OPERATOR'S MANUAL

Version 2.1

Rev: 06/04/2000

UNOCAL

W1265L
LOAD MOMENT OFFSHORE

WYLIE SYSTEMS INC. - RAYCO ELECTRONIC SYSTEM LTD.

INDEX

INDEX (CONTINUED)

JOB DATA

DATE: JUNE 11,2000

CUSTOMER: UNOCAL DOLLY VARDEN PLATFORM ALASKA

MACHINE: SKAGIT 363 SERIES AND NATIONAL CRANE SERIES

CHART'S FILE: XV8015 S/N: EAST 1265----15010/WEST 1265-015011

PROG. BY: LAURENT DUPRE

OPERATING SYSTEM: 1265L WITH SPECIAL SOFTWARE FOR DUTY SEL

ANGLE SENSOR: LIQUID TYPE

LENGTH SENSOR: NA

LOAD SENSOR 1: 10K DEAD END LOAD CELL WITH 15K SWL SKAGIT ONLY

SENSOR MOUNTING 1: DEAD END ARRANGEMENT SKAGITS ONLY

LOAD SENSOR 2: 10K COMPRESSION LOAD CELL ON SKAGIT AND NAT

SENSOR MOUNTING 2: SPECIAL MADE MOUNTING BLOCK

A2B: A2B HAS NOT BEEN INSTALLED BUT THE JUNCTION BOX CAN BE SET UP FOR A 2 BLOCK SYSTEM. THE CABLE HAS ENOUGH CONDUCTORS

6 CONDUCTOR FROM BOOM TIP TO CAB J BOX

WIRES:

NO CONNECTORS. ALL COMPONETS HARD WIRED.

ANGLE SENSOR DOSE HAVE A METAL CONNECTOR AT THE BOOM BASE

CONNECTORS:

SPECIAL NOTES:SYSTEM HAS AMPLIFIERS FOR BOTH LOAD LINES HOUSED IN A STAINLESS STEEL BOOM TIP JUNCTION BOX. IT HAS EXTRA CABLE GLANDS FOR TWO BLOCK SWITCHES AND THE SIGNAL CAN BE BROUGHT DOWN TO THE CAB JUNCTION BOX THROUGH THE BLACK AND WHITE WIRES.

PHONE NUMBERS. WYLIE SYSTEM..918-252-1957 CELL 503-784-1705 PAGER 888-812-2647

COMPLETED AND TESTED BY: CURT LUEDTKE /WEST COAST SERVICE

1. INTRODUCTION

1.1 System

The Wylie W1265 Load moment indicator is a length, load, angle, radius, lifting capacity and anti-two-block indicator. A display in the cab or near the operator will give all the necessary information to aid the operator when using the crane.

Intelligent System

The system is microprocessor based meaning that there is a computer inside the box with operating software. This software has four parts, each has a distinct mode allowing different functions: The normal operating mode, the calibration mode, the diagnostic mode and the configuration/setting mode.

The normal mode is the normal operating status of the unit when turned on. In this mode the operator will read the hook load, the radius, the angle, etc. and the operator will be able to select the hoist, the parts of lines and the boom configuration.

The calibration mode allows the calibration of the sensors, the radius and other various variables and can be accessed by removing the small wire acess cover on the back of the display and locating the slide switch by the fuses and switching it to the on position. No other unit is necessary to calibrate the system.

The diagnostic mode allows troubleshooting of the unit without the need of a voltmeter. It is accesed through the normal display mode.

The configuration/setting mode gives you options that allow the load charts to be interouplated when required. This mode also allows the setting of the number of load sensors up to four. This mode is available through the calibration mode only. Once accesed it will ask for a password of 1, 2, 3.

The system is designed to be fitted on any crane from conventional to telescopic and from 1 to 4 hoists. Thus its components can vary substantially from one machine to another.

There is different software for conventional and telescopic crane to convert from a sensor controlled boom length to an operator set boom length. This is the only difference in the two software. Make sure that the system's software is 1265L for conventional or lattice cranes.

The software is located in two CHIPs on the CPU board inside the display box. Along with the software version, the CHIPs also contain the crane's rated capacity charts. Information for both chips are written on a label glued to the CHIP' s surface.

The heart of the W1265 is the display unit. This box contains all electronic components required transforming sensor signals into the required information for the operator.

The other components are the angle sensor, the load sensors and the Anti-two-block switches and in some situations a proximity switch may be added to alert operator of a restricted area in the swing. All the above are connected to a basic central junction box and then a 12 conductor cable from that junction box to the display unit to provide the basic data.

There are two types of angle sensor, one type of length sensor, six types of dynamometers and dead end load sensors, two types of Anti-Two-Block switch. The choice of sensor is depending on the type of crane, the required accuracy, and the budget

of the customer. Some cranes existing sensors such as load or angle indicators may also be compatible and can be adapted to work with the 1265 system.

It is also possible in certain situations to use signal conditioners between the sensors and the display unit. This will not change the accuracy of the system but will reduce radio interference and loss of signal through connectors or slip rings.

2. HOW THE INDICATOR WORKS

2.1 Load sensor

THREE SHEAVE DYNAMOMETER

The dynamometer is a hoist line load sensor. It consists of a load cell applied against the middle sheave of a three-sheave arrangement. The three sheaves are positioned in a way that deflects the hoist line by a few degrees. When tensioned, the hoist line tends to straighten. This applies a force on the middle sheave against the load cell. The force is proportional to the hoist line tension. The hoist line tension is also proportional to the hook load (except for sheave friction). Dynos are a very good means for reading single line loads and the design is a « off the shelve » product and can be easy to adapt to most all situations. The unit is made of stainless steel for OFFSHORE applications.

DEAD END LOAD CELL

A hoist line sensor that consists of a load cell applied to the dead end arrangement on the boom tip. The load cell is made of stainless steel or special plated steel for OFFSHORE applications.The advantage of this design over the three-sheave arrangement is that there is no additional rope wear. The disavantage is that special adaptor plates are needed to fit the load cell to the boom tip dead end point. Overall the dead end system is a recommended means for reading the loads using muliti parts of lines.

SINGLE SHEAVE LOAD PIN LOAD CELL

This type of sensor usually consist of a special made load pin to fit a single sheave arrangement. This method is also a very good means to read single line loads but can take several weeks to build.

How the load cell works

The load cell used for all the load sensors work with the same principle. The load cell operates on the basis of a wheastone bridge. This means that four variable resistors of equal value are bonded to the weakest part of the load cell. When a load is applied, it changes the value of the resistors in opposite direction causing a voltage variation on the output wires. The voltage variation is to the order of thousandths of volts. The voltage output being so small, it could be sensitive to radio interference and wire resistance between the load cell and the control unit. Therefore, in some cases, an amplifier is used to insure good transmission of the signal.

