

**STACKER CRANE
INSTALLATION & MAINTENANCE MANUAL**



TABLE OF CONTENTS

1. Site Preparation.....	4
Prior Delivery	4
At Delivery	5
Figure 1 (Bearing Plate Location).....	5
2. Rail Assembly	6
Figure 2 (Rail & Endstop Installation).....	6
Rail Alignment	6
Rail Levelness	7
Figure 3 (Rail Alignment)	8
Runway Limit Switch Option	9
Limit Switch Ramp Installation	9
Figure 4 (Standard Limit Switch Ramp Installation).....	10
3. Conductor Bar Assembly	11
Figure 5 (Conductor Bar Bracket)	11
Figure 6 (Conductor Bar Hanger Clamp Assembly)	12
Conductor Bar Installation.....	13
Figure 7 (Conductor Bar Installation)	13
Figure 8 (Conductor Bar Splice Details).....	14
Figure 9 (Conductor Bar Splice Cover Installation).....	15
Figure 10 (Power Feed Installation)	16
Figure 11 (End cover Installation)	17
4. Bridge, Trolley and Mast Installation	18
Figure 12 (Bridge & Trolley Components)	18
Double Aisle Bridge Installation	19
Figure 13 (Double Aisle Bridge Installation)	20
Installation Procedure	21
Figure 14 (Collector Post Installation)	21
Figure 15 (Double Collector Post Installation Details - Motorized System)	22
Collector Shoe Installation	22
Mast Assembly Installation	23
Figure 16 (Mast Installation).....	23
Figure 17 (Bolt Tightening Pattern)	24
Figure 18 (Trolley Cut-A-Way)	25
Collector Ring Installation	25
Figure 19 (Trolley Assembly).....	25
Figure 20 (Collector Ring Installation Details)	26
Flood Light Installation.....	27
Toe Guard Adjustment.....	27
Back Stop Installation	27
Chain Bucket Installation	27
Hoist Chain Lubrication.....	27
Figure 21 (Installation of Mast to Trolley)	28
Figure 22 (Fork Installation Details)	29
Fork Installation	29
5. Stacker Test and Operation	30
Checking Hoist Operation	30
Checking For Scuffing or Binding.....	30
Checking for Trolley Motion	31
Checking for Rotation	31
Carriage Safety Stop Device.....	31
Figure 23 (Carriage Safety Stop Details).....	31
Monthly Visual Inspection	32
Physical Test Procedure	32
Dynamic Load Test.....	32
Dynamic Load Test Data Sheet Sample Form	34
6. Trouble Shooting	35
7. Carriage Assembly Adjustments	36
Carriage Safety Stop Adjustments	36
Figure 24 (Safety Stop Adjustment)	36
8. Lubrication	37
9. Overall System View.....	38
Figure 25 (System View).....	38



WARNING: INSTRUCTIONS FOR ASSEMBLY ARE SET FORTH ON THESE PAGES. PROPER ASSEMBLY IS THE RESPONSIBILITY OF THE PURCHASER AND IS NOT COVERED BY ANY WARRANTY OF THE SELLER. BUYER IS CAUTIONED NOT TO SUBSTITUTE PARTS OR HARDWARE. SELLER DISCLAIMS ALL LIABILITY TO ANY SUBSTITUTION OF PARTS OR HARDWARE NOT APPROVED IN WRITING BY SELLER.

INSTALLATION DETAIL DRAWINGS THAT FOLLOW ARE INTENDED AS BASIC GUIDES TO INSTALLATION OF STANDARD COMPONENTS. DEPENDING UPON THE SPECIFICS OF THE SYSTEM, THERE MAY BE LIMITATIONS REGARDING THE USE OF THESE STANDARD COMPONENTS AND/OR A REQUIREMENT FOR SPECIAL INSTALLATION TECHNIQUES.

SITE PREPARATION:

Prior to Delivery

- a.) Racking systems should be assembled only by trained personnel experienced in the proper assembly procedures for installation of racks. Preparation is essential before installation begins. All applicable drawings and instructions must be reviewed and followed. This includes architectural drawings as well as any installation or layout drawings.
- b.) The site preparation should be done prior to receipt of the racking system. The area in which the racking system is to be erected must be clear and free of obstructions. Check to make certain overhead clearance is sufficient to provide for the overall height on the Stack – Storage and Retrieval System as indicated on the general arrangement drawing supplied by Rapistak Corporation.
- c.) The highest elevation point and the lowest elevation point of the floor in the area where the system is to be erected must be determined. This can be done using a laser level (which is recommended) or transit or dumpy level and a measure rod (if no rod is available, a flexible rule taped to a stick or pipe will suffice). The difference between the highest and lowest elevation will determine the thickness of shimming material required to level the system. This information should be transmitted to the sales engineer so that an ample quantity of special shims required may be ordered and shipped from the factory with your system. This will enable you to have your shimming material on hand to immediately start the erection.
- d.) Racking should only be installed on adequate concrete floor. The column base plates and anchorage to the floor slab are based on a 28-day concrete compressive strength (f'c) of 3,000 psi. You should confirm that your concrete floor meets these requirements.
- e.) Every column in the racking system must be properly anchored to the floor. Every column in the system installation should be anchored to the floor with at least two (2) ½ inch diameter expansion anchors that have a minimum embedment of 2-1/2 inches. Some installations require additional or heavier anchorage. Check your installation drawings for details.
- f.) Aisles and area should be kept clean and clear of all materials and debris during installation. Aisles and the area under the racks should be swept clean before any moving vehicles are allowed to operate in the aisles around the racks.
- g.) Racks must be configured according to the drawings provided. Assembling racks into an altered configuration can damage the capacity of the rack structure, which can result in a rack less than adequate for the new configuration. Obtain a qualified engineer's (manufacturer) review before reconfiguring your rack to ensure the safety and adequacy of the new configuration.
- h.) Do not mix parts from different manufacturers with supplied components without a review by a qualified engineer (manufacturer). Mixing parts may result in a

less rigid structure that can decrease rack capacity. Use of supplied parts with parts from different manufacturers will also void any warranty.

At Delivery

- a.) Before assembling your Stack-Storage and Retrieval System, uncrate and unpack the entire system. Separate stacking System components (painted yellow) from the racking components.
- b.) Should any parts be missing notify Rapistak Corporation, Buffalo, NY at 716-822-2804 immediately. When referring to your system, always use the serial number located on the bridge. Rapistak Corporation will not be responsible for any costs associated with installation delays or return trips to complete work due to missing components.
- c.) Should any parts be damaged notify the freight carrier immediately. Rapistak Corporation will not be responsible for any costs associated with installation delays or return trips to complete work due to damaged components caused in shipping.
- d.) Carefully examine the general assembly drawing included, which shows all system components and their relative positions in the system before starting any work. Plus review the field installation manual for installing the stacker crane.

Caution: Do not drop mast on bearing plate edge when removing from crate/truck!

