| AIN3 | Cant sensor |
| AIN4 | General analog input (option) |
| N/A | |
| AIN5 | General analog input (option) |
| AIN6 | General analog input (option) |
| REL3-REL5 | Counter balance valves control (option) |

Table 3.5.1  System input description

The system configuration is done as follows:
Navigate in the calibration menu using buttons (#2) or  (#3) to highlight the field «21  - enable/disable i/o»
Push the Select (#4) button to confirm the choice
Use buttons (#2) or (#3) to highlight one of the unused inputs
Pushing the Select (#4) button will toggle the corresponding input from enable to disable state. Repeat the procedure for each input not used.
When the configuration is done, push the ESC (#5) button to return to the main calibration menu.

### 3.5.2 Selecting units of measure for calibration

The units of measure must be selected before starting any calibrations. Two choices can be selected: Imperial or metric, load units are displayed in 1000 x lbs or 1000 x kgs to 2 decimal places and length units are displayed in feet or metres to 1 decimal place.

Navigate in the calibration menu using buttons (#2) or (#3) to highlight the field «20 - unit of calib: imperial»
Push the Select (#4) button to toggle the choice between imperial and metric.
Note that as soon that one calibration procedure is performed the system will not allow further changes to the unit of measure for calibration. This setting should not be confused with the display units setting for the normal working mode which can be changed at any time in the system set up mode.

### 3.5.3 Calibration data screen

Use the sub-menu «16 calibration data» screen to enter fixed data values used for various operations of the system.
Navigate through the calibration menu using buttons (#2) or (#3) to highlight the field «16 - calibration data»
Push the Select (4) button to confirm the choice
Use buttons (#2) or (#3) to highlight the desired variables to edit
Push the Select (#4) button to obtain the setting mode. Use buttons (#2) or (#3) to change the value and push Select (#4) button once to confirm. Then scroll to the next variable and repeat the procedure.
The variables are listed below, all dimensions are displayed in the units defined above in 'calibration units' ie m and kg x 1000 or ft and lbs x 1000.
Once all the calibration data is entered, push the ESC (#5) button to return to the main calibration menu.

**Slew offset:**
This is the distance between the centre of rotation of the crane and the boom base pin. The value is negative if the boom base pin is behind the centre of rotation. Use the set button #4 until the value becomes negative. E.G: 2 feet, 4 inches on a telescopic crane becomes minus 2.3ft (-2.3)

**Sheave radius :**
The radius of the boom head sheave block. It is used to compensate the radius when lifting with one part of line.

**Height offset :**
The height of the boom foot pin above ground level, use the figure for on outriggers if different from on tyres.

**Rope limit main:**

This is the maximum line pull permitted per part of line on the main hoist according to the chart. This value will be used as the load limitation if lower than the rated capacity.

**Rope limit aux:**
This is the maximum line pull permitted per part of line on the auxiliary hoist. This value will be used as the load limitation if lower than the rated capacity.

**Rope limit whip1:**
Not used.

**Rope limit whip2:**
Not used.

**Max parts of line:**
Set the maximum number of parts of line. This applies to all hoists.

**Percent per part:**
This value allows de-rating of the hoist line capacity when reeving with more than one part. The total rope capacity will de-rate by the percent set except for one part.

**Gap for extension:**
This value is a tolerance that the system uses when calibrating the radii for the fully retracted boom, see section 3.10.4. It is not normally used and should only be changed with the guidance of Wylie Systems technical support.

**Rig angle:**
The RIG ANGLE is a set angle below which the operator can permanently bypass the lock-out by pressing the RIG button, it should be set at the lowest practical boom angle possible. This function is used to allow the rigging of jibs or hook reeving at boom angles below the SWL chart. The RIG function is canceled when the operator booms up above the set angle or if the system is turned off.

**Alarm 1:**
This alarm is the pre-alarm on load. When the set percentage is reached, an intermittent buzzer is activated as well as the approach warning (amber) light.

**Alarm 2:**
This alarm is the maximum load limit. When the set percentage is reached, the overload warning (red) light and the approach warning

light are on and the buzzer is continuous. The lock-out is not activated.