2.2 Amplifier

The amplifier is used when the distance between the load cell and the control unit exceeds 80 feet. Beyond that distance, radio waves and wire internal resistance may noticeably influence the load cell signal. The amplifier is also used when the signal wires of load sensor as well as other sensors like angle or length must go through a slip ring.

The amplifier simply amplifies the load cell millivolt output into a 0-5 Volt signal, then in a second stage, it converts the signal into a 4-20 mA output. The signal is then less sensitive to radio interference or internal wire resistance, or slip ring resistance. In high Rf areas additional filters may be needed to reduce Rf or EMF.

2.3 Angle sensor

PENDULUM TYPE

The pendulum type is basically a high precision one-turn pot driven by a heavy pendulum. The pendulum will keep the pot's knob pointing toward the ground regardless of the angle of the boom. The resulting voltage output from the pot is proportional to the angle of the boom. The sensor is housed in a square stainless steel enclosure. This unit can be designed for explosion areas.

LIQUID TYPE

The liquid type angle sensor consists of two electrodes with a semi-conductor liquid in between. The electrodes send pulses through the liquid which has a capacitate property. When the electrodes are fully immersed, the capacity is at its highest. As the boom angle changes, less electrode surface is in the liquid causing a small capacity. An internal circuit converts the pulse output in an analog output almost identical to the pendulum type signal. This unit is housed in a round, sealed aluminum alloy enclosure. This unit is most commonly used on the 1265 systems except when the boom is a class1 or 2 for explosion proof. In this situation the Pendulum type angle sensor is used.

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2.5 Anti-two-block switch

The Anti-Two-Block switch is a spring-loaded switch. It is attached to the boom tip on one end and to a chain leading to a weight clamped around the hoist line at the other end. When the hook block lifts the weight, the switch becomes disengaged and the signal is cut.

2.6 Display

The display is both the operator display panel and the processing unit. In it, the sensor signals are read and computed to determine the angle, the radius, the load and the capacity. The results are then displayed to the operator using 4 liquid Crystal display screen, indication lights and a needle bar graph located on the same box. The display is composed of three sections:

THE INPUT BOARD

The input board has all the wire connections. On this board, the signals are conditioned to be legible for the processor. The supply voltage is reduced from an input range of 24

VDC to 5 VDC to supply both the processor and the sensors. The supply voltage is also reduced to 10 VDC for the warning lights on the display panel.

The reduced voltages are sent up to the other board via a Molex connector and loose colored wires. It can be unplugged by pulling downward on the colored wires.

The processed signals from the sensors are sent up to the other board via a flat ribbon connector. This connector can be unplugged when the power is OFF by pulling open the side clamp of the connector on the board.

On this board are two fuses, the # 1 FUSE protects the supply voltage to the unit. If blown, the unit is OFF. Use a 2 amp 5X20mm to replace. The #2 FUSE protects the VP terminals used to forward voltage to external switches and amplifiers. Use a 1 amp 5x20mm to replace.

There is a dry contact relay for lockout and external alarm. It has only a .5 amp on 24 VDC rating. It is used to control a slave relay. The terminals available are common, normally open and normally closed.

Two other relay output drivers exist and are used in special applications to drive additional external relays. There is a serial communication port RS 232 on the terminal strip identified as TX, RX and 0V. It can be used for a printer or to communicate with the microprocessor.

On the top right of the board is found a multiplexed amplifier to condition load cell input. This board can multiplex 4 load cell signals. The amplified load cell signal is routed two different ways. The first is AIN6 that is a direct input into the microprocessor. The second route is to a frequency converter that converts the sensor signal into a pulse with variable width. The width of the pulse is then measured by the High Speed Input of the processor in increments of one microsecond. This means that if the load cell signal is converted into a 1-second pulse, the processor could measure the load cell signal with a resolution of one millionth. Of course, one second is a long time when quick response is needed, and therefore a shorter span is used with less resolution to optimize speed and resolution.

Load cell sensor signals can be supplied to the board in the form of millivolts (direct load cell output), analog 0 to 5 volts, analog 0 to 1,2 or 3 volts and current 4-20 mA. All other analog sensor signals can be supplied in 0 to 5 volts or any portion of it with a span of 1 volt or more or in current 4-20 mA or any other current loop that is ground referenced.

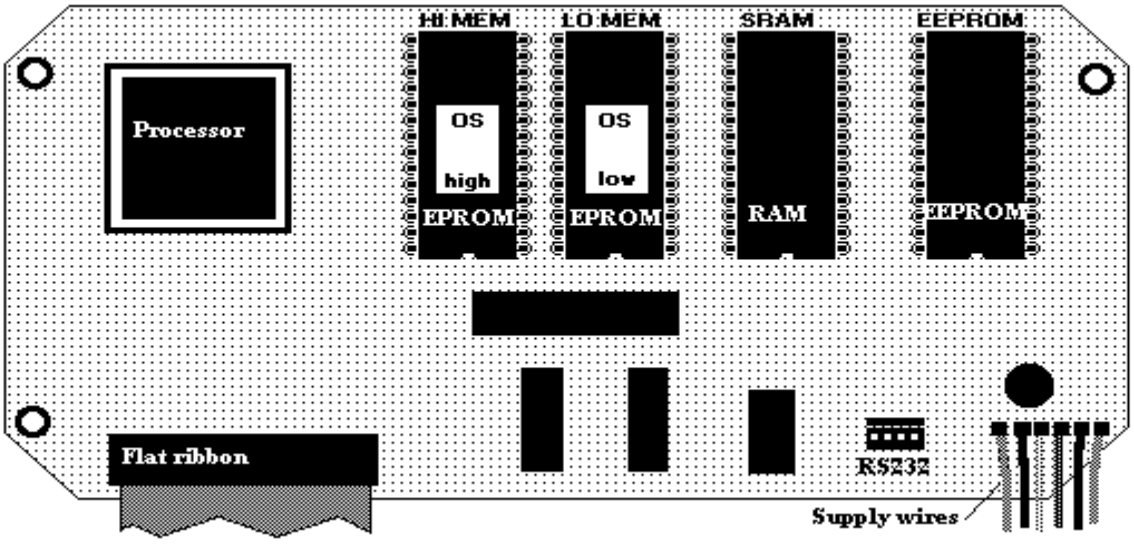
Din	**Description**
0	Anti-two-block
1	Used for Duty Selection from slew switch
2	Used for special duty selection when needed
3	Used for Motion Cut Bypass

Ain	**Description**
0	Boom Angle
1	Boom Length
2	Direction sensor main hoist
3	Direction sensor aux. Hoist

TX	**Description**
0+	Positive signal of the load sensor on main hoist **
0-	Negative signal of the load sensor on main hoist
1+	Positive signal of the load sensor on aux. hoist
1-	Negative signal of the load sensor on aux. hoist
2+	Positive signal of the load sensor on whip1 hoist**
2-	Negative signal of the load sensor on whip1 hoist
3+	Positive signal of the load sensor on whip2 hoist
3-	Negative signal of the load sensor on whip2 hoist

THE CPU BOARD

The Central Processing Unit board has for function to read all the sensor signals. Using the stored calibration data, the CPU converts the signals into the various information like boom angle, length, radius and hook load. The CPU also compares the information with the set limits entered by the operator. The CPU will finally trigger the alarms and lockout output if a limit is reached or if a two-block situation is sensed.



