



Rev 10

Cranesmart Systems

Non-LMI System - User Manual

May 11, 2016

The Cranesmart 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 monitors, anti-2-block systems, angle indicators, and or any combination system.

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

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.

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

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 office in Edmonton, Alberta 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.

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 worldwide 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. 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 the Cranesmart Systems 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 the 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 recalibration and testing.

If **ANY** issues arise, contact the Cranesmart Systems main office @ 780-437-2986 and ask for the service department. Please have the component serial number(s) readily available.

Table of Contents

INSTALLATION INSTRUCTIONS.....	9
LOAD CELL LINK INSTALLATION	10
Male/Female load cell installation (7,500, 15,000 & 25,000 lb).....	10
Male/Female 7.5/15/25K Load Cell Link Placement Dead-end - for Multiple Parts-of-Line:.....	11
Male/Female 7.5/15/25K Load Cell link Placement on Headache Ball - for Single Part-of-Line:	12
Male/Male Flat Link Load Cell Installation (40,000, 50,000 or 80,000 lb.).....	13
Sandwich Link Stabilization Pin – Male/Male flat link load cells only.....	13
Male – Male 40/50/80K Load Cell Link Placement on Boom Tip Dead-End - for Multiple Parts-of-Line:	14
Male – Male 40/50/80K Load Cell Link Placement on headache Ball – for Single Part-of-Line:.....	15
LOAD CELL BATTERY REPLACEMENT	16
RADIO LINERIDER INSTALLATION.....	18
Radio Linerider Installation Overview	18
Hydraulic Boom Linerider Installation Instructions.....	19
Installation Steps.....	19
Lattice Boom Linerider Installation Instructions.....	20
Installation Steps.....	20
Installing the Wire Rope (Hoisting Cable) Through Linerider Assembly Instructions	22
Installation steps	22
ANTI-2-BLOCK INSTALLATION.....	23
Counterweight.....	24
BOOM ANGLE TRANSDUCER INSTALLATION	25
WIND SPEED TRANSDUCER INSTALLATION.....	26

LEVEL TRANSDUCER INSTALLATION INSTRUCTIONS	27
Installation Type A – Measuring Machine Tilt (Roll).....	27
Installation Type B – Measuring Grade and Super Elevation / Ship List (Roll) and Trim (Pitch).....	28
Level Transducer Error Messages	29
BATTERY REPLACEMENT FOR ANTI-2-BLOCK, ANGLE, CABLE REEL & LEVEL TRANSDUCERS.....	30
DISPLAY PANEL INSTALLATION.....	31
Mounting the Display Panel	31
Wiring the Display Panel.....	32
Alarm Shut-offs – The White Wire	32
Basic Wiring Diagram	33
Power Converters.....	34
Hazardous Area Options.....	34
Alarm Hub	34
Alarm Hub Wiring diagram.....	36
Antenna Installation	37
Antenna types	37
Outside Operator Cab OR no Cab on Crane	38
Inside Operator Cab.....	39
Marine Installation.....	40
Shut-off Bypass Plug	41
DISPLAY PANEL OPERATIONS	42
System Start-up.....	42
Panel Button Functions.....	43
Quick Winch Switching.....	44
To View the Auxiliary Winches.....	44
Menu Navigation	45

Secondary Operating Screen Navigation Bar	45
Tare Out Function.....	45
Setup Menus	46
OPERATOR PERMISSION LEVEL	47
Configure Menu	48
Select Winch and POL (Parts-of-Line)	48
Limits Menu.....	49
Load Limits.....	49
Angle Limits	49
Level Transducer Limits.....	50
Wind Limits	50
System Menu	50
About	51
LCD Contrast.....	51
Permissions	51
Diagnostic Menu.....	52
Signals.....	52
Panel Relay	52
Viewer.....	53
SUPERVISOR PERMISSION LEVEL.....	54
Permissions Level	55
To Set the Permission Level.....	55
To Exit the Menu	55
Calibration Menu	56
Load Cell Calibration	56
Boom Angle Indicator Calibration	59
Level Transducer Calibration	60
Options Menu.....	61

LIMITS LOCK.....	61
BY-PASS BUTTON.....	61
EXT RELAY (Output for Shutoff / Horn / Indicator).....	61
CONFIG LOCK.....	62
LANGUAGE	63
UNITS.....	63
System Menu	64
ABOUT.....	64
LCD CONTRAST	64
PERMISSIONS	64
RESTRICTED	65
Clock.....	65
CHECKSUM REPAIR.....	65
DISPLAY TIMER.....	65
SUPERVISOR ENABLE / DISABLE MENU	66
DISPLAY PANEL – OPERATING SCREENS.....	67
Primary Operating Screen	67
Secondary Operating Screen	68
Limits Screen	68
Signal Strength Screen.....	69
Info Screen.....	69
DISPLAY PANEL – ALARMS	70
Alarm Codes	71
Function Shut Offs.....	73
TECHNICAL SPECIFICATIONS	74
7,500lb single line pull load cell.....	74
15,000 single line pull load cell.....	74

25,000lb single line pull load cell.....	76
40,000lb single line pull load cell.....	77
50,000lb single line pull load cell.....	78
80,000lb single line pull load cell.....	79
Anti-2-Block Switch.....	79
Boom Angle Transducer.....	81
Display Panel.....	82
Alarm Hub.....	83
Wind Speed Transducer.....	84

Installation Instructions

Guidelines

Read these instructions before beginning installation.

If the power available is not 12 - 24 (28VDC Maximum) Cranesmart Systems can supply the necessary converters. Please call our sales department at (888) 562-3222 or (780) 437-2986.

- Have the necessary tools available.
- Mount the transducers - load cell, angle transducer, A2B 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 drill bits.
- Welder – for attaching weld plate to boom/jib tips, if installing A2B or angle systems (not required for load cell installation).
- 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 to ensure the components can be disassembled and/or removed if necessary.

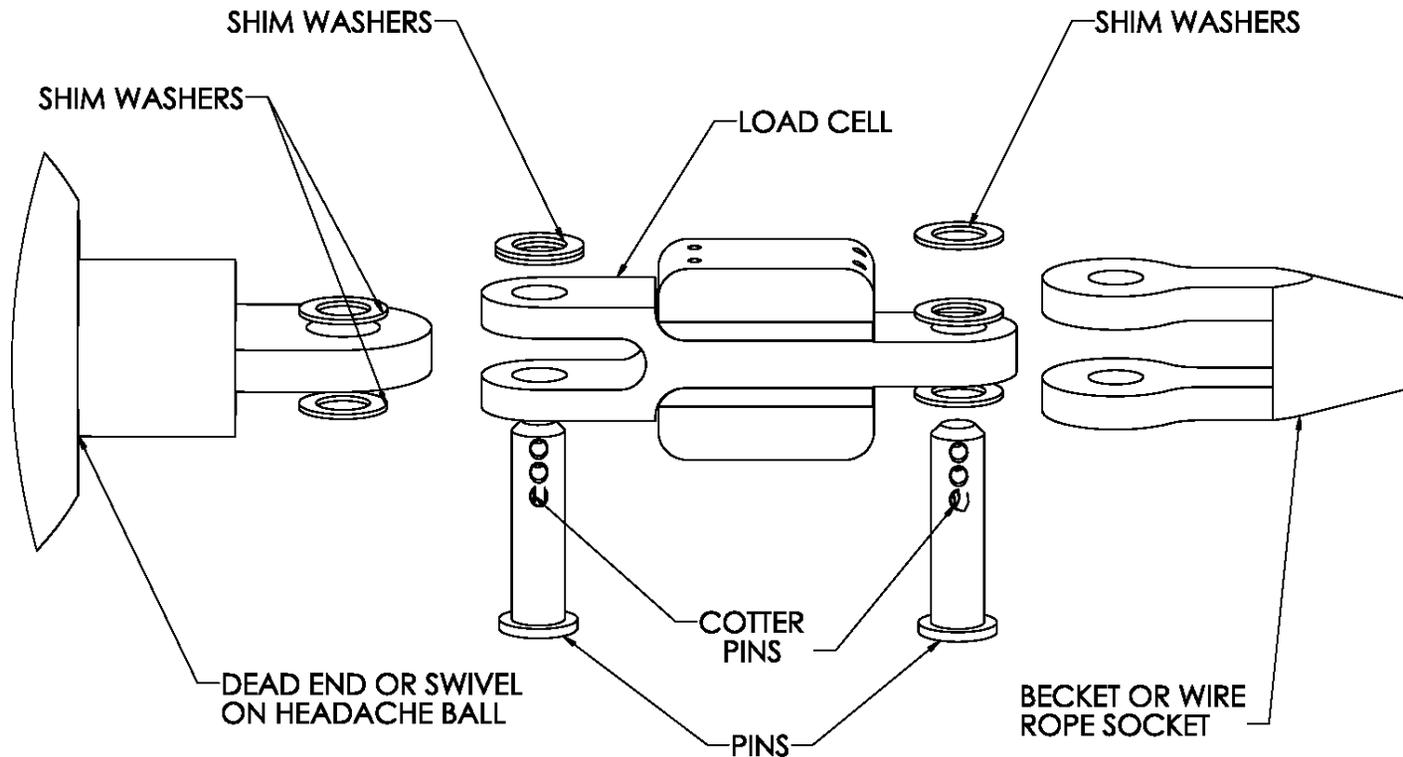
Load Cell Link Installation

Male/Female load cell installation (7,500, 15,000 & 25,000 lb)

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

Refer to the following illustration for the assembly of the load cell

1. Pin the blue load cell between the wire rope socket (becket) and the dead end on the main boom of the crane.
2. Pin the yellow load cell between the wire rope socket (becket) and the headache ball or the auxiliary sheave (rooster) on the crane's boom tip.
(Orange is for the Aux. 2 winch, if applicable.)

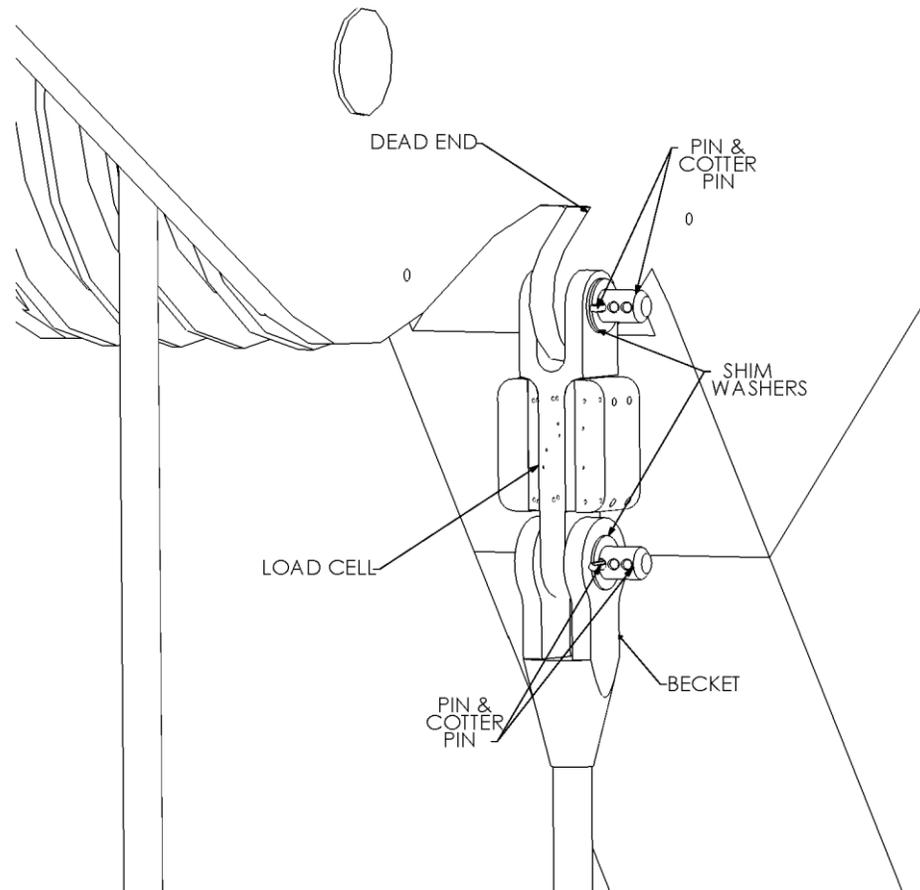


Male/Female 7.5/15/25K Load Cell Link Placement Dead-end - for Multiple Parts-of-Line:

Pin the load cell link between the wire rope (wedge) socket and the dead end as illustrated below. The system is factory calibrated. To address any questions, please call the Cranesmart Systems 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.

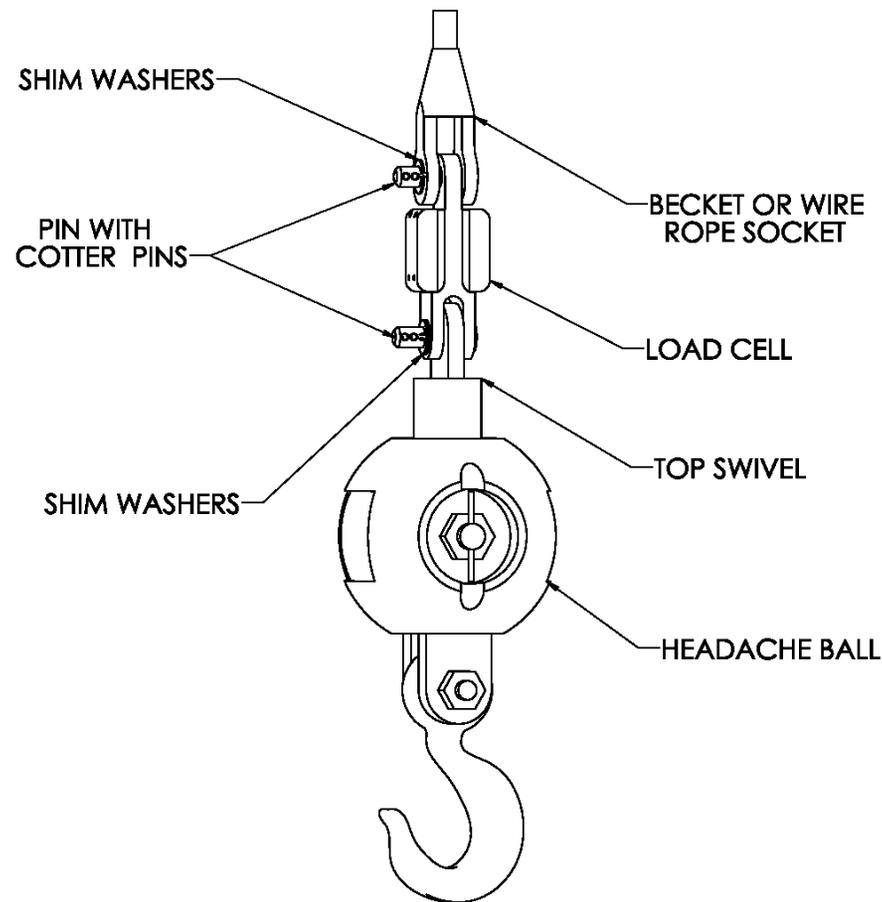


Male/Female 7.5/15/25K Load Cell link Placement on Headache Ball - for Single Part-of-Line:

Pin the load cell link between the wire rope (wedge) socket and the 'headache ball' or hook block as illustrated below. The system is factory calibrated. To address any questions, please call the Cranesmart Systems sales department at (888) 562-3222 or (780) 437-2986.

NOTE:

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

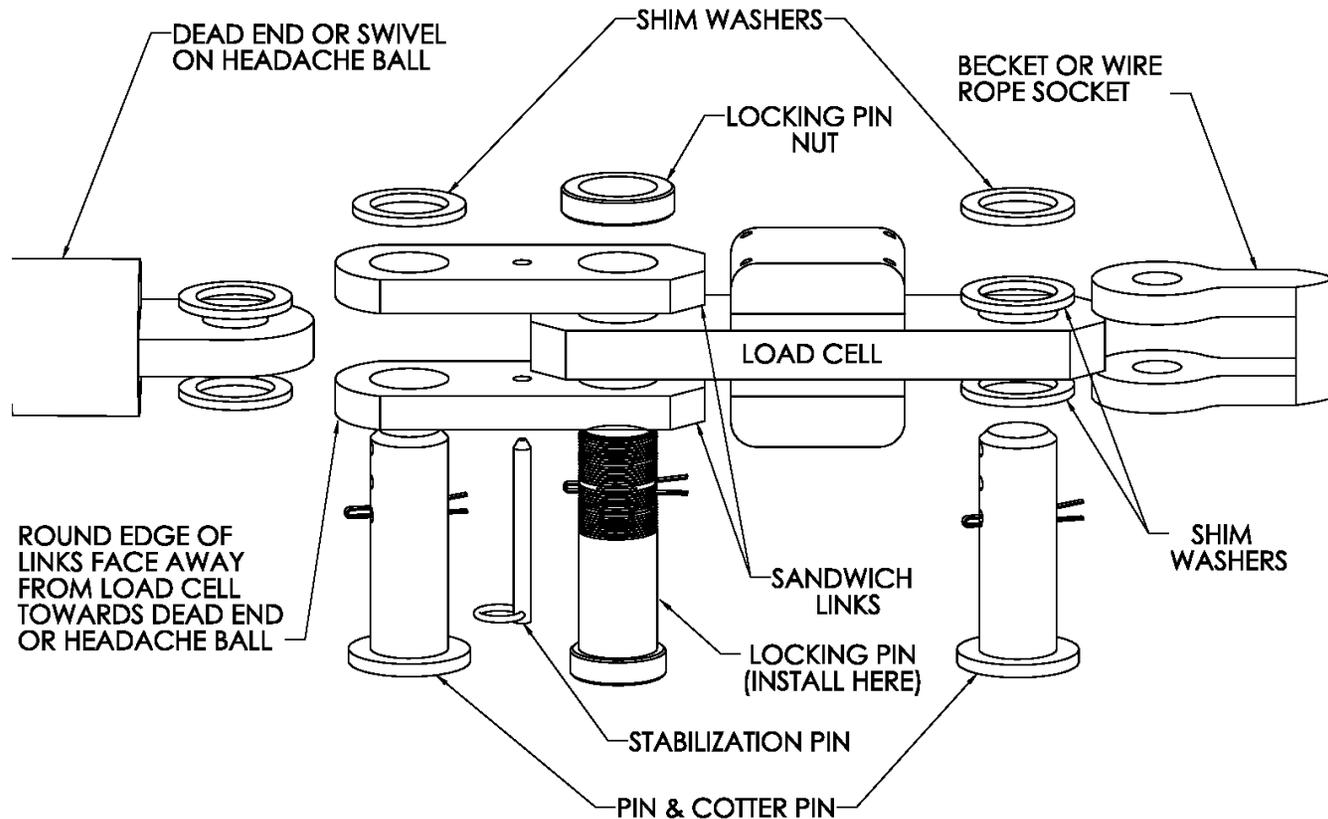


Male/Male Flat Link Load Cell Installation (40,000, 50,000 or 80,000 lb.)

(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. Ensure that this pin is securely in place. Also ensure that the locking threaded centre pin and the stabilization pins are located in place as illustrated below.



