



W2245

Rated Capacity Indicator

for
Telescopic cranes with derrick pressure sensors

Operating Manual

(Frame F45TH410 onward)

Crane Warning Systems Atlanta
1-877-672-2951 Phone
1-678-261-1438 Fax
www.cwsa.biz

Contents

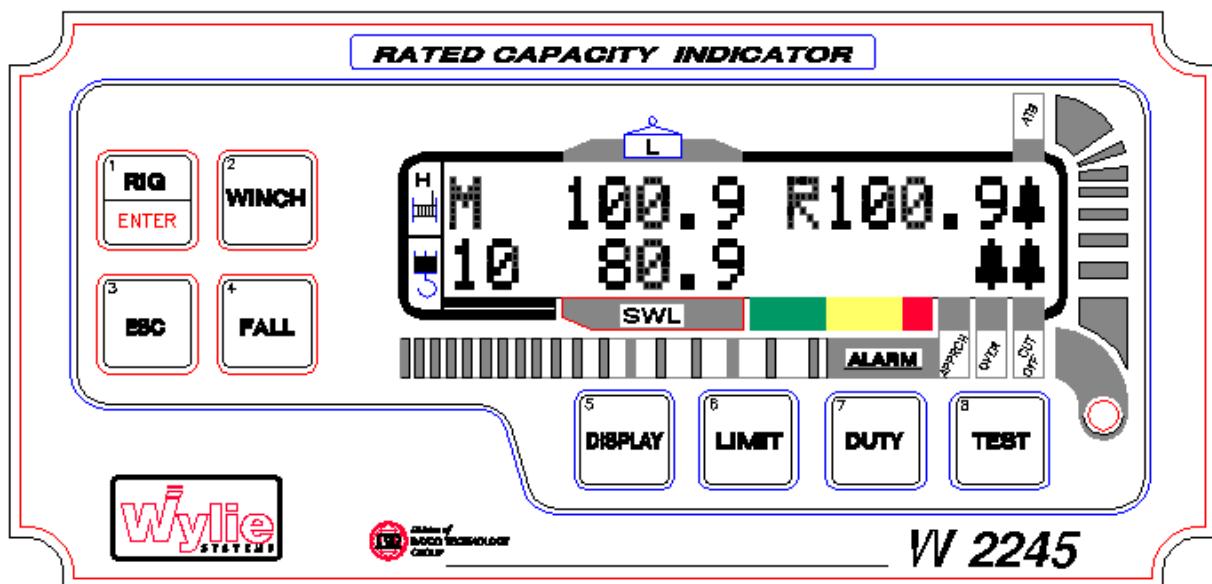
1.0 GENERAL DESCRIPTION OF THE INDICATOR SYSTEM.....	5
1.1: Display Unit.....	5
1.2 Keyboard Description.....	6
1.3 Alarms Description	6
1.3 Alarms Description	6
2.0 OPERATING PROCEDURE	8
2.1 Warning.....	8
2.2- Power On	9
2.3- Operation	9
2.4 – General system operation	10
2.5 – Detailed Description of Indicator Functions.....	11
3.0 TROUBLE SHOOTING	22
4.0 - ROUTINE MAINTENANCE	23
4.1 - Cleaning.....	23
4.2 – Cables.....	23
4.3 - Display	23
4.4 – Performance Check	23
5.0- PERFORMANCE CHECK.....	24
5. 1 - Daily	24
5.2 - Every 6 Months	24
5.3 – Accuracy	24

1.0 GENERAL DESCRIPTION OF THE INDICATOR SYSTEM

The Wylie systems W2245 Automatic Rated Capacity Indicator system has been designed to provide the crane operator with the information necessary to operate the crane safely and within the maximum permitted loading specified by the crane manufacturer.

The indicator functions by automatically monitoring the load applied to the crane and continuously compares this load with the maximum permitted load for each crane position. The display unit of the indicator system provides continuous information relating to crane loading and warns the operator when approaching or exceeding the limit of the crane capacity.

