



Rev 9

Cranesmart Systems

LMI System - User Manual

May 11, 2015



The Cranesmart™ LMI System

Congratulations!

“You have invested in the industry’s leading technology in crane safety equipment.”

This manual covers the installation and operation of all Cranesmart™ Load Moment Indicators (LMI).

For sales, service or assistance: (888) 562-3222 / 1 (780) 437-2986

An electronic copy of this manual is available at www.cranesmart.com in Adobe PDF format.

Load cell transmitter FCC compliance identification	NFBLAB123
Angle transducer FCC compliance identification	NFBLAB124
Anti-2-block transmitter FCC compliance identification	NFBLAB124

FCC Compliance: Please note - Changes or modifications not expressly approved by Cranesmart Systems for FCC compliance could void the user’s authority to operate the equipment.

Warranty

Cranesmart™ Systems warrants to the purchaser of each new Cranesmart™ System that any part thereof which proves to be defective in material or workmanship within two (2) years from date of delivery will be repaired or replaced at no charge if the system is returned to us in Edmonton, Alberta with all freight charges prepaid. If a performance problem should occur, contact our offices in Edmonton, Alberta, Canada at (888) 562-3222 or (780) 437-2986.

This warranty does not cover defects resulting from accident, alteration, improper use, or failure of the purchaser to follow normal operating procedures as outlined in this instruction manual and/or industry best practices.

PLEASE NOTE:

- OPENING THE DISPLAY PANEL VOIDS THE WARRANTY.
- NO COMPONENTS OF THE SYSTEM ARE TO BE SUBMERGED IN WATER.
- THIS WARRANTY IS IN LIEU OF ANY WARRANTY OR MERCHANTABILITY AND OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, ALL OF WHICH ARE HEREBY EXCLUDED.

Cranesmart™ Systems shall in no event be liable for any special, indirect, or consequential damages whatsoever and neither assumes nor authorises any person to assume for it any other obligation or liability.

Important Safety Information

All of Cranesmart™ Systems' load cells and support hardware have been designed and tested to have a minimum 5 to 1 safety factor and to meet or exceed the guidelines, standards and certification requirements set forth by more than 30 legislative bodies world-wide including API, ABS, DNV, ASME and OSHA.

All Cranesmart™ load cells and support hardware are to be considered “Critical Path” components. Loads imposed on these components should never exceed the maximum rated capacity shown on the load cell(s)/components. The rated capacity applies only to uniform direct tension loading (straight-line pull). Off-axis loading, bending, side loading, two-blocking and shock loads should be avoided. Damages caused by such situations are not covered by our warranty.

Inspection for damage, deterioration, cracks and corrosion on all load-bearing components should be conducted pre-use, weekly, monthly, quarterly or annually, depending upon crane usage. Load bearing components showing damage, deterioration, cracks or corrosion should be removed from service. If the crane is two-blocked or side loaded the load cell and links should be visually inspected immediately. Continued use of damaged components may result in catastrophic failure and personal injury.

Unless authorized by the factory in writing, modifications such as cutting, welding or permanently attaching other material to any load cell, pin, link or part thereof will void the warranty. **Do not** repair, alter, rework, or reshape any load bearing component by welding, heating, grinding or bending. **Do not** engrave or stamp markings into the steel body of the load cell as this may affect the integrity of the load cell, will void the warranty, and may result in a costly replacement of the steel body.

Regular Inspections

We recommend that all load components regularly undergo routine visual inspection as noted above. We also recommend that a qualified inspector, using industry standard techniques such as Ultrasonic Testing and/or Dye Penetrate Testing, annually inspect the load components. These tests are to be performed in conjunction with the inspection frequencies and guidelines as mandated by your applicable regulatory bodies.

IMPORTANT NOTE: Do not disassemble the load cell by removing the plastic covers during testing. Disassembly will require the cell to be returned to the factory for re-calibration and testing.

If **ANY** issues are found please note the Cranesmart™ System serial number, contact our staff at 888-562-3222 or 780-437-2986 and ask for the service department.

Table of Contents

INSTALLATION INSTRUCTIONS.....	10
LOAD CELL LINK INSTALLATION.....	11
Male/Female load cell installation (7,500, 15,000 & 25,000 lbs).....	11
Male/Female 7.5/15/25K Load Cell Link Placement Dead-end - for Multiple Parts-of-Line:.....	12
Male/Female 7.5/15/25K Load Cell link Placement on Headache Ball - for Single Part-of-Line:.....	13
Male/Male Flat Link Load Cell Installation (40,000, 50,000 or 80,000 lbs.).....	14
Sandwich Link Stabilization Pin – Male/Male flat link load cells only.....	14
Male – Male 40/50/80K Load Cell Link Placement on Boom Tip Dead-end - for Multiple Parts-of-Line:.....	15
Male – Male 40/50/80K Load Cell Link Placement on headache Ball – for Single Part-of-Line:.....	16
LOAD CELL BATTERY REPLACEMENT.....	17
RADIO LINERIDER INSTALLATION.....	19
Radio Linerider Installation Overview.....	19
Hydraulic Boom Linerider Installation Instructions.....	20
Installation steps.....	20
Lattice Boom Linerider Installation Instructions.....	21
Installation steps.....	21
Installing The Wire Rope (Hoisting Cable) Through Linerider Assembly Instructions.....	23
Installation steps.....	23
ANTI-2-BLOCK INSTALLATION.....	24
Counterweight.....	25
BOOM ANGLE TRANSDUCER INSTALLATION.....	26
WIND SPEED TRANSDUCER INSTALLATION.....	27

RADIO CABLE REEL WITH BOOM ANGLE MEASUREMENT	28
Cable Reel Assembly	28
Cable Reel Installation.....	29
Installation of Mounting Feet	29
Small Cable Reel Installation	30
Large Cable Reel Installation	31
Cable Reel Drum Installation	31
Installing the Guides and Anchor	32
Terminating the Cable at the Anchor	33
LEVEL TRANSDUCER INSTALLATION INSTRUCTIONS	34
Installation Type A – Measuring Machine Tilt (Roll).....	34
Installation Type B – Measuring Grade and Super Elevation / Ship List (Roll) and Trim (Pitch).....	35
Level Transducer Error Messages	36
BATTERY REPLACEMENT FOR ANTI-2-BLOCK, ANGLE, CABLE REEL & LEVEL TRANSDUCERS.....	37
BOOM DIRECTION TRANSDUCER – BDT	38
Mounting the BDT Bracket	38
Tank Tags.....	38
DISPLAY PANEL INSTALLATION.....	40
Mounting the Display Panel	40
Wiring the Display Panel.....	41
Alarm Shut-offs – The White Wire	41
Basic Wiring Diagram	42
Power Converters.....	43
Hazardous Location Rated systems	43
Junction Box	43

Junction Box Wiring Diagram.....	44
Alarm Hub	45
Alarm Hub Wiring Diagram.....	46
Antenna Installation	47
Antenna types	47
Outside Operator Cab OR no Cab on Crane	48
Inside Operator Cab.....	49
Marine Installation.....	50
Shut-off Bypass Plug	51
DISPLAY PANEL OPERATIONS	52
System Start-up.....	52
To Accept the Current Configuration.....	53
To Change the Display Panel Configuration.....	53
Quick Winch Switching.....	54
To View the Auxiliary Winches.....	54
To Accept the New Winch Configuration.....	56
Panel Button Functions.....	57
Menu Navigation	58
Secondary Operating Screen Navigation Bar.....	58
Tare Out Function.....	58
Setup Menus	59
OPERATOR PERMISSION LEVEL	60
Configure Menu	61
Select Winch and POL (Parts-of-line).....	61
Limits Menu.....	61
Load Limits.....	61
Angle Limits	62

Tip Height Limits	62
Radius Limits.....	62
Level Transducer Limits.....	63
Wind Limits	63
System Menu	64
About	64
LCD Contrast.....	64
Permissions	64
Diagnostic Menu.....	65
Signals.....	65
Panel Relay	65
Viewer.....	65
Cable Reel.....	66
 SUPERVISOR PERMISSION LEVEL.....	 67
Permissions Level	68
To Set the Permission Level.....	68
To Exit the Setup Menu.....	68
Calibration Menu	69
Load Cell Calibration	69
Boom Angle Indicator Calibration	71
Level Transducer Calibration	71
Cable Reel Calibration.....	72
Options Menu.....	73
Limits Lock.....	73
Bypass button.....	73
Ext Relay (Output for Shutoff/Horn/Indicator).....	73
Config Lock.....	74
Language.....	75
Units.....	75

BDT Default	75
Basket Capacity	76
System Menu	76
About	76
LCD Contrast.....	76
Permissions	77
Restricted	77
Clock.....	77
Checksum Repair.....	77
Display Timer	78
Supervisor Enable/Disable Menu	78
Logger Menu.....	78
Download.....	78
PIN Codes	79
PIN Login	79
DISPLAY PANEL – OPERATING SCREENS.....	80
Primary Operating Screen	80
Secondary Operating Screen	80
Limits Screen	82
Signal Strength Screen.....	83
Info Screen.....	84
DISPLAY PANEL – ALARMS	85
Alarm Codes	86
Function Shut Offs.....	89
TECHNICAL SPECIFICATIONS	90
7,500lb single line pull load cell.....	90
15,000 single line pull load cell.....	91

25,000lb single line pull load cell.....	92
40,000lb single line pull load cell.....	93
50,000lb single line pull load cell.....	94
80,000lb single line pull load cell.....	95
Anti-2-Block Switch.....	96
Boom Angle Transducer.....	97
Display Panel.....	98
Alarm Hub.....	99
Wind Speed Transducer.....	100

Installation Instructions

Guidelines

- **Read these instructions before beginning installation procedures.**
- **If the power available is not 12 to 24VDC (28VDC maximum) Cranesmart™ Systems can supply the necessary converters. Please call our service department at (888) 562-3222 or (780) 437-2986.**

- Have the necessary tools available.
- Mount the transducers - Load Cell, Angle transducer, A-2-B switch, etc.
- Mount the Panel, Alarm Hub and Antenna.
- Test the system.

Tools Required

- Man basket if the boom cannot be lowered– to reach the boom, rooster sheave and/or jib
- Pliers – for removing and bending cotter pins.
- Electric drill with bits.
- Welder not required for LOAD CELL installation – for attaching weld plate to boom/jib tips – if installing A2B or angle systems.
- Wire crimping tools – for the display panel power and ground connections.
- Screw drivers and/or socket set.
- Anti-seize compound for bolts and threaded pins so that the components can be disassembled and/or removed if necessary.

NOTE:

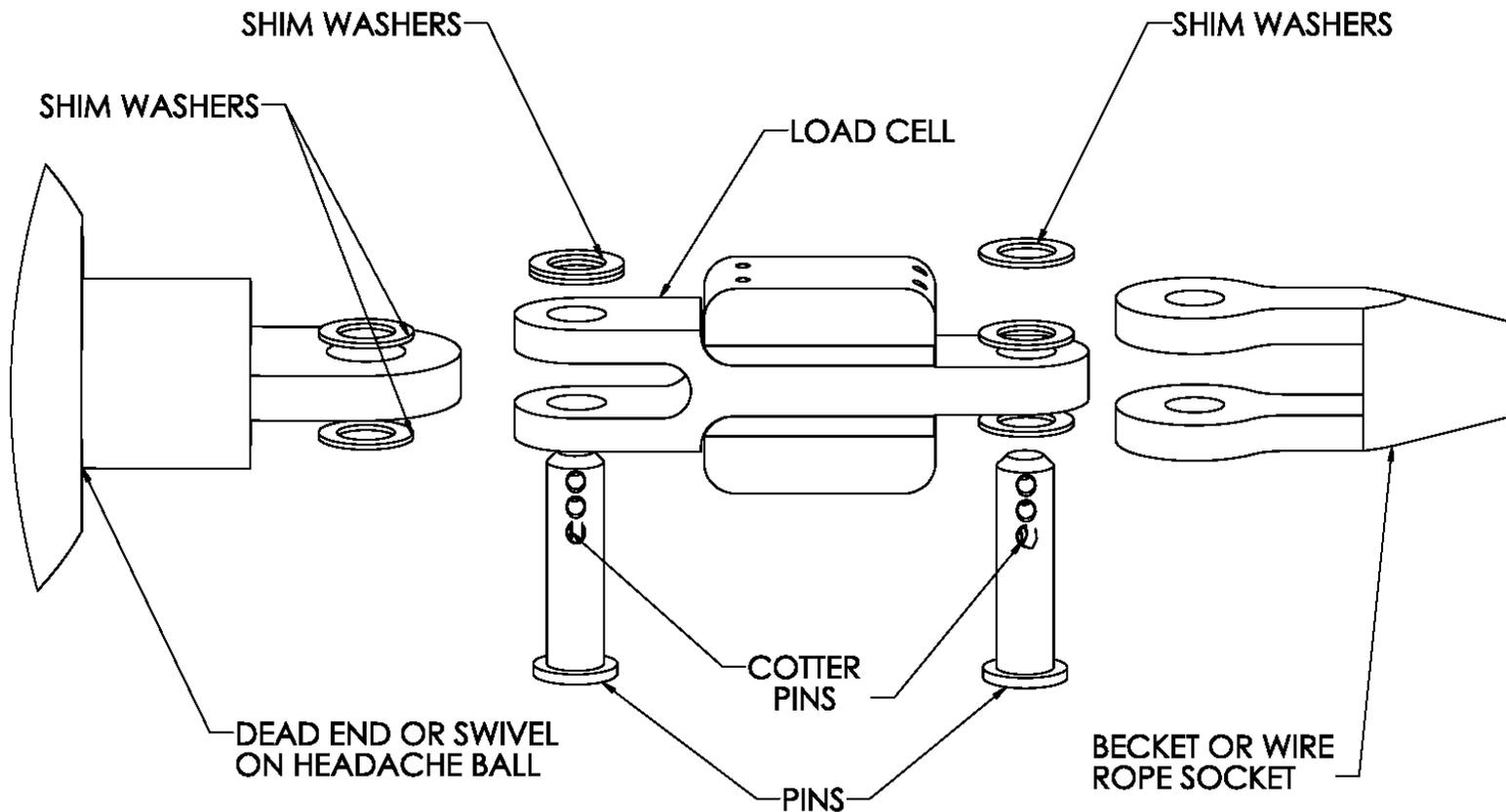
- When a Cranesmart™ system is programmed for use with an Alarm Hub, the Alarm Hub will need to be present as power to the display panel is routed through the alarm hub. If the Alarm Hub is damaged or missing and the panel is powered, an error condition will be present on the display panel.

Load Cell Link Installation: “Male to Female” load cell form (7,500, 15,000 & 25,000 lbs)

(Blue = Main Line, Yellow = Aux. 1 Line, Orange = Aux. 2 Line)

Refer to the following two illustrations for the correct installation of the load cell(s):

1. Even Parts of Line: Pin the load cell between the wire rope socket (becket) and the dead end on the boom of the crane (see second illustration)
2. Odd Parts of Line: Pin the load cell between the wire rope socket (becket) and the headache ball.
3. If an Aux.2 load cell link, pin to the auxiliary line from the rooster sheave on the crane's boom tip.

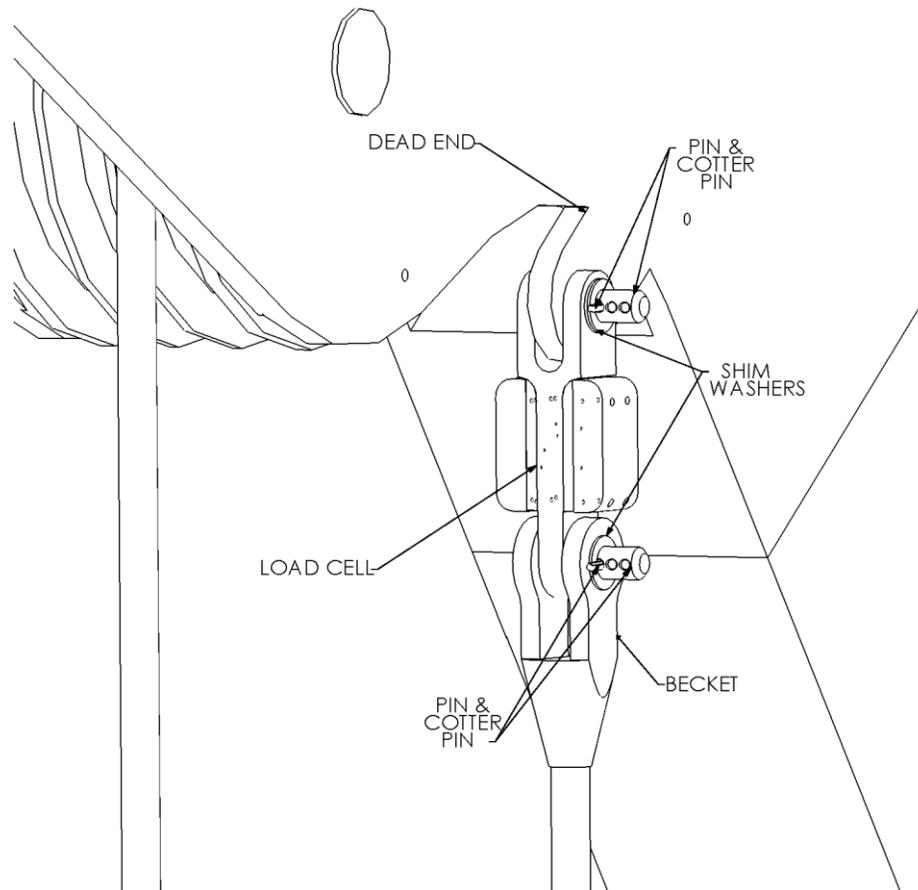


Load Cell Link Installation: “Male to Female” form (Dead-End / Multiple Parts-of-Line)

1. Pin the load cell link between the wire rope (wedge) socket and the dead end as illustrated below.
2. Your system is calibrated at the factory.
3. If you have any questions please call our sales department at (888) 562-3222 or (780) 437-2986.

NOTE:

- Ensure the load cell does not contact the boom or rigging at any angle when pinned in place.

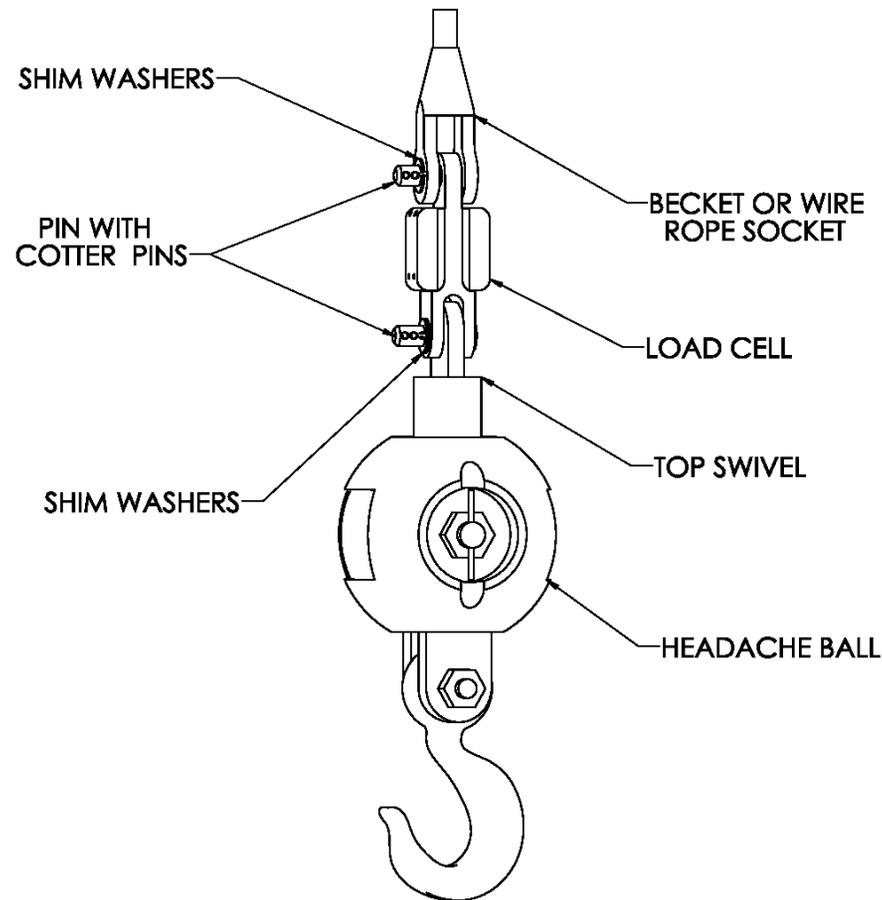


Male/Female 7.5/15/25K Load Cell link Placement on Headache Ball - for Single Part-of-Line:

Pin the load cell link between the wire rope (wedge) socket and the “Headache Ball” or hook block as illustrated below. Your system is factory calibrated. If you have any questions please call our sales department at (888) 562-3222 or (780) 437-2986.

NOTE:

- Custom links are available, if necessary, to help fit the load cell on the ball. Please call for assistance.

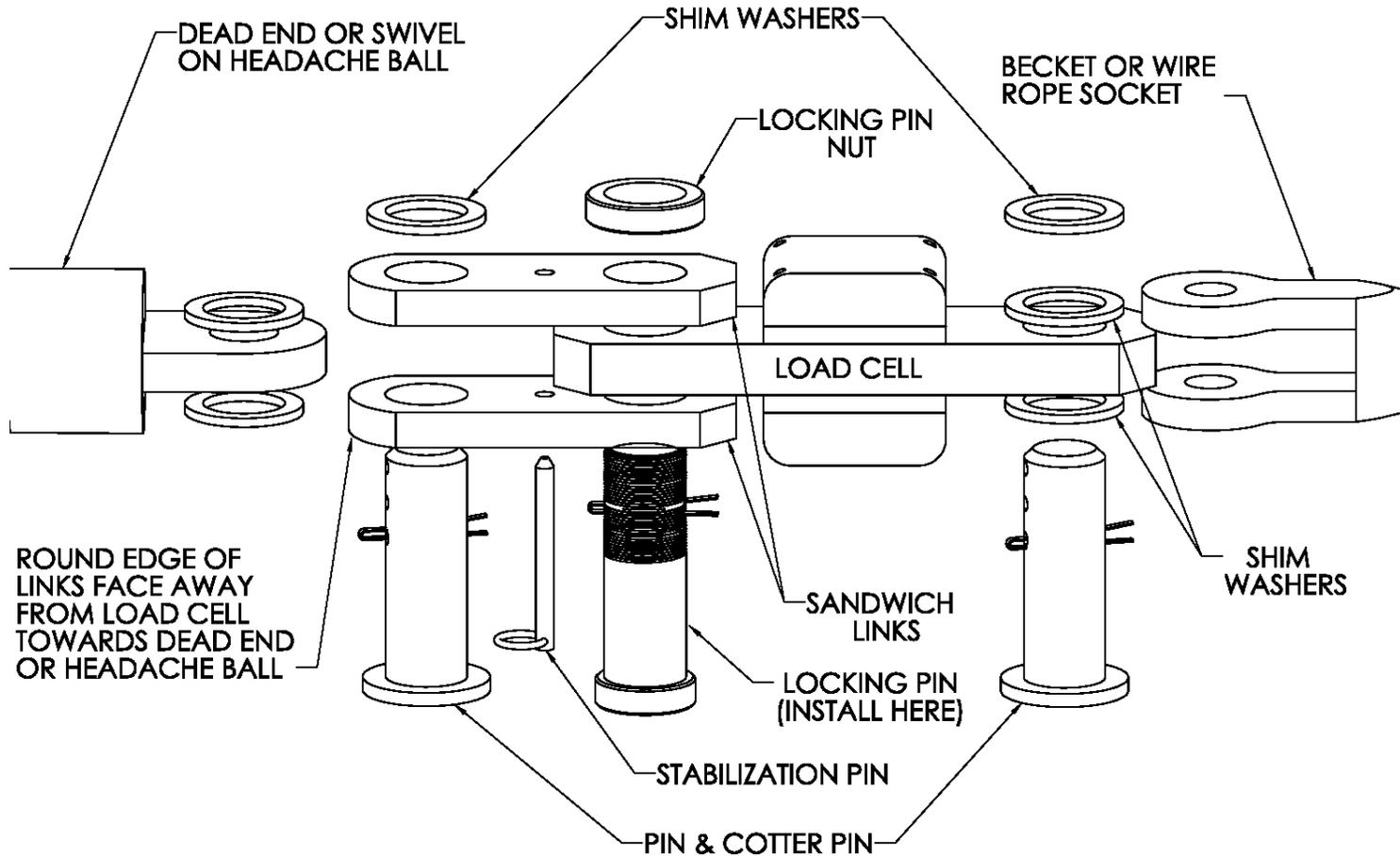


Male/Male Flat Link Load Cell Installation (40,000, 50,000 or 80,000 lbs.)

(Blue = Main, Yellow = Aux. 1 Winch, Orange = Aux. 2 Winch)

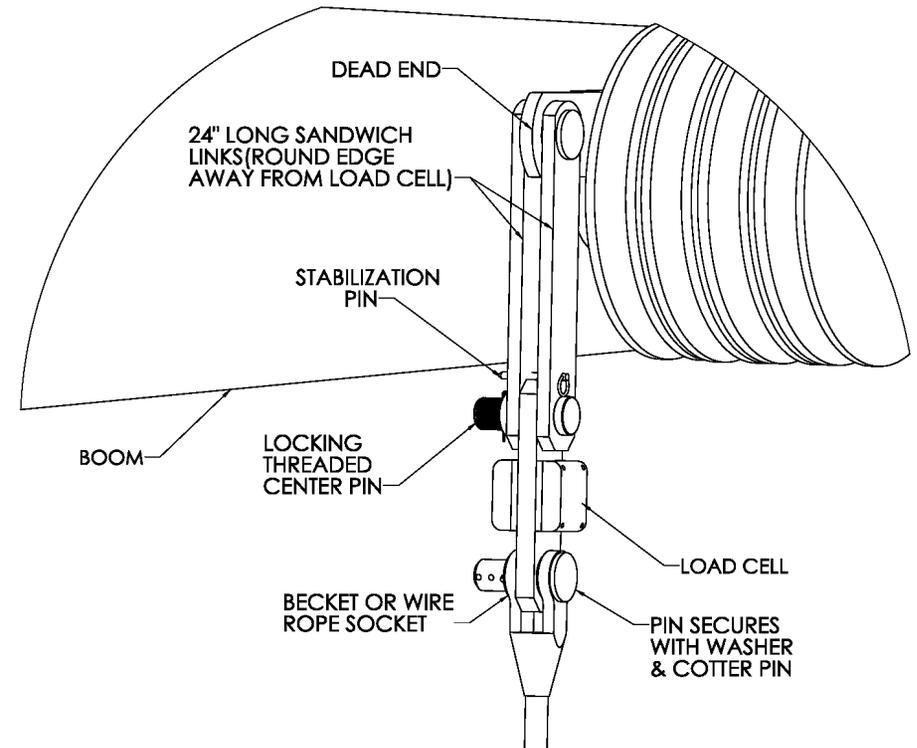
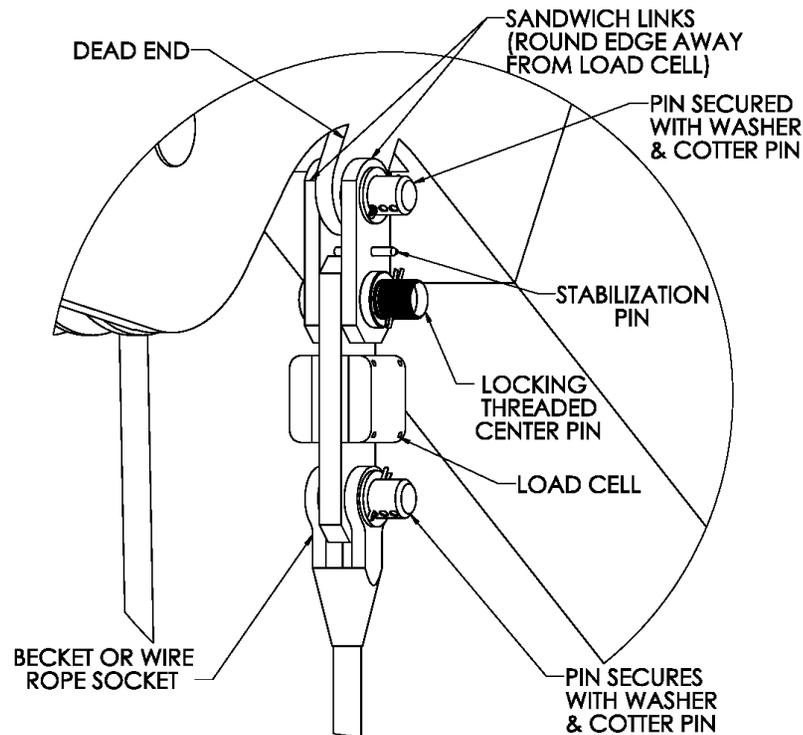
Sandwich Link Stabilization Pin – Male/Male flat link load cells only

The Sandwich Link Stabilization Pin prevents the sandwich link from folding against, and damaging the load cell when the headache ball or hook block is laid on the ground or during a two-blocking. Also ensure that it is securely in place. Ensure that the locking threaded centre pin and the stabilization pins are located in place as illustrated below.



Male – Male 40/50/80K Load Cell Link Placement on Boom Tip Dead-end - for Multiple Parts-of-Line:

The drawings below show the standard Sandwich Link installation and the optional 24" long Sandwich Link installation. Use the Sandwich Links to pin the load cell link between the wire rope socket (becket) and the dead end boom tip as illustrated below. Place the locking threaded centre pin (important) and the stabilization pin as illustrated below.



