



**HIRSCHMANN**

**PRS 35 EZ**



**OPERATOR'S / SERVICE MANUAL**

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## 1 GENERAL INFORMATION

The PAT PRS 35 EZ System has been designed to provide indication from various types of sensors, i.e. A2B, Load, Wind and Angle.

The A2B system will warn the crane operator of a two-blocking condition of the crane. If a two-blocking condition is approached, the system will warn the operator by sounding an audible alarm, flashing the backlit LCD and locking out those functions which may aggravate the crane's condition, whenever applicable.

If the system is set up for load, angle or wind, limits can be set by the user. When these limits are exceeded the system will warn the operator by sounding an audible alarm, flashing the backlit LCD and de-energize the lockout relay.

The system relay can be connected to the cranes lockout system. If so, the system will lock out when exceeding any of the user limits.

**NOTE:** The term "two-block" is a crane term that refers to a condition when the load handling device comes in contact with the boom head. This condition, if not prevented, may cause the wire rope to break, allowing the load to fall. Either raising the load into the boom head, or telescoping the boom out without paying attention to the hoist line can cause a "two-block" condition.

## 2 WARNINGS

The PAT PRS 35 EZ System is an operational aid, which warns a crane operator of approaching two-block conditions, which could cause damage to equipment and personal injury.

This device is not, and must not be a substitute for good, sound operator judgment, experience and use of accepted safe crane operating procedures.

The responsibility for the safe operation of the crane remains with the crane operator who must ensure that all warnings and instructions supplied are fully understood and observed.

Prior to operating the crane, the operator must carefully and thoroughly read and understand the information in this manual to ensure that the operation and limitations of the system and the crane are known.



**The system can only work correctly, if all sensors/transmitters have been properly set. For correct setup, the operator has to answer thoroughly and correctly all questions asked during the setup procedure in accordance with the real rigging state of the crane. To prevent material damage and serious or even fatal accidents, the correct adjustment of the system has to be ensured before starting the crane operation.**

**Always refer to operational instructions and load charts provided by the crane manufacturer for specific crane operation and load limits.**

### 3 FEATURES

The PAT PRS 35 EZ has the following features:

- Can be hardwired to most PAT sensors.
- Wireless operation option of multiple sensors.
- Easily and clearly shows the operator required information.
- Multi language. The system can be setup to display text in both English and Spanish.
- Multiple limits can be set.
- Minimum of 500 feet LOS.
- Can display in multiple units.
- Built in lockout relay. Rated at 5 amps
- Tare function.
- Low battery indication.
- Expandable
- Direct replacement for the EI33

### 4 SYSTEM DESCRIPTION

#### 4.1 CONSOLE

The console has 2 functions:

- Accepts inputs from the crane operator (reeving, limits and setup)
- Displays important data and information from the sensors

The operator's console should be mounted in the operator's field of vision.

##### 4.1.1 Liquid Crystal Display

The Liquid Crystal Display (LCD) used in the PAT PRS 35 EZ console is a wide temperature-range graphic display with transfective characteristics that give it a high visibility in sunlight and during backlit night operation. Due to the nature of any LCD, it works on the principle of polarization of light. It should be noted that dual polarizations that are at a certain angle to each other can reduce the amount of light up to completely eliminating it if that angle becomes perpendicular. This can have significance if the operator is wearing polarized sunglasses that happen to be perpendicularly polarized in relation to the LCD's polarization. In this rare case, the operator has to work without sunglasses or find different sunglasses that do not have this characteristic, in order to avoid having the visibility of the display impaired.

The LCD contains an automatic temperature compensation that will adjust the LCD's contrast according to the surrounding temperature.

## 4.1.2 Control Identification

This unit contains a display and different controls that are described as follows:

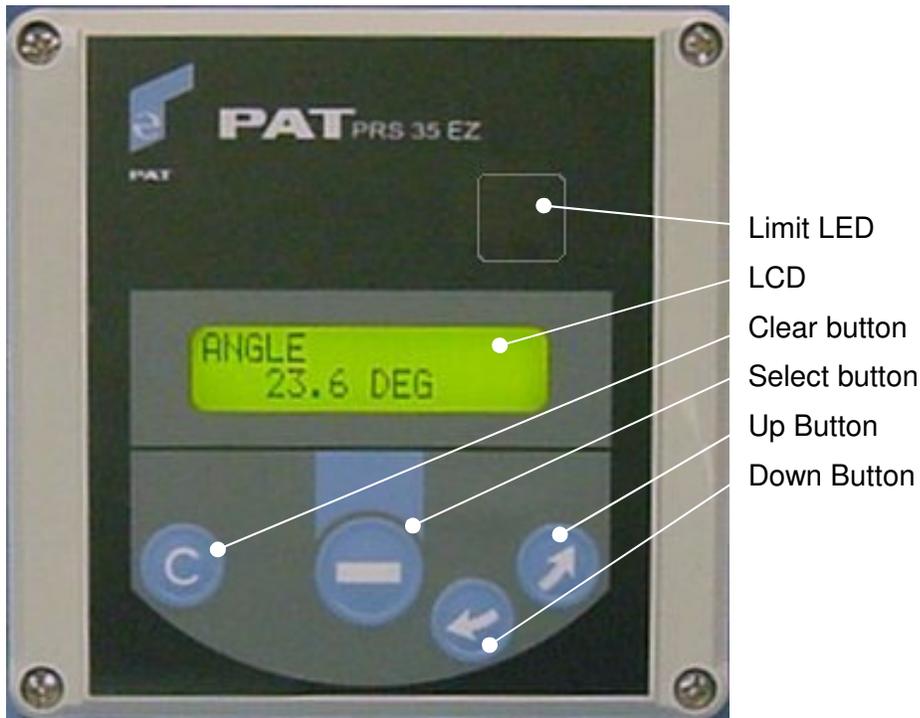


Fig 2: Operator's Console

### Button "SCROLL UP"



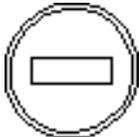
- Use this button to increase values or to scroll up.
- Changes which sensors are displayed and how each is displayed.

### Button "SCROLL DOWN"



- Use this button to decrease values or to scroll down.
- Changes which sensors are displayed and how each is displayed

### Button "SELECT"



- Use this button to enter the menu screen and to confirm selections.

**Button "C"**

- Generally used to back out of a selection and return to the previous screen.
- Pushing this button for more than 1 second will bypass the control lever lockout function of the system.
- Accesses the Tare function



Since button C can deactivate the lockout function of the system, the following instructions must be obeyed:

- **The by-pass function shall be used with discretion, as unwarranted use of it to override the control lever lockout system can result in harm to the crane and danger to property and persons.**
- **Never use the by-pass function to either overload or operate the crane in a non-permissible range.**

**4.2 OPERATION**

Upon switching on crane ignition switch, the system starts with an automatic test of the system, of lamps and audible alarm. During the test, the LCD shows the console and system software version. The PRS 35 EZ setup procedure allows the operator to input the sensors being used and the limits for the sensors. The operator must complete the setup procedure for each sensor.

## 4.2.1 MENU STRUCTURE



SETUP
<ul style="list-style-type: none"> <li>• <b>REEVING</b></li> </ul>
<ul style="list-style-type: none"> <li>• <b>LIMITS</b> <ul style="list-style-type: none"> <li>○ <b>ANGLE</b> <ul style="list-style-type: none"> <li>MIN</li> <li>SELECTION</li> <li>MAX</li> <li>SELECTION</li> </ul> </li> <li>○ <b>WINDSPEED</b> <ul style="list-style-type: none"> <li>SELECTION</li> </ul> </li> <li>○ <b>LOAD</b> <ul style="list-style-type: none"> <li>MAX LOAD</li> </ul> </li> <li>○ <b>LINERIDER</b> <ul style="list-style-type: none"> <li>SELECTION</li> </ul> </li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>CALIBRATIONS</b> <ul style="list-style-type: none"> <li>○ <b>ANGLE</b> <ul style="list-style-type: none"> <li>ZERO POINT</li> </ul> </li> <li>○ <b>LOAD 0-POINT</b></li> <li>○ <b>LOAD RANGE</b> <ul style="list-style-type: none"> <li>LOADCELL TYPE</li> <li>7.5 TON</li> <li>10 TON</li> <li>22.5 TON</li> </ul> </li> <li>○ <b>LINERIDER 0</b></li> <li>○ <b>LINERIDER ADJ</b></li> </ul> </li> </ul>

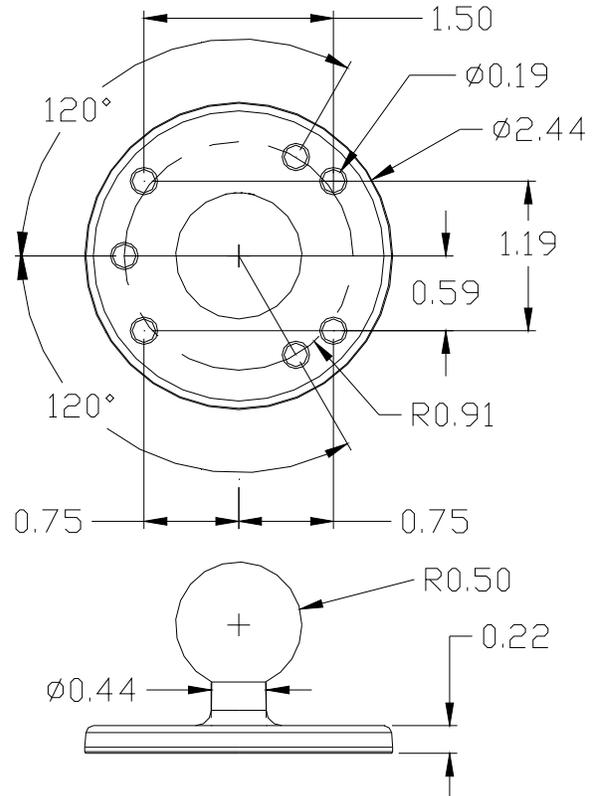
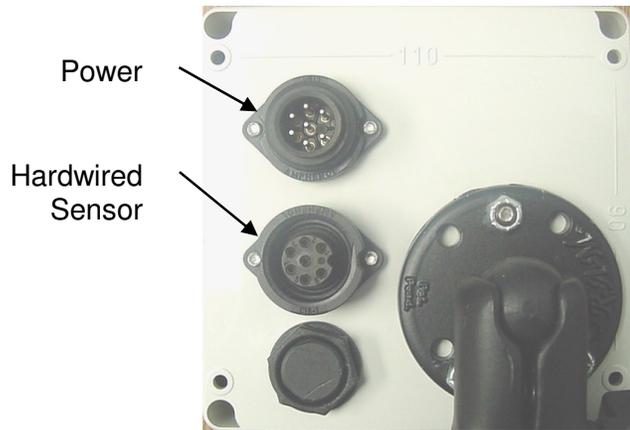
SETUP CONT'
<ul style="list-style-type: none"> <li>• <b>SENSORS</b> <ul style="list-style-type: none"> <li><b>INSTALL / REMOVE</b> <ul style="list-style-type: none"> <li>○ <b>ANGLE</b> <ul style="list-style-type: none"> <li>NOT INSTALLED</li> <li>HARDWIRED</li> <li>HIRSCHMANN</li> <li>KRUEGER</li> <li>RADIO</li> </ul> </li> <li>○ <b>A2B1</b> <ul style="list-style-type: none"> <li>NOT INSTALLED</li> <li>HARDWIRED</li> <li>RADIO</li> </ul> </li> <li>○ <b>A2B2</b> <ul style="list-style-type: none"> <li>NOT INSTALLED</li> <li>HARDWIRED</li> <li>RADIO</li> </ul> </li> <li>○ <b>WINDSPEED</b> <ul style="list-style-type: none"> <li>NOT INSTALLED</li> <li>HARDWIRED</li> <li>RADIO</li> </ul> </li> <li>○ <b>LOADCELL</b> <ul style="list-style-type: none"> <li>NOT INSTALLED</li> <li>HARDWIRED</li> <li>RADIO</li> </ul> </li> <li>○ <b>LINERIDER</b> <ul style="list-style-type: none"> <li>NOT INSTALLED</li> <li>HARDWIRED</li> <li>RADIO</li> </ul> </li> </ul> </li> </ul> </li></ul>
<ul style="list-style-type: none"> <li>• <b>OPTIONS</b> <ul style="list-style-type: none"> <li>○ <b>TEST SEQUENCE</b></li> <li>○ <b>LB/MPH OR KG/KPH</b></li> <li>○ <b>ENGLISH OR SPANISH</b></li> <li>○ <b>CONTRAST</b></li> <li>○ <b>ANALOG INPUT ma/volts</b></li> </ul> </li> </ul>