1.1: Display Unit



View of W2245 Display

The display unit indicates the status of the crane to the operator. The top row of the LCD screen in normal operation mode shows Winch used, Rigging mode available (flashing R if available), Hook Load, Load Radius and Angle (eg A30 is 30 degrees). The bottom row, in normal operation mode, shows number of Falls, Rated Load, a bar graph for %SWL and either the current duty number (eg D01 is duty 1) or Alarms status.

The winch used is shown on the top left part of the display. 'M' indicates main Winch, 'A' indicates auxiliary winch.

The **NUMBER OF FALLS** is shown on the bottom left part of the display

The **HOOK LOAD** and **RATED LOAD** are gross loads, including the weight of the block and any lifting slings used.

The **LOAD RADIUS ('R')** is measured horizontally from the crane centre of slew to the crane lifting point (usually the hook).

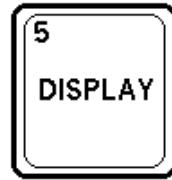
The **BASE BOOM ANGLE ('A')** is the angle of the centre line of the bottom section of the boom (usually parallel to the top of the boom) to the horizontal.

1.2 Keyboard Description

There are eight pushbuttons on the display keypad. Button 1 has a double function. The top row of the button shows the main function and the bottom row shows the secondary function. The Main function is used in normal mode, while the secondary one is used for menu navigation and editing purposes.



Used to by-pass permanently the lockout while rigging the crane. The Enter function is used to confirm other actions.



Pressing this button gives access to other information by changing the display screen temporarily.



Used to select the Winch used. The secondary «UP» function is used to scroll up in menu or increase value being edited. This button will be referenced to this second function in this manual.



Used to access the LIMIT menu.



Used to return to normal mode.



Used to access Duty selection mode.



Used to set the number of FALLS for the selected Winch. The secondary «DOWN» function is used to scroll down in menu or decrease value being edited. This button will be referenced to this second function in this manual.



Used to run the system test procedure

1.3 Alarms Description

Four warning indicators with a bell shape are provided on the display screen. They function as follows:

ATB: «ON» if an Overwinch/Two block condition. This may stop hoisting of the winch operation dependant on crane model.

APPRCH: Approach warning. «ON» when the load on the hook is between the approach and overload limits specified during calibration. The percentage level may be changed during the calibration process (see note). This is accompanied by the operation of an audible warning device that is fitted to the control box display.

OVER: Overload warning. «ON» when the load on the hook is over a percentage of the rated capacity. The percentage level may be changed during the calibration process (see note). This is also accompanied by the operation of an audible warning device that is fitted to the control box display.

CUT OFF: Motion Cut. «ON» when the load on the hook is over a percentage of the rated capacity. The percentage level may be changed during the calibration process (see note). This is usually associated with, for example, booming down, telescoping out or hoisting up. The exact operation is specific to the crane model.

Note: The alarm level percentages should be set to comply with local regulations, if in doubt consult Wylie Systems for guidance

When a warning alarm is activated, the red lamp illuminates giving a visual warning.

ROPE: This warning will flash at the «NUMBER OF FALLS» indicating that the rated capacity is limited by the winch rope if less than the normal falls for lifting full capacity for the configuration are rigged and set.

2.0 OPERATING PROCEDURE

2.1 Warning

The W2245 Wylie Rated Capacity Indicator is to be regarded only as an aid to the operator . When the parameters are set correctly, the indicator will warn the crane operator of a potential overload condition that could cause damage to equipment, property, and/or injury to the operator or site workers in the vicinity of the crane and its load.

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

The safe operation of the crane is the sole responsibility of the operator who must observe and obey all warnings and instructions supplied by Wylie Systems, the crane manufacturer, and the relevant safety authorities.