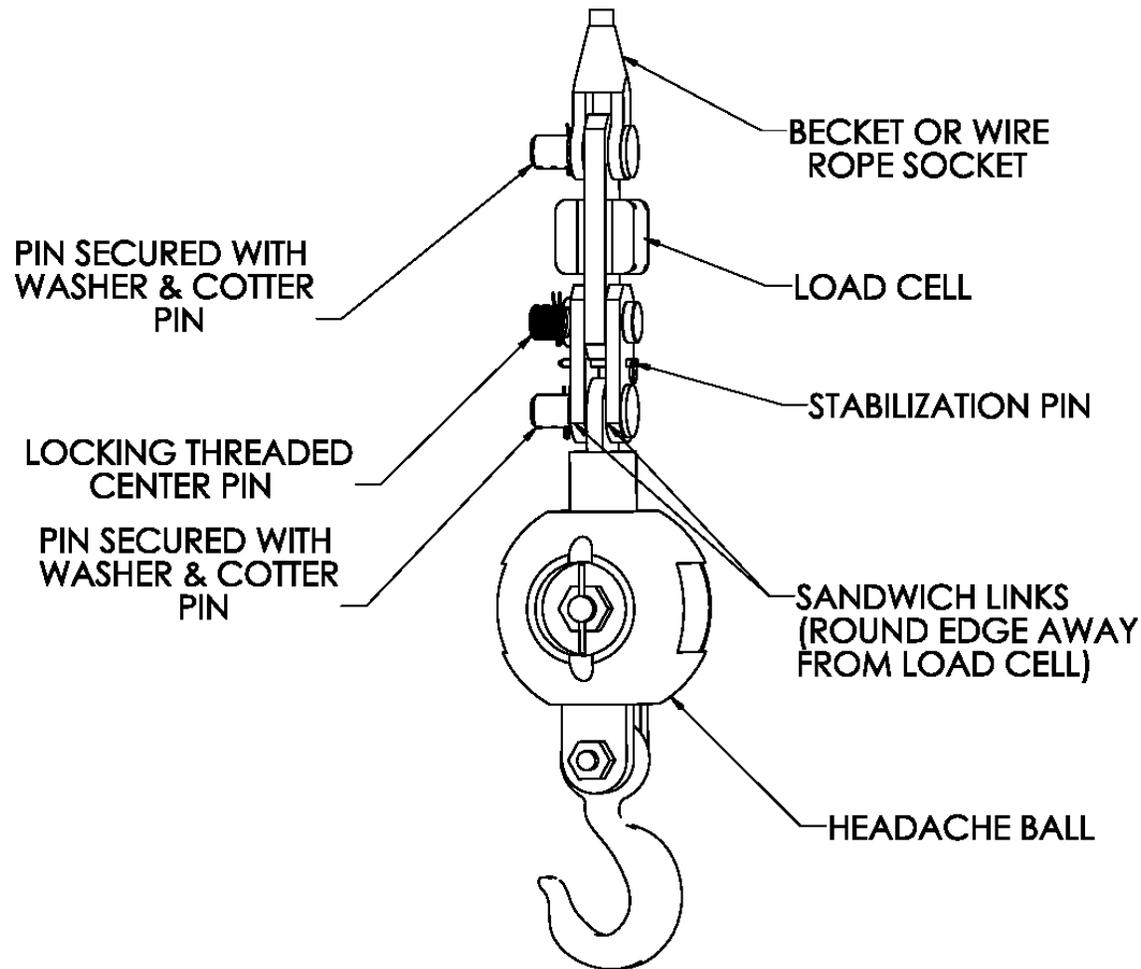
Your system is factory calibrated. If you have any questions please call our sales department at (888) 562-3222 or (780) 437-2986.

NOTE:

- Ensure the load cell does not contact the boom or rigging at any angle when pinned in place.

Male – Male 40/50/80K Load Cell Link Placement on headache Ball – for Single Part-of-Line:

Pin the load cell link between the wire rope (wedge) socket and the “Headache Ball” or hook block as illustrated below. Place the locking threaded centre pin and the stabilization pin as illustrated below.



Your system is factory calibrated. If you have any questions please call our sales department at (888) 562-3222 or (780) 437-2986.

Load Cell Battery Replacement

The display panel will indicate a low battery for approximately three (3) weeks before the battery fails.

Starting for systems sold during and after February 2008, Cranesmart™ Systems will supply replacement power cells for our transmitters for the cost of freight shipping (customers are responsible for any incurred taxes/duties).

Before replacing the batteries call the service department at (888) 562-3222 or (780) 437-2986. Once you have verified that it is a dead battery follow the steps below.

Please have the serial number of your system handy before calling for replacement batteries or to ask for technical assistance. You can find the serial number on either the display panel or the load cell itself.

Tools and Equipment for battery replacement:

Battery replacement kit contains:

- One 3.6 volt Lithium Ion D-cell battery
- Two O-rings – (one for a 7.5/15/25K load cell, one for a 40K and larger load cell)
- One 6g packet of Silicone Grease (Dow corning 111 or similar)
- One 5/32" Allen key

The Kit also contains the following:

- Two battery cover gaskets – (one for a 7.5/15/25K load cell, one for a 40K and larger load cell)
- One tube of RTV Silicone Sealant (Dow corning 734 or similar)

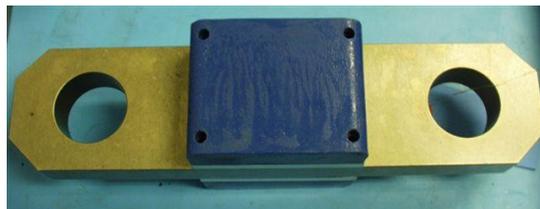
These parts are designed for use with the older gasket sealed load cells and **are not to be used** with o-ring sealed load cells.

NOTE:

- SAFT 33600 3.6V Lithium power cells may also be available from local sources. Ensure that you take the existing battery with you if possible for correct size matching. Other manufacturer's may not follow the SAFT sizing conventions.
- If you purchase your own battery you will also need to reuse the o-ring. Please ensure that you use grease, as per the instructions below, when installing the o-ring.

Locate the four exposed hex bolts on the battery compartment side of the Load Cell. If the holes are filled with silicone you are on the transmitter side of the Load Cell. Do not open this side, it has no user serviceable parts. Your warranty will be **Void** if the Transmitter Electronics section has been opened.

1. Remove the load cell from the crane.
2. Use the Allen key to remove the four hex bolts.
3. Remove battery from clip (ensure you do not break the red polarisation tab).
4. Install the new Battery, (positive '+' to red polarisation tab).
5. Remove the old o-ring from the aluminum plate and discard.
6. Grease the proper replacement o-ring with your fingers using a portion of the silicone grease supplied with the kit.
7. Install the new greased o-ring into the groove on the aluminum plate. Apply the remaining grease liberally covering the o-ring and groove. As mentioned above, **Do Not use the RTV silicone sealant** it is for the older gasket style load cell.
8. Place the plastic cover over the Battery pack taking care not to pinch the battery wires.
9. Replace the screws and fully tighten the hex bolts. Some grease may squeeze out depending on the amount grease applied.
10. Clean off any excess grease.
11. Re-install the load cell to test its operation.



Do not use a power drill or power screwdriver to remove or tighten the bolts, you may damage the threads on the aluminum plate.

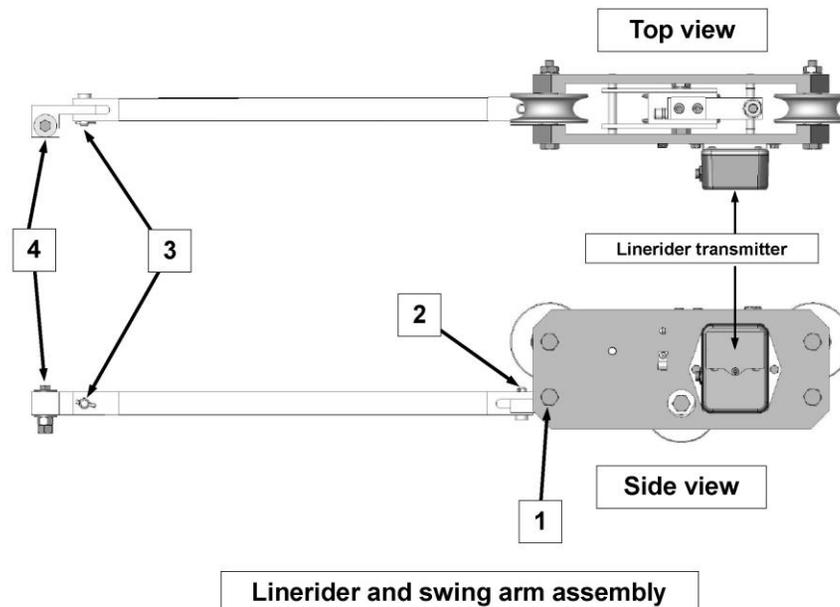
Radio Linerider Installation

The linerider installation will depend on the type of boom. Please read and follow the applicable instructions for hydraulic or lattice style booms.

Radio Linerider Installation Overview

The linerider is attached to a swing arm mounting bracket (included with kit) as shown in the illustration below. 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.

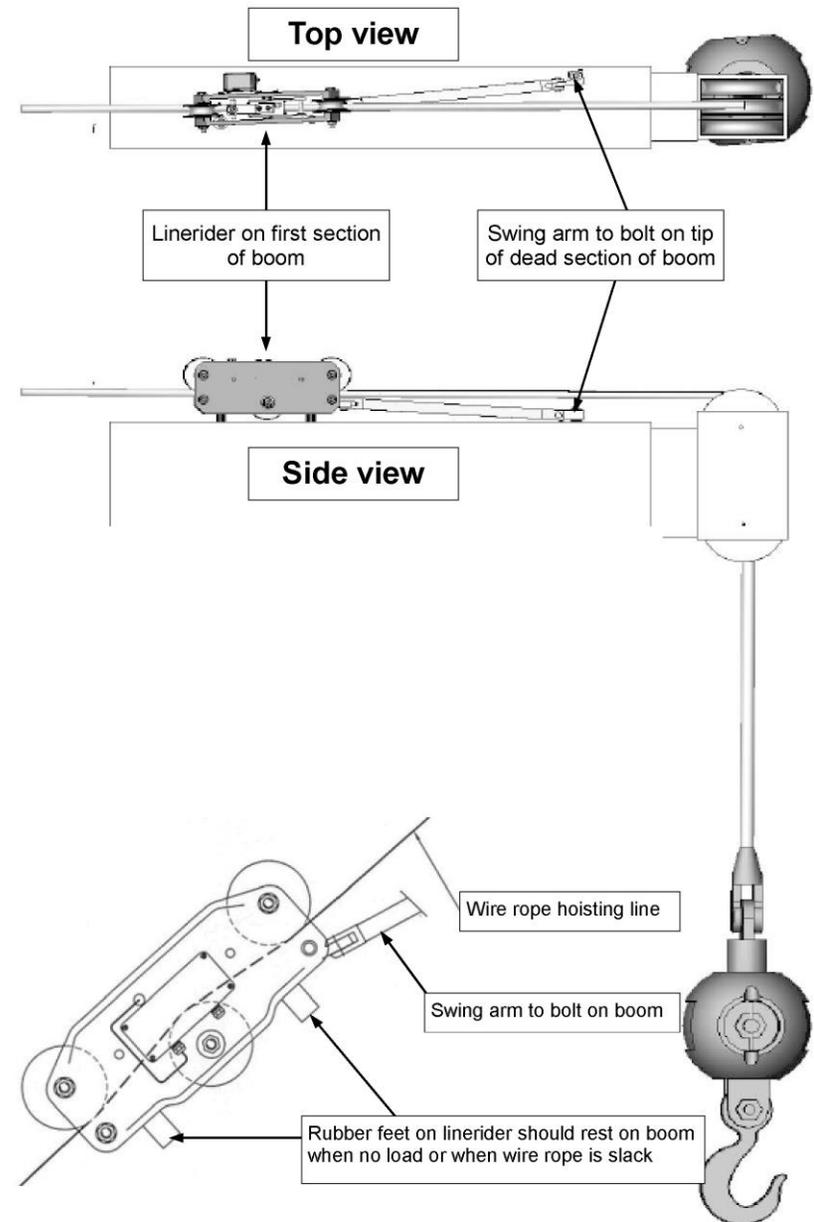


Hydraulic Boom Linerider Installation Instructions

Important note: The linerider component should be located on the top of the boom and as close to the dead end section boom tip as possible – see illustration.

Installation steps

1. Affix the bolt at the tip of the base section (dead section) of the hydraulic boom as illustrated to the right. Select a location so that the swing arm angle with respect to the boom will not exceed 30° during normal operation of the crane. The linerider should be located on the top of the boom and as close to the dead end section boom tip as possible.
2. Attach the swing arm to the bolt.
3. Run the hoist line through the linerider as per instructions on page 23 of this manual.
4. Check to ensure that the linerider has freedom of movement from side to side.

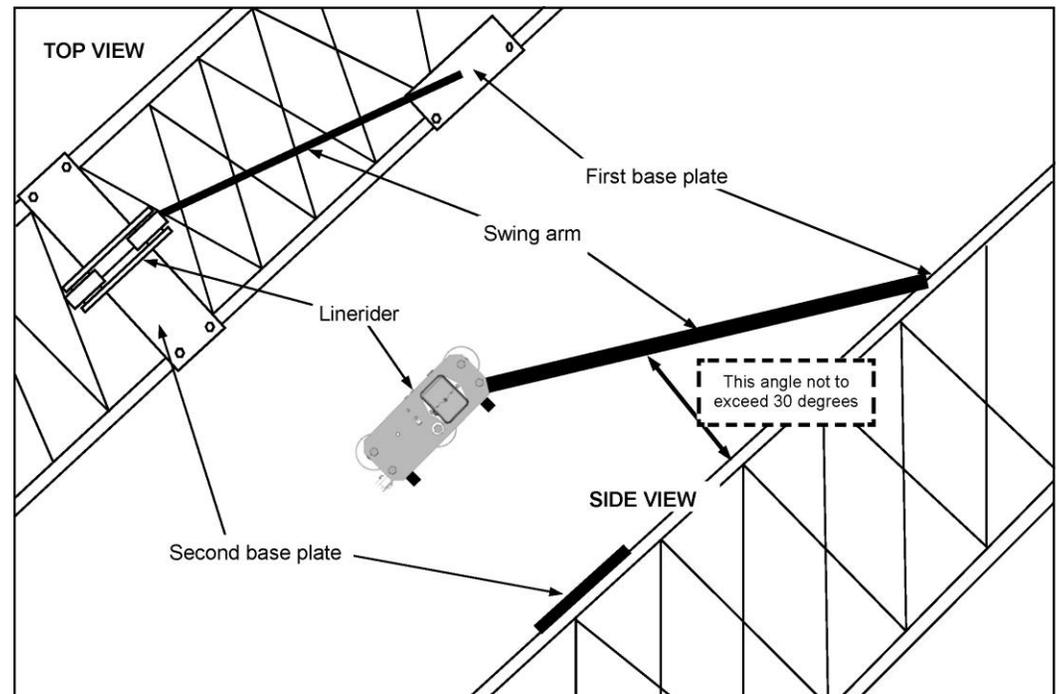


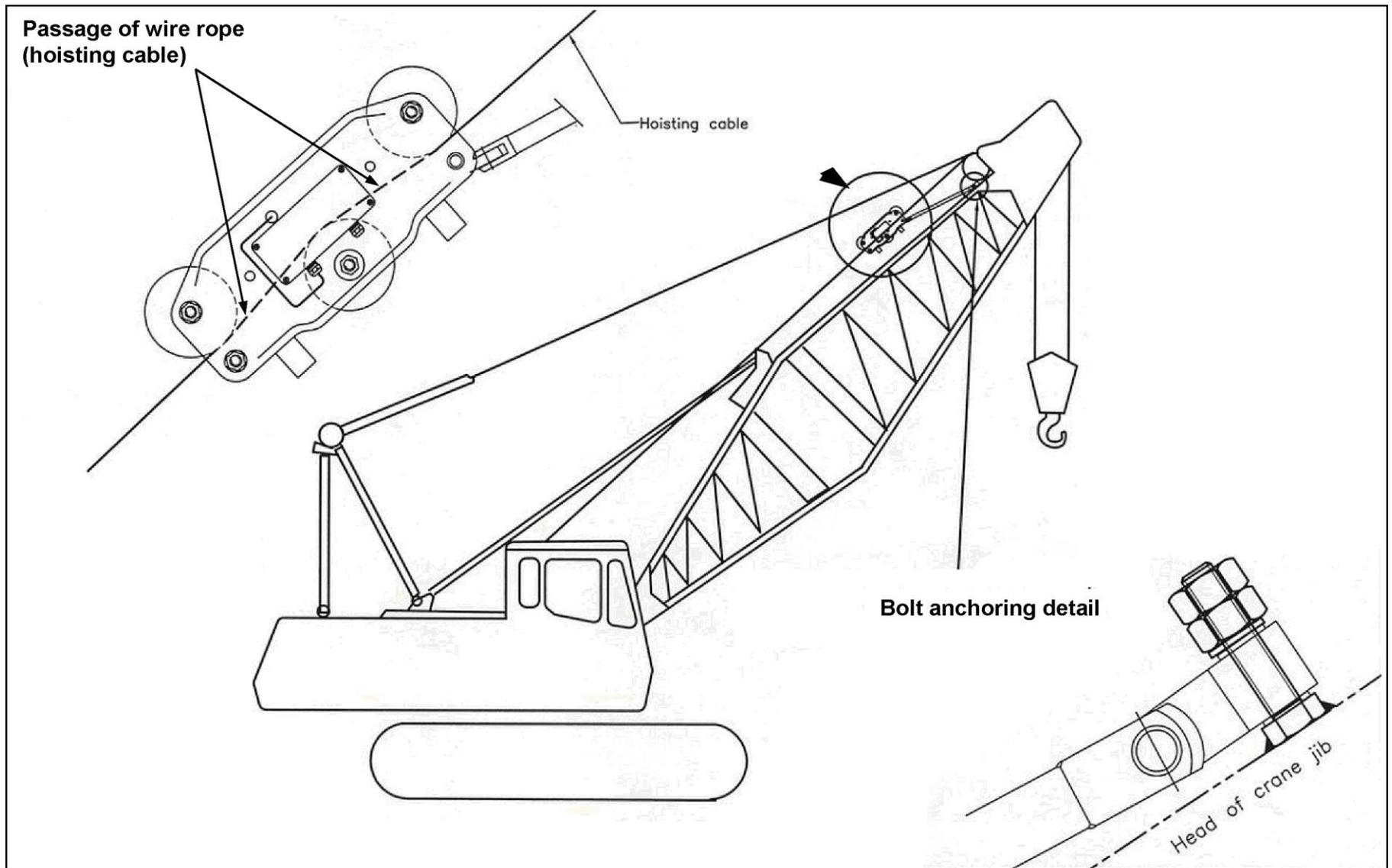
Lattice Boom Linerider Installation Instructions

Important note: The linerider component should be located on the top of the boom and as close to the boom tip as possible.

Installation steps

1. Select a location that the swing arm angle with respect to the boom will not exceed 30° (see figure below). The linerider should be mounted as close to the lattice boom tip as possible.
2. Construct two base plates. Size of the base plates will be specific to the lattice structure and your selected location.
3. The first base plate will be attached to the boom with the swing arm bolt affixed to the center of the base plate.
4. The second base plate will be attached to the boom so that it supports the linerider when not in use.
5. Affix the swing arm bolt to the center of the first base plate.
6. Affix the first base plate to the selected location on the lattice boom.
7. Attach the swing arm to the bolt.
8. Run the wire rope (hoisting line) through the linerider as per instructions on page 23 of this manual.
9. Ensure freedom of movement from side to side.
10. Attach the second base plate to the boom so the linerider's rubber feet will touch the plate when there is no load (wire rope is slack).





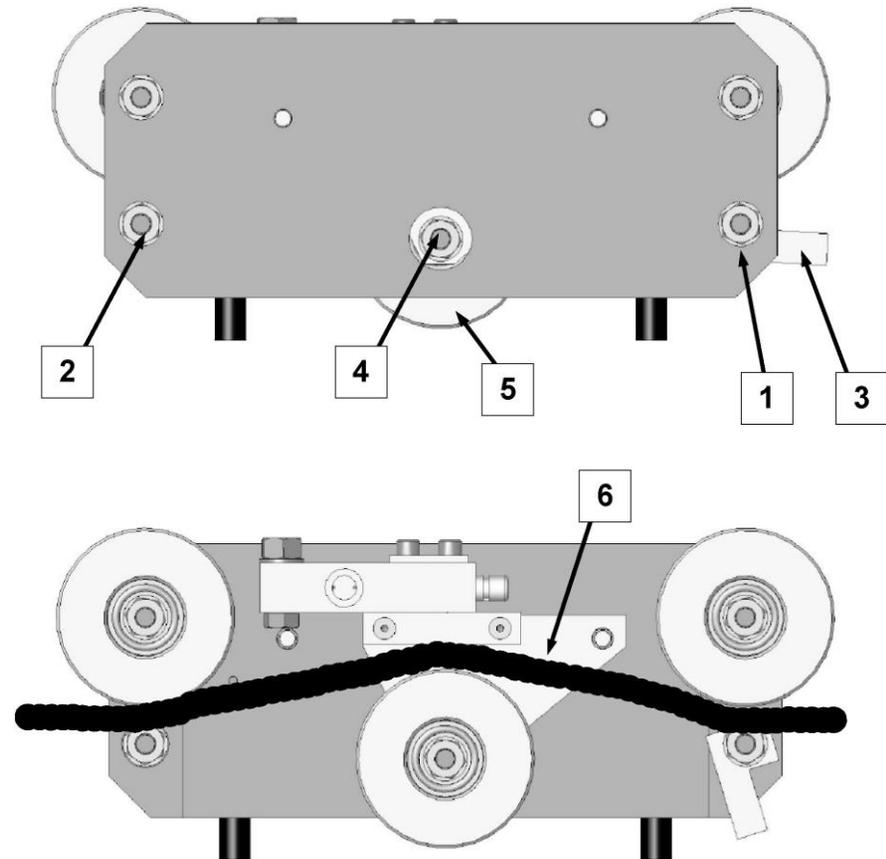
Linerider Mounting on Lattice Boom Tip

Installing The Wire Rope (Hoisting Cable) Through Linerider Assembly Instructions

Important note: The linerider component should be located on the top of the boom and as close to the boom tip as possible. The wire rope should be maintained according to standard practices (in good condition, properly lubricated) to ensure correct calibration.

Installation steps

1. With linerider positioned as illustrated at right remove free axle (at right bottom of the linerider).
2. With linerider positioned as illustrated above remove anchoring axle (at left bottom of the linerider).
3. Remove anchor component with sleeve.
4. Remove measurement pulley axle (at the left center of the linerider).
5. Remove the pulley with its sleeve.
6. Pass and position the wire rope (hoisting cable) as illustrated at right.
7. Put the linerider back together in reverse of disassembly steps.

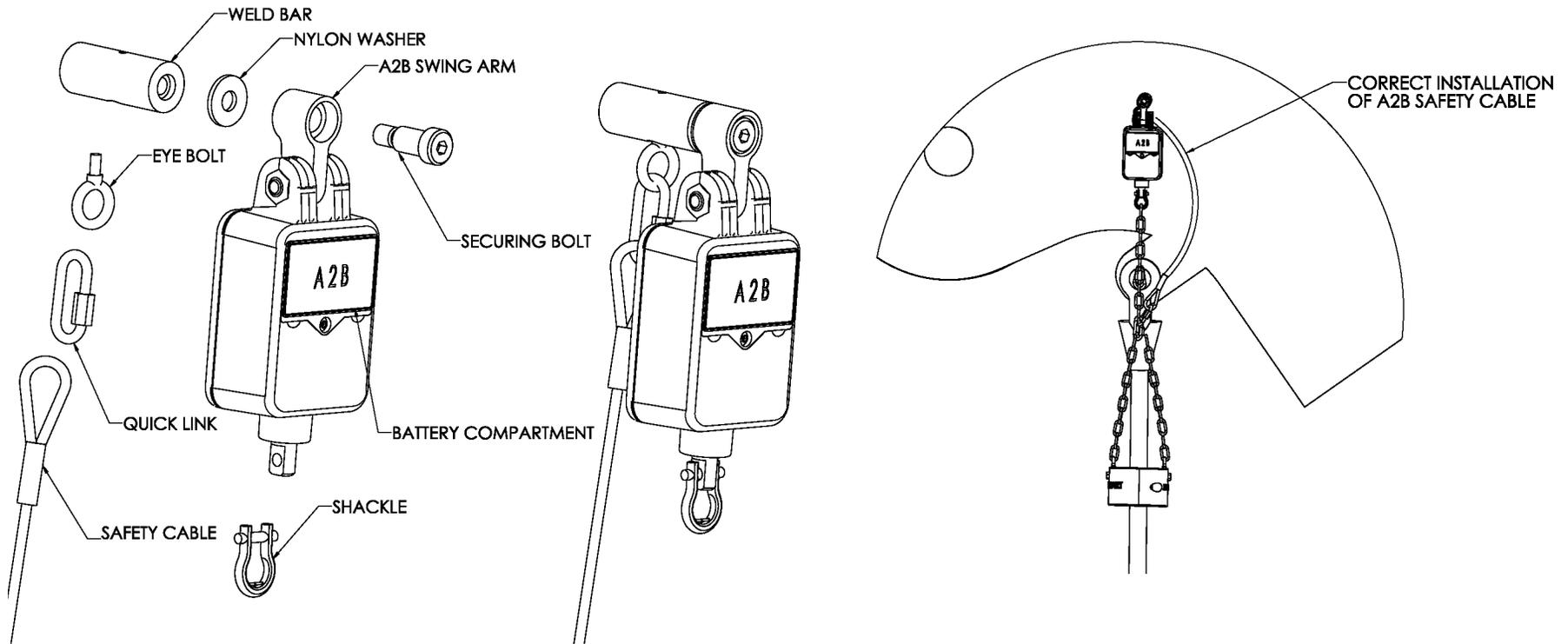


Anti-2-Block Installation

(Blue = Main, Yellow = Aux. 1 Winch, Orange = Aux. 2 Winch)

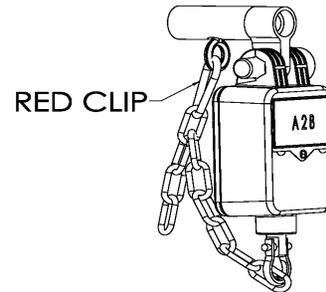
The switch is designed to swivel and pivot so that it is always in an upright vertical position in line with the wire rope, regardless of the boom angle.

1. Weld the Weld bar to the crane. Ensure the switch is mounted directly above the dead-end or the slowest speed line. The Weld bar can be welded directly to the crane or to an existing Cranesmart™ weld plate. (Both sides of the weld bar are identical).
2. Ensure that the mounted A2B switch will have an unobstructed line-of-sight to the receiver panel antenna. Install the large shoulder bolt into the A2B swing arm.
3. Attach the A2B switch to the bar. (Install the nylon bushing between the bar and the swing arm).
4. Attach the two-piece counterweight to the dead-end line or the slowest speed line.
5. Use the C-shackle (bottom of A2B switch) to install the chain to the A2B switch.
6. Counterweight Safety Cable: This Safety Cable is used to secure the counterweight so that it will not fall down the wire rope in the case of severe damage to the A2B. See drawing for proper installation.



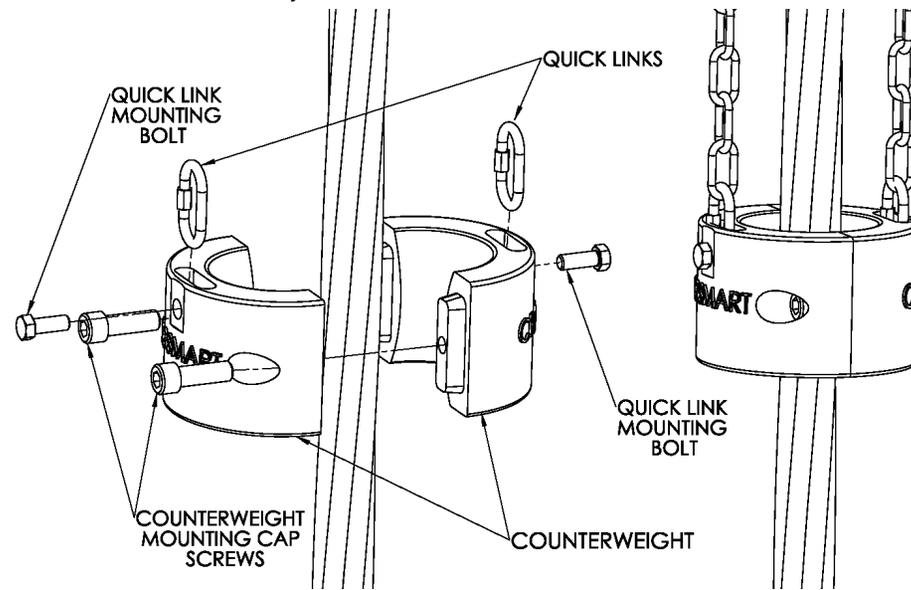
NOTE:

- Ensure the A2B switch can move freely without contacting the boom, the sheaves, bracing struts or any other equipment such as a swing away jib extension. The Eyebolt on the weld bar is used with the red clip for storage and transportation on mobile cranes. When transporting the crane it is advised that the weight is hung using this method.



