

SkyAzúl

EQUIPMENT SOLUTIONS

PRS80 EZ



INSTALLATION, CALIBRATION and SERVICE MANUAL

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1 GENERAL INFORMATION

The PAT Telemetry Receiver 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 Telemetry Receiver 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.



WARNING

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 Telemetry Receiver has the following features:

- 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.
- Wireless operation.
- Minimum of 500 feet LOS.
- Frequency Hopping Spread Spectrum transceivers
- Can display in multiple units.
- Built in lockout relay. Rated at 2 amps
- Analog display of % of limit on load cells and wind speed.
- Tare function.
- Low battery indication.
- Expandable

4 SYSTEM DESCRIPTION

4.1 Operating 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 Telemetry Receiver 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:



1. LCD
2. Clear button
3. Select button
4. Up Button
5. Down Button

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.
- While pushing this button, the control lever lockout function of the system can be deactivated.
- 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.

5 SYSTEM 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 LC display shows the console and system software version.

The TR 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.

On several screens, icons are used to represent the sensor. Here are the icons used in the system.



First installed A2B switch



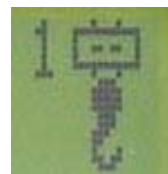
Second installed A2B switch



Load sensor



Wind Speed Sensor






Reeving #

5.1 MENU'S

- ❖ REEVING
- ❖ LIMITS
- ❖ SETUP
 - ◆ SENSORS
 - A2B 1
 - A2B 2
 - LOAD 1
 - LOAD 2
 - WIND SPD
 - ANGLE 1
 - ANGLE 2
 - For each sensor:
 - ❖ INSTALL NEW
 - ❖ UNINSTALL
 - ❖ ENABLE / DISABLE
 - ◆ CALIBRATIONS
 - LOADCELL 1
 - LOADCELL 2
 - ◇ For each loadcell:
 - ◇ ZERO POINT
 - ◇ SENSOR TYPE
 - ♥ 7.5 TON MAX
 - ♥ 22.5 TON MAX
 - ◆ SCREEN/BEEPER
 - UNITS
 - LBS - MPH
 - KG - KPH
 - LANGUAGE
 - PCT BAR IS ON/OFF
 - WARNING ARE ON/OFF
 - ◆ DIAGNOSTICS
 - SCREEN
 - KEYPAD
 - OUTPUTS
 - ALARM LOG
 - COMM DATA
 - LOW BATTERIES (This will only be shown if a low battery condition exists)
- ❖ ABOUT

5.2 Menu Selection Instructions

From the operating screen, press  to enter the menu selection.

Use the up  and down  to scroll through and high light your selection then press  to make the selection.

5.3 Load

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.

5.3.1 Load Display

When a load cell has been installed, the option is available to display the on hook load.

The load cell must be installed in the dead end of the load line.

If additional sensors are installed, optional screens can be selected. Some showing one of the sensors only and some showing multiple sensors at once. The combination of displayed sensors can be selected by pressing the arrow buttons while on the working screen.

Set the console to match the crane hoist reeving.

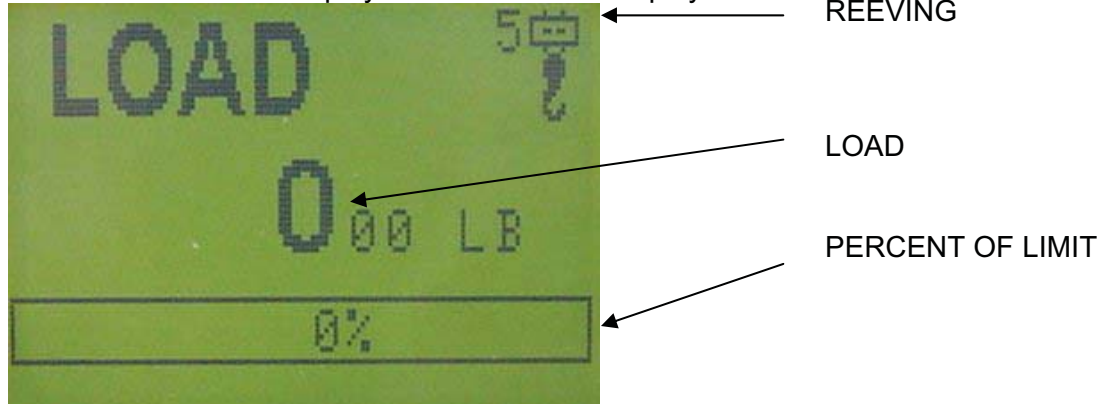


Use the up down arrows to adjust the reeving.

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.

The console will now display the on hook load display.



There are several options for selecting which values are shown on the display and multiple ways in which the data can be displayed. To change the data that is displayed, use the up and down arrows. The up arrow cycles thru the available displays. These options change for different combinations of sensors. If the display does not change, there is no option available for this combination.

5.3.2 Tare Function



The tare function is activated by pressing the button. "t" will flash beside the load display while the tare function is active. **The tare function is deactivated after 30 seconds if no other buttons are pressed.**

5.3.3 Limits

Load limits can be easily set thru the setup menu. When a limit is set, the limit may be shown on the bottom portion of the screen. What is shown depends on the user preferences. The screen can show an icon representing the sensor for which the limit is set or it can be in the form of an analog bar. When a limit is exceeded the limit icon will flash and the lockout relay will disengage.

5.3.3.A SETTING LIMITS

To set limit

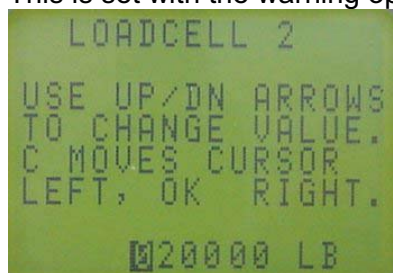



Press . Scroll to select LIMITS. Scroll to select your sensor.

Only installed devices can be selected for limits.

Two types of limits can be set for the load cell. Max linepull and max total load. Both will limit the maximum capacity. To set the maximum limit of the load, select LOADCELL 2. To set a limit on the maximum permissible line pull, select LINE PULL 2 from the menu. This will give a limit based on the current reeving of the hook block.

Note: a prewarning can be set so as to beep the alarm when a limit is approached but not reached. This is set with the warning option. Menu- SETUP/ SCREEN/BEEPER/ WARNING.



Enter the value for the limit. Use the arrows to change values. Use the  to change move to the next digit. Note the last 2 digits are fixed on the load cell and can not be changed.

