W3100
LATTICE BOOM CRANES WITH HOIST ROPE LOAD SENSOR(S)

Calibration Manual

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The purpose of this manual is to provide the customer with the operating procedures essential for the promotion of proper machine operation for its intended purpose. It is important to over-stress proper usage. All information in this manual should be read and understood before any attempt is made to operate the machine.

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

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

The W3100 Rayco-Wylie Systems Rated Capacity indicator is to be regarded only as an aid to the operator.
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 Rayco-Wylie system indicator, the operator must carefully read the information in both this manual and the crane manufacturer operator's manual. He must also have read and understood the CIMA safety manual, the latest ASME B30.5 standard and the current OSHA, federal, state and local regulations applicable to his job.
Correct functioning of the system depends upon routine daily inspection.
Any suspected faults or apparent damage should be immediately reported to the responsible authority before using the crane.

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SINCE SAFETY OF PERSONNEL AND PROPER USE OF THE MACHINE IS OF PRIMARY CONCERN, DIFFERENT SYMBOLS ARE USED THROUGHOUT THIS MANUAL TO EMPHASIZE CERTAIN AREAS. THE FOLLOWING DEFINITIONS INDICATE THE LEVEL OF HAZARD WHEN THESE SYMBOLS APPEAR THROUGHOUT THIS MANUAL.

WHENEVER ONE OF THESE SYMBOLS APPEARS IN THIS MANUAL, PERSONNEL SAFETY IS A CONCERN. PLEASE TAKE TIME TO READ AND UNDERSTAND THESE DEFINITIONS!

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

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

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

NOTE: PROVIDES INFORMATION THAT MAY BE OF SPECIAL INTEREST.

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1

GENERAL DESCRIPTION

1.1 - Introduction

This manual contains calibration information for the W3100 Rated Capacity indicator system. Information in this manual will enable qualified personnel to calibrate the W3100 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 - CONFIGURATION AND CALIBRATION