### 4.2.2 Installation

The console has a mount that allows the console to be swiveled into any direction and to be mounted in a variety of locations and on nearly any surface.

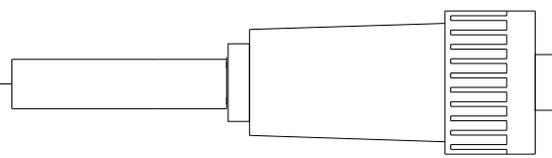
Choose a location that is in view and within reach of the operator. If radio sensors are being used, locate in line of site with the sensor. Securely attach the base of the mounting apparatus onto a solid surface.

The power supply can be from 12- 24 volt DC. The lockout wire supplies power to operate external solenoids, or relays. The rating of the lockout is 5 amp. An internal fuse protects against overloading this circuit.



POWER	1
GROUND	2
LOCKOUT	3
NA	4
NA	5
NA	6

CONSOLE CONNECTOR 1



1	RED	X1	10-30VDC
2	BLACK	X2	GROUND
3	YELLOW	X3	LOCKOUT NO
4			NA
5			NA
6			NA

WIRE LENGTH 6"

CONSOLE CONNECTOR 2

1	RED	X4	+ Ub
2	ORANGE	X5	+5 Vdc
3	YELLOW	X6	Sensor In
4	GREEN	X7	KGnd
5	BLUE	X8	A- Gnd
6	WHITE	X9	Digital In

WIRE LENGTH 6"

Power cable connections

## 5 ANGLE

### 5.1.1 Operation

When an angle sensor is installed either with radio or hardwired the function of the console is the same. The angle is displayed in tenths of a degree



When other sensors are installed, they can be shown on other screens. These screens can be accessed with the up/down arrows.

### 5.1.2 Limits

The limits are set by selecting



SETUP/ LIMITS/ ANGLE

There is then the choice to set the minimum angle limit or the maximum angle limit.

To set the limit:

- Select the desired limit to set.
- Move the boom to desired angle.
- Press enter.

The angle limits can be cleared without moving the boom to the desired angle. To clear the angle limit without booming to the angle:



SETUP/ LIMITS/ ANGLE/ MINIMUM

Press and hold the down arrow,



. The limits will change to -5 degrees.



SETUP/ LIMITS/ ANGLE/ MAXIMUM

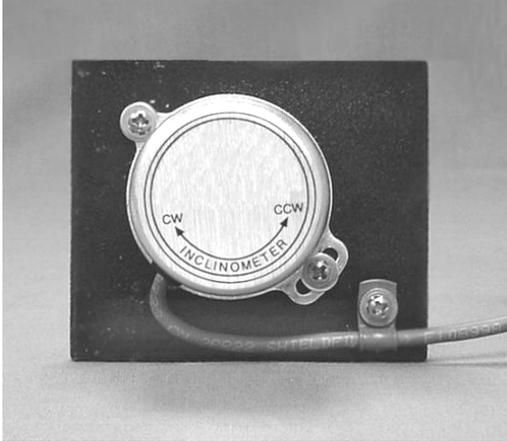
Press and hold the up arrow,



. The limits will change to 90 degrees.

### 5.1.3 Installation / Calibration Hardwired

Attach the supplied angle sensor mounting plate to the left side of the boom. Note the orientation of the plate from the photo below. If you are going to weld the plate to the boom, remove the angle sensor from the plate. Do not weld near the angle sensor. It will be damaged by welding.



Install the angle sensor to the plate with #6-32 screws and washers.

Clamp the cable with the supplied clamp and #6-32 screw and washers.

Route the cable from the boom to the console and insert the connector. Loop any extra cable length and store in a safe location.

#### Hardwired (HIRSCHMANN)

This is the setup for the standard Hirschmann angle sensor. This angle sensor has a digital output.

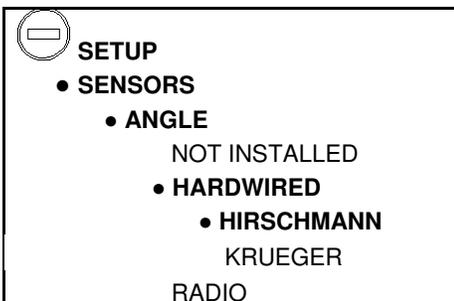
The angle sensor must be previously installed.

Use the setup screens to add the angle sensor to the system.

Select the "HIRSCHMANN" from the following menu.



MENU/ SENSORS/ ANGLE/ HARDWIRED/ HIRSCHMANN

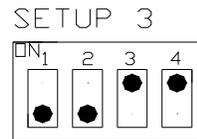


## Hardwired (Kruger)

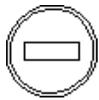
Note for older system updates, use the hardwired option. For example if replacing a Krueger AP console and using the existing sensor, select the **hardwired** option.

Set the internal DIP switch to:

Voltage Angle sensor -        **SETUP 3**



Select the "HARDWIRED" from the following menu.



MENU/ SENSORS/ ANGLE/ HARDWIRED/ KRUEGER

### 5.1.4 Calibration

Both the radio and the hardwired sensors are calibrated with the same procedure. The angle sensor is pre-calibrated at the factory, but it still must be matched to the boom angle. A level, accurate to +/- .2 degrees must be used to set the boom to a known angle.

Go to the menu for calibration of the angle:



MENU/ SETUP/ CALIBRATION/ ANGLE

1. Once the boom angle is determined and the sensor is securely mounted, enter the angle setting screen. This screen is used to match the angle sensor to the angle of the boom.
2. Scroll to the correct angle and press OK.

The calibration and set up of the sensor is then complete.

## 5.2 ANGLE

This procedure describes how to install and setup a radio angle transmitter.



**WARNING**

**CONTACT CRANE MANUFACTURER FOR WELDING INSTRUCTION PRIOR TO WELDING ON BOOM.**



Angle sensor, transmitter, and mounting plate.



The angle sensor will be mounted on the side of boom so as the boom angle changes, the angle sensor can rotate as shown in the 0°(left) and 90° (above) positions.

### General information

The angle sensor total range is approximately 105° and the zero point is adjustable in the software in the angle calibration menu. With no software adjustment, the angle range will allow a -15° to 90° range, but if the angle sensor is zeroed at -5° (-5° becomes 0°) your angle range will be -10° to 95°. Therefore, when affixing the mounting plate to the boom, make sure you will be able to get your desired angle range for your application.

1. Locate an appropriated flat surface area on the boom base section or luffing jib root section. Avoid the installation close to moving parts or parts that could interfere during boom hoist up and down. Lower the boom into position that will allow you to safely install the angle sensor.

Notes: The antenna must point down and not up. Do not install angle sensor on hot mounting plate, temperatures greater than 125°F (52°C) this could damage the angle sensor and/or transmitter.

2. Measure the boom angle by using a digital inclinometer (i.e. smart level) at the area selected in step 1. Align the mounting plate as defined by the decal or so the mounting holes pointing down as shown in the pictures above. Affix the mounting plate onto the area. Clean, prime, and paint the mounting plate if necessary.
3. Remove the angle sensor cover by loosen the four screws in the cover. Check the gasket to insure it is not damaged. Remove the batteries. Align the 4 holes with the mounting plate threaded holes and screw the angle sensor onto the mounting plate by using the four screws supplied in the kit. Attach the antenna to the connector by carefully rotating the antenna clockwise
4. On the console, setup the sensor by using the menu selection:  
MENU SETUP/SENSORS/ANGLE 1 or 2. In the setup process you will be asked to insert the batteries while the receiver searches for the transmitter. Install batteries correctly as shown on the label in the battery compartment. When the sensor has been found, confirm the angle sensor has been installed. Return angle sensor cover and tighten the four cover screws carefully.
5. On the console, calibrate the angle by using the menu selection:  
MENU SETUP/SENSORS/ANGLE (1 or 2 as defined above)/ZERO POINT. After making this selection, measure the boom angle by using a digital inclinometer (i.e. smart level), scroll to the correct angle and press OK. The calibration and set up of the sensor is now complete.
6. Check the angle of the main boom at 0°, 40°, 60°, and 70° and compare it with the measure value. It should be  $\pm 1^\circ$ . If it is incorrect, repeat step 5, calibrate the angle sensor again, and verify the actual angle and/or use a different/higher angle (50°) to scroll to and match the angle.

## 6 A2B

### 6.1.1 Operation

When an A2B switch has been installed, the status of the switch is always shown. If other sensors are installed besides the A2B, the A2B status will be shown on the right side of the display.

A2B OK



#### 6.1.1.A PRE-OPERATION INSPECTION

Before operating the crane, the following electrical connections must be checked to ensure that the system is properly connected for the crane configuration.