Counterweight

1. Attach counterweight chain to the bottom of the A-2-B transmitter using the C-Shackle supplied.
2. Put the counterweight together around the cable as shown in the diagram.
3. Bolt the two counterweight halves together using the cap screws. The cap screws are coated with oil but it is suggested that anti-seize compound be used on the bolts to allow for easy removal.

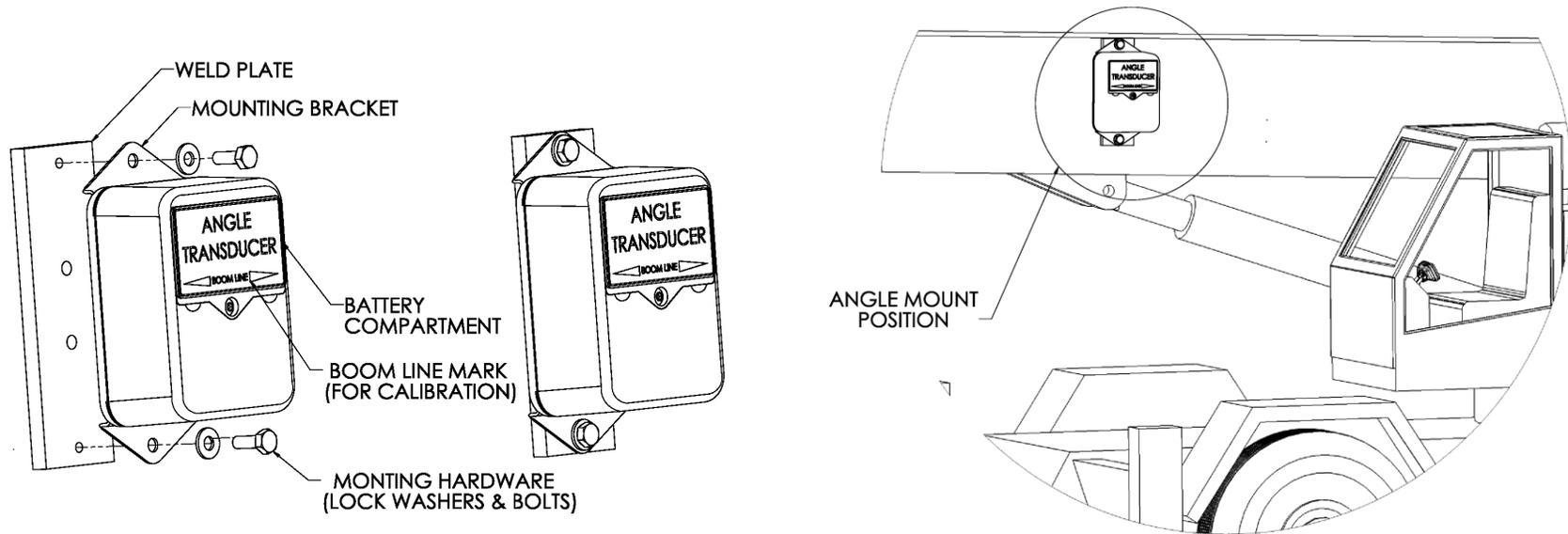


Boom Angle Transducer Installation

The Boom Angle transducer must be installed on the boom at a distance of at least five (5) feet from where the antenna will be mounted on the cab of the crane (See page 47) and must maintain line of sight with the antenna in all boom positions. The transducer can be mounted on either side of the boom. The transducer cannot be installed on the top or bottom of the boom and must be installed in the orientation shown in the diagram below. Do not weld permanently before testing in case adjustments are needed.

To Install the Transducer:

1. Remove the weld plate from the Angle transducer.
2. Align and mark the installation position. Use the illustration on the transducer label to position the transducer parallel (level) with the boom line.
3. Tack weld the weld plate before testing the system.
4. Mount the transducer to the weld plate.
5. Raise the boom to a minimum of 45° angle and return it to level. (This will set the transducer for the proper side of the boom before calibration).



Wind Speed Transducer Installation

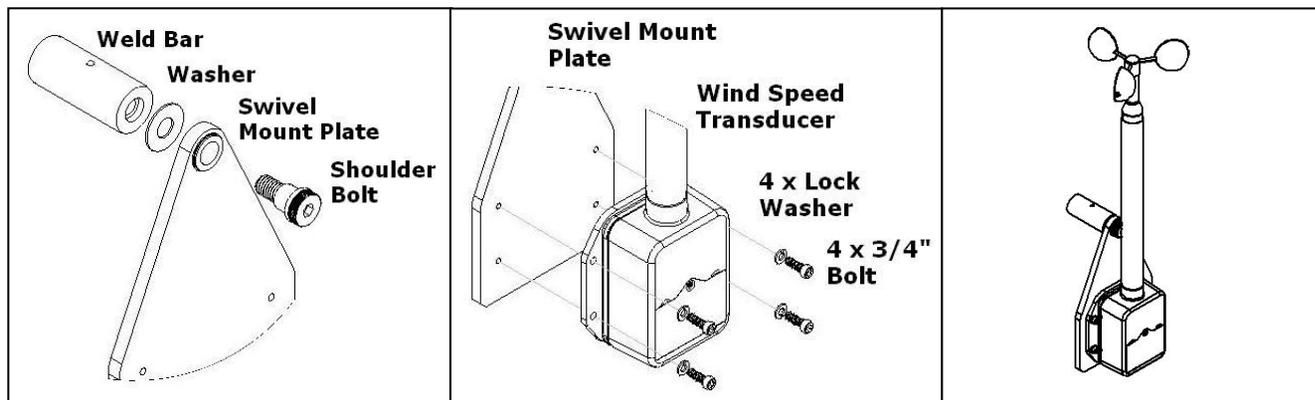
The wind speed transducer is designed to swivel so that it is always in an upright vertical position, regardless of the boom angle.

Tools required

- 5/16" hex key (included)
- 3/16" hex key (included)
- Welder

Wind Speed Installation Procedure

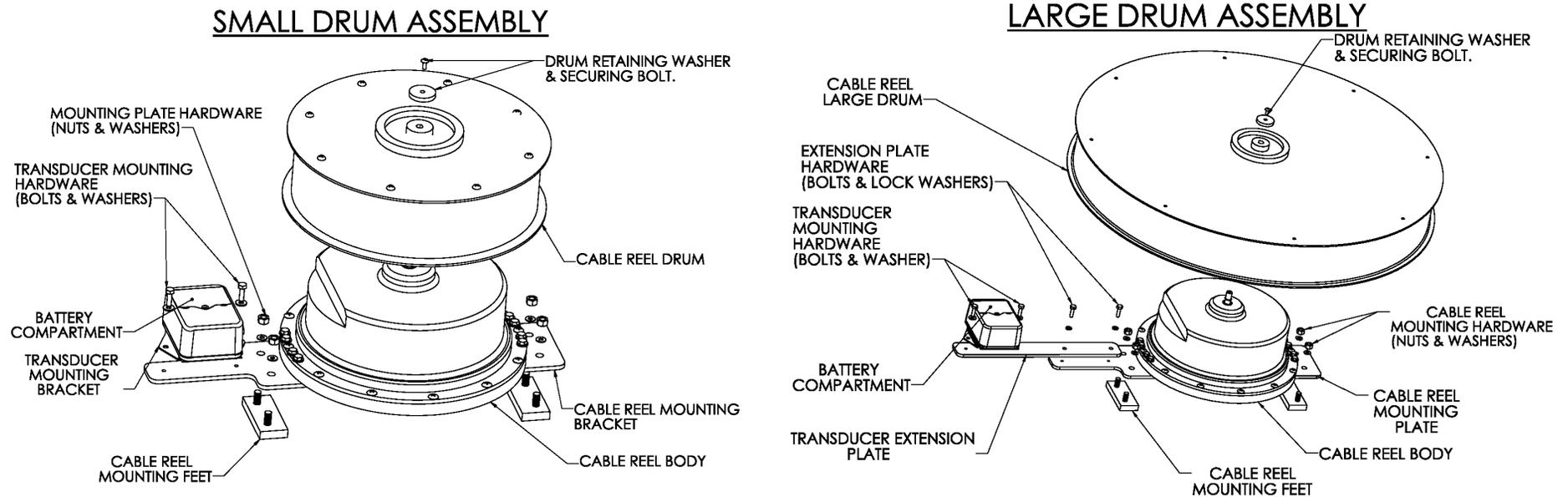
1. Remove the shoulder bolt from the weld bar and swivel mount plate.
2. Tack weld the weld bar to the crane. The weld bar can be welded directly to the crane or to an existing Cranesmart™ weld plate. (Both sides of the weld bar are identical).
3. Attach the wind speed swivel mount plate to the weld bar using the shoulder bolt and washer. Use a 5/16" hex key to tighten the bolt.
4. Attach the wind speed transducer to the swivel mount plate using the provided hex key bolts and lock washers. Use a 3/16" hex key to tighten all bolts.
5. Ensure that there is enough clearance for the wind speed transducer to swing freely. Finish welding the weld bar to the crane.



Radio Cable Reel with Boom Angle Measurement

The Cable Reel measures boom length and boom angle. It is commonly purchased as part of the LMI (Load Moment Indicator) Systems for Hydraulic cranes. The drum is attached to a fixed position on the base boom section of the crane and the end of the cable is anchored to the tip section of the boom. The number of revolutions the drum makes calculates length. The cable reel then transmits the boom length to the display panel. There are two sizes of drums: a small drum, 15" in diameter, suitable for crane booms with a hydraulic extension spanning up to 100ft, and a large drum 32" in diameter, suitable for crane booms with a hydraulic extension spanning up to 200 ft.

Cable Reel Assembly

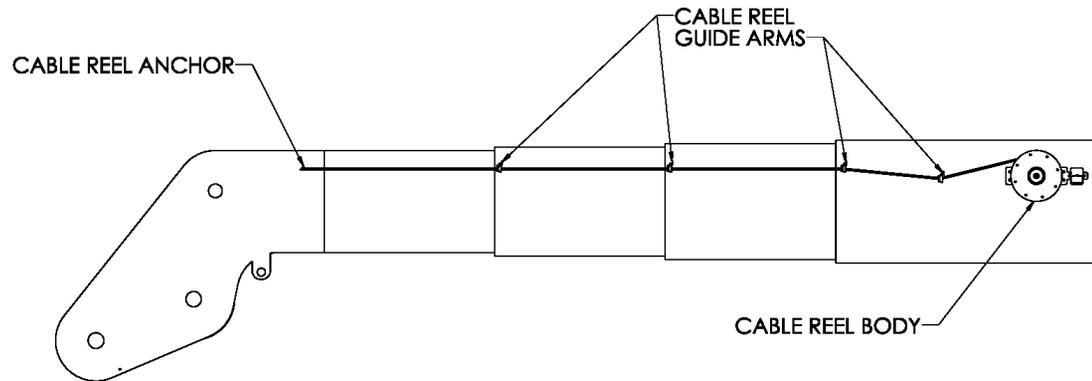


NOTE:

- The cable reel assembly should not come in contact with the cradle rest or other obstructions while the crane is in use or being put away.
- The cable reel transducer must have an unobstructed line of sight back to the display panel's antenna.
- Orient the mounting bracket so that the transducer is closer to the receiver's antenna.

Cable Reel Installation

The cable reel is set up for use on the left side of the boom but it can be installed on either the left or right side of the boom. The drawing below shows standard left side boom installation with the cable spooling off the drum from the top. If you are mounting the cable reel on the right side of the boom the cable will spool off the drum from the bottom. You will need to change the orientation of the blue transmitter box. Always make sure that the labels on the transmitter box are right side up and that the connector is at the bottom of the case. If this is not done the Boom Angle will not function properly.



Installation of Mounting Feet

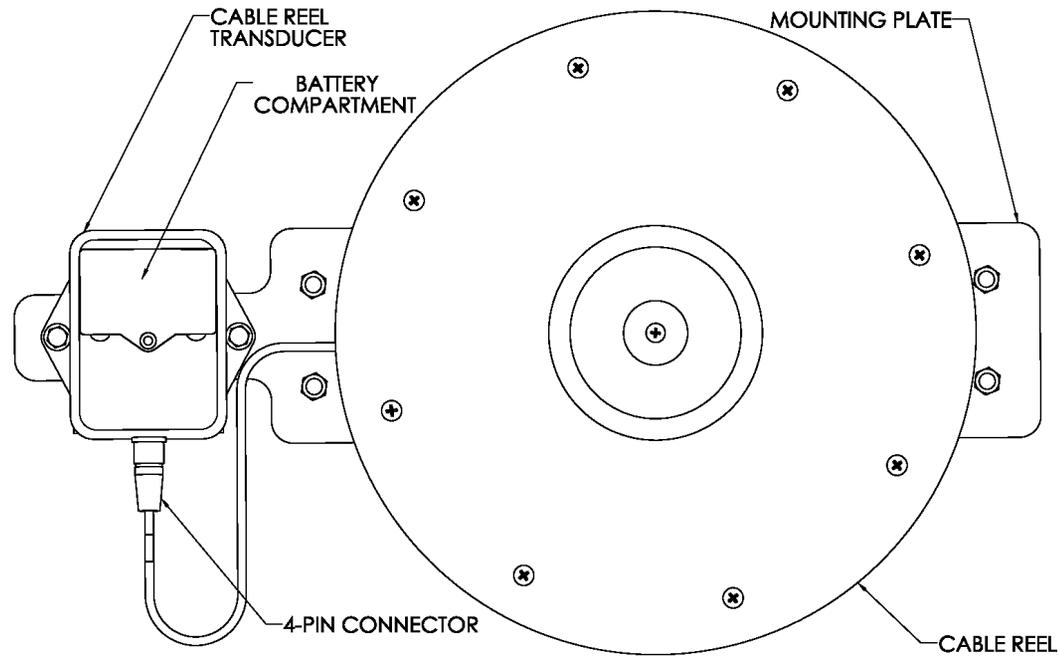
1. Locate and mark a position on the boom at least 10' back from the tip of the base section.
2. The mounting feet come already attached to the "Mounting Feet Template".
3. Using the template as a guide, tack weld the feet to the boom.
4. Remove the template and save the hardware, it will be needed later to finish the installation.
5. Temporarily install the Cable Reel assembly to verify correct positioning of the mounting feet before completing the welds.
6. Remove the Cable Reel Assembly
7. Complete the welds

NOTE:

- Do not weld mounting feet with cable reel assembly attached. The cable reel body and transducer have static sensitive components and can be damaged by close proximity welding.
- If you are painting the mounting feet ensure that the threads do not get paint in them.

Small Cable Reel Installation

The Small Cable Reel will arrive from the factory fully assembled and ready to install

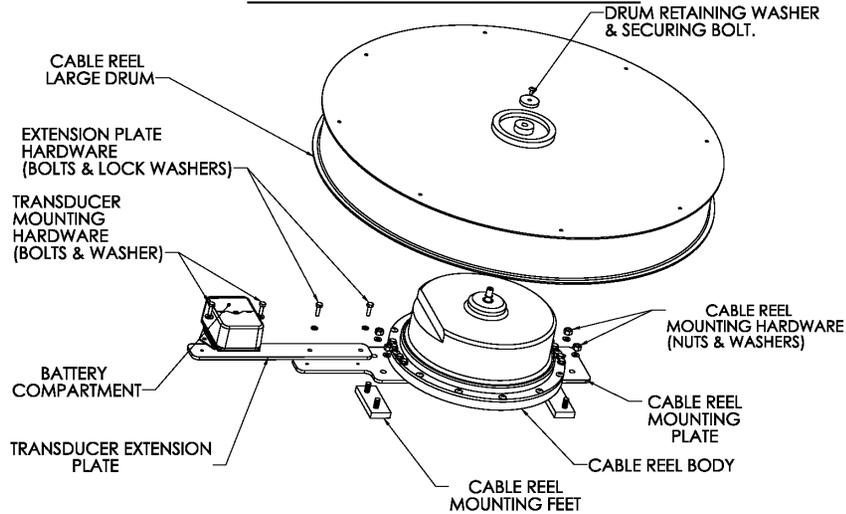


1. Lift the Cable Reel assembly on to the mounting feet.
2. Using the supplied hardware bolt the Mounting Plate to the mounting feet.
3. Attach the 4-pin connector to the Cable Reel Transducer Box
4. To complete the installation continue to the "Installing Guides and Anchor" section

Large Cable Reel Installation

The Large Cable Reel will arrive from the factory partially disassembled. The Drum will be packaged separate from the Cable Reel body assembly and the Cable Reel Transducer will be mounted to a separate Transducer Extension Plate.

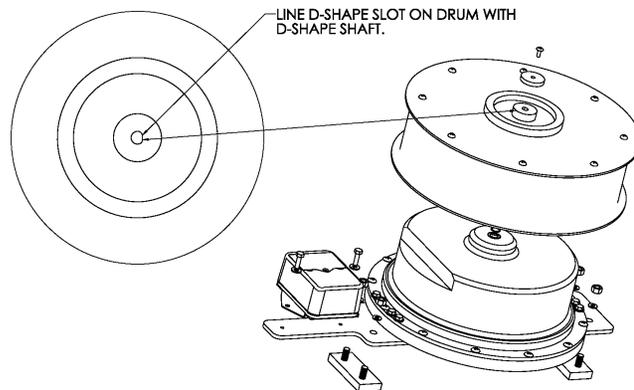
LARGE DRUM ASSEMBLY



1. Use the supplied hardware to bolt the Transducer Extension Plate with Transducer in place as shown in diagram.
2. Lift the Cable Reel assembly on to the mounting feet.
3. Using the supplied hardware bolt the Mounting Plate to the mounting feet.
4. Attach the 4-pin connector to the Cable Reel Transducer Box.
5. Strain relief the signal cable to prevent it from being damaged.
6. Attach the Drum using the instructions below.

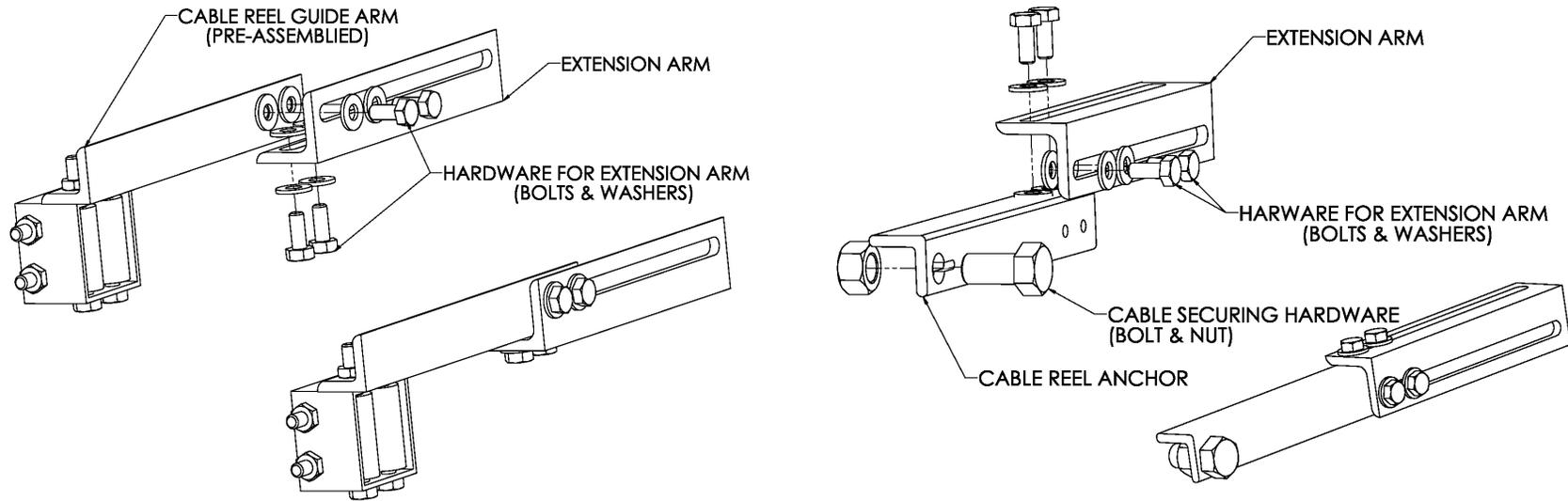
Cable Reel Drum Installation

Use the following instructions to install either the small or the large drum to the Cable Reel body assembly



1. With the label facing outwards lift the drum and place on the shaft. The top of the shaft and the hole in the drum are D-shaped so they can only be installed one way.
2. Install the drum-retaining washer and secure with bolt.
3. Apply a small amount of thread lock to the threads before tightening the retaining bolt. This will prevent the bolt from backing off.

Installing the Guides and Anchor



The anchor and guide arms may need to be modified (shortened) to accommodate your installation of the cable reel.

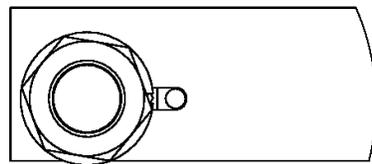
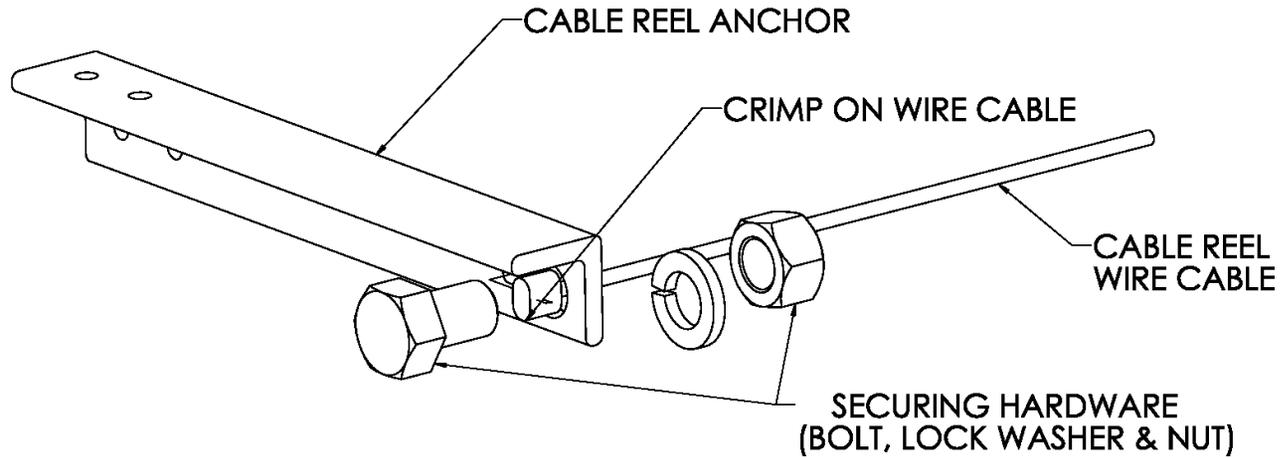
1. The first guide is to be mounted up the boom, 2-4 feet away from the drum. Position it vertically to allow the cable to pass through the guide. It should be horizontally aligned with the middle of the drum in order to allow for proper water run-off. The cable should move back and forth in the guide. The cable should not be forced to one side.
2. The next guide should be welded at the end of the main boom section in the same alignment as the first.
3. Weld a guide at the end of each moving section of the crane.
4. Weld the anchor to the tip of the boom. Allow for 6-12 inches of space between the last guide and anchor.
5. Spin the cable drum in the direction of the payout this is indicated by the arrows on the drum. Spin 2 revolutions for the small 19" drum and 5 revolutions for the large 32" drum. This pre-loads the spring allowing for proper tension during extension and retraction of the cable reel drum.
6. Run the cable through the roller guides. Be careful not to let go the cable under tension as it may cause internal damage to the system.

NOTE:

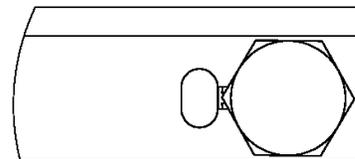
- Installation for Non-Proportional Boom cranes must have the anchor at the tip of the boom
- For a Proportional Boom crane, you can secure the cable to the tip of the first moving section but this will affect the resolution of the cable reel. Please contact our service department for more information

Terminating the Cable at the Anchor

The cable reel anchor design allows the operator to remove the cable from the boom quickly and easily.



FRONT VIEW



BACK VIEW

1. Slide crimped cable end through the keyhole opening in the anchor.
2. Install the retaining bolt, lock washer and nut to secure the cable in the keyhole opening.

NOTE:

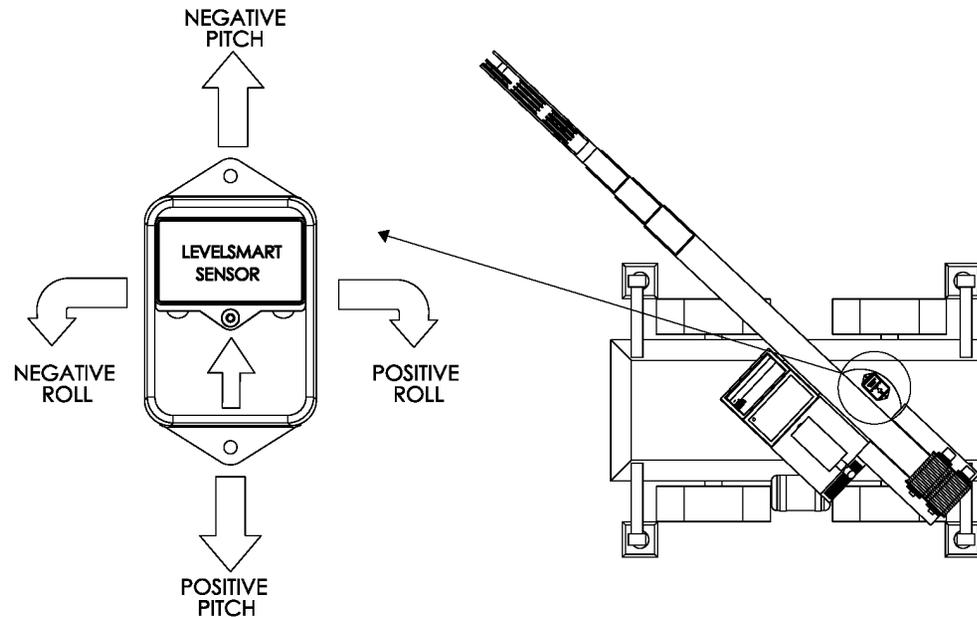
- When removing the cable from the anchor do not allow the cable to spin back freely as this may damage the internal workings of the cable reel.

Level Transducer Installation Instructions

Installation Type A – Measuring Machine Tilt (Roll)

This installation is typically used in marine applications where the crane is on a ship or a barge and it allows the user to observe actual tilt based on the direction of the boom.

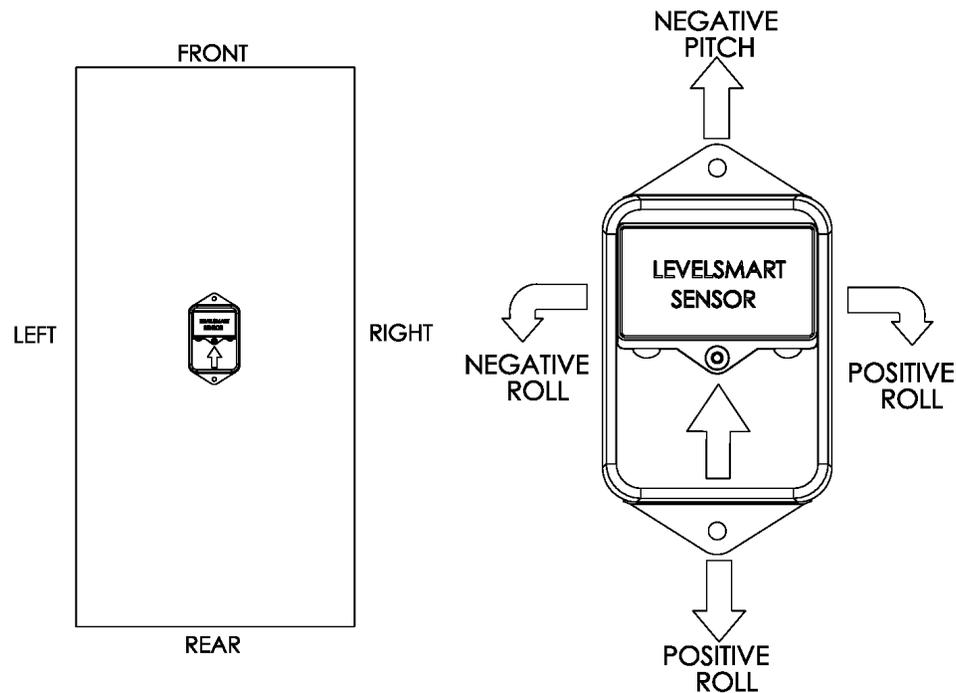
1. The Level Transducer should have a clear line of sight to the Cranesmart™ system's antenna and be kept free of all obstructions.
2. The Level Transducer must be mounted onto a part of the crane that rotates along with the boom. The label must be facing up and the directional arrow should point along the boom towards the tip. Refer to the diagram below.
3. Make sure that the Level transducer is not mounted in a position where it might be stepped on or in a position where it may suffer impact damage. Possible mounting locations are on top of the turret or on the operator's cab if it rotates with the boom.
4. The mounting position needs to be stable during operation as vibration may cause the unit to jitter.
5. The Level Transducer should be made as level as possible but it is **NOT** critical that the Level Transducer be perfectly level. The unit will be calibrated (see page 71) after installation.
6. Verify communication with receiver panel before permanently mounting the Transducer (see page 83)
7. The crane **MUST** be level during the calibration process.
8. **DO NOT** weld the weld plate with the Level Transducer attached.