If the system is turned off, all setup and limits remain stored. When turning the system on again these adjustments can be acknowledged by merely confirming the reeving and pressing the SELECT button (provided that the crane configuration has not been modified!).

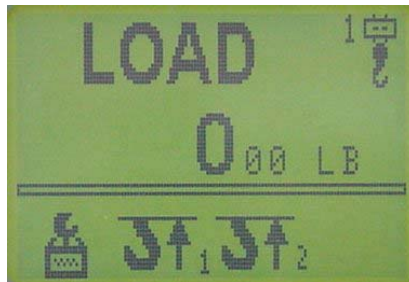
5.4 A2B

5.4.1 A2B display

When an A2B switch has been installed, the status of the switch is always shown. There are several options for displaying the status. If other sensors are installed besides the A2B, the A2B status will be shown as an icon.



A2B alone



A2B with other sensor.

5.4.2 A2B limit

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



A2B warning.

5.4.3 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.

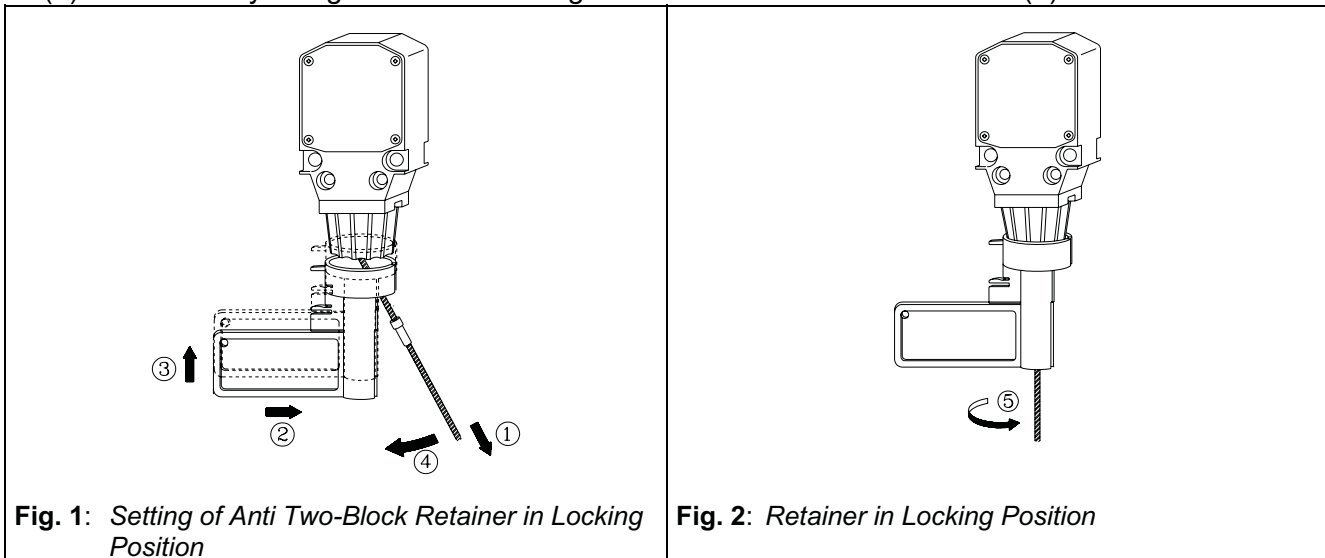
With even parts of hoisting line, the weight shall be attached to the dead-end line. With odd parts of hoisting line, the weight shall be attached to the line of lowest speed.

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. A lanyard is supplied to connect flag to A2B mounting plate.

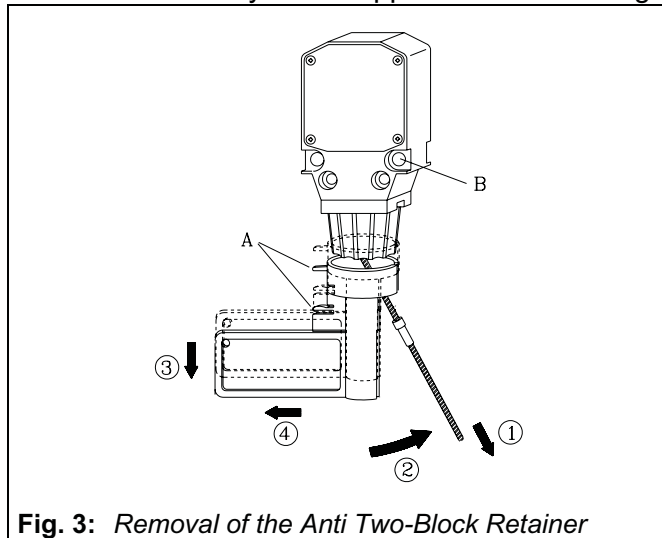


Fig. 3: Removal of the Anti Two-Block Retainer

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.



WARNING

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)

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



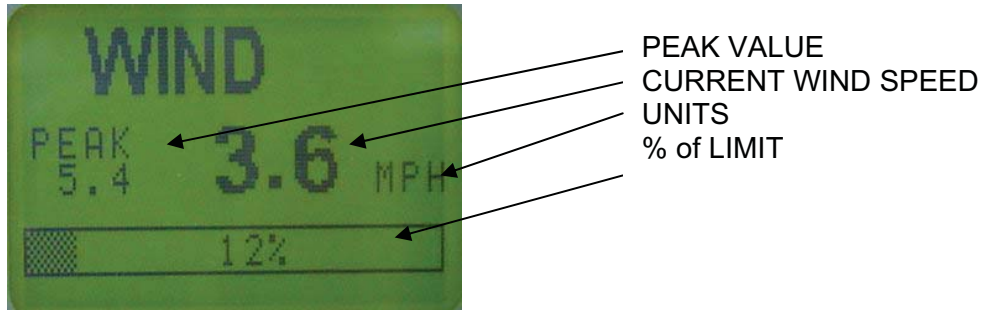
If the A2B warning symbol fails to flash and audible alarm does not function as described and the crane movements are not stopped, the system is not working properly. The malfunction shall be corrected before operating the crane.

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

5.5 Wind


5.5.1 Display

The wind speed can be shown by itself on the screen or if in combination with other sensors, as an icon on the bottom of the 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. The % of limit is shown at the bottom.

5.5.2 LIMITS

The system sets the default speed limit to 30 mph. This is represented in by the bargraph. The bargraph shows the % of the limit that is set. The limit can be set to other values.

To change the default limit, press , then select the sensor for the limit that you want to set.

Use the arrows to change the value. Use the  to confirm the values.