The CPU board is composed of a processor in the INTEL family. It is a 16-bit processor running at 8 MHz internal and external. This microprocessor is capable of handling up to 64,000 addresses. It is comparable to the 80286 in general speed and features. Most other processors used for LMIs are 8 bit processor running at 1 MHz and capable of handling up to 256 addresses. They can be compared to the first Apple 2E or the Commodore 64. The net advantage of this is the capability of doing more calculations faster to yield an accurate hook load reading instantaneously.

The CPU board also contains the RAM, the EPROM, the EEPROM, the PAL and various other less important dedicated CHIPs.

The RAM is the Random Access Memory, the processor memory. It stores all the calculated variables while operating. It is available in battery backed up SRAM. In this case, calculated data like lifts can be stored in memory until retrieved or printed.

The EPROM contains the operating system. On desktop computers it is called the DOS (disk operating system), on this system, it is called the O.S. (operating system). It is the O.S. that tells the system what it is and what it is supposed to do. In this case, a load moment indicator based on dynamometers or hydraulic pressure. Attached to the O.S. are the programmed crane charts. They are attached rather than on a separate CHIP because the system runs on 16 bits and the EPROM CHIPs are 8 bits. Therefore, two CHIPs are required to read one file. To save on space and cost, both the O.S. and the charts are on the same file. The use of 16 bit CHIPs would be more costly and difficult to obtain. The first CHIP is called LOW MEMORY and the second is called HIGH MEMORY. Each CHIP has its own location on the board and a direction for insertion. The notch on the CHIP must line up with the one drawn on the board. If the charts need to be modified or the operating system upgraded, it is done by replacing both CHIPs.

The EEPROM is the calibration CHIP. It stores permanently the entire calibration data specific to a particular crane. The information is stored in two banks on the same chip. It is useful to have two banks in case something is calibrated wrong. Then, the second

bank can be brought back and the calibration can resume without starting from scratch. The default bank is called A and the spare bank is called B.

THE DISPLAY BOARD

This board is the operator interface. It contains the 4 alpha-numerical liquid Crystal display on which appear such information as boom length, angle, radius, hook load, preset limits, failure messages, hoist used and parts of lines. It contains the processing circuitry for the 4-button keypad. It contains the indicator lights for alarms and status information. Finally it contains the 10 indicator lights used in the overload bargraph along with a analog needle that compares displayed load to displayed safe working capacity.

PRIMARY POWER SUPPLY

The system is generally supplied with a 1.2 amp 24v regulated power supply that is Housed in a separate box. It is designed for a 120vAC or 220/240vAC connection.

3. INSTALLATION

3.1 Load sensor

A typical installation drawing is supplied with the indicator. This will vary depending on the type of load sensor and the type of crane .

A special drawing may be supplied for particular application.

Before and after installing, make sure that the load sensor operates properly at all boom angles and that fleet angles are respected.

Make sure the mounting bracket is sufficiently strong to support the load sensor and the forces applied on it.

Refer also to the specification sheet for additional information concerning the load sensor and its suitability for the application. Wire the amplifier or junction box according to supplied drawing.

3.2 Amplifier

A typical installation drawing is supplied with the indicator. This will vary depending on the type of load sensor and the type of crane .

The amplifier is usually mounted on the BOOM TIP.It can be welded or use two 1/4 x 20 bolts. If a amplifier is supplied because of slip rings, mount the box on the turret part of the crane with the cable glands pointing downward. Wire accrding to supplied drawing.

3.3 Angle sensor

A typical installation drawing is supplied with the indicator. This will vary depending on the type of angle sensor and the type of crane.

Special attention must be given to the side of the boom on which it is mounted. If mounted on the left side of the boom, the angle indicator must be oriented in a specific direction that is different from the right side of the boom. Wire according to supplied drawing.

3.7 Anti-Two-Block switch

A typical installation drawing is supplied with the indicator. This will vary depending on the type of switch and the types of crane.

If two switches will be used at the same time, make sure the proper switch or junction box is used at the boom tip.

No wiring is needed, a standard connector is supplied for the switch. If a junction box is used, wire according to the supplied drawing.

3.8 Display

The display should be located at the front of the cab, where it is readily visible from the operator's control position. Take care not to obscure any displays, control levers, or switches, etc.

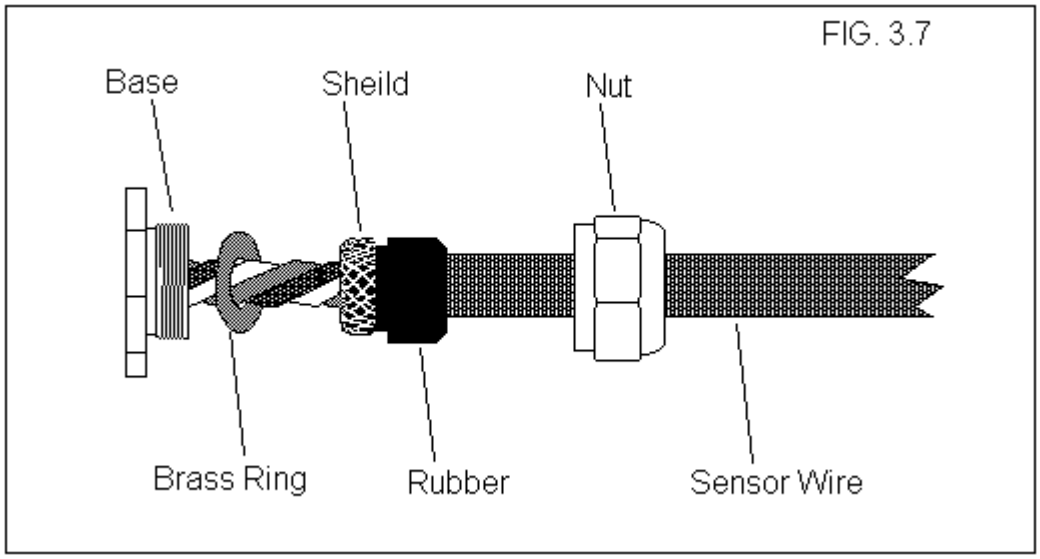
Leave sufficient room for the 12 conductor sensor wire to be fed from the bottom of the display.

The screen contrast is factory set. However, it can be adjusted on site. Open the front cover. Just under the cover on the display board is a small screw adjustment. Turning right will darken. Note that the screen will darken slightly as the temperature increase and fade slightly as the temperature decreases. If the unit will be operated in a hot climate, it is better to reduce the contrast. If the unit will be operated in a cold climate, it is better to increase the contrast slightly.