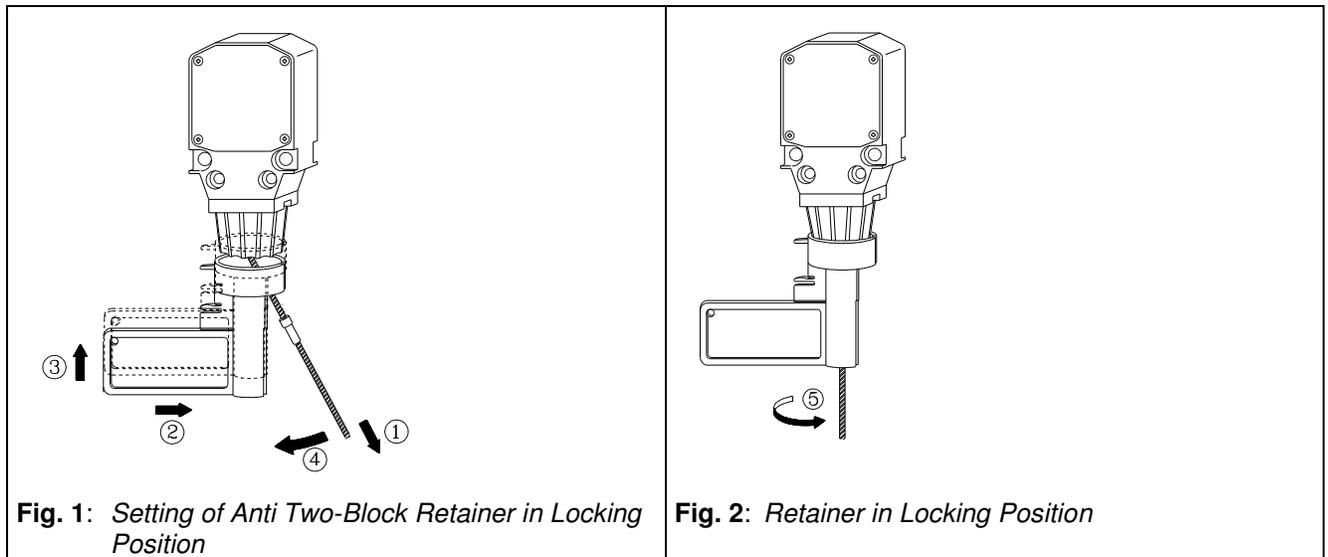
With even parts of hoisting line, the weight shall be attached to the dead-end line. With odd parts of hoisting line, the weight shall be attached to the line of lowest speed.

A separate A2B weight and transmitter must be used for each hoist that is in use. The Retainer flag, if equipped, must be removed from each switch that is in use. Switches that are not in use should either be removed from the system or must have the retainer flag installed.

Anti-Two-Block Retainers (optional)

#### Installation of Anti Two-Block Retainer in Locking Position Procedure (see Fig. 1 and 2):

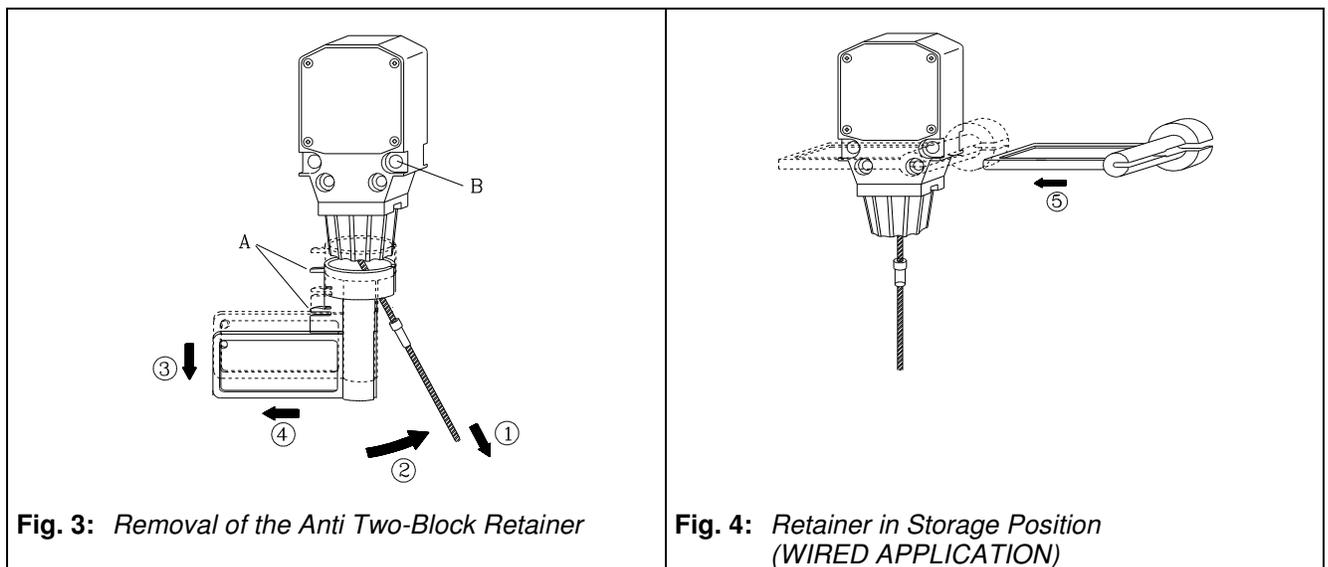
1. Pull the cable out of the switch and bend back parallel to the boom and hold (1).
2. Slide the retainer from left side with its slot over the cable between the crimped stop and the switch (2). Push it firmly straight onto the cable guide of the Anti Two-Block switch (3).



3. Straighten the cable completely into the slot and release the cable (4).
4. Turn the flag of the retainer for best visibility for the operator (5).

#### Removal and Storage of the Anti Two-Block Retainer Procedure (see Fig. 3 and 4):

1. Pull the cable out of the switch (1) and bend back parallel to the boom and hold (2).
2. Move the retainer down (3) and then left (4) to remove it from the Anti Two-Block switch. Release the cable.
3. For storage slide the retainer from right side (5) over the Anti Two-Block switch until the clips (A) lock into the holes (B).



After the electrical connections have been checked to insure that the system is properly connected for the crane configuration, the following checks shall be made:

1. Check the electrical wiring connecting the various parts of the system for physical damage.
2. Check the anti two-block switches and weights for free movement.



**The following tests shall be performed with care to prevent damage to the machine or injury to personnel. Proper functioning of the system requires successful completion of these tests before operating the machine.**

If the operator cannot see the load-handling device approaching the boom nose, he shall have an assistant (signal person) watch the load-handling device. The operator shall be prepared to stop the machine immediately should the system not function properly as indicated by flashing the warning symbol, sounding the audible alarm and locking the crane movements, hoist up, telescope out and boom down. ( if lockout is installed)

Check the anti two-block alarm by performing one of the following tests:

- a. By manually lifting the weight attached to the anti two-block switches. When the weight is lifted, the audible alarm should sound, the anti two-block alarm display should flash.
- b. Slowly raise the main boom load-handling device to create a potential two-block condition. When the load-handling device lifts the weight, the audible alarm should sound, the anti two-block alarm display should flash and the motion of the load-handling device should be stopped. Lower the load-handling device slightly to eliminate this condition.
- c. Slowly lower the boom to create a potential two-block condition. When the load-handling device lifts the weight, the audible alarm should sound, the anti two-block display should flash and the boom lowering function should be stopped. Lower the load-handling device slightly to eliminate this condition.



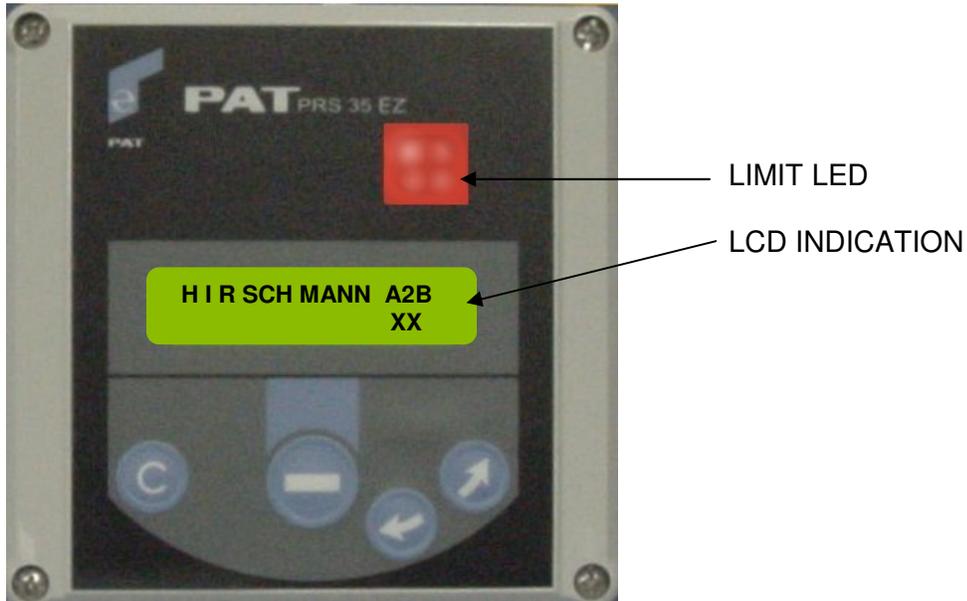
**If the A2B warning symbol fails to flash and audible alarm does not function as described and the crane movements are not stopped, the system is not working properly. The malfunction shall be corrected before operating the crane.**

5. If the crane is equipped with a boom extension, repeat the test procedure for the boom extension anti two-block switch.

### 6.1.2 A2B limit

When the A2B limit is exceeded, the relay will disengage. The display will show A2B XX and the red LED will light. The audible alarm will sound. The limit for the A2B is fixed by the chain length and can not be altered.

A2B warning.



### 6.1.3 Installation

#### 6.1.3.A Transmitter / Switch

The transmitter and battery housing are made of a special polymer that resists damage from impact and will not become brittle even in low temperatures.



### 6.1.3.B Transmitter LED

The transmitter has an LED on the bottom for diagnostics. The LED should be on when in a two-block condition or when the weight is lifted. The LED will flash rapidly during a 2-block condition and will stop flashing after the switch is in a two-block condition for more than 15 seconds. The LED will flash randomly approximately every 2 seconds when the switch is transmitting. When in sleep mode, the LED will not flash. When the transmitter is power up (batteries removed and replaced) the transmitter LED will be on for 1 second to indicate the transmitter is setup for an A2B switch.

### 6.1.3.C Travel position (optional)

Designed into the transmitter plate is a small hole into which a hook can be installed. This can be used to fasten the chain. This hook is used to open the switch and put it into a permanent 2-block condition. This serves 2 functions.

1. It extends battery life.
2. It prevents the lockouts and alarms from engaging and disengaging due to bounce while traveling.

The system is in permanent lockout and the system will not function until the chain is unhooked. To use the feature, attach any part of the chain into the hook. When it is desired to use the switch again, simply unhook the chain to allow the switch to close.

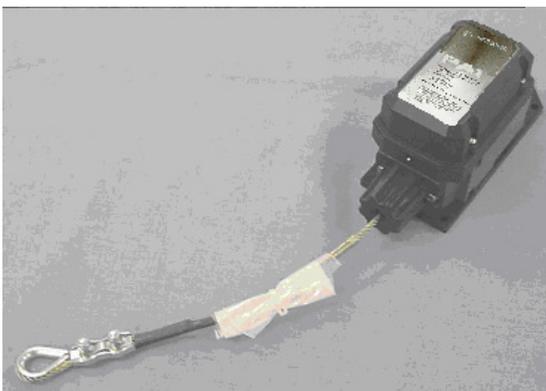


## WARNING

The chain must be unhooked before the crane is operated.