**Alarm 3:**
This alarm is the lock-out (motion cut) load limit. When the set percentage is reached, all three warning lights are on and the buzzer is continuous. The lock-out is activated.

**Note**

These three alarms are based on actual hook load expressed as a percentage of permitted load, the permitted load may be determined by the crane chart or rope limit whichever is lower. The actual percentages set depend on local regulations; the default settings in Europe are 95%, 105% and 110% respectively. If in doubt consult Wylie Systems or your local authority.

**Outside duty radius:**
This variable represents a transition distance between the last radius rating and zero capacity. If the actual hook radius exceeds the maximum chart radius, the system alarms will be triggered. The system will not allow radii beyond the maximum radius given by the load charts. The OD (OUT of DUTY on RADIUS) will allow the SWL to decay evenly from the last point on the chart to zero over the distance set by this variable. Note, this is only valid if the chart interpolation is set to 'on', refer to section 3.5.4.

**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 a tolerance on the internal selection of the relevant load capacity chart for the actual boom length fitted and selected on the display of the i3000.

**Inside duty length:**
This variable represents a tolerance on the internal selection of the relevant load capacity chart for the actual boom length fitted and selected on the display of the i3000.

### 3.5.4 Interpolation

This function determines whether or not the i3000 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 known as stepped. Refer to the crane manufacturer’s load chart to determine if the charts should be interpolated or stepped.

Change the status of chart interpolation as follows:
Navigate in the calibration menu using buttons (#2) or (#3) to highlight the field «24 - interpolation»
Push the Select (#4) button to toggle the status between ON and OFF.

### 3.5.5 Datalogger data (optional)

Use the sub-menu «datalogger data» screen to enter data related to the datalogger, this menu item is only available on systems fitted with the datalogger feature. Refer to the separate manual supplied with the datalogger for more details.

**Day:**
This value refers to the current date.
**Month:**
This value refers to the current month, ie January =1, February =2 etc.
**Year:**
This value refers to the current year.
**Hours** ***<<time>>:***
This refers to the hours value of the current time, the existing clock setting is shown next to the word ‘hours’ for reference.
**Minutes:**
This refers to the minutes value of the current time.
**Crane identity:**
This refers to a unique ‘code’ consisting of up to 8 characters that can be used to identify your machine from any others such as a fleet number or similar.

Use the sub-menu «users id» screen to enter access codes for each operator, up to 200 different codes are available.

Use the sub-menu «download datalogger» screen to enable the download procedure.

### 3.5.6 Rotation data (optional)

Use the sub-menu «rotation data» screen to enter data related to the slew position sensor if fitted, this menu item is only available on systems fitted with the range limiting feature.

**Rotation direction:**
This value refers to the rotation of the sensor shaft and should be set such that the indication of slew angle increases with clockwise slew of the crane superstructure.  Push the Select (#4) button to toggle the choice between clockwise and counter-clockwise.

**Approach zone height:**
This value represents the distance between the pre-warning alarm and the height limit point set in the range limit mode.

**Approach zone wall:**
This value represents the distance between the pre-warning alarm and the wall limit point set in the range limit mode.

**Approach zone radius:**
This value represents the distance between the pre-warning alarm and the radius limit point set in the range limit mode.

**Prox. Position (°):**
Not used.

## 3.6 Two-point angle sensor calibration

The angle sensor calibration routine is a two-point calibration, both steps must be completed to ensure an accurate calibration.

### 3.6.1 First point: Zero angle

Navigate through the calibration menu using buttons (#2) or (#3) to highlight the field «1 - Zero angle»
Push the Select (#4) button to confirm the choice. The system will display 2 lines of data. The first line is the boom angle (initially the same as line 2), the second line is the angle sensor signal in terms of "Bits" (this is a digital value equivalent to the sensor signal voltage). Ignore the data on the first line at this stage.
Boom down to minimum angle, ideally zero degrees (main boom parallel to ground). Measure the true boom angle using an independent precision angle indicator and note this value.
The value on the first line of the display must match the true value measured with the inclinometer. To adjust this value push the Select (#4) button, the value on the first line will be highlighted. Use buttons (#2) or (#3) to adjust the indicated value of boom angle to read the actual boom angle measured.
Push the Select (#4) button to confirm the edited value.
When done, push the ESC (#5) button to return to the main calibration menu.