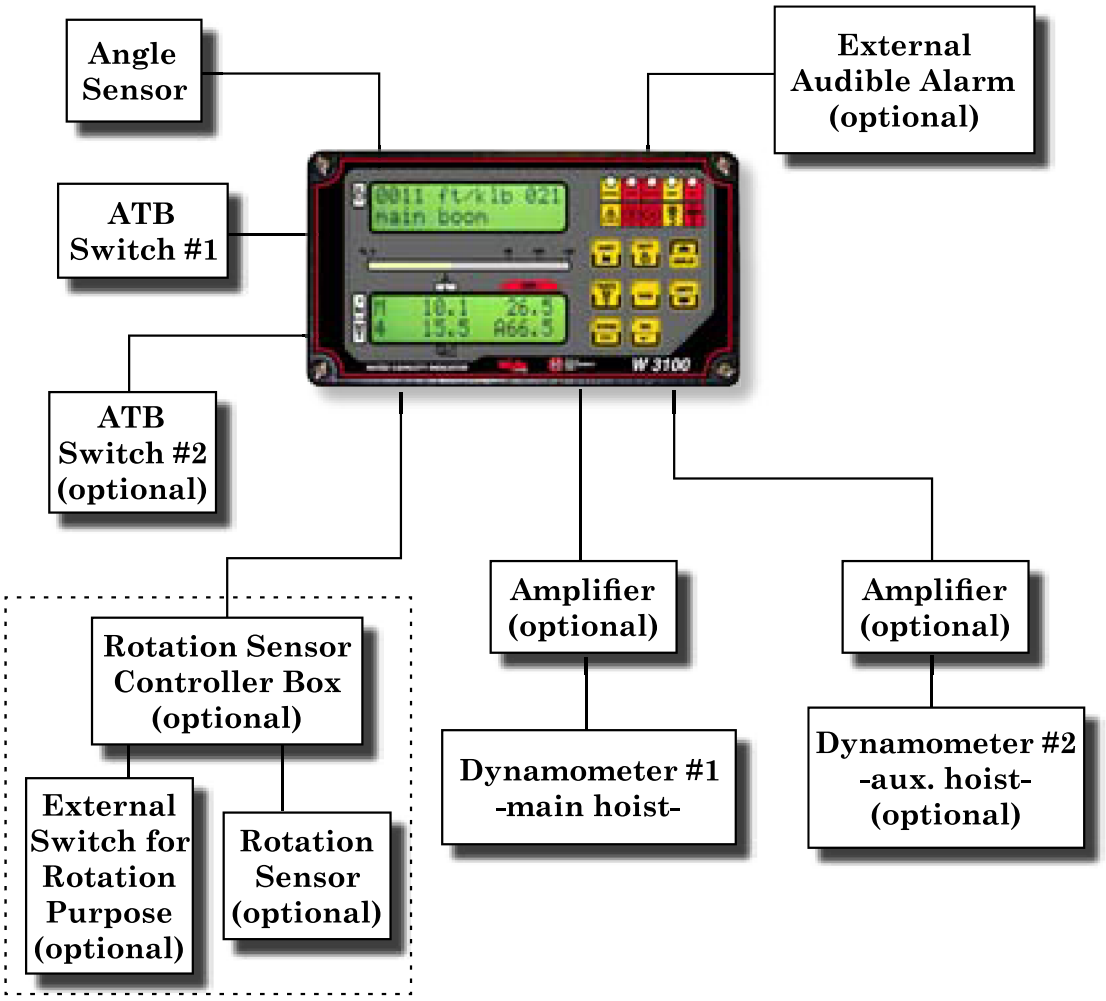
SECTION 3 - INSTALLATION

1.3 - Brief description of the W3100 system

The W3100 is a computerized crane safety system. It measures load, boom angle, radius, and indicates safe or hazardous conditions. It comprises sensors fitted to the crane and a display located in the crane cabin.
The load sensor provides an electrical signal that is proportional to the actual load in the load hoist rope system of the crane. An inclinometer provides a signal that is proportional to the boom angle. Radius is calculated from boom angle and the boom measurement parameters calculated by the system during the calibration process.

In operation the actual load lifted by the crane is automatically compared with corresponding data related to the maximum permissible crane manufacturer loading charts. 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 angle and main radius are displayed in digital form on a liquid crystal display (LCD).
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 nonvolatile memory. Using known loads, boom angles, and other pre-determined data performs the calibration of the crane.

Figure 1: W3100 Block Diagram



1.4 - W3100 specifications

1.4.1 - Display

- Liquid Crystal Display (Two, 16 characters x 2 rows).
- Big characters 0,307" X 0,197" (7.8 mm X 5 mm).
- Viewing area of 2 X (3,898" (99 mm) wide X 0,945" (24 mm) high).
- LCD backlight for great visibility in any lightning conditions.
- 5 Color alarm status LED.

1.4.2 – Sensor excitation

- ± 5Volts, +5Volts.

1.4.3 – Relay output

- 2 relay NO/NC contacts rated @ 5A.

1.4.4 – Environmental

- Operating: -10 °C to +70 °C (14 °F to 158 °F).
- Storage: -30 to +80 °C (-22 °F to 176 °F).

1.4.5 – Input power

- 11 – 30 VDC (10W typical, 20W max).

1.4.6 – Enclosure

- IP65 Display Box.

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CONFIGURATION AND CALIBRATION

The calibration section of this manual will guide the technician and explain the procedures to follow in order to rapidly and efficiently calibrate the crane and the system. The calibration mode is a separate entity of the W3100 system. It is totally independent of the regular operating mode (normal mode) as if it were a different system. The purpose of the calibration mode is to adjust the angle sensor, the pressure sensors, the radius and numerous other factors or set points. Calibration mode can be accessed by pressing the MODE button and is protected by a 4-digit password.

Necessary Calibrating Tools	• Steel measuring tape of 30m (100 ft) capacity with accuracy of 1cm or better. • Angle indicator with accuracy of 0.5° or better. • Test load that produces a line pull of approximately 90% of line pull.
Necessary Calibration Information	• The rated line pull of each hoist line. • The maximum number of parts of lines. • The weight of each block (within ±1%), slings and attachment used for calibration. • The hoist line weight per meter or feet.

2.1 – Internal amplifier

The W3100 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.

2.1.1 – Internal amplifier gain setting

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' value in the Diagnostic Mode. While in the diagnostic mode (refer to diagnostic mode section in the W3100 Operator's Manual), go to Diagnostic Mode and check the 'MAIN' value. This value represents the main hoist load input converted into a 10 bits digital signal. This should range between 50 and 950 when functioning correctly.

On the CPU board of the W3100 CPU Box, locate the amplifier jumpers as shown on figure 3.1.