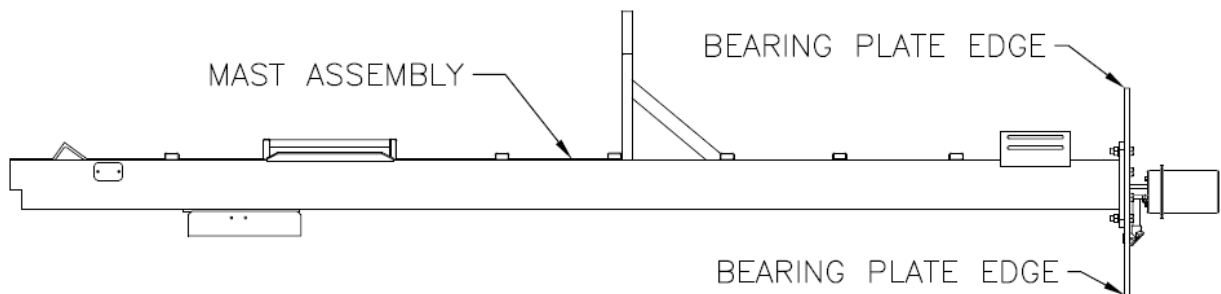


Figure 1 (Bearing Plate location)

RAIL ASSEMBLY:

Raise the rails into position on top of the support structure and bolt the rail to the support structure using the rail clips or “J” bolts (if provided) and the supplied hardware. If the rail section comes with rail splice kits, you will be required to splice the rail together as shown in (Figure 1). **Note: Use the general arrangement drawing to assemble and locate the rail sections.**

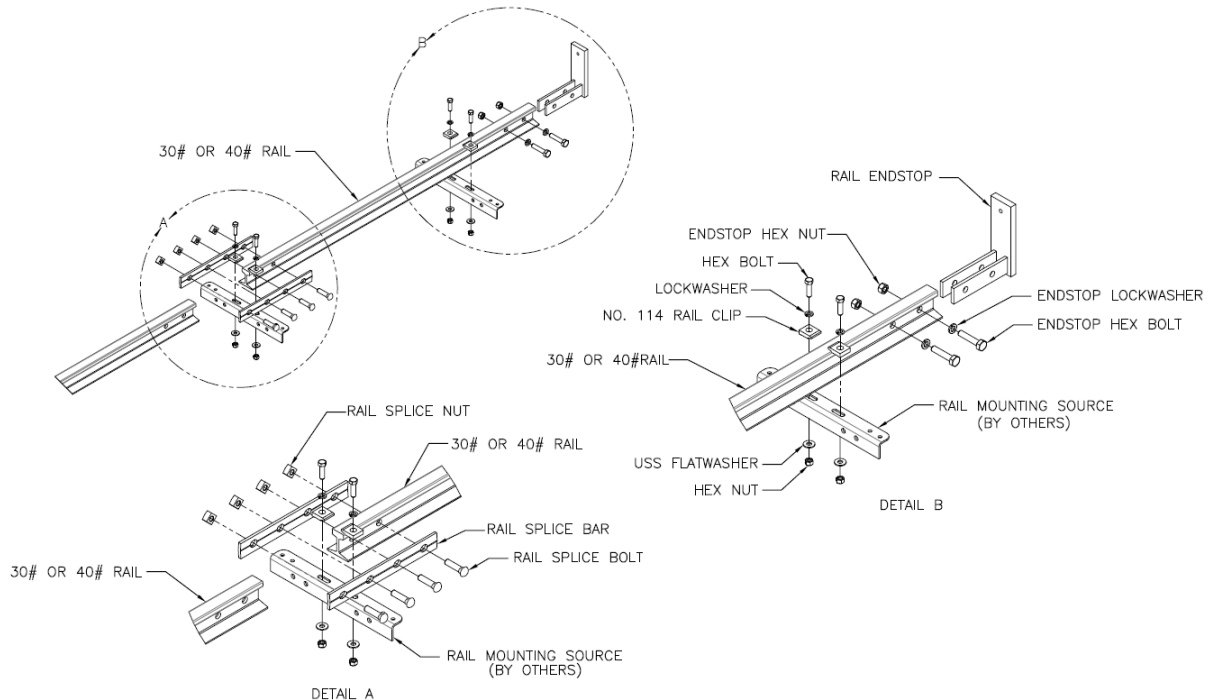


Figure 2 (Rail & Endstop Installation)

Rail Alignment

The crane rails must be aligned to each other to ensure the proper operation of the Stacker System. Using a string line, tightly stretch the string line 3” away from the inside edge of the railhead. At the end of the rail, measure the distance from the string line to the inside edge of the railhead. Walk along the length of the rail at about 3’-0” intervals and check the distance from the string line to the inside edge of the railhead. If the reading does not match the first reading, move the rail the necessary distance to position it in a straight line and anchor the rail in place. After aligning one rail use a metal tape measure to measure the distance between the two rails, at one end, by placing the zero end of the tape measure on the outside edge of the aligned rail head and measuring the distance across to the inside edge of the opposite rail head. **Note: Use the general arrangement drawing to locate the proper distance between rails.** Move to the opposite end of the rails and check the distance between the two

rails. This reading should be the same as the opposite end. Using a string line, tightly stretch the string line 3" away from the inside edge of the railhead. At the end of the rail, measure the distance from the string line to the inside edge of the railhead. Walk along the length of the rail and at each rail clip check the distance from the string line to the inside edge of the railhead. If the reading does not match the first reading, move the rail the necessary distance to position it in a straight line and anchor the rail in place. See (Figure 3) for rail alignment tolerances.

Rail Levelness

After the rail sections are properly aligned, you must be sure to level the rails to each other. This will ensure the proper operation of the Stacker System. Using a sight level, hook a tape measure to the bottom flange of the rail at one end of the system. Using the distance recorded as a datum, walk along the rail section and take a measurement at every column point. If the reading does not match the datum, level the rail the necessary distance to position it in a level line by shimming the rack or runway beam. Without moving the sight level, shoot across to the opposite end of the opposite rail and level the rail to match the datum. Relocate the sight level and level the opposite rail in the same manner as mentioned above. See (Figure 3) for rail levelness tolerances.