If the unit is pre-wired with connectors, simply plug in the connectors. If the unit is not pre-wired, continue with the following instructions.

Loosen the four screws on the small back cover of the display.wire according to the supplied drawing (See the JOB DATA sheet for the drawing number). Wire resistors or jumpers if any as shown on drawing. Make sure all connections are done properly and completed before powering the system. When stripping wires, do not drop the ends, the copper threads or the shield threads in the box.

All wires' shields should be grounded to the cable glands of the junction box at 1 end only. Fold the shield over the rubber sleeve. Use the brass ring for 2,3 ,4 or 6 lead wires.



Power supply must be 24 Volts DC only. If not available, an external power supply to convert to 24 Volts DC is required. Power lead must be able to sustain a minimum of 24 Volts with a current of 1.2 amps and if the unit is connected to a lockout device, a low current slave relay must be used to activate lock-outs. Never connect lock-out controls or valves directly to the 1265 system as it may damage internal circuits.

Slave relay coil rating should not be more than 1/2 amp at 24v.

No wires should be passing near a radio antenna. All wires must be shielded.

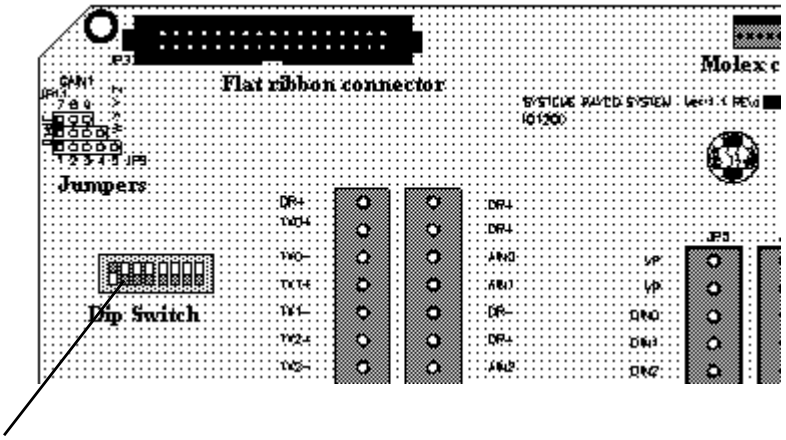
All wires must be fed away from mechanical parts, keep a minimum bending radii of two inches when static and 4 inches when moving.

DIP SWITCHES

The dip switches are usually preset. However, if a change is required on site because an amplifier has been added or removed, it can be done as follow:

SWITCH	STANDARD	REASON
Dip switch 1:	ON	Always on
Dip switch 2:	OFF	Always off
Dip switch 3:	OFF	Always off
Dip switch 4:	OFF	Always off
Dip switch 5:	ON	Off only if a fourth load sensor is installed
Dip switch 6:	ON	Off only if a third load sensor is installed
Dip switch 7:	OFF	Only if AUX. load sensor has a 4-20 mA input
Dip switch 8:	OFF	On only if main load sensor has a 4-20 mA input

The dip switch box is located on the INPUT BOARD:



Dip switch

4.2 Crane Preparation

Rig crane for its most commonly used configuration. Insure hoist rope is in proper condition and spooled properly on the hoist drum. Grease all hoist systems sheaves and check for free rotation. Remove any hardened grease from sheaves. Insure proper rigging is in place to handle the expected load safely.

4.3 Indicator Preparation

Power the unit, then select the hoist being calibrated and set the parts of lines on the display. Refer to Diagnostic mode of section 7.2. For voltages, see sensor specification sheets. Enter diagnostic mode and verify voltage input from sensors (refer to p. 6 of DIAGNOSTIC section 7.2.). If amplifiers are installed, see amplifier specification sheet.

COMMON VOLTAGES

For a liquid type angle sensor, boom angle (AINO) at 0 degree should be within 1.4 and 1.9 volts, and when boomed up to 75 degrees, AINO should be between 2.6 and 3.4 volts.

For a different angle sensor, insure voltage varies at every operating angle. Minimum voltage change for all crane working range must exceed 1V (Min. acceptable = .2 volt).

For the load sensor, without amplifiers and with no load on the hook, AIN6 should read between .24 and .50 volts, and when lifting 90% of maximum line pull, AIN6 should read between 3 and 4 volts. If this is not the case, correct the internal amplifier setting described in following section 4.4 or the external amplifier setting in section 4.5. Repeat with each hoist while in the diagnostic mode. Scroll down to hoist selection. Use #3 button to change hoist and scroll back up to AIN6. If reading remains outside of the required limits, a sensor may be installed or connected wrong, verify the connection or call for technical support.

For load sensors WITH AMPLIFIERS the voltages will be higher with no load and the block hanging ,the voltages will be above 1.2V and below 1.9v. Maximum voltage must not exceed 4.1v with maximum lift . A voltage of .24v would indicate a problem with the amplifier or the fuse #2 is blown in the display , and a signal with no load or block hanging of 4.9v indicates that a load cell may not be connected or the cable may be damaged. A amplifier could also be bad.

4.4 Internal Amplifier Setting

To adjust the internal amplifier (used when no external amplifiers are installed), lift a load on the appropriate hoist which provides around 90% of the maximum line pull. While in the diagnostic mode, verify the voltage displayed on AIN6. Open the display box. On the top right part of the INPUT board are the amplifier jumpers. Note the arrangement and refer to table.

4.5External amplifier setting

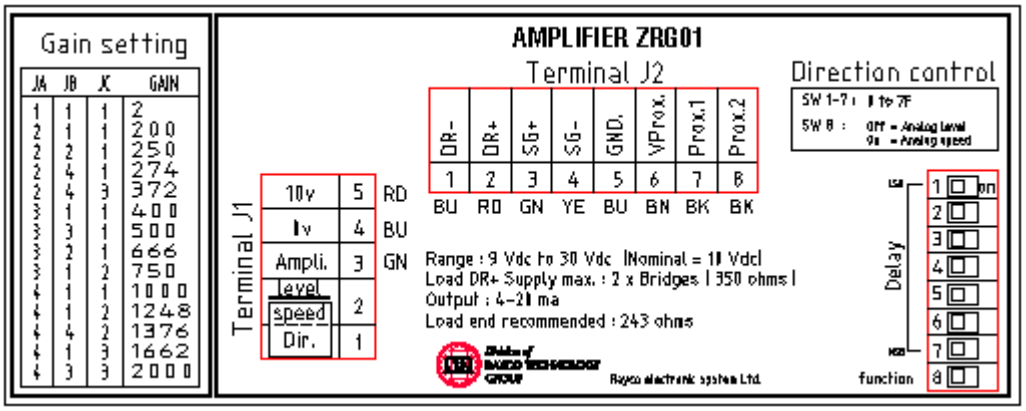
The external amplifier is usually installed on the dynamometer or on the boom nearby. There are several adjustments on external amplifiers. The voltage requirements are

slightly different with an external amplifier. The voltage on AIN6 must not exceed 4.3 volts with maximum line pull.