Installation Type B – Measuring Grade and Super Elevation / Ship List (Roll) and Trim (Pitch)

This installation should be used for Locomotive Cranes (grade and super elevation) or Ship and Barge applications where the user wants the Cranesmart™ system to indicate if the **ship** is listing (Rolling) or Trimming (pitching)

1. The Level Transducer should have a clear line of sight to the Cranesmart™ system's antenna and be kept free of all obstructions.
2. The Level Transducer can be mounted to the deck (label facing up) or onto a post the higher the Level Transducer is from the deck the better the radio transmission will be.
3. The correct mounting position of the Level Transducer is critical. The label must be facing up and the directional arrow should point towards the front of the car or ship. Refer to the diagram below.
4. The mounting position needs to be stable during operation as vibration may cause the unit to jitter.
5. The Level Transducer should be made as level as possible but it is **NOT** critical that the Level Transducer be perfectly level. The unit will be calibrated (see page 71) after installation.
6. Verify communication with receiver panel before permanently mounting the Transducer (see page 83)
7. The barge deck **MUST** be level during the calibration process.
8. **DO NOT** weld the weld plate with the Level Transducer attached.



Refer to this table for application terminology

Default	Roll	Pitch
Locomotive Crane	Super Elevation	Grade
Ship/Barge	Listing	Trimming

Level Transducer Error Messages

During installation or operation of a system with a Level Transducer installed, the system may give various error messages relating to the Level Transducer.

**PITCH
ABOVE PRESET MAXIMUM**

72

**ROLL
ABOVE PRESET MAXIMUM**

71

If a ROLL ABOVE PRESET MAXIMUM message is displayed it means that the Transducer is tilted sideways from its calibrated zero past the number of degrees set in the LIMITS screen. Press SELECT from the main operating screen to view the current list value. If the value is positive then the Transducer is tilted too far to the right. If the value is negative then the Transducer is tilted too far to the left.

If a PITCH ABOVE PRESET MAXIMUM message is displayed it means that the Transducer is tilted forward or backwards from its calibrated zero past the number of degrees set in the LIMITS screen. Press SELECT from the main operating screen to view the current list value. If the value is positive then the Transducer is tilted too far backward. If the value is negative then the Transducer is tilted too far forward.

**PITCH & ROLL
ABOVE PRESET MAXIMUM**

70

If a PITCH & ROLL ABOVE PRESET MAXIMUM message is displayed it means that the Transducer is tilted both too far sideways and too far forward or backward. Follow the instructions above to fix this problem.

If these messages are displayed while the Transducer is level you may need to re-calibrate your transducer via the CALIBRATE screen (see page 71). If the error messages are displayed during normal operation while the crane is operating in a safe configuration in the allowable range it may need to be changed in the LIMITS screen (see page 63).

Battery Replacement for Anti-2-Block, Angle, Cable Reel & Level Transducers

The display panel will indicate a low battery for approximately three (3) weeks before the battery fails.

Before replacing the batteries call the service department at (888) 562-3222 or (780) 437-2986. Once you have verified that it is a dead battery follow the steps below.

Please have the serial number of your system handy before calling for replacement batteries or to ask for technical assistance. You can find the serial number on either the display panel or the load cell itself.

Tools and Equipment for battery replacement:

Battery replacement kit (Free from Cranesmart™ Systems) contains:

- One 3.6 volt Lithium Ion D-cell Battery
- One 1/8th Allen key

NOTE:

- We suggest you remove the transmitter from the boom of the crane; however, battery replacement can be done with the transmitter on the boom. If it is raining or snowing remove the transmitter and perform the battery replacement indoors or undercover.
- You may also buy a 3.6V Lithium battery from a local battery store. Ensure that you take the existing battery with you if possible for correct size matching.

To Replace the Battery:

1. Remove the cap screw from the battery compartment lid and remove the lid.
2. Remove the battery from the holder and wait 30 seconds – 1 minute before installing the new battery.
3. Insert the new battery according to the battery picture on the base of the battery clip.
4. Make sure that the o-ring is greased and has not been damaged because this will affect the seal.
5. Secure the lid.

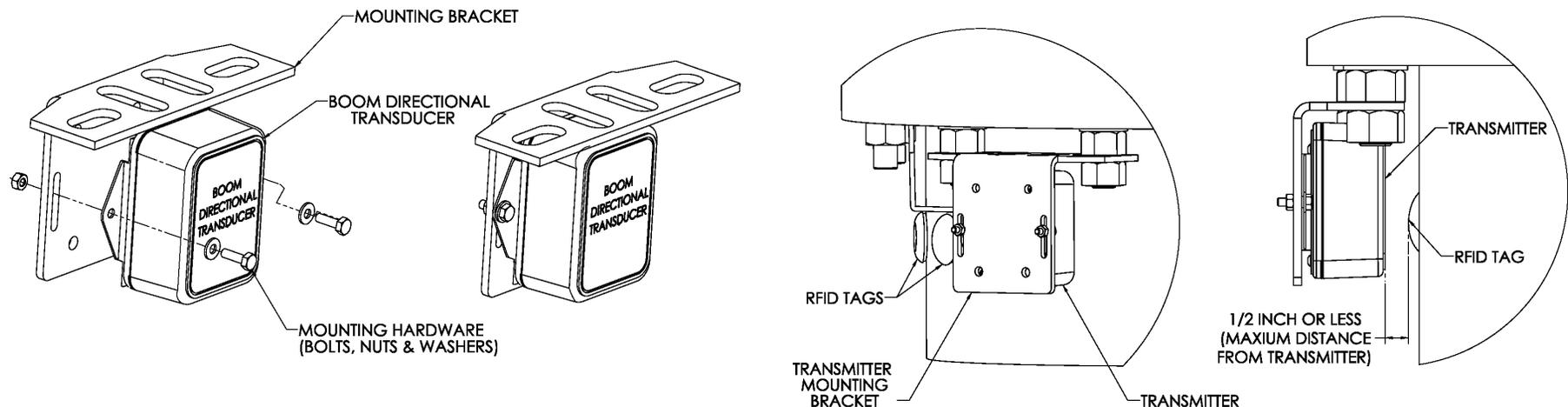


Boom Direction Transducer – BDT

The Boom Directional Transducer allows the user to set up lift areas for the crane and can be used to automatically set up load charts based on those lift areas

Mounting the BDT Bracket

1. Using the supplied bracket, mount the BDT to the turret.
2. The BDTs location should be close to the cab or to the Cranesmart™ junction box and will be attached using a six-foot communication wire.
3. For proper tank tag reading the distance from the BDT and the tank tag must be $\frac{1}{2}$ inch or less as shown in the diagram. Adjust the bracket to move the BDT in or out as required.

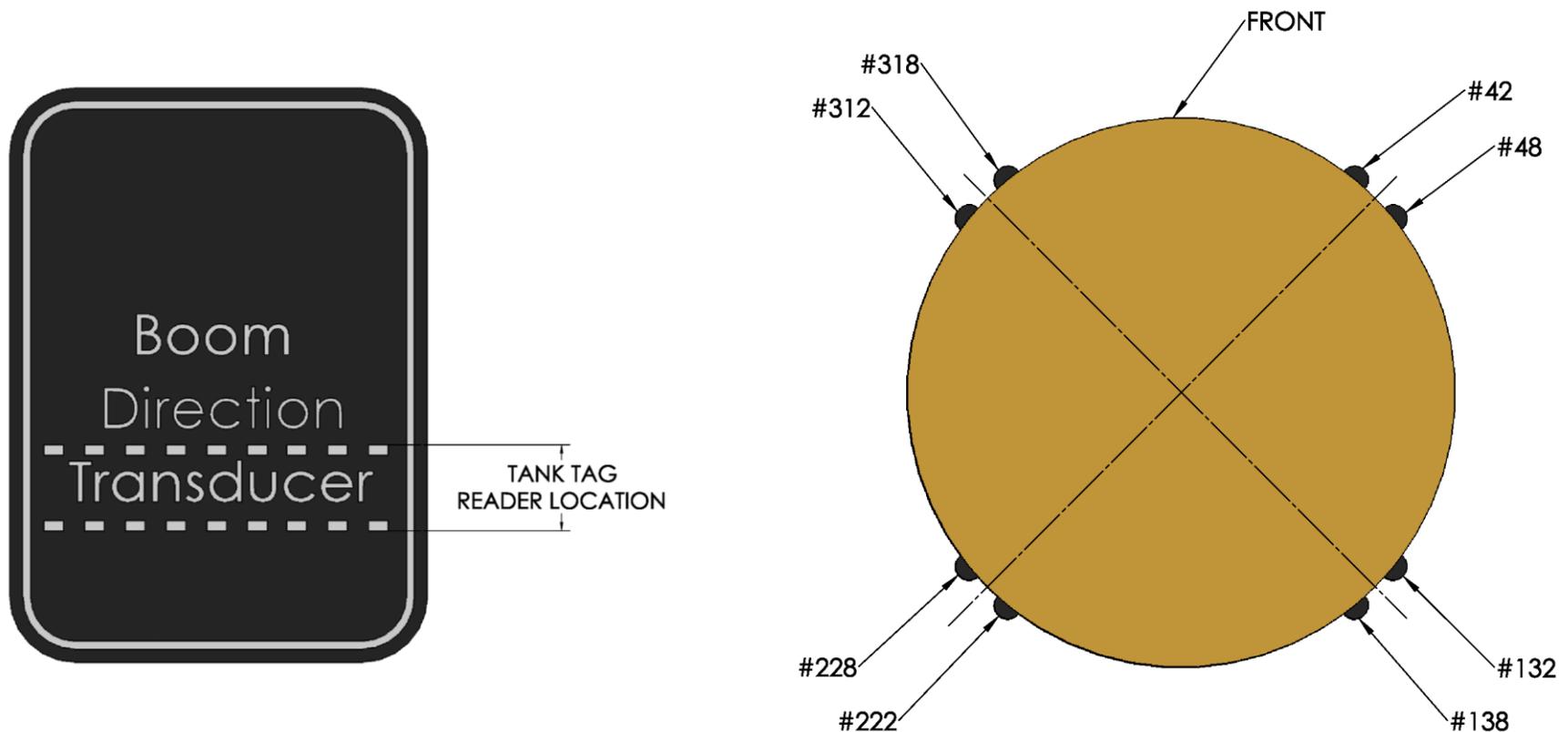


Tank Tags

The Tank Tags are the numbered small round disks that are used to mark the lift areas on the turret. Please refer to your custom manual section for exact placement of the tank tags.

1. Using the centre of the BDT bracket as a guide, swing the turret around to mark the points of transition on the fixed turret.
2. For each “point of transition” mark on the turret, add two more marks one 3” to the left and one 3” to the right. These will be the final tank tag position marks and they will be 6” apart.

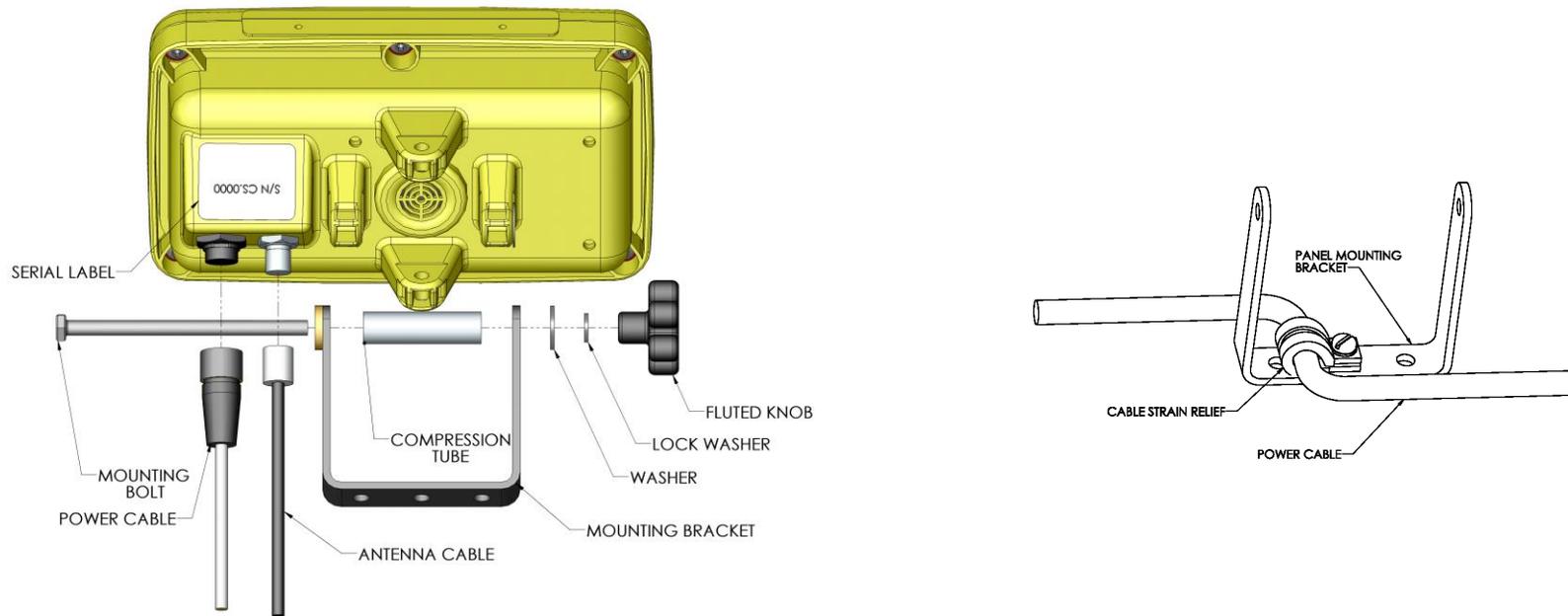
3. Attach each of the corresponding tank tags to the correct location on the turret. Starting at the front (the center of the transducer when the boom is pointing directly forward) and turning clockwise, the number on the tank tags should increase; the first tag will have the lowest number.
4. Initially attach all tank tags with an adhesive tape (such as duct tape) until all positions are finalized.
5. Match each tank tag to the outside marks made in step 2.
6. Align each tank tag so that the word "TRANSDUCER" on the BDT label passes directly over it (see drawing). This is the tank tag reader location on the BDT and for proper function all tank tags must pass through that area to be properly read.
7. Once a full test has been run, apply the supplied adhesive under all of the tank tags. Leave the tape on the tank tags until the adhesive is dry and the tank tags do not move. It could take up to 2 days for the adhesive to dry depending on ambient temperature.
8. Using cable ties, secure the six-foot communication cable starting at the BDT and then move up toward the junction box making sure that it cannot be pinched or snagged through full revolution of the turret.



Display Panel Installation

Mounting the Display Panel

1. Mount the Display Panel where the operator has an unobstructed view.
2. Remove Bracket from the Display Panel by turning the fluted knob off the bolt and sliding it out.
3. Align, mark and drill mounting holes using the mounting bracket as a guide.
4. Attach the bracket using the hardware provided.
5. Re-install the Display Panel to the bracket.
6. Use the P-clamp to provide strain relief for the power cable by attaching it to one of the mounting bolts on the bracket.



NOTE:

- The Display Panel can pivot horizontally or vertically by changing the position of the mounting bracket.
- The Display Panel should be mounted in the operator's field of view but not obstruct sight during a lift.
- The length of cable may limit where you can mount the Display Panel.
- The power connector is keyed to ensuring a proper connection.
- DO NOT PRESSURE WASH THE DISPLAY PANEL OR SUBMURGE THE DISPLAY PANEL IN WATER

Wiring the Display Panel

Power to the Display Panel is supplied through the three-conductor cable labelled Power, included in the kit, which plugs into the back of the panel. Refer to the wiring diagram below.

1. Connect the Red wire to a positive 12 or 24 VDC (28VDC Max) terminal.
2. Connect the Black wire to a solid ground on the crane.
3. OPTIONAL: Connect the White wire to an optional 'Shut off' or to sound external horns. (Maximum output is 7.5 amps).

NOTE:

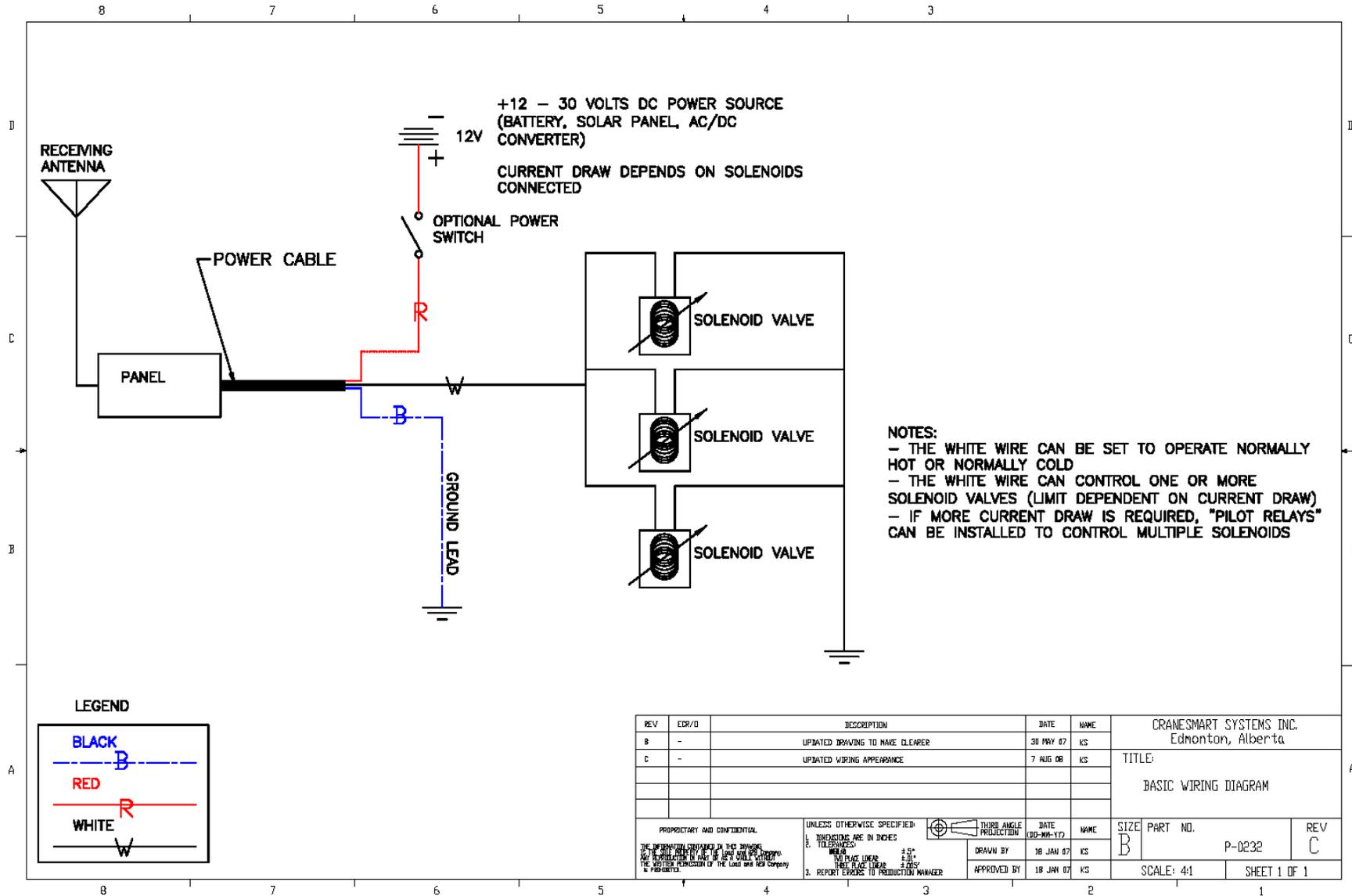
- For the system to work properly ensure that a continuous 12 to 24 (28VDC Max) is available to the panel at all times while the crane is in operation. If the voltage drops below 10.5 VDC the panel will shut down and not function.
- When attaching the power cable to the panel, align and gently push the plug into the receptacle, then slide the plug neck back towards the panel and turn clockwise ½ turn to tighten.
- If you cut the power cable to shorten it for installation you will notice that it contains two extra wires. The purple and blue wires are used in other applications for RS485 communication and should not be used.

Alarm Shut-offs – The White Wire

The Cranesmart™ system will be shipped with a three conductor wiring harness, which includes a black, red and white wire. The white wire may be used in conjunction with external alarm horns, lights or shut-offs if you have them installed.

- When you are powering (supply power to) the Cranesmart™ System with +12 VDC the white wire is normally hot (energized) with a +12 VDC in a non-alarm condition. If you do not wish to use the white wire for any of the above, please ensure that the exposed end of the white wire remains sealed to prevent grounding and damage to the display panel.
- When you are powering (supply power to) the Cranesmart™ System with +24 VDC the white wire is normally hot (energized) with a +24 VDC in a non-alarm condition. If you do not wish to use the white wire for any of the above, please ensure that the exposed end of the white wire remains sealed to prevent grounding and damage to the display panel.

Basic Wiring Diagram



Power Converters

A power converter is needed where the only supply is AC voltages. Cranesmart™ power converters change 110/220V AC to 12/24VDC depending on the application. If a power converter is needed it is normally discussed at the time of purchase.

Hazardous Location Rated systems

In Class 1 Division 2 or Zone 2 (C1D2 / C1Z2) applications the Cranesmart™ System panel will wire identically to basic wiring instruction. The significant difference is that the panel has a pigtail with a Hazardous Location Certified connector on the end. The connector will mate with the corresponding Hazardous Location Certified Connector on a power cable or on the cable coming from the alarm hub. When dealing with these connectors utilize hand tools to secure the connection tight enough so tools will be needed to disconnect them.

Junction Box

The Junction Box is used to connect Power and ground to the panel and BDT - Boom Direction Transducer (see page 38). It also is a pathway of communication between both components. The Junction box comes with the following cables

- 5-pin Standard power cable
- 5-pin Serial cable, to connect the junction box to the panel.

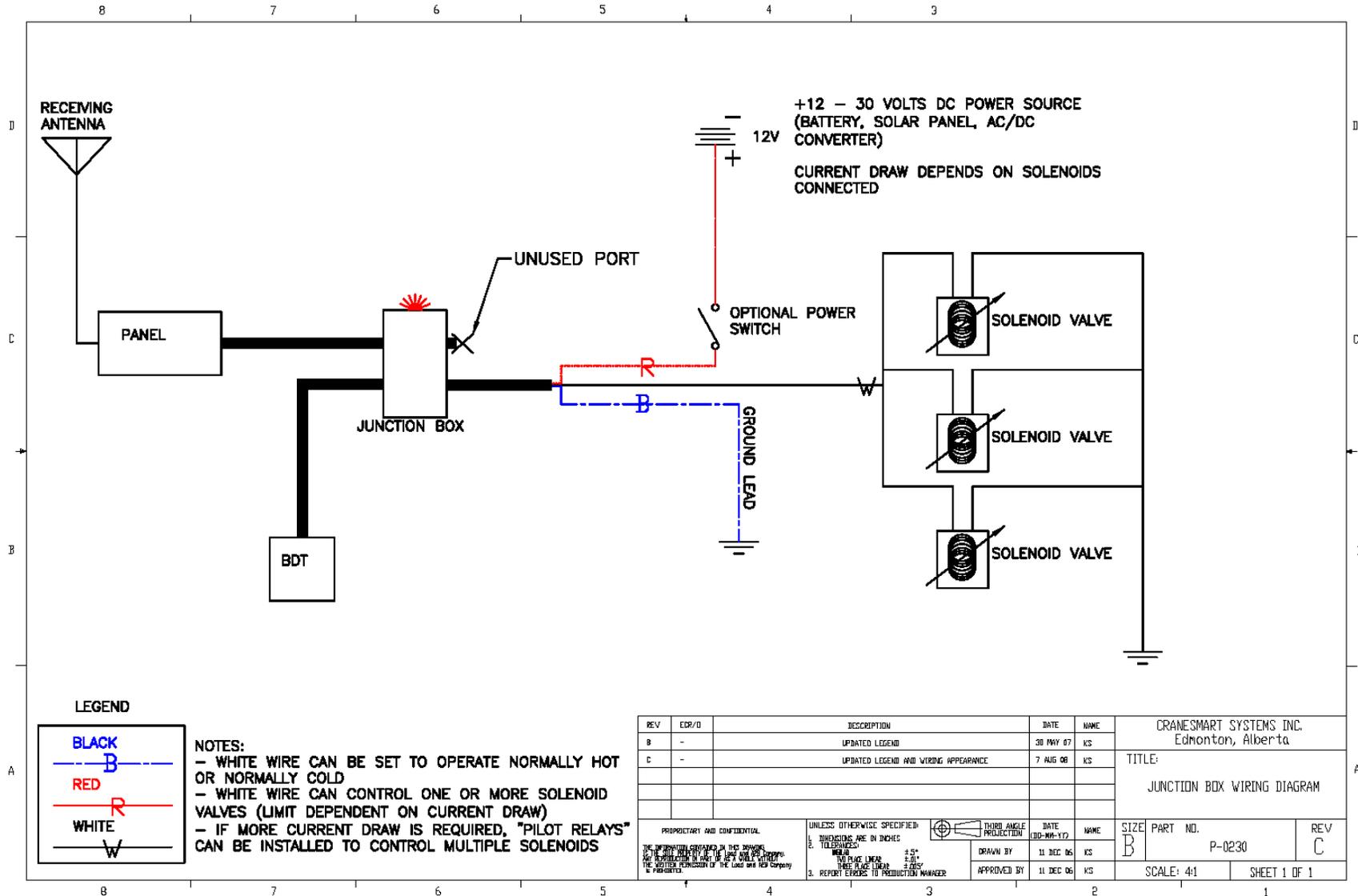
Installation the Junction box

1. Locate a position to mount the Junction Box where the operator can reach the wiring if necessary
2. Align Mark and drill holes using the mounting holes on the box as a guide.
3. Bolt Junction box in place.
4. Wiring in power cord. See section on Electrical Wiring of a Cranesmart™ Panel
5. Connect Serial cable form Junction box to Panel.

NOTE:

- The limiting factor on where you can mount the junction box is based on the lengths of cable you have and were the panel is mounted.
- Each Plug is keyed to ensure proper connection.

Junction Box Wiring Diagram

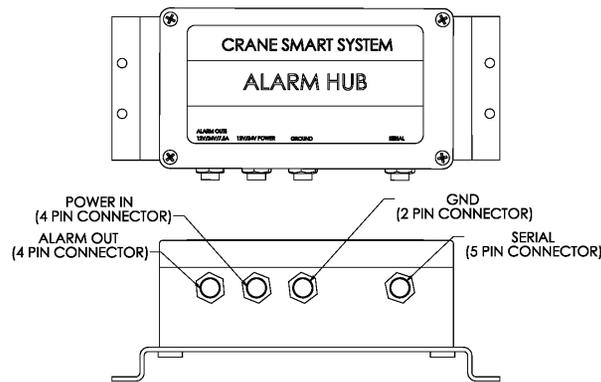


Alarm Hub

When used with the alarm hub the panel has the ability to control 4 separate outputs. These outputs can be set normally hot or normally cold. The alarms that control the outputs of the alarm hub are specified at the time of purchase.

The standard alarm hub comes supplied with the following cables:

- 4-pin Alarm output cable
- 4-pin Power cable, the ends of the cable are twisted together
- 2-pin Ground
- 5-pin Serial cable to connect the panel to the alarm hub.



Installation of Alarm Hub

1. Locate a position to mount the alarm hub where the operator can reach the wiring if necessary
2. Align Mark and drill holes using mounting holes on the Alarm Hub bracket as a guide.
3. Bolt Alarm hub in place.