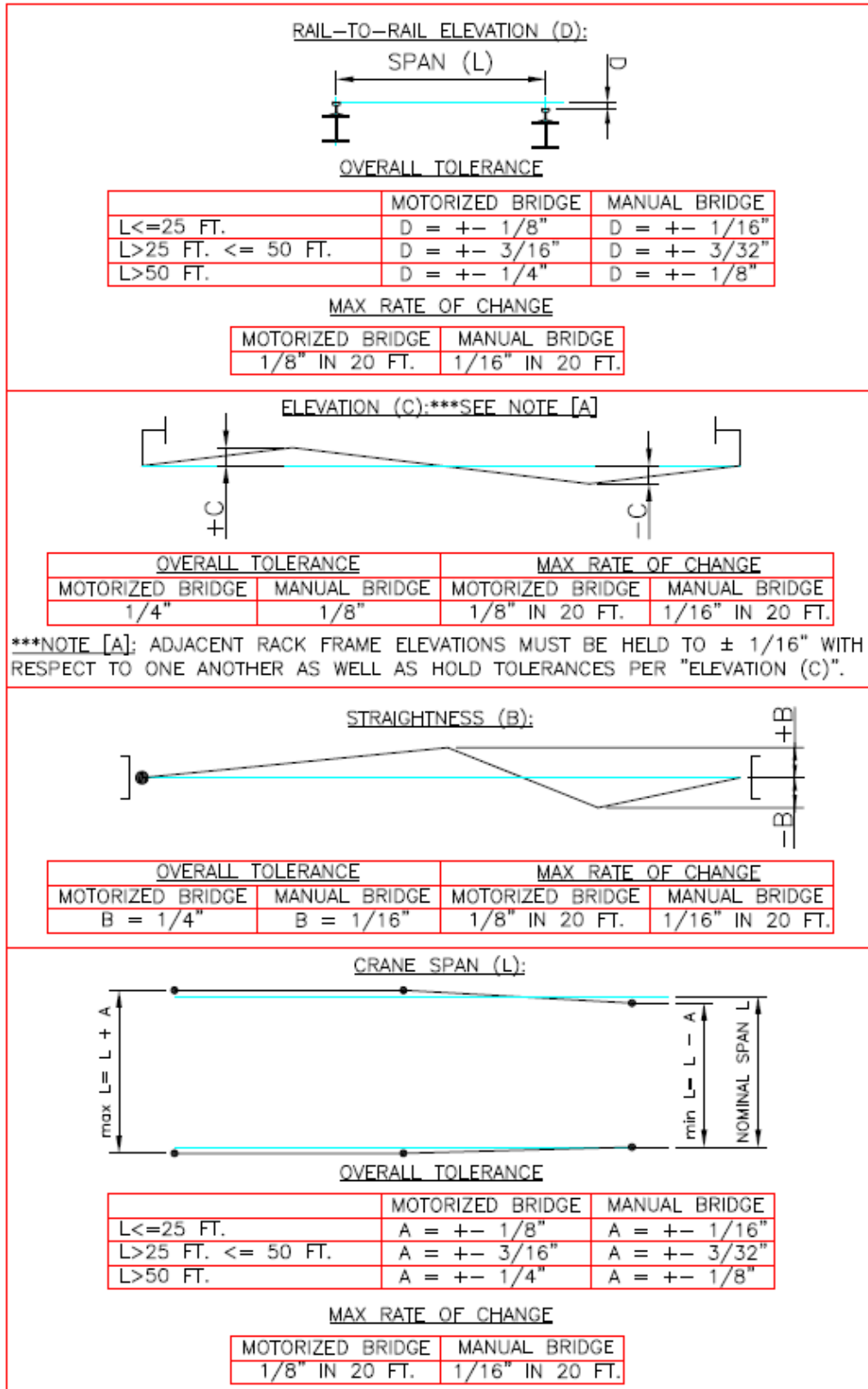


Figure 3 (Rail Alignment)

RUNWAY LIMIT SWITCH OPTION:

Limit Switch Ramp Installation (For Runway Limit Switch Option)

Use supplied hardware to attach the Limit switch ramps on the runway. Insure that the ramps are installed on the same side of the Bridge runway as the bridge mounted limit switch. See (Figure 4) for details. Please note that some systems may have a non-standard limit switch ramp or orientation. These systems will have a drawing included in the installation packet to show proper placement.

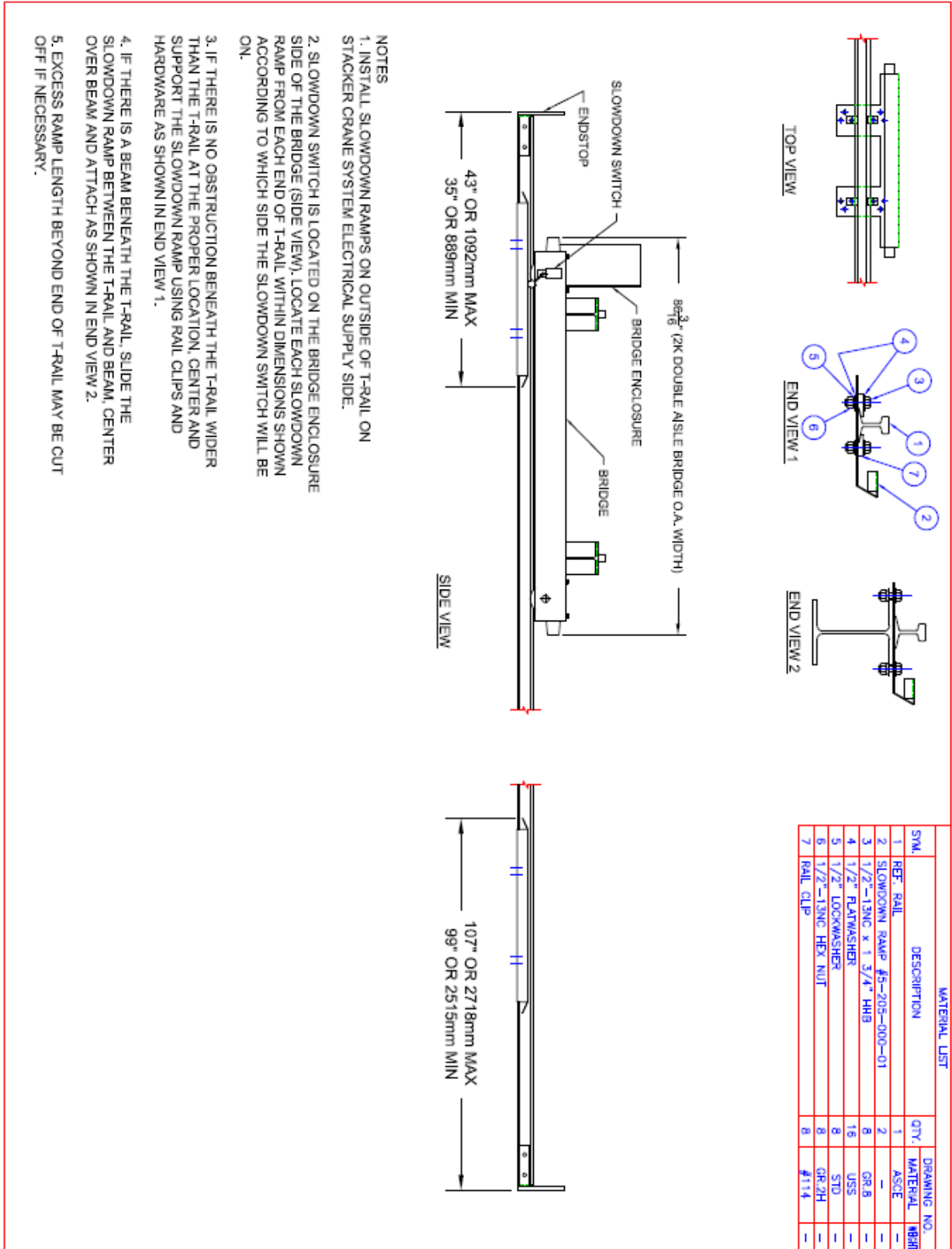


Figure 4 (Standard Limit Switch Ramp Installation)

CONDUCTOR BAR ASSEMBLY:

Caution: Insure the conductor bars are not connected to live power cables!! The conductor bar installation must be completed and the stacker system installation finished before power is applied to the conductor bars and the system.