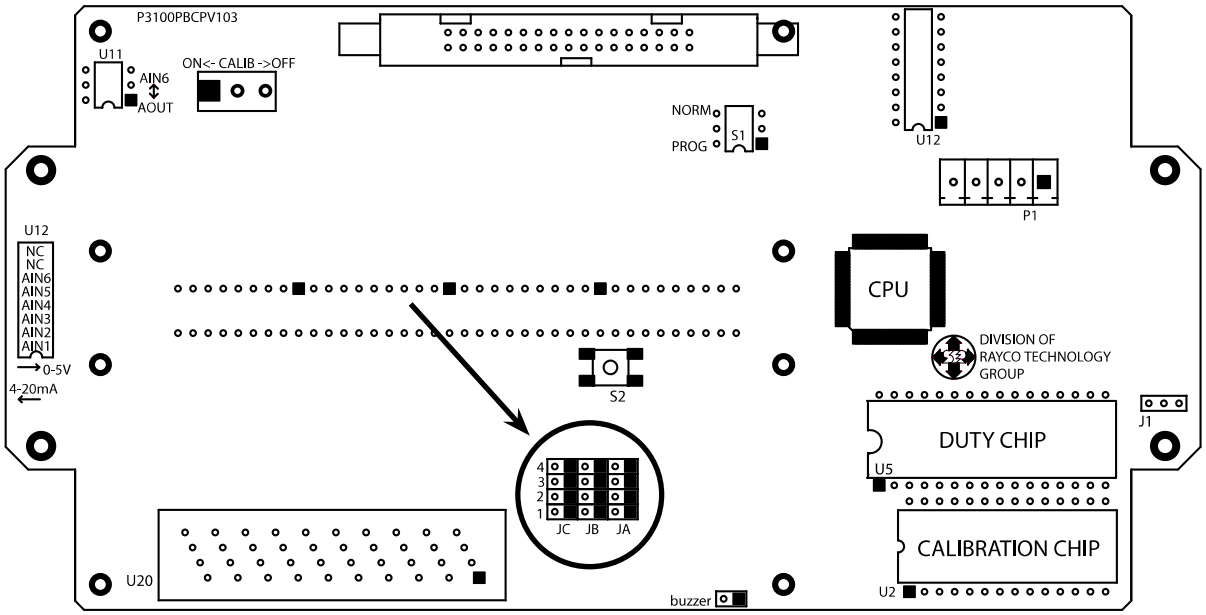


Figure 3.1: The W3100 CPU board

They are noted as JA, JB, and JC. Note the arrangement and refer to the table 3.2 below to determine the amplifier gain level.

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 3.2: Amplifier gain level

To adjust the internal amplifier, you have to lift the test load on the main hoist, which should provide around 90% of the maximum line pull.
While lifting the test load, if 'main' value of the Diagnostic Mode is lower than 615 bits, set the jumpers to the next higher level until the value is above 615 bits and below 820 bits.

If 'MAIN' value is above 820 bits, set the jumpers to the next lower level until the value is below 820 and above 615 bits.
100% line pull should not exceed 900 bits. The same gain setting is used for main and auxiliary hoist.

2.1.2 – External amplifier overview

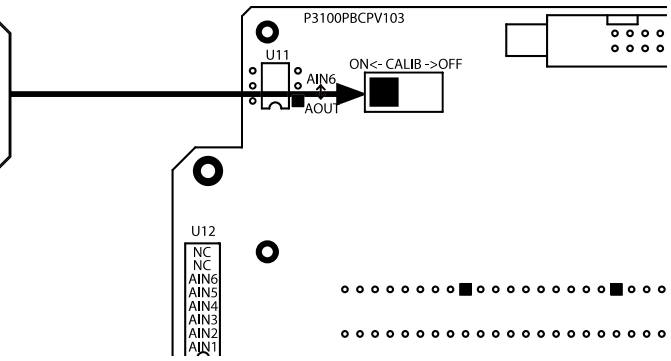
If an external amplifier is required, refer to the manual supplied with the external amplifier for connections and setting. The amplifier gain on the W3100 cpu board must be set to 1 and the gain adjustment is made on the external amplifier board instead. Remember to toggle the appropriate switches, refer to the wiring diagram to set the switch according to the analog input used.

33L0012: External Amplifier

2.2 - Memory protection

The W3100 system has both a hardware and software key to protect the data calibration. The hardware key protection is implemented by the calibration switch located on the CPU board. When you slide the calibration switch to the ON position, the hardware protection is disabled and you are allowed to enter calibration data in the memory bank.

Close up view of the calibration swich located on the CPU board. When the switch is placed on the ON position, calibration is enabled.



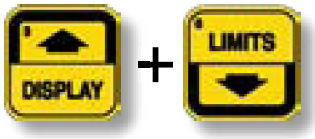
MAKE SURE THAT THE CALIBRATION SWITCH IS SET TO THE ON POSITION BEFORE STARTING CALIBRATION OF THE SYSTEM. WHEN THE CALIBRATION IS OVER SET THE SWITCH TO THE OFF POSITION TO PREVENT YOUR CALIBRATION DATA FROM BEING CORRUPTED.