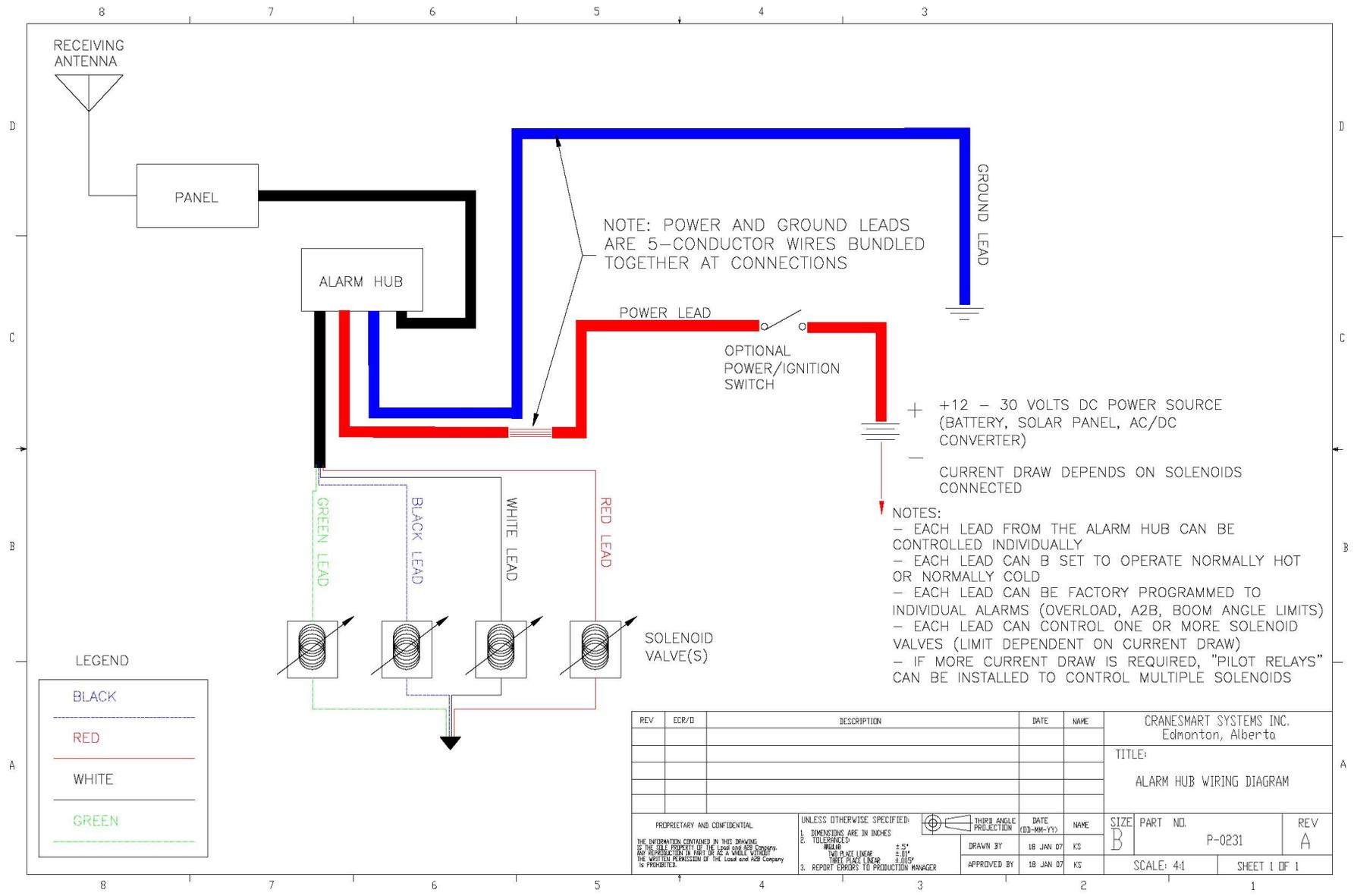
Wiring the Alarm Hub

1. Attach the Black wire to electrical ground
2. Attach the Red wire to power 12-24Vdc
3. Attach serial cable from alarm hub to panel.
4. Use the custom insert as a guide to wire your alarm outputs.
5. Test to see that they control the proper alarm.

NOTE:

- The length of cable and the position of the panel will limit where you can mount the alarm hub.
- The Plug is keyed to ensure a proper connection.

Alarm Hub Wiring Diagram



Antenna Installation

There are three types of antennas; installation and placement depend on the length and type of boom on your crane.

Antenna types

1. Panel Mount – For all cranes without a cab
2. External Mount – For cranes with cabs
3. Marine – For marine cranes with cabs

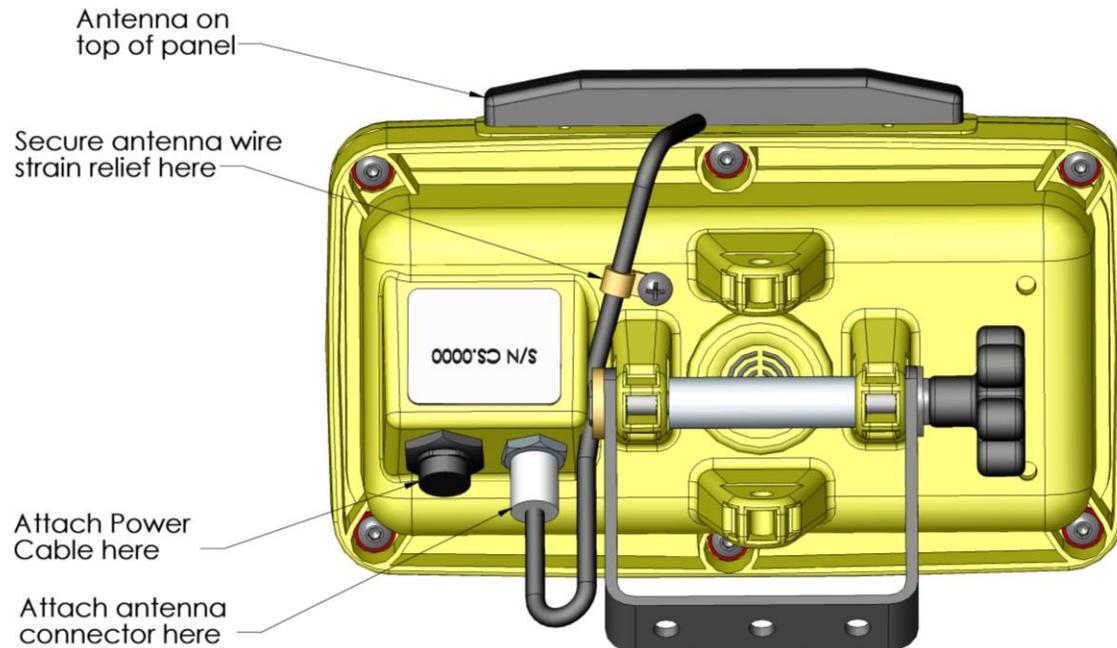
NOTE:

- Ensure that the lines of sight between the Load cells, Anti-2-block switches, Angle transducers and the antenna are not obstructed.
- Do not let the antenna touch glass or metal.

Outside Operator Cab OR no Cab on Crane

When the display panel is mounted outside of the cab or there is no cab on the crane use the panel mount antenna. This antenna is normally installed at the factory, if it is not installed, do the following:

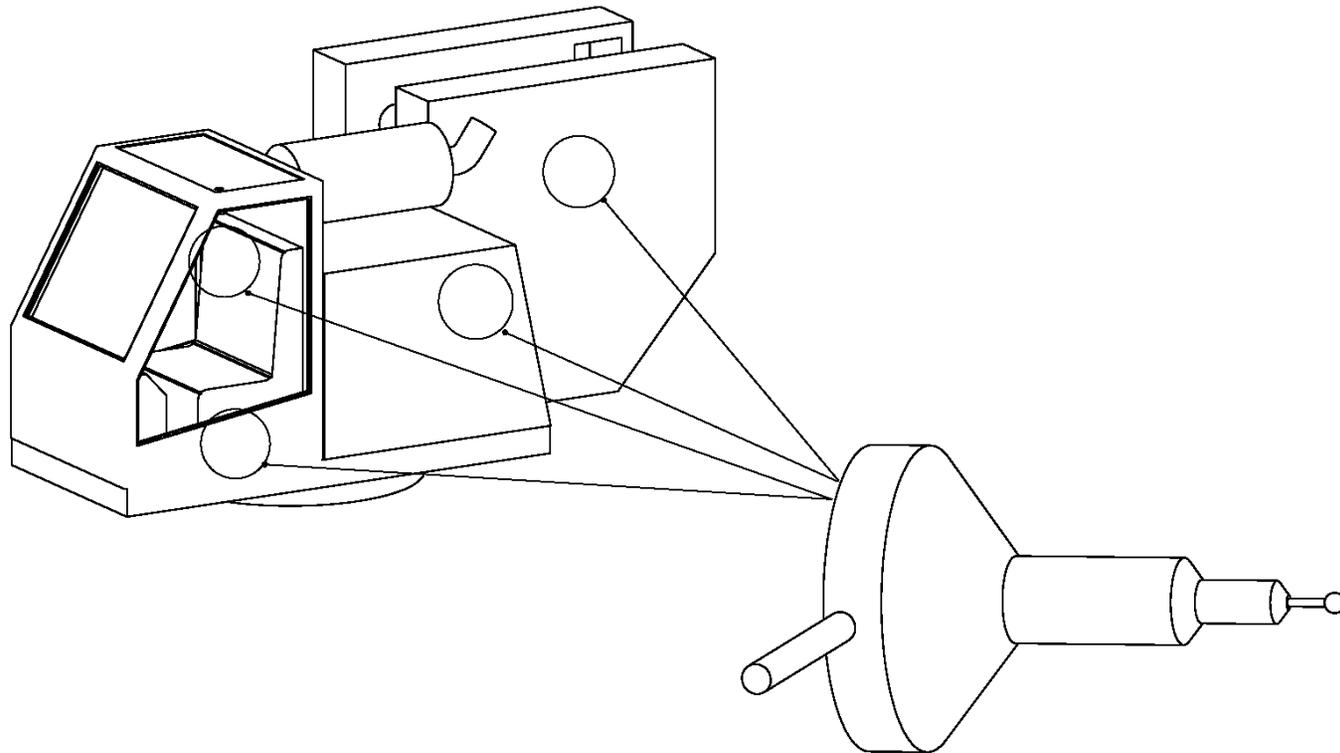
1. Clean the top of the panel with the alcohol pad included in the installation kit.
2. Peel off the paper from the adhesive strip on the underside of the antenna.
3. Place the antenna on the top of the panel.
4. Using the P-clamp and machine screw included in the installation kit, strain relief the cable as shown below.
5. Attach the antenna connector to the panel and secure.
6. Determine the best position for the antenna; check the signal quality while moving it around.
7. Check the quality of the signal using the “SIG” option in the Secondary Operating screen (see page 83). (This menu displays for eight seconds). For a permanent display use the signal viewer in the Diagnostics menu.



Inside Operator Cab

When the display panel is mounted inside the cab of the crane use the external magnetic mount antenna. This antenna will be included in the system packaging. Installation varies between cranes but use the following as a guideline.

For optimum performance, the antenna should be installed horizontally as shown below but it will work in a vertical orientation also. To confirm the best position for the antenna; check the signal quality while moving it around (see page 83 of this manual)

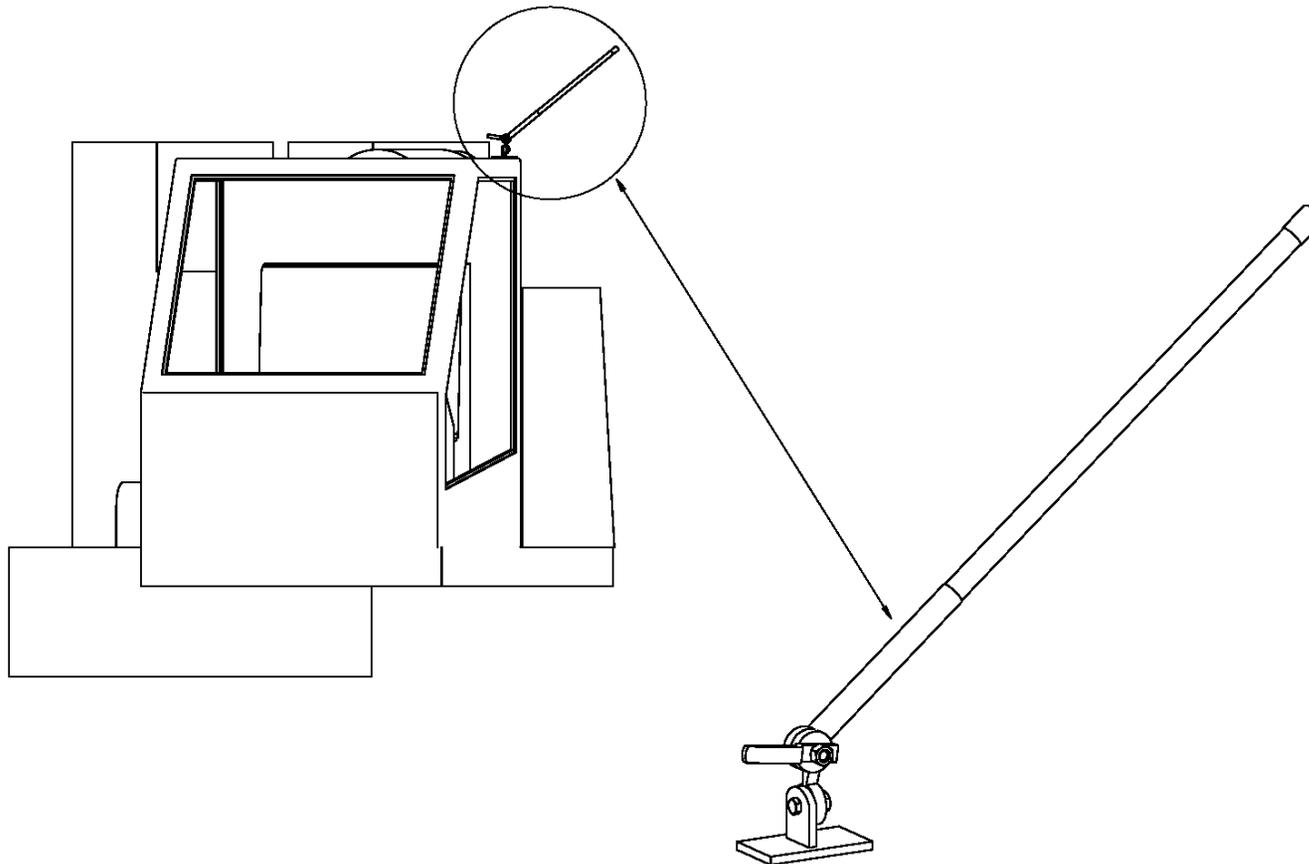


Marine Installation

When the Cranesmart™ system is used on a crane with a cab in a marine environment use the external marine antenna included in the kit. Installation varies between cranes but use the following as a guideline.

For optimum performance, the antenna should be installed at a 45° angle as shown below.

Determine the best position for the antenna; check the signal quality by using the signal display screen (see 83) while changing the angle, etc.



Shut-off Bypass Plug

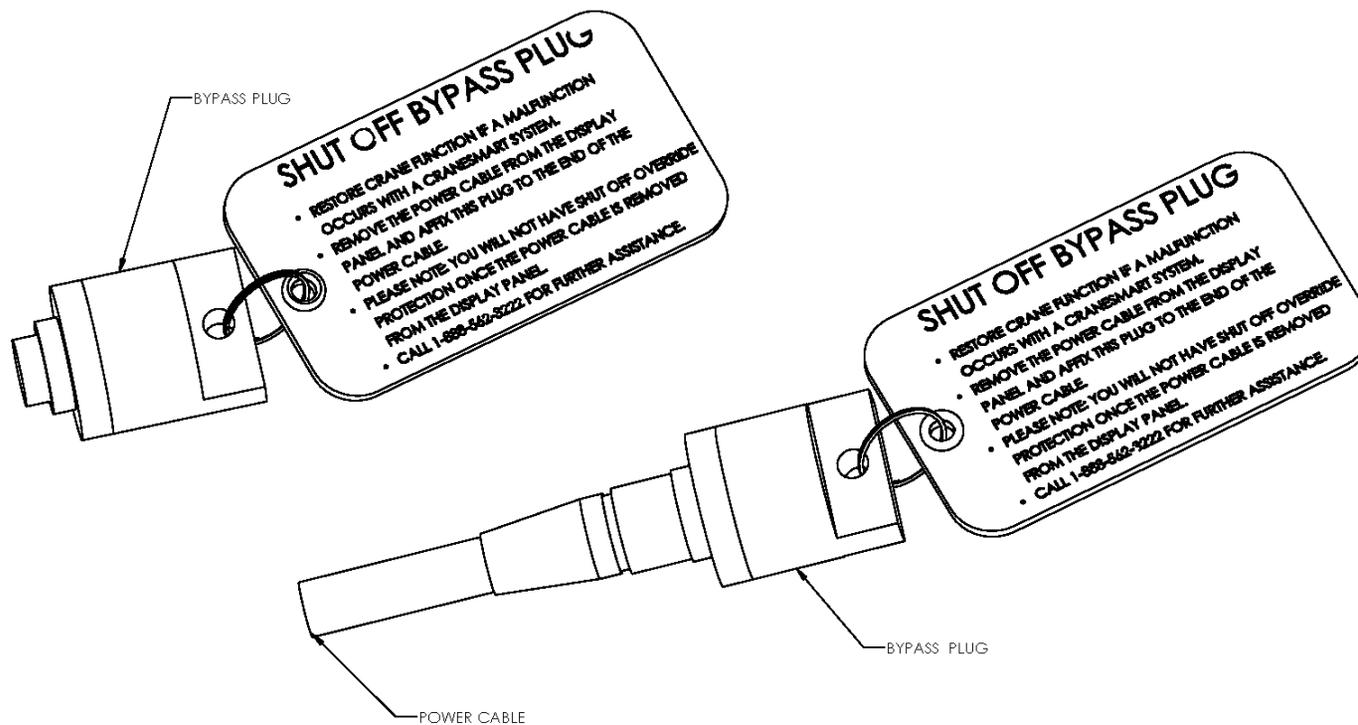
The bypass plug is only required with systems that are using shut-off functions and only if those solenoids are “Normally Hot” (energized), supplying power while in the normal operational modes (not alarming).

If you have installed the system using the white output wire to control your crane shut-offs/kick outs and the Cranesmart™ system is overcome by user damage or system malfunction this wire can be by-passed using a bypass plug included with the kit. When this plug is installed as follows, it will allow your function kick outs to be re-energised.

1. Remove the power cable from the back of the display panel by twisting the coupling ½ turn clockwise and pull away from the panel.
2. Insert the plug (Bypass plug) into the end of the power cable (lower illustration) – not the panel – and turn the plug ½ turn clockwise.

NOTE:

- This will restore crane functions however the Cranesmart™ System is no longer monitoring crane functions.



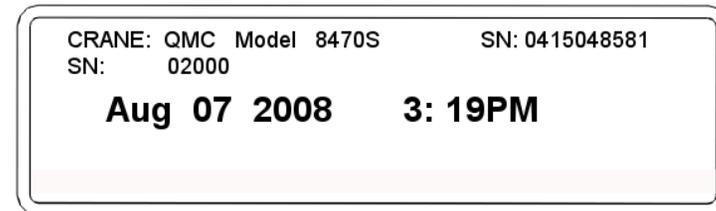
Display Panel Operations

System Start-up

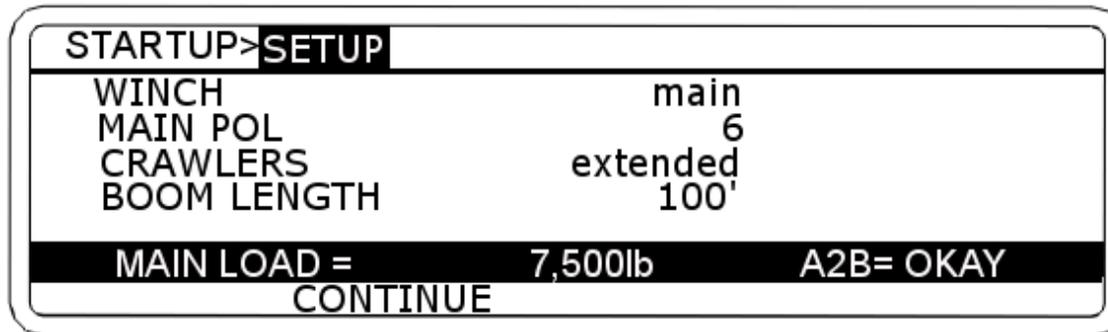
When the Cranesmart™ LMI System starts it follows a series of steps that enable the operator to accept the current settings and load chart or make any necessary changes. The first screen displayed is the Cranesmart™ systems logo. The panel then displays the Crane type and configuration, the serial number and, the date and time. The system then displays the Start-up setup screen, at this point the operator can select to continue with the configuration or select change.



Startup Screen



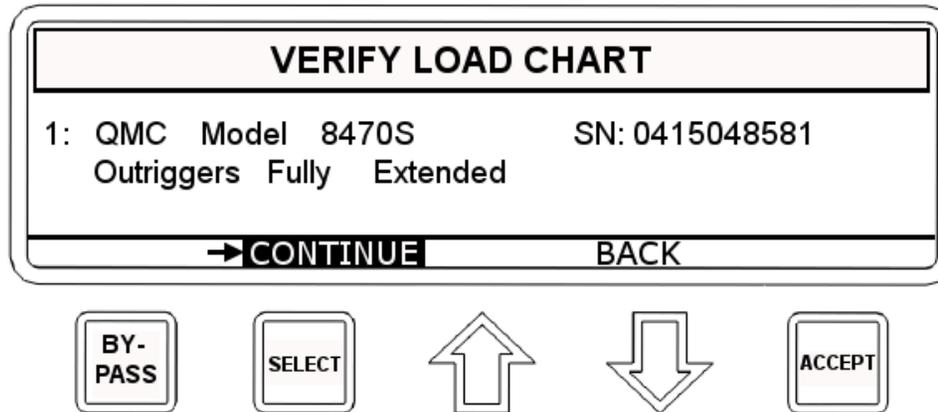
Date/Time/Crane Information



Setup Screen

To Accept the Current Configuration

1. Select continue. (The Verify Load Chart screen will be displayed).



2. Select continue. The Primary Operating screen will be displayed and the panel will begin operation.

To Change the Display Panel Configuration

1. Use the Up or Down arrows, select Change.
2. Use the Up or Down arrows, select Winch.
3. Use the Up or Down arrows, select (Main, Aux 1, Aux 2).
4. Press Accept twice to save.
5. Use the Up or Down arrows, select POL
6. Use the Up or Down arrows choose the number of POL.
7. Press Accept twice to save.

NOTE:

- Systems are customised for each client, each system has Winch and Parts-of-Line, however, other parts are optional and may or may not be part of your system. Cranesmart™ Systems will provide specific instructions for your customised system.

Quick Winch Switching

Quick Winch Switching enables operators to quickly change the display to show the auxiliary winch line.

NOTE:

- A winch can only be selected if a load cell is enabled on that winch.

To Change or View the Auxiliary Lines EDIT: Condense these two entries

1. Use the Up or Down arrows, select Change.
2. Use the Up or Down arrows, select Winch.
3. Use the Up or Down arrows, select (Main, Aux 1, Aux 2).
4. Press Accept twice to save.
5. Use the Up or Down arrows, select Aux1 POL
6. Use the Up or Down arrows choose the number of POL.
7. Press Accept twice to save.
8. Make changes as necessary and select Continue. (The Verify Load Chart screen will be displayed).

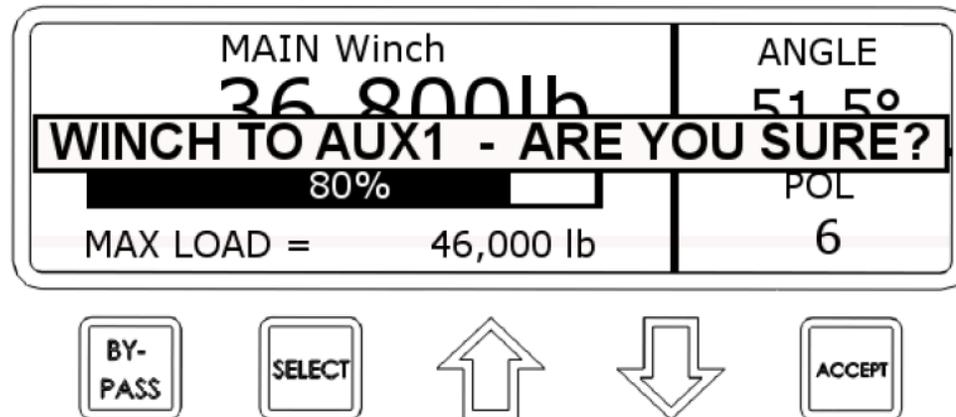
NOTE:

- When the Quick winch prompt is being displayed, the Primary Operating screen will not update with new information.
- The Up and Down arrows move to a different winch depending on the winch the operator is viewing:

MAIN Winch	UP KEY	to AUX1 Winch.
	DOWN KEY	to AUX2 Winch.
AUX1 Winch	UP KEY	to AUX2 Winch.
	DOWN KEY	to MAIN Winch.
AUX2 Winch	UP KEY	to MAIN Winch.
	DOWN KEY	to AUX1 Winch.

To View the Auxiliary Winches

1. Press the Up or Down arrows, (a message is displayed warning the user that the system will change to another winch).



2. Press Accept to Change, (the configuration screen for the new winch will be displayed).
3. Press Select to Cancel.

To Accept the New Winch Configuration

STARTUP>SETUP		
WINCH	main	
MAIN POL	6	
CRAWLERS	extended	
BOOM LENGTH	100'	
MAIN LOAD = 7,500lb A2B= OKAY		
CONTINUE		



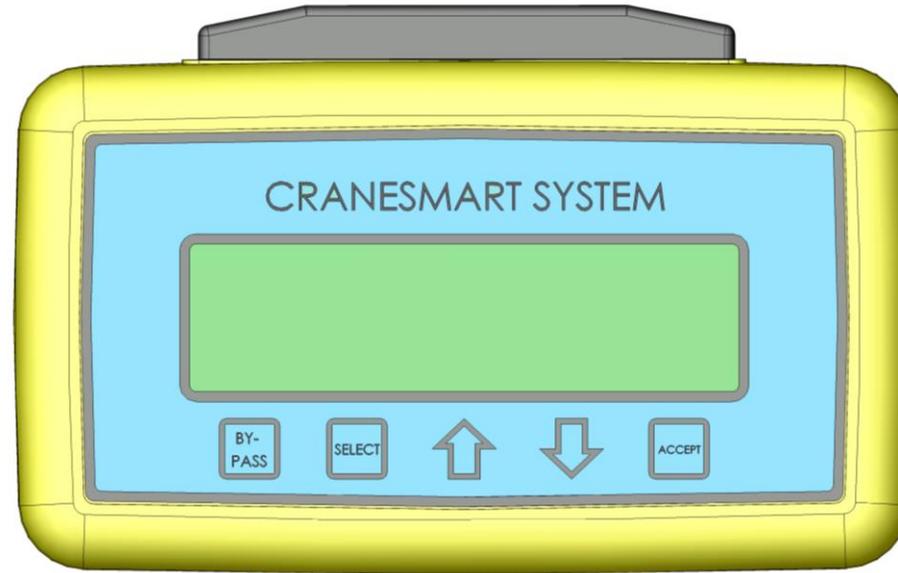
1. Select continue. (The Verify Load Chart screen will be displayed).

VERIFY LOAD CHART		
1: QMC Model 8470S	SN: 0415048581	
Outriggers Fully	Extended	
→CONTINUE BACK		



2. Select continue. (The Primary Operating screen will display the new winch selection and the panel will begin operation).

Panel Button Functions EDIT: Move this ahead of the winches



By-pass	The By-pass button enables the operator to by-pass any existing alarms. It enables the operator to override any shut-offs and restore crane functions while the system is in alarm. The Bypass works for 30 seconds and displays the remaining time periodically before returning to normal functioning.
Select	The By-pass function can be disabled – call our service department for details. The Select key enables the operator to enter any highlighted field. When a Menu is selected a new screen is displayed. When a Value is selected the operator can change the Value. When an Operation is selected the operation is performed.
Up	In Menu mode is used to move through the menus or change winch on Primary Operating Screen. In Selector mode is used to increase Values.
Down	In Menu mode is used to move through the menus or change winch on Primary Operating Screen. In Selector mode is used to decrease Values.
Accept	The Accept key enables operators to accept and save any adjusted setting.

**Sound judgement must be used when using the Bypass function.
The Bypass function can be disabled – call our service department for details.**

Menu Navigation

The Cranesmart™ System uses a menu system to lead you through its functions. In normal operating mode the system provides a general level menu of functions for which operators have permission. In supervisor mode the system provides access to enable supervisors to configure a system to match their needs.

The Cranesmart™ System displays the Configuration settings and then displays the Primary Operating screen on start-up; press the Select button to enter the Secondary Operating screen to access the Navigation bar. From the Secondary Operating screen users press the up or down arrows to select Setup to enter the menu system.

Secondary Operating Screen Navigation Bar

The Secondary Operating Screen has a navigation line on the bottom of the display to enable users to move through the rest of the Cranesmart™ system.



Exit	Returns the user to the Primary Operating screen.
Limits	Displays the Limit settings for the system, i.e. the Max or Min Angle or Max Load settings.
Tare	Enables the operator to Tare out the current load value and return to the Primary Operating screen.
Sig	Displays the signal strength for the transducers in the system and counts the packets of information being received.
Info	Displays information about the system including; load chart, date and time, and operation time.
Setup	Displays menu options to reconfigure system settings and diagnostic information.

Tare Out Function

The Cranesmart™ system has a Tare function, which enables the operator to zero out the weight of the hook block or headache ball and rigging. Once the tare function has been enabled only the weight below the hook will be displayed as the actual weight on the Primary Display screen.

To Enable Tare Out:

1. From the Primary Operating screen press the Select button, the Secondary Operating screen is displayed.
2. Use the Up or Down arrows select Tare. This automatically sends you to the Primary Operating screen and a "T" will be displayed at the end of the bar graph.

To Disable Tare Out

If the system has a Boom Angle Indicator the Tare Out function is automatically disabled when the crane's angle is changed by 3°.

To Disable the Tare Out function for a system without a Boom Angle Transducer use the following steps:

1. From the Primary Operating screen press the Select button, the Secondary Operating screen is displayed.
2. Use the Up or Down arrows select Tare. This will automatically send you to the Primary Operating screen and you will notice that the "T" is now gone from the end of the bar graph.

NOTE:

- The amount of weight deducted with the Tare Out function will also be deducted from your load chart amount in most cases.