Note: a prewarning can be set so as to beep the alarm when a limit is approached but not reached. This is set with the warning option. Menu- SETUP/ SCREEN/BEEPER/ WARNING.

5.6 Angle

5.6.1 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.



5.6.2 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.

6 INSTALLATION AND SETUP

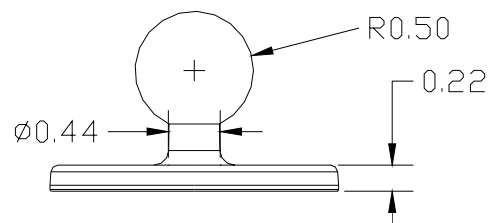
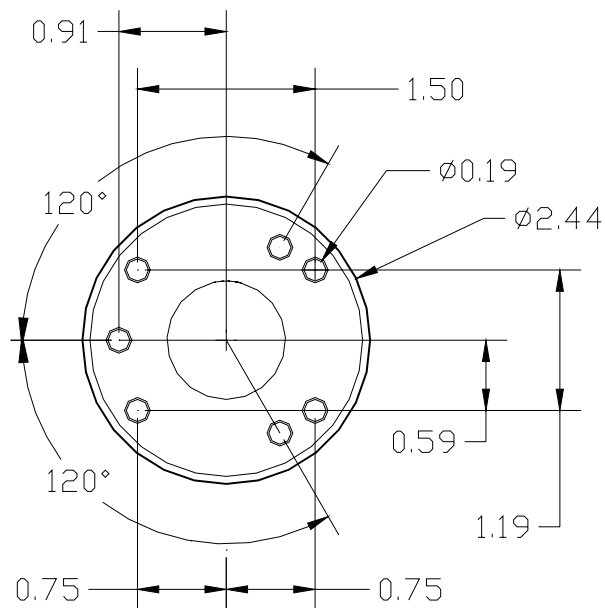
6.1 Console Mounting

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 line of site of the sensor and within reach of the operator. Securely attach the base of the mounting apparatus onto a solid surface. 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.

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 2 amps. An internal fuse protects against overloading this circuit.

Mount the console antenna in a position that is in direct line of the transmitter, ensuring that no obstructions will interfere with the transmission of the radio signal.

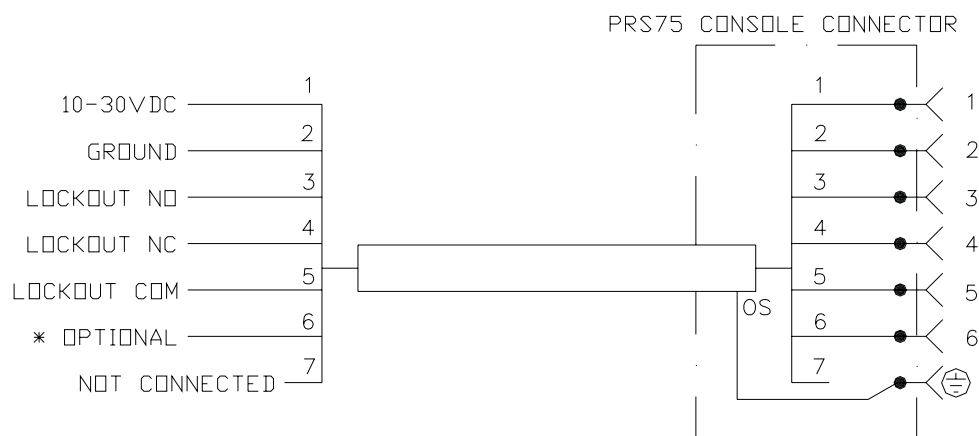


6.2 Wiring



The wiring at the console connection is:

Pin #	Description	
#1-	Power	10-30VDC
#2-	Ground	
#3-	Lockout NO	2 amp max
#4-	Lockout NC	2 amp max
#5-	Lockout common	2 amp max
#6-	Option	

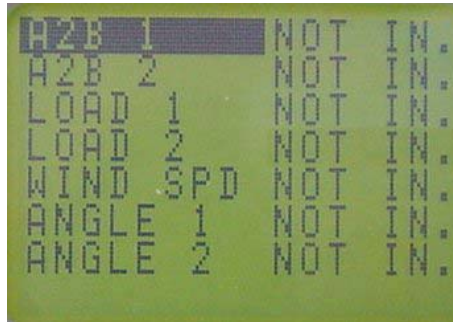


6.3 Adding sensors

To add a new sensor,

Menu- SETUP/SENSORS/

This gives the sensor select/information screen. It shows the status of all hardware. In the example below "NOT IN." means that none of the sensors are installed.



Sensor status screen.

Choose the sensor that you wish to install and follow the onscreen instructions, which will ask you to remove the paper tap insulating the battery contact or installing the batteries into the transmitter. To do this, remove the 4 screws from the transmitter housing and remove the paper insulation tag that reads "REMOVE BEFORE OPERATION" by holding the batteries in place with one hand and removing the tag with the other or insert batteries, if not installed.



LOOSEN 4 SCREWS



6.4 Repeater

The purpose of the repeater is to reduce the possibility of a communication loss error by receiving the load cell transmitted ID code and re-transmitting the same ID code out to the PRS 80. To do this, the repeater is positioned at the boom tip, up the hoist rope from the load cell and up the boom from the PRS 80. If the load cell does not have a direct line of sight or blocked by a wall/structure from the PRS 80 then there is less chance of the signal absorption/interference.

Power cable connections: PIN 1 - +UB (9 to 30VDC), PIN 2 - GND

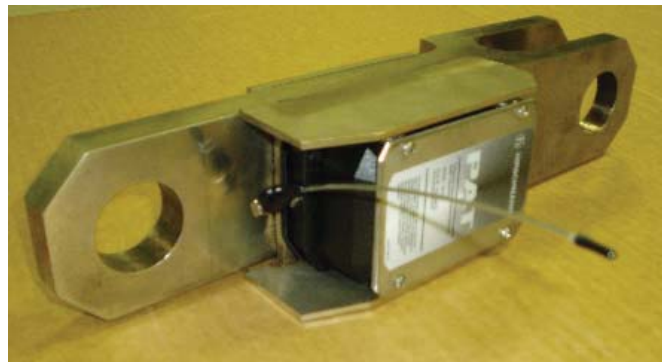
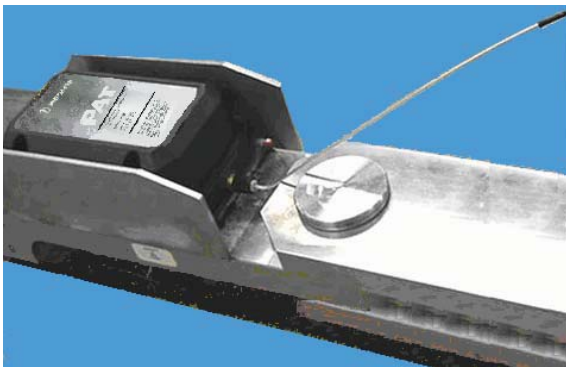
The repeater is setup from the factory to repeat signals from the load cells to the PRS 80 receiver. PRS 80 can receive both transmissions (load cell and repeater) and output the load signal to the system computer.