### 6.1.3.D Transmitter/Switch installation

Install the standoff to the boom head using 2 5/16x3/4" HEX bolts. The hole pattern for the standoff is the same as that of conventional PAT A2B switches. In most cases the standoff can be mounted in the same location as the conventional switch.



If not replacing an existing switch, the proper location would be one that allows the switch to rotate freely without being obstructed by any part of the boom head. It should be mounted close to the dead end mounting gusset. The switch should normally be mounted on the cab side of the crane.



For jib installations, locate the switch close to the jib head.

Remove the lynch pin from the standoff. Slide the A2B switch onto the standoff. Replace the lynch pin into the standoff.

Install the weight and chain onto the A2B switch.

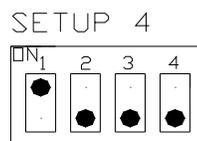
### 6.1.4 A2B Setup

#### HARDWIRED

In order to use the A2B, the A2B sensor must first be set up on with the console.

Set the internal DIP switch to:

A2B sensor - SETUP 4



Add the first A2B sensor to the console by pressing



SENSORS/A2B 1/ HARDWIRED.

## RADIO

In order to use the A2B, the A2B transmitter must first be set up to with the console.

Add the first A2B sensor to the console by pressing



SENSORS/A2B 1/ RADIO. The console will show "SEARCHING". Pull and release the cord of the A2B switch. The switch is now setup.

Add the Second A2B sensor to the console by pressing

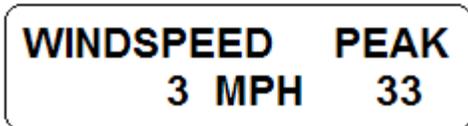


SENSORS/A2B 2/ RADIO. The console will show "SEARCHING". Pull and release the cord of the A2B switch. The switch is now setup

## 7 WIND

### 7.1.1 Operation

The wind speed can be shown by itself on the screen or if in combination with other sensors, as an additional screen.



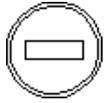
The speed can be shown in miles per hour, or kilometers per hour.

When the wind speed is displayed by itself, the peak speed is also shown. The peak will be the highest wind speed recorded since the system was started. When the system is turned off the peak

value will be reset. The peak value can also be reset by pressing the  button.

## 7.1.2 LIMITS

The system sets the default speed limit to 20 mph. The limit can be set to any value. The limits are set by selecting



SETUP/LIMITS/WIND

Use the up and down arrows to set the desired limit.

## 7.1.3 Installation

The sensor is delivered with a bracket support that allows the sensor to stay perpendicular to the ground through the boom angle range.



**WARNING**

**CONTACT CRANE MANUFACTURER FOR WELDING INSTRUCTIONS PRIOR TO WELDING ON BOOM.**

The 1" diameter mounting pole will be affixed to the boom tip at your discretion so that the anemometer sensor is mounted approximately a foot higher than the boom sheaves and will not interfere or be damaged by hoist lines or extension mounting or movement. Affix the mounting pole to the boom tip or possibly the length cable anchor pin so the pipe supports the sensor.



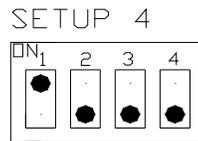
## 7.1.4 Wind Setup

In order to use the wind sensor, the wind sensor must first be set up to with the console.

### HARDWIRED

Set the internal DIP switch to:

Wind speed sensor - SETUP 4



Add the wind sensor to the console by pressing



SENSORS/ WIND/ HARDWIRED.

### RADIO

Add the wind sensor to the console by pressing



SENSORS/ WIND/ RADIO.

The console will show "SEARCHING". Remove the batteries from the transmitter. Reinstall the batteries into the transmitter. The LED on the transmitter will be on for 3 seconds and then start to flash on and off. The sensor should now be set up.

When the transmitter is powered up (after batteries removed and replaced) the transmitter LED will be on for 3 seconds to indicate the transmitter is setup for a wind speed sensor.

## 8 LOADCELL

### 8.1.1 Operation

In order to use the load cell, the load cell must first be installed into the system. See the section on load cell setup. When set up with a load cell, the last selected display and configuration will be shown and must only be confirmed if that configuration setup equals the crane's actual configuration. Otherwise the reeving must be changed to match the current configuration.

The load cell can be installed into a single part line configuration or into a multipart line configuration. When a multiple parts are used, the system multiplies the force from the load cell by the parts of line selected on the console. This is why it is imperative that the correct parts of line (reeving) is selected on the console.



### WARNING

The correct setting of the reeving is of utmost importance for the proper functioning of the system. Therefore, only operators who are thoroughly familiar with the operation of the system should perform the setting of the system. The system will only measure the load on hook and will not measure the effect of any other attachments.

### Reeving

To view the on hook load display, the correct reeving must be set.

Enter Setup screen. Select Reeving and press . Use the arrows to adjust the reeving setting.

**REEVING**

**4**

When complete, press .

**LOADCELL**

**33,200 LB**

### Units

The load can be displayed in pound or in kilograms.

To change the units, press . MENU/OPTIONS/LB

## 8.1.2 LIMITS

The unit has no default limit set for the load.

The limits are set by selecting



SETUP/LIMITS/LOAD

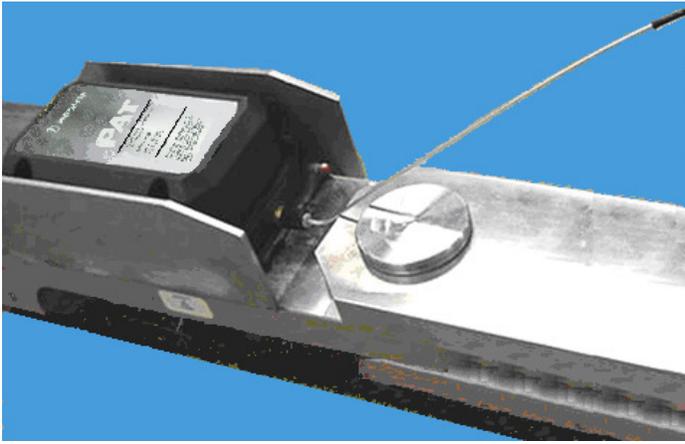
**LIMITS  
LOAD**

Use the up and down arrows to set the desired limit. Press  when complete.

**MAX LOAD  
35,200 LB**

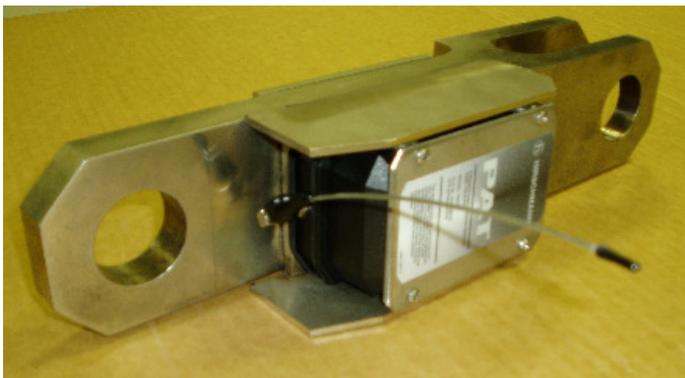
### 8.1.3 Installation

The load cell is installed at the dead end of the wire rope that is being used to lift the load. Use the appropriate pins for the type and size of socket, block or ball that is being used. Note: The pin size should have been specified when ordered and should match the existing pin diameter. Ensure that the correct pin used is rated for the maximum line pull capacity. For the 7.5 ton load cell, install the pin so the pin head on the antenna side. The pin diameter, jaw thickness and jaw opening used to connect to the load cell will effect position of the antenna. There is 90° fitting for the antenna P/N 031-300-050-535 maybe necessary in some cases. Ensure all safety pins are installed properly with washers and bushing to fit the hole diameter and pin length.



7.5 ton Installation

Install the plate using the 2-1/4" pin so the pin head on the antenna side. The plates have a rest button installed to prevent the plates from striking the transmitter on the side of the load cell. On rest button should be on the load cell side of the plate. Ensure all safety pins are installed properly with washers and bushing to fit the hole diameter and pin length.



### 8.1.4 Loadcell Setup

In order to use the loadcell, the loadcell must first be installed into the system. Add the loadcell to the console by pressing

#### HARDWIRED



SETUP / SENSORS / INSTALL-REMOVE / LOADCELL / HARDWIRED.

#### RADIO

Add the radio loadcell to the console by pressing



SETUP / SENSORS / INSTALL-REMOVE / LOADCELL / RADIO.

The console will show "SEARCHING". Remove the batteries from the transmitter. Reinstall the batteries into the transmitter. The LED on the transmitter will be on for 3 seconds and then start to flash on and off. The sensor should now be set up.

When the transmitter is powered up (after batteries removed and replaced) the transmitter LED will be on for 3 seconds to indicate the transmitter is setup for a load cell.

Press  when complete.

#### 8.1.4.A LOADCELL RANGE

Use the following menu selection as an example to select the correct load cell. The following is an example for setting the 7.5 ton load cell.



SETUP / CALIBRATIONS / LOAD RANGE / LOADCELL TYPE / 7.5 TON.

### 8.1.5 Loadcell Calibration

#### ZERO POINT SETTING

The load cell being zeroed must be installed and communicating with the console and there should be no load applied to the load cell. Use the following menu selection to set the zero point of the load cell.



SETUP / CALIBRATIONS / LOAD 0-POINT

Press  when complete.

### 8.1.5.A ACCURACY AND TEST REQUIREMENTS

Check the load display by lifting a load of known weight. The accuracy of the load indication shall be within the tolerance of SAE J376, refer to complete SAE standard before testing.

#### Accuracy

The accuracy of the load indicating system is to be such that the indicated load is not less than 100% of the actual load, nor more than 110% of the actual load. Where the system cannot meet the accuracy criteria at the lower load range, conspicuous labeling or signaling is to be provided indicating that these accuracy criteria cannot be met.

The weight of the load being lifted and all additional equipment such as blocks, slings, sensors, etc.; also referred to as working load.

#### Test Requirements

System tests are to be conducted using an appropriate configured crane and specified load rating chart.

For system calibration, three or more test radii or boom angle are to be employed to establish compliance with the accuracy section above. Test loads shall be as near as is practical to minimum, mean, and maximum values within the operating limits.

One of the following test methods or equivalent is to be used:

##### Known Weight

Test load to be applied by suspending known weights accurate to  $\pm 1\%$ . If the weights of all additional equipment such as blocks, slings, sensors, etc., are included in the test load, the total load is to be known to an accuracy of  $\pm 1\%$ .

##### Fixed Anchor (Deadman)

Test load to be applied by hoisting against a fixed anchor or deadman equipped with a means for measuring loads accurate to  $\pm 1\%$ . If the weights of all additional equipment such as blocks, slings, sensors, etc., are included in the test load, the total load is to be known to an accuracy of  $\pm 1\%$ .

The system accuracy is to be determined from the following formula:

$$\frac{\text{Indicated Load}}{\text{Actual Load}} \times 100 = \% \text{ of Load}$$

## 9 LINE RIDER

### 9.1.1 Operation

In order to use the linerider, the linerider must first be installed into the system. See the section on linerider setup.

