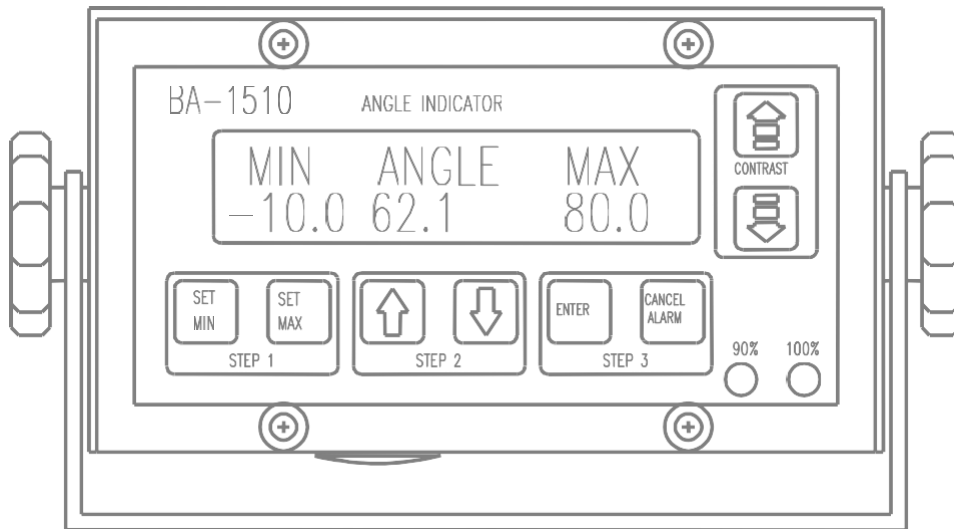


BA 1510™ ANGLE INDICATOR



INSTALLATION MANUAL

HYDRAULIC & LATTICE CRANES





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WARNING

The BA-1510™ Angle Indicator is designed to assist fully trained and experienced crane service personnel in the installation of the BA-1510™ System. At no time may the BA-1510™ System be used as a substitute for standard safety practices and precautions required for the safe setup and operation of cranes.

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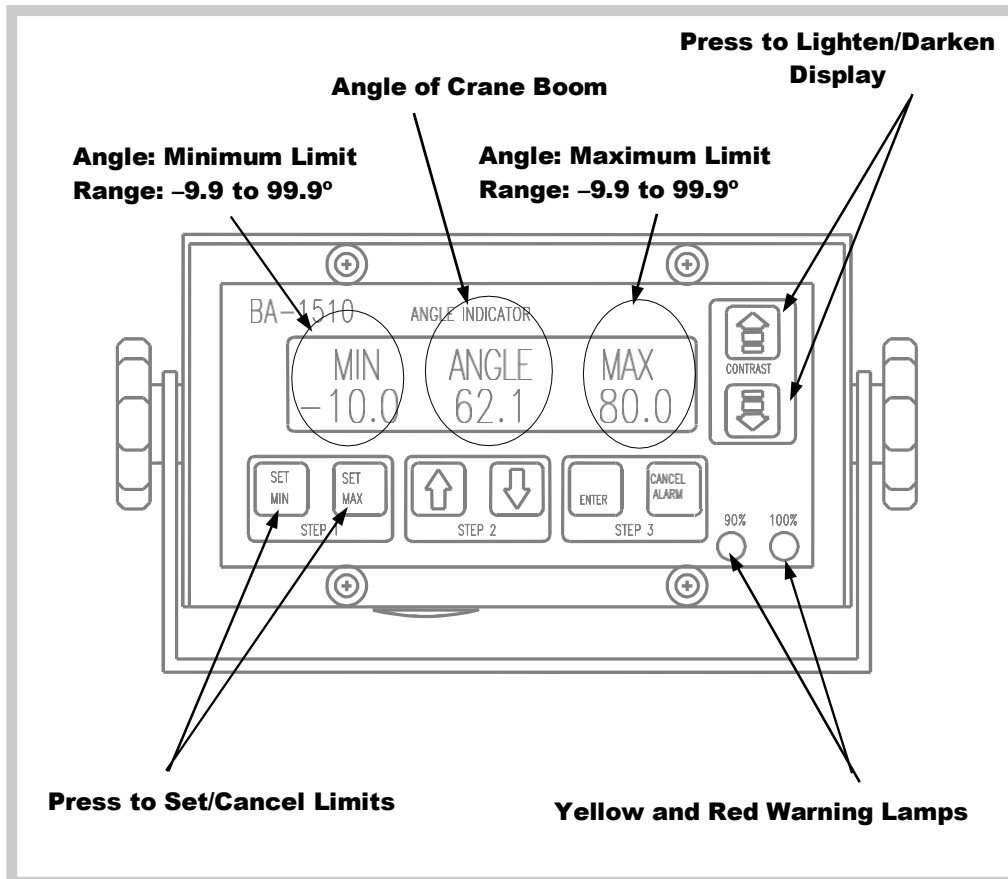


FIGURE 1. THE BA-1510™ ANGLE INDICATOR (METER)

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THE BA-1510™ ANGLE INDICATOR (METER)

Refer to Figure 1 on page 6.

The BA-1510™ Angle Indicator is designed to measure, calculate, and display angles from the boom and/or boom head to the horizon during setup and operation of the crane.

1. Choose a location for the BA-1510™ Angle Indicator (meter) inside the cab. Ensure that the operator can easily view the meter display without obstructing the view through the cab window.
2. Securely mount the bracket for the meter in the cab.
3. Mount the meter on the bracket.
4. Route the power to a 12 or 24 VDC source (typically the aux power line) that turns off when the crane ignition is turned off.
5. Connect the black wire to "ground" and the red wire to the 12 or 24 VDC source.