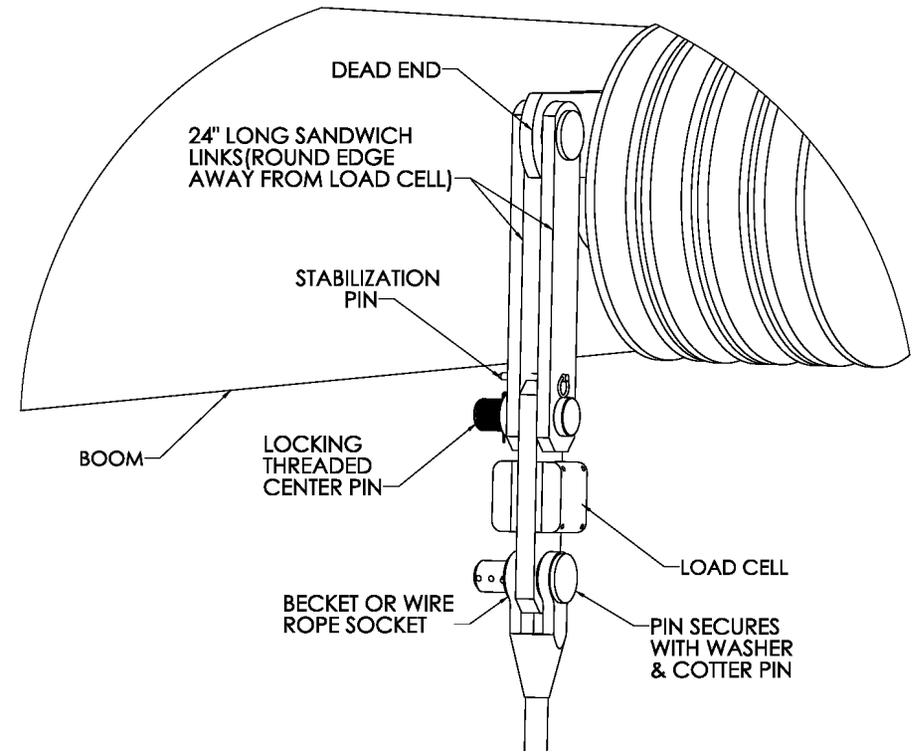
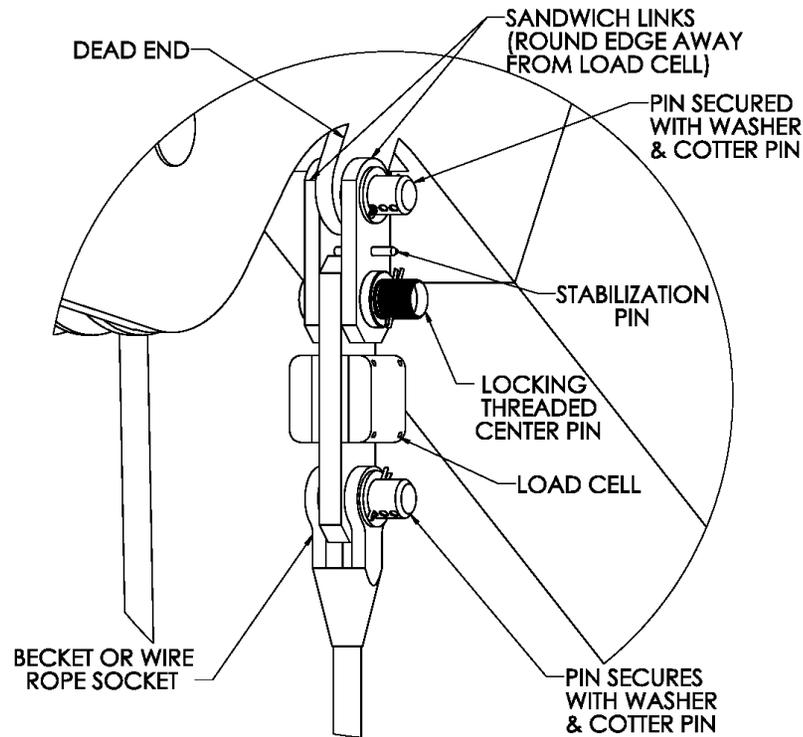
NOTE:

- 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 Boom Tip Dead-End - for Multiple Parts-of-Line:

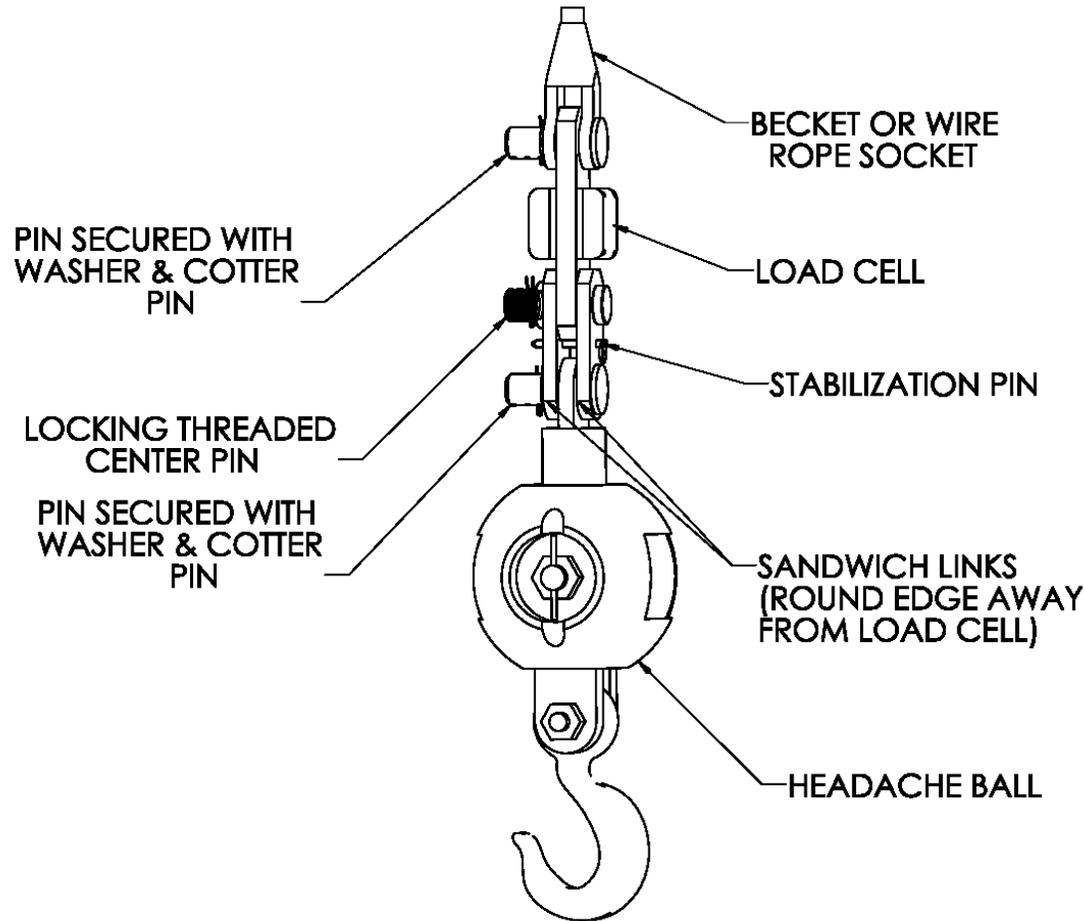
NOTE: Each system is factory calibrated. Please call the Cranesmart Systems sales department at (888) 562-3222 or (780) 437-2986 to answer any questions.

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.



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.



Load Cell Battery Replacement

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

Before replacing batteries, please call the service department at (888) 562-3222 or (780) 437-2986 and have the serial number of the system being serviced readily available. The serial number can be found on the display panel or the load cell itself.

Tools and Equipment for Battery Replacement:

The battery replacement kit (free from Cranesmart Systems) contains:

- (1) 3.6 volt lithium ion D-cell battery
- (2) O-rings (one for a 7.5/15/25K load cell, one for a 40K and larger load cell)
- (1) 6g packet of silicone grease (Dow Corning 111 or similar)
- (1) 5/32" Allen key
- (2) battery cover gaskets (one for a 7.5/15/25K load cell, one for a 40K and larger load cell)
- (1) tube of RTV silicone sealant (Dow Corning 734 or similar)

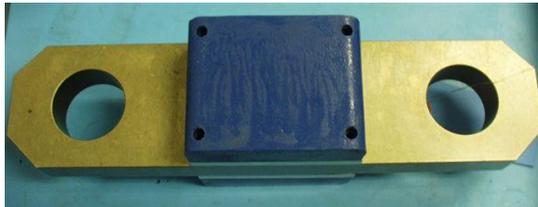
These parts are designed for use with the older gasket sealed load cells and **are not to be used** with o-ring sealed load cells.

NOTE:

- A 3.6V Lithium battery can be purchased from a local battery store for use with the load cell. Use the existing system battery for size matching.
- If purchasing a new battery, the o-ring will need to be reused. 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. The holes that are filled with silicone indicate the transmitter side of the load cell. Do not open this side – it has no user serviceable parts, and ***the 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 the battery from clip (be careful not to break the red polarisation tab).
4. Install the new battery, (positive to red polarisation tab).
5. Remove and discard the old o-ring from the aluminum plate.
6. Grease the proper replacement o-ring, 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. Carefully place the plastic cover over the battery pack, so as 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 that was applied.
10. Clean off any excess grease.
11. Reinstall the load cell and test its operation.



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

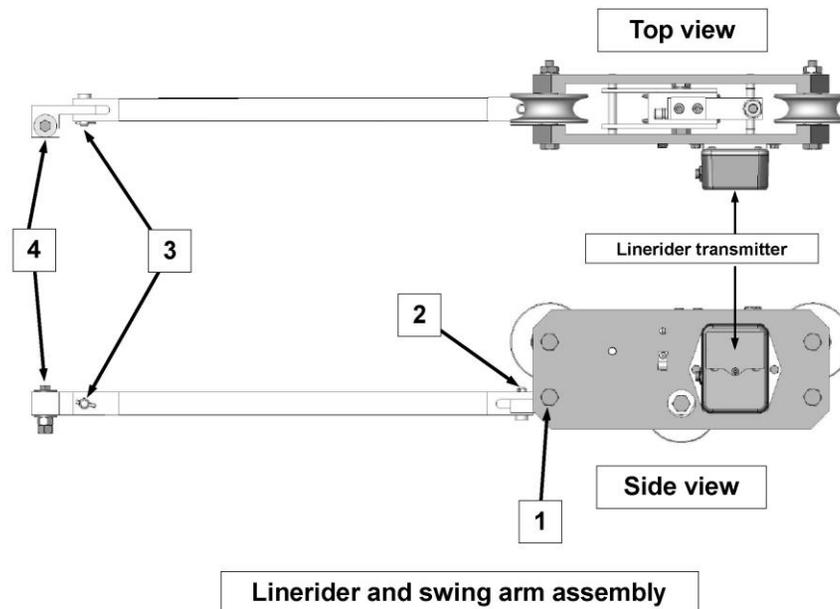
Radio Linerider Installation

The linerider installation will vary, depending on the type of crane boom it's being installed on. Follow the instructions below for hydraulic or lattice style boom installation.

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.

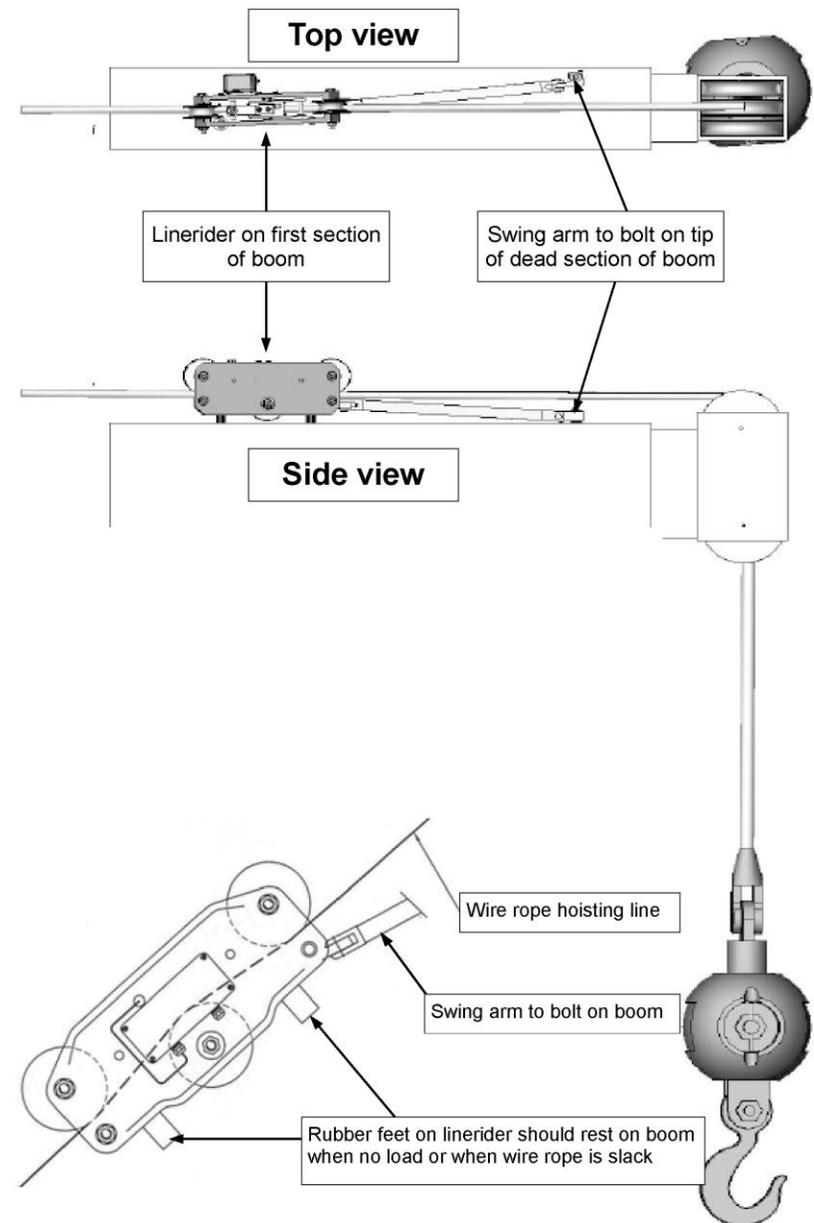


Hydraulic Boom Linerider Installation Instructions

Important note: The linerider component should be located on the top of the boom and as close to the dead end section of the 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 tip of the base (or non-moving) section as possible.
2. Attach the swing arm to the bolt.
3. Run the hoist line through the linerider as per the instructions on page 22 of this manual.
4. Check to ensure that the linerider has freedom of movement from side to side.

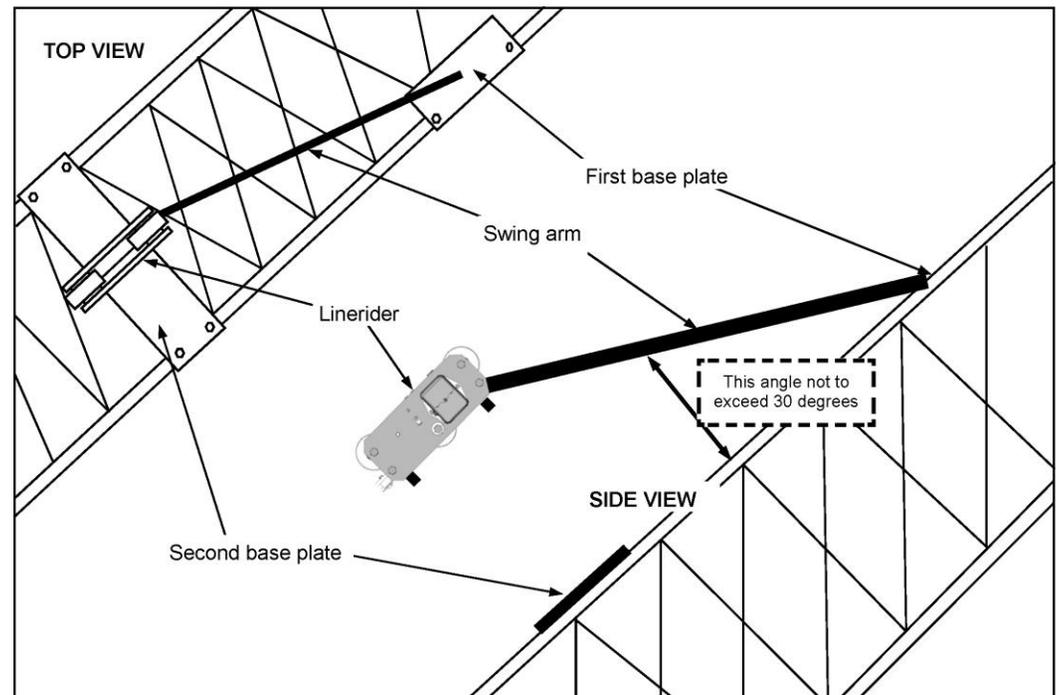


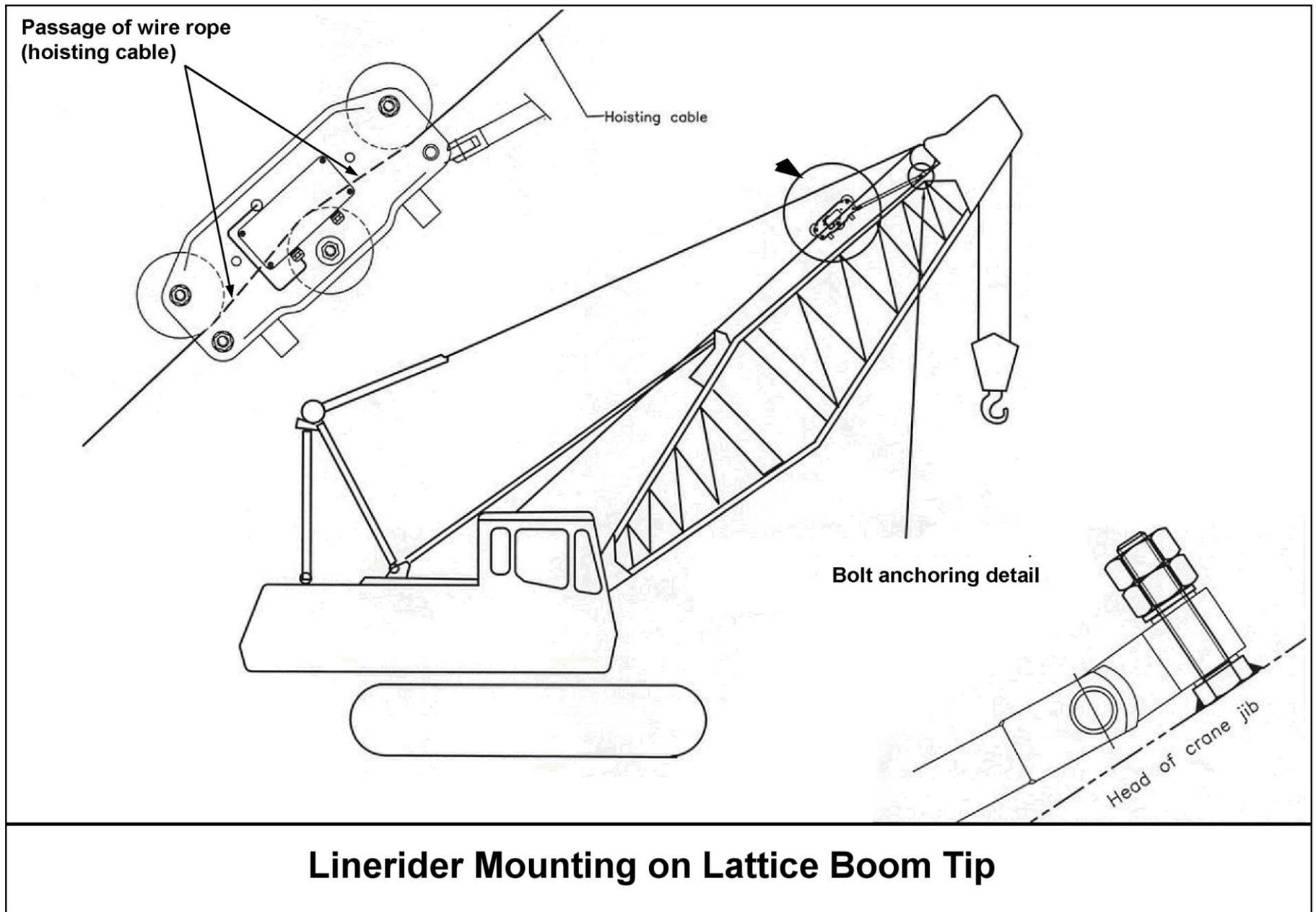
Lattice Boom Linerider Installation Instructions

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. The size of the base plates will be specific to the lattice structure and the plate 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 22 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).