2.2.1 – System initialization

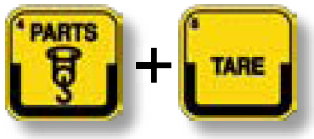
Before starting the system calibration, sensors need to be verified for good working order through the diagnostic mode (refer to 'Diagnostic Mode' section in the W3100 Operator's Manual).
When each sensor has been verified for its full functionality the system can be initialized in order to start the calibration procedure. This will obliterate all calibration data from the bank "A memory", and therefore should be done only when a system is installed for the first time.

Perform a system initialization as follows:

1. Press and hold buttons #3 and #6 at the same time (that's the reset buttons of the system).

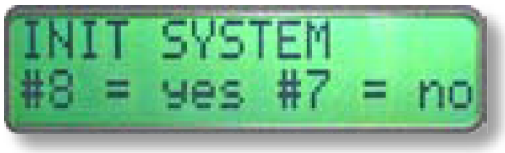


2. While holding button #3 and #6, press both buttons #4 and #5 at the same time.



3. Release buttons #3 and #6, which release the system reset.

4. Press (#8) button to select 'YES'.



When the initialization is done, the system will return to its normal operation.

First, rig the main hoist line with minimum parts of line (two, three or four parts is acceptable). If the hoist line friction is high, the calibration will be more difficult with four than three parts of line. Most important, the block must hang straight and directly below the head block.

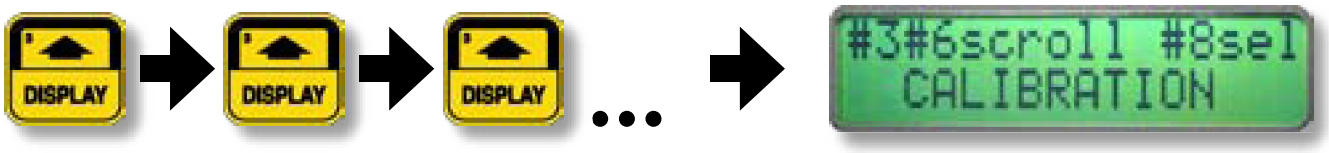
The test load that will represent near maximum line pull when lifted by the main hoist reeve with one, two, three or four parts of lines as discussed in the above paragraph must be known with ±1 % accuracy.

2.3 - Calibration mode

To enter into the calibration mode, first make sure you are in the normal mode. If you see the boom configuration on the upper LCD display, you are in the normal mode.

If you are not in the normal mode, press ESC (#7) as many times as necessary to reach it.

Once in the normal mode, press button #3 (7 times) and select "CALIBRATION" on the upper LCD display.



When calibration is selected, press SELECT (#8) button to open this mode.

If it is the first time since the last power up or reset of the system that the calibration mode is accessed, a screen will appear asking you to enter your password. The calibration menu is protected to prevent your data from being modified by the crane operator. Enter your four-digit password to go directly to the first screen of the calibration menu.

By default the password is: 1-2-3-4 unless asked for a specific password.

When you do the calibration for the very first time it is recommended to initialize memory Bank A as instructed in section 3.5 "Memory management".

2.4 - Calibration mode presentation

The calibration mode is organized in a linear sequence. A series of 18 menus or sections will appear. The SCROLL UP (#3) or SCROLL DOWN (#6) buttons will allow you to scroll through these menus. Once in the calibration mode it is possible to scroll and access any stage of the calibration.

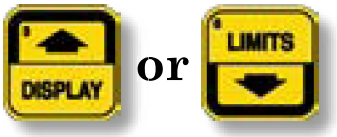
2.4.1 – Disable unused inputs

One of the first things you may want to do is to turn off some of the system's inputs not used for your specific installation.

<u>To disable an input or output proceed as follows:</u>

1- Scroll UP or DOWN to highlight «17-enable/disable i/o» and push the SELECT (#8) button to enter the menu.

2- Scroll UP or DOWN to highlight the desired input or output.



3- Push the SELECT (#8) button to toggle the input or output to enable or disable.

4- Repeat for all unused inputs or outputs.

5- Push the ESCAPE (#7) button once to return to the main calibration menu.