If the voltage is below 3 volts at max line pull, boom down completely to access the amplifier, open the box, move the jumper to the next amplifier level. Boom back up and lift the load again. If the voltage on AIN6 is too high, boom back down and replace the jumper where it was originally.

4.4 Calibration procedure

A separate manual is supplied for the calibration procedure. It is recommended to have on site technical support to perform the calibration on the first few cranes.



5. DISPLAY DESCRIPTION

5.1 Display Panel

The W1265 series, Load Moment Indicator, is a microprocessor-based system with 4 digital displays. The main function of this system is to provide visual indications of angle, load, radius, capacity, etc. The display panel is composed of a digital display screens, a needle bar graph, indicator lights, a sound alarm and a keypad.

5.2 Needle Bargraph

The needle bargraph is found directly to the side of the the display screen information. This feature allows the operator to see the percentage of the load that is being lifted when compared to the rated capacity. As the hook load approaches the maximum capacity more lights will illuminate and the needle will move towards the upper percentages.

- 0% to 84%, green range, within the set limit.
- 85% to 99%, yellow range, approaching the set limit.
- 100% to end, red range, danger, you have reached the crane's capacity.

If the crane has a lockout system, it will be activated once you have reached the red light*. However, you will be able to maneuver the crane into a safe zone by booming up, or hoisting down.

*: Although the first red light will always come on at 100% capacity, the lockout activation may have been set at a different rating like 98% or 110%.

5.3 Key Board

The system has 5 buttons. 4 of the buttons have multi function features. The 5th button is the TEST button. Pressing this button will test all the LCD's and the lights.

5.4 Indicator Lights

The 1265 has only one indicator light. It is an Anti 2 Block light indication. It is luminated if there is a Two block situation. The other lights on the display are related to the needle bar graph.

5.5 LCD Screen

The 1265 uses 4 display screens that show various information. When the power is turned on, the system automatically defaults to these screens after showing the company name and the units of display in the large lower window.

The system will always return to these screens at start-up.

This screen can also be accessed at any time while in any other function except calibration, by pressing the ESC button once or twice.

6. OPERATING INSTRUCTION

When the power is turned on, the system briefly shows the company name, then for three seconds, it displays the measuring units, and then; it goes into the normal operating mode. The normal mode displays the hook load, the rated capacity, the radius, In the larger screen various information is shown and by pressing the INFO button you can see other information such as angle, error codes etc, also the hoist used and the parts of lines.

*6.1 *** Warning ****

The Wylie Load Moment 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 an approaching overload condition that could cause damage to equipment, property, and/or injury to the operator or site workers in the vicinity of the crane and its load.

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, the crane manufacturer, and the relevant Safety Authorities. This system complies with the SAE J375, SAE J159, SAE J374.

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 W1265 must be set to the crane parameters E.G.[main boom, rooster, jib , main hoist, auxiliary hoist and parts of lines] before operating the crane.

The W1265 Series display, is not suitable for use in a hazardous (Explosive) environment and is disigned for safe cab use.

6.2 Operating procedures

At start-up the display will always go to the last configuration that has been programed into the system before it was shut off. 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 damage as a result of improper capacity. Failure to configure properly may also cause a zero capacity if no chart is found to match the configuration set by the operator.The operator must verify the crane configurations for each available hoist every time and every time the crane is rigged. The following are examples which requires the operator to reconfigure the system:

MAIN HOIST:

-Parts of lines
-Lifting over main boom

AUXILIARY HOIST:

-Parts of lines
-Lifting over main boom
-Lifting over a rooster
-Lifting with a jib

Each hoist has its own configuration set-up in memory. By pressing the DUTY or the PARTS button you can change the hoist from main to auxiliary or whip, and the configuration and number of parts of lines will also change. Therefore, the operator must select each hoist and verify the configurations and number of parts of lines.

These 2 buttons can access hoist or other configurations: **DUTY /\ #1 BUTTON OR PARTS V #1 BUTTON**.

Operator can view the boom length and height by using the **INFO** button.

Operator can override the lockout while rigging, if enabled, by pressing the **ESC** button.

The system will not indicate or account for unusual, not permitted and dangerous maneuvers. Nor will the system compensate for side load and off level situation.

Duty /\ button

Every time, the button is pressed, an additional screen appears in the larger display window, that describes a specific winch or configuration. It may also toggle between dyanamic or static lifting capacities. Continue to press the **DUTY** button until the proper configuration or winch is selected. This button also is used to scroll through various menu items in calibration or diagonostic mode. It is also used to increase values in calibration mode.

PARTS BUTTON

V This button in some versions allow the operator to change the

Parts of line but in most situations it will allow a operator to switch duties just like the DUTY button. It will also be used in calibration or in diagonostic mode to scroll down through various menu selections. It also is used to decrease values in the calibration mode.

ACKN

ENTER BUTTON

This button is used to gain acess to DIAGONOSTICS mode. In CALIBRATION mode it is used to enter into selected calibration menus and is also used to accept entered values in the calibration mode. In calibration mode it can be used to accelerate calibration values by holding the #1 or #2 button and then holding the #3 button. This will increase the values at a rapid rate so that calibrating values can be set quickly. Use this button to toggle hoist selections main, aux, whip, whip1 in the Diagonostics mode.

INFO

ESC BUTTON This button is used to gain additional information in the

larger display window on the 1265 display. Pressing this button repeatedly gains acess to information such as boom angle, error codes, etc. This button also is used in diagonistic mode to escape from that mode and in calibration mode it is used to escape from a selected program or can escape from a incorrectly entered value in calibration mode.

6.12 Quick Tricks

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

QUICK RESET:

The system can be reset by pressing the TEST button once

SPEED SETTING

When changing a value with the set buttons like a limit for instance, it may take a while to go from 20.7 feet to 150.3 feet in increments of 0.1 foot. While pressing on the **#1or #2** button, use a finger from the other hand and press on the **ENTER** button. The value now increments in feet instead of tenths of feet. Release the **ENTER** button while still pressing on the **1 or #2** button and the increments return to tenths of feet. Do not release the **#1or #2** button before the **ENTER** button or the value will be entered instantly.

7. QUICK REFERENCE SHEET

With this manual you will find the laminated sheets that apply to your system. We strongly recommend that they be installed in the cab for they were designed as an aid for new operators as well as a refresher for experienced operators. We suggest as well that a company decal be placed on the sheets with the name and phone number of the person responsible for the system. It is important for operators, especially in the case of bare rentals, to be able to get the support needed in order to ensure proper use of both the crane and the system.