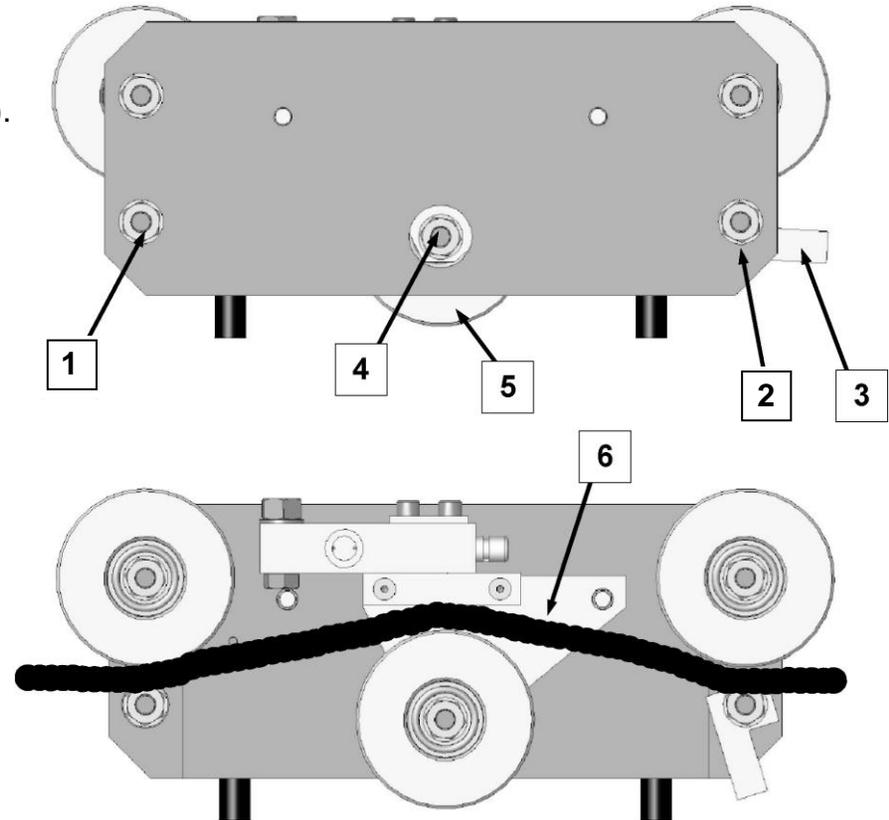




Installing the Wire Rope (Hoisting Cable) Through Linerider Assembly Instructions

Installation steps

1. With the linerider positioned as illustrated at right, remove the free axle (at bottom left of the linerider).
2. Remove the anchoring axle (at bottom right of the linerider).
3. Remove the anchor component with sleeve.
4. Remove the measurement pulley axle (at the 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. Reassemble the linerider in reverse order to the above disassembly steps.

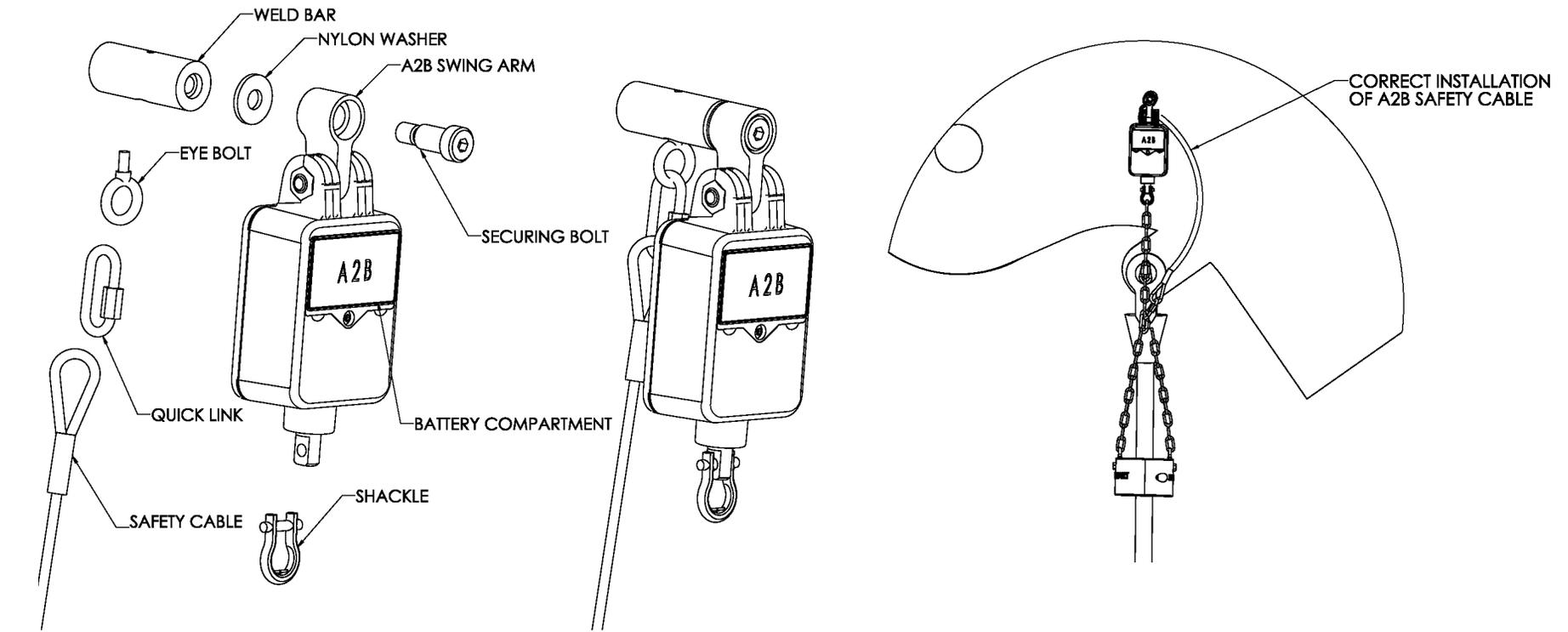


Anti-2-Block Installation

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

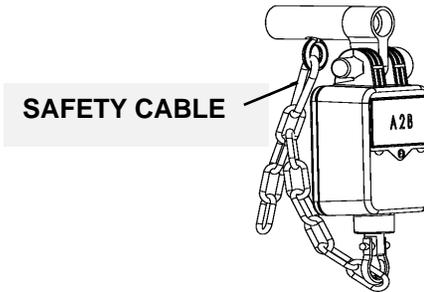
The switch is designed to swivel and pivot to track with the wire rope in relation to the boom angle.

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 ends 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 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.



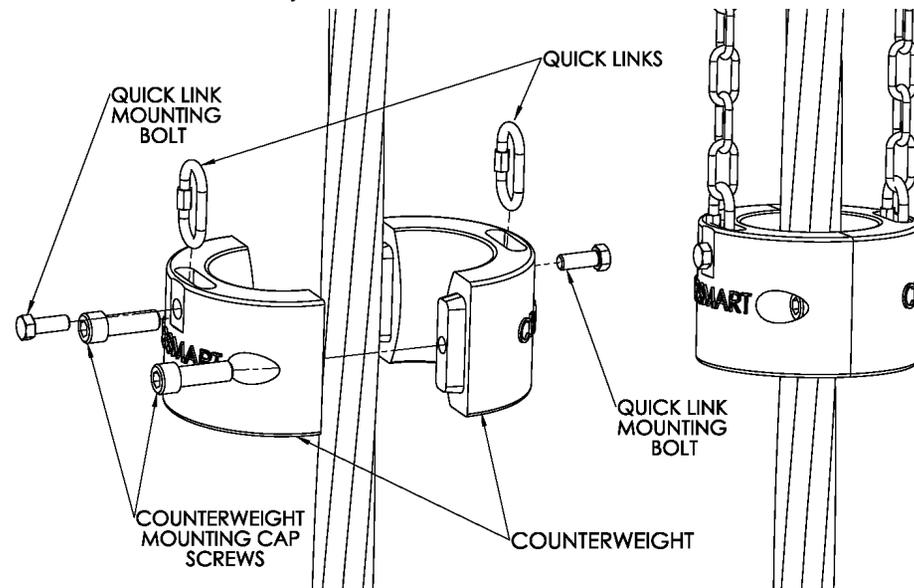
NOTE:

- 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, in order to remove tension from the counterweight chain.



Counterweight

1. Attach the counterweight chain to the bottom of the A-2-B transmitter using the 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.

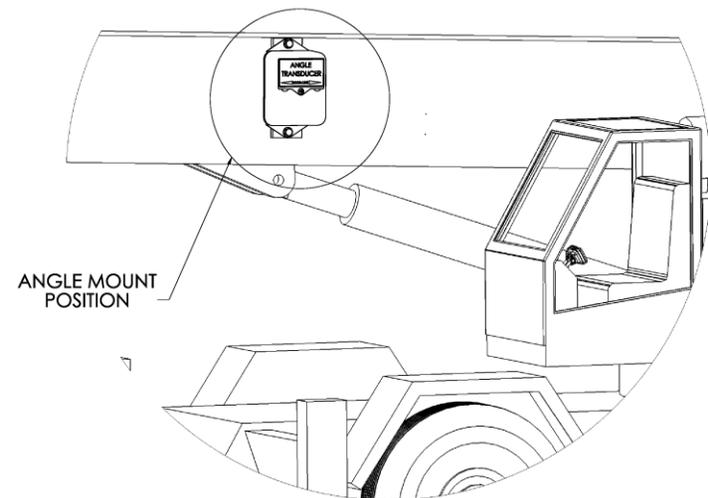
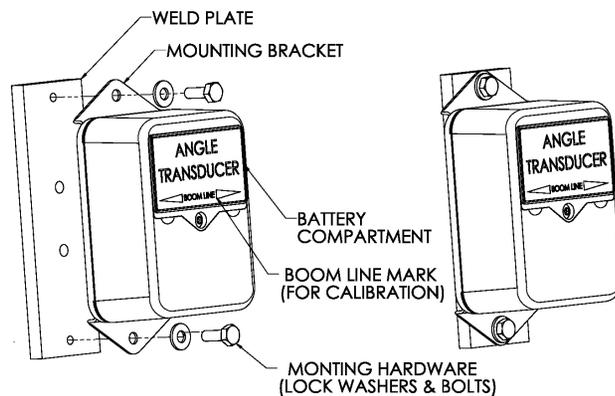


Boom Angle Transducer Installation

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 37) 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. Verify operation
6. Raise the boom to a minimum angle of 45° and return it to level. (This will set the transducer for the proper side of the boom before calibration).
7. Remove transducer to finalize the welding
8. Repeat steps 4-6



Wind Speed Transducer Installation

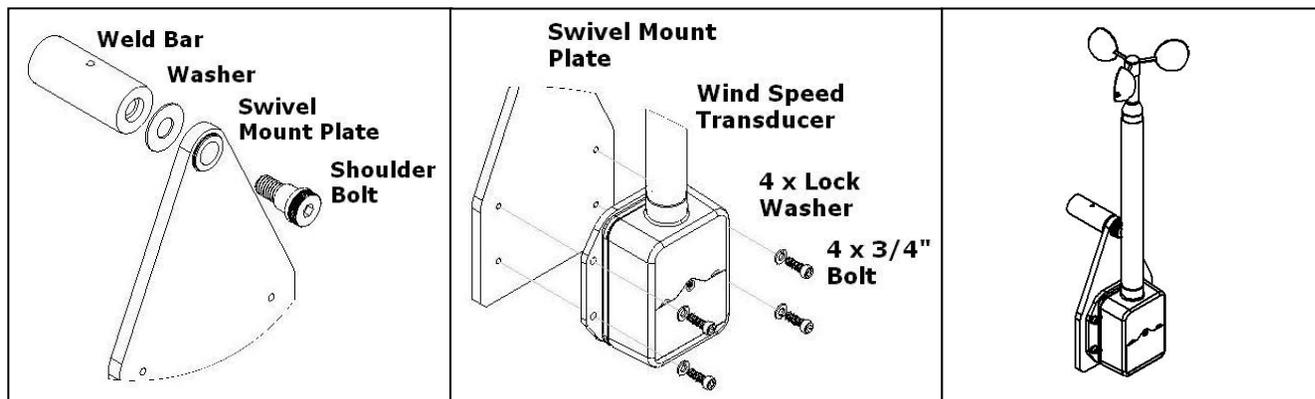
The wind speed transducer is designed to swivel so that it is always in an upright vertical position, regardless of the boom angle.

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 ends 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.

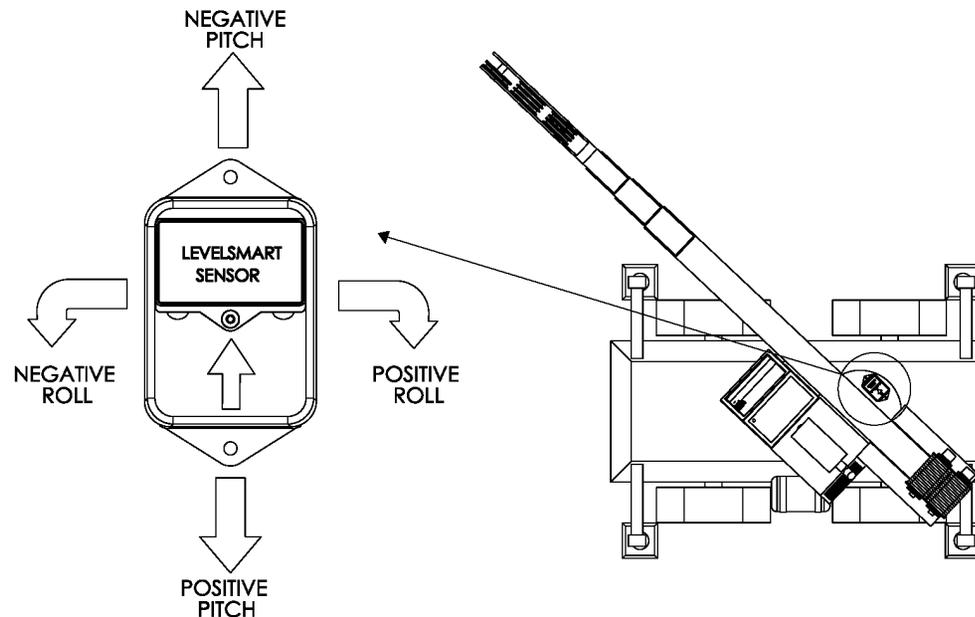


Level Transducer Installation Instructions

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.

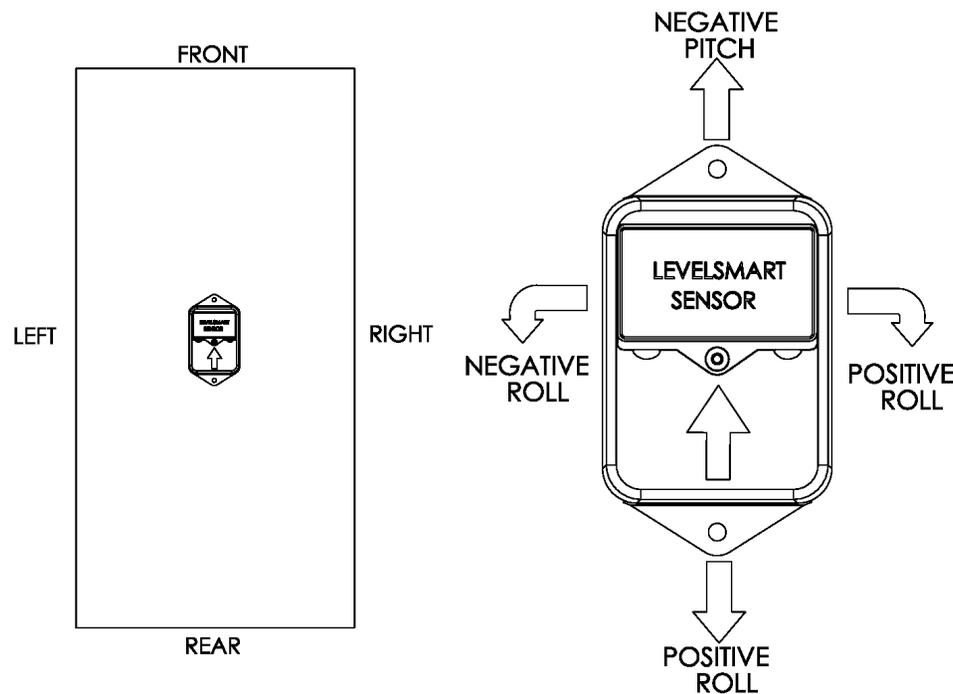
1. The Level Transducer should have a clear line of sight to the Cranesmart system's antenna and be kept free of all obstructions.
2. The Level Transducer must be mounted onto a part of the crane that rotates along with the boom, but does not change with the boom angle. The label must be facing up and 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 it be perfectly level. The unit will be calibrated (see page 60) after installation.
6. Verify communication with the receiver panel before permanently mounting the transducer (see page 69).
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 it be perfectly level. The unit will be calibrated (see page 60) after installation.
6. Verify communication with receiver panel before permanently mounting the transducer (see page 69).
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 display various error messages.

**ROLL
ABOVE PRESET MAXIMUM**
71

**PITCH
ABOVE PRESET MAXIMUM**
72

A 'ROLL ABOVE PRESET MAXIMUM' message indicates the transducer is tilted sideways from its calibrated zero, past the number of degrees set in the LIMITS screen. From the Main Operation screen, press the SELECT button to view the current list value. If the value is positive, the transducer is tilted too far to the right. If the value is negative, the transducer is tilted too far to the left.

A 'PITCH ABOVE PRESET MAXIMUM' indicates the transducer is tilted forwards or backwards from its calibrated zero, past the number of degrees set in the LIMITS screen. From the Main Operation screen, press the SELECT button to view the current list value. If the value is positive, the transducer is tilted too far backward. If the value is negative, the transducer is tilted too far forward.

**PITCH & ROLL
ABOVE PRESET MAXIMUM**
70

A 'PITCH & ROLL ABOVE PRESET MAXIMUM' message indicates 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, the transducer may require recalibration via the CALIBRATE screen (see page 60). If the error messages are displayed during normal and safe operation, the transducer limits may need to be adjusted in the LIMITS screen (see page 50).

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 verifying that a dead battery is at fault, follow the steps below.

Please have the serial number of the system available before calling for technical assistance. The serial number can be found on both the display panel or the load cell itself.

Tools and Equipment for battery replacement:

Battery replacement kit (free from Cranesmart Systems) contains:

- One Saft 3.6 Volt Lithium Ion D-cell battery
- One 1/8" Allen key

NOTE:

- It is suggested that the transmitter be removed 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.
- If purchasing a 3.6V Lithium battery from a local battery store, use the old battery for correct size matching.

To Replace the Battery:

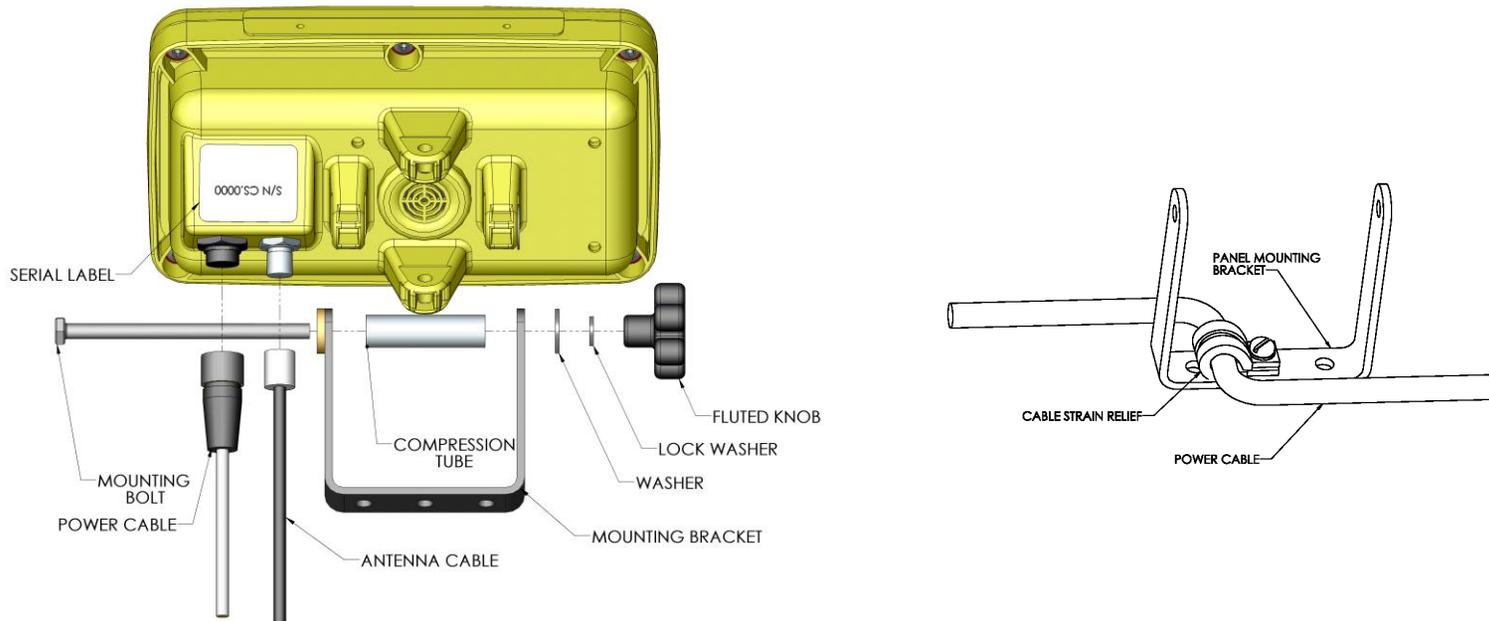
1. Remove the screws from the battery compartment lid and remove the lid.
2. Remove the battery from the holder and wait 30 seconds – 1 minute before installing the new battery.
3. Insert the new battery according to the battery diagram on the base of the battery clip.
4. Make sure that the o-ring is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



Display Panel Installation

Mounting the Display Panel

1. Mount the display panel to ensure the operator has an unobstructed view of it.
2. Remove the bracket from the display panel by turning the fluted knob off of the mounting bolt and sliding the bolt 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 power cable may limit where you can mount the display panel.
- The power connector is keyed to ensure 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 on the following page.