After switching power on to the repeater from the crane ignition switch, the system starts with an automatic test of the repeater board, LEDs, and electronic components. The red power LED should be on and other red LED blinks when the repeater is transmitting a signal.

6.5 Load

6.5.1 Load cell 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.

6.5.2 Load Cell Setup and Calibration.

The PRS80 console and load cell should be already been setup. However, it maybe necessary to perform the following setup and calibration for maintenance or if you believe the load reading is incorrect. Calibration is required when a new sensor is added or replaced.

If the load cell is not already added to the system, go to the section on **adding sensors**.

Two things must be done to setup a load cell. First, the type of load cell must be input into the console. Second, the zero point of the load cell must be set.

6.5.2.A Adding a Sensor

Menu selection - SETUP/SENSORS/

This gives the sensor select/information screen. It shows the status of all hardware. In the example below "NOT IN." means that none of the sensors are installed.



Sensor status screen.

Choose the sensor that you wish to install and follow the onscreen instructions, which will ask you to remove the paper tap insulating the battery contact or installing the batteries into the transmitter. To do this, remove the 4 screws from the transmitter housing and remove the paper insulation tag that reads "REMOVE BEFORE OPERATION" by holding the batteries in place with one hand and removing the tag with the other or insert batteries, if not installed. If the batteries are already installed, pull or disconnect one battery and reinstall to reset transmitter.

6.5.2.B Setting Sensor Type

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.

Menu-SETUP/CALIBRATIONS/SENSOR TYPE



6.5.2.C Setting Zero Point

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 as an example to set the zero point of the load cell.

Menu-SETUP/CALIBRATIONS/ZERO-POINT



6.5.3 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:

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

6.6 A2B

6.6.1 Transmitter / Switch

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



LED

Travel Hook
Option, Customer Supplied

6.6.2 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.

6.6.3 Travel position (optional)

Designed into the transmitter plate is a small hole into which a hook or hardware can be installed to fasten the chain and put the switch 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.

During this condition, 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.

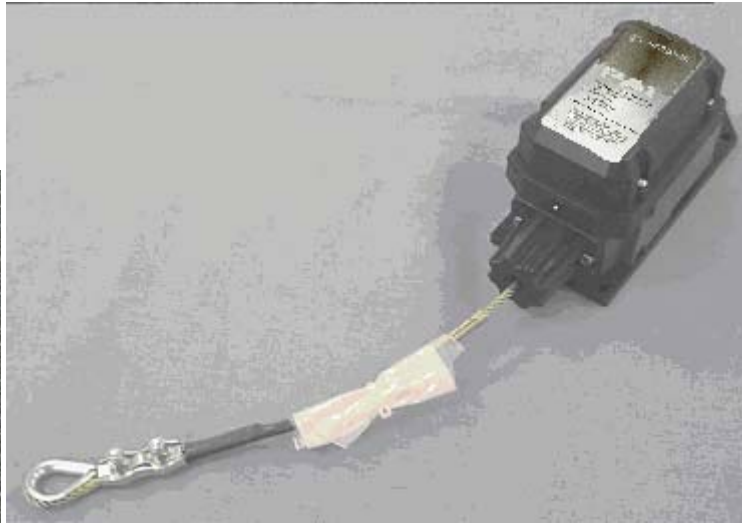


WARNING

The chain must be unhooked before the crane is operated.

6.6.4 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.

6.7 Wind

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 mounting pole is 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. It must be installed so that no part of the crane can disrupt the measurement of wind.



Assembly of parts.

6.8 Angle

6.8.1 Angle Installation, Setup, Calibration

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.



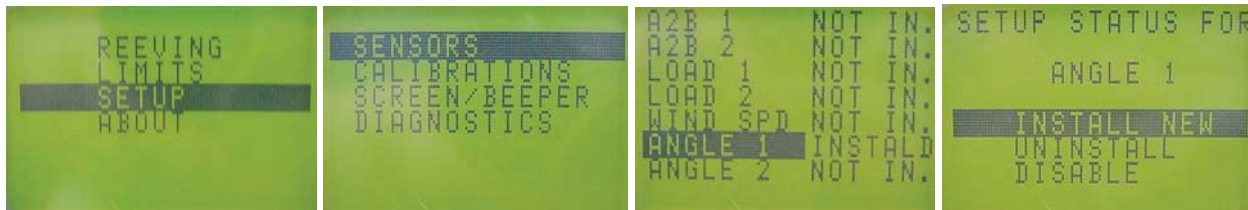
The angle sensor will be mounted on the side of boom so as the boom angle changes, the angle sensor can rotate as shown in the 0°(left) and 90° (above) positions.

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.

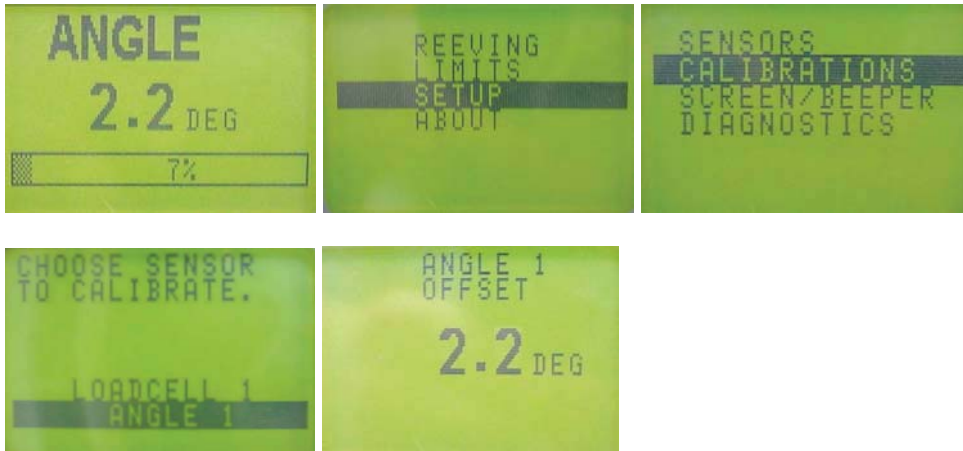


In the setup process you will be asked to insert the batteries while the receiver searches for the transmitter. Install batteries correctly as shown on the label in the battery compartment. When the sensor has been found, the angle sensor screen will be displayed. Inspect the gasket on the battery cover for cuts or other damages, install and tighten the four cover screws.