During normal operation the SWL (safe working load) of a crane must not be exceeded. It should be noted that certain statutory requirements do not permit the SWL to be exceeded except for the purpose of testing.

Before operating a crane equipped with a Wylie system, the operator must carefully read the information in both this manual and the crane manufacturer operator's manual to ensure that he/she fully understands the correct operating procedures and safety standards.

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.

The W2245 must be set to the crane parameters E.G.[outriggers, tyres 360, tyres front, pick and carry, main boom, rooster, jib, power pin extended, main hoist, auxiliary hoist and parts of lines] before operating the crane.

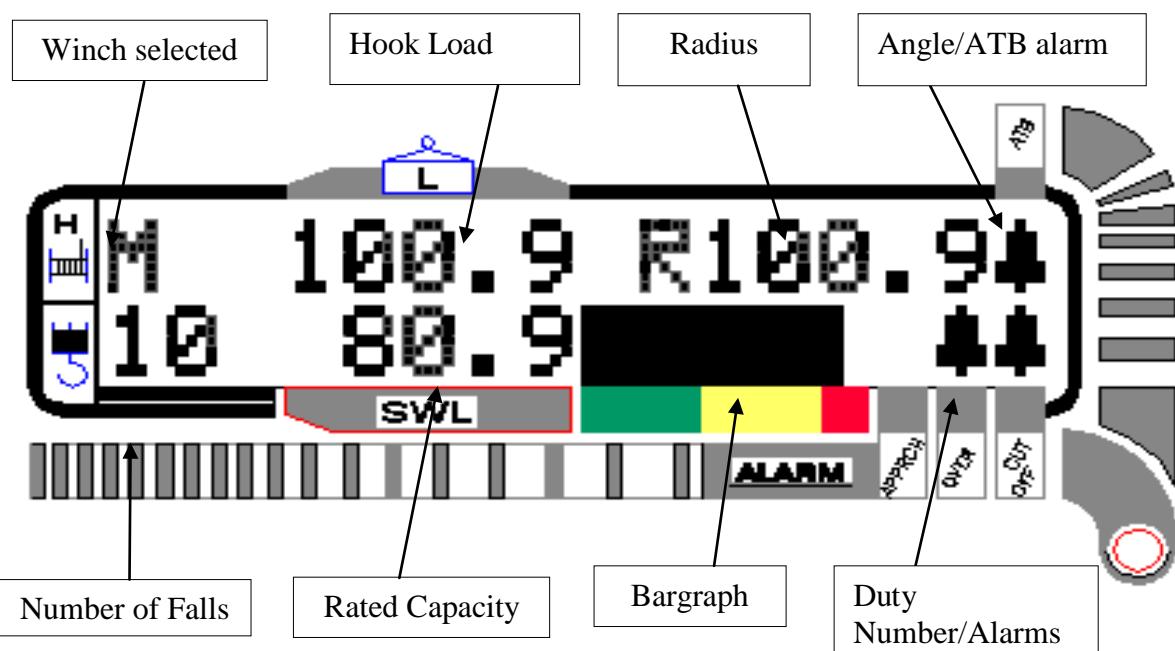
2.2- Power On

Switch on the electrical supply (i.e. crane key switch) to the indicator.

When the indicator is turned on, the system briefly shows the company name, then it displays a configurable message (normally the measuring units), for three seconds. The system then stabilises, and goes into the normal operating mode.

2.3- Operation

As shown below, the normal mode displays the hook load, the rated capacity, the load radius or Angle , the hoist used and the number of Falls.



Using button (#5) DISPLAY the operator can access other functions of the system like Error report and Diagnostics for maintenance purposes. These functions are displayed for 15 seconds before the system returns to the normal display.

2.4 – General system operation

In order to have the proper rated capacity and radius, the system must be configured properly. Failure to configure the system properly can cause the crane to break or tip and may result in injury or death. Failure to configure properly may also cause a zero rated capacity if no chart is found to match the configuration set by the operator. E.G.: jib duties on tyres may not be valid duties.