The conductor bar assembly will be installed along the side of one rail section as shown in (Figure 5). Mount the conductor bar mounting brackets to the support structure using the supplied hardware. The conductor bar mounting brackets should not be mounted more that 4'-0" apart on center and 9 1/2" from the center line of the rail head to the front of the mounting bracket. Install quad hanger clamps as shown in (Figure 6) on each conductor bar mounting bracket.

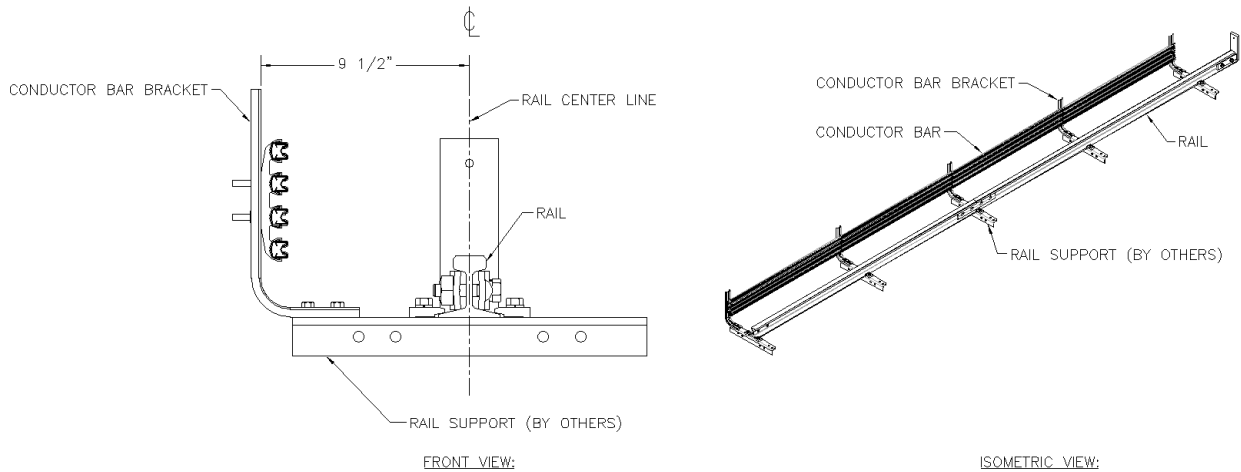


Figure 5 (Conductor Bar Bracket)

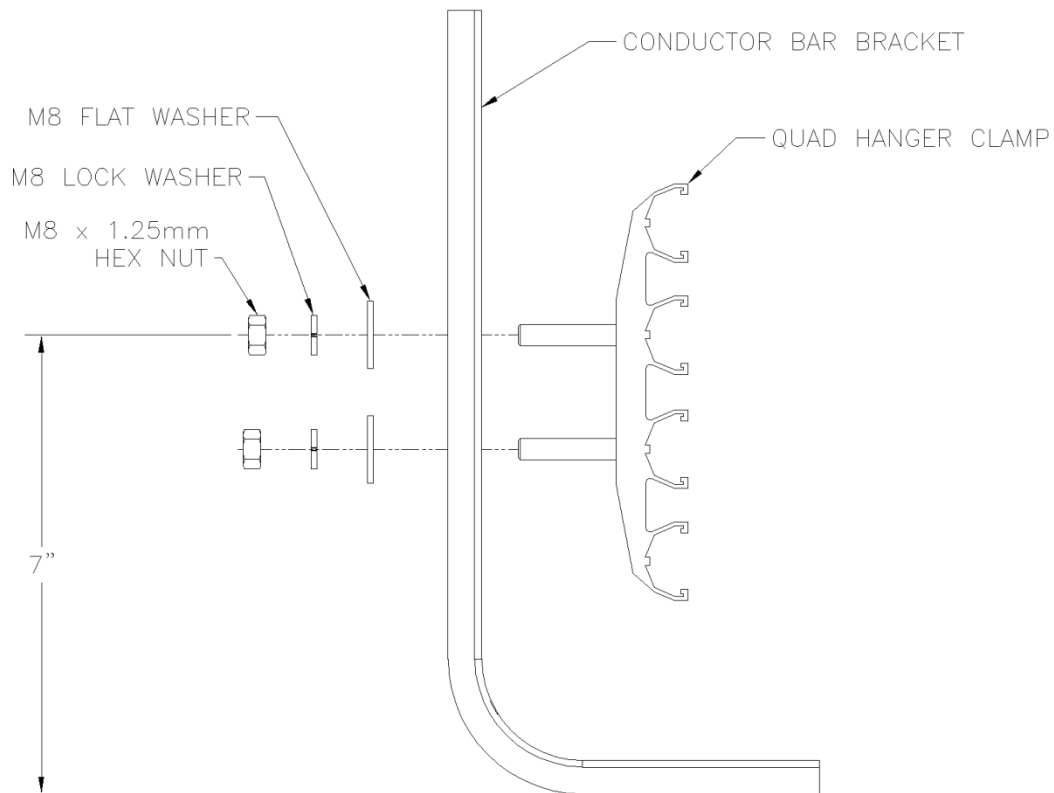


Figure 6 (Conductor Bar Hanger Clamp Assembly)

TOOLS REQUIRED: 13mm A/F wrench

1. Remove nuts, lock washers, and flat washers from quad hanger assembly.
(The M8 bolt will stay in place inside the molding.)
2. Assemble as shown in the diagram ensuring the correct alignment is observed.
3. Finger tighten the M8 nuts.
4. Snap conductor bars into hangers
5. Tighten M8 nuts to recommended torque of 8 Nm (5-6 ft-lbs.)

Conductor Bar Installation

Install the conductor bars by snapping them into the plastic snap-in hangers. Bolt additional conductor bars on if necessary at each splice point. Cover all splices with joint covers. See the general arrangement drawing for more information. **Note:** Splice joints should be not less than 6" nor more than 12" from the conductor bar bracket. Do not allow the conductor bar to extend past the end of the runway rail.