NOTE: In some cases, if the crane voltage is not stable, a 4300 MFD 50 VDC # PO16050 capacitor connected to the red and black wires of the meter can help. This capacitor is available on request. Connect the red wire to the positive (+) terminal of the capacitor and the black wire to the negative (-) terminal.

6. Tie and store excess cable under the dashboard or in a convenient place where the cable will not be damaged.

NOTE: If no motion cut valves are to be installed, insulate the orange wire. This wire will be "HOT" when the meter is operating.

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A220220 ANGLE SENSOR WITHOUT ANTI TWO-BLOCK FOR HYDRAULIC & LATTICE CRANES

Refer to Figure 2 on page 9 and Figure 3 on page 10. For installation of the Angle Sensor (A220220) with magnetically dampened pendulum, follow the steps below:

1. Locate a site for the angle sensor on either the LEFT SIDE (outside) of the boom, or on the RIGHT SIDE (inside) of the boom, as viewed from the cab of the crane.
2. Mount the angle sensor with the electrical connector facing the boom pivot and the top of the sensor parallel to the center line of the boom.
3. Lower the boom to a horizontal position, and mount the boom angle sensor vertically (connector facing the boom pivot) to the webbing with 1/4 inch bolts or studs or weld plate.
4. Refer to page 13 for important cable information. Route the angle sensor cable along the lower edge of the boom. Make a loop either in front of the boom pivot or behind the boom pivot ensuring that the cable will not stretch, pinch, or abrade when the boom is at a high or low angle.
5. Install cable clamps about every two or three feet along the boom, or as needed.

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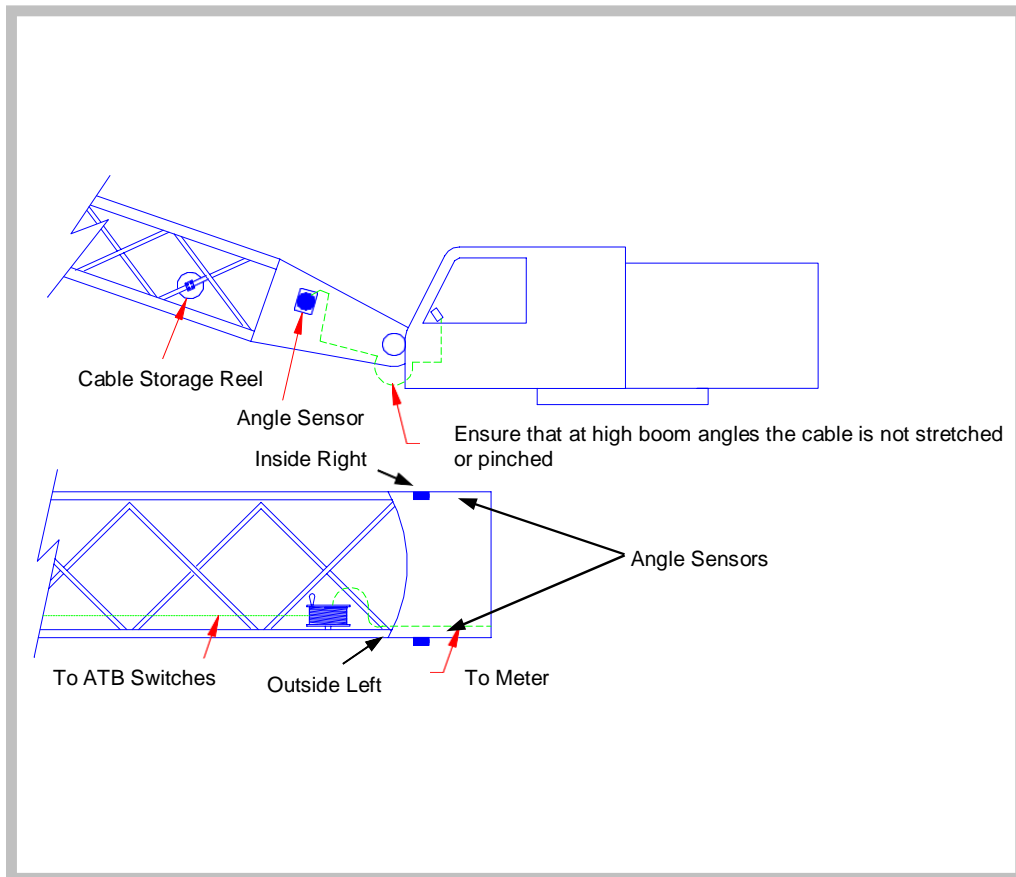