The system configuration is done basically with the 3 buttons labelled **WINCH**, (#2), **FALL** (#4), and **DUTY** (#7).

The operator may also set operating limits like maximum angle, minimum angle, maximum radius, etc. These limits may be temporary or memorised depending on the configuration settings made during calibration. The operator can access them with the **LIMIT** button and change them with the indicated buttons.

The operator can override the lockout system in the event of an emergency, using the override key .

The operator can override the lockout during rigging operations by pressing the **RIG** button, this rigging mode is only available under the following circumstances:

1. The boom must be fully retracted.
2. The radius must be greater than the maximum working radius for which a safe working load is specified for this boom length.
3. The load on the hook must be less than twice the block weight set in the calibration data for the hoist in use.

Whenever the RIG mode is available a flashing 'R' will appear next to the winch indicator.

Rigging mode will be automatically deselected if any of the above three conditions changes or if the RIG button is pressed a second time.

The system will not indicate or account for unusual, not permitted and dangerous manoeuvres, nor will it compensate for side load and off level situations.

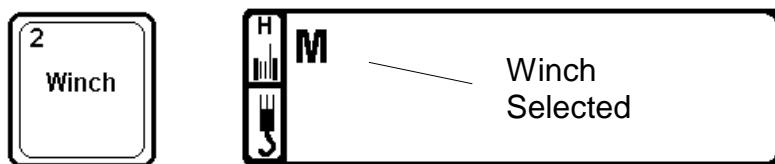
2.5 – Detailed Description of Indicator Functions

2.5.1 System configuration

Refer to the duty selection chart issued with each system for specific details of the duty number descriptions.

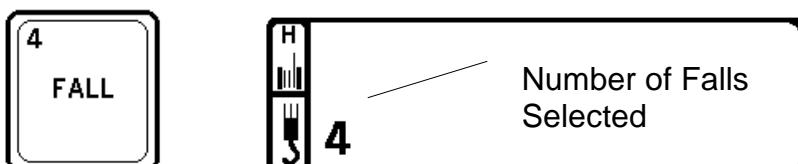
Operation of the Winch, Falls, and Duty buttons is inhibited if a load of greater than 20% SWL is suspended.

2.5.1.1 Winch Selection : WINCH button (#2)



This button allows the operator to select the Winch used. The operator can see the winch selected on the top left of the display. «M» indicates main winch, «A» indicates auxiliary winch. When pressing the WINCH button, the system selects the next winch. Only the winch programmed will appear on the display. For example, if a crane has a main winch and an auxiliary winch, pressing the WINCH button will switch from M to A and from A to M. If a crane has only one winch, pressing the WINCH button will have no effect.

2.5.1.2 Number of Falls selection: FALL button (#4)



The number of falls set for the selected winch is shown on the lower left corner of the display screen. To change, simply press the **FALL** button (**#4**). The number of falls will increase until the maximum number available on the crane is reached and then return to one, two, three, etc.

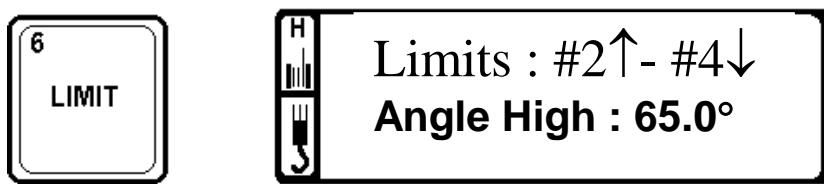
The number displayed is automatically set. There is no need to press other buttons. Note, if the winch is changed, the number of falls will also change.

2.5.1.3 Duty Selection: DUTY button (#7)



Pressing the duty button allows the duty number to be changed using buttons 2 and 4, note that the state of the optional slew sensor will affect the duty number and only those duties that are valid for the current slew sensor state will be displayed. Use enter (#1) or wait 15 seconds to confirm the selection.