**Note:**
When you increase or decrease a value with button (#2 or #3) and press button ESC (#6), it will increase the speed by a factor of 100.
Fast increase: (#2 and #6) , Fast decrease (#3 and #6)
These buttons may also be called "Set" buttons

### 3.6.2 Second point: Span angle

Navigate through the calibration menu using buttons (#2) or (#3) to highlight the field «2 - Span angle»
Push the Select (#4) button to confirm the choice. The system will display 2 lines of data similar to that seen during the zero angle calibration.
Boom up to over 65 degrees (main boom referred to ground) or as high as possible if this is not practical. Measure the true boom angle as before and note this value.
The value on the first line must match the true value measured with the inclinometer. To adjust this value push the Select (#4) button, the value on the first line will be highlighted. Use buttons (#2) or (#3) to adjust the indicated boom angle to the actual boom angle measured.

Push the Select (#4) button to confirm the edited value. The value displayed on the first line should be now the actual boom angle.

When done, push the ESC (#5) button to return to the main calibration menu.

## 3.7 Two-point length sensor calibration

The length sensor calibration routine is a two-point calibration, both steps must be completed to ensure an accurate calibration.

### 3.7.1 First point: Zero extension

Navigate through the calibration menu using buttons (#2) or (#3) to highlight the field «3 - Zero extension»
Push the Select (#4) button to confirm the choice. The system will display 2 lines of data. The first line is the boom extension (initially the same as line 2), the second line is the length sensor signal in terms of “Bits” (this is a digital value equivalent to the sensor signal voltage). Ignore the data on the first line at this stage.
Retract the boom to its fully closed position.
The value on the second line of the display should be in the region of 100 “bits” but in any case must exceed 50 “bits”.
To set this extension value to zero push the Select (#4) button once to see a value of zero and a second time to confirm the value.
When done, push the ESC (#5) button to return to the main calibration menu.

### 3.7.2 Second point: Span extension

Navigate through the calibration menu using buttons (#2) or (#3) to highlight the field «4 - Span extension»
Push the Select (#4) button to confirm the choice. The system will display 2 lines of data similar to that seen during the zero extension calibration.
Fully extend the boom, if a manual section if fitted do not extend it at this stage. Calculate the extension to be calibrated by subtracting the fully retracted boom length from the extended length, measure the boom with a tape if unsure of the actual boom lengths of the machine. This calculated extension value is the number to be set on the first line of the display, remember to use the correct units set in section 3.5.2.
To adjust this value push the Select (#4) button, the value on the first line will be highlighted. Use buttons (#2) or (#3) to adjust the indicated extension to the required value.
Push the Select (#4) button to confirm the edited value.
When done, push the ESC (#5) button to return to the main calibration menu.

## 3.8 Load Hoist Calibration

It is recommended to always hoist and stop the load smoothly when calibrating load on the i3000 system. This is to eliminate any errors in the load reading due to frictional effects. The frictional effect can be observed on dynamometer (line rider) systems, the displayed load will decrease when lowering the load and increase when hoisting the load. On dead-end load cell systems, the displayed load increases when lowering. These friction effects can be minimised by ensuring boom head sheaves and hook block are properly greased.

The load sensor calibration routine is a two-point calibration, both steps must be completed to ensure an accurate calibration.

### 3.8.1 Preparation For Calibration

If your system has both main and auxiliary load sensors then first select the hoist to be calibrated, they can be done in any order. Navigate through the calibration menu using buttons (#2) or (#3) to highlight the field «5 - Hoist». Push the Select (#4) button to confirm the choice. Use buttons (#2) or (#3) to select either main or aux and push select (#4) to confirm the choice. If no choice is available then check the correct inputs have been activated in section 3.5.1. Note that the current setting is shown at the bottom of the display.

Parts of line (falls) configuration.
Navigate through the calibration menu using buttons (#2) or (#3) to highlight the field «6 - Parts of line». Push the Select (#4) button to confirm the choice. Use buttons (#2) or (#3) to select the parts of line currently rigged on the machine and push select (#4) to confirm the choice. If the correct choice is not available then check the correct maximum value has been set in section 3.5.3. Note that the current setting is shown at the bottom of the display.