After making this selection, measure the boom angle by using a digital inclinometer (i.e. smart level). If the angle displayed does not match the measured angle complete the angle calibration next step. If the angle displayed matches the measured angle, go to step 6.

5. On the console, calibrate the angle by using the menu selection: MENU SETUP/CALIBRATIONS/ANGLE (1 or 2 as defined above)/ANGLE OFFSET. Note: Choose sensor to calibrate screen will not be shown if there is only one sensor installed.



After making this selection, measure the boom angle by using a digital inclinometer (i.e. smart level), scroll to the correct angle. Use the Up or Down arrows to adjust the offset to zero degrees. In this example, the displayed angle is 2.2° and the measure the boom angle by using a digital inclinometer is 1.2°; therefore, the down arrow was pressed to adjust the displayed angle to 1.2°.



Press the select button to enter the adjustment, pressing the “C” button will cancel the adjustment. 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.

6.8.2 Accuracy and Test Requirements

Check the angle display by changing the angle of the boom to known angles. The accuracy of the angle indication shall be within the tolerance of SAE J375, refer to complete SAE standard before testing.

Accuracy

For Boom Angle Indicating Systems, the indication is to be as follows: For boom angles 65 deg or more, the indicated angle is to be neither greater than the actual boom angle nor more than 2 deg less than the actual boom angle. For boom angles less than 65 deg., the indicated angle is to be neither greater than the actual boom angle nor more than 3 deg less than the actual boom angle.

Test Requirements

For system calibration, three or more test radii or boom angle are to be employed to establish compliance with the accuracy section above. Test angles are to be as near as practical to the minimum, mean, and maximum of the operating range.

For periodic calibration checks, two or more boom angles are to be employed.

Level the crane to within 0.5 deg in an area that is clear of obstructions, so that the boom may be moved from maximum radius/minimum boom angle to the minimum radius/maximum boom angle.

For boom angle indicating systems, the following test procedure or equivalent is used:
At each test position, the boom angle is measured by an adjustable level, protractor, or equivalent calibrated means and the measurement compared to the boom angle indicator. The adjustable level or protractor must be positioned on a smooth surface of the boom base section parallel with the longitudinal centerline.

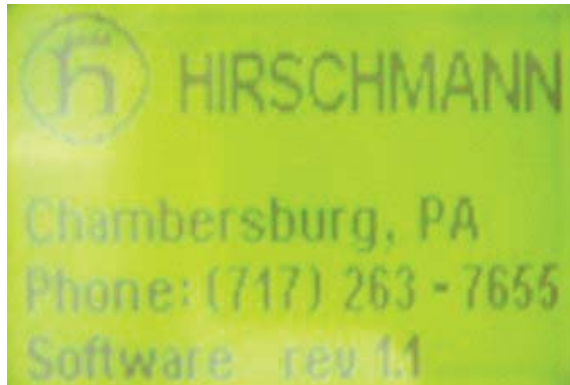
7 SERVICE / TROUBLESHOOTING

Daily maintenance of the Load 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 the problems identified in the Malfunctions Table and replacing faulty mechanical parts and cables, no other repairs shall be performed by non-expert personnel.

When the PRS80 Telemetry Receiver system is turned on, it will show the following screen. This screen shows the telephone number of Hirschmann 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 fails, please contact your nearest service representative before operating the system!

7.1 Screens

Communication error screen



This screen shows that there is an error in the communication between the sensor / sensors and the console. The sensor that is in error is indicated with the icon at the bottom of the screen. In the example, both the load and the A2B 1 are in error. Only the sensors that communication error are shown.

7.2 Diagnostics

There are several diagnostics screens that can be accessed thru the display. However, it is possible that a malfunction can cause the displays to be inaccessible. In this case follow the troubleshooting section of the manual.

7.2.1 To Test the Display:

Menu- SETUP/ DIAGNOSTICS/ SCREEN.



Various test screens will be displayed by pressing the button. Press button to go to the next screen. Note any problems in the display.

7.2.2 To Test the buttons:

Press



Menu- SETUP/ DIAGNOSTICS/ BUTTONS.



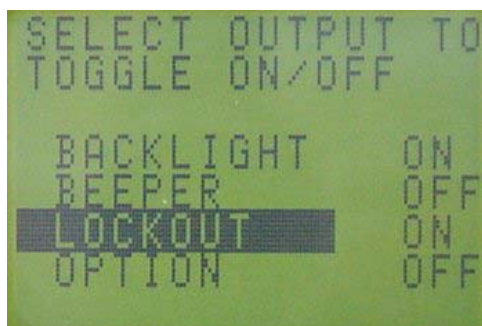
When a button is pressed, the corresponding button on the console will invert. Press each button one at a time. When finished, press and hold "C".


7.2.3 To Test the outputs:

Press



Menu- SETUP/ DIAGNOSTICS/ OUTPUTS.

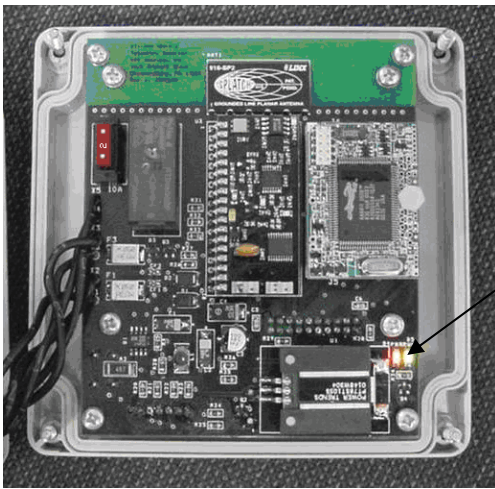


Arrow to select an output to test. Press  to test the selected output. The state of the output

will change when the  button is pressed. The status indicator text will also change when the



button is pressed.



Indicator LED's
RED = POWER
FLASHING GREEN = OK

7.3 TROUBLESHOOTING

After the onboard diagnostics have been performed, follow these guidelines

All LED's are located inside the receiver box.