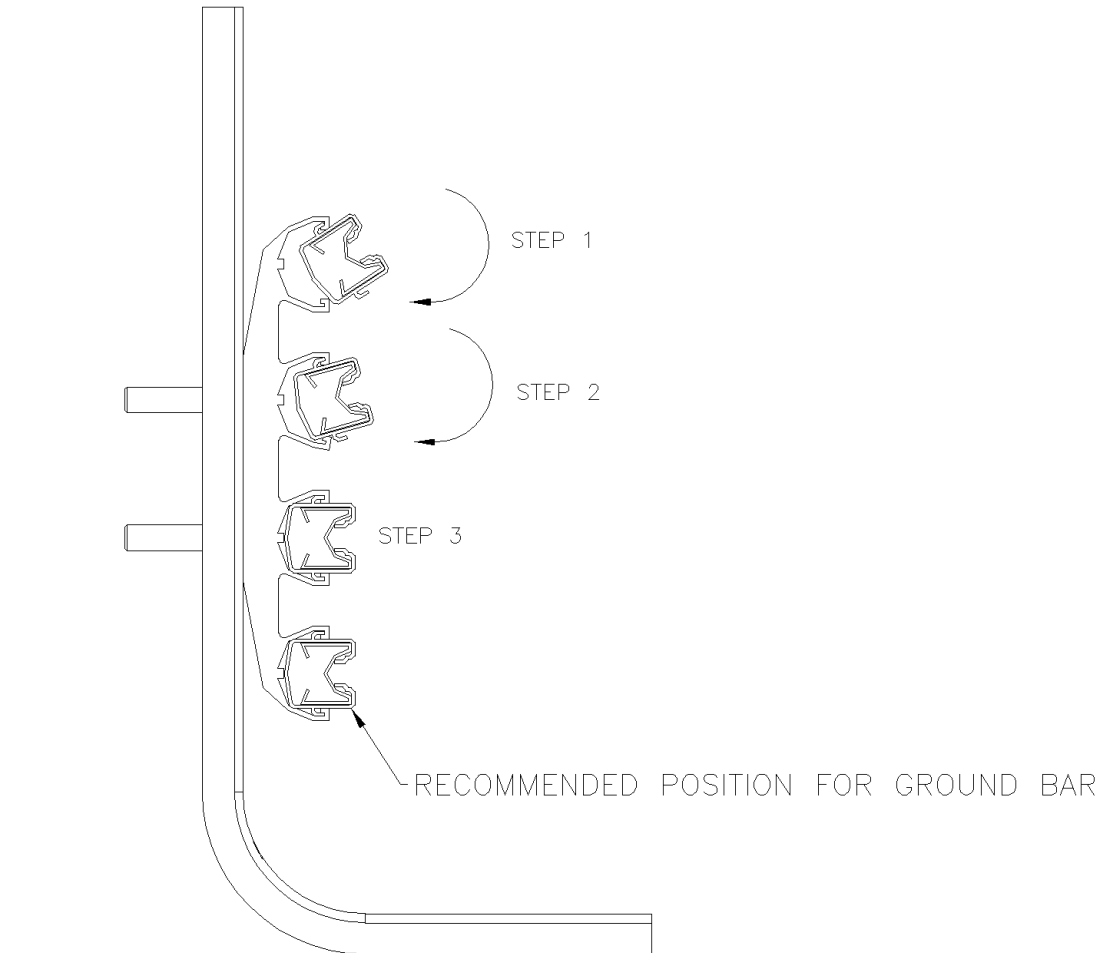


Figure 7 (Conductor Bar Installation)

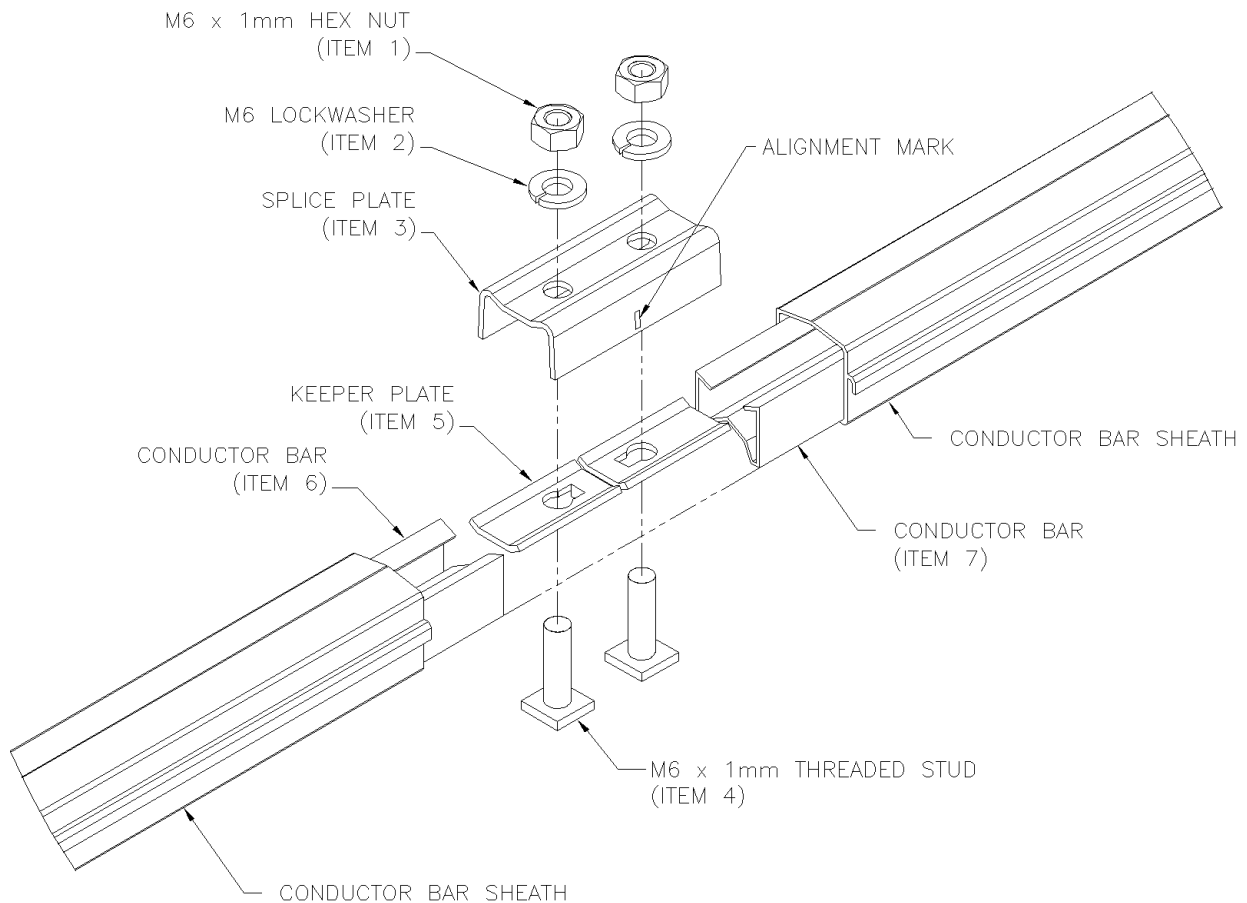


Figure 8 (Conductor Bar Splice Details)

TOOLS REQUIRED: 10mm A/F open ended wrench

1. Fit item 4 into item 5. (Ensure tab captivates the head on the setscrew.)
2. Slide item 4 and item 5 into item 6 and 7 respectively.
3. Place item 3 over item 4, making sure alignment mark is in line with end faces of conductor bar.
4. Fit items 2 and 1 in the order shown.
5. Tighten item 1 to recommended torque of 8 Nm (5-6 ft-lbs.)
6. Check that both faces of the conductor bar are touching each other and there is no gap exceeding 0.5mm (0.02") at the faces.
7. NOTE: if the conductor was field cut, file off all burrs on conductor ends before assembling splices.