FIGURE 2. THE ANGLE SENSOR/CABLE STORAGE REEL FOR LATTICE CRANES

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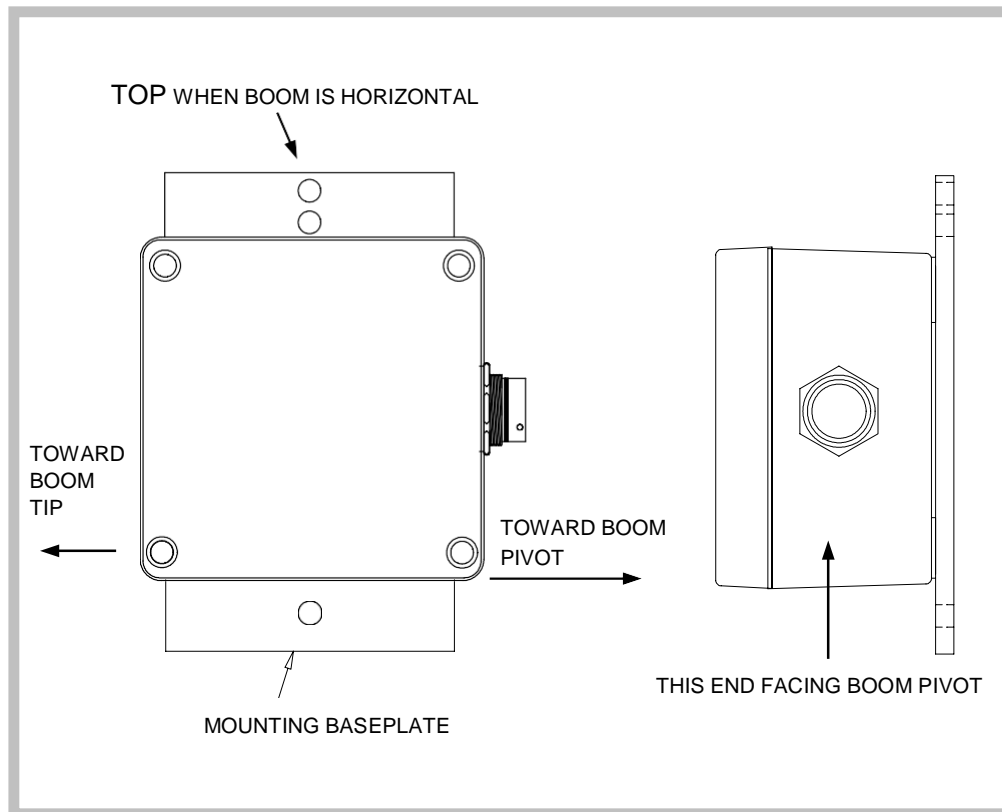


FIGURE 3. THE ANGLE SENSOR - NEW EXTERNAL MOUNT

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A220300

ANGLE SENSOR

WITHOUT ANTI TWO-BLOCK

FOR HYDRAULIC & LATTICE CRANES

Refer to Figure 2 on page 9 and Figure 4 on page 12. For installation of the older, oil dampened Angle Sensor (A220300), follow the steps below:

1. Locate a site for the angle sensor on either the LEFT SIDE (outside) of the boom, or on the RIGHT SIDE (inside) of the boom as viewed from the cab of the crane.
2. Mount the angle sensor with the electrical connector facing the boom pivot and the top of the sensor parallel to the center line of the boom.
3. Lower the boom to a horizontal position, and mount the boom angle sensor vertically (connector facing the boom pivot) to the webbing with 1/4 inch bolts or studs. The slotted hole at the bottom of the sensor is used to adjust the angle of the sensor before tightening.
4. Fill the male connector on the angle sensor with silicon grease and connect it to the angle cable.
5. Refer to page 13 for important cable information. Route the angle sensor cable along the lower edge of the boom. Make a loop either in front of the boom pivot or behind the boom pivot ensuring that the cable will not stretch, pinch, or abrade when the boom is at a high or low angle.
6. Install cable clamps about every two or three feet along the boom or as needed.

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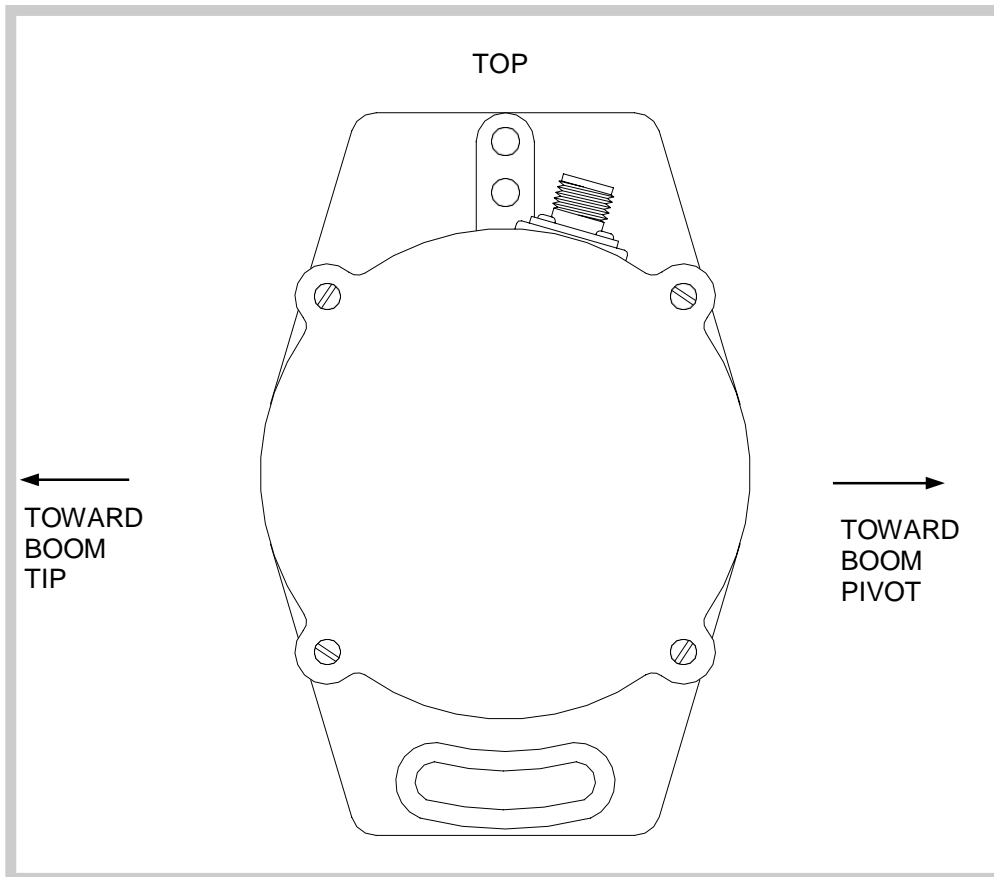


FIGURE 4. THE ANGLE SENSOR POSITION FOR OLDER VERSIONS

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CABLE A047027

Use the cable labeled A047027 between the BA1510 display and the angle sensor (5 pin), and for the ATB cable (3 pin). This cable is generally used with the storage reel described below.