Problem	Cause	Solution
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.
LCD does not function properly	Faulty LCD	Go into the diagnostics screen for the display. Verify all screens are functioning. If any of the tests fail, replace console
Buttons do not work	Faulty buttons	If possible, go to the diagnostics screen for the buttons. Test the function of each button. If any of the buttons fail, replace the console.
Communication error	Low battery	Verify which sensor is causing the error by looking at the icons on the communication error screen. Replace batteries.
Communication error	Faulty sensor	Verify which sensor is causing the error by looking at the icons on the communication error screen. Verify that the LED on the sensor is blinking.
Communication error	Poor reception	Verify which sensor is causing the error by looking at the icons on the communication error screen. Verify that the 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.
Horn does not sound	Faulty	Go into the diagnostics screen for the outputs. Verify all outputs are functioning. If any of the tests fail, replace console.
Crane functions locked out all the time	Incorrect wiring	Check for power to lockout device.
Crane functions locked out all the time	Communication error.	See communication error.
Crane functions locked out all the time	Fault in receiver module.	Check relay output voltage on wire number 3.
Transmitter LED does not flash	Sensor is asleep.	Pull switch wire rope. Red LED will flash ~each 2 sec. Replace batteries. Replace transmitter.

8 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.

8.1 Battery Replacement

To replace the batteries, remove the 4 screws from the transmitter housing. In 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.

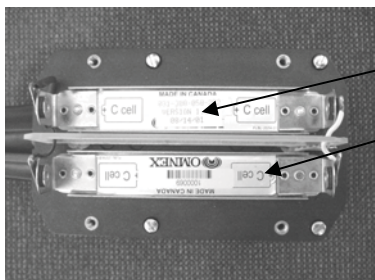
Make sure that the cardboard tube is installed as shown.