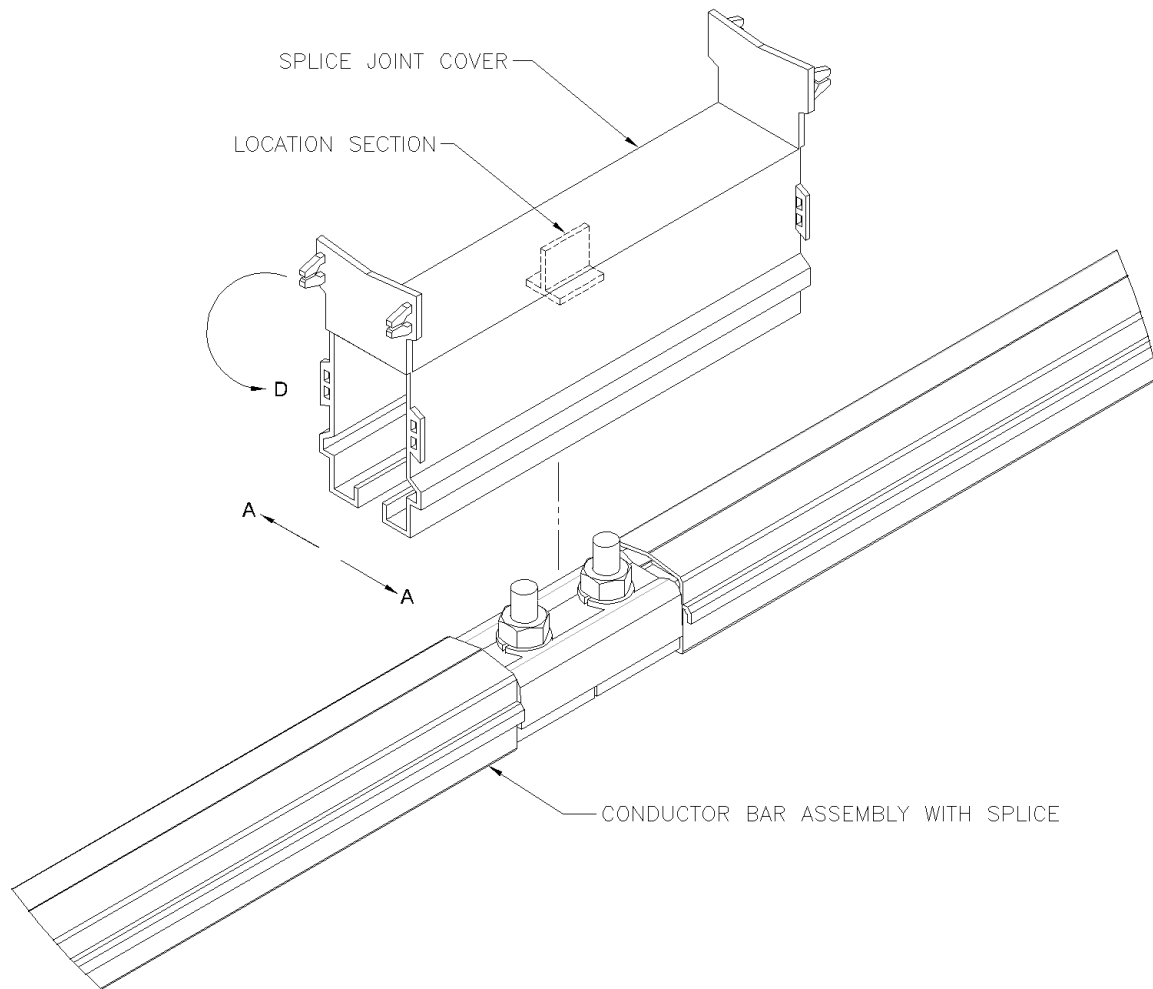


Figure 9 (Conductor Bar Splice Cover Installation)

1. Spring legs out in the directions "A-A" as shown. (This is to ease the fitting of the joint cover over the conductor bar.)
2. Fit the joint cover over the bolted joint. Joint cover **MUST NOT** be opened up more than 45° on either side during the assembly over the joint. Ensure the "Location Section" sits between the two bolts.
3. Close the flaps in the direction "D". Ensure the flaps "click" home on both sides.

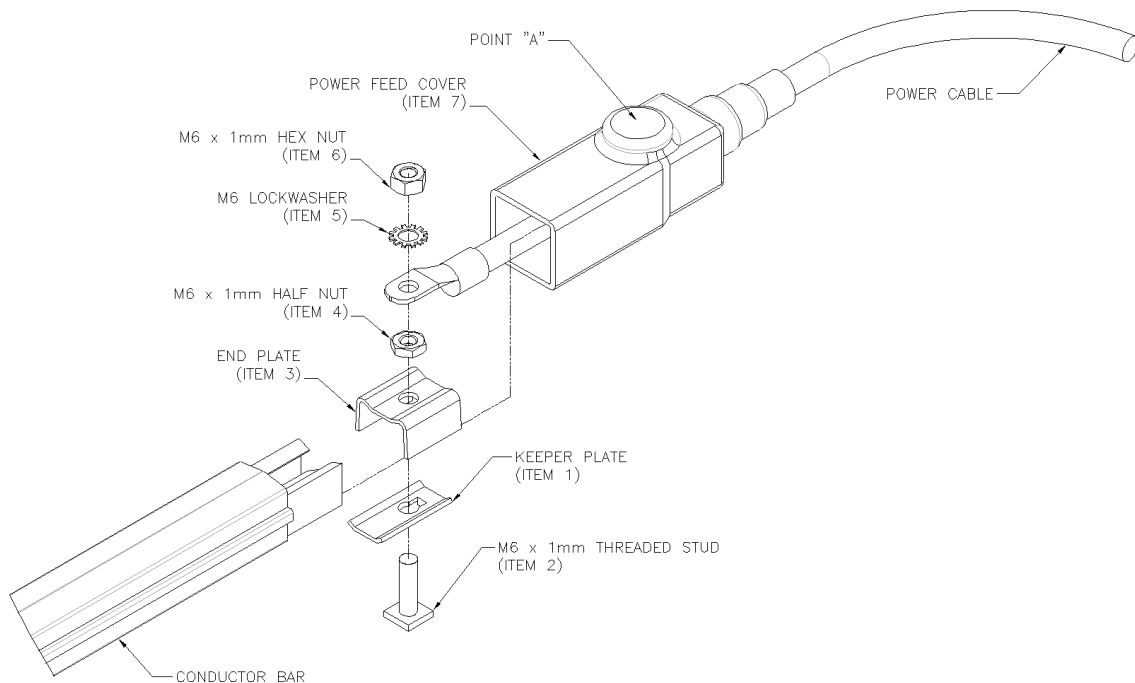


Figure 10 (Power Feed Installation)

TOOLS REQUIRED: 10mm A/F wrench, suitable sharp knife cable stripper, cable crimping tool, suitable cable terminal.