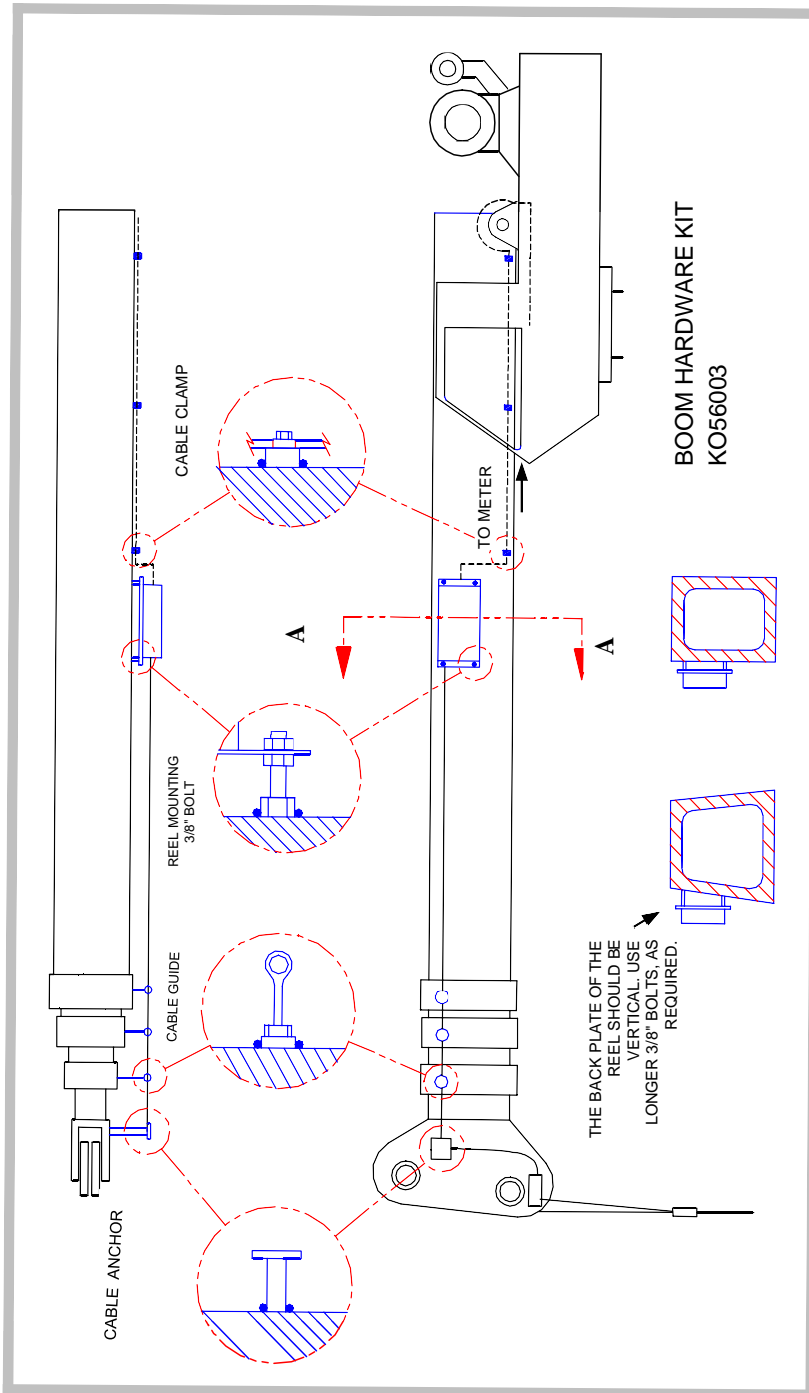
CABLE STORAGE REEL ASSEMBLY WITH ANTI TWO-BLOCK

FOR LATTICE CRANES

Refer to Figure 2 on page 9 and Figures 8 and 9 on page 22.

The cable storage reel is a hand-cranked extension reel that can hold enough cable for maximum boom length. After setup, store excess two-block cable on this reel.

1. Mount the cable storage reel on the inside of the butt section of the boom by clamping it to the lacing. The hole pattern on the base of the reel will accommodate various clamp sizes.
2. Loosen the wing-nut on the front of the reel when extending or retracting the cable. Tightening the wing-nut will stop the reel from unwinding.
3. Secure the Two-Block cable along the boom, as needed.



SECTION A - A

14

FIGURE 5. EXTENSION REEL ASSEMBLY FOR HYDRAULIC CRANES

EXTENSION REEL ASSEMBLY WITH ANTI-TWO-BLOCK FOR HYDRAULIC CRANES

Refer to Figure 5. on page 14.

1. Locate a site for the Extension Reel Assembly on the LEFT side (operator's left when seated in the cab) of the non-telescoping section of the boom. Position this assembly approximately one third of the way along the boom from the boom pivot.

Warning: Ensure that the reel does not hit the cab, boom rest, or other part of the crane at low boom angles.

2. Mount the Extension Reel Assembly parallel to the boom and toward the top, using 3/8" diameter bolts welded to the boom.

NOTE: If the boom is not box-shaped, use longer bolts at the top or bottom to ensure that the reel position remains vertical.