2.5.1.4 Limits setting



By pressing this button, the operator can access the limit setting menu. The operator is able to view and change limits on angle high, angle low, and maximum radius.

To access the limits, press the **LIMITS** (#6) button until the desired limit appears. To change the limit press the **UP** button #2 or the **DOWN** button #4. To return to the main menu, press **ESC** (#3) or **DISPLAY** (#5).

The operator does not need to confirm a change of limit. Once the value on the display is changed, the limit is changed.

The boom can be at any position when setting a limit. If the operator changes a limit, but he does not press **ESC** (#3) or **DISPLAY** (#5); the system will return to the primary display and the limit will be recorded.

2.5.1.5 Lockout control

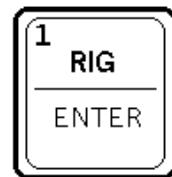
A motion cut solenoid may be connected so that motions into danger (hoisting, telescoping out, derricking down) are prevented when the system detects an overload. Output available from the system is in form of a dry contacts relay rated at 2 AMP 24 Volts DC. It is used to control a slave relay. The terminals available are common, normally open and normally closed. Refer to the

electrical connections drawing supplied with the indicator for further details.

2.5.1.6 Bypass Key

If a lockout or an external alarm is installed, it can be bypassed or overridden by activating the **BYPASS KEY**. This is momentary and the bypass will work only while the operator actives the key.

2.5.1.7 Rigging mode: RIG button (#1)



If a lockout or an external alarm is installed, it can be bypassed or overridden permanently while rigging the crane. To function, the boom must be fully retracted and below the last radius or angle capacity. At this position the system will indicate it by displaying 'R' next to the winch in use indication, the operator can press the **RIG button (#1)** and the message

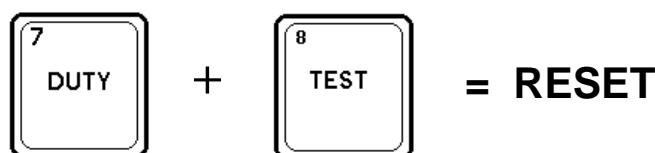
«No Cut Off Or Over Load Alarm»

will appear on the screen. The message and the lockout bypassed will remain until the operator has pressed the **RIG button (#1)** again, repositioned the crane to a working position, lifted a load or the system is turned off

2.5.2 Quick tricks

There are two quick tricks that it may be useful to know.

2.5.6.1 Quick reset



Simultaneously press the **DUTY (#7)** and **TEST (#8)** buttons. The system automatically resets. This can be used anywhere in the normal mode or in the calibration mode.

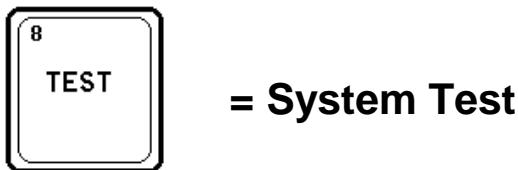
2.5.6.2 Speed setting

When changing a value in Limit mode using the **UP** (#2) and **DOWN** (#4) buttons, it may take a while to go from, for example 20.7 meters to 100.3 meters in steps of 0.1m . While pressing on the **UP** (#2) or **DOWN** (#4) buttons, use a finger from the other hand and press the **ENTER** button (#1) or **ESC** button (#3). The value now steps in metres instead of tenths of metres. Release the **ENTER** or **ESC** button while still pressing on the **UP** or **DOWN** button and the steps return to tenths of metres. Do not release the **Up** or **DOWN** button before the **ENTER** button otherwise the value will be entered instantly.