At this point, the load sensor is ready for calibration. Prepare the crane to lift the calibration loads. The calibration loads should consist of at least two loads, a small load and a large load. The addition of a third load allows for checking the mid-range calibration of the system. The large calibration load should provide between 50-90% line pull on the hoist line, while using as many falls as is feasible. If a large enough load cannot be found, the crane can be reeved to fewer falls to increase the line pull for a given calibration load.

EXAMPLE:
An i3000 System is being calibrated on a crane that has a single-fall line pull of 5,000 Kg and a maximum reeving of 12 falls. The available “known” test weight is 25,000 Kg. To achieve the best calibration, the crane should be reeved to 6 falls.

This will achieve 83% of maximum line pull when the calibration load is lifted. The crane could be reeved to as many as 10 falls and still be within the range of 50-90% of line pull. This would, however, not provide as good a calibration as would the 6 falls reeving.

The smaller load should be approximately 5-10% of the larger load. In the example above, the appropriate small load would weigh 1,000-2,500 Kg.

In the same example, a typical mid-range load would weigh 9,000 – 15,000 Kg.

NOTE: The weight of the calibration loads and any device used for lifting the calibration loads, including the hook block weight, must be known accurately. The accuracy of the calibration is dependent upon the accuracy of the weights used during calibration.

### 3.8.2 Zero Load

Rig the crane to lift the small calibration test load, ensure the load is positioned at a safe radius and is below the Safe Working Load for the current machine configuration.
Navigate through the calibration menu using buttons (#2) or (#3) to highlight the field «7 - Zero dyno». Push the Select (#4) button to confirm the choice.
The system will display 2 lines of data. The first line is the hook load (initially zero), the second line is the load sensor signal in terms of “Bits” (this is a digital value equivalent to the sensor signal voltage). Ignore the data on the first line at this stage.

Slowly and smoothly hoist the small calibration load and stop.

To adjust the indicated load push the Select (#4) button, the value on the first line will be highlighted. Use buttons (#2) or (#3) to adjust the indicated value to match the total load weight suspended (load, hook block, slings, hoist line below boom tip – if applicable, etc).
Push the Select (#4) button to confirm the edited value.

When done, push the ESC (#5) button to return to the main calibration menu.

### 3.8.3 Span Load

Rig the crane to lift the large calibration test load, ensure the load is positioned at a safe radius and is below the Safe Working Load for the current machine configuration.
Navigate through the calibration menu using buttons (#2) or (#3) to highlight the field «8 - Span dyno». Push the Select (#4) button to confirm the choice.
The system will display 2 lines of data. The first line is the hook load (initially zero), the second line is the load sensor signal in terms of "Bits" (this is a digital value equivalent to the sensor signal voltage). Ignore the data on the first line at this stage.

Slowly and smoothly hoist the large calibration load and stop.

To adjust the indicated load push the Select (#4) button, the value on the first line will be highlighted. Use buttons (#2) or (#3) to adjust the indicated value to match the total load weight suspended (load, hook block, slings, hoist line below boom tip – if applicable, etc).
Push the Select (#4) button to confirm the edited value. Normally the display will show 'accepted' but if the warning 'bad span' is displayed it means that the difference between the small and large calibration loads is insufficient to produce a good calibration and the test loads must be reconsidered ie use a smaller load for the zero calibration and/or a larger load for the span calibration.
When done, push the ESC (#5) button to return to the main calibration menu.

### 3.8.4 Verify The Load Calibration

Return to «8 - Span dyno» and push the Select (#4) button. Verify the weight displayed against a minimum of 2 suspended calibration loads. Hoist and stop the load a number of times at different heights, always hoist at a constant speed and stop as smoothly as possible. Once finished, press ESC (#5) to exit the menu selection without changing the calibration.

The average weight displayed should be between 95% and 105% of the actual calibration load weight to meet the requirements of BS7262 but note other standards may require alternative calibrations.

If the large load reading is consistent but inaccurate, it is possible that a fluctuation or movement of the load during calibration caused a load increase or decrease before the ENTER button was pressed. Repeat the procedure from 3.8.3 onward (Note: It is not necessary to leave the calibration mode to verify the weights being hoisted).