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).

NOTES:

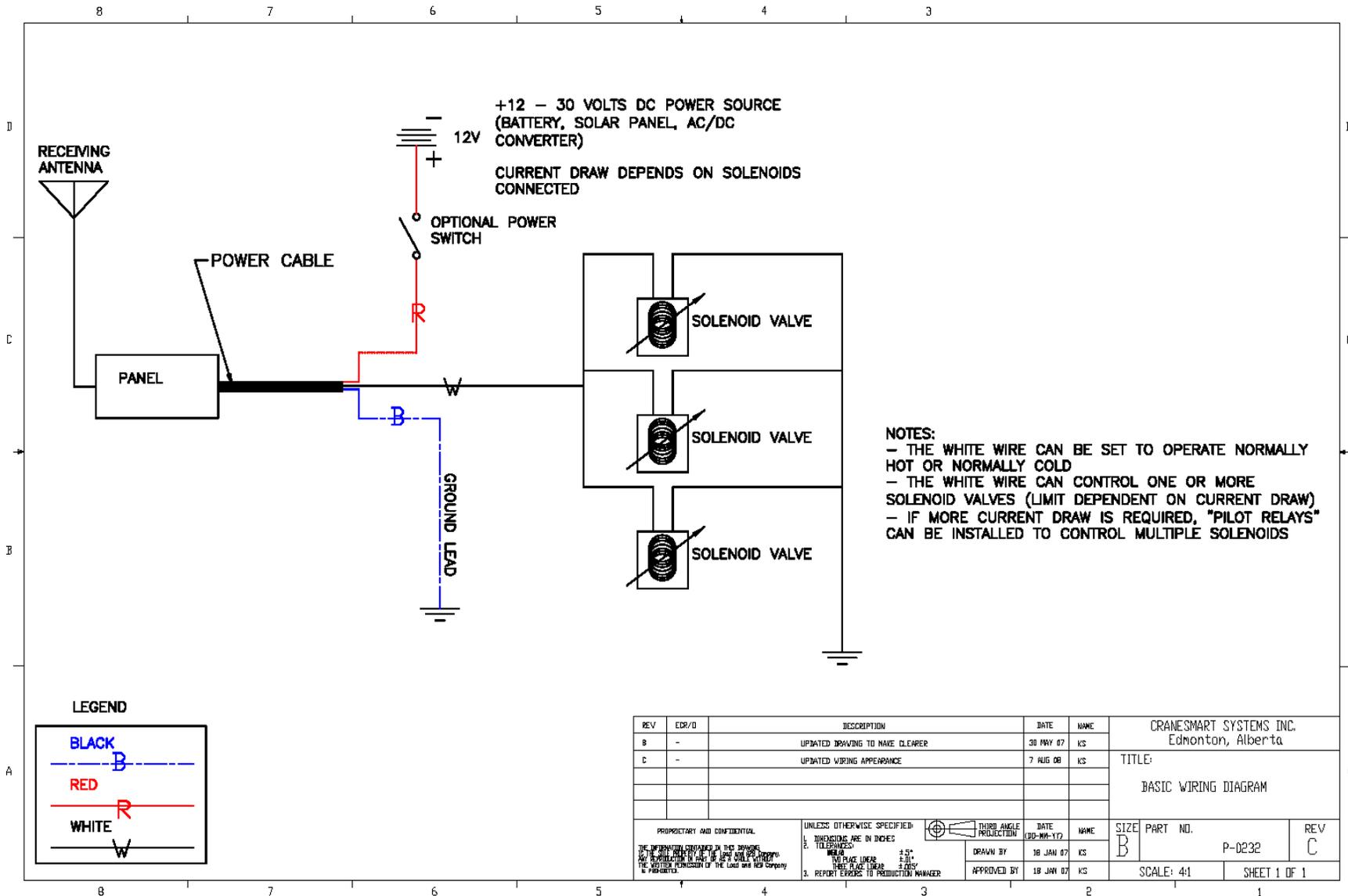
- Ensure that a continuous 12 to 24 (28VDC Max) is available to the panel at all times while the crane is in operation. ***If the voltage drops below 10.5 VDC the panel will shut down.***
- When attaching the power cable to the panel, align the plug and gently push it into the receptacle, then slide the plug neck back towards the panel and turn it clockwise half a turn to tighten.
- If the power cable is cut to shorten it for installation, it will be noticed that two extra wires are contained inside the insulation. The purple and blue wires are only used in other applications (for RS485 communication).

Alarm Shut-offs – The White Wire

The Cranesmart system will be shipped with a three-conductor wiring harness which consists of a black, a red, and a white wire. The white wire may be used in conjunction with external alarm horns, lights, or shut-offs (if installed).

- When supplying 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 the white wire is not to be used for any of the purposes listed above, ensure that its exposed end remains sealed to prevent grounding and damage to the display panel.
- When supplying 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 the white wire is not to be used for any of the purposes listed above, ensure that its exposed end remains sealed to prevent grounding and damage to the display panel.

Basic Wiring Diagram



Power Converters

A power converter is needed to convert AC voltage to DC for the display panel. Cranesmart power converters change 110/220V AC to 12/24VDC, depending on the application. If a power converter is needed it will be discussed at the time of purchase.

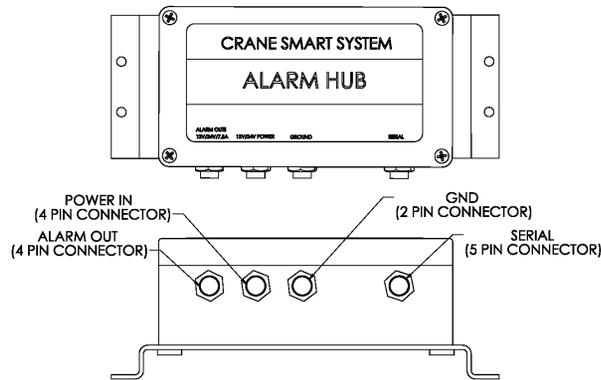
Hazardous Area Options

In Class 1 Division 2 (C1D2) applications the Cranesmart system will wire identically to the basic wiring diagram – the only difference being that the panel has a pigtail with a red C1D2 connector on the end. The connector will mate with the corresponding red C1D2 on a power cable or on the cable coming from the alarm hub. When using with these connectors, tools will be needed to disconnect them.

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 the position mark and drill holes using the alarm hub mounting bracket holes as a guide.
3. Bolt the alarm hub in place.

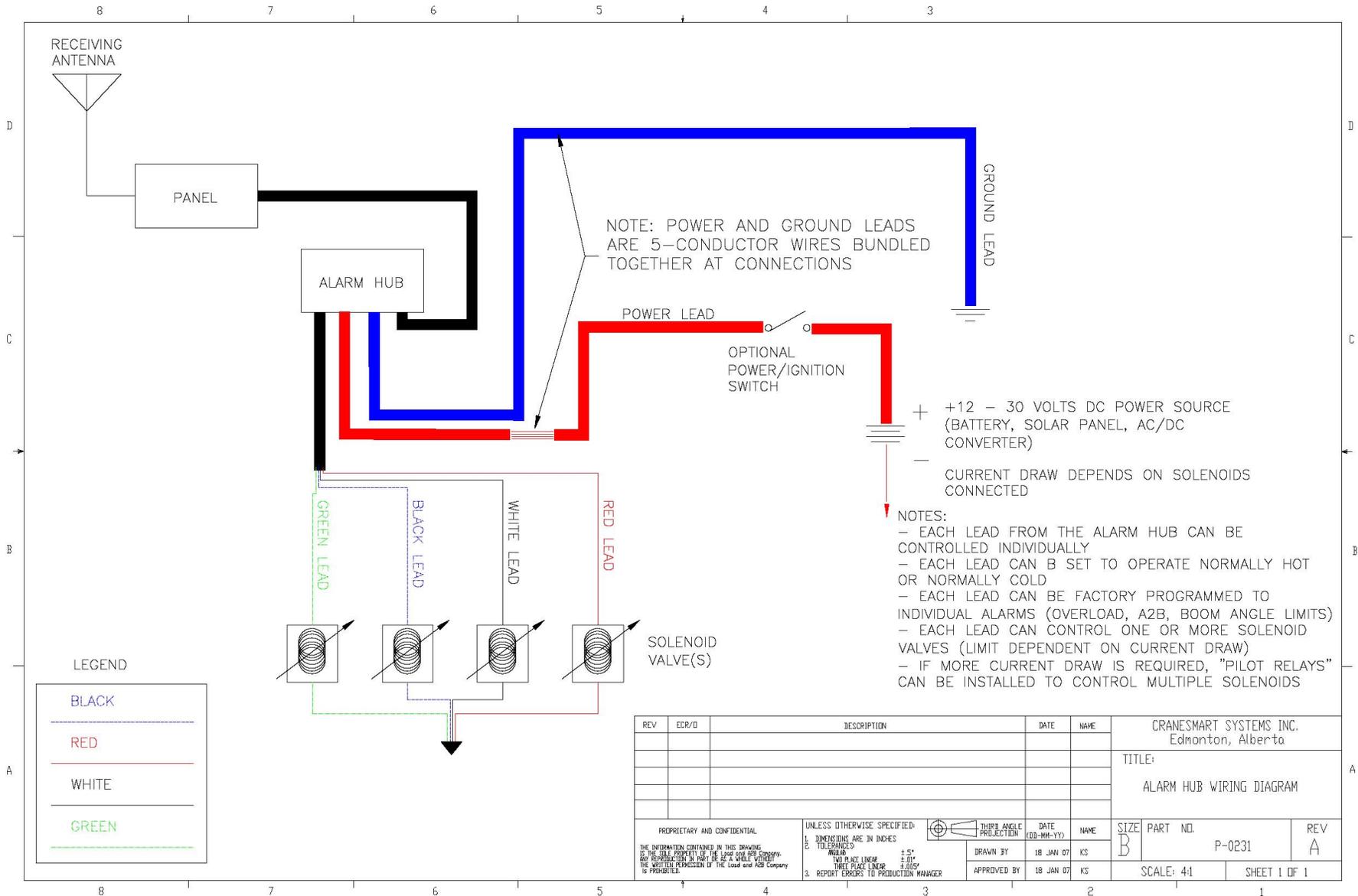
Wiring the Alarm Hub

1. Attach the black wire to electrical ground.
2. Attach the red wire to power 12-24Vdc.
3. Attach the serial cable from the alarm hub to the panel.
4. Use the custom insert as a guide to wire the alarm outputs.
5. Test to ensure that the outputs control the proper alarms.

NOTE:

- The length of cable and the position of the panel will limit the mounting location of the alarm hub.
- The plug is keyed to ensure a proper connection.
- When a Cranesmart system is programmed for use with an alarm hub, the alarm hub must be present and working or the display will indicate an error condition. The alarm hub is crucial in this case, as power to the display panel is routed through it.

Alarm Hub Wiring diagram



Antenna Installation

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

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 .

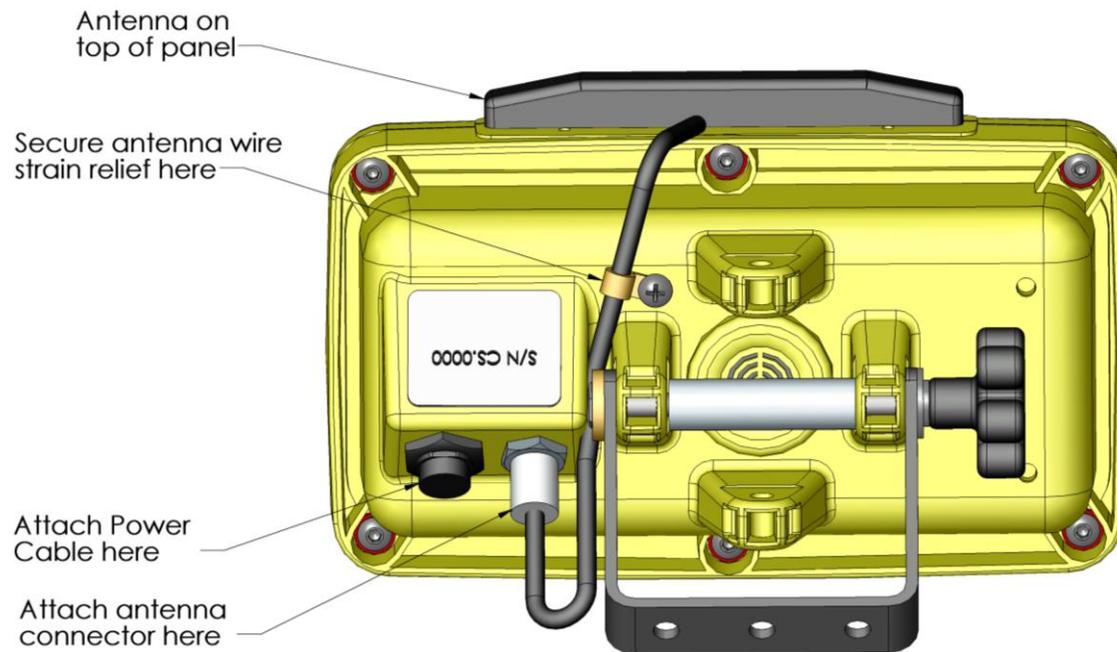
NOTE:

- 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:

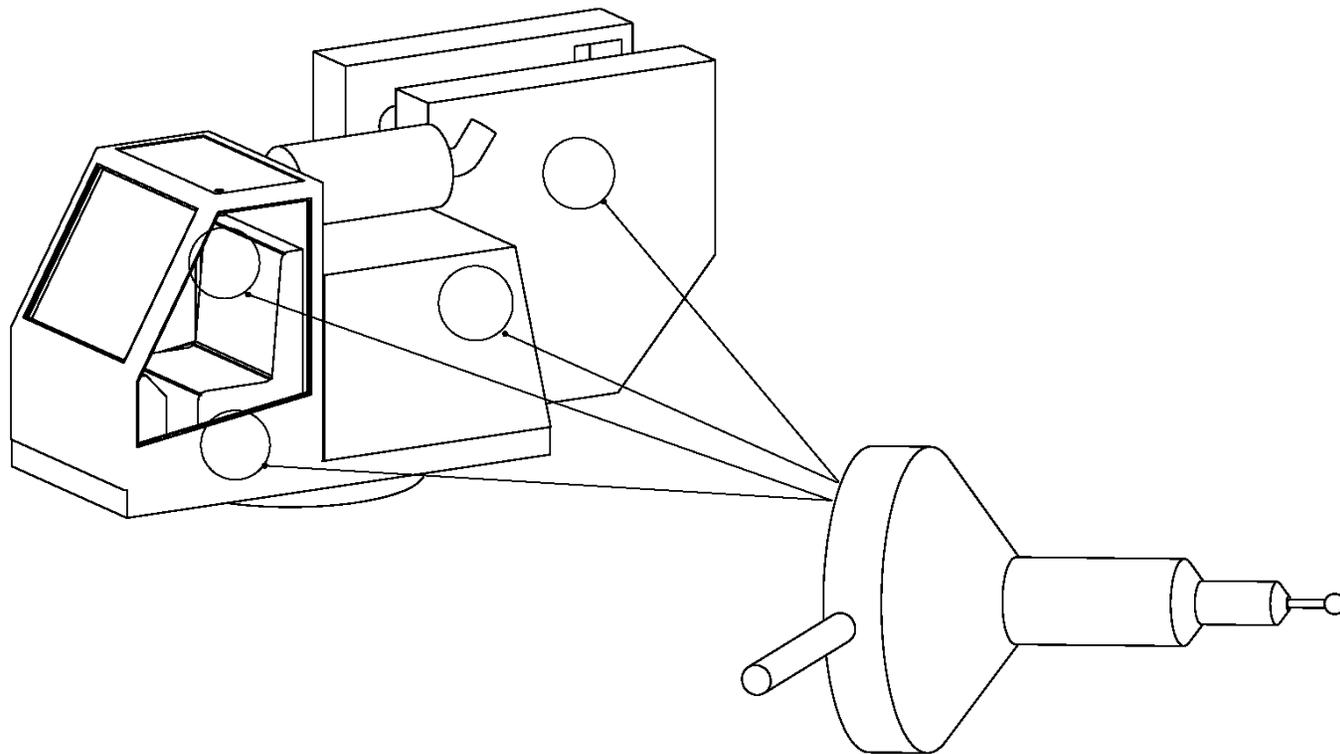
1. Clean the top of the panel with the alcohol pad included in the installation kit.
2. Peel off the paper from the adhesive strip on the underside of the antenna.
3. Place the antenna on the top of the panel.
4. Using the P-clamp and machine screw included in the installation kit, strain relief the 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 Operation Screen (see page 69). (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 can be used as a guideline.

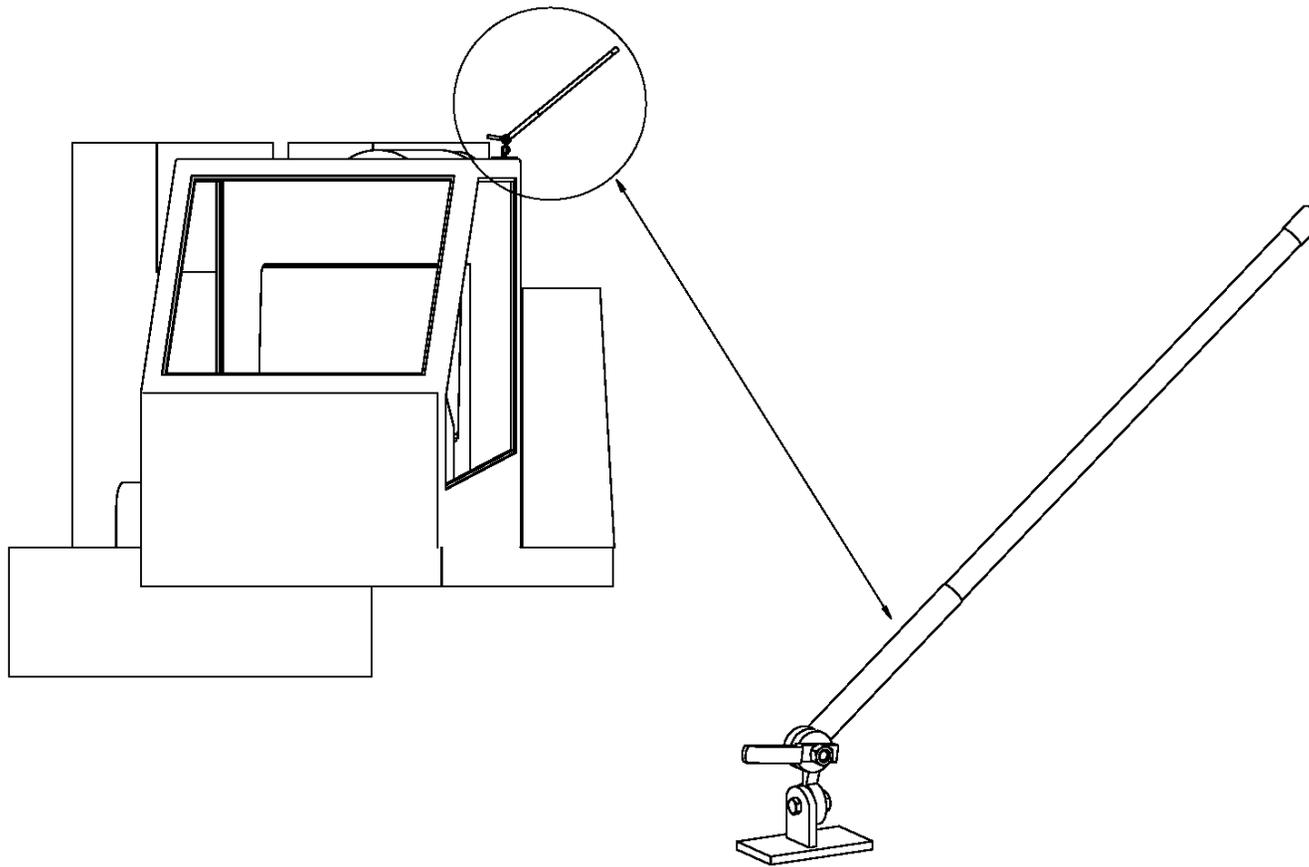
For optimum performance, the antenna should be installed horizontally as shown below but it will work in a vertical orientation also. To confirm the best position for the antenna, check the signal quality while moving it around (see page 69 of this manual).