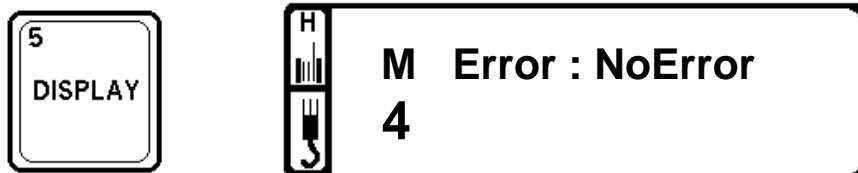
2.5.3 Build-In Test Facilities

A suite of test programs is available by pressing the **TEST** (#8) button. The system performs a series of test programs and then returns to the normal operating mode.



2.5.4 Error codes and system failure

While in the normal operation mode, press the **DISPLAY** (#5) button until the display shows ERROR following by either NO ERROR or letters. If a letter is shown, there is an error or a failure. See the table below for a description of the error.



The screen above indicates that there are no errors. However, if an error exists, the system will indicate this by displaying an «E» alternately with the Winch letter (in normal mode). Instead of the «**NO Errors**» message there will be a list of codes. Take note of the Error codes. Below is a listing of the codes with their respective definition.

	Code	Definition
Error due to sensor failure	A B E F	Failure in sensor TX0 or TX1 Failure in sensor TX0 or TX1 Failure in sensor AIN0 Failure in sensor AIN1
Error due to Board failure (I/O)	J	Failure in DR Plus
Failure due to Display	L M	Failure with keypad Failure with LCD display
Failure due to Memory	O P Q R	Failure - Eprom busy Failure – Checksum Eprom Failure – Checksum EEprom Failure – Checksum RAM
Error due to chart	S T U V W	Failure - No duty Chart Configuration not calibrated Failure – Checksum Chart Failure - Invalid value detected Dimensions missing

2.5.4.1 Errors A B,E,F

Errors A,B,E, and F are caused by sensors. This means that the sensor is either faulty, out of the operating parameters, or not connected. Use the diagnostic menu to view the input voltage from the sensor. Note if an amplifier is installed because of slip rings or distance, see amplifier specification and use the sensor specification for the amplifier input specification.

The following table is a description of the sensors:

TX0	Load sensor on main hoist line
TX1	Load sensor on aux hoist line
AIN0	Angle Sensor
AIN1	Length Sensor

2.5.4.2 Error J

These errors are caused by a failure of the base board. Replace the base board or send it in for repair. Note where each wire is connected. Note where each jumper and dip switch is set. If repaired, the system may not need recalibration. If replaced, the system will need recalibration of the sensors.

2.5.4.3 Error L

The keypad or the keypad driver is not working at power up. Replace the key pad or try another display board. Technical support is recommended.

2.5.4.4 Error M

The screen fails to respond to the processor. If the failure is more serious, nothing will appear on the display or the information will be frozen. Technical support is recommended.

2.5.4.5 Error O, P, Q, R

Errors show internal memory failure: tech. support is recommended.

2.5.4.6 Error S

The system cannot find a chart for the configuration selected. For example, selecting a jib duty on tyres would lead the system to Error S if there were no chart for that configuration. Rig the crane and set the indicator to a valid configuration.

Another example is where the boom length exceeds the maximum boom length specified in the chart. Eg on tyres duties may be limited to a boom length shorter than maximum.

2.5.4.7 Error T

This error indicates that the radius was not calibrated for this boom or jib selection. Radius must be calibrated with the boom fully retracted as a minimum requirement.

2.5.4.8 Error U, V

These errors will appear when changing eproms containing charts and/or the operating system. The only solution is to re-calibrate the system entirely. This situation will not appear when changing charts and keeping the same operating system.