1. Cut item 7 to suit cable diameter.
2. Pass cable through item 7.
3. Crimp terminal to cable.
4. Fit item 2 into item 1. Note: tab to face downward
5. Fit assembly into conductor bar.
6. Fit item 3 over items 1 & 2. Secure with half nut (item 4). Tighten item 4 to recommended torque value of 10 Nm (7-8 ft-lbs).
7. Fit terminal and secure items 5 & 6.
8. Tighten item 6 to recommended torque of 8 Nm (5-6 ft-lbs).
9. Push item 7 over assembly. (Ensure item 2 is located at point "A" on item 7).

Note: The bottom conductor bar should be marked as the ground bar.

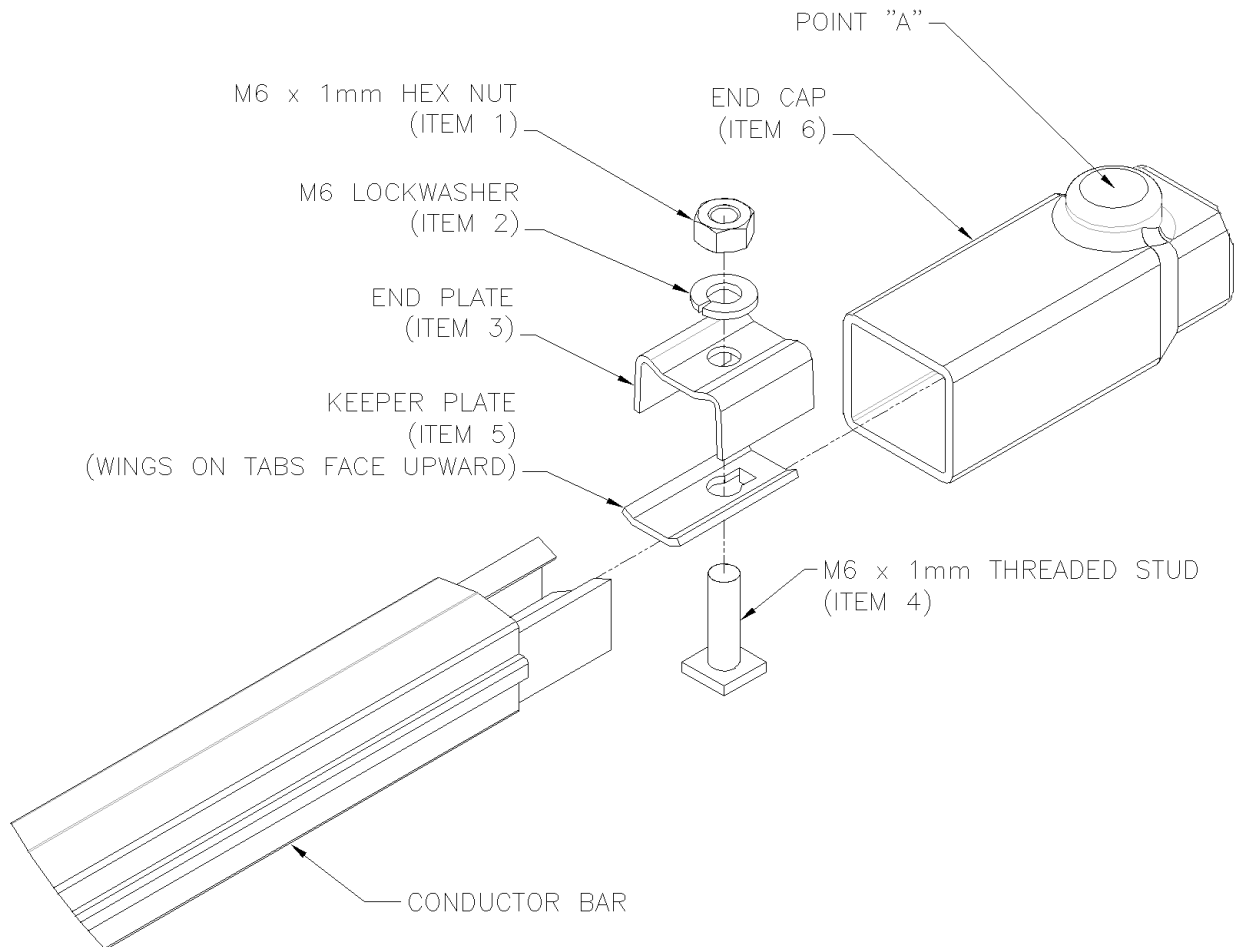


Figure 11 (End Cover Installation)

TOOLS REQUIRED: 10mm A/F open ended wrench

1. Place item 4 into item 5 so that the head of the set screw is captivated within the tab of the stainless steel washer.
2. Place assembly (items 4&5) into the conductor bar.
3. Place items 3, 2 & 1 over items 4 & 5. (Ensure item 3 is flush with conductor bar face.)
4. Tighten item 1 to a recommended torque of 8 Nm (5-6 ft-lbs).
5. Push item 6 over assembly. (Ensure item 4 is located at point "A" on item 6.

Caution: After the conductor bar is installed make sure the disconnect is off, locked out and properly tagged before installing the Stacker Crane!!

BRIDGE, TROLLEY AND MAST INSTALLATION:

CAUTION: Serious injury and damage can result from attempting to lift the Bridge Assembly without first blocking the Trolley Assembly. The Trolley Assembly is blocked to the Bridge Assembly when shipped. Before installing the Bridge Assembly remove the Mast Assembly and **DO NOT** unblock the Trolley Assembly. The Trolley Assembly must be balanced on the Bridge Assembly before lifting. Caution must be taken when removing the Mast Assembly so as not to damage the Collector Ring Assembly.

UNDER NO CIRCUMSTANCES SHOULD YOU ATTEMPT TO LIFT THE BRIDGE ASSEMBLY WITHOUT FIRST BLOCKING THE TROLLEY ASSEMBLY. SERIOUS INJURY AND DAMAGE CAN OCCUR!!!!