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 can be used 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 by checking the signal quality on the signal display screen (see page 69) while changing the angle, etc.



Shut-off Bypass Plug

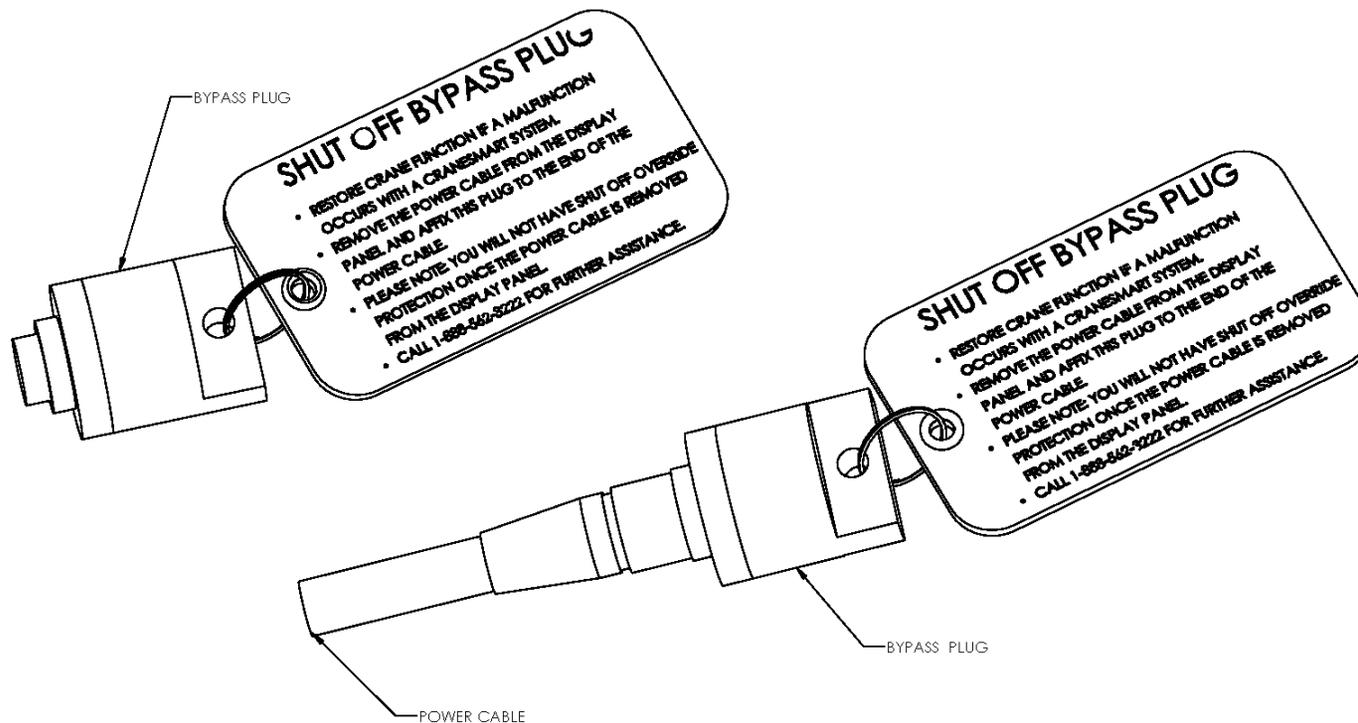
Not all systems require a shut-off bypass plug. The bypass plug is only required with systems that are using shut-off functions and only if those solenoids are normally hot (energized).

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

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

NOTE:

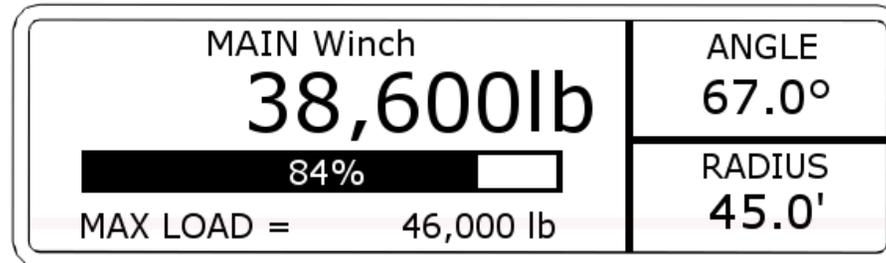
- While this will restore crane functions, the Cranesmart system will no longer be monitoring crane functions.



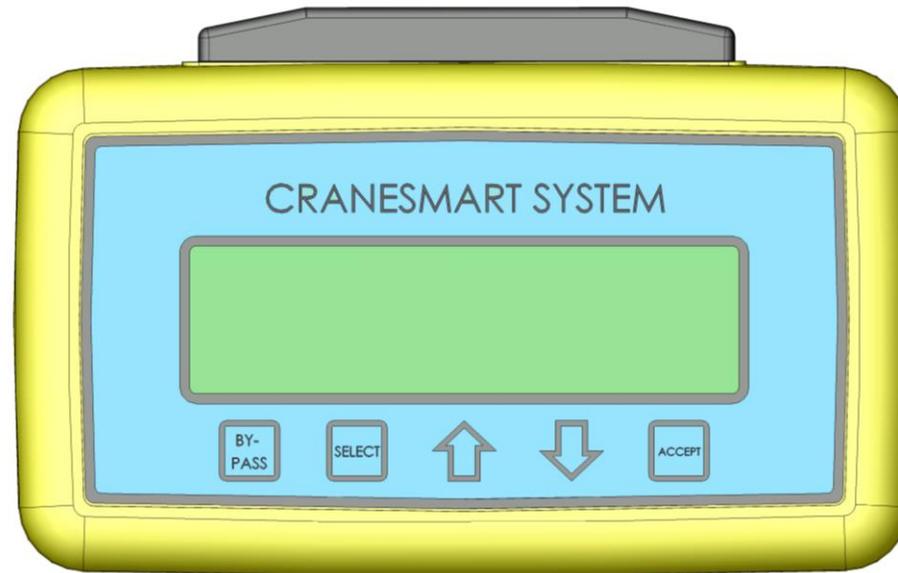
Display Panel Operations

System Start-up

When the Cranesmart system starts the Cranesmart logo is displayed. The panel then displays the Primary Operating Screen and the system is ready for operator use. The following pictures show a load system as an example.



Panel Button Functions



- *BYPASS** The BY-PASS button enables the operator to bypass any existing alarms, 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. To disable the bypass function, call the Cranesmart Systems service department for details.
- SELECT** The SELECT button 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, this button is used to move through menu options. It will also change the winch on the Primary Operating Screen. In selector mode, it is used to increase values.
- DOWN** In menu mode, this button is used to move through menu options. It will also change the winch on the Primary Operating Screen. In selector mode, it is used to decrease values.
- ACCEPT** The ACCEPT button 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 the Cranesmart Systems service department for details.**

Quick Winch Switching

This option enables operators to quickly change the display to show the auxiliary winch line.

NOTE:

- This option is for systems with load cells only. A winch can only be selected if a load cell is enabled on that winch.

MAIN Winch	ANGLE
10,000	51.5°
WINCH TO AUX 1 - ARE YOU SURE?	
7%	POL
MAX LOAD = 240,000 lb	6

To View the Auxiliary Winches

1. Press the up or down arrows.
2. Press the ACCEPT button to change (the configuration screen for the new winch will be displayed).
3. Press the SELECT button to cancel.

NOTE:

- When the quick winch prompt is being displayed, the Main Operating Screen will not update with new information.
- To change the POL for the winch displayed, use the Config Menu, (see Display Panel – Operator Functions).
- The up and down arrows can be used to select a winch different from the one currently being viewed.

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.

Menu Navigation

The Cranesmart system uses a menu driven interface to allow user access to its various functions. In normal operating mode the system provides a general level menu of functions to which operators have access. In supervisor mode the system provides access to more functions for supervisors to configure the system to match their needs. On start up, the system displays the Primary Operating Screen; users 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 and 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, 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 Operation Screen.

To Enable Tare Out:

1. From the Primary Operating Screen press the SELECT button to enter the Secondary Operating Screen.
2. Use the up or down arrows to select TARE. This automatically opens 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 to enter the Secondary Operating Screen.
2. Use the up or down arrows to select TARE. This will automatically open the Primary Operating Screen and the 'T' is now gone from the end of the bar graph.

NOTE:

- The amount of weight deducted with the 'tare out' function must also be deducted from your load chart amount in most cases. It is safer to keep the weight of the cranes rigging included in the displayed weight to stay within safe operating parameters.

Setup Menus

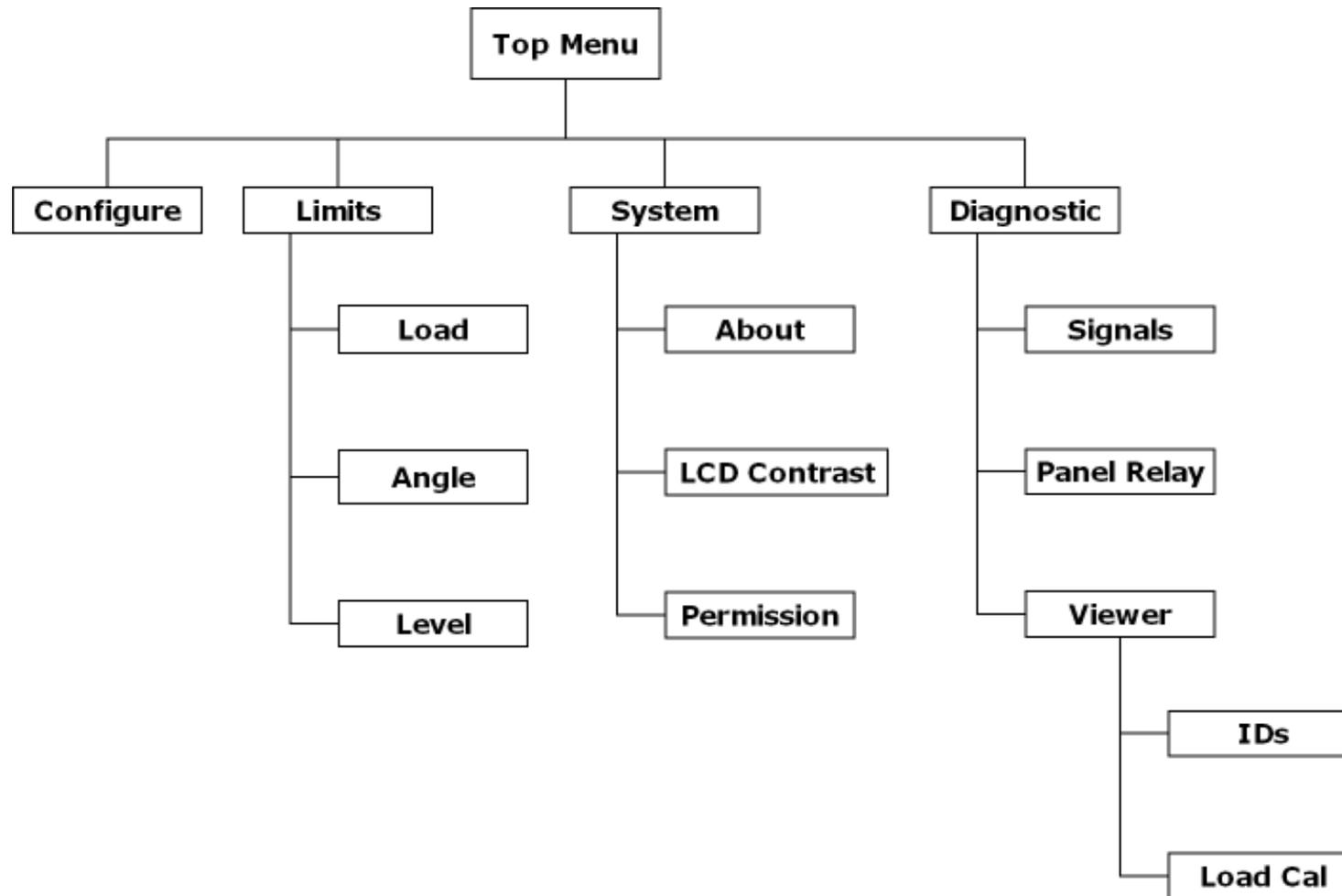
The Setup Screen displays menus that enable operators to configure system settings. The menus available depend on the permission level of the user. There are two permission levels available to users:

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 or supervisory personnel.

To access the Setup Menus use the following steps:

1. From the Primary Operating Screen, press the SELECT button to open the Secondary Operating Screen.
2. Use the up or down arrow buttons to move through the navigation bar and select SETUP.
3. Press the SELECT button. This will open the Top Menu point in the Setup Menu.

Operator Permission Level



Configure
Limits
System
Diagnostic

Enables users to select the Winch and Parts-of-Line to be displayed.
 Enables users to set limits for: Load, Angle, Tip Height, Radius and Wind Speed indicators.
 Enables users to display the serial number of the system or change the permission level.
 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

For systems with load cells, 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 to open the Secondary Operating Screen.
2. Use the up or down arrows to select SETUP, and press the SELECT button.
3. Highlight CONFIGURE and press the SELECT button.
4. Highlight CHANGE and press the SELECT button.
5. Highlight (Main, Aux 1, Aux 2) and press the SELECT button.
6. Press the ACCEPT button twice to save.
7. Highlight MAIN POL and press the SELECT button.
8. Use the up or down arrows choose the number of POL.
9. Press the ACCEPT button twice to save.
10. Highlight EXIT and press the SELECT button to return to the Primary Operating Screen, or Select BACK to return to the Top Menu.

NOTE:

- Not all systems have multiple load cells.
- Winch and POL settings can only be set for the number of load cells on the 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 to enter the Secondary Operating Screen.
2. Use the up or down arrows to highlight SETUP and press the SELECT button..
3. Highlight LIMITS and press the SELECT button (if LIMITS is Locked, the operator must enter the correct key.)
4. Highlight LOAD and press the SELECT button.
5. Highlight (Main, Aux 1, Aux 2) and press the SELECT button.
6. Use the up or down arrows to increase or decrease the maximum limit for that winch.
7. Press the ACCEPT button twice to save.
8. Highlight SETUP to return to the Primary Operating Screen or select BACK to return to the Top Menu.

Angle Limits

1. From the Primary Operating Screen press SELECT to enter the Secondary Operating Screen.
2. Use the up or down arrows to highlight SETUP and press the SELECT button.
3. Highlight LIMITS and press the SELECT button.
4. Highlight ANGLE and press the SELECT button. The value will be defaulted to the max.
5. Highlight MAX and press the SELECT button.
6. Use the Up or Down arrows to increase or decrease the maximum limit for that angle sensor.
7. Press the ACCEPT button twice to save.
8. Use the up or down arrows to highlight MIN and press the SELECT button.
9. Use the up or down arrows to increase or decrease the minimum limit for that angle sensor.
10. Select EXIT to return to the Primary Operating Screen; select BACK to return to the Limits Menu; select TOP MENU to return to the Top Menu.

Level Transducer Limits

1. From the Primary Operating Screen press the SELECT button until the Secondary Operating Screen is displayed.
2. Use the up or down arrows to highlight SETUP and press the SELECT button.
3. Highlight LIMITS and press the SELECT button.
4. Highlight LEVEL and press the SELECT button.
5. The defaulted Pitch Angle will be displayed. Press the SELECT button.
6. Use the up or down arrows to adjust the maximum limit for the pitch.
7. Press the ACCEPT button twice to save.
8. Use up or down arrows to highlight MAX ROLL ANGLE and press the SELECT button.
9. Use the up or down arrows to adjust the maximum limit for the roll angle.
10. Press the ACCEPT button twice to save.
11. Highlight EXIT and press the SELECT button to return to the Primary Operating Screen; select BACK to return to the Limits Menu; select TOP MENU to return to the Top Menu.

Wind Limits

1. From the Primary Operating Screen press the SELECT button to enter the Secondary Operating Screen.
2. Use the up or down arrows to highlight SETUP and press the SELECT button.
3. Highlight LIMITS and press the SELECT button.
4. Highlight WIND and press the SELECT button.
5. Highlight MAX WIND and press the SELECT button.
6. Use the up or down arrows to increase or decrease the maximum wind speed. The maximum value must be at least 15 MPH.
7. Press the ACCEPT button 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 the SELECT button to enter the Secondary Operating Screen.
2. Use the up or down arrows to highlight SETUP and press the SELECT button.
3. Highlight SYSTEM and press the SELECT button.
4. Highlight ABOUT and press the SELECT button.
5. Select EXIT to return to the Primary Operating Screen; select BACK or TOP MENU to return to the Top Menu.

LCD Contrast

LCD contrast allows adjustment of the panel display to be lighter or darker for easier viewing.

1. From the Primary Operating Screen press the SELECT button to open the Secondary Operating Screen.
2. Use the up or down arrows to highlight SETUP and press the SELECT button.
3. Highlight SYSTEM and press the SELECT button.
4. Highlight LCD CONTRAST and press the SELECT button.
5. Use the down arrow button to make the display darker, or the up arrow to make it brighter.
6. Once the contrast reaches the desired level press the ACCEPT button twice to save the setting.
7. Select EXIT to return to the Primary Operating Screen or select BACK or TOP MENU to return to the Top Menu.

Permissions

This option allows the user to enter the Supervisor Mode (see page 55).

1. From the Primary Operating Screen press the SELECT button to enter the Secondary Operating Screen.
2. Use the up or down arrows to highlight SETUP, then press the SELECT button.
3. Highlight SYSTEM and press the SELECT button.
4. Highlight PERMISSION and press the SELECT button.
5. Use the Up or Down arrow button to set the permission access code.
6. Press the ACCEPT button twice to save.

7. If a correct code is entered, the Top Menu will open automatically. Otherwise, the permission screen will remain on the display. Select EXIT to return to Primary Operating Screen and *operator* permission level.

Diagnostic Menu

Signals

This screen shows the signal level of each transducer that is activated on the system.

1. From the Primary Operating screen press the SELECT button to enter the Secondary Operating Screen.
2. Use the up or down arrows to highlight SETUP and press the SELECT button.
3. Highlight DIAGNOSTIC and press the SELECT button.
4. Highlight SIGNALS and press the SELECT button.
5. Select EXIT to return to the Primary Operating Screen, or select BACK or TOP MENU to return to the Top Menu.

Panel Relay

This 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.

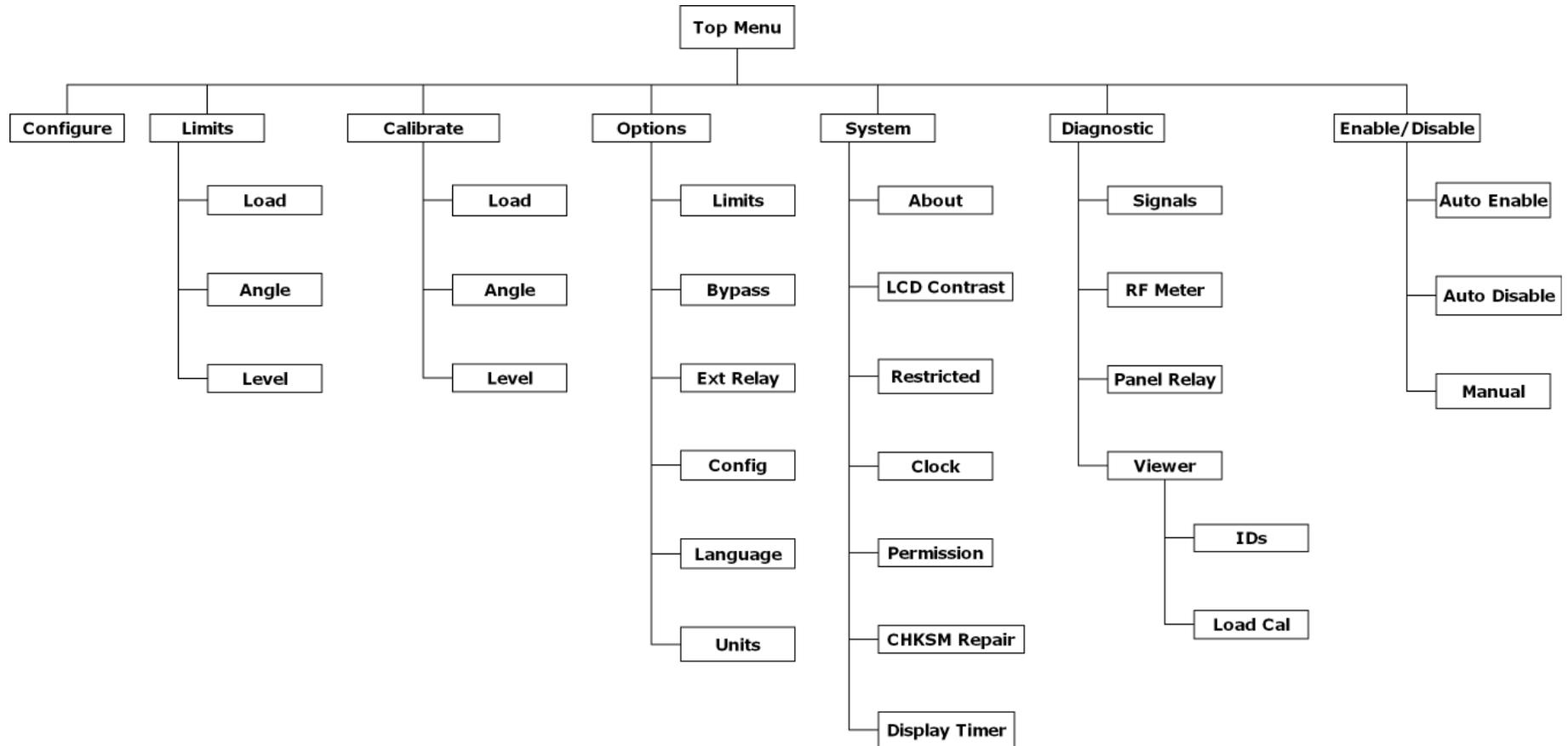
1. From the Primary Operating Screen press the SELECT button to enter the Secondary Operating Screen.
2. Use the Up or Down arrows to highlight SETUP, then press the SELECT button.
3. Highlight DIAGNOSTIC and press the SELECT button.
4. Highlight PANEL RELAY and press the SELECT button.
5. Select EXIT to return to the Primary Operating Screen or select BACK or TOP MENU to return to the Top Menu.