3. After mounting the Extension Reel Assembly, remove the four 1/4-20 trusshead screws from the cover of the reel. Pull the cover off and set it aside.
4. Remove the nylon cords, blocks, and packing used to lock the reel during shipment.
5. Uncoil the extension reel cable, but DO NOT REMOVE the cable clamp.
6. Pull the reel cable to the tip of the boom.
7. Locate an anchor site from which it is possible to see one cable guide at the end of each boom section.
8. Weld a cable anchor (an eight inch long pipe with a square cable stop welded on one end) to the boom head at the selected site.

-
9. After letting the anchor cool down, temporarily attach the reel cable to it. Ensure that there is some tension in the cable line.
 10. Install the cable guides using the small square weld-tabs and jam nuts provided. Adjust the height of each guide so that the cable will run through the center of the guide hole.
 11. Install the cable guides using the small square weld-tabs and jam nuts provided. Double-check the alignment of the cable guides (**eye bolts**) at the end of each boom section to ensure that the cable guides form a straight line from the reel to the boom head.

Continue with the **Pre-Tension** steps ON THE NEXT PAGE.

PRE-TENSION

The reel is fitted with 130 ft of shielded 2-wire cable, which is terminated in a 3-pin connector. The cable **cannot** be shortened to accommodate varying boom lengths.

The following method of pre-tension is recommended:

- a. Fully retract the main boom.
- b. Remove the cable from the anchor at the boom head and release the cable clamp.
- c. Slowly rewind the cable by hand onto the reel. Continue until the distance between the boom head and the connector is approximately 12 ft. (At this point there will be no pre-tension because of the clutch on the reel shaft.)
- d. Pull the cable toward the boom head, threading it through the cable guides until the end of the cable is 3 ft beyond the boom head anchor point.
- e. Secure the cable to the anchor point with 3 to 4 wraps. Ensure that there is sufficient remaining cable to connect to the Anti Two Block switch.
- f. Put the cover back on the extension reel and secure it with the four 1/4-20 truss head screws.
- g. Using the small square weld blocks and cable clamps provided, secure the signal cable every 3 to 4 feet in a path, from the extension reel along the boom and behind the boom pivot, to the meter.

Note: This action will avoid stretching, pinching or abrading the signal cable when the boom is lowered.

MAIN ANTI TWO-BLOCK SWITCH

Refer to Figures 8 and 9 on page 22 for lattice cranes and Figures 6 and 7 on pages 20-21 for hydraulic cranes.

The model number of the Main Anti Two-Block switch determines the method of mounting.

1. Remove the two 1/4 - 20 truss head screws from the switch cover and set the cover aside.
2. Look at the pivoting switch arm:
 - If the arm is cast with the number **10767 and the letters G.L.G.**, use **Method 1** below.
 - If the arm is cast with the number **11826 and the letters G.L.G.**, use **Method 2** below.

METHOD 1

- a. Boom down to zero degrees.
- b. Find and mark a location on the boom head where the switch can be mounted at about a **30 degree angle** to the boom. Ensure that the switch will not interfere with any of the attachments when fitted.

NOTE: The angle is measured from the bottom front edge of the switch.
- c. Remove the back weld plate from the switch; weld the plate to the boom.
- d. After allowing the plate to cool, clean and paint the plate.
- e. Mount the switch to the plate; replace the cover.
- f. Attach the chain and weight assembly to the switch swing arm.

METHOD 2

- a. Boom down to zero degrees.
- b. Locate and mark a site on and parallel to the boom head for mounting the switch.

-
- Ensure that the switch will not interfere with any of the attachments when fitted.
- c. Remove the back weld plate from the switch and weld the plate to the boom.
 - d. After allowing the plate to cool, clean and paint the plate.
 - e. Mount the switch to the plate and replace the cover.
 - f. Attach the chain and weight assembly to the switch swing arm.

JIB ANTI TWO-BLOCK SWITCH

Refer to Figure 3.

Select the appropriate mounting method, as outlined on pages 18-19.

The Jib anti two-block switch is connected to the main anti two-block switch with a cable. In some cases, the jib anti two-block switch (ATB.) will have to be mounted behind the jib sheave.

- a. Connect the jib cable to the jib switch and lace the cable inside the jib where it cannot be pinched or damaged.
- b. Secure the cable every 3 to 4 feet. A small loop will be required to connect the cable to the main switch.

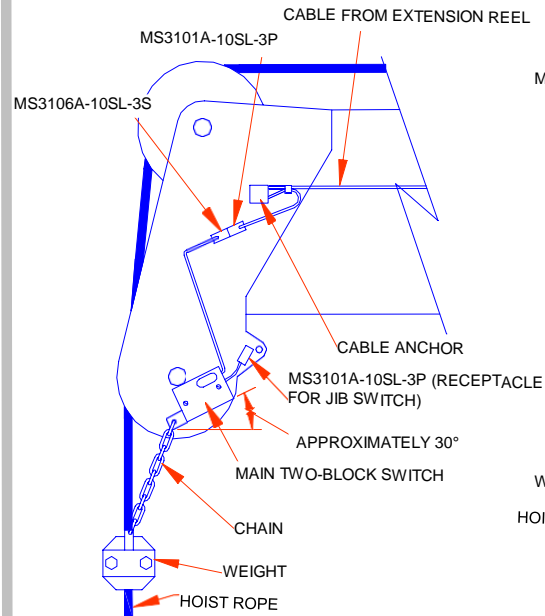
NOTE: Coil the cable when not in use.

ROOSTER/AUXILIARY ANTI TWO-BLOCK SWITCH

The Rooster/Auxiliary Anti Two-Block Switch is installed the same way as the jib switch but in most cases the cable from the switch will be long enough to connect directly to the main Anti Two-Block Switch. Clamp the cable to the boom head to prevent cable damage.