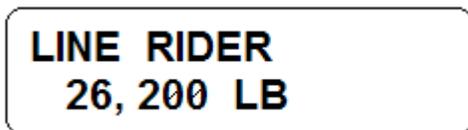
#### Reeving

To view the on hook load display, the correct reeving must be set.

Enter Setup screen. Select Reeving and press . Use the arrows to adjust the reeving setting.



When complete, press .



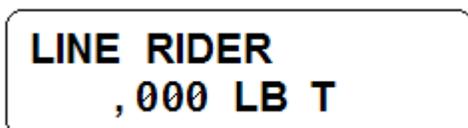
#### Units

The load can be displayed in pound or in kilograms.

To change the units, press . MENU/OPTIONS/LB

#### Tare

A Tare load can be displayed by pressing . Pressing this button will zero out the current load display. The tare load will be displayed for 30 seconds. While in the tare function, a T will be shown on the display.



### 9.1.2 LIMITS

The unit has no default limit set for the load.

The limits are set by selecting



SETUP/LIMITS/LINERIDER

Use the up and down arrows to set the desired limit. Press  when complete.

### 9.1.3 Installation

The linerider installation will depend on the type of boom. Follow the applicable instructions for a hydraulic or lattice boom.

#### LINERIDER GENERAL INFORMATION

The linerider is attached to the swing arm mounting bracket as shown in Figure 4. The swing arm assembly has four joints:

1. Vertical movement at the attachment point to the linerider.
2. Horizontal movement of the swing arm.
3. Vertical movement of the swing arm.
4. Swivels horizontally around the mounting bolt.

The mounting bolt secures the swing arm to the machine.

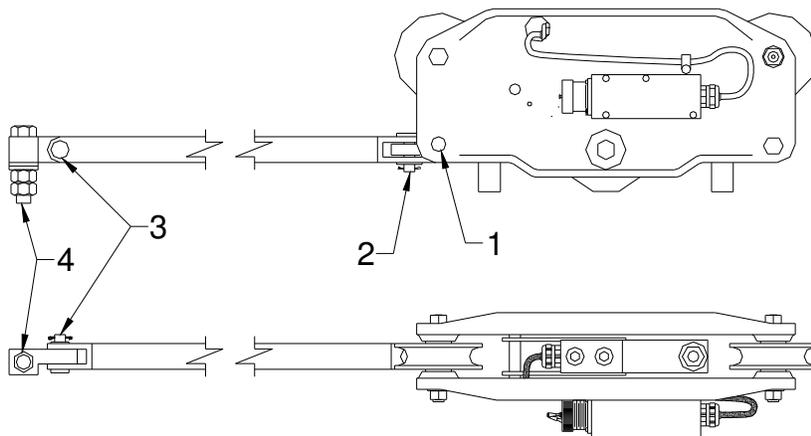


Figure 4. Linerider and Swing Arm.

### 9.1.3.A HYDRAULIC BOOM MACHINES

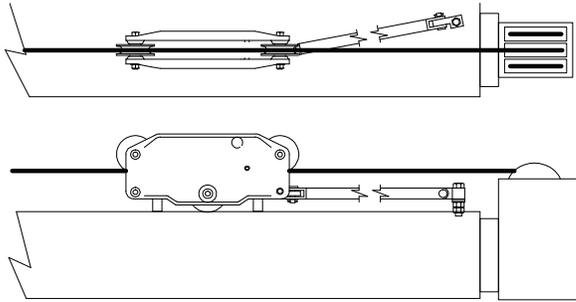


Figure 5. Hydraulic Boom Linerider Installation.

**NOTE: CONTACT CRANE MANUFACTURER FOR WELDING INSTRUCTION PRIOR TO WELDING ON BOOM.**

1. Affix the bolt at the tip of the base section on the main boom similar to Figure 5.
2. Attach the swing arm to the bolt.
3. Run the hoist line through the linerider.
4. Attach the swing arm to the linerider.
5. Ensure freedom of movement side to side
6. Connect linerider electrically with cable provided.

Note: It is recommended that this cable be routed through conduit to the swing arm in a way that best protects the cable from damage, and secured with tie straps.

7. Connect the linerider extension to the console cable at boom base with the 28ft extension provided.

**NOTE: Extra cable extensions can be ordered if required.**

### 9.1.3.B LATTICE BOOM MACHINES

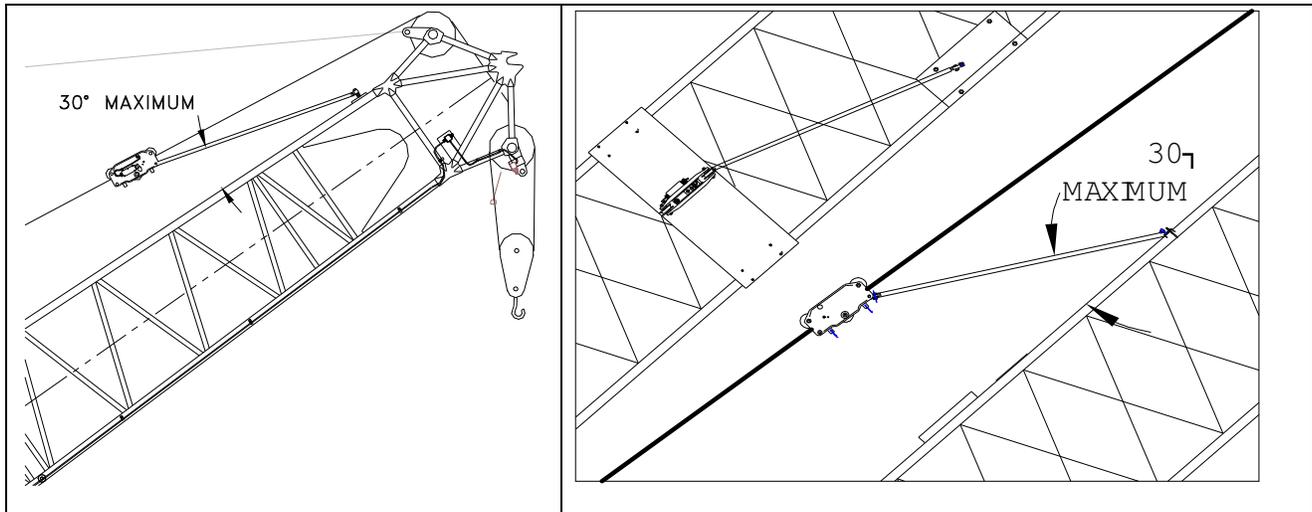


Figure 6. Lattice Boom Linerider Installation.

**WARNING: CONTACT CRANE MANUFACTURER FOR WELDING INSTRUCTION PRIOR TO WELDING ON BOOM.**

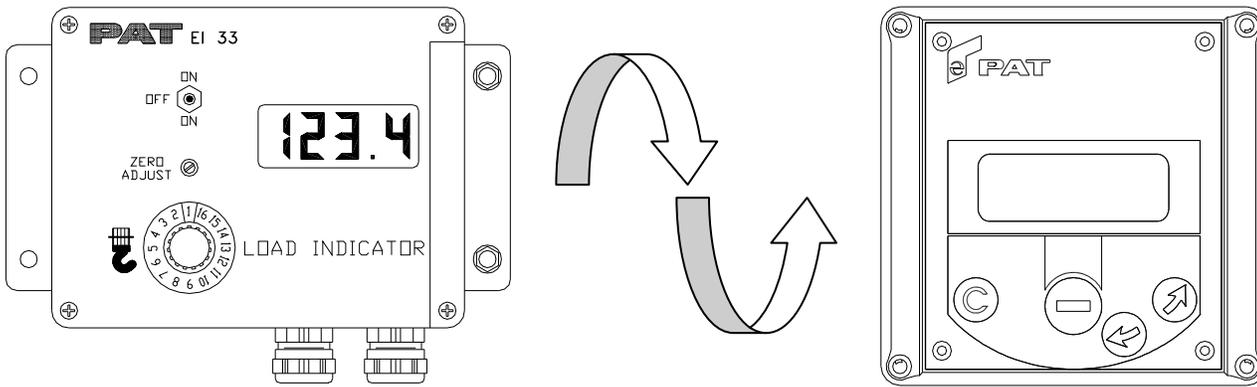
1. Select a location that the swing arm angle with respect to the boom will not exceed 30°(see Figure 6). The linerider should be located as close to the boom tip as possible.
2. Construct two base plates. Size of base plates will be specific to the lattice structure and your selected location.
  - a. The first base plate will be attached to the boom with the swing arm bolt affixed to the center of the base plate.
  - b. The second base plate will be attached to the boom so that it supports the linerider when not in use.
3. Affix the swing arm bolt to the center of the first base plate.
4. Affix the first base plate to the selected location on the lattice boom.
5. Attach the swing arm to the bolt.
6. Run the hoist line through the linerider.
7. Attach the swing arm to the linerider.
8. Ensure freedom of movement side to side
9. Attach the second base plate to the boom so the linerider rubber supports will touch the plate when there is no load.
10. Connect linerider electrically with cable provided.

Note: It is recommended that this cable be routed through conduit to the linerider in a way that best protects the cable from damage, and secured with tie straps.

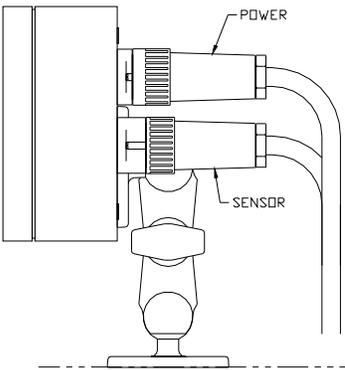
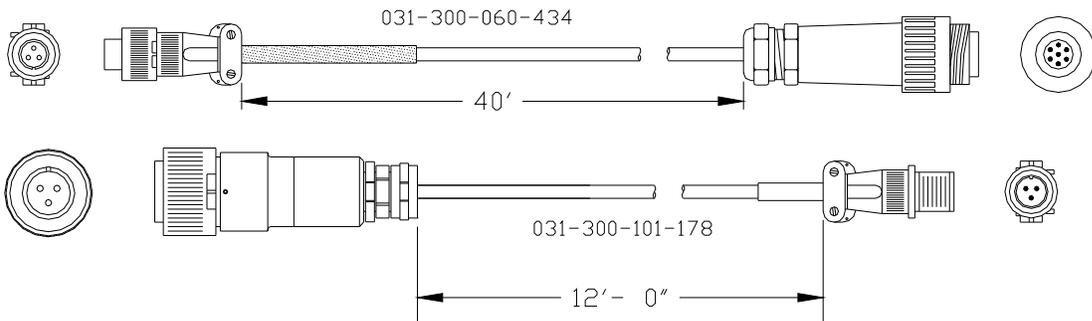
11. Connect the linerider extension to the console cable at boom base with the 28ft extension provided.