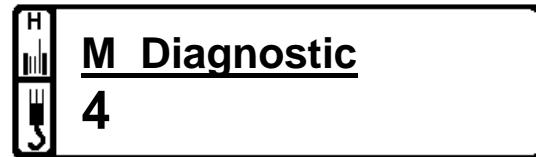
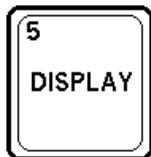
2.5.4.9 Error W

This error appears on calibrating radius and boom moment before completing the dimensions menu. Refer to the calibration manual for further details

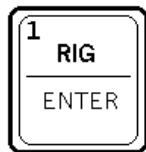
2.5.7 Diagnostic menu

2.5.7.1 Access

Press the **DISPLAY (#5)** button until the screen shows the diagnostic menu.



Press the **ENTER button (#1)** to enter the diagnostic menu. NOTE: you will not be able to enter the diagnostic menu if a load of greater than 20% SWL is suspended.



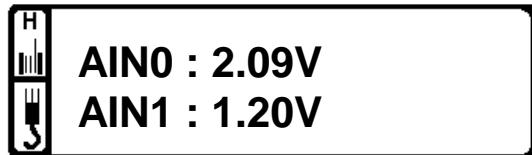
Then press **DOWN (#4)** to scroll down through the various diagnostic menus.

2.5.7.2 Frame and source file

This is the operating software with chart source file. This information is important when calling for technical support or making changes in charts or upgrading the operating system.



2.5.7.3 Angle and length sensor



AIN0 is the angle sensor voltage, it must be above 0.3 Volt to calibrate. The exact voltages will vary from one model of angle

sensor to another. Refer to the angle sensor specification sheet. The important thing is that there is an increase of at least 1.0 Volt from 0 degrees to 70 degrees and that the voltage never exceeds 4.8 Volts.

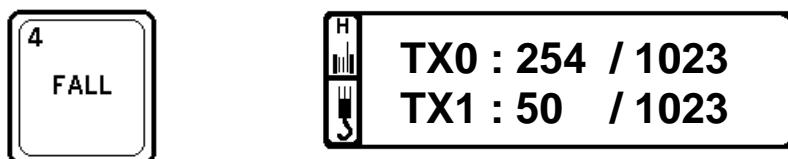
AIN1 is the length sensor voltage, it must be above 0.3 Volt to calibrate. The exact voltages will vary from one model of length sensor to another. Refer to your length sensor specification sheet. The important thing is that there is an increase of at least 0.05 volts per metre and that the voltage never exceeds 4.8 Volts.

2.5.7.4 Sensor supply dr+



The DR+ is the sensor supply voltage. It normally indicates 5.00 Volts plus or minus 0.1 Volt. If the voltage is below 4.90 Volts, a sensor wire is shorted causing a drain of power. If the voltage is above 5.25 Volts, a load sensor wire is damaged or the internal amplifier is set incorrectly causing the load sensor voltage to increase above 4.95 Volts. A wrong DR+ will affect the readings on all sensors.

2.5.7.5 Pressure sensor signal in bits



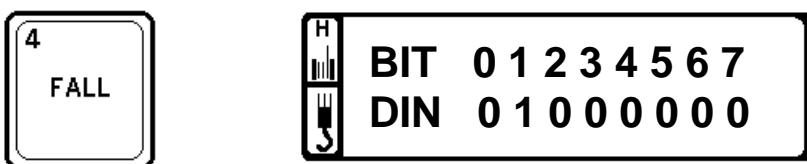
TX0 is the full side pressure sensor and TX1 is the Rod pressure sensor. The display reading is in bits. The total bits is 1023. TX0 and TX1 are normally used for internal gain adjustments.

2.5.7.6 Pressure in bars



Pres1 is the full side pressure sensor and Pres2 is the Rod pressure sensor. The display reading is in bars.

2.5.7.7 Din (digital inputs)



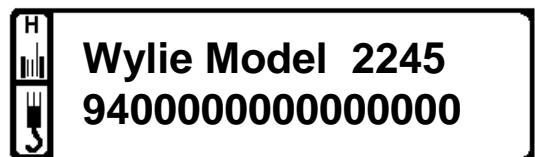
Din stands for Digital Input. There are 8 digital inputs or commonly called switch inputs. Only two are readily available on the terminal strip of the control unit.