If the smaller calibration weight is incorrect, a bad value may have been entered at ZERO LOAD. If this happens, it is necessary to repeat the procedure from 3.8.2 onward.

### 3.8.5 Aux load calibration

Repeat sections 3.8.1 to 3.8.4 for the auxiliary load sensor if fitted.

## 3.9 Friction Compensation (optional)

This feature is optional and only available for systems where the load sensor is fitted with direction sensing proximity sensors.
All previous load calibration work up to this point has been done with the load static after hoisting. Multi-part rope systems will have certain friction characteristics depending on the sheave size, the rope size, the sheave bearing design, and the number of parts of line among other factors. These frictional effects may be significant enough to cause inaccuracies in load readings between hoisting and lowering the load. An optional Rope Direction Sensor (RDS) may be supplied to monitor the movement of the rope and allow corrections to be calibrated for different motions of the hoist system.

Before beginning this section all the load sensor calibrations detailed in section 3.8 must be complete.
Navigate through the calibration menu using buttons (#2) or (#3) to highlight the field «17 - friction compensation»
Push the Select (#4) button to confirm the choice.
The choices available are described in the following table.

| | |
|---|---|
| Main hoisting (%) | Compensation factor for hoisting state on main hoist. |
| Main lowering (%) | Compensation factor for lowering state on main hoist. |
| Main low and stop (%) | Compensation factor for lowering and stop state on main hoist. |
| Aux hoisting (%) | Compensation factor for hoisting state on auxiliary hoist. |
| Aux lowering (%) | Compensation factor for lowering state on auxiliary hoist. |
| Aux low and stop (%) | Compensation factor for lowering and stop state on auxiliary hoist. |

**Note**
If rope direction sensors are not fitted to your system, all of these variables must stay at zero (0) value.

### 3.9.1 Friction compensation factor calculation

Hoist the large test load at constant speed. While the load is being hoisted up, look at the displayed load and write down the peak load (Lp). Stop hoisting and write down the load (L). Use the following equation to calculate the friction compensation while hoisting:

$$\text{Hoisting (\%)} = \frac{(L / Lp) - 1 \quad * 100\%}{\text{Parts of lines used}}$$

Lower the load at constant speed. While lowering the load, look at the displayed load and write down the lowest load (Lmin). Use the following equation to calculate the friction compensation while lowering:

$$\text{Lowering (\%)} = \frac{(L / Lmin) - 1 \quad * 100\%}{\text{Parts of lines used}}$$

Stop the load above the ground. The load displayed is Ls. The compensation for the lower and stop condition is:

$$\text{Lower and stop (\%)} = \frac{(L / Ls) - 1 \quad * 100\%}{\text{Parts of lines used}}$$

### 3.9.2 Entering friction compensation factors

Enter a friction compensation setpoint as follows:

Navigate through the calibration menu using buttons (#2) or (#3) to highlight the field «17 - friction compensation»
Push the Select (4) button to confirm the choice
Use buttons (#2) or (#3) to select the desired variable to edit.
Push the Select (#4) button to obtain the setting mode. Use buttons (#2) or (#3) to change the value and push Select (#4) button once to confirm. Then scroll to the next variable and repeat the procedure.

When all friction compensation factors are entered, push the ESC (#5) button to return to the main calibration menu.

Repeat the friction compensation calibration for the other hoist if required.

## 3.10 Radius Calibration

Before beginning this section, Slew Offset and Sheave radius items of the sub-menu «16 – calibration data» must be entered and the angle and length sensors must be calibrated.
The purpose of this calibration function is to set the parameters that will allow the i3000 system to accurately calculate the operating radius of the crane configuration in use.
Before calibrating the operating radius using menu «10 – basic boom length p1-2», the crane configuration in use must be correctly set. All values should be set in metres or feet as defined in the system setup, section 3.5.2.

### 3.10.1 Boom Configuration

Navigate through the calibration menu using buttons (#2) or (#3) to highlight the field «9 - Boom configuration». Push the Select (#4) button to confirm the choice. Use buttons (#2) or (#3) to select the configuration of the machine and push select (#4) to confirm the choice. The current setting is shown at the bottom of the display.
Note that the basic main boom must be calibrated before any other boom configurations including the manual section, jibs or rooster.