Viewer

This option is used to view the load cell calibration data and/or component ID numbers.

1. From the Primary Operating Screen, press the SELECT button to enter the Secondary Operating Screen.
2. Use the Up or Down arrow buttons to highlight SETUP, then press the SELECT button.
3. Highlight DIAGNOSTIC and press the SELECT button.
4. Highlight VIEWER and press the SELECT button.
5. From this display there are two options: LOAD CAL and IDs.
6. The LOAD CAL option allows the user to view the calibration information of the load pin. No adjustments can be made from this screen.
7. The IDs option allows 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 the 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.

Permissions Level

To access these menu selections, use the supervisor permission code: 111 at the permission screen.

To Set the Permission Level

1. From the Primary Operating Screen press the SELECT button to enter the Secondary Operating Screen.
2. Use the up or down arrows to highlight SETUP, then press the SELECT button.
3. Highlight SYSTEM and press the SELECT button.
4. Highlight PERMISSION and press the SELECT button.
5. Use the up or down arrow buttons to scroll to the permission code (111).
6. Press the ACCEPT button twice to save the change.
7. The Top Menu will automatically open, where more functions will now be available.

To Exit the Menu

1. After selecting EXIT, a message will display on screen, asking to confirm the choice.
2. Press the ACCEPT button again to confirm the choice and exit the menu.



NOTE:

- If the ACCEPT button is pressed without setting the supervisor permission code, the system will return to the Primary Operating Screen at *operator* permission level.
- Pressing the up or down arrow button will cancel the exit.
- If necessary, the supervisor permission code can be changed in order to limit system access. Please call the Cranesmart service department for more information.

Calibration Menu

Load Cell Calibration

Restoring Factory Calibration:

1. From the Top Menu, use the up or down arrow button to highlight CALIBRATE and press the SELECT button.
2. Highlight LOAD and press the SELECT button.
3. Highlight FACTORY CAL and press the SELECT button.
4. Press the SELECT button to confirm the decision to restore factory calibration.
5. Select TOP MENU to continue with *supervisor* permission or select EXIT to return to the Primary Operating Screen with *operator* permission. The original factory calibration of the load cell will now be restored. Repeat these steps on the Aux.1 load cell if necessary.

Set Span – Calibrating with a Known Weight (Part 1):

1. Lift a known weight.
2. From the Top Menu, use the up or down arrow buttons to highlight CALIBRATE, then press the SELECT button.
3. Highlight LOAD and press the SELECT button.
4. Highlight (MAIN, AUX 1, AUX 2) and press the SELECT button. The display at the top of the screen will change to show the selection.
5. Highlight SET SPAN and press the SELECT button.
6. Use the up or down arrows to set the displayed value to that of the known weight being lifted.
7. Press the ACCEPT button twice to save the change.

8. Select TOP MENU to continue with *supervisor* permission or select EXIT to return to the Primary Operating Screen with *operator* permission.

Set Load Zero – Calibrating with a Known Weight (Part 2):

1. Ensure there is no load or rigging on the hook.
2. From the Top Menu Screen use the up or down arrow button to highlight CALIBRATE and press the SELECT button.
3. Highlight LOAD and press the SELECT button.
4. Highlight (MAIN, AUX 1, AUX 2) and press the SELECT button. The display at the top of the screen will change to show the selection.
5. Highlight SET ZERO and press the SELECT button.
6. Use the up or down arrow button to set the 'zero weight' for the winch.
7. Press ACCEPT button twice to save the change made.
8. Select TOP MENU to continue with *supervisor* permission or, select EXIT to return to the Primary Operating Screen with *operator* permission.

NOTE:

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

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 slightly more than 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 arrow button changes the increments by 100 lb for up to 16 parts-of-line.
- If 17 or more parts-of-line are required, the increments for a single push of the arrow buttons change by 100 lb to start, then 200 lb.
- 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 using 10 POL, load calibration may be affected by 10%.

- For best results, always ensure 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:

$$\frac{(\text{maximum single line pull of winch}) \times (\text{parts-of-line})}{2} = \text{minimum known weight required}$$

Examples of Known Weights

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

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

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

NOTE:

- The factory restore function can be used to manually calibrate a load cell.
- The system can be re-calibrated using a known weight and following the steps above.
- Calibrating load cells is a two-step process; first, ensure that the correct winch and parts-of-line is selected for the load cell, then calibrate load zero and span for that 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 set the angle value on the display panel to zero. The following steps describe how to set the angle to zero when the boom (or Luffing Jib) and the installed angle transducer are as close to horizontal as possible.

To Set Angle Zero:

1. Install the boom angle transducer.
2. Use a level to position the boom to as close to zero degrees as possible.
3. Raise the boom to a 45° angle.
4. Lower the boom to a 0° angle.
5. From the Primary Operating Screen, press the SELECT button to open the Secondary Operating Screen.
6. Set permissions (see page 55).
7. Use the up or down arrow button to highlight TOP MENU and press the SELECT button to continue with supervisor permission.
8. Highlight CALIBRATE and press the SELECT button.
9. Highlight ANGLE and press the SELECT button. The value will be defaulted to zero.
10. Highlight ZERO and press the SELECT button.
11. Use the up or down arrow button to set the zero angle (zero angle can be set between -20° and 90°).
12. Press the ACCEPT button twice to save the change.
13. Select TOP MENU to continue with *supervisor* permission; select BACK to return to the Calibrate Menu, or select EXIT to return to the Primary Operating Screen with *operator* permission level.

Level Transducer Calibration

When the level transducer is installed, it is necessary to calibrate the unit. To do this, the pitch and roll angle values must be set to zero in the display panel. The following steps describe how to set these angles to zero.

NOTE: The crane must be perfectly level before attempting to calibrate the level transducer.

Set Level Zero:

1. Install the level transducer (see page 9).
2. Position the crane to be perfectly level (use the bubble level included with the level transducer).
3. To perform calibration, the permission codes section in the panel must be accessed (see page 55).
4. Once the correct permission code has been entered, use the following steps to calibrate the level transducer.
5. Use the up or down arrow button to highlight CALIBRATE and press the SELECT button.
6. Highlight LEVEL and press the SELECT button.
7. The default selection will be PITCH ANGLE ZERO. Press the SELECT button.
8. Use the up or down arrow button to adjust the angle to zero.
9. Press the ACCEPT button twice to save the change.
10. Now, the ROLL ANGLE ZERO option will be active. Press the SELECT button.
11. Use the up or down arrow button to adjust the angle to zero.
12. Press the ACCEPT button twice to save the change.
13. The level transducer is now calibrated.
14. Select TOP MENU to continue with *supervisor* permission; select BACK to return to the Calibrate Menu, or select EXIT to return to the Primary Operating Screen with *operator* permission level.

Options Menu

LIMITS LOCK

This option enables the user to restrict access to the Limits Menu.

1. From the Top Menu Screen, use the up or down arrow button to highlight OPTIONS and press the SELECT button..
2. Highlight LIMITS and press the SELECT button.
3. Highlight Locked/Unlock and press the SELECT button.
4. Press the ACCEPT button twice to save the change.
5. Select TOP MENU to continue with *supervisor* permission, or select EXIT to return to the Primary Operating Screen with *operator* permission level.

BY-PASS BUTTON

This option allows the user to disable the BY-PASS button. Once the BY-PASS button is disabled, pressing it will have no effect.

1. From the Top Menu Screen, use the up or down arrow button to highlight OPTIONS and press the SELECT button.
2. Highlight BYPASS and press the SELECT button.
3. Highlight ENABLE/DISABLE and press the SELECT button.
4. Press the ACCEPT button twice to save.
5. Select TOP MENU to continue with *supervisor* permission, or select EXIT to return to the Primary Operating Screen with *operator* permission level.

EXT RELAY (Output for Shutoff / Horn / Indicator)

The EXT RELAY setting enables the user 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 to highlight OPTIONS and press the SELECT button.
2. Highlight EXT RELAY and press the SELECT button.
3. Highlight NORM HOT / NORM COLD and press the SELECT button.
4. Press the ACCEPT button twice to save the change.
5. Select TOP MENU to continue with *supervisor* permission, or select EXIT to return to the Primary Operating Screen with *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 Setup Menu screens.

1. From the Top Menu Screen, use the up or down arrow button to highlight OPTIONS and press the SELECT button.
2. Highlight CONFIG and press the SELECT button.
3. Highlight LOCKED / UNLOCK and press the SELECT button.
4. Press the ACCEPT button twice to save the change.
5. Select TOP MENU to continue with *supervisor* permission, or select EXIT to return to the primary operating screen with *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.

TOP MENU>CONFIGURE		
WINCH	main	
MAIN POL	6	
CONFIGURATION IS LOCKED		
MAIN LOAD= 27.0001b A2B= OKAY		
CONTINUE		

TOP MENU>CONFIGURE		
WINCH	main	
MAIN POL	6	
CRAWLERS	extended	
BOOM LEN	100'	
MAIN LOAD= 27.0001b A2B= OKAY		
EXIT	BACK	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 arrow buttons to highlight OPTIONS and press the SELECT button.
2. Highlight LANGUAGE and press the SELECT button.
3. Use the up or down arrow button to select the appropriate language. The panel text will now change to the newly selected language.
4. Press the ACCEPT button twice to save the change.
5. Select TOP MENU to continue with *supervisor* permission, or select EXIT to return to the primary operating screen with *operator* permission level.

UNITS

The UNITS selection enables the user to change the units of measurement displayed on the panel.

1. From the Top Menu Screen, use the up or down arrow buttons to highlight OPTIONS and press the SELECT button.
2. Highlight UNITS and press the SELECT button.
3. Use the up or down arrow button to select the units of choice. The panel text will now change to the newly selected units.
4. Press the ACCEPT button twice to save the change.
5. Select TOP MENU to continue with *supervisor* permission, or select EXIT to return to the Primary Operating Screen with *operator* permission level.

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 arrow button to highlight SYSTEM and press the SELECT button.
2. Highlight ABOUT and press the SELECT button.
3. Select TOP MENU to continue with *supervisor* permission, select BACK to return to the System Menu, or select EXIT to return to Primary Operating Screen with *operator* permission level.

LCD CONTRAST

LCD CONTRAST allows you to adjust the panel display to be lighter or darker for easier viewing.

1. From the Top Menu Screen, use the up or down arrow button to highlight SYSTEM and press the SELECT button.
2. Highlight LCD CONTRAST and press the SELECT button.
3. Use the down arrow to make the display darker, or the up arrow to make it lighter. The contrast will change immediately.
4. When satisfied with the display contrast, press the ACCEPT button twice to save the change.
5. Select TOP MENU to continue with *supervisor* permission, select BACK to return to the System Menu, or select EXIT to return to Primary Operating Screen with *operator* permission level.

PERMISSIONS

This option allows the user to enter the Supervisor Mode (see page 55).

1. From the Top Menu Screen, use the up or down arrow button to highlight SYSTEM and press the SELECT button.
2. Highlight PERMISSION and press the SELECT button.
3. Use the up or down arrow button to set the permission access code.
4. Press the ACCEPT button twice to save the change.
5. Select TOP MENU to continue with *supervisor* permission, select BACK to return to the System Menu, or select EXIT to return to the Primary Operating Screen with *operator* permission level.

RESTRICTED

Users must call the Cranesmart Systems service department to gain access to the Restricted Menu.

Clock

1. From the Top Menu Screen, use the up or down arrow button to highlight SYSTEM and press the SELECT button.
2. Highlight Clock and press the SELECT button.
3. Highlight HOURS, MINUTES, MONTHS, DAY or YEAR.
4. Use the up or down arrow button to set TIME, and DATE.
5. Press the ACCEPT button twice to save the change.
6. Select TOP MENU to continue with *supervisor* permission, select BACK to return to the System Menu, or select EXIT to return to the Primary Operating Screen with *operator* permission level.

CHECKSUM REPAIR

If the display shows a 'checksum error', this function can be used to repair the problem.

1. From the Top Menu Screen, use the up or down arrow button to highlight SYSTEM and press the SELECT button.
2. Highlight CHKSM REPAIR and press the SELECT button.
3. Use the up or down arrow button to select REPAIR/CANCEL. If REPAIR is chosen, the screen will display 'REPAIRING CHECKSUM ERROR'. After checksum has been repaired, the System Menu will automatically open.
4. Select TOP MENU to continue with *supervisor* permission, select BACK to return to the Top Menu, or select EXIT to return to the Primary Operating Screen with *operator* permission level.

DISPLAY TIMER

1. From the Top Menu Screen, use the up or down arrow button to highlight SYSTEM and press the SELECT button.
2. Highlight DISPLAY TIMER and press the SELECT button.

3. Highlight TIMER and press the SELECT button.
4. Use the up or down arrow button to change display time.
5. Press the ACCEPT button twice to save the change.
6. Select TOP MENU to continue with *supervisor* permission, select BACK to return to the System Menu, or select EXIT to return to the Primary Operating Screen with *operator* permission level.

SUPERVISOR ENABLE / DISABLE MENU

1. From the Top Menu Screen, use the up or down arrow button to highlight ENABLE/DISABLE and press the SELECT button.
2. Highlight AUTO ENABLE, AUTO DISABLE or MANUAL and press the SELECT button.
3. Select TOP MENU to continue with *supervisor* permission, or select EXIT to return to the Primary Operating Screen with *operator* permission level.

NOTE:

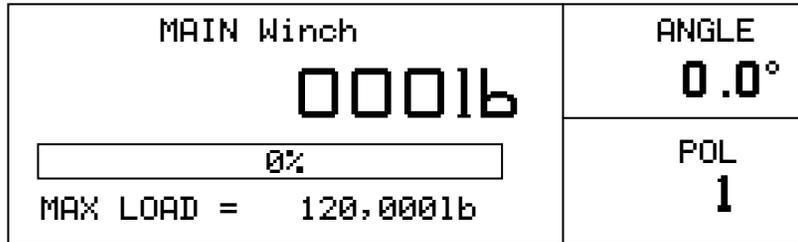
- For AUTO ENABLE / DISABLE, the system steps through all the active transducers. Operators may have to wait approximately 5 seconds for the system to connect to a transducer.
- AUTO DISABLE can only be used if a transducer is in a system or battery alarm.
- For MANUAL ENABLE / DISABLE, use the up or down arrow button to select the transducers to enable or disable. (Extra choices may be available under 'MORE').

Display Panel – Operating Screens

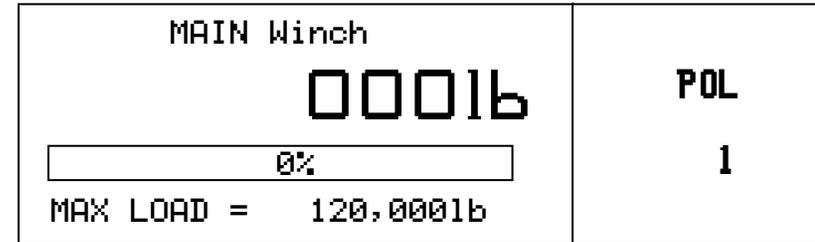
Primary Operating Screen

The Primary Operating Screen enables users to view various parameters of active components. This screen display will change, depending on the configuration of the system purchased. Displays for the most common combinations are shown below:

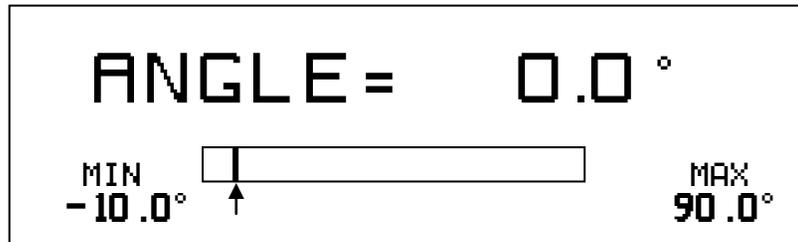
Load, Angle & A2B or Load & Angle systems



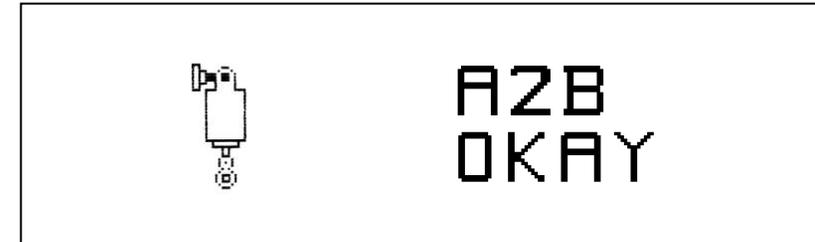
Load & Angle or Load only systems



Angle & A2B or Angle only systems



A2B only systems



- Winch Displays the 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.
- 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 the system and perform operator functions. To view the Secondary Operating Screen, press the SELECT button from the Primary Operating Screen. The picture below is an example of a load, angle & A2B system.

MAIN WINCH	
A2B OKAY	WIND N/A
EXIT ←	LIMITS TARE SIG INFO SETUP

- Winch Displays the winch for the information that follows. (Main, Aux1 or Aux2)
- A2B Displays the status of all A2B switches in the system.
- Wind Displays the wind speed in miles per hour when the wind exceeds 15 MPH (only for systems with wind speed transducers installed).

Limits Screen

The Limits Screen displays the limit settings for all of the components of the system. No changes can be made from this screen. For information on how to make changes to the limits, see page 49. **NOTE: The Limits Screen is not available on A2B only systems.**

LOAD	MAX	ANGLE	MAX	MIN
MAIN	120.0001b	MAIN	90.0°	-10.0°
→EXIT				

Signal Strength Screen

The Signal Strength Screen displays the strength of the signals from any enabled transducers, using percentages, a bar graph and the RF count. For properly functioning transmitters, signal strengths should be at least 50% and increase every 5 -10 seconds. This screen should be used when installing boom mounted transmitters to help ensure placement for the best signal. This display is also used to aid the Cranesmart service department in trouble shooting.

1. From the Primary Operating Screen, press the SELECT button to move to the Secondary Operating Screen.
2. Use the up or down arrow button to highlight SIG, then press the SELECT button.
3. The Signal Strength Screen should now be displayed.
4. Press the SELECT button to return to the Primary Operating Screen.

SIGNAL STRENGTH			RF COUNT
LOAD MAIN	99%		32
A2B MAIN	99%		32
ANG MAIN	99%		32
-MENU			

Info Screen

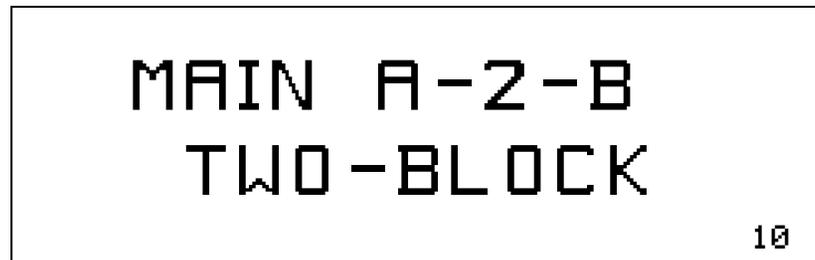
The Info Screen displays Cranesmart system information which is used by the Cranesmart service department for troubleshooting.