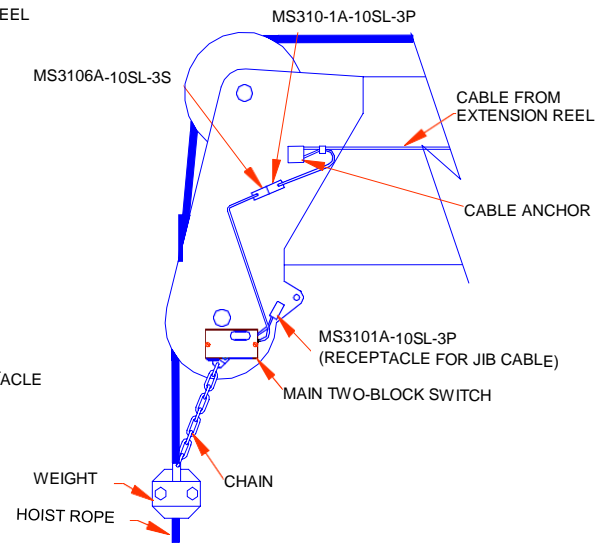
METHOD 1

FOR SWITCHES WITH THE NUMBER 10767 CAST INTO THE SWITCH ARM (G.L.G. WILL ALSO APPEAR CAST IN THE SWITCH ARM).



METHOD 2

FOR SWITCHES WITH THE NUMBER 11826 CAST INTO THE SWITCH ARM



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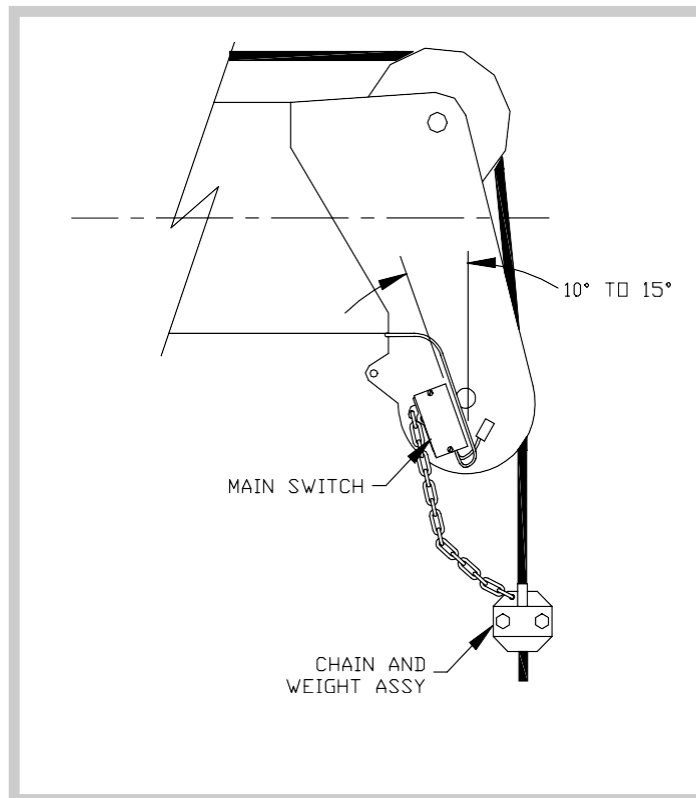
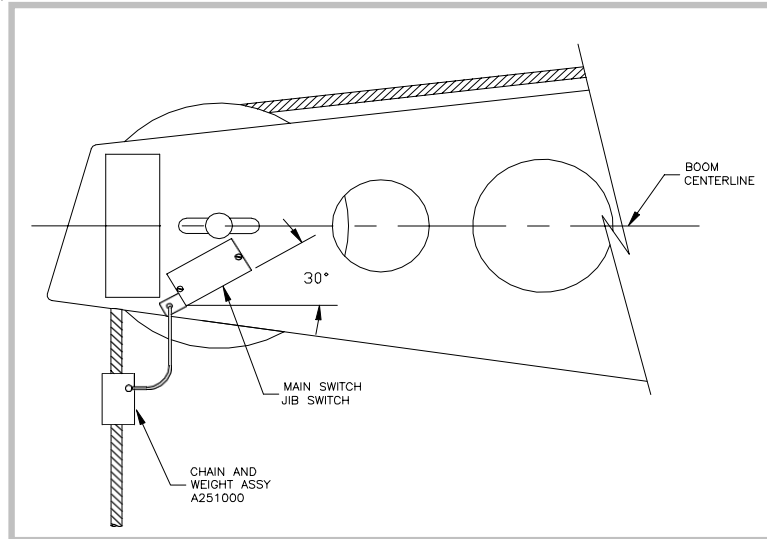


FIGURE 7. MAIN ANTI TWO-BLOCK SWITCH RIGHT HAND MOUNT FOR HYDRAULIC CRANES

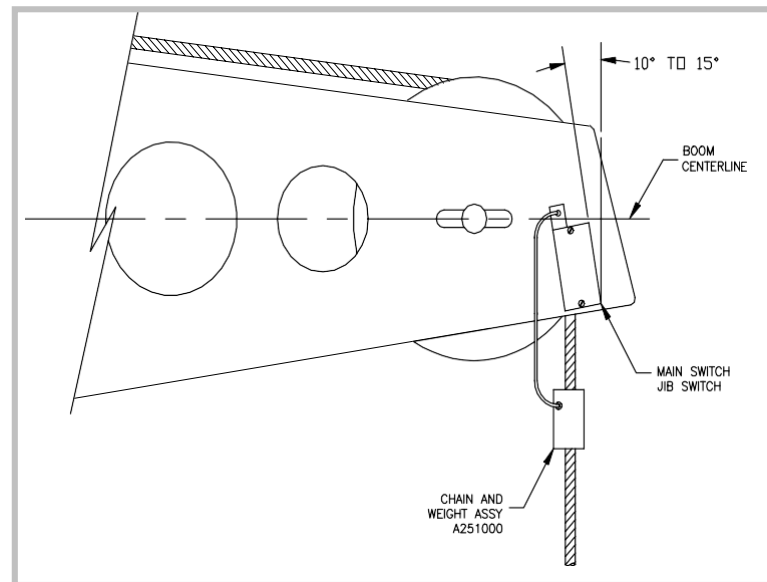
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**FIGURE 8.
MAIN SWITCH -
LEFT HAND
MOUNT FOR
LATTICE
CRANES**