2.4.2 - Selecting measurement units

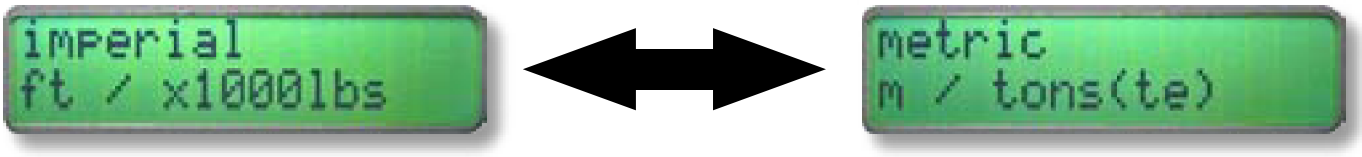
The measurement units must be selected before starting any calibrations.

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.

Note that as soon that one calibration procedure is performed the system will not allow further changes to the unit of measure.

To change the calibration unit, just push the SELECT (#8) button once the «16-Calib. unit» is highlighted.

Watch the upper display showing the actual unit of calibration.



2.4.3 - Calibration Data

The calibration data menu is a sub-menu used to access 17 different variables used in various system operations.

These variables are :

- **Slew offset:**
  The distance between the centre of rotation of the crane and the boom base pin in units and tenths of units. The value is negative if the boom base pin is behind the centre of rotation. Use the button #6 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. It is used to compensate radius when lifting with one part of line (fall).

- **Height offset:**
The height offset is the distance between the ground and the boom head highest point. Level the boom (0°) to measure this parameter.

- **Rope limit main:**
(Single line pull) This is the maximum line pull permitted per part of line on the main hoist according to the chart. This value multiplied by the parts of line is used as the load limitation if lower than the rated capacity obtained from the load chart for the current crane configuration and radius or angle.

- **Rope limit aux:**
(Single line pull) This is the maximum line pull permitted per part of line on the auxiliary hoist. This value will be used as the capacity if it is lower than the radius capacity.

- **Rope limit whip1:**
(Single line pull) This is the maximum line pull permitted per part of line on the first whip hoist. This value will be used as the capacity if it is lower than the radius capacity.

- **Max parts of line:**
(Max number of falls) Set the maximum number of parts of lines. This will apply to all hoists when pressing the PARTS button, the number of parts will increase up to the set number and return to one.

- **Percent per part:**
This value allows for departure of the hoist line capacity when reeving with more than one part. The total rope capacity will derate by the percent set multiplied by the number of parts of lines minus one (-1).

- **Gap for extension:**

The zero extension is calculated by the W3100 for each boom configuration. If you see this message when doing P1/P2: «not fully retracted», you may want to increase this variable to enlarge the correct zone for zero extension.

- **Rig angle:**

This sets the angle at which the rigging is permit.

- **Alarm 1:**

This sets the approach alarm warning.

- **Alarm 2:**

This sets the maximum load limit (over alarm warning).

- **Alarm 3:**

This sets the lock-out activation limit (cut-off alarm warning).

> ***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 operator is lifting a load at the outermost radius on the chart, the alarm may sound even if there is no overload if the displayed radius exceeds the chart radius even by one inch. The OD (OUT of DUTY on RADIUS) will allow a straight line capacity from the chart value to zero and stretched over the distance set by this variable.

- **Outside duty angle:**
  The outside duty angle variable applies to angle based charts and allow for a smooth transition from the lowest degree capacity on the chart to zero capacity. This variable is set in degrees.

- **Outside duty length:**
  The OD length variable represent the permitted zone where the specific boom length based capacity chart is still accepted. This is a very important factor when the displayed boom length exceeds the maximum boom length on the chart. The distance entered for this variable extends the acceptable boom length for the maximum boom length on the chart.

- **Inside duty length:**
  This variable fulfills the same tasks as the outside duty length variable but applies to the minimum retracted boom length acceptable within the retracted boom length chart.

2.4.4 - Entering fixed data values

To modify one of these variables in the calibration data menu proceed as follows:

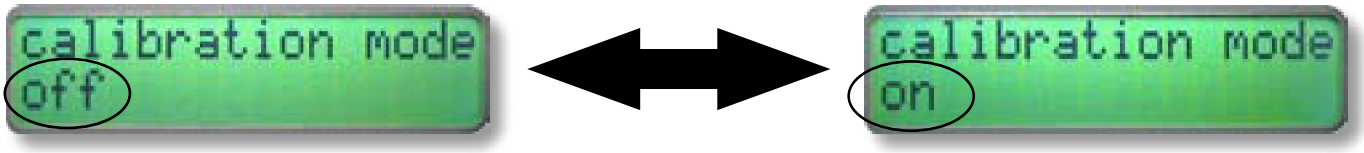
1. Scroll UP or DOWN to highlight the «12-calib. data» line and push the SELECT (#8) key to enter the menu.
2. Scroll up or down to highlight the desired variable. **or**
3. Push the SELECT button to edit the variable.
4. Use the UP or DOWN button to change the value. **or**
5. Push the SELECT button to record the change.
6. Repeat 1 to 5 for all desired variables.
7. Push the ESCAPE button to return to the main calibration menu.