1. From the Primary Operating Screen, press the SELECT button to move to the Secondary Operating Screen.
2. Use the up or down arrow button to highlight INFO, then press the SELECT button.
3. The Information Screen should now be displayed.

VER: 5.203d1 SN: 02000 FREQ: 0138	
LOAD:	MAIN=OK
A2B:	MAIN=OK
ANGLE:	MAIN=OK
-MENU	

Display Panel – Alarms

The panel has built-in audible and visual alarms. The alarm message 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, an alarm number is also displayed in the lower right hand corner of the screen. Each alarm number is unique to the particular alarm it is associated with, and can be useful information in a troubleshooting situation.



When the display panel is installed and powered, alarms may sound, and their corresponding screens displayed. This indicates which component signals (load cell, anti-2-block, angle transducer, etc) are not being received by the panel. These alarms will be active until all parts of the system are installed and there is a clear line of sight to the antenna. If all parts of the system are correctly installed and the alarms are still sounding, check the Signal Strength Screen (see page 69) to ensure that the boom mounted transmitters are sending clear signals. Moving the cab-mounted antenna for better signal reception may also help solving this problem. If further assistance is required, please call the Cranesmart Systems service department at (888) 562-3222 or (780) 437-2986.

NOTE:

- The audible alarm is intended for the operator to hear. If necessary, Cranesmart Systems can provide a horn that is louder and which will automatically increase in volume depending on ambient noise.

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

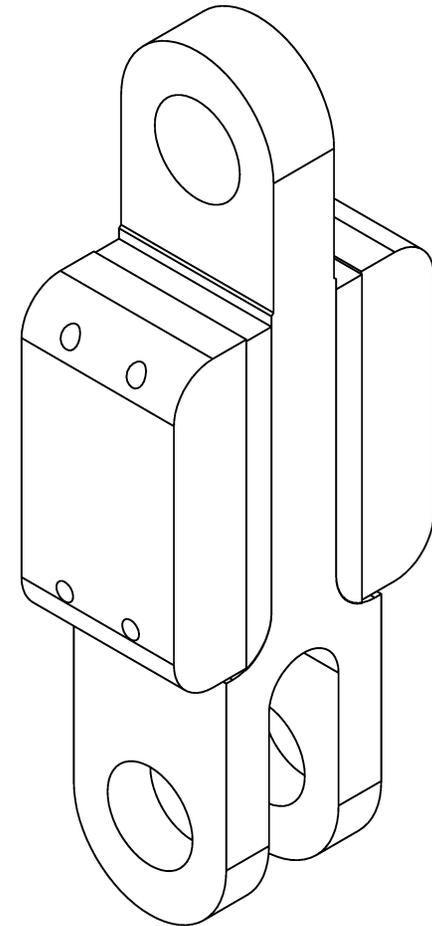
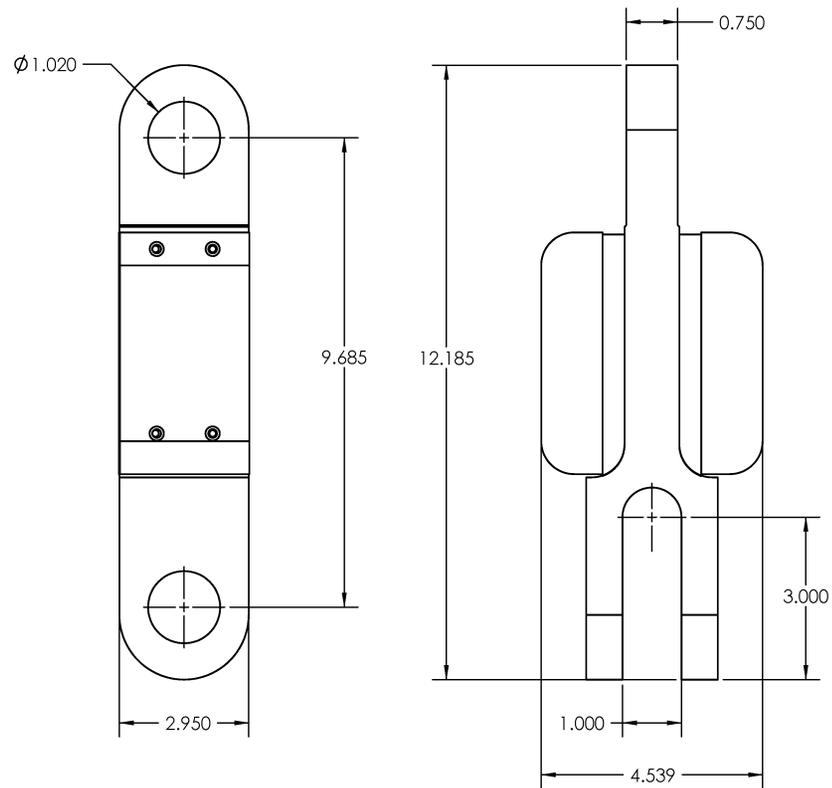
Function Shut Offs

Cranesmart Systems provides 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 specific alarms, displays, or function shut offs are required, please call the Cranesmart Systems sales department at (888) 562-3222 or (780) 437-2986.

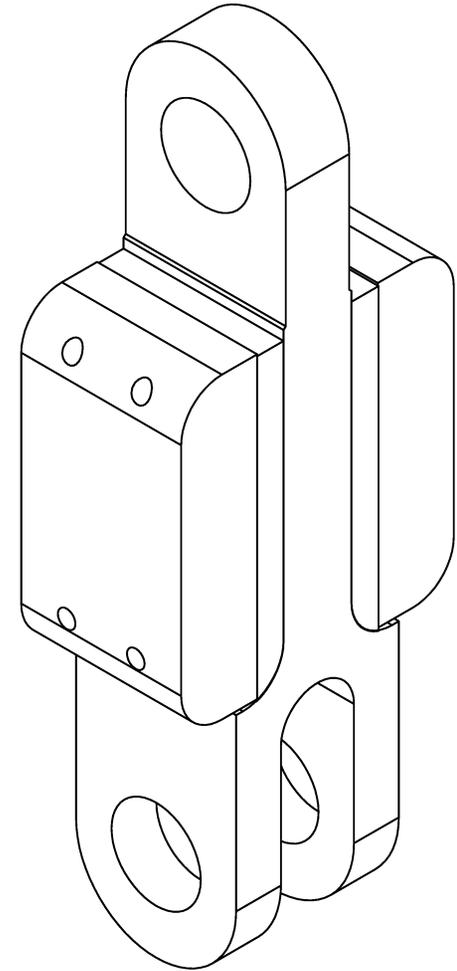
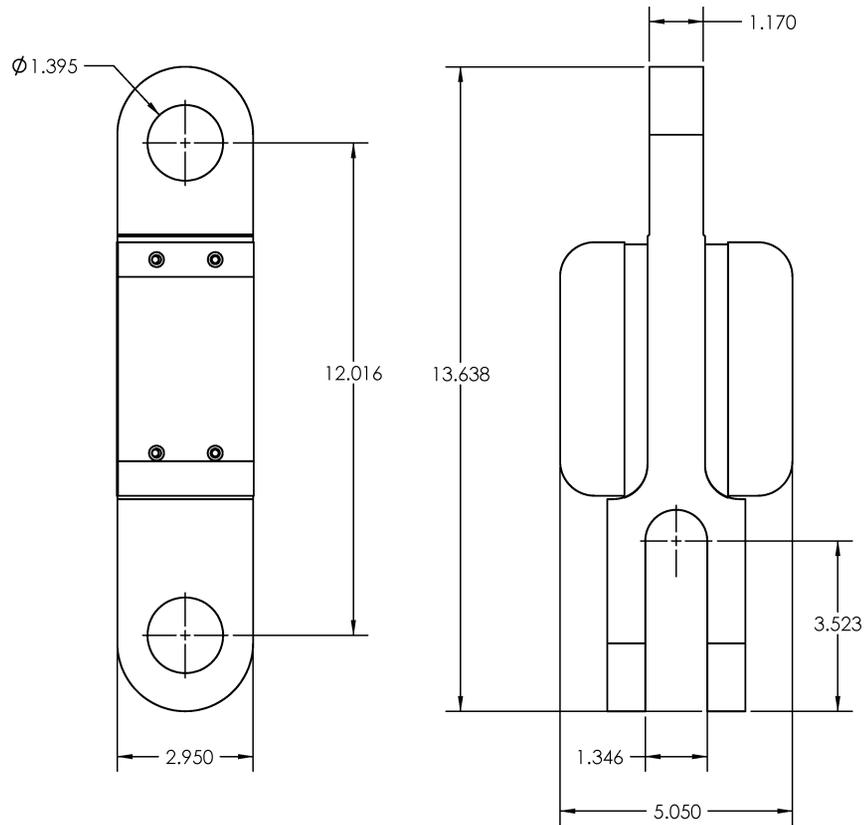
Technical Specifications

7,500lb single line pull load cell



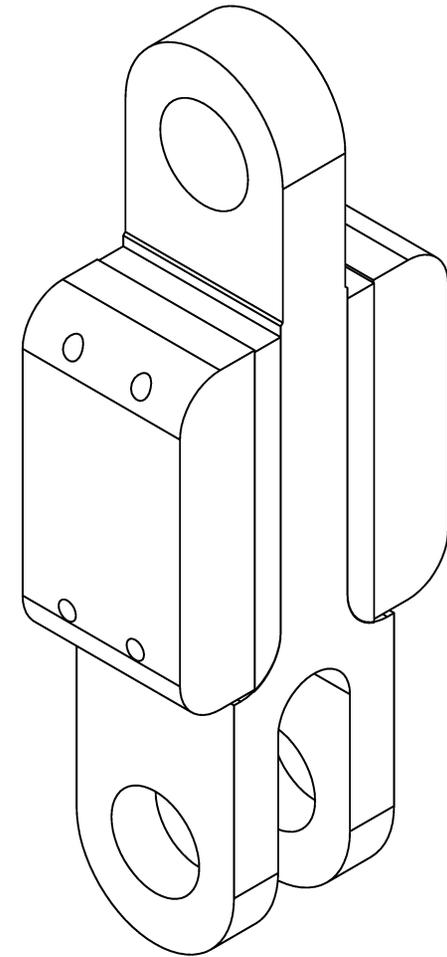
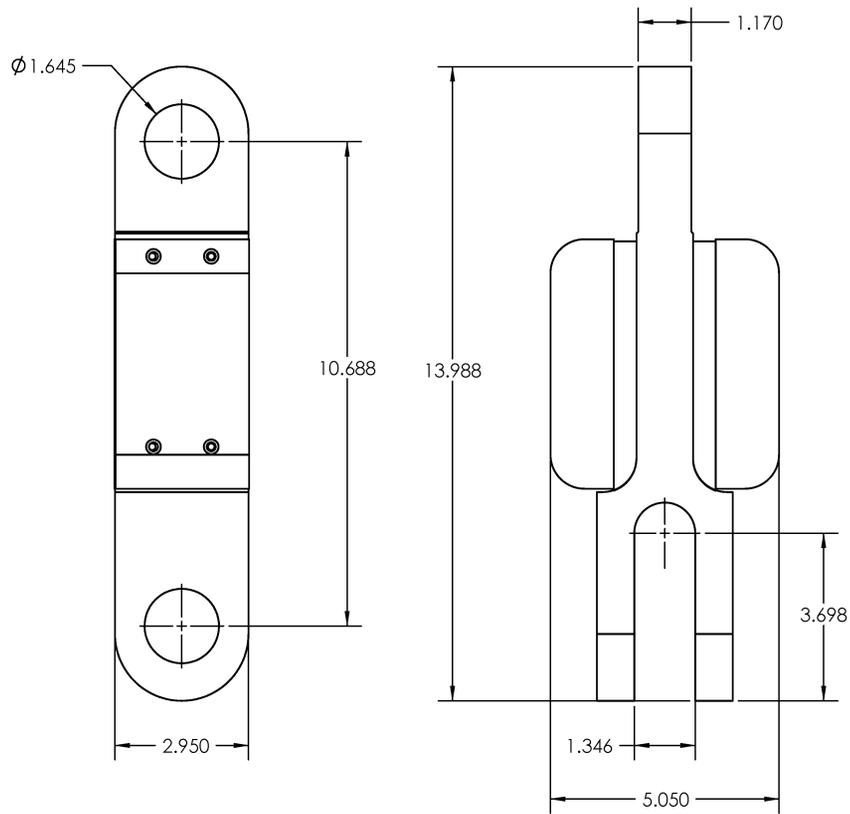
HEIGHT [in]	12.185	OPERATING TEMP. [°F]	-40° TO +140°
WIDTH [in]	4.539	BATTERY / LIFE	Lithium Ion / 5+ Yrs
DEPTH [in]	2.950	FCC COMPLIANCE	NFBLAB123
PIN CENTER-TO-CENTER [in]	9.685	PIN HOLE DIAMETER [in]	1.020
WEIGHT [lb]	10	ANTENNA	QUARTER WAVE, INTERNAL

15,000 single line pull load cell



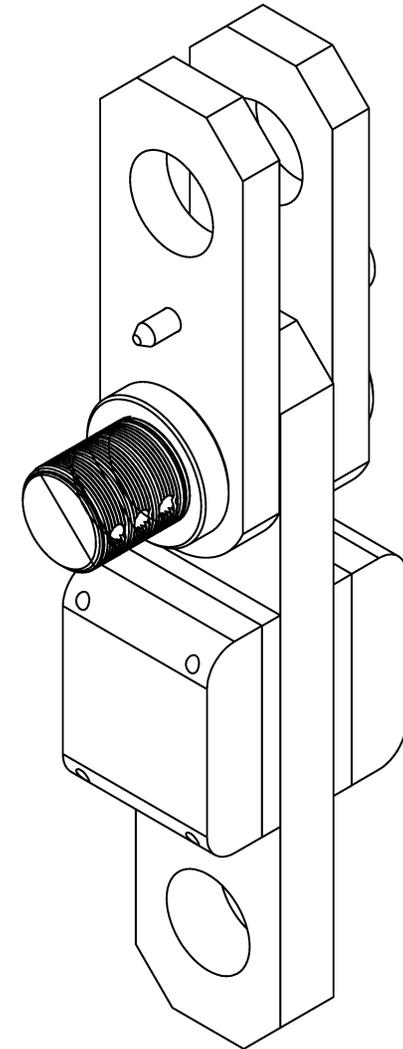
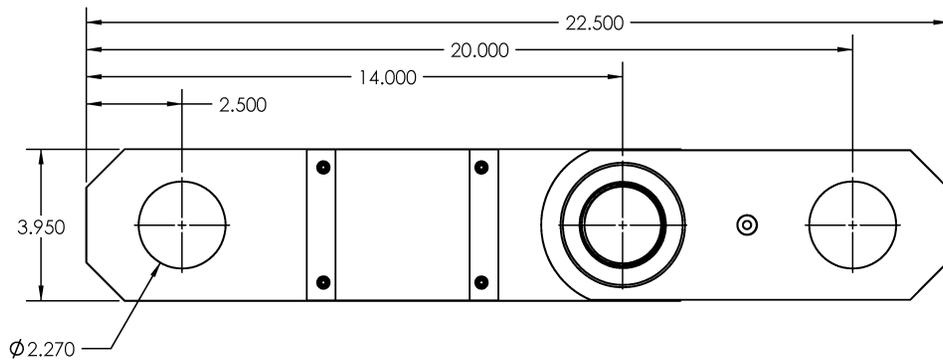
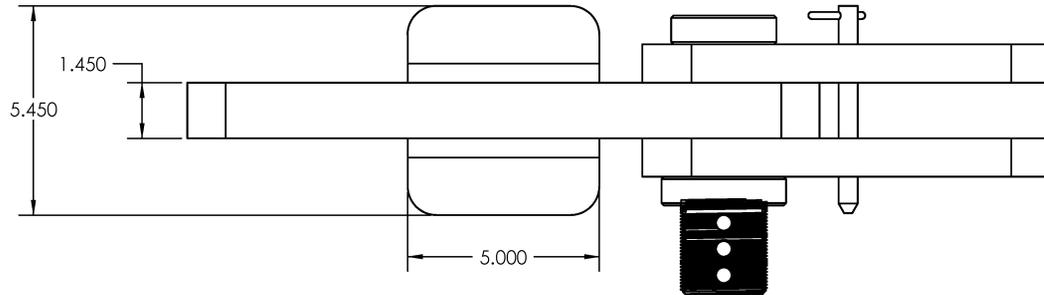
HEIGHT [in]	13.638	OPERATING TEMP. [°F]	-40° TO +140°
WIDTH [in]	5.050	BATTERY / LIFE	Lithium Ion / 5+ Yrs
DEPTH [in]	2.950	FCC COMPLIANCE	NFBLAB123
PIN CENTER-TO-CENTER [in]	12.016	PIN HOLE DIAMETER [in]	1.395
WEIGHT [lb]	14	ANTENNA	QUARTER WAVE, INTERNAL

25,000lb single line pull load cell



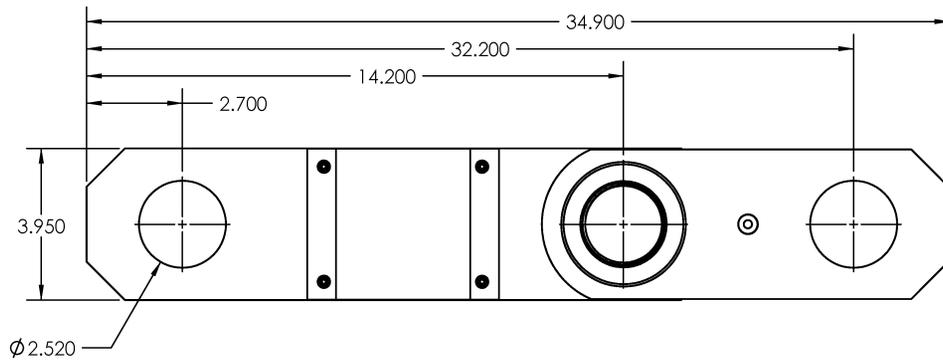
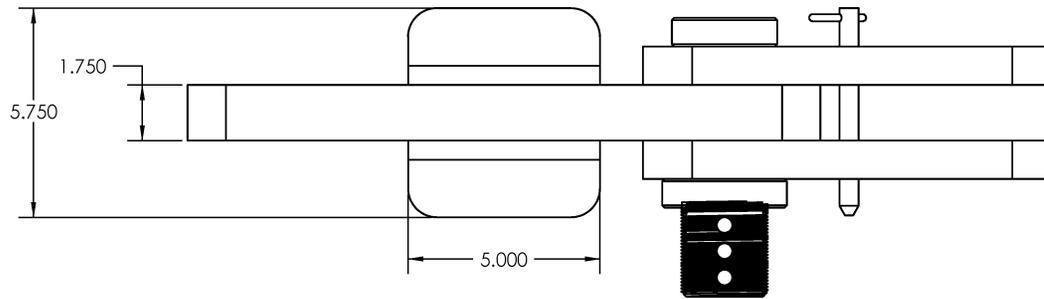
HEIGHT [in]	13.638	OPERATING TEMP. [°F]	-40° TO +140°
WIDTH [in]	5.050	BATTERY / LIFE	Lithium Ion / 5+ Yrs
DEPTH [in]	2.950	FCC COMPLIANCE	NFBLAB123
PIN CENTER-TO-CENTER [in]	12.016	PIN HOLE DIAMETER [in]	1.395
WEIGHT [lb]	14	ANTENNA	QUARTER WAVE, INTERNAL

40,000lb single line pull load cell

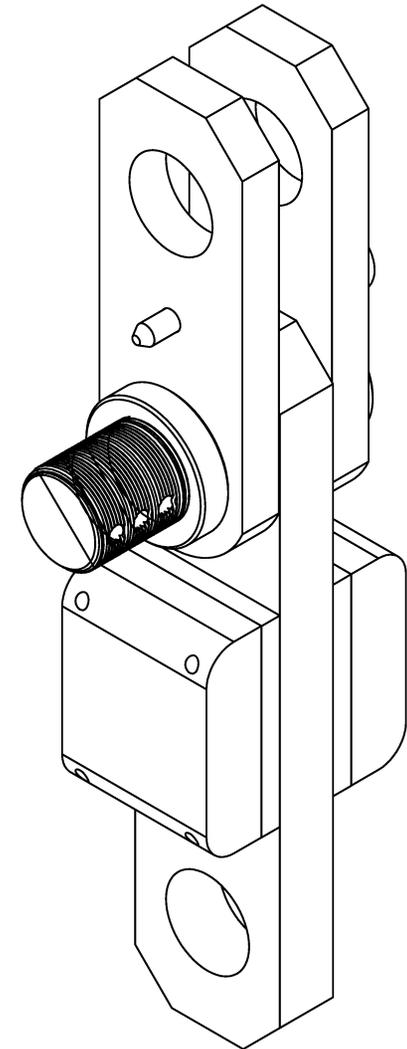


HEIGHT w/ LINKS [in]	22.500	OPERATING TEMP. [°F]	-40° TO +140°
WIDTH [in]	5.450	BATTERY / LIFE	Lithium Ion / 5+ Yrs
DEPTH [in]	3.950	FCC COMPLIANCE	NFBLAB123
PIN CENTER-TO-CENTER [in]	17.500	PIN HOLE DIAMETER [in]	2.270
WEIGHT [lb]	33	ANTENNA	QUARTER WAVE, INTERNAL