**NOTE: Extra electrical extensions can be ordered if required.**

**9.1.3.C PRS35 UPGRADE FROM EI33**

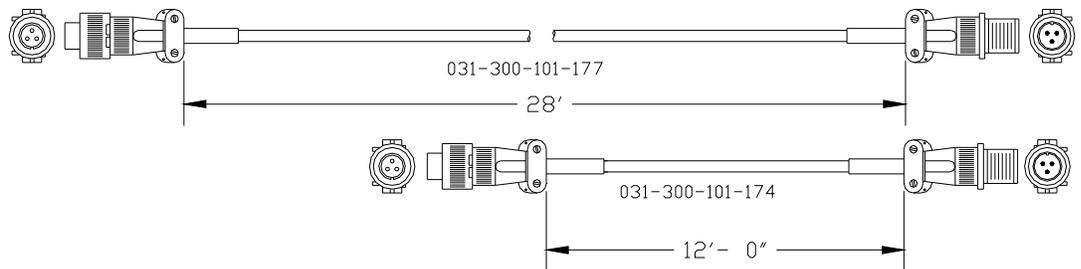


**NOTE: ADDITIONAL CABLE ASSEMBLIES ARE REQUIRED WHEN UPGRADING FROM THE EI33 CONSOLE TO THE PRS35. (SEE BELOW)**



Cable assembly (031-300-060-434) connects to the back of the PRS35 console and mates with the existing (031-300-101-178) cable assembly which connects to the linerider.

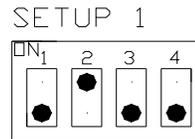
If additional length is required between the console and linerider, cable assemblies of various lengths are available. (see below)



## 9.1.4 Linerider setup

### Hardwired

Set the internal DIP switch to:  
4-20 mA sensor - SETUP 1



Select the "HARDWIRED" from the following menu.



SENSORS/ LINERIDER/ HARDWIRED

## 9.1.5 Linerider Calibration

The zero point and the gain of the linerider must be set before operation.

### **Essential Information:**

- The units of measure shall be the same as load chart units.
- Calibration should be completed after installation, crane modification, or anytime there is an indication of inaccuracy.
- Recommendations for system calibration:
  - Use single part line during calibration.
    - Note: Multiple parts of line are acceptable. (It only increases the amount of test load recommended)
  - Pick a known test load as close as possible to the maximum rated load for line configuration.
  - The test load must include the hook block and all rigging.

1. Turn unit "on".
2. Set the reeving to the actual parts of line configured.
3. Place hook block or headache ball on the ground, so there is no load on the hoist line.

4. Press  CALIBRATIONS/LINERIDER 0.

5. Press  . The display should show ,000 LB.

6. Pick a known test load as close as possible to the maximum rated load. SAE recommends the test load should be accurate to  $\pm 1\%$ .

7. Press  CALIBRATIONS/LINERIDER ADJ.

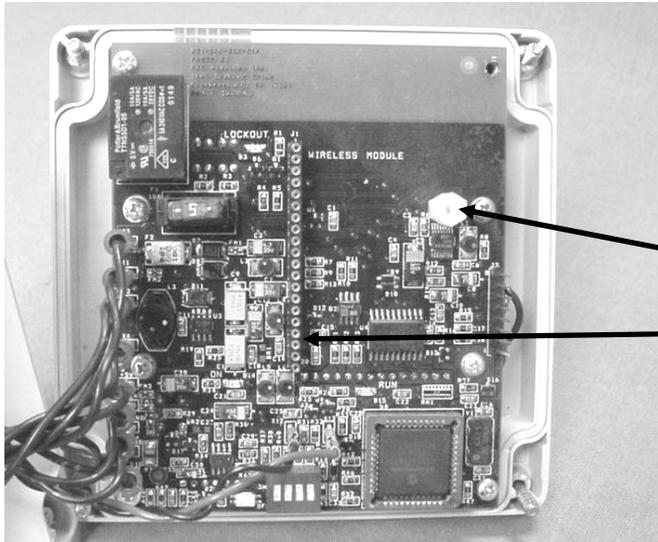
8. Compare the known test load to the displayed load and adjust if necessary using the arrows on the console.

## 10 RADIO MODULE

### 10.1 INSTALLATION

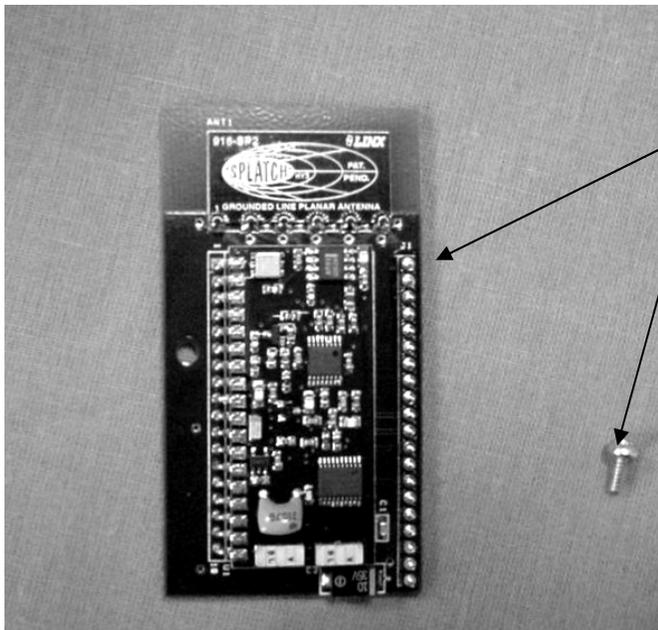
A receiver module must be installed into the PRS35 before a radio sensor can be set up or used. The following is the procedure for installing the radio module.

Loosen the 4 console lid screws. Fold back the lid to see the electronic board in the console.



Mounting point

Connector

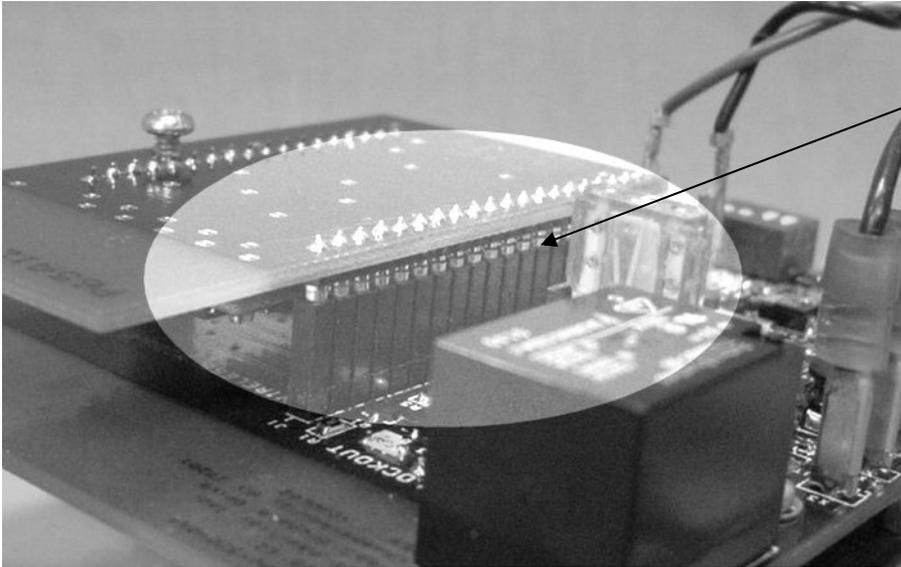


Radio module

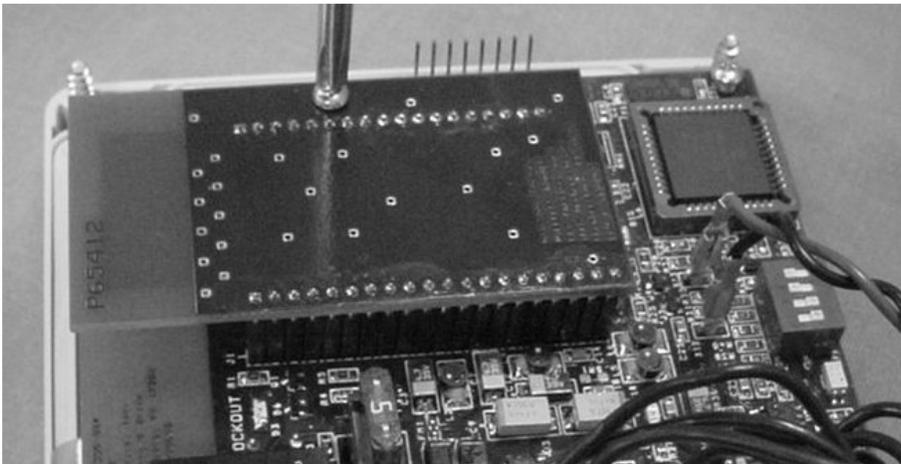
Mounting screw

Caution: Handle the module with care. The module can be damaged by static electricity. Take proper precautions by removing any static electricity from your body. Do not remove the board from its protective anti static bag until the time of installation.

Part number 031-300-350-015



Align the pins and press the radio module into place. Make sure that they are correctly aligned and that they are firmly seated.



Tighten the screw.

Reassemble the console. Make sure that the console lid is completely seated and properly tightened.

# 11 ADDING SENSORS

To add a new sensor,

Menu- SETUP/SENSORS/

This gives the sensor select/information screen. It shows the status of all hardware. Each sensor has several options:

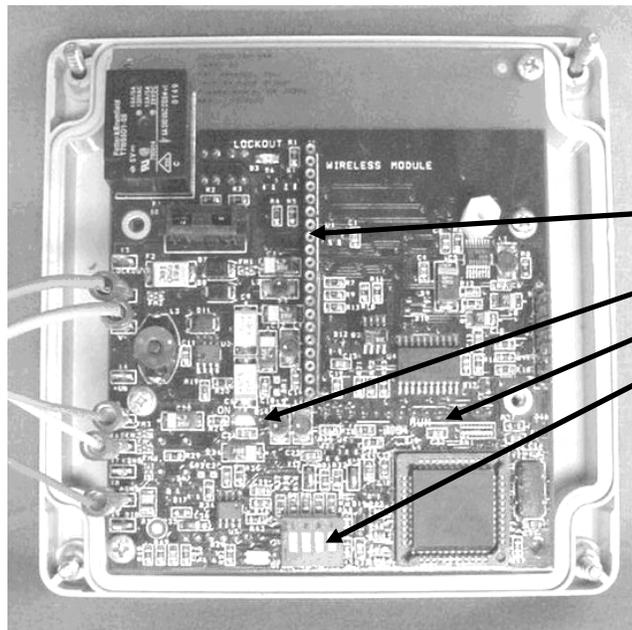
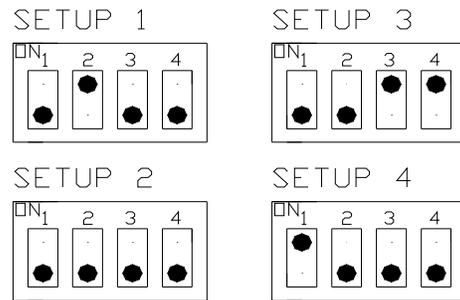
- \*NOT INSTALLED
- HARDWIRED
- RADIO

The status of the sensor is indicated with an "\*". In the example, the sensor is "not installed".