Setup Menus

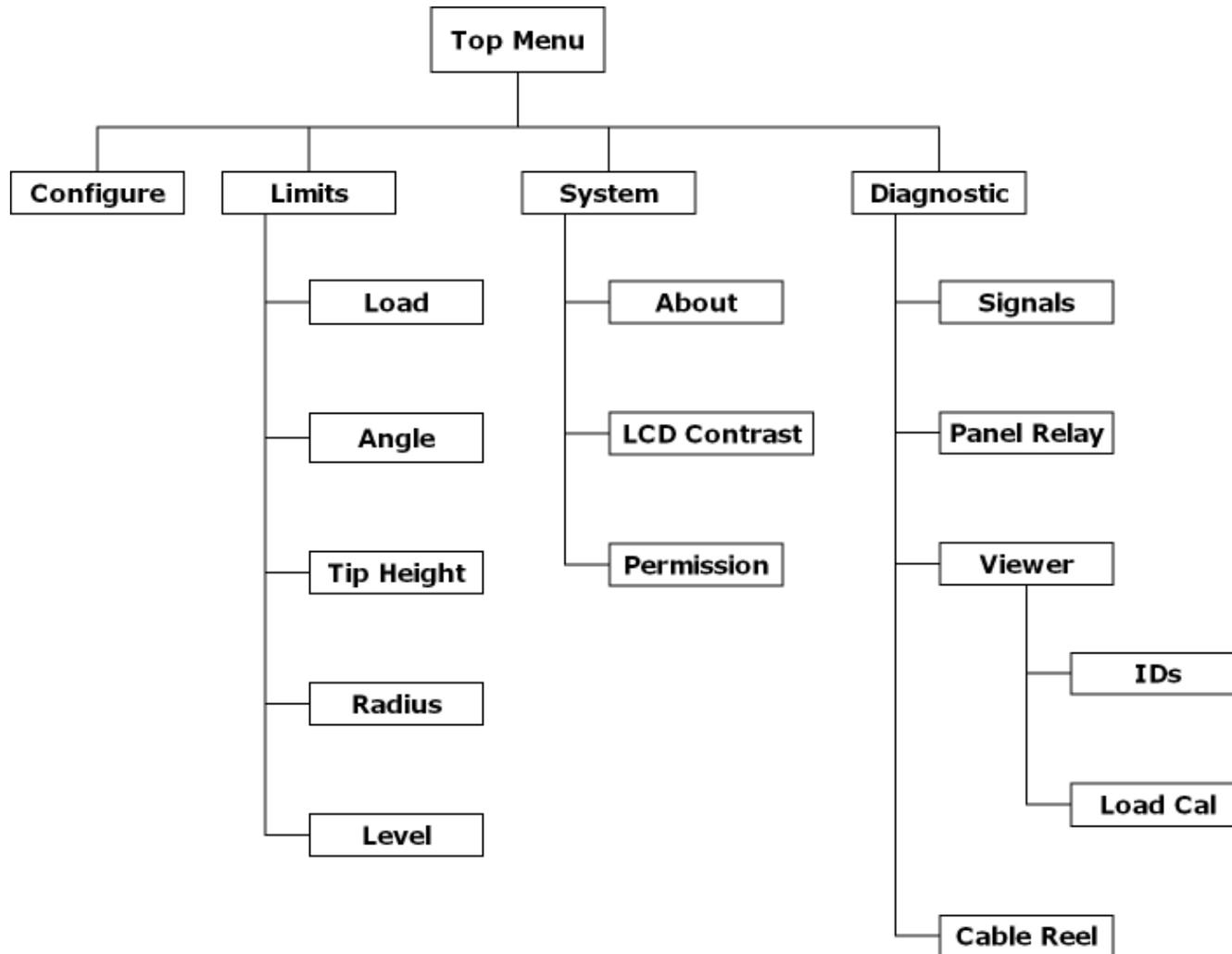
The Setup screen displays menus to enable operators to configure settings for the system. The menus available depend on the permission level of the user. There are two permission levels available to users:

1. Operator Permission level – This is the basic level and can be accessed by the crane operator for simple functions without a permission code.
2. Supervisor Permission level – This level requires a permission code to access functions that will affect the operation and calibration of the system and should only be accessed by installation personnel or supervisory personnel.

To access the Setup Menus use the following steps:

1. From the Primary Operating screen, press the Select button to move to the Secondary Operating screen.
2. Use the Up or Down Arrows to move through the navigation bar, select Setup.
3. Press the Select button. You are now at the Top Menu point in the Setup Menu

Operator Permission Level



- Limits Enables users to set limits for Load, Angle, Tip Height, Radius and Wind Speed indicators.
- Configure Enables users to select the Winch and Parts-of-line to be displayed.
- System Enables users to display the serial number of the system or change the permission level.
- Diagnostic Enables users to view the signal strength and RF signal from the transducers. Also enables users to view the IDS of the components of the system.

Configure Menu

The Configure Menu enables users to select the winch in use and set parts-of-line.

Select Winch and POL (Parts-of-line)

1. From the Primary Operating screen press select, the Secondary Operating screen is displayed.
2. Use the Up or Down arrows, select Setup.
3. Use the Up or Down arrows, select Configure
4. Use the Up or Down arrows, select Change.
5. Use the Up or Down arrows, select (Main, Aux 1, Aux 2).
6. Press Accept twice to save.
7. Use the Up or Down arrows, select Main POL
8. Use the Up or Down arrows choose the number of POL.
9. Press Accept twice to save.
10. Select Exit to return to Primary Operating Screen or Select Back to return to the top menu.

NOTE:

- Systems are customised for each client, each system has Winch and Parts-of-Line, however, other parts are optional and may or may not be part of your system. Cranesmart™ Systems will provide specific instructions for your customised system.

Limits Menu

The Limits menu enables users to set the limits at which alarms will sound and shut-offs will occur.

Load Limits

1. From the Primary Operating screen press select, the Secondary Operating screen is displayed.
2. Use the Up or Down arrows, select Setup.
3. Use the Up or Down arrows, select Limits. (If Limits is Locked the operator must enter the correct key.)
4. Use the Up or Down arrows, select Load.
5. Use the Up or Down arrows, select (Main, Aux 1, Aux 2).
6. Use the Up or Down arrows to increase or decrease the Maximum limit for that Winch.
7. Press Accept twice to save.
8. Select Exit to return to Primary Operating Screen or Select Back to return to the top menu.

Angle Limits

1. From the Primary Operating screen press select, the Secondary Operating screen is displayed.
2. Use the Up or Down arrows, select Setup.
3. Use the Up or Down arrows, select Limits.
4. Use the Up or Down arrows, select Angle, you will be defaulted to Max.
5. Select Max.
6. Use the Up or Down arrows to increase or decrease the Maximum limit for that Angle Sensor.
7. Press Accept twice to save.
8. Use the Up or Down arrows, select Min.
9. Use the Up or Down arrows to increase or decrease the Minimum limit for that Angle Sensor.
10. Select Exit to return to Primary Operating Screen, Select Back to return to the Limits menu or Select Top Menu to return to the Top Menu.

Tip Height Limits

1. From the Primary Operating screen press select, the Secondary Operating screen is displayed.
2. Use the Up or Down arrows, select Setup.
3. Use the Up or Down arrows, select Limits.
4. Use the Up or Down arrows, select Tip Height, you will be defaulted to the Max for the Main Tip.
5. Select Max.
6. Use the Up or Down arrows, set Maximum Height.
7. Press Accept twice to save.
8. Use the Up or Down arrows, select Min.
9. Use the Up or Down arrows, set Minimum Height.
10. Press Accept twice to save.
11. Repeat steps 4 to 10 for Aux 1 and Aux 2 Tips.
12. Select Exit to return to Primary Operating Screen, Select Back to return to the Limits menu or Select Top Menu to return to the Top Menu.

Radius Limits

1. From the Primary Operating screen press select, the Secondary Operating screen is displayed.
2. Use the Up or Down arrows, select Setup.

3. Use the Up or Down arrows, select Limits.
4. Use the Up or Down arrows, select Radius, you will be defaulted to the Max of the Main Radius.
5. Select Max.
6. Use the Up or Down arrows, set Maximum Radius.
7. Press Accept twice to save.
8. Use the Up or Down arrows, select Min.
9. Use the Up or Down arrows, set Minimum Radius.
10. Press Accept twice to save.
11. Repeat steps 4 to 10 for Aux 1 and Aux 2 Radius.
12. Select Exit to return to Primary Operating Screen, Select Back to return to the Limits menu or Select Top Menu to return to the Top Menu.

Level Transducer Limits

1. From the Primary Operating screen press select until the Secondary Operating screen is displayed.
2. Use the Up or Down arrows, to highlight Setup. Press select.
3. Use the Up or Down arrows, to highlight Limits. Press select.
4. Use the Up or Down arrows, to highlight Pitch-Roll. Press select.
5. You will be defaulted to Max Roll Angle. Press select.
6. Use the Up or Down arrows to adjust the Maximum limit for the Roll Angle.
7. Press Accept twice to save.
8. Use Up or Down arrows to highlight Max Pitch Angle. Press Select.
9. Use the Up or Down arrows to adjust the Maximum limit for the Pitch Angle.
10. Press Accept twice to save.
11. Highlight Exit and press select to return to Primary Operating Screen, Select Back to return to the Limits menu or Select Top Menu to return to the Top Menu.

Wind Limits

1. From the Primary Operating screen press select; the Secondary Operating screen is displayed.
2. Use the Up or Down arrows, select SETUP.
3. Use the Up or Down arrows, select LIMITS.
4. Use the Up or Down arrows, select WIND.

5. Select MAX WIND.
6. Use the Up or Down arrows to increase or decrease the maximum wind speed. Minimum wind speed setting is defaulted at 15 MPH and can not be set to a lesser value.
7. Press ACCEPT twice to save.

System Menu

The system menu provides information about the system on the crane and enables users to set Access Permissions.

About

1. From the Primary Operating screen press select, the Secondary Operating screen is displayed.
2. Use the Up or Down arrows, select Setup.
3. Use the Up or Down arrows, select System.
4. Use the Up or Down arrows, select About.
5. Select Exit to return to Primary Operating Screen or Select Back or Top Menu to return to the top menu

LCD Contrast

LCD contrast allows you to adjust your panel display to be lighter or darker for easier viewing.

1. From the Primary Operating Screen press select, the Secondary Operating Screen is displayed.
2. Use the Up or Down arrows, select Setup.
3. Use the Up or Down arrows to select System.
4. Use the Up or Down arrows to select LCD Contrast.
5. Press Select on Contrast, then use the Down arrow to make the display darker, or the Up arrow to make it lighter. The contrast will change immediately.
6. When you are satisfied with your display contrast press Accept twice to save.
7. Select Exit to return to the Primary Operating Screen or select back or Top Menu to return to the top menu.

Permissions

Allows user to enter the Supervisor Mode (see page 68)

1. From the Primary Operating screen press select, the Secondary Operating screen is displayed.
2. Use the Up or Down arrows, select Setup.
3. Use the Up or Down arrows, select System.
4. Use the Up or Down arrows, select Permission.

5. Press select on Permission.
6. Use the Up or Down arrows, set the Permission Access Code.
7. Press Accept twice to save.
8. Use the Up or Down arrows to select Top Menu to continue with changed permission or, Select Exit to return to Primary Operating Screen and Operator Permission level.

Diagnostic Menu

Signals

Will show the signal level of each transducer that is activated on the system

1. From the Primary Operating screen press select, the Secondary Operating screen is displayed.
2. Use the Up or Down arrows, select Setup.
3. Use the Up or Down arrows, select Diagnostic.
4. Use the Up or Down arrows, select Signals.
5. Select Exit to return to Primary Operating Screen or Select Back or Top Menu to return to the top menu

Panel Relay

Will show only the condition and the status of the internal panel relay that controls the white wire. No adjustments can be made from this screen.

1. From the Primary Operating screen press select, the Secondary Operating screen is displayed.
2. Use the Up or Down arrows, select Setup.
3. Use the Up or Down arrows, select Diagnostic.
4. Use the Up or Down arrows, select Panel Relay.
5. Select Exit to return to Primary Operating Screen or Select Back or Top Menu to return to the top menu

Viewer

Used to view Load cell Calibration data and/or component ID numbers.

1. From the Primary Operating screen press select, the Secondary Operating screen is displayed.
2. Use the Up or Down arrows, select Setup.
3. Use the Up or Down arrows, select Diagnostic.
4. Use the Up or Down arrows, select Viewer.
5. From this display you can enter Load Cal or IDs

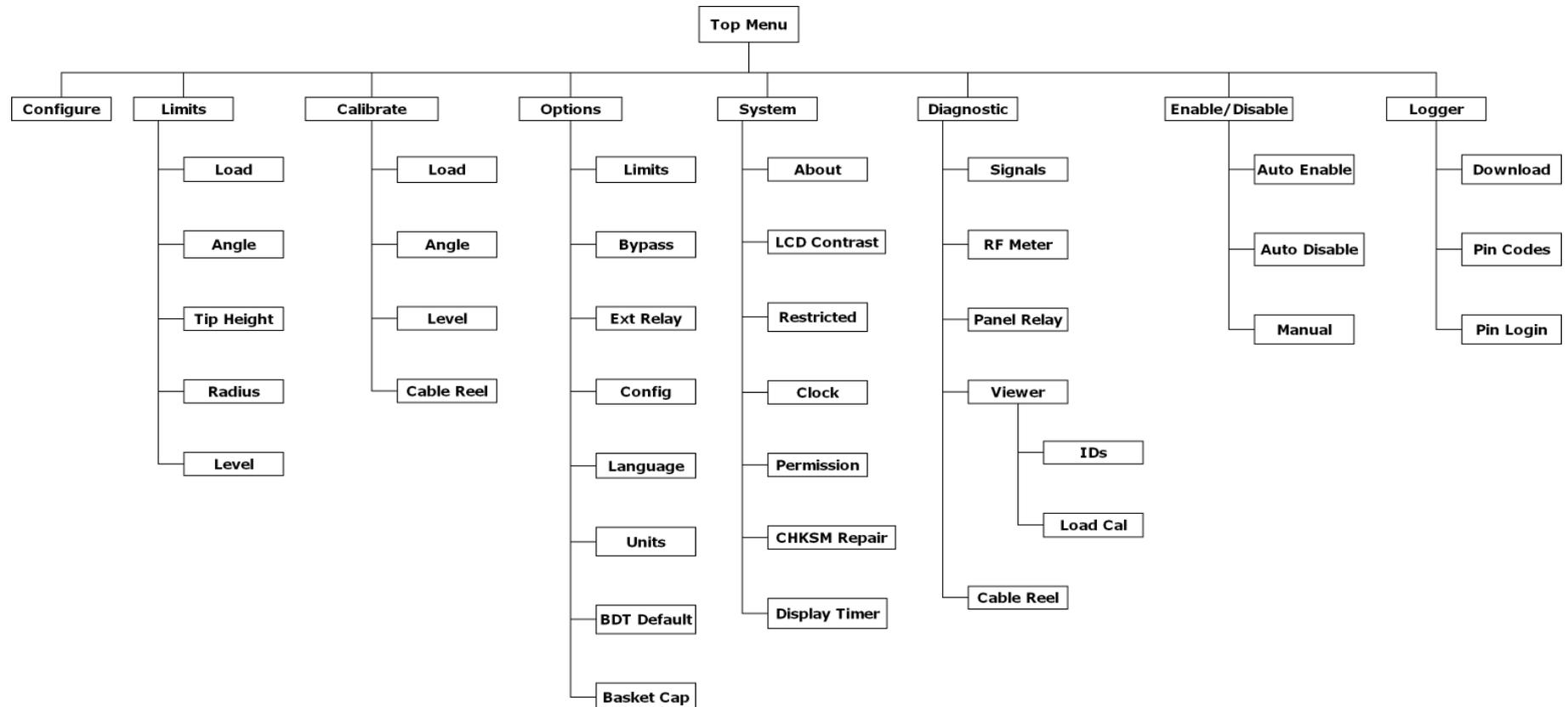
6. Load Cal will allow the user to view the calibration information of the load transducer. No adjustments can be made from this screen.
7. IDs will allow the user to see the ID numbers for each component possible on the system. No adjustments can be made from this screen.
8. Select Exit to return to Primary Operating Screen or Select Back or Top Menu to return to the top menu

Cable Reel

Used to troubleshoot the wireless cable reel. It displays the actual boom length including all jibs and extensions along with the retracted and extended set points. The other information is to aid the service technicians in troubleshooting.

1. From the Primary Operating screen press select, the Secondary Operating screen is displayed.
2. Use the Up or Down arrows, select Setup.
3. Use the Up or Down arrows, select Diagnostic.
4. Use the Up or Down arrows, select Cable Reel.
5. Select Exit to return to Primary Operating Screen or Select Back or Top Menu to return to the top menu

Supervisor Permission Level



- Configure Enables users to select the Winch and Parts-of-line to be displayed.
- Limits Enables users to set limits for Load and Angle indicators.
(Not in A2B only systems)
- Calibrate Enables supervisors to set calibrations for the Load, Angle, Level or Cable Reel.
- Options Enables supervisors to Enable or Disable the Limits Lock, Bypass button or External Alarms.
- System Enables users to display the serial number of the system or change the permission level.
- Diagnostic Enables users to view the signal strength and RF signal from the transducers. Also enables users to view the
IDS of the components of the system.
- Enable/Disable Enables supervisors to Enable or Disable transducers in the system.
- Logger Used to log alarms and set login PIN codes.

Permissions Level

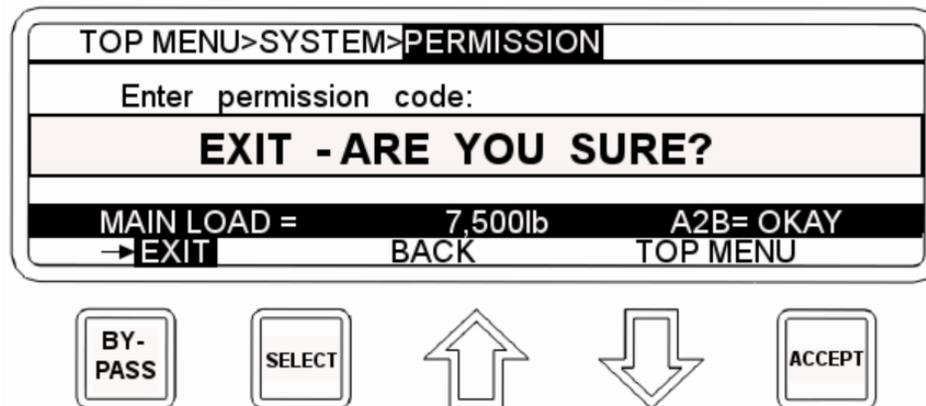
To access these menu selections you must use the Supervisor Permission code of “111” at the permission screen

To Set the Permission Level

1. From the Primary Operating screen press select, the Secondary Operating screen is displayed.
2. Use the Up or Down arrows, select Setup.
3. Use the Up or Down arrows, select System.
4. Use the Up or Down arrows, select Permission.
5. Press Select button and use the Up or Down arrows to scroll to the permission code (111).
6. Press Accept twice to save.
7. You will be automatically taken to the Top Menu where you can select from the functions available.

To Exit the Setup Menu

1. If you select Exit a message will be displayed to verify that you want to exit.



2. Press Accept to Exit. If you press Select a message will be displayed to Press Accept to Exit.

NOTE:

- If the Accept key is pressed the system will return to the Primary Operating Screen and return to the Operator permission level.
- If the supervisor does not want to exit pressing the Up or Down arrows will cancel the exit.
- The Supervisor Permission code can be changed by the user to limit access if necessary. Please call our Service department for more information

Calibration Menu

Load Cell Calibration

Factory Restore of Calibration

To restore the systems factory settings:

1. From the Top Menu screen, use the Up or Down arrows select Calibrate.
2. Use the Up or Down arrows, select Load.
3. Use the Up or Down arrows, select Factory Cal.
4. Use the Up or Down arrows, select Factory Cal. (The system will ask if you are sure you want to restore the Factory Calibration).
5. Use the Up or Down arrows to select Top Menu to continue with Supervisor permission or, Select Exit to return to Primary Operating Screen and Operator Permission level. Your load cell original factory calibration has now been restored. Repeat this on Aux.1 load cell if necessary.

Set Span – Calibrating with a known weight – step 1

1. Pick up a Known Weight.
2. From the Top Menu screen, use the Up or Down arrows select Calibrate.
3. Use the Up or Down arrows, select Load.
4. Use the Up or Down arrows, select (Main, Aux 1, Aux 2), the display at the top of the screen will change to show your selection.
5. Use the Up or Down arrows, select Set Span.
6. Use the Up or Down arrows to set the known weight being lifted.
7. Press Accept twice to save.
8. Use the Up or Down arrows to select Top Menu to continue with Supervisor permission or, Select Exit to return to Primary Operating Screen and Operator Permission level.

Set Load Zero - Calibrating with a known weight – step 2

1. Ensure there is no load or rigging on the hook.
2. From the Top Menu screen select Calibrate.
3. Use the Up or Down arrows, select Load.
4. Use the Up or Down arrows, select (Main, Aux 1, Aux 2), the display at the top of the screen will change to show your selection.
5. Use the Up or Down arrows, select Set Zero.
6. Use the Up or Down arrows to set the Zero weight for the winch.

7. Press Accept twice to save.
8. Use the Up or Down arrows to select Top Menu to continue with Supervisor permission or, Select Exit to return to Primary Operating Screen and Operator Permission level.

NOTE:

- The weight displayed on the panel should indicate block or headache ball weight to the nearest 100 lbs. For example, if the headache ball is 160 lbs. the display should indicate 200 lbs.

Known Weights

The minimum weight to be used for Load cell calibration depends on the Load Cell's single line pull rating. A known weight of 50% or more of the single line pull capacity is best for re-calibrating the load cells.

Important Calibration/Weight Adjustment Information

- In the system calibration modes a single push of the Up or Down arrows changes the increments by 100 pounds for up to 16 parts-of-line.
- If you require 17 or more parts-of-line, the increments for a single push of the Up or Down arrows, change by 100 pounds to start and change to 200 pounds.
- Sheave friction can be a factor in Load system calibration. The Load cell measures force on one part-of-line (POL) and multiplies it by the number of parts-of-line. If you are running 10 POL this may affect load calibration by 10%.
- For best results always make sure sheave bearings are clean and well lubricated.
- When the Calibration is complete, repeat the steps with each load cell on each winch, i.e. Main, Auxiliary One, etc.
- Formula for known weights
- $(\text{Maximum single line pull of winch} \times \text{parts-of-line}) \div 2 = \text{minimum known weight required}$

Examples of Known Weights

Using a 15,000lbs. SLP load cell and running 4 parts-of-line, the ideal known calibration weight would be 30,000lbs.

Using a 25,000lbs. SLP load cell and running 6 parts-of-line, the ideal known calibration weight would be 75,000lbs.

Using a 40,000lbs. SLP load cell and running 8 parts-of-line, the ideal known calibration weight would be 160,000lbs.

NOTE:

- You may utilise the factory restore function to self calibrate.
- You can re-calibrate the system yourself by using a known weight and following the steps above.
- Calibrating the Load Cells is a two-step process; first, ensure you have selected the correct Winch and Parts-of-line for the Load Cell, and then calibrate Load Zero and Span for that Load Cell. Repeat these steps for each Load Cell on the crane.

Boom Angle Indicator Calibration

When the Boom Angle transducer is installed it will be necessary to Zero the Angle value in the Display Panel. The following steps describe how to set the angle to zero when your Boom (or if installed on Luffing Jib) and the installed Angle transducer are as close to horizontal as possible.

To Set Angle Zero:

1. Install Boom Angle transducer.
2. Use a carpenter's level to position the Boom as close as possible to 0°.
3. Raise boom to 45° angle.
4. Lower boom to 0° angle.
5. From the Primary Operating screen press select, the Secondary Operating screen is displayed.
6. Set permissions (see page 68)
7. Use the Up or Down arrows to select Top Menu to continue with Supervisor permission.
8. Use the Up or Down arrows, select Calibrate.
9. Use the Up or Down arrows, select Angle, you will be defaulted to Zero.
10. Select Zero.
11. Use the Up or Down arrows to set the Zero Angle, (zero angle can be set between -20° and 90°).
12. Press Accept twice to save.
13. Use the Up or Down arrows to select Top Menu to continue with Supervisor permission, Back to return to the Calibrate menu or, select Exit to return to Primary Operating Screen and Operator Permission level.

Level Transducer Calibration

When the Level Transducer is installed, it will be necessary to calibrate the unit. To do this you must Zero the Pitch and Roll Angle values in the Display Panel. The following steps describe how to set the angles to zero. **The crane must be perfectly level before attempting to calibrate the Level Transducer.**

Set Level Zero:

1. Install Level Transducer (see page 34).
2. Position the crane so that it is perfectly level. Use the bubble level included with the Level transducer.
3. To perform calibration you will need to access the permission codes section in the panel (see page 68).
4. Once you have entered the correct permission code, use the following steps to calibrate the Level Transducer.

5. Use the Up or Down arrows, highlight Calibrate. Press Select.
6. Use the Up or Down arrows, highlight Level. Press Select.
7. You will be defaulted to Pitch Angle Zero. Press Select.
8. Use the Up or Down arrows to adjust the Zero Angle to zero.
9. Press Accept twice to save.
10. You will now be defaulted to the Roll Angle Zero. Press Select.
11. Use the Up or Down arrows to adjust the Zero Angle to zero.
12. Press Accept twice to save.
13. The Level transducer is now calibrated.
14. Highlight Top Menu and Press Select to continue with Supervisor permission, Back to return to the Calibrate menu or, Exit to return to Primary Operating Screen and Operator Permission level.

Cable Reel Calibration

If your system includes a cable reel it will need to be calibrated immediately after installation.

1. Install the Cable Reel (see page 27).
2. To perform calibration you will need to access the permission codes section in the panel (see page 68).
3. Once you have entered the correct permission code, use the following steps to calibrate the cable reel.
4. Use the Up or Down arrows to highlight Top Menu. Press Select to continue with Supervisor permission. From the Top Menu use the Up or Down arrows to select Calibrate.
5. Use the Up or Down arrows to select Cable Reel.
6. The default is Set Retracted. Fully retract your boom, then press Select.
7. A message should be displayed, for example, "MIN BOOM CALIBRATED AT 31".
8. When you have returned to the Cable Reel menu, fully extend your boom.
9. Use the Up or Down arrows to select Set Extended.
10. A message should be displayed, for example, "MAX BOOM CALIBRATED AT 70".
11. Use the Up or Down arrows to select Top Menu to continue with Supervisor permission, back to return to the Calibrate Menu or, Select Exit to return to Primary Operating Screen and Operator Permission level.

Options Menu

Limits Lock

The Limits Lock enables you to restrict access to the Limits menu.

1. From the Top Menu screen, use the Up or Down arrows and select Options.
2. Use the Up or Down arrows, select Limits.
3. Use the Up or Down arrows, select Locked/Unlock.
4. Press Accept twice to save.
5. Use the Up or Down arrows to select Top Menu to continue with Supervisor permission or, Select Exit to return to Primary Operating Screen and Operator Permission level.

Bypass button

This option enables you to disable the by-pass button, pushing the by-pass button will then have no effect.

1. From the Top Menu screen, use the Up or Down arrows and select Options.
2. Use the Up or Down arrows, select Bypass.
3. Use the Up or Down arrows, select Enable/Disable.
4. Press Accept twice to save.
5. Use the Up or Down arrows to select Top Menu to continue with Supervisor permission or, select Exit to return to Primary Operating Screen and Operator Permission level.

Ext Relay (Output for Shutoff/Horn/Indicator)

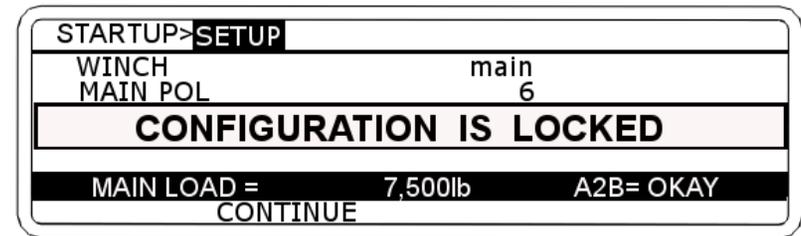
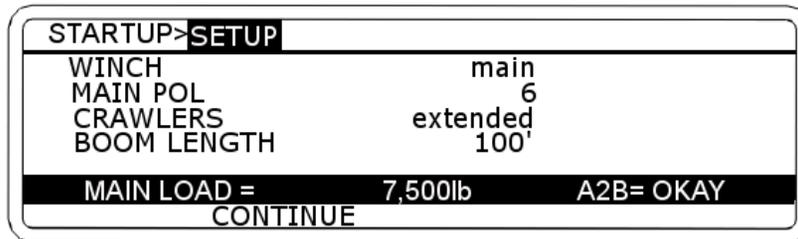
The Ext Relay setting enables you to change the normal state of the alarm output wire (the White lead from the power harness). Usually this setting is shipped in the “Normally Hot” state, indicating that the alarm output wire is powered when no alarms are occurring. If required, the setting can be changed to “Normally Cold”, indicating that the alarm output wire is not powered when no alarms are occurring.

1. From the Top Menu screen, use the Up or Down arrows select Options.
2. Use the Up or Down arrows, select Ext Relay.
3. Use the Up or Down arrows, select Norm Hot/Norm Cold.
4. Press Accept twice to save.
5. Use the Up or Down arrows to select Top Menu to continue with Supervisor permission or, Select Exit to return to Primary Operating Screen and Operator Permission level.

Config Lock

Config Lock enables the supervisor to stop operators from changing the crane's configuration. The Config Lock affects both the Setup Menu Configuration and the Start-up Set-up menu screens.