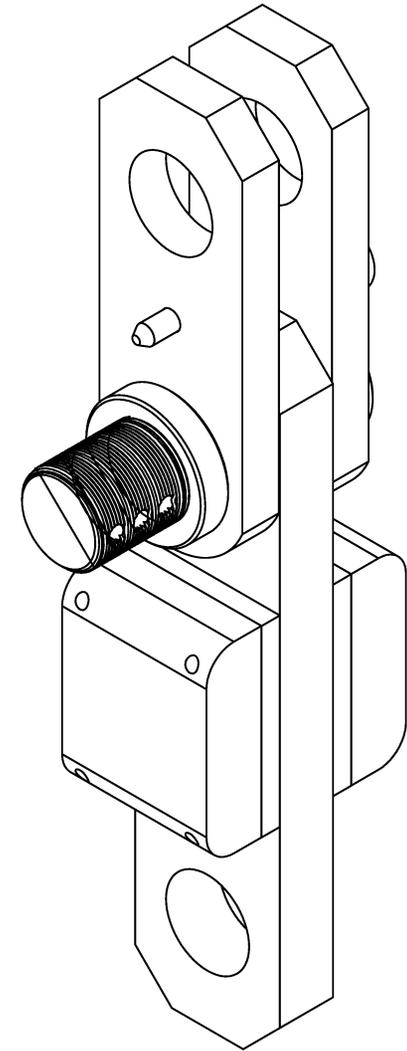
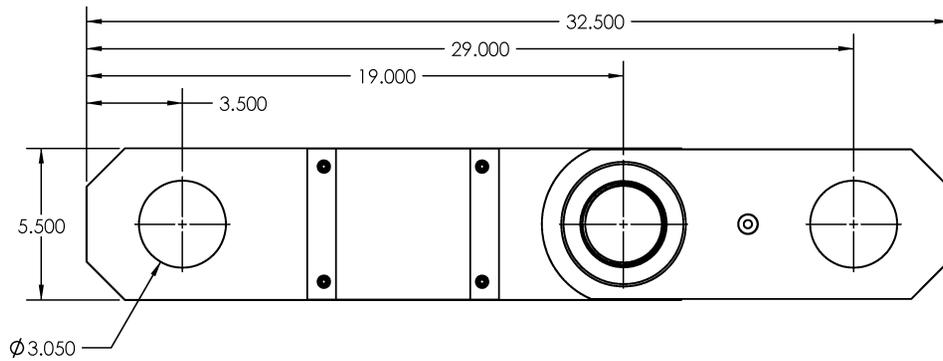
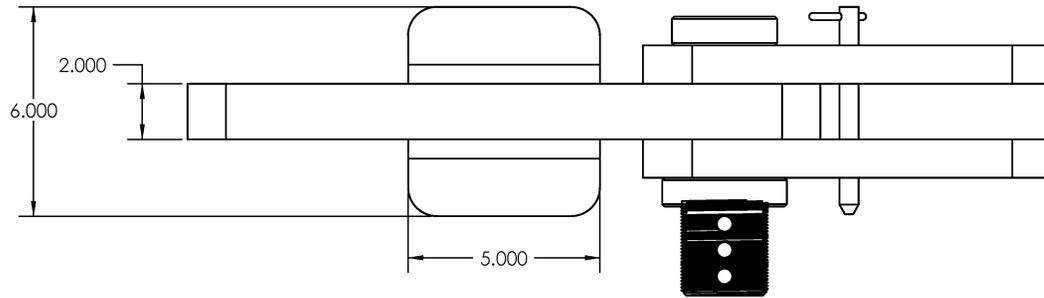
50,000lb single line pull load cell



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

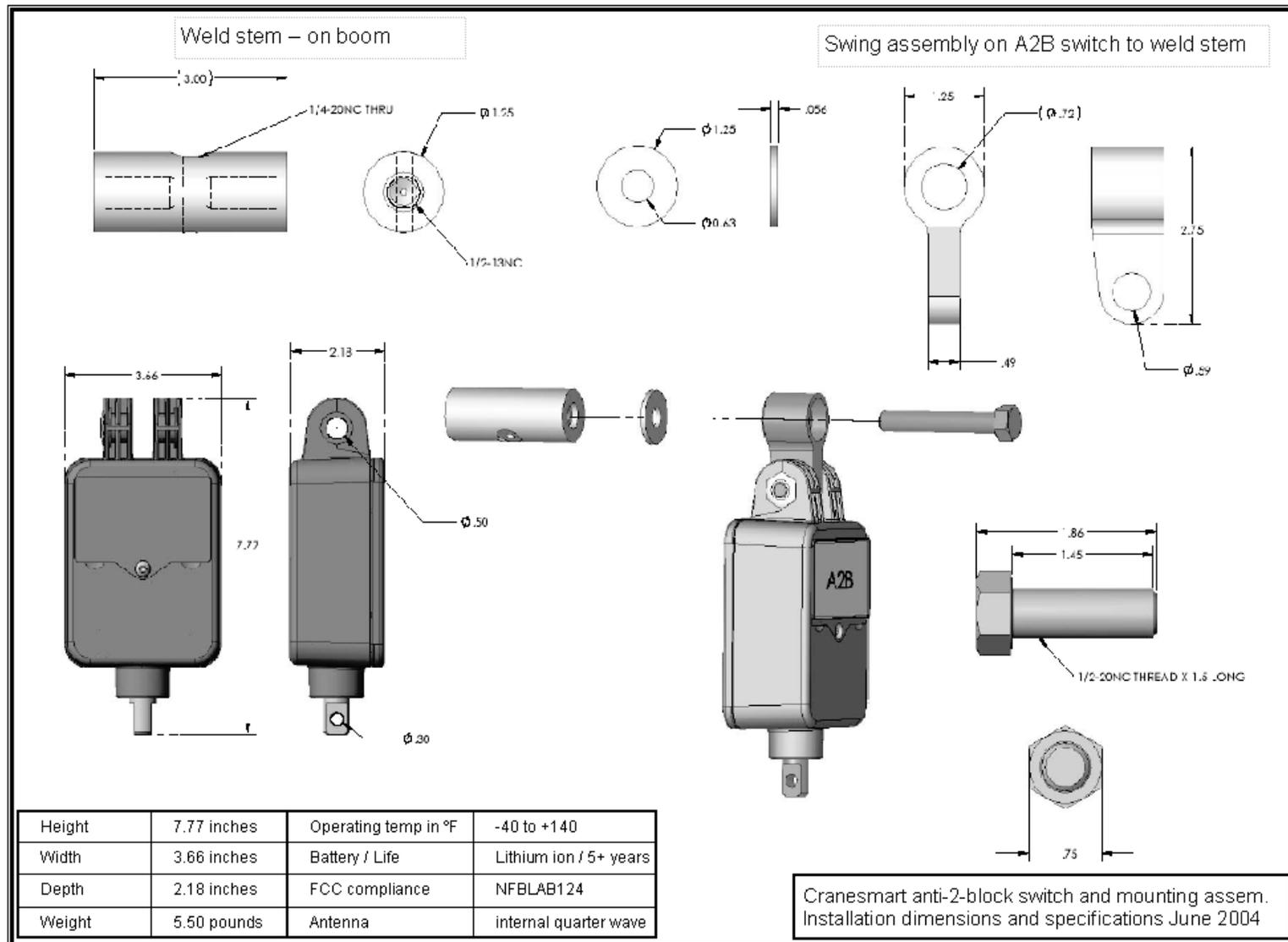


80,000lb single line pull load cell

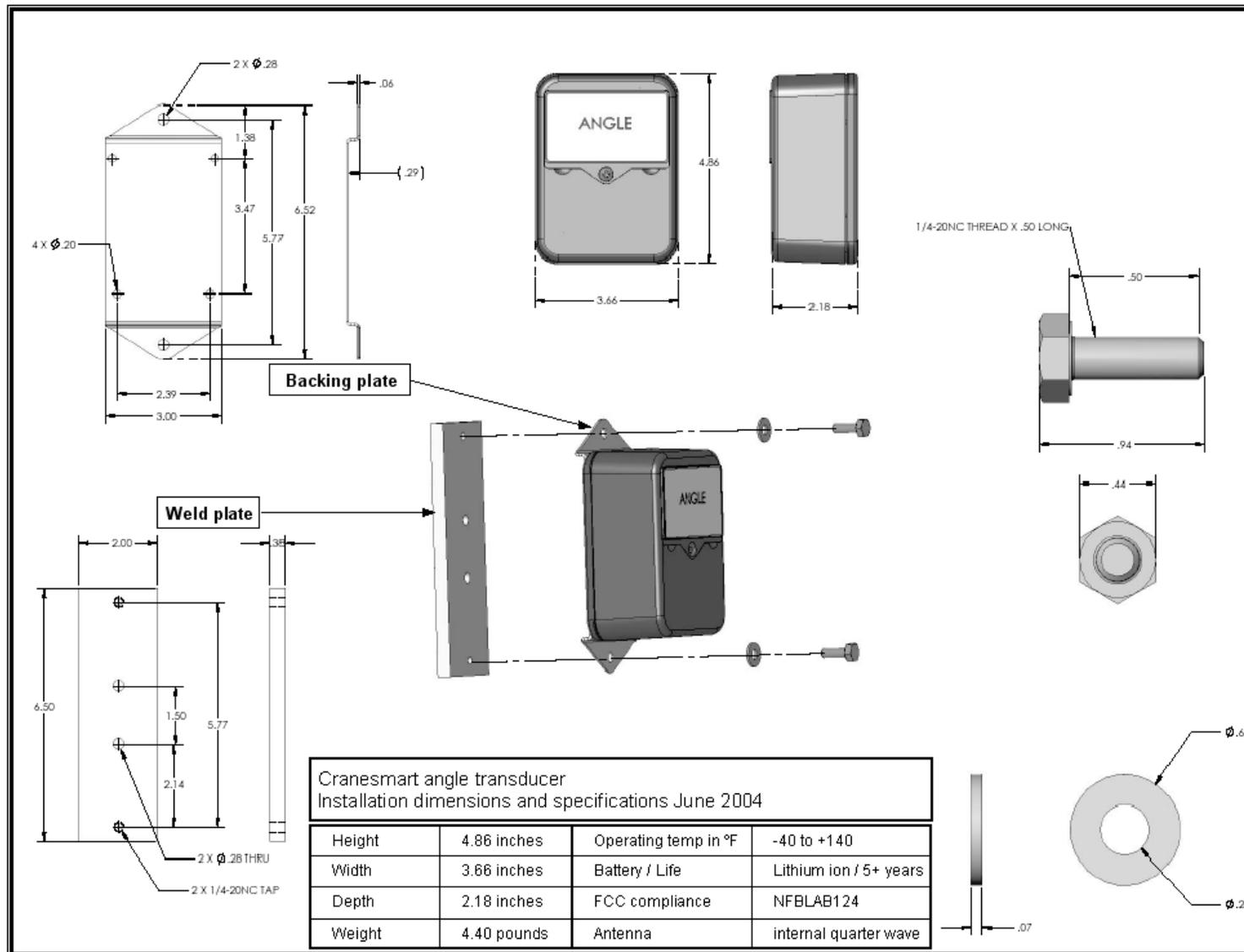


HEIGHT w/ LINKS [in]	32.500	OPERATING TEMP. [°F]	-40° TO +140°
WIDTH [in]	6.000	BATTERY / LIFE	Lithium Ion / 5+ Yrs
DEPTH [in]	5.500	FCC COMPLIANCE	NFBLAB123
PIN CENTER-TO-CENTER [in]	25.500	PIN HOLE DIAMETER [in]	3.000
WEIGHT [lb]	50	ANTENNA	QUARTER WAVE, INTERNAL

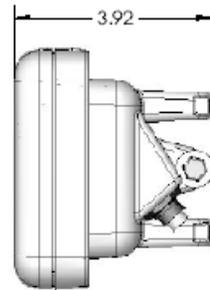
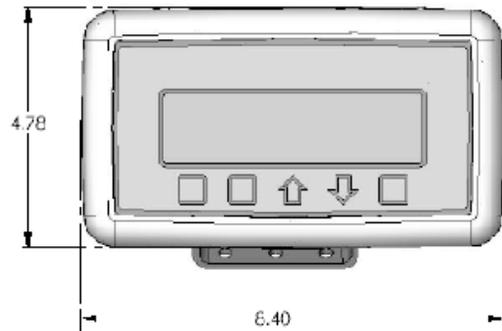
Anti-2-Block Switch



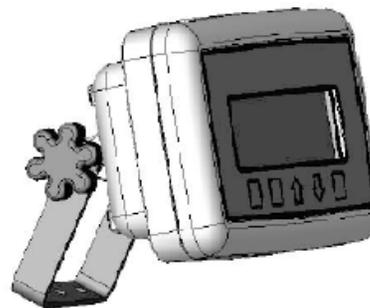
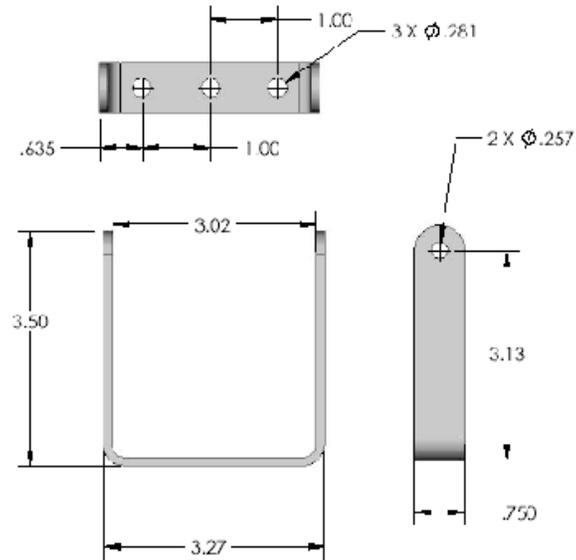
Boom Angle Transducer



Display Panel



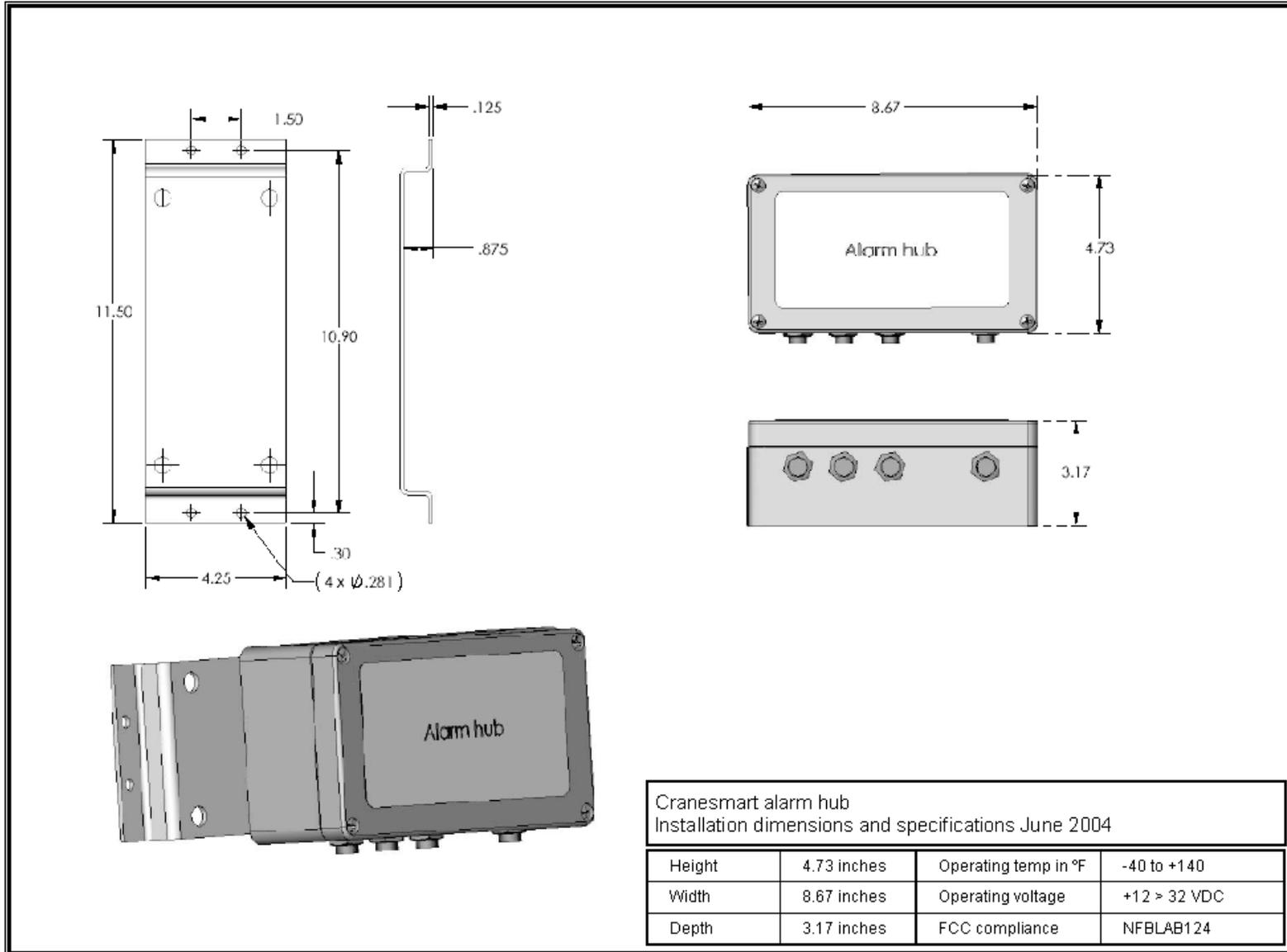
Back panel mounting bracket assembly
May be mounted vertically or horizontally



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

ITEM NO.	DESCRIPTION	QUANTITY
1	A2B WELD BAR	1
2	18-8 SS General Purpose Flat Washer 1/2" Screw Size, 1-1/4" OD, .05"-.08" Thick	1
3	SWING/PIVOT COUNTER WEIGHT	1
4	18-8 Stainless Steel Shoulder Screw 5/8" Shoulder Dia, 1/2" L Shoulder, 1/2"-13 Thread	1
5	WINDSPEED TRANSMITTER	1
6	18-8 Stainless Steel Split Lock Washer 1/4" Screw Size, .49" OD, .06" min Thick	2
7	18-8 Stainless Steel Socket Head Cap Screw 1/4"-20 Thread, 3/4" Length	2

TECHNICAL SPECIFICATIONS	
OVERALL HEIGHT	22.75" (578mm)
SWEEP DIA.	6.90" (175mm)
OPERATING TEMP.	-40° TO 140° F (-40° TO 60° C)
BATTERY / LIFE	Lithium Ion / 5+ Yrs.
FCC COMPLIANCE	NPELAB124

REV	ECO/0	DESCRIPTION	DATE	NAME

PROPRIETARY AND CONFIDENTIAL THIS INFORMATION IS UNCLASSIFIED IN THE DRAWING BUT IS NOT TO BE RELEASED OR DISCLOSED TO THE PUBLIC OR TO ANY OTHER PARTY WITHOUT THE WRITTEN PERMISSION OF CRANESMART SYSTEMS INC.		UNLESS OTHERWISE SPECIFIED: 1. DIMENSIONS ARE IN INCHES 2. TOLERANCES: ANGULAR: ±.5° TWO PLACE UNDER: .01" THREE PLACE UNDER: .005" 3. REPORT ERRORS TO PRODUCTION MANAGER	THIRD ANGLE PROJECTION	DATE (D-D-MMM-YY)	NAME
DRAWN BY: - CHECKED BY: - APPROVED BY: 18/04/09 AH	DATE: - NAME: -	CRANESMART SYSTEMS INC. Edmonton, Alberta	TITLE: WINDSPEED TRANSMITTER	SIZE: B PART NO.: 900-1055A_MANUAL	REV: A
SCALE: 1:1		SHEET 1 OF 1			