LOOSEN 4 SCREWS

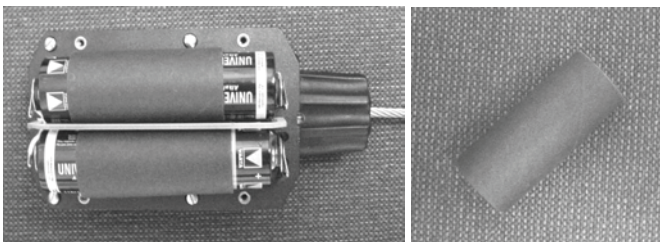


INSPECT CONDITION OF GASKET



Software version
Battery direction

BATTERY DIRECTION LABEL



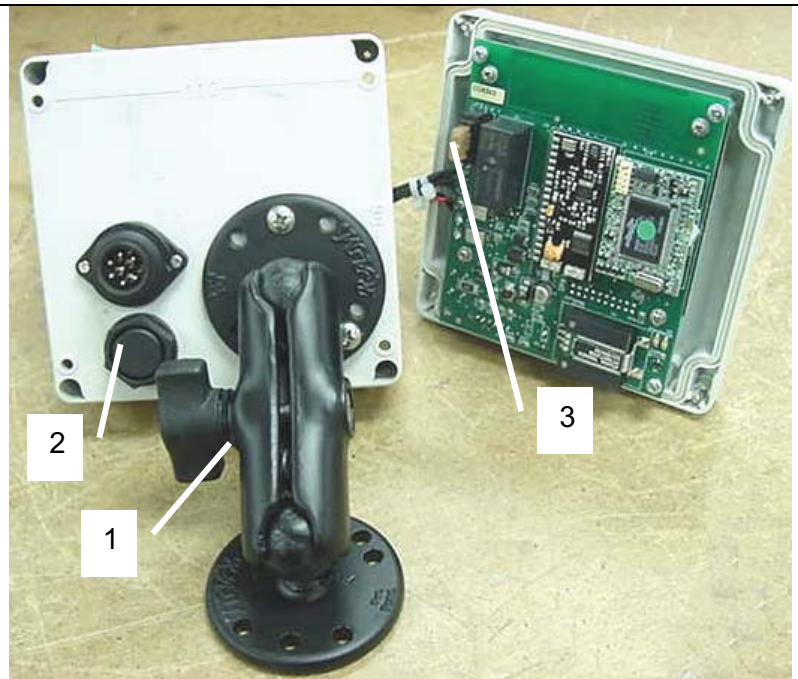
INSTALLED BATTERIES IN CARDBOARD TUBE

9 PART NUMBERS

CONSOLE



031-300-060-584
PRS80 Console

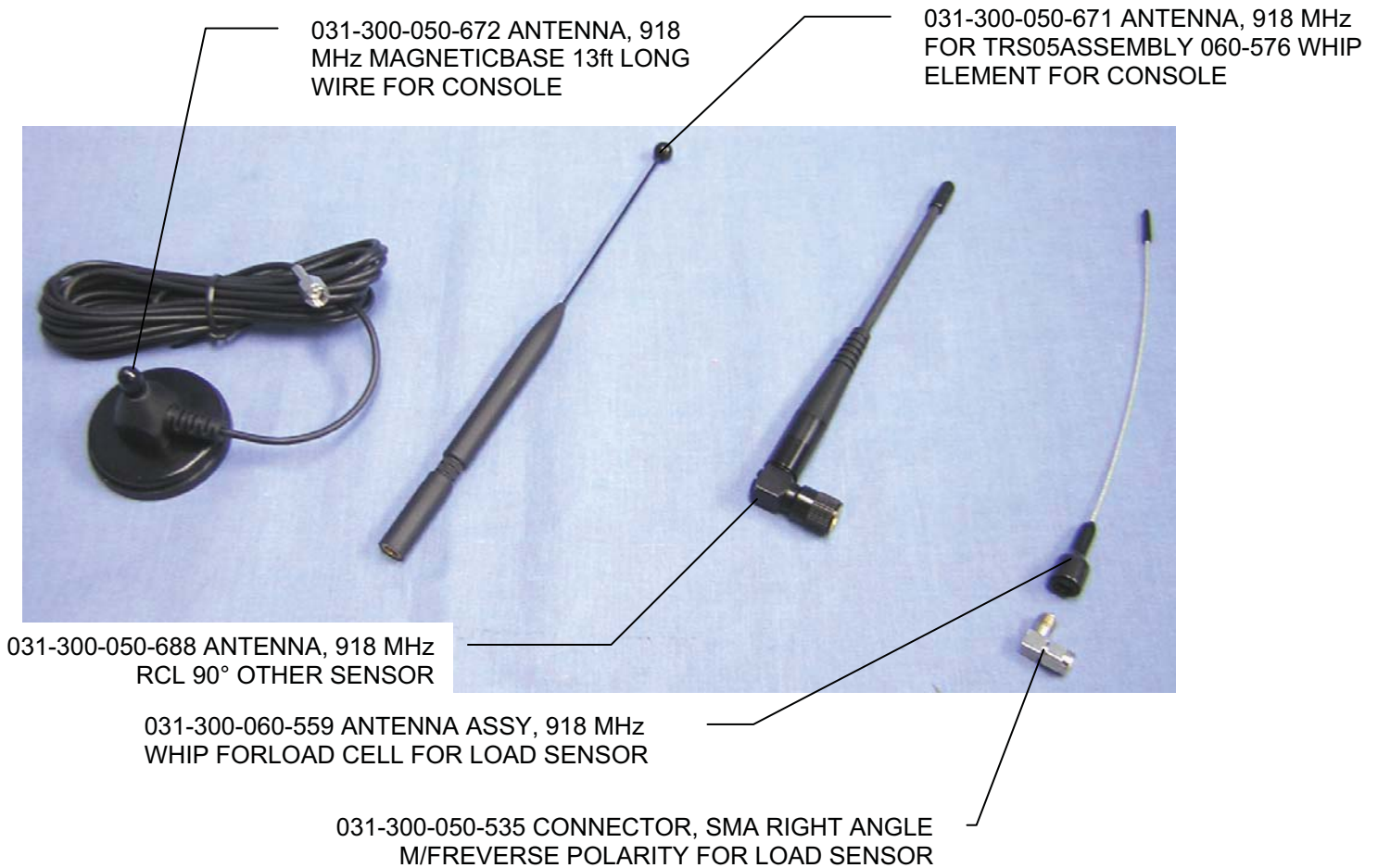


Item	Part number	Qty	Description
1.	031-300-060-382	1.0	Mounting Arm W/1" Ball
2.	024-000-100-095	1.0	Membrane Element
3.	031-300-050-223	1.0	Fuse, 2 Amp Auto (Mini)



031-300-060-491
Cable assembly, PRS80 Console

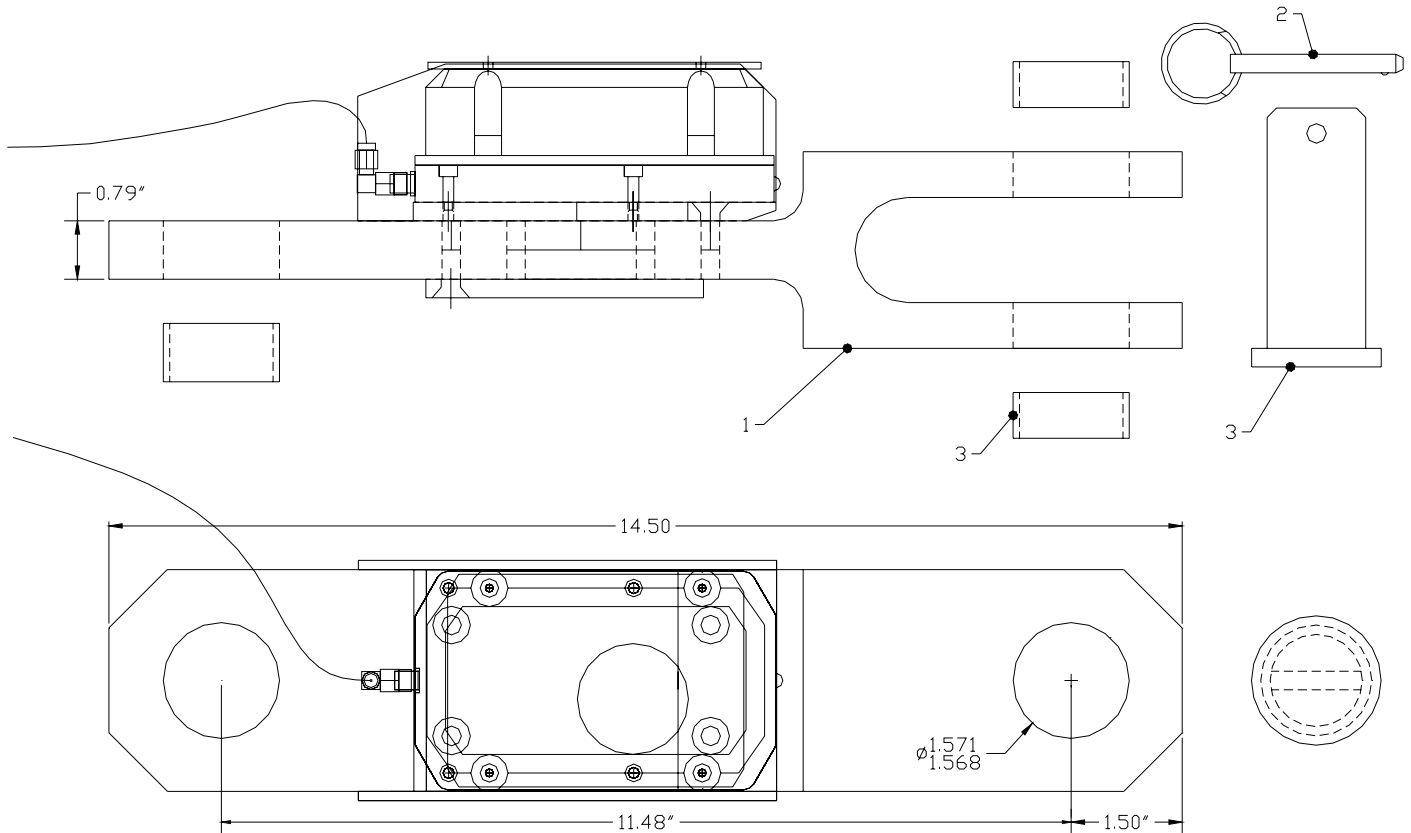
Mount antennas in identical positions and in a direct line between transmitter and receiver, ensuring that no obstructions will interfere with the transmission of the radio signal.