8. TROUBLE SHOOTING

If the alarm sounds, it is caused by an overload, a sensor failure or there is no load chart for that radius or boom angle. 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 overloading, 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 lines, the boom/jib selection and the configurations. Verify that the capacity showing on the middle display matches with the capacity according to the load chart. All must be right. If the alarm still sounds, go to the next step.

ALWAYS INSURE THE SYSTEM IS PROPERLY CONFIGURED BEFORE SEARCHING FOR PROBLEMS WITH THE SYSTEM. MANY TIMES THE LOAD IS READING HEAVY BECAUSE THE PARTS OF LINE HAS BEEN ENTERED INCORECTLY. ALWAYS CHECK FOR THE MOST OBVIOUS PROBLEMS BEFORE SEARCHING FOR PROBLEMS WITH THE SYSTEM. IF THERE IS A PROBLEM WITH THE SYSTEM ALWAYS ACCESS THE ERROR CODE REPORT FROM THE MAIN DISPLAY MODE AND THEN DETERMINE A PLAN OF ACTION .

UNPLUGGING THE SYSTEM WILL NOT CAUSE ANY PROBLEMS WITH THE 1265 SYSTEM SINCE THE CALIBRATION DATA IS STORED IN A EEPROM CHIP.

The third step is to access the W1265 System error menu and diagnostic menu. To access the error menu, press the **INFO** button until you see the letter E> on the second line of the larger display window to the left.The letters to the right of E> on the lower line of the display are error codes. See error code section of this manual.

8.1 Error Codes

	DEFINITION	CODE
Failure due to sensor	A	Failure in sensor TX0 (MAIN)
	B	Failure in sensor TX1
	C	Failure in sensor TX2 (WHIP)
	D	Failure in sensor TX3
	E	Failure in sensor AIN0 (ANGLE SENSOR)
	F	Failure in sensor AIN1
	G	Failure in sensor AIN2
	H	Failure in sensor AIN3
Failure due (I/O)	I	Failure due to low battery
	J	Failure in DR Plus
	K	Failure in HIS Time-out
Failure due to Display	L	Failure with keypad
	M	Failure with LCD display
	N	Failure in 8255 chip
Failure due to Memory	O	Failure - Eprom busy
	P	Failure - Checksum Eprom
	Q	Failure - Checksum EEprom
	R	Failure - Checksum RAM
Failure due to chart	S	Failure - No duty Chart
	T	Configuration not calibrated
	U	Failure - Checksum Chart
	V	Failure - Invalid value detected
	W	Dimension missing

ERRORS FROM A TO H

Errors from A to H are caused by sensors, this means that the sensor is either faulty, out of the operating parameters, not connected or not calibrated. Use the diagnostic menu to see the input voltage from the sensor. See sensor specification sheet at the end of this manual for voltage and working parameters. 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.

Following is a description table of the sensors:

TX0	Load sensor on Main hoist line	Also refered to as AIN6
TX1	Load sensor on Aux hoist line	Also refered to as AIN6
TX2	Load sensor on Whip hoist line	Also refered to as AIN6
TX3	Load sensor on Whip1 hoist line	Also refered to as AIN6
AIN0	Angle Sensor	
AIN1	Length Sensor	
AIN2	Direction/Friction sensor on main hoist	
AIN3	Direction/Friction sensor on auxiliary hoist	

ERROR I

Errors I comes from low voltage input. Use a voltmeter and verify the power supply voltage. The minimum acceptable is 11 volt DC.

ERROR J AND K

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.

ERROR L

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

ERROR M

The screen failed 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 or on site service is recommended.

ERROR N

The 8255 chip is the driving chip for all the display indicator lights. If there is a spike in the supply or lockout voltage, the 8255 will momentarily reset causing all the lights on the display to light. Adding a diode on the lockout wires to the ground and/or a capacitor on the supply can reduce this. This minor error does not prevent normal system functionning.

ERROR O, P, Q, R

Errors show internal memory failure: tech. support or on site service recommended.

ERROR S

The system cannot find a chart for the configuration selected. For example, selecting a Pick and Carry and JIB 32FT leads the system to Error S since there is no chart for that configuration. Configure the crane properly.

Another case is where the boom length exceeds the maximum boom length specified in the chart. This can happen if the reeling drum wire sags when fully telescoped. This problem can be resolved by changing the OD-LENGTH value in the calibration mode.

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.

ERROR U, V

These errors will appear when changing CHIPs containing charts and 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.

ERROR W

This error appears on calibrating radius and boom moment before completing the dimensions menu.

8.2 Diagnostic Menu

ACCESS

Press the **ENTER** button one time and the larger lower screen will show the diagnostic menu.

Diagnostic
1265 Ver: 2.01

Press button number 2 (**DOWN V**) to scroll down through the various diagnostic informations.

1250 Ver: 3.00
96/03/14 6

THIS IS THE OPERATING SOFTWARE WITH VERSION DATE AND TIME OF ISSUE. THIS INFORMATION IS IMPORTANT WHEN CALLING FOR

TECHNICAL SUPPORT OR MAKING CHANGES IN CHARTS OR UPGRADING THE OPERATING SYSTEM. THIS MANUAL IS WRITTEN FOR THE OPERATING SOFTWARE 1265 VERSION 2.01, ISSUED APRIL 14, 2000.

95/12/12 13:15
Ain0: 1.70V >.1

ANGLE

AIN0 is the angle sensor voltage, it must be above 0.1 Volt, 0.3 Volt to calibrate. The exact voltages will vary from one model of angle sensor to another. Refer to your angle sensor specification sheet. The important thing is that there is an increase of at least 1.0 Volt from 0 degree to 70 degrees and that the voltage varies at any angles and never exceeds 4.8 Volts. The sensors used for UNOCAL will have a voltage of 1.85v at 0 degrees.

Ain0: 1.70V >.1
Ain1: 0.56V >.1

LENGTH (NOT USED FOR UNOCAL)

AIN1 is the length sensor voltage, it must be above 0.1 Volt, 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 must be an increase of at least 0.015 Volt per foot and that the voltage varies at any length and never exceeds 4.8 Volts.

Ain1: 0.56V >.1
Ain6: 0.51V >.1

LOAD SENSOR

AIN6 is the load sensor voltage, it must be above 0.1 Volt, 0.3 Volt to calibrate and with a amplifier the voltage will be above 1.2v. For systems used on UNOCAL, this voltage will be 1.6 to 1.8v with block hanging. AIN6 is the only load sensor voltage available; it can represent the main hoist, the auxiliary, the whip or the whip1. The voltage displayed is that of the selected hoist in the operating mode or in the diagnostic mode (see Hoist: 1 = Main on next page). UNOCAL cranes all use a load amplifier for main and whip sensors.

The exact voltages will vary from one model and size of load sensor to another. Refer to your load sensor specification sheet. The important thing is that there must be an increase of at least 2.500 Volt from no load to maximum line pull and that the voltage varies with any load, even the headache ball.