**FIGURE 9.
MAIN SWITCH -
RIGHT HAND
MOUNT FOR
LATTICE
CRANES**



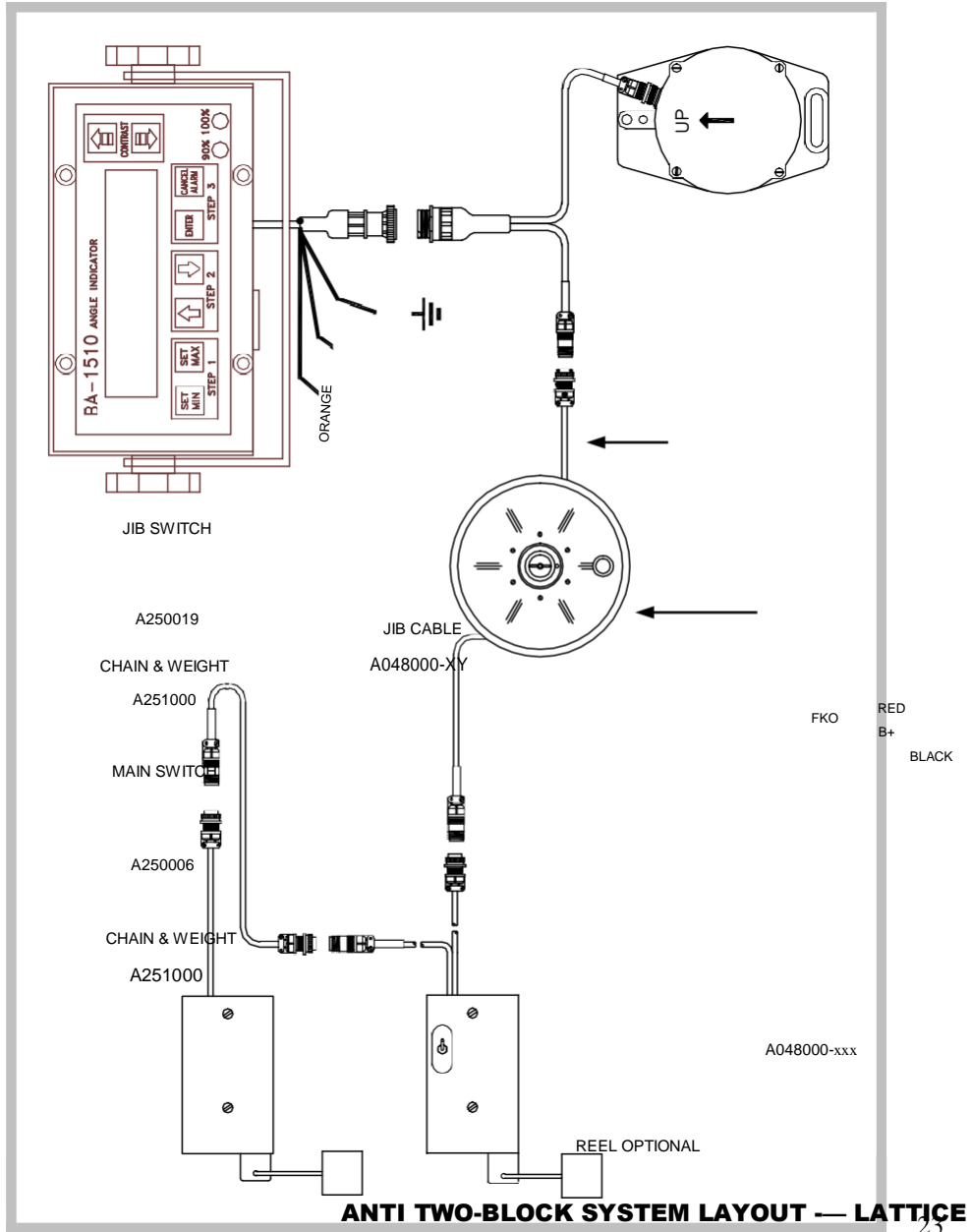
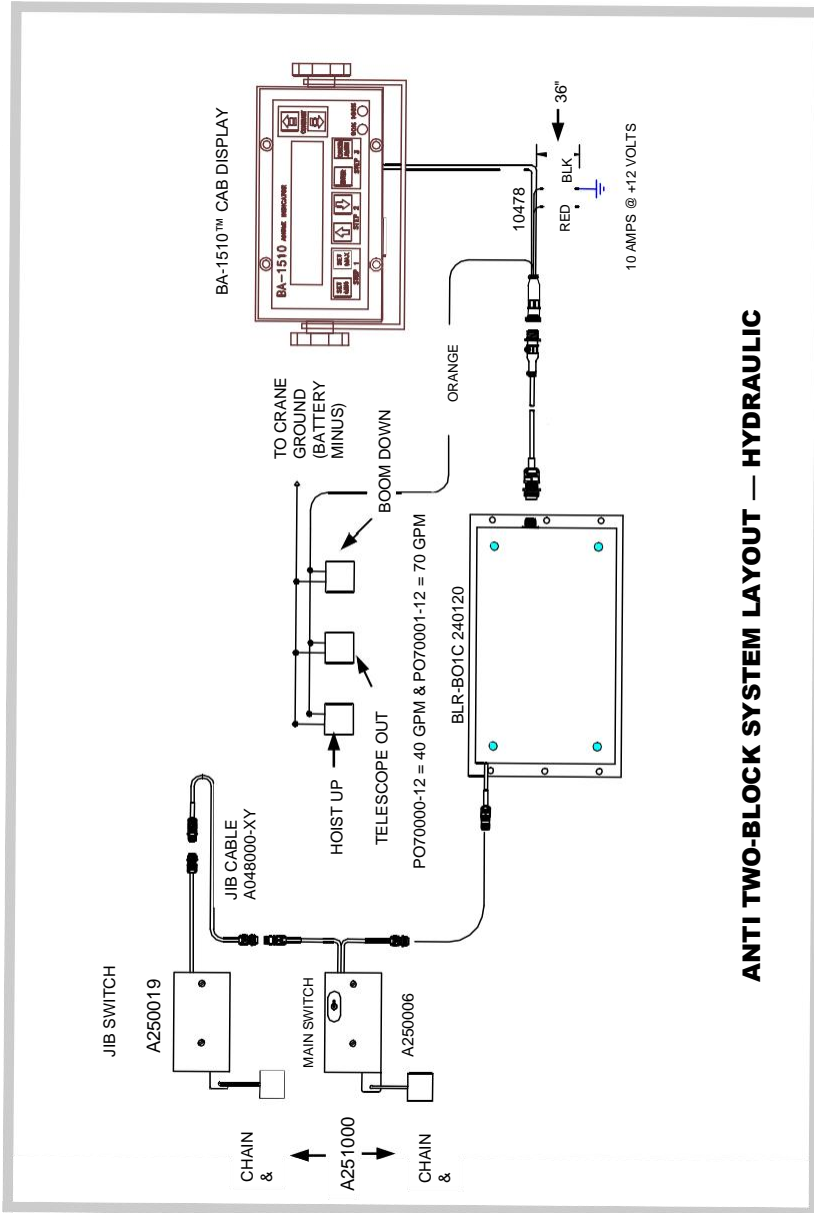