031-300-060-596 TRS 05 REPEATER
031-300-050-688 ANTENNA, 918 MHz RCL 90°



031-300-060-601 CABLE ASSY, 15' 2 COND SS 20AWG W/12 SKT DEUTSCH

LOADCELL**7.5t (15k) RADIO LOAD CELL**

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

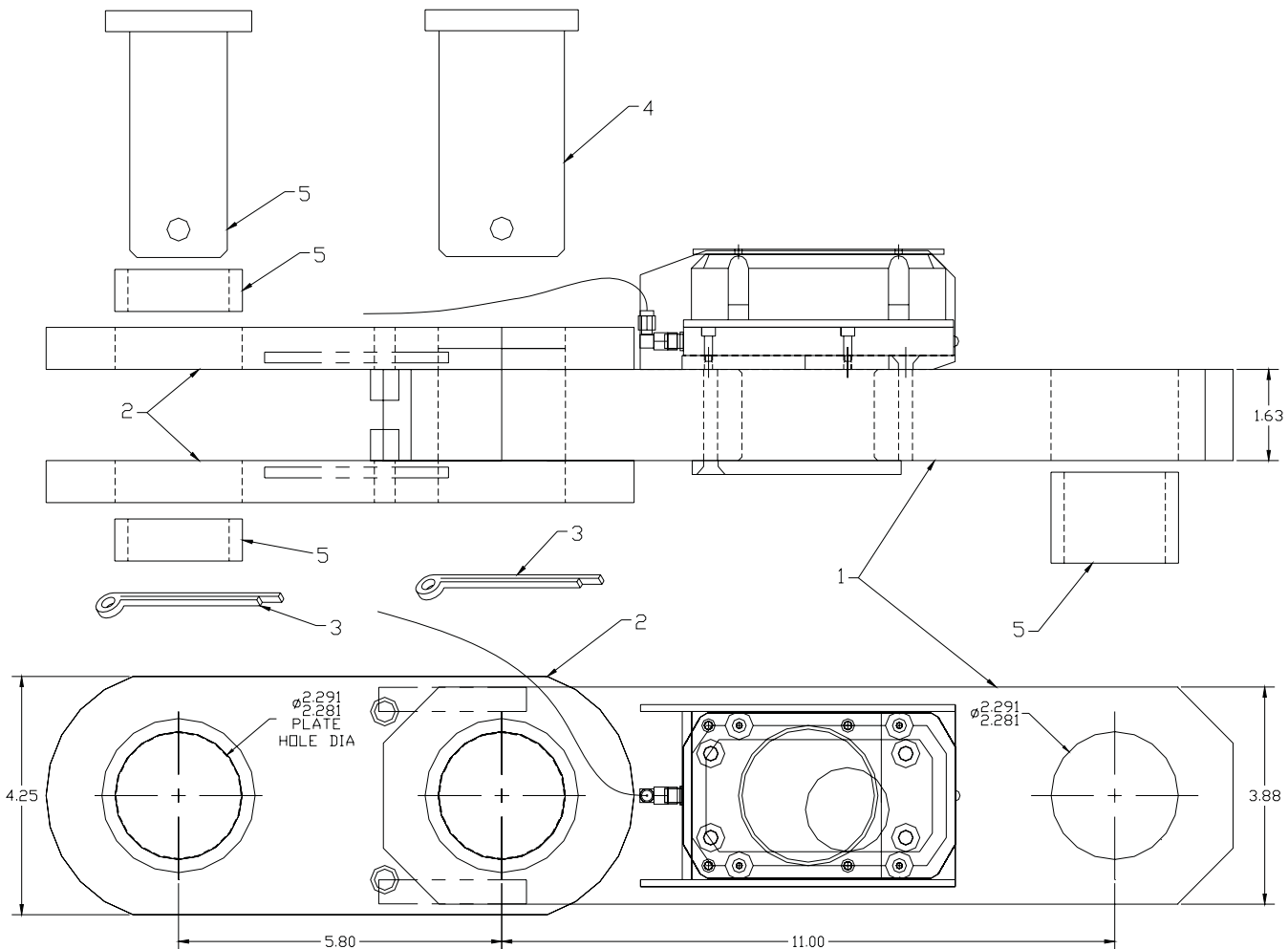
	ITEM	PART NUMBER	QTY	DESCRIPTION
	1	031-300-060-608	1.00	SENSOR ASSY, FORCE TRANS. 7.5T W/RADIO TRANSMITTER
	2	031-300-050-064	1.00	HARDWARE, COTTER PIN 2 3/8" LG1.8" GRIPPER LENGTH
OPTION	3	031-300-100-999	1.00	PIN, 1.5" DIAMETER, FOR USE W/15T FORCE TRANS.
OPTION	3	031-300-050-574	1.00	PIN/BUSHINGS, 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 031-300-060-559



90° antenna fitting 031-300-050-535

20t (45k) RADIO LOAD CELL

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

ITEM	PART NUMBER	QTY	DESCRIPTION
1	031-300-060-609	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 40K RADIO LOADCELL
OPTION 5	031-300-050-563	1.00	PIN/BUSHINGS, 1 5/8" FOR 40K RADIO LOADCELL 7/8" ROPE
OPTION 5	031-300-050-604	1.00	PIN/BUSHINGS, 1 1/2" FOR 40K RADIO LOADCELL



90° antenna fitting 031-300-050-535



Whip Antenna 031-300-060-559

A2B

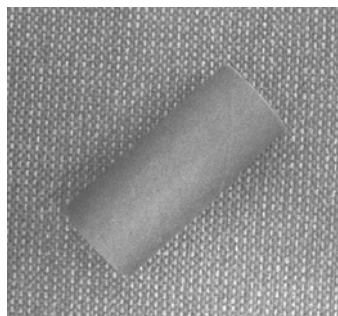
Radio A2B transmitter assembly with antenna
031-300-060-593



Radio A2B transmitter
031-300-060-586



Antenna only
031-300-050-688



Card board battery tube
031-300-050-536



Neoprene rubber gasket
031-300-050-763



Radio A2B switch
031-002-060-022



A2B Mounting stud
031-300-050-295



A2B mounting plate
031-300-050-264



Lynch pin
031-300-050-272

WIND

Mounting pole
031-300-050-321



Pin
031-300-050-322



Retaining pin
031-300-050-323



Anemometer mounting plate
031-300-050-480



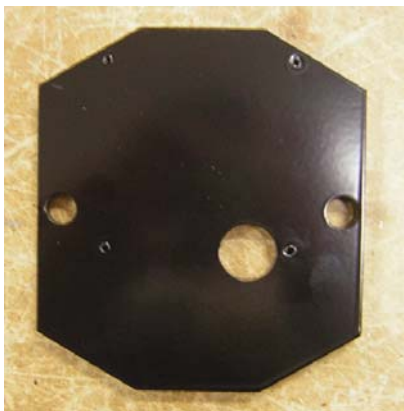
Transmitter
031-300-060-586

ANGLE

Angle sensor with transmitter
031-300-060-592



Mounting plate for angle sensor
031-300-050-577



Redesigned mounting plate (031-300-050-577)
(Direct replacement for above mounting plate)



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