### 3.10.2 Parts of Line Configuration

Navigate through the calibration menu using buttons (#2) or (#3) to highlight the field «6 - Parts of line». Push the Select (#4) button to confirm the choice. Use buttons (#2) or (#3) to select the parts of line currently rigged on the machine and push select (#4) to confirm the choice. Note that the current setting is shown at the bottom of the display.
This is to take account of the head sheave radius if only one fall is reeved.

### 3.10.3 Tare Load Configuration

The purpose of the tare load is to take into account the weight of the hook block during unloaded boom deflection calibration.
Navigate through the calibration menu using buttons (#2) or (#3) to highlight the field «11 - tare load»
Push the Select (#4) button to confirm the choice
The system will display the tare load variable. Push the Select (#4) button to highlight the variable for editing.
Use buttons (#2) or (#3) to change the value and push Select (#4) button once to confirm.

Push the ESC (#5) button to return to the main calibration menu.

### 3.10.4 Retracted boom radius calibration

Prepare the crane as specified in the crane's operating manual in a way to be able to move the boom freely. The basic boom radius calibration routine needs 2 values of radius measured at 2 different boom angles, it is a two-point calibration and both steps must be completed to ensure an accurate calibration.

Fully retract the boom.
Navigate through the calibration menu using buttons (#2) or (#3) to highlight the field « 10 - Basic boom length p1-2» Push the Select (#4) button to confirm the choice. The system will display 2 lines of data. The first line shows the actual boom length selected (initially zero) plus the boom angle from the angle sensor. The second line shows the operating radius calculated by the system. The system will automatically start the routine with the first point to calibrate called «P1 - 20°».
Look at the boom angle display and bring the boom down to between 15 and 20 degrees.
Measure the actual radius using the calibration units set in the system setup and note this value.
Push the Select (#4) button to highlight the radius variable for editing. Use buttons (#2) or (#3) to adjust the variable to match the measured value and push Select (#4) button once to confirm. The system will automatically continue the routine with the second point to calibrate called «P2 - 60°».
Look at the boom angle display and bring the boom up to between 60 and 65 degrees.
Measure the actual radius and note this value.
Push the Select (#4) button to highlight the radius variable for editing. Use buttons (#2) or (#3) to adjust the variable to match the measured value and push the Select (#4) button once to confirm. The system will return to point «P1 - 20°», at this stage the length and radius values should display the actual values.
Push the ESC (#5) button to return to the main calibration menu.

### 3.10.5 Unloaded boom deflection calibration

Extend the boom to approximately 1/3 of full extension.
Navigate through the calibration menu using buttons (#2) or (#3) to highlight the field « 12 - Unload deflection p3-4» Push the Select (#4) button to confirm the choice. The system will display 2 lines of data. The first line shows the current boom length plus the boom angle from the angle sensor. The second line shows the operating radius calculated by the system. The system will automatically start the routine with the first point to calibrate called «P3 - 60° 1/3 extend».
Look at the boom angle display and bring the boom up to between 60 and 65 degrees.
Measure the actual radius using the calibration units set in the system setup and note this value.
Push the Select (#4) button to highlight the radius variable for editing. Use buttons (#2) or (#3) to adjust the variable to match the measured value and push Select (#4) button once to confirm. The system will automatically continue the routine with the second point to calibrate called «P4 - 60° full extend».
Fully extend the boom.
Look at the boom angle display and bring the boom up to between 60 and 65 degrees.
Measure the actual radius and note this value.
Push the Select (#4) button to highlight the radius variable for editing. Use buttons (#2) or (#3) to adjust the variable to match the measured value and push the Select (#4) button once to confirm. The system will return to point «P3 - 60° 1/3 extend».
Push the ESC (#5) button to return to the main calibration menu.

### 3.10.6 Loaded Boom Correction

Navigate through the calibration menu using buttons (#2) or (#3) to highlight the field « 13 - Load bend correction» Push the Select (#4) button to confirm the choice. Move the boom to the fully telescoped position and at an angle of between 60 and 70 degrees. Lift a load between 50% and 90% of the SWL when fully telescoped and at the stated angle. Note that this load must be greater than twice the tare load set in section 3.10.3. Measure the radius, it should be equal to or slightly greater than the displayed radius. Push the Select (#4) button to highlight the radius variable for editing. Use buttons (#2) or (#3) to adjust the variable to match the measured value, Note only increase the value to the new radius, never decrease this value

below the primary value calculated by the system. Push the Select (#4) button once to confirm.
Push the ESC (#5) button to return to the main calibration menu.
The radius is now fully calibrated for this crane configuration.