The PRS35 is a very powerful and flexible system. To allow for multiple types of sensors, a 4 position DIP switch is utilized. The DIP switch must be in the proper position for the attached sensor to function properly. The DIP switch will be set into the proper position before shipped from the factory. If adding a hardwired sensor to the system, use the following for the diagrams.

## DIP SWITCH SETTINGS

- Current Linerider - SETUP 1
- Kruger Angle sensor - SETUP 3
- Serial Angle sensor - NA
- Hardwired Wind speed - SETUP 4
- Hardwired A2B - SETUP 4
- All Radio sensors - NA



WIRELESS SOCKET  
 POWER INDICATION  
 RUN INDICATION  
 DIP SWITCH

## 12 SERVICE / TROUBLE SHOOTING

Daily maintenance of the system consists of inspecting:

1. The electrical wiring connecting the various parts of the system. If electrical wiring is damaged, it shall be replaced immediately.
2. If the insulation is worn on the electrical wiring or cable guides are damaged, these parts shall be replaced.
3. A damaged or punctured display must be replaced immediately to prevent ingress of water and damage to the internal circuitry.

Other than correcting problems identified in the Malfunctions Table and replacing faulty mechanical parts and cables, no other repairs shall be made.

When the PRS 35 EZ system is turned on, it will show the following screen. This screen shows the telephone number of PAT and the software version.



Make sure the display is working and all the lights come on during this time. Listen to the buzzer sound. If any of the components above fail, please contact your nearest service representative before operating the system!

## 12.1 SCREENS

### Communication error screen

When working from the normal operating screen and an error occurs, a communication error screen will be displayed temporarily, which indicates loss of communication between a sensor and the console.

This screen shows that there is an error in the communication between the A2B sensor and the console. The sensor that is in error is indicated on the bottom line.

**SIGNAL LOST**  
**A2B 1**

To return to this communication error screen, return to the SETUP screen and press . At this point, you are enabled to scroll through all sensors which are experiencing a communication error by

pressing the UP  and DOWN  arrows.

#### 12.1.1 To test the outputs:

The following outputs can be tested. Function lockout, Limit LED's, Buzzer.

SETUP >> OPTIONS >> TEST SEQUENCE.

**OPTIONS**  
**TEST SEQUENCE**

Select this option and then press . Each of the outputs will be cycled on individually, enabling the user to determine if each is functioning correctly.

#### 12.1.2 To test the inputs:

The analog input screen may be used to assist with troubleshooting errors.

To access this select: SETUP >> OPTIONS >> ANALOG INPUT

**ANALOG INPUT**  
**20 MA**

**ANALOG INPUT**  
**5.1 VOLTS**

To change between milliamps and volts use the UP  or DOWN  arrows while viewing the analog input.

## 12.2 TROUBLESHOOTING

After the onboard diagnostics have been performed, follow these guidelines. All LED's are located inside the receiver box.

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
LCD does not light or show characters.	No power to console	Make sure the console is getting power from the crane. Check wiring. Ensure correct polarity of the power. Open console, check status of LED's. Both the red and green LED's should be on.
Limit LED's do not light	No power to console	Make sure the console is getting power from the crane. Check wiring. Ensure correct polarity of the power. Open console, check status of LED's. Both the red and green LED's should be on.
Communication error	Low battery	Verify which sensor is causing the error by looking at the communication error screen. (see section 11) Replace batteries.
Communication error	Faulty sensor	Verify which sensor is causing the error by looking at the communication error screen. (see section 11) Verify that the transmitting LED on the sensor is blinking.
Communication error	Poor reception	Verify which sensor is causing the error by looking at the communication error screen. (see section 11) Verify that the transmitting LED on the sensor is blinking. Verify that the sensor is line of sight to the console.
Communication error	Sensor not installed.	Install the sensor on the console. See adding sensors
Communication error	Poor communication caused by interference.	Remove potential interference sources from the area. Mount the receiver in a different location.
Buzzer does not sound	Faulty	Go into the diagnostics screen for the outputs. Verify all outputs are functioning. (see section 11) If any of the tests fail, replace console.
Crane functions locked out all the time	Incorrect wiring	Check for power to lockout device. Clear all faults.
Crane functions locked out all the time	Communication error.	See communication error. (see section 11)
Crane functions locked out all the time	Fault in receiver module.	Check for power to lockout device. Clear all faults.
Transmitter LED does not flash	Sensor is asleep.	Change the status of the sensor. Pull switch wire rope of A2B.
Transmitter LED does not flash	Batteries dead.	Replace the batteries.

## 12.3 TROUBLESHOOTING MOISTURE

The PRS 35 contains electronic components in various locations, such as central unit, sensors, junction boxes etc. These internal components cannot be designed to withstand exposure to moisture over a longer period of time. For this reason, the housings of the components are water protected according to IP 65. If you find water or moisture inside any of the housings, the source for the water ingress has to be detected and corrected to ensure proper operation.

There are two major possibilities for the occurrence of excessive moisture inside an enclosure:

- 1) Water ingress
- 2) Condensation

This outline gives instructions for detecting the cause for excessive moisture by using simple troubleshooting methods and how to prevent the moisture ingress from happening again.

### 12.3.1 Water Ingress

There are 4 possibilities for water to enter an enclosure:

- 1) Spray Cleaning
- 2) Missing / Loose Screws
- 3) Broken Lid
- 4) Defective Gasket

It is possible to find out the source of water ingress by going through the following steps and ruling out one possibility after the other until the cause is identified:

#### 1) Spray Cleaning

The enclosures used for the PRS 35 system are water protected to IP 65. This means protection against the environment, such as rain. However, through the use of spray cleaner at short distances, it is possible to force water through the gasket or strain relieves. For this reason, avoid spraying any components from short distances with spray cleaners. Convey this fact to any member of a maintenance crew.

#### 2) Missing / Loose Screws

All screws have to be present and to be equally tight to ensure water protection of the enclosure. If there are screws missing, replace them. If no screw is missing, check the tightness. If any were loose, then open all screws and then re-tighten them equally.

#### 3) Broken Lid

An enclosure will only seal correctly if the lid is not bent. To check this, loosen all screws of the lid, take the lid off the box and visually inspect it for deflection. If the lid is bent or damaged, it needs to be replaced. Try to determine what has caused the lid to be bent and eliminate the reason for that. Order a new lid through your PAT representative.

#### 4) Defective Gasket

The gasket underneath the lid seals the unit. The gasket needs to be in good condition in order to seal correctly. If the gasket is torn, brittle or severely bent, it needs to be replaced. Order a new gasket through your PAT representative.

## 13 MAINTENANCE

The only maintenance required is to change the batteries when required. Also, check the mounting hardware daily to ensure that there is no damage. Replace any damaged parts before operating the crane.

### 13.1 BATTERY REPLACEMENT

To replace the batteries, remove the 4 screws from the transmitter housing. During battery replacement, use caution when opening the battery cover and transmitter to avoid damage to the gasket causing moisture ingress which could corrode the batteries and terminals. Inspect the gasket surface on the transmitter for nicks or other damages that may prevent the gasket from sealing. If it appears to be damaged, a replacement gasket should be installed.

Install 4 fresh batteries into the proper location and direction as indicated on the battery holder.

Make sure that the cardboard tube is installed as shown.



**LOOSEN 4 SCREWS**



**INSPECT CONDITION OF GASKET**



Software version label  
Battery direction label

**BATTERY DIRECTION LABEL**



**INSTALLED BATTERIES**



**CARDBOARD TUBE**

## 14 PART NUMBERS

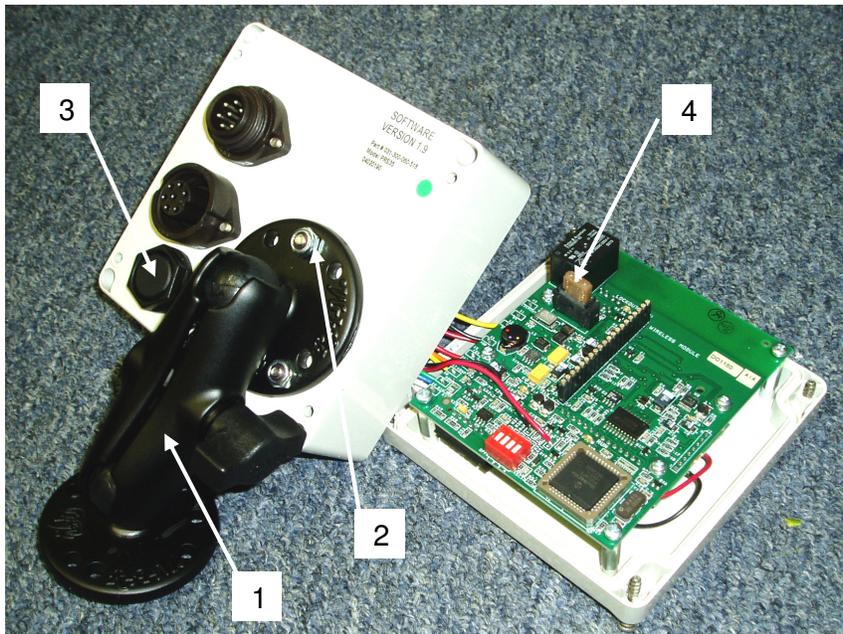
### 14.1 CONSOLE



031-300-060-518 PRS 35 EZ



031-300-060-491 Power cable



Item	Part number	Qty	Description
1.	031-300-060-382	1	Console Accy, Mounting Arm W/1" Ball
2.	031-300-050-485	3	Screw, #10-24 X 5/8 Ph. Ph
2.	031-300-050-487	3	Washer, Sealing #10
2.	031-300-050-489	3	Nut, #10-24 Lock Nylon Insert
3.	024-000-100-095	1	Membrane Element
4.	031-300-050-223	1	Fuse, 2 Amp Auto (Mini)

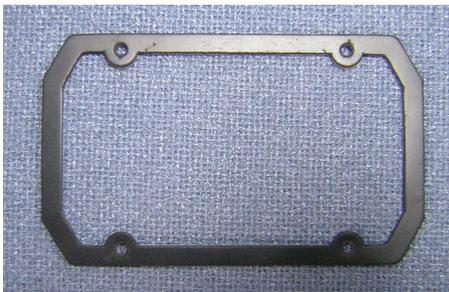
\* Please contact Hirschmann, ECS with questions concerning repair of the display or internal boards. (717) 263-7655

## 14.2 A2B



031-300-060-484

Radio A2B transmitter assembly

031-300-050-654  
Radio A2B transmitterAntenna only  
031-300-050-688

031-300-050-763

Neoprene rubber gasket



**031-002-060-022**

**Radio A2B switch**



**031-300-050-295**

**A2B Mounting standoff**



**031-300-050-264**

**A2B mounting plate**



**031-300-050-272**

**Lynch pin**

### 14.3 WIND



**031-300-050-321**      **Mounting pole**



**031-300-050-322**      **Pin**



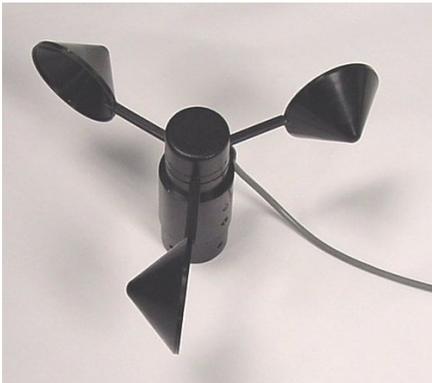
**031-300-050-323**      **retaining pin**