Bit stands for the address or name of each digital input. The numbers 0 and 1 next to Din stand for the status of each input: 0 means ground (0V) and 1 means positive (VP). When the terminal is left open, it defaults to the supply voltage 12 or 24 Volts (VP) and a 1 is displayed. When the terminal is grounded (0V), it displays a 0. Note that this is the standard setting.

Digital input 0 is used for the Anti-Two-Block. When unconnected, the terminal defaults to 1 causing the A2B alarm and lockout to activate.

Digital input 1 is used for the slew switch. When grounded, it usually signifies over front or over rear. If the charts are included in this manual, it will be noticed that when Din1 is 0, selection 1 for slew position is used in the chart. When Din1 is 1, selection 0 for slew position is used in the chart.

2.5.7.8 Calibration



On this screen, a number occupies every bottom space. Either 0, 1, 2, etc. The bottom spaces represent the boom configuration from 1 to 16 starting from the left. For instance, the left most number represents the main boom configuration.

Each different number indicates the status of the radius calibration for the specific boom configuration. 0 indicates that this boom configuration radius is not calibrated. 2 indicates that P1 and P2 are calibrated. 4 indicates that P3 and P4 (no load deflection) are calibrated. 5 indicates that the loaded boom deflection has been performed. 7,8,9 indicate various stages of boom moment are calibrated.

3.0 TROUBLE SHOOTING

If the alarm sounds, it is caused by an overload, a sensor failure or an operator adjustable limit being exceeded. If an operator adjustable limit is exceeded, it will be displayed on the screen. Refer to the limit setting section of this manual.

The first step is to verify if the alarm is caused by an overload. Verify the hook load and the capacity, if the crane is overloaded, lower the load or reduce the radius. If the alarm still sounds, go to the next step.

The second step is to verify the hoist selection, the parts of line, the boom/jib selection and the configurations/deductions. Verify that the capacity showing on the bottom left of the display matches with the capacity according to the load chart. All must be correct. If the alarm still sounds, go to the next step.

The third step is to access the W2245 System error menu and diagnostic menu. To access the error menu, press the **DISPLAY** button (#5) until the screen shows the error menu. The letters on the first line of the display following (**Error:**) are error codes. refer to the error code section of this manual.

4.0 - ROUTINE MAINTENANCE

4.1 - Cleaning

Do not pressure or steam clean the control box, junction boxes, angle sensor, Pressure sensor and any connectors. This could force moisture into the connectors and cause sensor failure in time. To clean the surface of the display use mild soap or mild window cleaners. Use a clean/soft cloth.

4.2 – Cables

Check all the wires for cuts or damage. Replace if needed.

4.3 - Display

If condensation appears in the display of the control unit, open the cover in a dry place and allow to air dry for a day. When perfectly dry, tighten slightly the cable glands. Apply silicone grease or similar material to the cover seal and re-tighten the cover. Do not over tighten as this will localize the seal pressure and void the waterproof quality of the seal.

4.4 – Performance Check

Verify the accuracy of the system every day and every 6 months or 1000 hrs. Refer to the next section: Performance Checks and procedures.

5.0- PERFORMANCE CHECK

5. 1 - Daily

At the beginning of every shift, configure the system properly and verify the weight of the hook block and the radius with the boom selection used.

5.2 - Every 6 Months

Perform a complete periodical test. Position and level the machine. Testing personnel must be familiar with the machine and the system. The crane and the system must be configured properly. The load chart must be respected.

One known weight accurate to +/- 1% and equal to the maximum capacity at near maximum radius will be used to test the alarm and the accuracy of the load indication.

Another known weight accurate to +/- 1% and equal to the maximum capacity at near minimum radius will be used to test the alarm and the accuracy of the load indication.

5.3 – Accuracy

Refer to local standards for acceptable errors in radius and load indicators.