1. From the Top Menu screen, use the Up or Down arrows and select Options.
2. Use the Up or Down arrows, select Config.
3. Use the Up or Down arrows, select Locked/Unlock.
4. Press Accept twice to save.
5. Use the Up or Down arrows to select Top Menu to continue with Supervisor permission or, Select Exit to return to Primary Operating Screen and Operator Permission level.
6. When the operator selects Change from this screen and the Config Lock is on the operator will only be able to change two settings, Winch and POL.
7. When the Operator selects Continue the sequence of screens is the same as at Start up or after using the Quick Winch Switch.



NOTE:

- If there is a problem with the configuration a supervisor will be required to make the change.

Language

The Language selection enables you to change the Language of the Display panel.

1. From the Top Menu screen, use the Up or Down arrows and select Options.
2. Use the Up or Down arrows, select Language.
3. Use the Up or Down arrows, select the language of choice. The panel text will now change to the newly selected language.
4. Press Accept twice to save.
5. Use the Up or Down arrows to select Top Menu to continue with Supervisor permission or, Select Exit to return to Primary Operating Screen and Operator Permission level.

Units

The Units selection enables you to change the units of measurement displayed by the panel.

1. From the Top Menu screen, use the Up or Down arrows and select Options.
2. Use the Up or Down arrows, select Units.
3. Use the Up or Down arrows, select the units of choice. The panel text will now change to the newly selected units.
4. Press Accept twice to save.
5. Use the Up or Down arrows to select Top Menu to continue with Supervisor permission or, Select Exit to return to Primary Operating Screen and Operator Permission level.

BDT Default

BDT Default allows the supervisor to choose what position will be used for load chart selection in the event that the BDT system is disabled.

1. From the Top Menu screen, use the Up or Down arrows and select Options.
2. Use the Up or Down arrows, select BDT Default.
3. Use the Up or Down arrows, select the position to be used for the default.
4. Press Accept twice to save.

NOTE:

- The BDT Default selection only applies when the Cranesmart™ System has been equipped with a BDT

Basket Capacity

Basket Capacity allows the supervisor to specify the rated capacity of the man basket. This is used in conjunction with the weighing procedure documented in the custom section of your manual to determine the total allowable capacity.

1. From the Top Menu screen, use the Up or Down arrows and select Options.
2. Use the Up or Down arrows, select BASKET CAP.
3. Use the Up or Down arrows, select the rated capacity of the man basket.
4. Press Accept twice to save.

NOTE:

- The Basket Capacity selection only applies when the Cranesmart™ System has been programmed with the man basket option.

System Menu

When the permission level has been changed the System menu provides additional options.

About

1. From the Top Menu screen, use the Up or Down arrows, select System.
2. Use the Up or Down arrows, select About.
3. Select Top Menu to continue with Supervisor permission, Back to return to the System Menu, or select Exit to return to Primary Operating Screen and Operator Permission level.

LCD Contrast

LCD contrast allows you to adjust your panel display to be lighter or darker for easier viewing.

1. From the Top Menu screen, use the UP or Down arrows to select System.
2. Use the UP or Down arrows to select LCD Contrast.
3. Press Select on Contrast, then use the Down arrow to make the display darker, or the Up arrow to make it lighter. The contrast will change immediately.
4. When you are satisfied with your display contrast press Accept twice to save.
5. Use the UP or Down arrows to select Top Menu to continue with changed permission, Back to return to the System Menu, or Select Exit to return to Primary Operating Screen and Operator Permission level.

Permissions

Allows user to enter the Supervisor Mode (see page 68)

1. From the Top Menu screen, use the Up or Down arrows, select System.
2. Use the Up or Down arrows, select Permission.
3. Press Select on Permission.
4. Use the Up or Down arrows, set the Permission Access Code.
5. Press Accept twice to save.
6. Select Top Menu to continue with Supervisor permission, Back to return to System Menu, or Select Exit to return to Primary Operating Screen and Operator Permission level.

Restricted

Users must call the service department to gain access to the restricted menu.

Clock

1. From the Top Menu screen, use the Up or Down arrows and select System.
2. Use the Up or Down arrows, select Clock.
3. Use the Up or Down arrows, select Hours, Minutes, Months, Day or Year.
4. Use the Up or Down arrows, set Time, and Date.
5. Press Accept twice to save.
6. Use the Up or Down arrows to select Top Menu to continue with Supervisor permission, Back to return to System Menu, or select Exit to return to Primary Operating Screen and Operator Permission level.

Checksum Repair

If your display shows that you have a “Checksum Error” you can use this function to repair the problem.

1. From the Top Menu screen, use the Up or Down arrows and select System.
2. Use the Up or Down arrows, select CHKSM Repair.
3. Use the Up or Down arrows, select Repair/Cancel. If repair is chosen the screen will display “Repairing Checksum Error”. After Checksum has been repaired, you will automatically be sent back to the System Menu.
4. Use the Up or Down arrows to select Top Menu to continue with Supervisor permission, Back to return to the Top Menu, or select Exit to return to Primary Operating Screen and Operator Permission level.

Display Timer

1. From the Top Menu screen, use the Up or Down arrows select System.
2. Use the Up or Down arrows, select Display Timer.
3. Use the Up or Down arrows, select Timer.
4. Use the Up or Down arrows to change Display Time.
5. Press Accept twice to save.
6. Use the Up or Down arrows to select Top Menu to continue with Supervisor permission, Back to return to System Menu, or Select Exit to return to Primary Operating Screen and Operator Permission level.

Supervisor Enable/Disable Menu

1. From the Top Menu screen, use the Up or Down arrows and select Enable/Disable.
2. Use the Up or Down arrows, select the Auto Enable, Auto Disable or Manual.
3. Use the Up or Down arrows to select Top Menu to continue with Supervisor permission or, select Exit to return to Primary Operating Screen and Operator Permission level.

NOTE:

- For Auto Enable/Disable the system steps through the transducers in the system until all transducers have been located. Operators may have to wait approximately 5 seconds for the system to connect to a transducer.
- Auto Disable can only be used if a transducer is in a system or battery alarm
- For Manual Enable/Disable use the Up or Down arrows to select the transducers to enable/disable. (Extra choice may be available under – More)

Logger Menu

The Logger menu is used for setting up User PIN codes and enabling the PIN code function, as well as downloading stored alarms.

Download

The download feature requires a cable and customised software purchased from Cranesmart™ Systems. If you need to download alarms but have not purchased a cable, please phone us at (888) 562-3222 or (780) 437-2986. Please refer to instructions included with the Cranesmart™ Alarms software and download cable.

PIN Codes

This menu is used to store up to 18 unique user PIN numbers.

1. From the Top Menu screen, use the Up or Down arrows to select Logger.
2. Used the Up or Down arrows to select PIN Codes.
3. Default to PIN1, press Select then use the Up or Down arrows to choose a PIN number. The numbers can be between 0001 and 9999.
4. Repeat for each PIN number. Select MORE to get to the second page of PIN numbers.
5. Remember your PIN number!
6. Select Top Menu to continue with Supervisor permission, Back to return to the Logger Menu, or Select Exit to return to Primary Operating Screen and Operator Permission level.

NOTE:

- When inputting your PIN Code on power up, the default starting value is 5000.

PIN Login

This option is used to turn on or off the PIN Login requirement when the panel is powered up. If it is enabled the user must enter a PIN before the panel will operate.

1. From the Top Menu screen, use the Up or Down arrows to select Logger.
2. Use the Up or Down arrows to select PIN login.
3. Use the Up or Down arrows to select enable/disable.
4. Press Accept twice to save.
5. Select Top Menu to continue with Supervisor permission, or Select Exit to return to Primary Operating Screen and Operator Permission level.

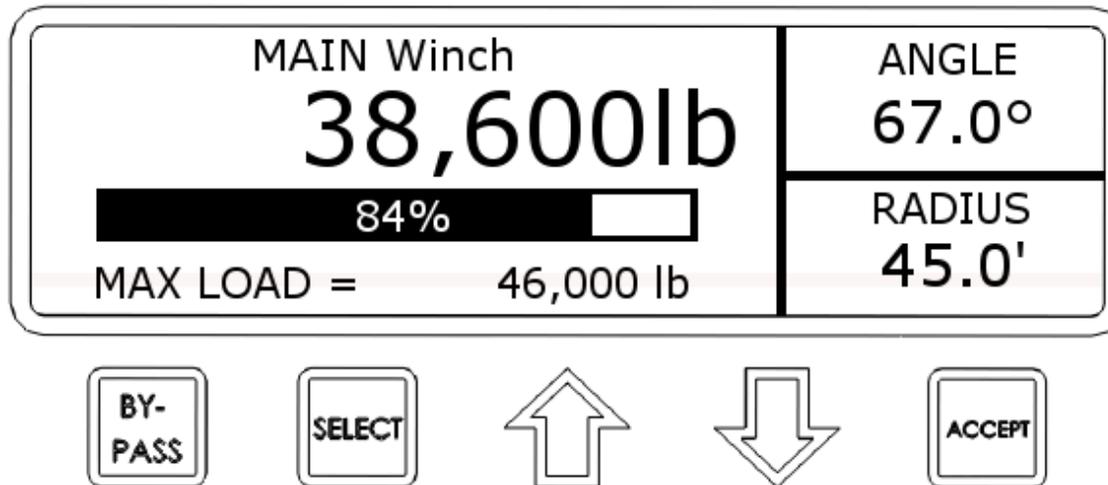
NOTE:

- If you have forgotten your PIN Code or have not set any codes but have enabled the Login, please phone our Service Department at (888) 562-3222 or (780) 437-2986.

Display Panel – Operating Screens

Primary Operating Screen

The Primary Operating screen enables users to view the current displayed values, the screen changes depending on the configuration of the system purchased. Display for Load and Angle Transducer shown below.



Winch	Displays the actual load on the hook in pounds. (Main, Aux 1, Aux 2)
Percentage Bar Graph	Displays the percentage of the pre-set maximum load defined by the Load Chart. The Bar Graph displays the amount of the load. If there is no load the graph is blank.
Max Load	Displays the maximum load as defined by the Load Chart.
Radius	Displays the current radius.
Angle	Displays the angle of the boom in degrees using the horizontal line as zero.
Tare	A "T" is displayed at the end of the bar graph to indicate the tare out function.

Secondary Operating Screen

The Secondary Operating screen enables users to view more detailed information about their system and perform operator functions.

To view the Secondary Operating screen press the Select button.

MAIN WINCH			A2B=OKAY
POL	LENGTH	TIP	WIND
6	100.0'	103.1'	<15mph
EXIT ← LIMITS TARE SIG INFO SETUP			



- Main Winch Displays the winch for the information that follows.
- A2B Displays the status of all A2B switches in the system.
- POL Displays the number of Parts-of-Line in use on the winch.
- Length Displays the Boom length.
- Tip Displays the height of the tip of the boom.
- Wind Speed Displays the wind speed in miles per hour when the wind exceeds 15 MPH if your system has a wind speed transducer.

Limits Screen

The Limits screen displays the Limit settings for the system.
The Limits Screen is not available on A2B only systems.

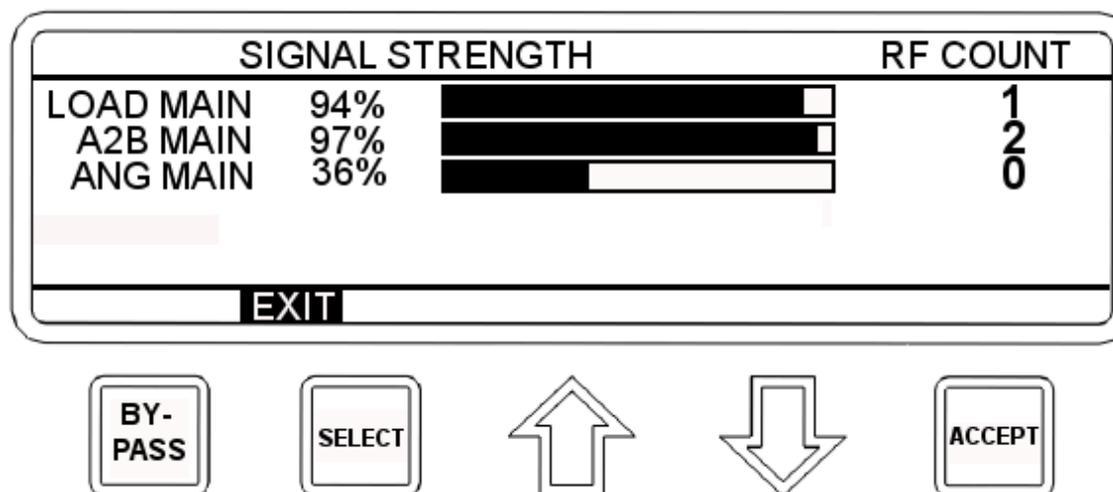
LOAD	MAX	ANGLE	MAX	MIN
MAIN	240,000lb	MAIN	90.0°	-10.0°
AUX1	25,000lb	BOOM	100.0'	30.0'
		RADIUS	250'	0'
WIND	100mph	TIP	250'	0'
EXIT				

BY-PASS SELECT ↑ ↓ ACCEPT

Signal Strength Screen

The Signal Strength screen displays the strength of the signals from any enabled transducers. This screen should be used when installing boom mounted transmitters to help ensure placement for best signal. It is also used to aid in trouble shooting by the Cranesmart™ service department.

1. From the Primary Operating screen, press the Select button to move to the Secondary Operating screen.
2. Use the Up or Down arrows to move through the navigation bar, select Sig.
3. The Signal Strength screen is displayed.



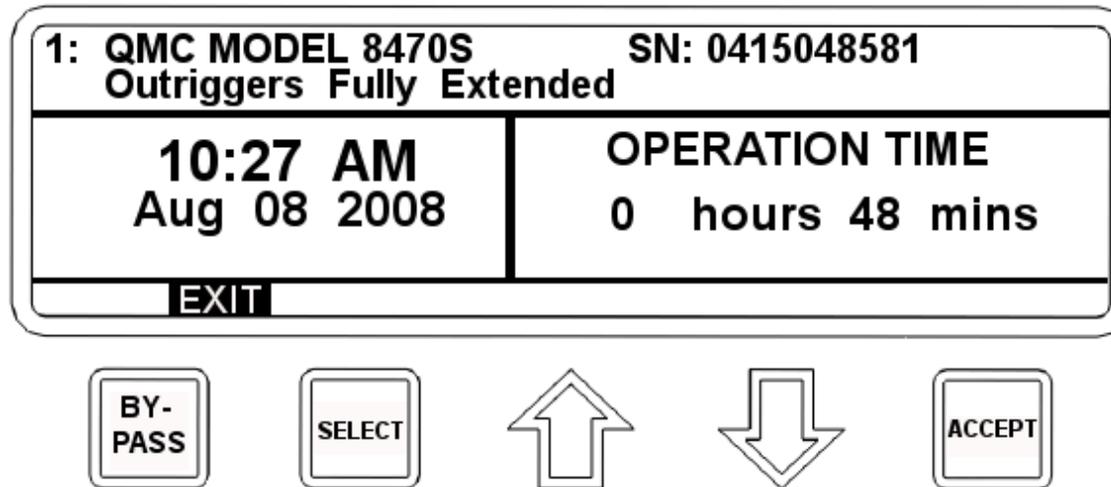
4. Press Select to return to the Primary Operating Display.

A2B Main	Indicates the A2B transducer signal strength
Load Main	Indicates the Load Main transducer signal strength
Load Aux 1	Indicates the Load Aux 1 transducer signal strength
Angle Main	Indicates the Angle Main transducer signal strength.
Wind Sys	Indicates the Wind System transducer signal strength.

Info Screen

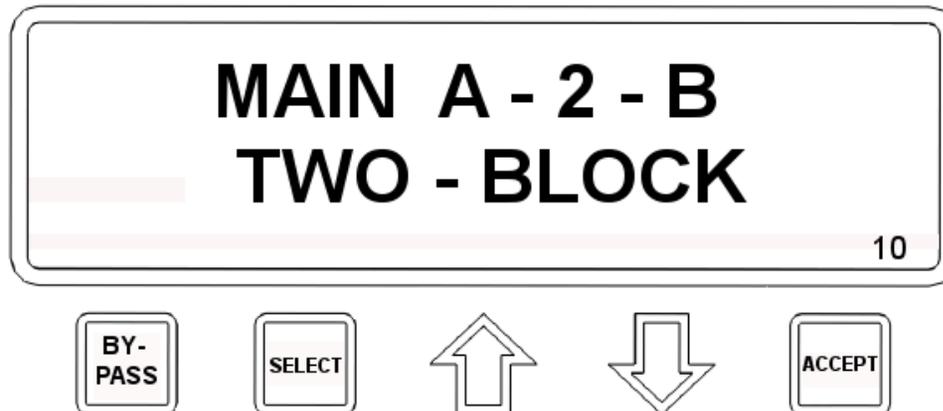
The Info screen displays Cranesmart™ system information. This information is used for troubleshooting by the Cranesmart™ service department.

1. From the Primary Operating screen, press the Select button to move to the Secondary Operating screen.
2. Use the Up or Down arrows to move through the navigation bar, select Info.
3. The Information screen is displayed.



Display Panel – Alarms

The panel has built-in audible and visual alarms. The alarm screens alternate with the primary operating screen to notify the operator of unsafe crane conditions while continuing to provide load and positional information. The alarms are



accompanied by an audible alarm provided within the panel. The example below is a Main A2B two-block alarm. To further help in troubleshooting there is an alarm number in the lower right hand corner of the screen. This number coincides with the alarm that is appearing on the screen. If the alarm is too fast to read the number can be used to identify the alarm.

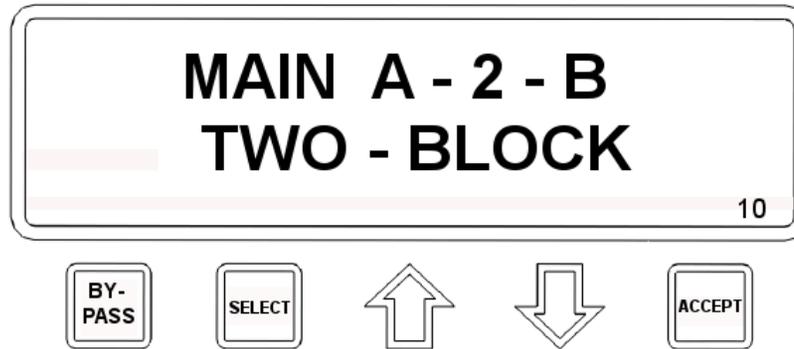
When the display panel is installed and powered you may see system error screens and hear alarms. The alarms may indicate which component (load cell, anti-2-block, angle transducer, etc) signal is not being received. The alarms are normal until all parts of the system are installed and there is a clear line of sight to the antenna. If all the parts of the system are correctly installed and the alarms are still sounding, check your signal strength screen (see page 83) to see if your boom mounted transmitters are sending a clear signal. You may also try moving your cab mounted antenna for better reception.

If neither of these solutions solves the problem call our service department at (888) 562-3222 or (780) 437-2986.

NOTE:

- The audible alarm is intended for the operator to hear. If you require a louder horn that can be heard across a platform or jobsite, Cranesmart™ Systems can provide a louder horn, which automatically increases in loudness depending on the ambient noise.

Alarm state of the Primary Operating screen on LMI System - If the Anti-2-block system senses that the block is too



close, the following alarm is displayed.

Alarm Codes

The following is a list of the most common error codes

Error Code #	Screen Alarm	Alarm Description
0	** BYPASS ** SEC REMAIN	Bypass button pressed
1	ALARM HUB MALFUNCTION	Alarm hub not communicating with display panel
3	MAIN LOAD SYSTEM ALARM	Main load cell not communicating with display panel
4	MAIN ANGLE SYSTEM ALARM	Main angle not communicating with display panel
5	MAIN A-2-B SYSTEM ALARM	Main A2B not communicating with display panel
8	MAIN LOAD ABOVE PRESET	Main Load exceeding the high limit alarm setting
9	MAIN ANGLE ABOVE PRESET	Angle exceeding the high limit alarm setting
10	MAIN A-2-B TWO-BLOCK	Main A2B in two block condition
11	AUX1 A-2-B TWO-BLOCK	Aux1 A2B in two block condition
12	AUX2 A-2-B TWO-BLOCK	Aux2 A2B in two block condition
19	MAIN ANGLE BELOW PRESET	Angle below the low limit alarm setting
24	MAIN 90% OF MAXIMUM LOAD	Load 90 percent high limit alarm

25	MAIN LOAD LOW BATTERY	Low Battery
26	MAIN ANGLE LOW BATTERY	Low Battery
27	MAIN A-2-B LOW BATTERY	Low Battery
29	CHECKSUM ERROR:	Display panel has a Checksum error
30	PANEL RELAY DETECT SHORT	Alarm output wire (White Wire) incorrectly installed
31	LEVELING LOW BATTERY	Low Battery
54	MAIN A-2-B OVER A/D ALARM	Main A-2-B Damaged
70	ROLL & PITCH ABOVE PRESET	Level exceeding the high limit alarm setting
71	ROLL ABOVE PRESET	Level exceeding the high limit alarm setting
72	PITCH ABOVE PRESET	Level exceeding the high limit alarm setting
103	AUX1 LOAD SYSTEM ALARM	Aux1 load cell not communicating with display panel
104	JIB ANGLE SYSTEM ALARM	Jib Angle not communicating with display panel
105	AUX1 A-2-B SYSTEM ALARM	Aux1 A-2-B not communicating with display panel
108	AUX1 LOAD ABOVE PRESET	Load exceeding the high limit alarm setting
109	JIB ANGLE ABOVE PRESET	Jib Angle exceeding the high limit alarm setting
119	JIB ANGLE BELOW PRESET	Jib Angle below the low limit alarm setting
122	AUX1 DISPLAY OVERFLOW	Aux1 Load Display error
124	AUX1 90% OF MAXIMUM LOAD	Aux1 Load 90 percent high limit alarm
125	AUX1 LOAD LOW BATTERY	Low Battery
126	JIB ANGLE LOW BATTERY	Low Battery
127	AUX1 A-2-B LOW BATTERY	Low Battery
154	AUX1 A-2-B OVER A/D ALARM	Aux1 A-2-B Damaged
168	AUX2 LOAD SYSTEM ALARM	Aux2 load cell not communicating with display panel
170	AUX2 A-2-B SYSTEM ALARM	Aux2 A-2-B not communicating with display panel
173	AUX2 LOAD ABOVE PRESET	Load exceeding the high limit alarm setting

187	AUX2 DISPLAY OVERFLOW	Aux2 Load Display error
189	AUX2 90% OF MAXIMUM LOAD	Aux2 Load 90 percent high limit alarm
190	AUX2 LOAD LOW BATTERY	Low Battery
192	AUX2 A-2-B LOW BATTERY	Low Battery
193	AUX2 LD REPEATR LOW BATTERY	Low Battery
254	AUX2 A-2-B OVER A/D ALARM	Aux2 A-2-B Damaged
303	MAIN LOAD SYSTEM ALARM	Main load cell not communicating with display panel
403	AUX1 LOAD SYSTEM ALARM	Aux1 load cell not communicating with display panel
468	AUX2 LOAD SYSTEM ALARM	Aux2 load cell not communicating with display panel

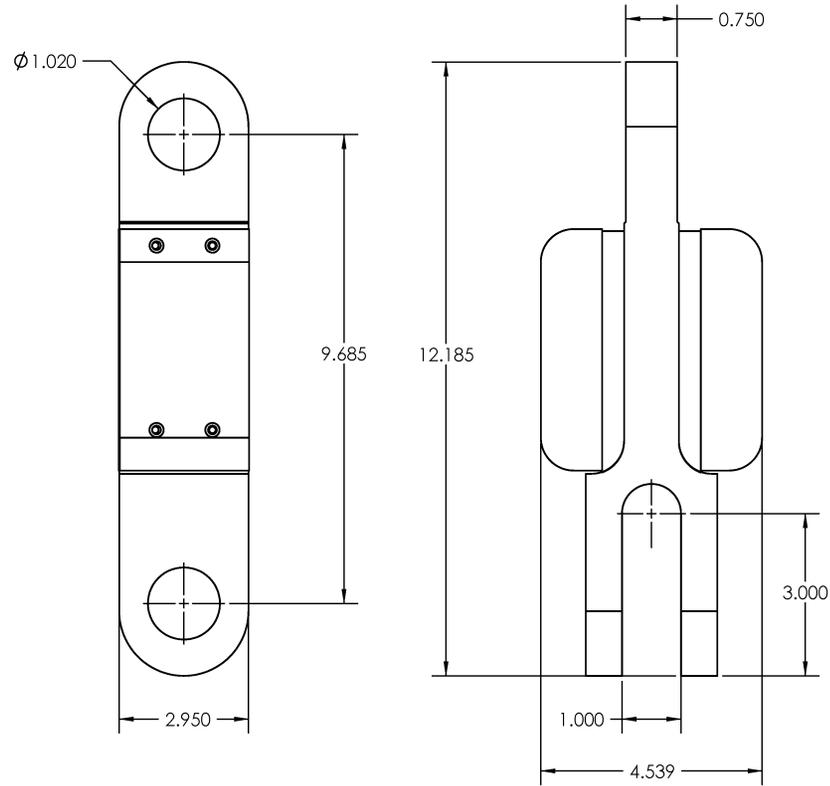
Function Shut Offs

Cranesmart™ Systems provide outputs for function shut offs. For example, the panel can be configured to interrupt the winch up function to prevent the operator from damaging the crane. Overload, A2B, angle and wind speed can also be used to shut the crane down in unsafe conditions. Outputs for the system are normally configured at the time of purchase to integrate into the crane's existing system or to match the shut offs provided with the system.

If you have specific requirements for alarms, displays or function shut offs call our sales department at (888) 562-3222 or (780) 437-2986.