2.4.5 – Crane capacity charts interpolation

Used to interpolate the safe working load between operating radiuses.

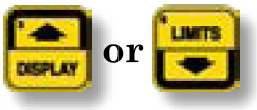
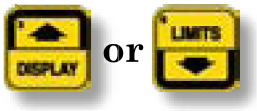
To change the status of the interpolation (ON/OFF), just push the SELECT (#8) button once the «15- Interpolation» is selected.

Watch the state on the upper LCD display showing the actual status of the interpolation.



2.4.6 – Limit setting

Used to set the approach limit for: Angle, radius or height.

1. Scroll UP or DOWN to highlight the «14-limit setting» line and push the SELECT (#8) key to enter the menu.
2. Scroll up or down to highlight the desired variable.  **or**
3. Push the SELECT button to edit the variable.
4. Use the UP or DOWN button to change the value.  **or**
5. Push the SELECT button to record the change.

2.5 - System memory management

The W3100 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 important calibration data stored in memory bank A. If in the next calibration stages, an error is made, it is possible with a "14 – memory" menu function 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.

2.5.1 - Backup

Calibration data and values calculated by the system during the calibration process is 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.

1. Scroll UP or DOWN to highlight the «10-backup» line. **or**

2. Push button #8 to confirm the choice and create the backup.

Software is available to download a copy of the calibration data to a portable computer; this data can be kept separate from the crane and used for analysis or for subsequent reloading back to the w3100 system in the unlikely event that this becomes necessary. Consult Rayco-Wylie Systems for more information.

2.5.2 - Memory management functions

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 "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.

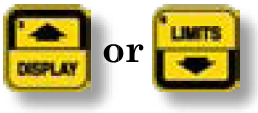
•Initialize memory a:
This option will obliterate all calibrations from bank A. This should only be done when a system is installed for the first time or if an incompatible operating system is installed in the system. This must never be done during or after calibration.

•Initialize memory c:
This option will obliterate from bank C all system configuration data entered by the operator.

2.5.3 – Memory management menu and function selection

1. Scroll UP or DOWN to highlight the "11-memory" line and push the SELECT (#8) key to enter the menu.

2. Scroll up or down to highlight the desired management function.



3. Push the Select (#8) button to perform the desired function.

4. Push the ESC (#7) button to return to the main calibration menu.

2.6 – Two-point angle sensor calibration

enter calibration mode (see section 2.3 for details).

2.6.1 - Zero angle

1- Scroll UP or DOWN to highlight the «1- select sensor» line and press the SELECT (#8) button.

2- Scroll UP or DOWN to choose *"angle"* and press the SELECT button, wait for system confirmation.

3- Scroll DOWN to highlight the «2- Zero sensor» line and press the SELECT (#8) button.

4- Boom down to zero degrees (main boom parallel to ground). The angle is in degree and the sensor's value is in bits. This sensor's value must be above 100.

5- Press the SELECT button to edit the zero angle value using Scroll UP or DOWN buttons.

6- Press SELECT again to confirm the zero and wait for system confirmation.

7- Push the ESC (#7) button to go back in the main calibration menu.

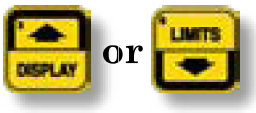
2.6.2 - Span angle

1- Scroll UP or DOWN to highlight the «3-span sensor» line and press the SELECT (#8) button.

2- Boom up to 70 degrees or higher. The sensor's value should be approximately 600 bits at 70°.

3- Press the SELECT button to edit the span value.

4- Use the UP or DOWN button to change the span value. Enter the present boom angle measured with an inclinometer.



5- Press the SELECT button to confirm the value.

6- Press the ESC (#7) button to return to the main calibration menu.

An important aspect of the display in bits is to verify if the signal is variable throughout the entire working area of the boom angle and that the resolution is above 3 bits per degree.

2.7 – Load hoist calibration

It is recommended to always hoist and stop the load smoothly when calibrating load on the W3100 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 system does not write the ZERO LOAD into the 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.

2.7.1 - Hoist selection

Select hoist to be calibrated.