FIGURE 10. SYSTEM LAYOUT FOR LATTICE CRANES



ANTI TWO-BLOCK SYSTEM LAYOUT — HYDRAULIC

FIGURE 11. SYSTEM LAYOUT FOR HYDRAULIC CRANES

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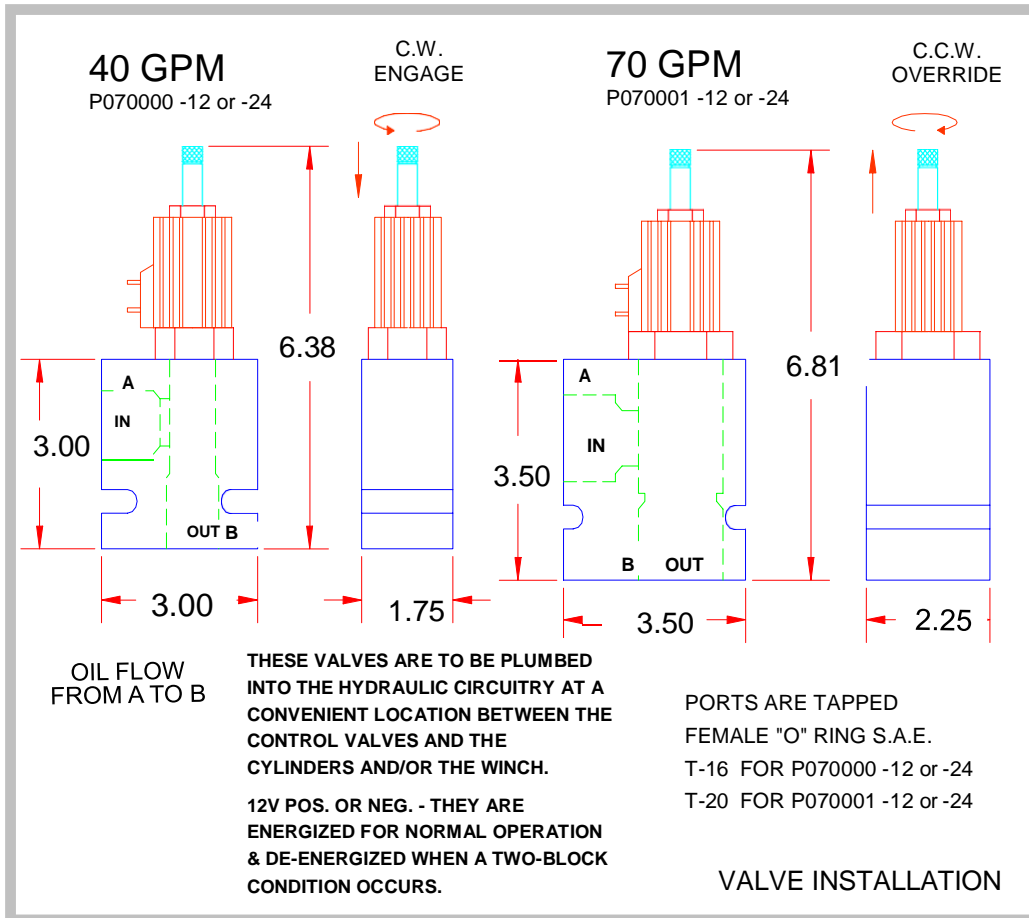


FIGURE 12. MOTION CUT VALVE INSTALLATION