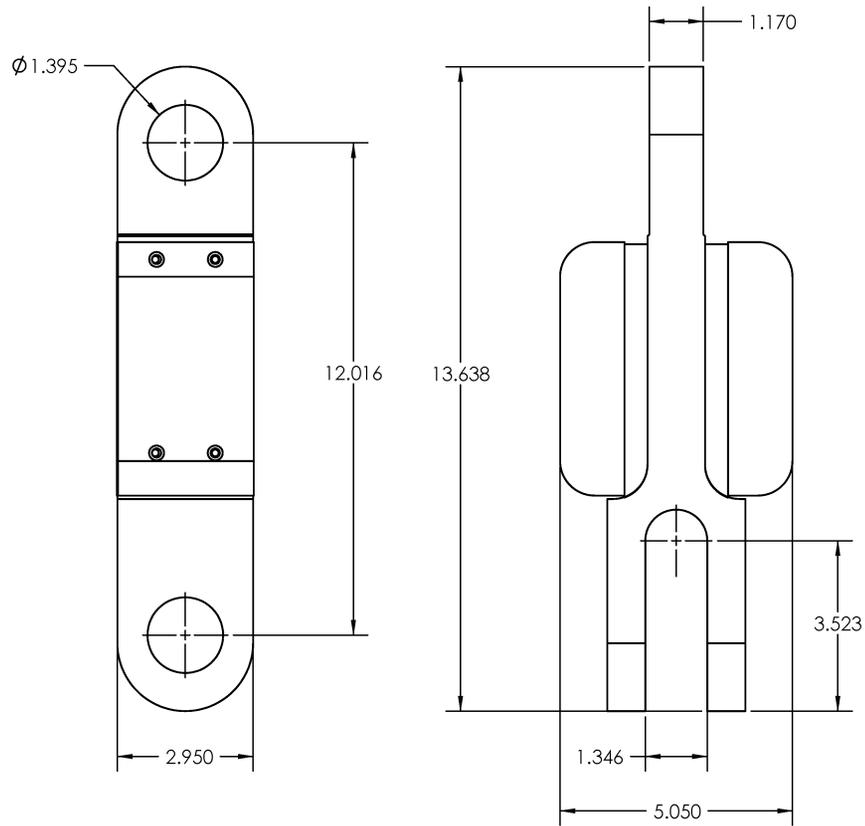
Technical Specifications

7,500lb single line pull load cell



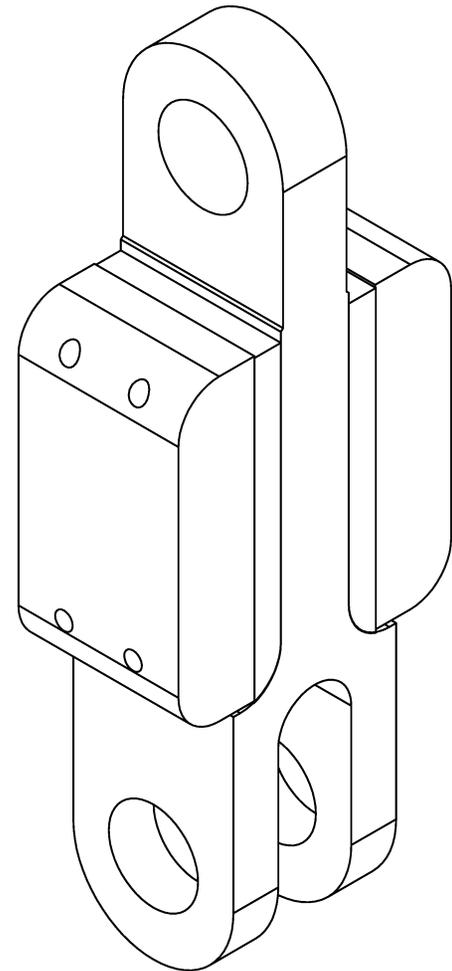
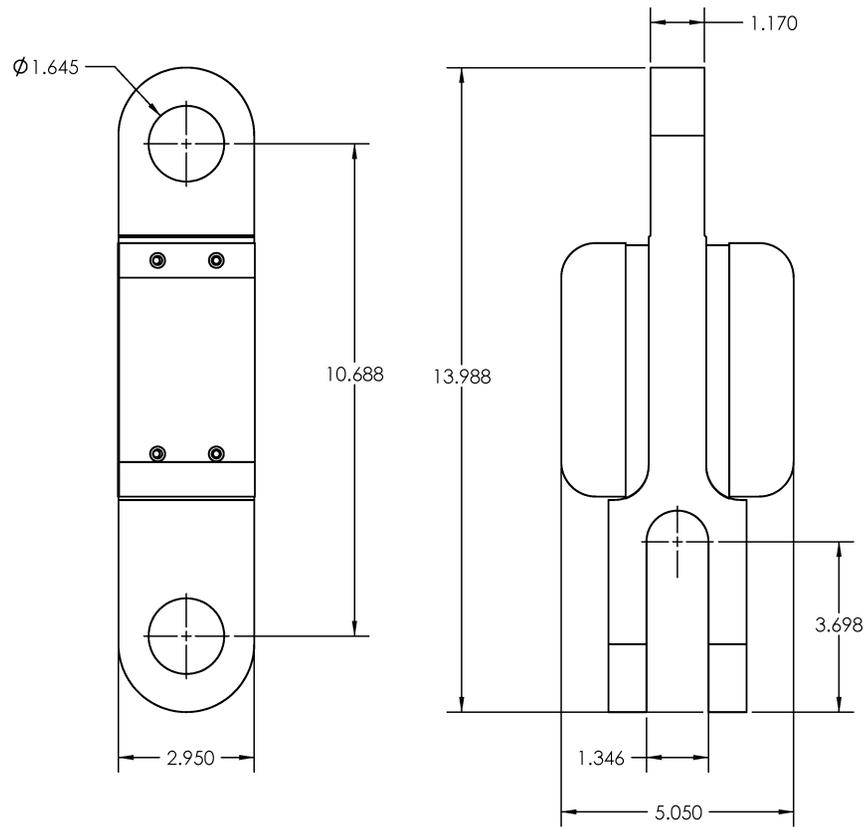
HEIGHT [in]	12.185	OPERATING TEMP. [°F]	-40° TO +140°
WIDTH [in]	4.539	BATTERY / LIFE	Lithium Ion / 5+ Yrs
DEPTH [in]	2.950	FCC COMPLIANCE	NFBLAB123
PIN CENTER-TO-CENTER [in]	9.685	PIN HOLE DIAMETER [in]	1.020
WEIGHT [lb]	10	ANTENNA	QUARTER WAVE, INTERNAL

15,000 single line pull load cell



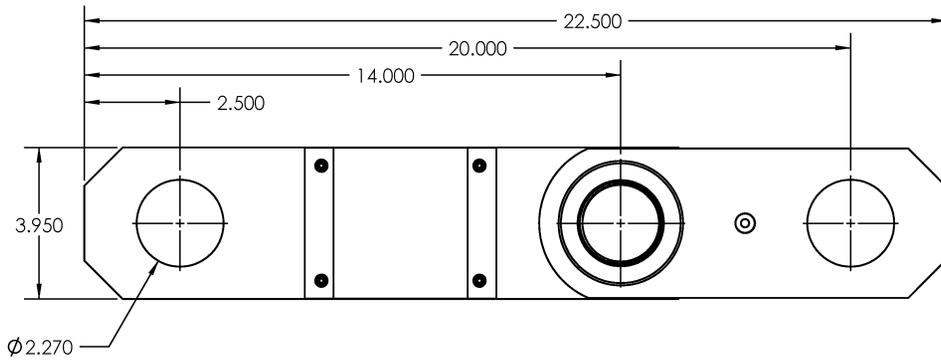
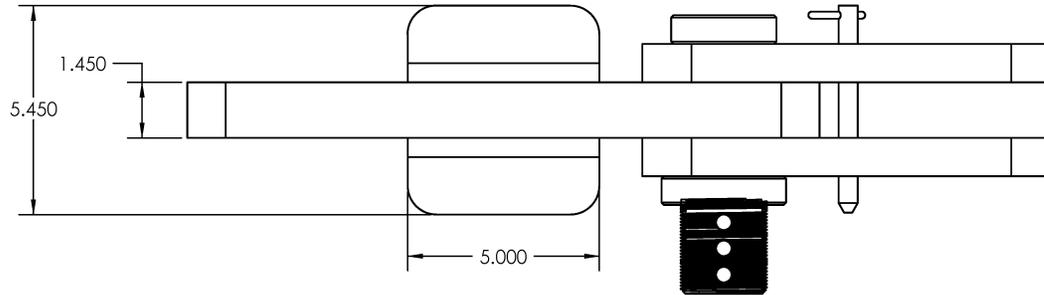
HEIGHT [in]	13.638	OPERATING TEMP. [°F]	-40° TO +140°
WIDTH [in]	5.050	BATTERY / LIFE	Lithium Ion / 5+ Yrs
DEPTH [in]	2.950	FCC COMPLIANCE	NFBLAB123
PIN CENTER-TO-CENTER [in]	12.016	PIN HOLE DIAMETER [in]	1.395
WEIGHT [lb]	1.4	ANTENNA	QUARTER WAVE, INTERNAL

25,000lb single line pull load cell

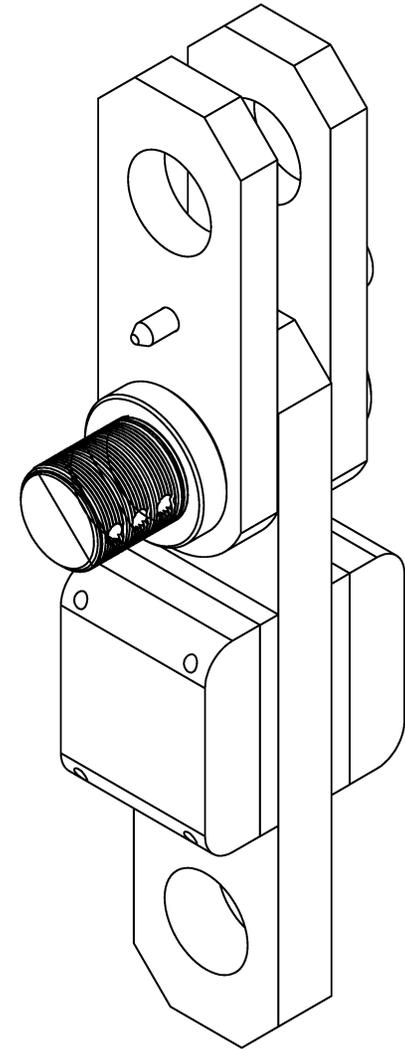


HEIGHT [in]	13.638	OPERATING TEMP. [°F]	-40° TO +140°
WIDTH [in]	5.050	BATTERY / LIFE	Lithium Ion / 5+ Yrs
DEPTH [in]	2.950	FCC COMPLIANCE	NFBLAB123
PIN CENTER-TO-CENTER [in]	12.016	PIN HOLE DIAMETER [in]	1.395
WEIGHT [lb]	14	ANTENNA	QUARTER WAVE, INTERNAL

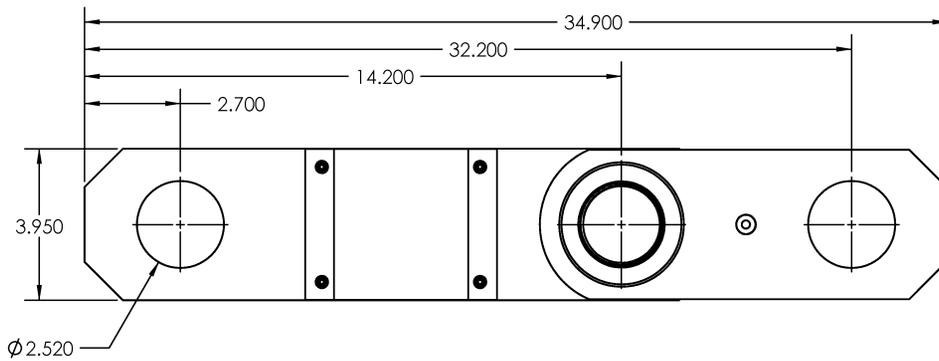
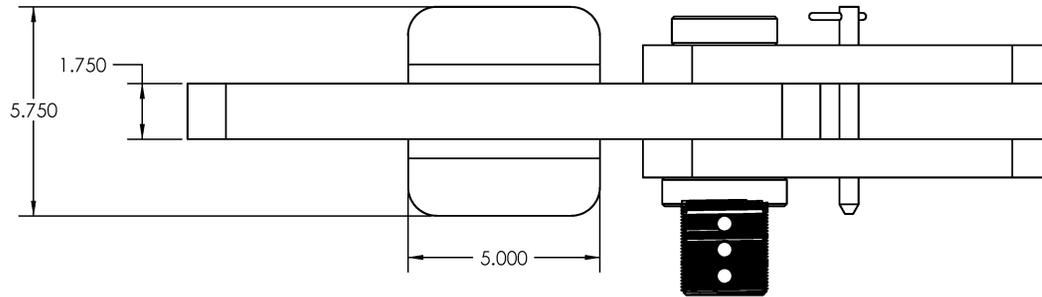
40,000lb single line pull load cell



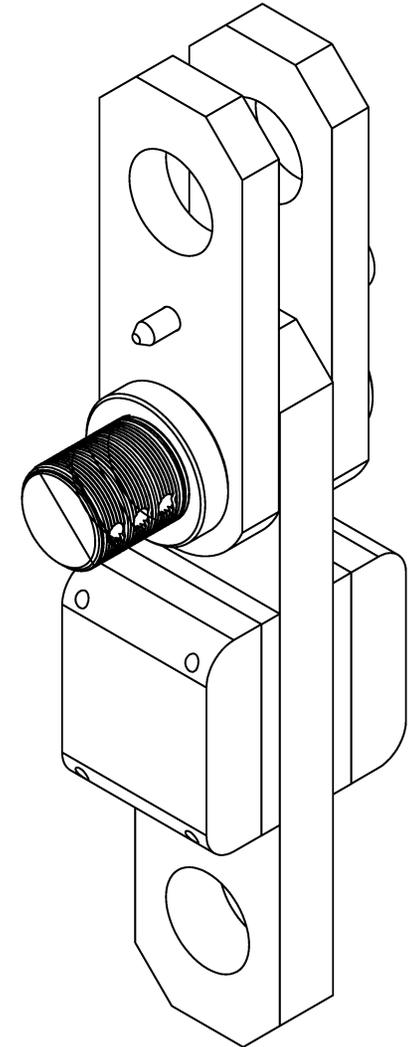
HEIGHT w/ LINKS [in]	22.500	OPERATING TEMP. [°F]	-40° TO +140°
WIDTH [in]	5.450	BATTERY / LIFE	Lithium Ion / 5+ Yrs
DEPTH [in]	3.950	FCC COMPLIANCE	NFBLAB123
PIN CENTER-TO-CENTER [in]	17.500	PIN HOLE DIAMETER [in]	2.270
WEIGHT [lb]	33	ANTENNA	QUARTER WAVE, INTERNAL



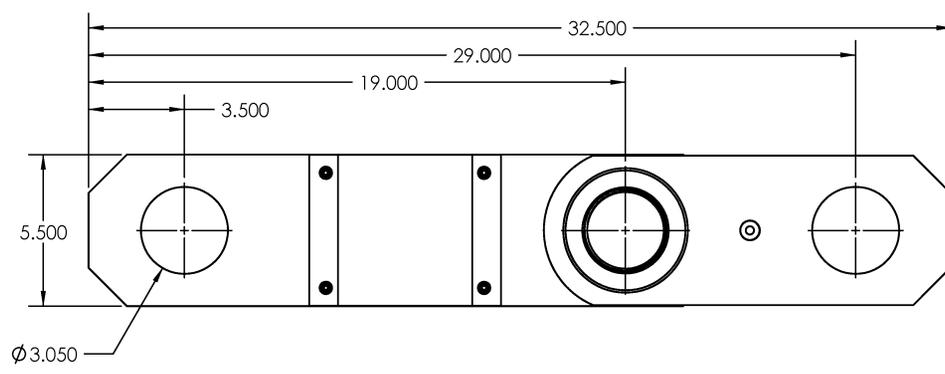
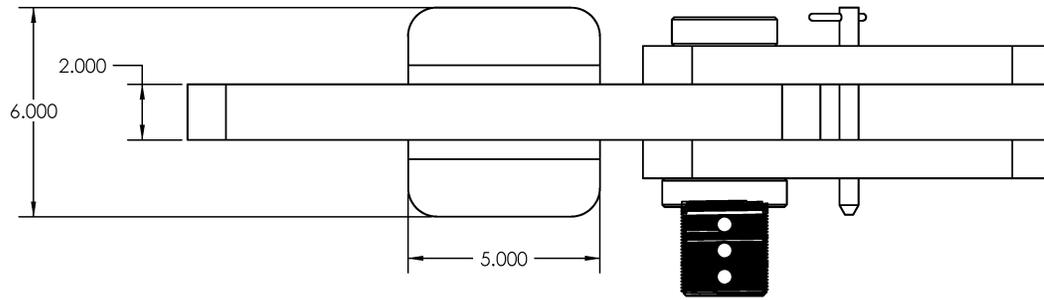
50,000lb single line pull load cell



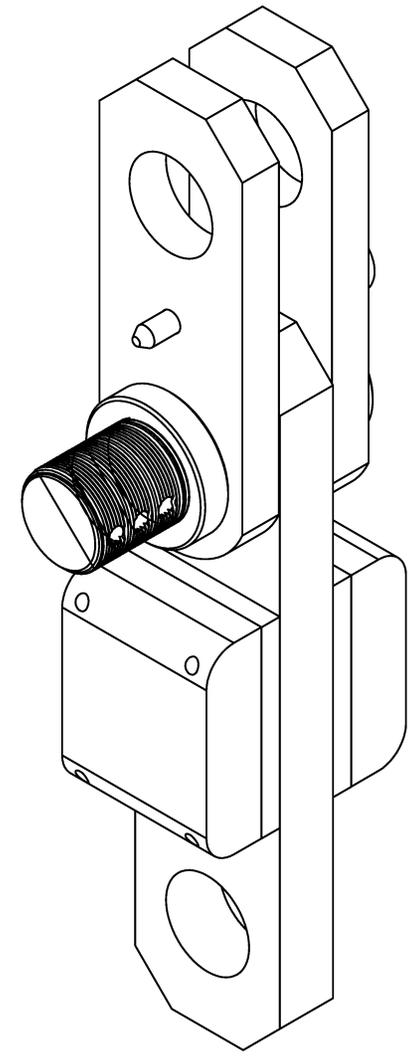
HEIGHT w/ LINKS [in]	35.000	OPERATING TEMP. [°F]	-40° TO +140°
WIDTH [in]	5.750	BATTERY / LIFE	Lithium Ion / 5+ Yrs
DEPTH [in]	3.950	FCC COMPLIANCE	NFBLAB123
PIN CENTER-TO-CENTER [in]	29.500	PIN HOLE DIAMETER [in]	2.520
WEIGHT [lb]	35	ANTENNA	QUARTER WAVE, INTERNAL



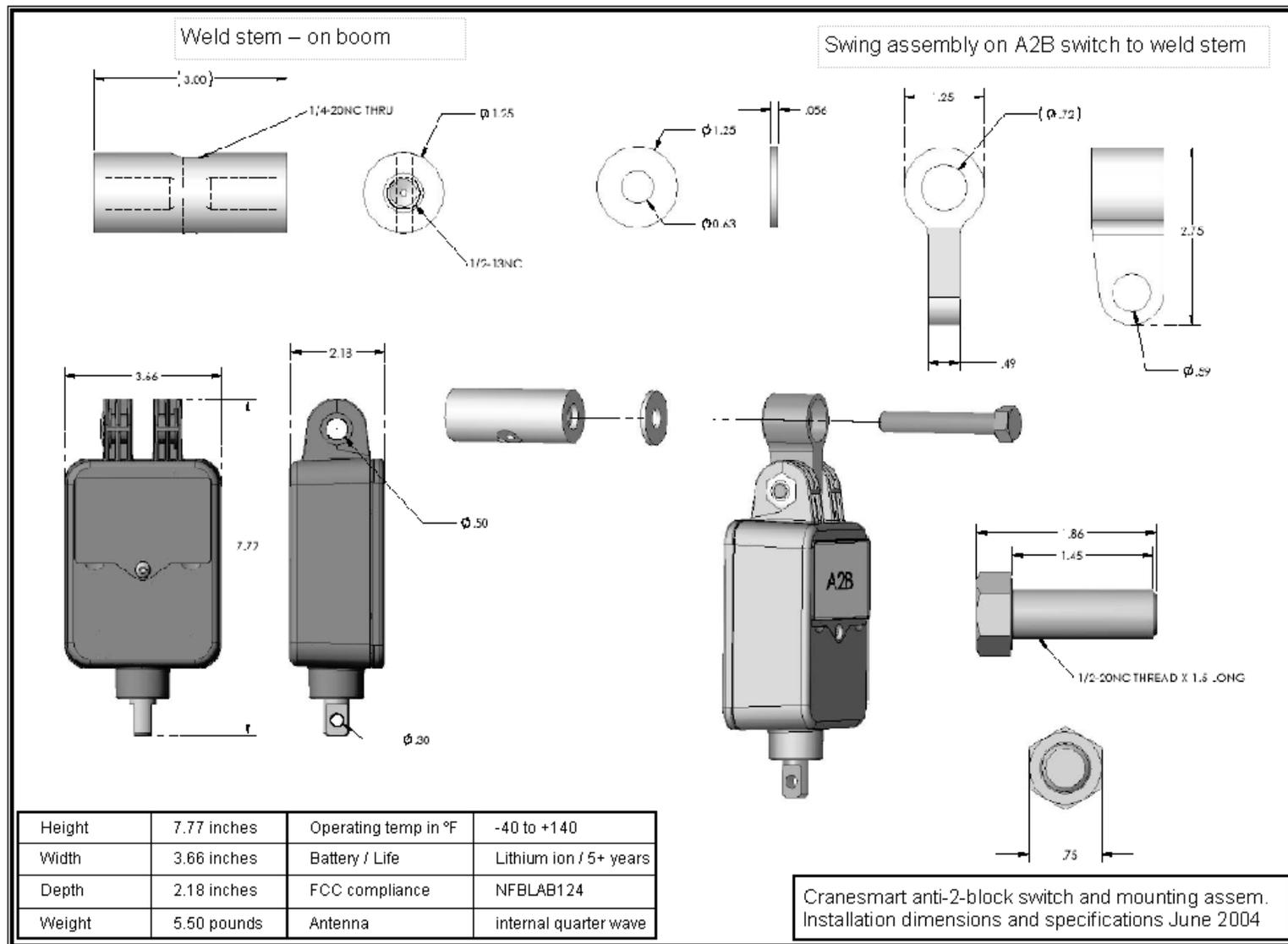
80,000lb single line pull load cell



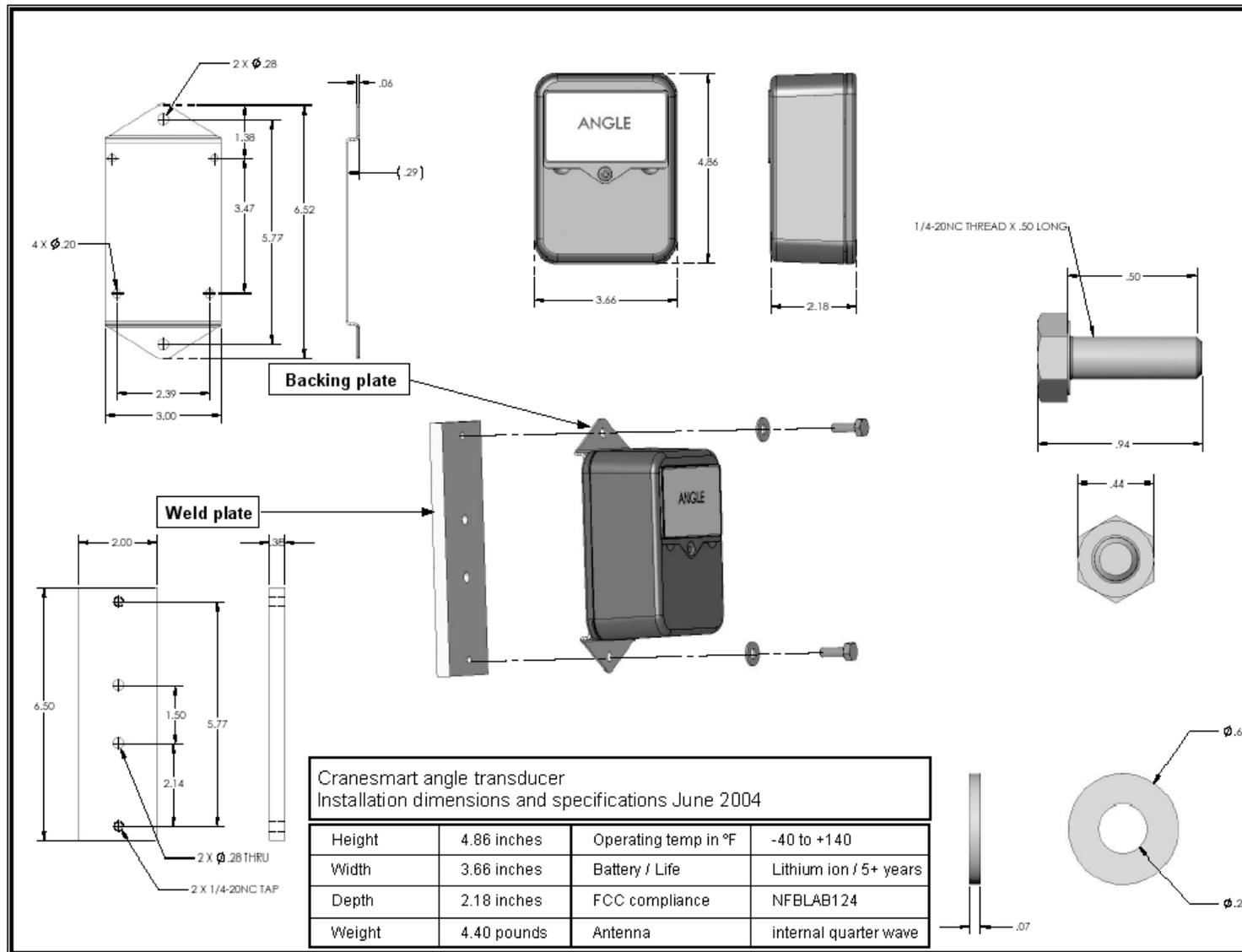
HEIGHT w/ LINKS [in]	32.500	OPERATING TEMP. [°F]	-40° TO +140°
WIDTH [in]	6.000	BATTERY / LIFE	Lithium Ion / 5+ Yrs
DEPTH [in]	5.500	FCC COMPLIANCE	NFBLAB123
PIN CENTER-TO-CENTER [in]	25.500	PIN HOLE DIAMETER [in]	3.000
WEIGHT [lb]	50	ANTENNA	QUARTER WAVE, INTERNAL



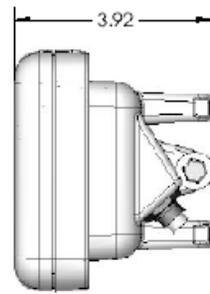
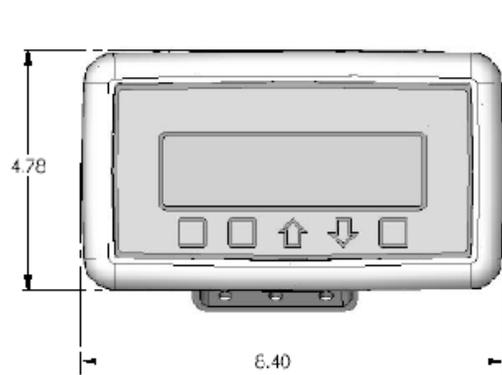
Anti-2-Block Switch



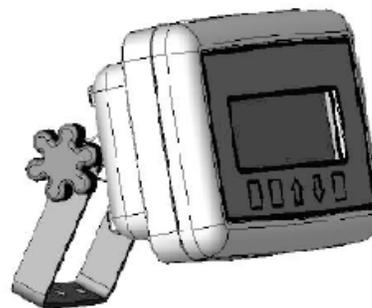
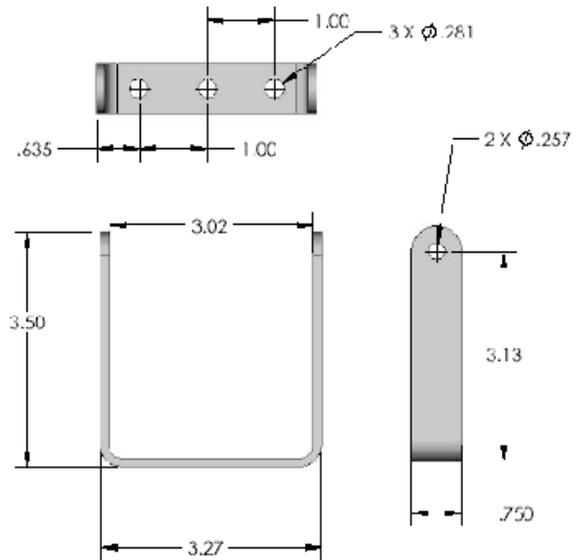
Boom Angle Transducer



Display Panel



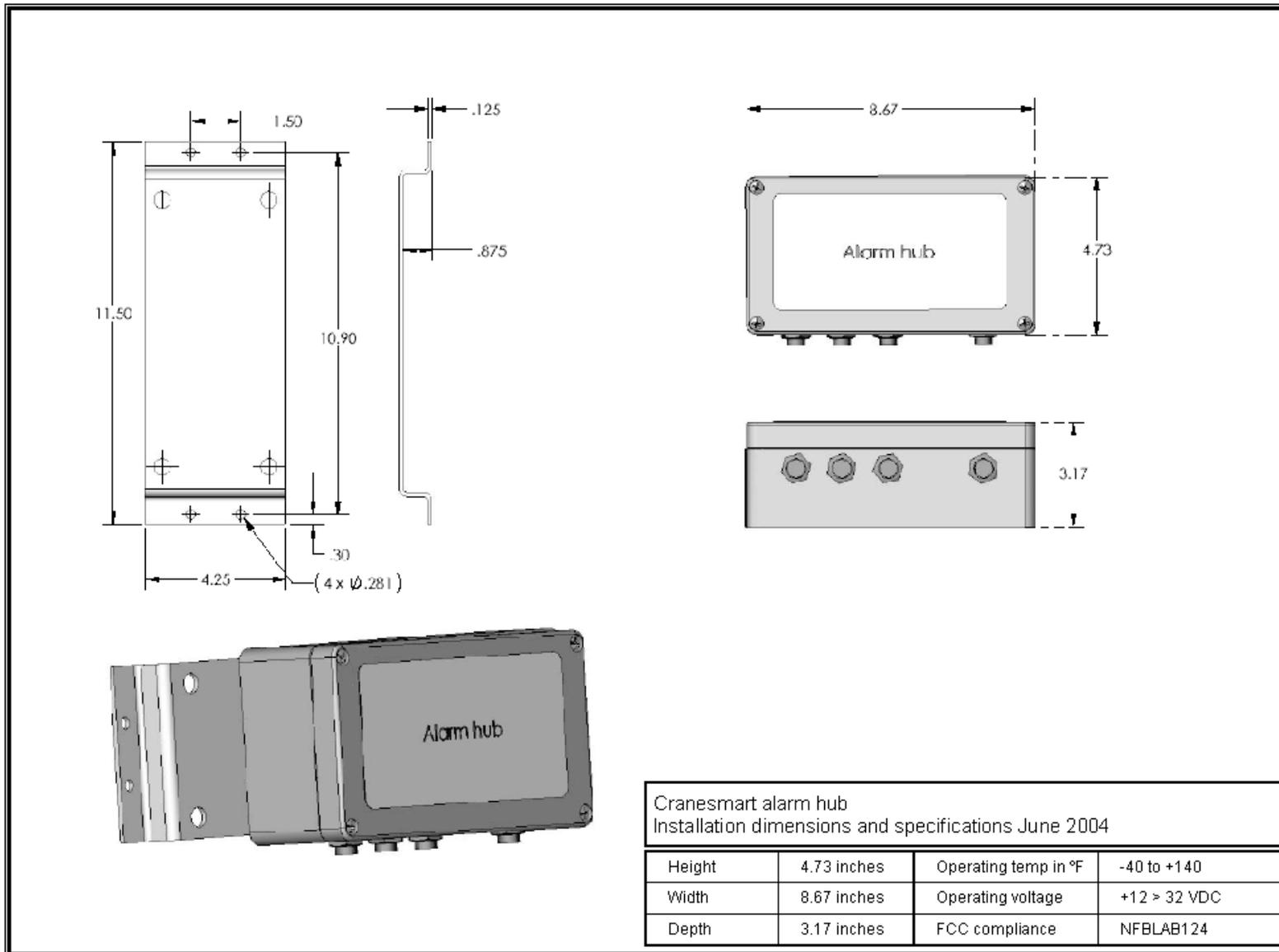
Back panel mounting bracket assembly
May be mounted vertically or horizontally



Cranesmart display panel and mounting
Installation dimensions and specifications
June 2004

Height	4.78 inches
Base width	8.40 inches
Base depth	3.92 inches
Operating temp in °F	-40 to +140
Operating voltage	+12 > 32 VDC

Alarm Hub



Wind Speed Transducer