**031-300-050-480**                      **anemometer mounting plate**



**031-300-050-686**                      **transmitter**



**031-300-050-507**                      **sensor**

### 14.4 LINERIDER



**048-311-060-042/048-311-060-043/048-312-060-042/048-312-060-044  
linerider**



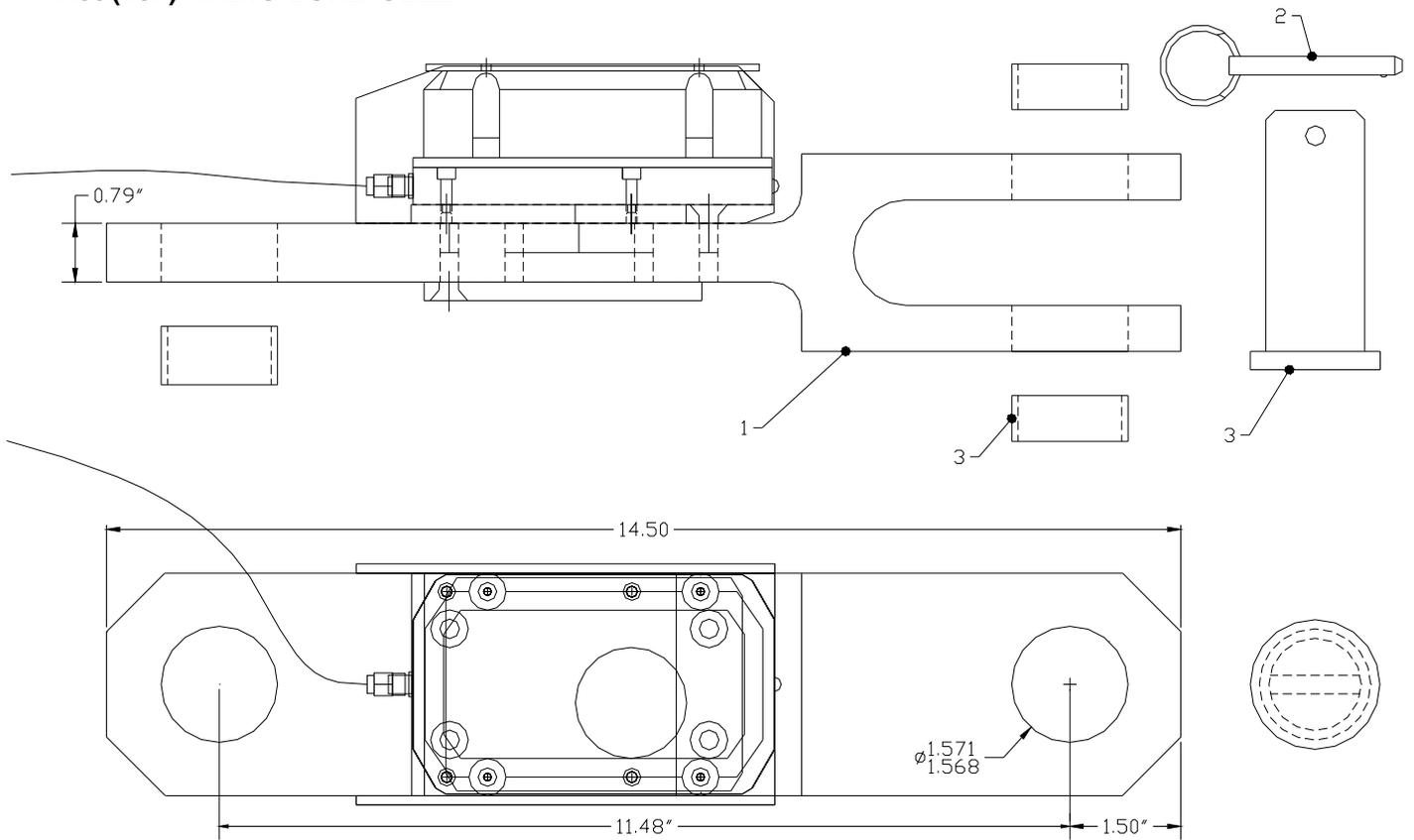
**031-300-060-434 extension cable**



**031-300-101-178 sensor cable**

## 14.5 LOADCELL

### 7.5t (15k) RADIO LOAD CELL



The load cell kit will include item 1, item 2, and one of the optional items 3.

	ITEM	PART NUMBER	QTY	DESCRIPTION
	1	031-300-060-571	1.00	SENSOR ASSY, FORCE TRANS. 7.5T W/RADIO TRANSMITTER
	2	031-300-050-064	1.00	HARDWARE, COTTER PIN 2 3/8" LG1.8" GRIPPER LENGTH
OPTION	3	031-300-100-999	1.00	PIN, 1.5" DIAMETER, FOR USE W/15T FORCE TRANS.
OPTION	3	031-300-050-574	1.00	PIN/BUSHINGS, 1 1/4" FOR 7.5T RADIO LOADCELL
OPTION	3	031-300-050-555	1.00	PIN/BUSHINGS, 1 1/8" FOR 7.5T RADIO LOADCELL 5/8" ROPE
OPTION	3	031-300-050-554	1.00	PIN/BUSHINGS, 1 3/8" FOR 7.5T RADIO LOADCELL 3/4" ROPE
OPTION	3	031-300-050-556	1.00	PIN/BUSHINGS, 1" 7.5T RADIOLOADCELL 1/2" ROPE

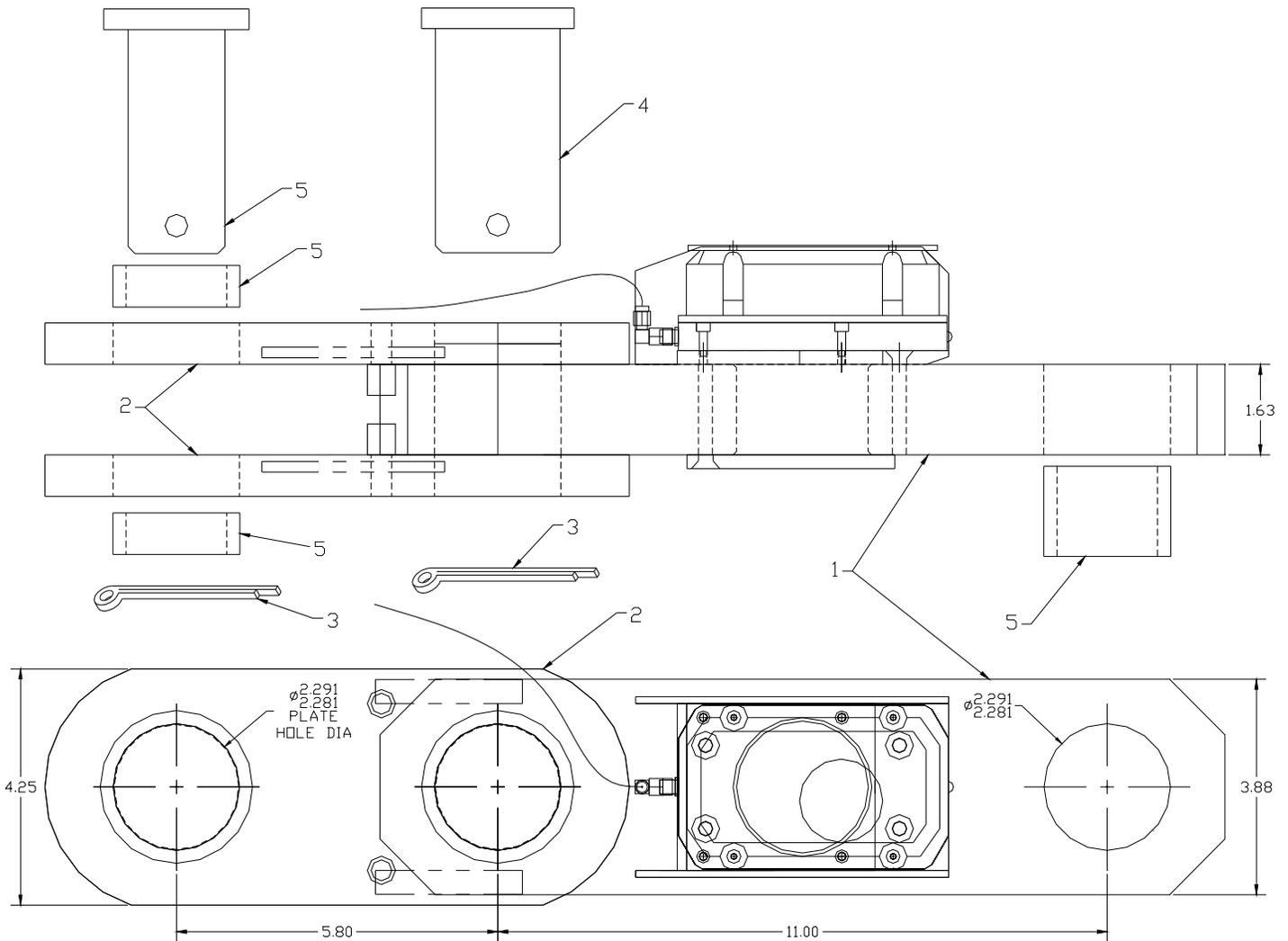


Whip Antenna 031-300-050-559



90° antenna fitting 031-300-060-535

**20t (45k) RADIO LOAD CELL**



The load cell kit will include item 1, item 2, item 3, item 4, and one of the optional items 5.

ITEM	PART NUMBER	QTY	DESCRIPTION
1	031-300-060-572	1.00	SENSOR ASSY, FORCE TRANS. 45K STRAIGHT W/TRANSMITTER
2	031-300-060-558	1.00	BRACKET, H 20t RADIO LOADCELL 2-050-520 PLATES & 2-050-573
3	031-300-050-625	2.00	HARDWARE, COTTER PIN 3/8" x 3"
4	031-300-050-568	1.00	PIN, 2.25" FOR 40K RADIO LOADCELL 1-1/8" ROPE
OPTION 5	031-300-050-568	1.00	PIN, 2.25" FOR 40K RADIO LOADCELL 1-1/8" ROPE
OPTION 5	031-300-050-559	1.00	PIN/BUSHINGS, 2" FOR 40K RADIO LOADCELL 1" ROPE
OPTION 5	031-300-050-600	1.00	PIN/BUSHINGS, 1 3/4" FOR 40 KRADIO LOADCELL
OPTION 5	031-300-050-563	1.00	PIN/BUSHINGS, 1 5/8" FOR 40 KRADIO LOADCELL 7/8" ROPE
OPTION 5	031-300-050-604	1.00	PIN/BUSHINGS, 1 1/2" FOR 40K RADIO LOADCELL