1. Scroll UP or DOWN to highlight the «4- select hoist» line and press the SELECT (#8) button.

2. Scroll UP or DOWN to choose the hoist sensor (Main, Aux or Whip) that you want to calibrate, press the SELECT button and wait for system confirmation.

If it is not possible to change to the correct hoist, the system may not be set-up for multiple hoist sensors, refer to section 3.4.1 to configure the system for the proper number of hoist.

2.7.2 - Part of line setting

Scroll UP or DOWN to highlight the «5- Parts of line» line and press the SELECT (#8) button.

The number of parts of line will flash. Scroll UP or DOWN buttons #3 and #6 to set the value to the number of parts of line reeved and press the SELECT (#8) button.

Verify that the number of parts of lines is shown correctly. If it is not possible to change to the correct number of parts of line refer to section 3.4.3 to configure the system for the maximum number of parts of line for the crane.

At this point, the load sensor is ready for calibration. Get the crane ready 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 parts 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.

EXAMPLE:

A W3100 System is being calibrated on a crane that has a single-part line pull of 5,000 Kg and a maximum reeving of 12 parts. The available "known" test weight is 25,000 Kg. To achieve the best calibration, the crane should be reeved to 6 parts.

This will achieve 83% of maximum line pull when the calibration load is lifted. The crane could be reeved to as many as 10 parts 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 parts 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.

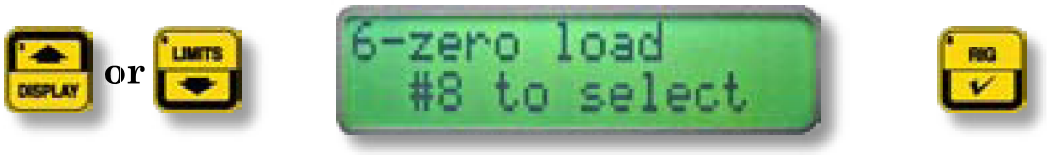
The weight of the calibration loads and any device used for lifting the calibration loads, including the hook block weight, must be known accurately. The accuracy of the calibration is dependant upon the accuracy of the weights used during calibration.

2.7.3 - Two-point load sensor calibration

At this point, the selected load sensor is ready for calibration. Get the crane ready to lift the test load. The load should be near maximum line pull on the hoist line. The load sensor can be calibrated on any number of parts of line. However, to avoid mixing hoist line friction and rope reading fluctuations, it is preferable to calibrate the hoist line with the fewest parts of line possible.
The load sensor calibration is done using two points.

2.7.3.1 - Zero Load

1. Scroll UP or DOWN to highlight the «6- Zero load» line and press the SELECT (#8) button.



2. Hoist the small calibration load and stop. Press the SELECT (#8) button again and the number in the upper right corner of the lower LCD display will flash. Use the Scroll UP or DOWN buttons #3 and #6 to adjust the displayed weight to match the total load weight suspended (load, hook block, slings, hoist line below boom tip – if applicable, etc). Once correct, press the SELECT (#8) button to accept the value, and wait for system confirmation.

3. Press the ESC (#7) button to return to the main calibration menu.

2.7.3.2 - Span Load

1. Scroll UP or DOWN to highlight the «7- Span load» line and press the SELECT (#8) button.

2. Lift the large calibration load smoothly and stop Press the SELECT (#8) button again and the number in the upper right corner of the lower LCD display will flash. Use the Scroll UP or DOWN buttons #3 and #6 to adjust the displayed weight to match the total load weight suspended (load, hook block, slings, hoist line below boom tip – if applicable, etc). Once correct, press the SELECT (#8) button to accept the value, and wait for system confirmation.

3. Press the ESC (#7) button to return to the main calibration menu.

2.7.3.3 - Load accuracy verification

Return to SPAN LOAD and press the SELECT (#8) button. Verify the weight displayed against a minimum of 2 suspended calibration loads. Hoist and stop the load a minimum of 5 times at different heights, always hoist at a constant speed and stop as smoothly as possible. Once finished, press ESC (#7) to exit the menu selection without changing the calibration.

The 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 has caused a load increase or decrease before the SELECT (#8) button was pressed.

Repeat the procedure from 3.7.3.2 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**

2.8 - Main boom operating radius calibration

Each boom configuration must be passed through the following 5 steps in order to calibrate the radius. The main boom must be calibrated before any other boom configurations eg. manual, jib at 0 deg., jib at 10 deg, jib at 10 deg with manual, etc...
The boom configuration is selected in Normal mode using «Duty» (#2) button.

All values should be set in metres or feet as defined on 3.4.2 Calibration Unit.