Repeat steps 3.10.1 to 3.10.6 for each crane configuration in turn.

Calibration of the system is now complete.

It is strongly recommended that a back up copy of the calibration file is made at regular intervals during the calibration process and particularly when calibration is complete.

Remember to reset the calibration switch to the OFF position (see section 3.4.1).

## 3.11 System memory management

### 3.11.1 Backup

Calibration data and values calculated by the system during the calibration process are saved when confirmed, and stored in the memory bank A. The purpose of the Backup function is to save the calibration data in a spare bank called bank B. Thereby if in the next calibration stages, an error is made, it will be possible to discard the new changes and retrieve the previously saved calibration.

Navigate in the calibration menu using buttons (#2) or (#3) to highlight the field «14 - backup»
Push the Select (#4) button to confirm the choice and create the backup.
When the backup is done the system will return to the main calibration menu automatically.

**NOTE**

A program is available which enables a copy of the calibration data to be downloaded to a portable computer; this data can be kept separate from the crane and used for analysis or for subsequent reloading back to the i3000 system in the unlikely event that this becomes necessary.
Consult Wylie Systems for more information.

### 3.11.2 Memory management functions

**Warning:** Using these options may delete the information stored in the calibration memory, be sure you have made a backup copy of any information you wish to keep to your PC before using these options **– if in doubt, don't!**

The i3000 system has 3 different banks of memory to store its complete data. They are noted as Bank A, Bank B and Bank C. These memories are non-volatile and do not require battery backup. The calibration data will be stored permanently unless changed by re-calibration or reconfiguration of the system. The purpose of each bank is described below:

Bank A: This memory bank is used to store the calibration data and values calculated by the system after confirmation during the calibration process.

Bank B:  this memory bank is a spare bank for storing copies of important calibration steps stored in memory bank A. If in subsequent calibration stages, an error is made, it is possible with a function of «15 – memory» menu to discard the new changes and retrieve the previous saved calibration data provided a back up has been done previously.
Bank C: This memory bank is used to store all general configuration data entered by the operator such as hoist selection, parts of line, etc.

The memory management menu is provided to allow manipulation of the data in the various memory banks.  The options available are:

Copy memory A to B
The contents of bank A will be copied into bank B. This is just like the menu  « 14 – Backup » explained above.
Copy memory B to A
This option will copy the contents of bank B into bank A.  All the data already in bank A will be replaced by a copy of the data from bank B and therefore will be lost.
Swap memories A and B
This option will place bank A data into bank B and at the same time bank B data into bank A. Both sets of data will be preserved but switched.
Initialize memory A
This option will obliterate all calibrations from bank A. This should only be done when a system is installed for the first time. This must never be done during or after calibration.
Initialize memory C
This option will delete the system configuration data from bank C.

### 3.11.3 Memory management menu and use

Navigate in the calibration menu using buttons (#2) or (#3) to highlight the field «15  - memory»
Push the Select (#4) button to confirm the choice
Use buttons (#2) or (#3) to highlight the desired memory management function
Push the Select (#4) button to perform the desired function.
When a specified function is done the system will return to the memory management menu automatically.
Push the ESC (#5) button to return to the main calibration menu.

## 3.12 Verifying the calibration

> Note
> The required accuracy for load, radius, angle, and SWL indications depends on local regulations, if in doubt consult Wylie Systems or your local authority.

At this stage, the entire system should work properly up to the configuration calibrated. Push the ESC (#5) button to return to the normal operating mode. Use the DUTY or PART buttons to configure the crane properly. Verify the radius, the angle and the load display at two different boom angles. For capacity comparison, use the load table matching the crane configuration selected in the system and interpolate between radii if the system is set up to interpolate.

Slowly lift a convenient test load, preferably greater than 50% SWL, and verify the weight displayed with the load suspended.