If the signal is out of range or too low with maximum line pull, see amplifier adjustment in the installation section. If a voltage of .24 v is shown on the selected load cell, it would indicate that the suppy voltage to the amplifier is interupted or there is a problem with the amplifier or gain settings on the amplifier board.

If the voltage is above 4.9 Volt with no load, one wire may be cut or open. See load sensor trouble shooting specification.

Ain6: 1.61V >.1
DR+ : 5.08V >.1

SENSOR SUPPLY DR+

The DR+ is the sensor supply voltage. It normally indicates 5.05 Volts plus or minus 0.08 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.

DR+ : 5.08V >.1
HSI0 : 361 bits

HSI

This value is the HSI0 is the high precision input for the load sensor. Just like AIN6, the HSI0 is used for all the load sensors. Instead of using a voltage input into the processor a bit count with a raw resolution of 1023 increments is used. The HSI, which stands for High Speed Input and uses a frequency conversion. Combined with the microprocessor's micro second timer, the frequency can be timed into 2100 increments while using only 60% of the signal. Once the raw resolution is averaged and filtered, a resolution of 4000 increments with reading stability and fast response is achievable.

.

Bit 0 1 2 3 4 5 6 7
Din:0 1 1 0 0 0 0 0

DIN (DIGITAL INPUTS)

Din stands for Digital Input. There are 8 digital inputs or commonly called switch inputs. Only four 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) for example, Din 0 is ground, Din 1 is positive, Din 2 is positive and Din 3 is ground. 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; each or all of the input switches can be reversed to default to 0V instead of VP.

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. On all UNOCAL cranes this option is not used.

THE FOLLOWING OPTIONS ARE NOT USED ON UNOCAL CRANES

Digital input 1 is used for the main slew switch. When grounded, it usually signifies over front or over rear. If the charts are included in this manual, you will notice 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.

Digital input 2 is used for special programs. One example is a man basket application where the man basket is bolted to the boom. When this switch is ground, the system no longer relies on the load sensor input for the displayed load. Instead it uses a fixed value set during calibration and selects a specific chart for man basket operation.

Digital input 3 is used for bypass activation and when grounded, showing 0 on the screen, the operator can use the **#4 or ESC** button to override the lockout and external alarm.

All the digital inputs positive source comes from the VP terminal. The VP terminal is used for powering switches, proximity switches and external amplifiers only. The VP or Voltage Positive is a fused power supply source. The fuse for VP is the lower one in the control unit. If the fuse blows, all digital inputs turn to 0. Therefore, the two-block alarm will be on, the over side capacity chart will be used, the hook load will show the man basket value or 0.0 and bypass with be available.

Diagnostic Menu
Hoist : 1 = Main

HOIST

This is a quick access to the hoist selection while in the diagnostic mode. Use the **#3** buttons to change hoist and verify the voltage input on AIN6 and the HSI input. Changing hoist here will change the hoist in the operating mode but not the parts of lines and the configuration. Using the #1 **DUTY** button in the operating mode will reestablish the proper settings.

Diagnostic Menu
1000000000000000

On this screen, a number occupies every bottom space. Either 0, 1, 2 or 3. 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. 1 indicates that P1 and P2 are calibrated. 2 indicates that P3 and P4 (no load deflection) are calibrated. 3 indicates that the loaded boom deflection has been performed.

Diagnostic Menu

ChartNum: 1

CHART NUMBER

This is the chart number. For programming use only.

Diagnostic Menu

HashValue: 16

BINARY CHART VALUE

This value is used only during programming of charts.

Diagnostic Menu

XV5347A.SRC

FILE NUMBER

This is a file number containing the programmed charts. If any problem with selection of charts, selection text and capacity value occurs, refer to this file to verify and make the corrections. This file is kept by the local manufacturer's office where the system originated.

Press ESC to return to the primary display. You can press the ESC button at any point while in the diagnostic mode to return to the primary display or press the #1 button to view previous information.

9. ROUTINE MAINTENANCE

CLEANING

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

If cleaning the dynamometer, dismantle the load cell and wipe clean with a cloth. Use of a solvent is not recommended on a loadcell. The dynamometer can be soaked in solvent. Change the bearings if contaminated or clean thoroughly and re-grease. The bearings are standard 6005 or 6006 and are relatively easy to replace.

WIRES

Verify all the wires for cuts or damages. Replace if needed.

DYNAMOMETER

Grease all the grease nipples every three months or every 500 hrs. Verify that the sheaves are turning freely. Verify that all bolts are tight .

DISPLAY

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

PERFORMANCE CHECK

Verify the accuracy of the system every day and every 6 months or 1000 Hr. See next section: Performance Check for accuracy requirements and procedures.

10. PERFORMANCE CHECK

DAILY

Before or at the beginning of every shift, configure the system properly and verify the weight of the hook block with every hoist, the radius with the boom selection used, the angle and the capacity. See section below for tolerances.

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.

Use the periodical test sheet included to record information such as owner's name, the crane manufacturer, crane serial number, system model, system serial number, crane configuration at time of test, system configuration at time of test, location of the load sensor, a statement that the system meets the requirements, signature of the person testing, etc.

Rig with enough parts of lines to lift the large weight. Fully retract the boom and boom up to the maximum, measure and record the radius, the hook weight and the angle. Note the displayed angle, radius, length, hook weight, parts of lines and capacity. Lift the large weight. Record the actual weight with the hook and rigging attachment. Note the

displayed weight after performing a hoist down and stop. Note the average, the low and the high value. Perform a hoist up and stop and note the same data. Boom down slowly until the alarm sounds. Note the actual and displayed radius. Put the load down.

Rig with enough part of lines to lift the small load. Telescope out fully and boom down to 45 degrees. Measure and record the radius, the hook weight and the angle. Note the displayed angle, radius, length, hook weight, parts of lines and capacity. Lift the small weight. Record the actual weight with the hook and rigging attachment. Note the displayed weight after performing a hoist down and stop. Note the average, the low and the high value. Perform a hoist up and stop and note the same data. Boom down slowly until the alarm sounds. Note the actual and displayed radius. Put the load down.

ANGLE

The angle displayed on the indicator must be between zero and two degrees below the actual angle.

RADIUS

The displayed radius must be between zero and 10% greater than the actual radius.

LOAD

The displayed weight with the load must be between zero and 10% greater than the actual load. For the hook block, the weight must be between zero and 200 lbs of the actual hook block weight.

PERIODICAL TEST SHEET

Owner's name	
Crane manufacturer	
Crane serial number	
System model	
System serial number	
Crane configuration at time of test	
System configuration at time of test	
Location of the load sensor	
Signature of the person testing	
Test date	
Statement that the system meets the requirements:	

	Minimum Radius	**Maximum Radius**
Actual Radius		
Displayed Radius		
Difference		
Percent		
Actual Boom Length		
Displayed Length		
Difference		
Percent		
Actual Angle		
Displayed Angle		
Difference		
Actual hook weight		
Displayed Hook Weight		
Difference		
Actual capacity		
Displayed Capacity		
Difference		
Actual test weight + rig + hook		
Displayed Hst Dwn average		
Displayed Hst Dwn high		
Displayed Hst Dwn low		
Displayed Hst Up average		
Displayed Hst Up high		
Displayed Hst Up low		
Difference		
Percentage		
Load moment alarm Radius		
Allowed actual radius		
Difference		
Percent		

REFERENCE TABLES

The following tables were presented previously in this manual. They are reproduced here for fast reference purpose.