2.8.1 Main boom radius calibration

2.8.1.1 - 20° Boom

1. Scroll up or down to «8 – boom len. p1-2 » line and press the SELECT (#8) button to get access.

The lower LCD display will show the boom length. On the top right of the LCD, the boom angle is displayed.

2. As the menu instructs, boom down to between 15 and 20 degrees. If the angle, the display will indicate the expected values.

3. Once at the correct angle, press the SELECT (#8) button.

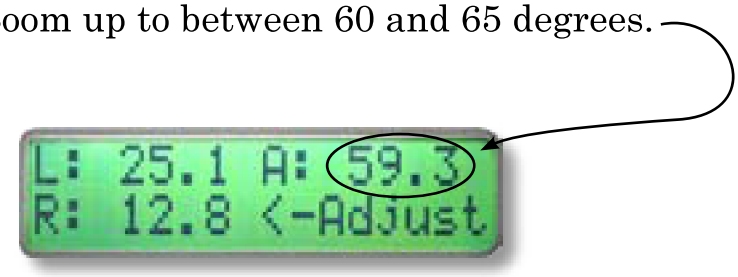
   The displayed radius will flash.

   Measure the actual radius, then set the value on the display accordingly and press the SELECT (#8) button to confirm calibration.

   The system will scroll automatically to point P2: 60° Boom.

2.8.1.2 - 60° Boom

1. The displayed radius might be wrong at this point because only half of the calibration is done. Boom up to between 60 and 65 degrees.



2. Press the SELECT (#8) button for editing.

   While the radius flashes, set the correct value.

   Press the SELECT (#8) button to confirm calibration.

2.8.1.3 - Check point

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.

2.8.2 - Jib operating radius calibration

All crane configurations listed in menu “Jib configuration” must be calibrated in the same manner as the main boom in terms of operating radius. The only exception is for the Load bend correction “ load bend correction” which is only relevant for configurations, which include lifting over a jib.

The jib operating radius calibration is done using the following procedure for each jib configuration:

1. Rig the crane according to the desired configuration.

2. Set the crane configuration parameters (Jib configuration, head type, boom length and tare load) as described previously for the basic main boom.

3. Calibrate the operating radius with menu «8 – boom len. p1-2 » following the same procedure used for the basic main boom.

2.8.3 – Loaded Boom deflection calibration

When the operating radius calibration has been performed for a jib, a boom deflection calibration must also be done.

1. Scroll to menu «9 – Load Bend Cor».

2. Press the SELECT (#8) button to get access.

3. Move the boom at an angle of between 60 and 70 degrees.

4. Lift a load between 50% and 90% of the SWL at the stated angle.

5. Measure the radius. It should be equal to or slightly greater than the displayed radius.

6. Press the SELECT (#8) button for editing, the radius value will flash.

   Increase the value to the new radius. Never decrease this value below the primary value calculated by the system.

7. Press the SELECT (#8) button to confirm calibration.

When your calibration is finished Press ESC (#7) to return to the main menu and backup your calibration data using menu «12- BACKUP» and after set the calibration switch to OFF POSITION to prevent your calibration data from being corrupted.

2.9 - Saving calibration data

Scroll to menu «12- BACKUP». Press the SELECT (#8) button. The system will save the calibration in a spare bank called bank B. The use of this function is not necessary to store calibration. Calibration is saved when confirmed, and stored in the calibration bank A. This bank like bank B is a permanent EEPROM bank. Battery back up is not necessary.

2.9.1 Memory management

Scroll to menu «13 – MEMORY». Press the SELECT (#8) button to get access. The top display will indicate the status of both the memory banks A and B. A must read OK for the system to operate. By scrolling up and down, the bottom display will offer various options:

Copy memory A to B
By pressing the SELECT (#8) button, the contents of bank A will be copied into bank B.

Copy memory B to A
This option will copy the contents of bank B into bank A. All the data in bank A will be lost.

Swap Memory A and B
This option will place the contents of bank A into bank B and at the same time the contents of bank B in bank A. Both banks will be preserved but switched.

Init. Memory A
This option will obliterate all data from memory bank A. This should only be done when a system is installed for the first time or if an incompatible operating system is installed in the system. This must never be done during or after calibration.

Init. Memory C
This option will eliminate all configuration information (duty, number of fall, winch, etc) from memory bank C, and reset all variables to their default values. Initialisation must be done when a system is first installed, or if an incompatible operating system is installed in the display.

INSTALLATION

Refer to the wiring diagram and installation guide provided with each component.

Notes

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