Control Wiring

Din	Description
0	Anti-two-block
1	Used for Duty Selection from slew switch
3	Used for special duty selection when needed
4	Used for Motion Cut Bypass

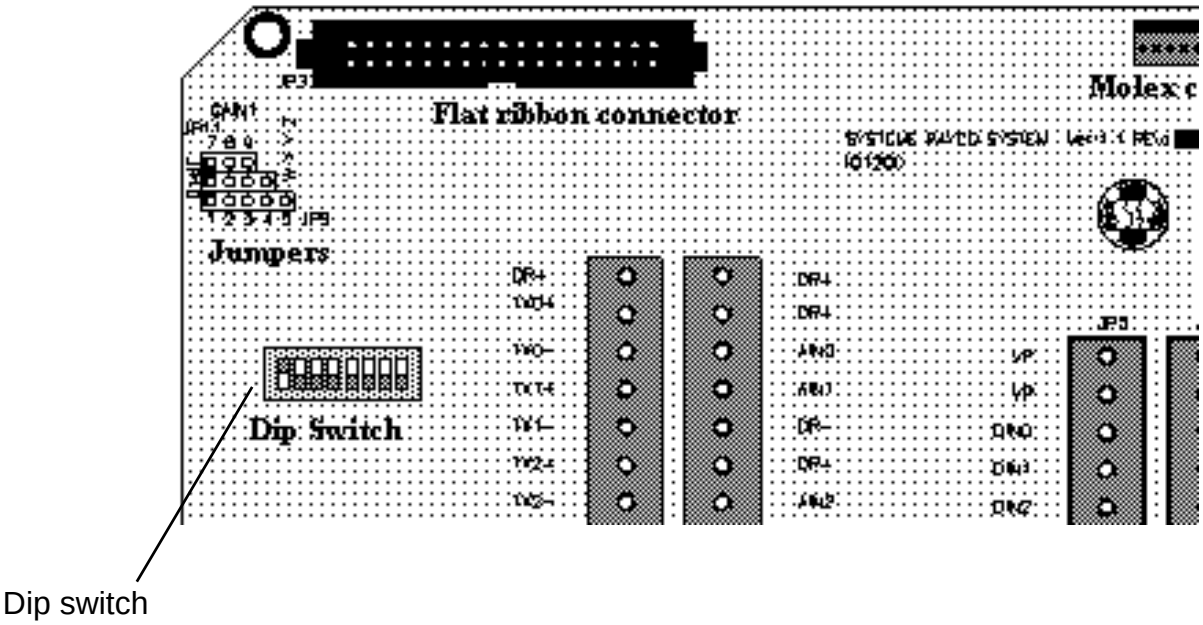
Ain	Description
0	Boom Angle
1	Boom Length
2	Direction sensor main hoist
4	Direction sensor aux. Hoist

TX	Description
0+	Positive signal of the load sensor on main hoist
0-	Negative signal of the load sensor on main hoist
1+	Positive signal of the load sensor on aux. hoist
1-	Negative signal of the load sensor on aux. hoist
2+	Positive signal of the load sensor on whip1 hoist
2-	Negative signal of the load sensor on whip1 hoist
3+	Positive signal of the load sensor on whip2 hoist
4-	Negative signal of the load sensor on whip2 hoist

Dip Switch

SWITCH	STANDARD	REASON
Dip switch 1:	ON	Always on
Dip switch 2:	OFF	Always off
Dip switch 3:	OFF	Always off
Dip switch 4:	OFF	Always off
Dip switch 5:	ON	Off only if a fourth load sensor is installed
Dip switch 6:	ON	Off only if a third load sensor is installed
Dip switch 7:	OFF	Only if AUX. load sensor has a 4-20 mA input
Dip switch 8:	OFF	On only if main load sensor has a 4-20 mA input

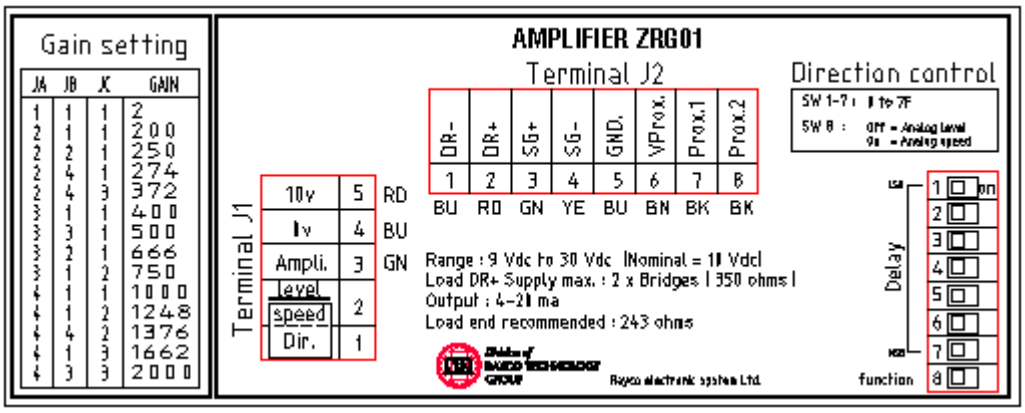
The dip switch box is located on the INPUT BOARD:



Internal Amplifier

Configuration	Connections	Gain

External Amplifier



Key Board

Indicator Lights

Symbol	Warning Light Functions
	THIS OPTION IS BYPASSED ON THE 1265 SYSTEM

Error Code

	DEFINITION	CODE
Failure due to sensor	A	Failure in sensor TX0
	B	Failure in sensor TX1
	C	Failure in sensor TX2
	D	Failure in sensor TX3
	E	Failure in sensor AIN0
	F	Failure in sensor AIN1
	G	Failure in sensor AIN2
	H	Failure in sensor AIN3
Failure due to Board (I/O)	I	Failure due to low battery
	J	Failure in DR Plus
	K	Failure in HIS Time-out
Failure due to Display	L	Failure with keypad
	M	Failure with LCD display
	N	Failure in 8255 chip
Failure due to Memory	O	Failure - Eprom busy
	P	Failure - Checksum Eprom
	Q	Failure - Checksum EEprom
	R	Failure - Checksum RAM
Failure due to chart	S	Failure - No duty Chart
	T	Configuration not calibrated
	U	Failure - Checksum Chart
	V	Failure - Invalid value detected
	W	Dimensions missing