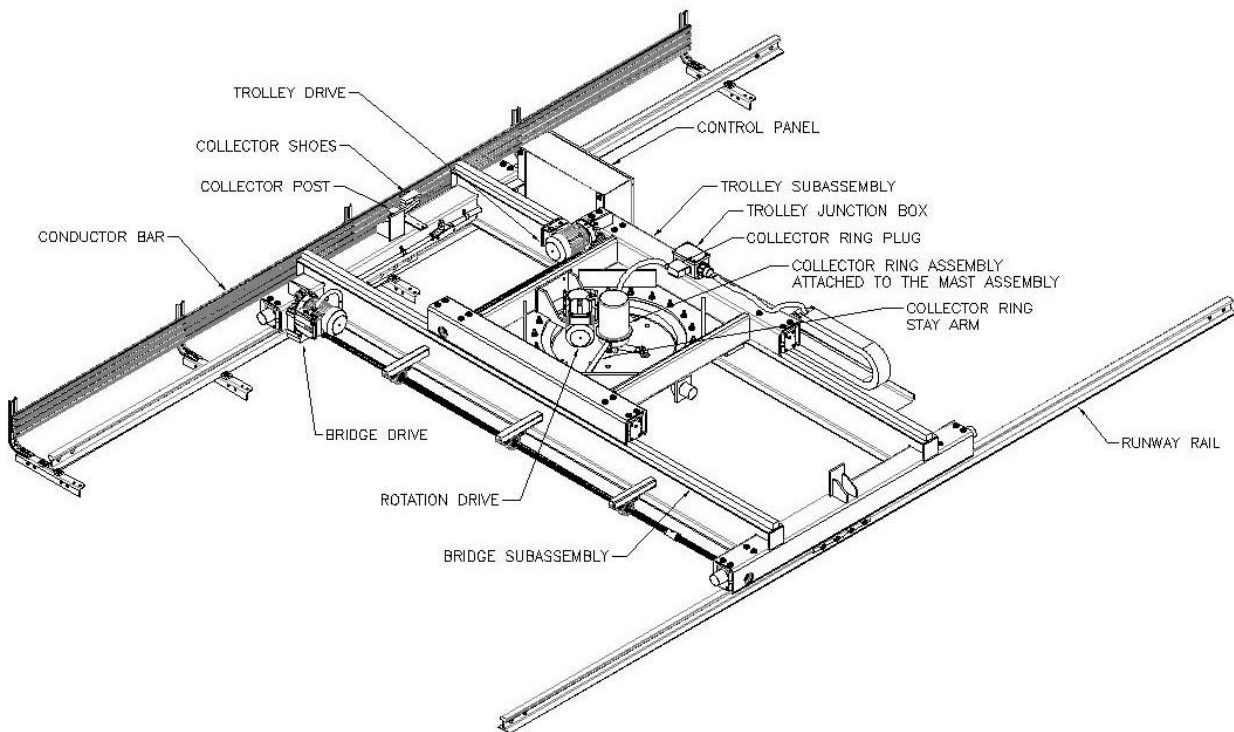


Figure 12 (Bridge & Trolley Components)



Double Aisle Bridge Installation

For bridges with a span equal to or greater than 25 feet, the bridge has a bolted connection to the endtrucks. Before installing the bridge on the runway, these endtrucks must be bolted on to the bridge beams. Use the included hardware to bolt the bridge beams on to the endtrucks. Please note that the beams and endtrucks are match marked to insure they are installed properly. After bolting the endtrucks to the bridge beams, connect the bridge motors to the electrical plugs from the bridge enclosure. Connect the trolley junction box to the electrical plug from the bridge cable tray. Finally, route the power cable from the bridge enclosure to the collector post and connect to the collector shoes.

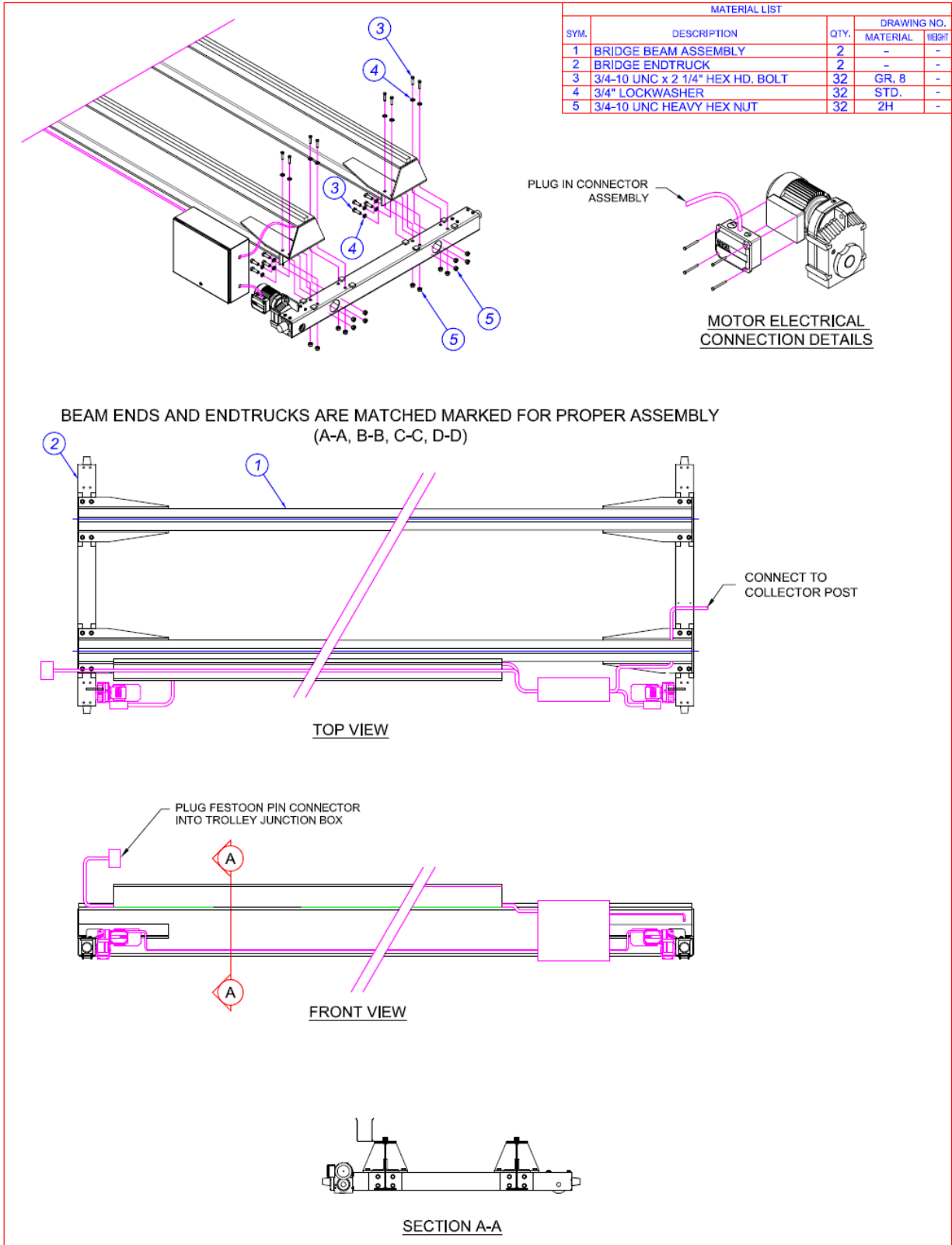


Figure 13 (Double Aisle Bridge Installation)

Installation Procedure

Install the collector post to the bridge assembly using the included hardware. Position the Bridge Assembly so that the Collector Post is adjacent to the Conductor Bar side of the system. Lift the Bridge Assembly and set the crane on the rails as shown in (Figure 14).

Remove the factory installed blocks from the Trolley Assembly. If the Bridge motion is hand propelled check for free travel motion along the entire length of the rails. The double flanged wheels must run freely along the rails without scuffing or binding on the sides of the rails. If any scuffing or binding should **occur, see Rail Alignment.**

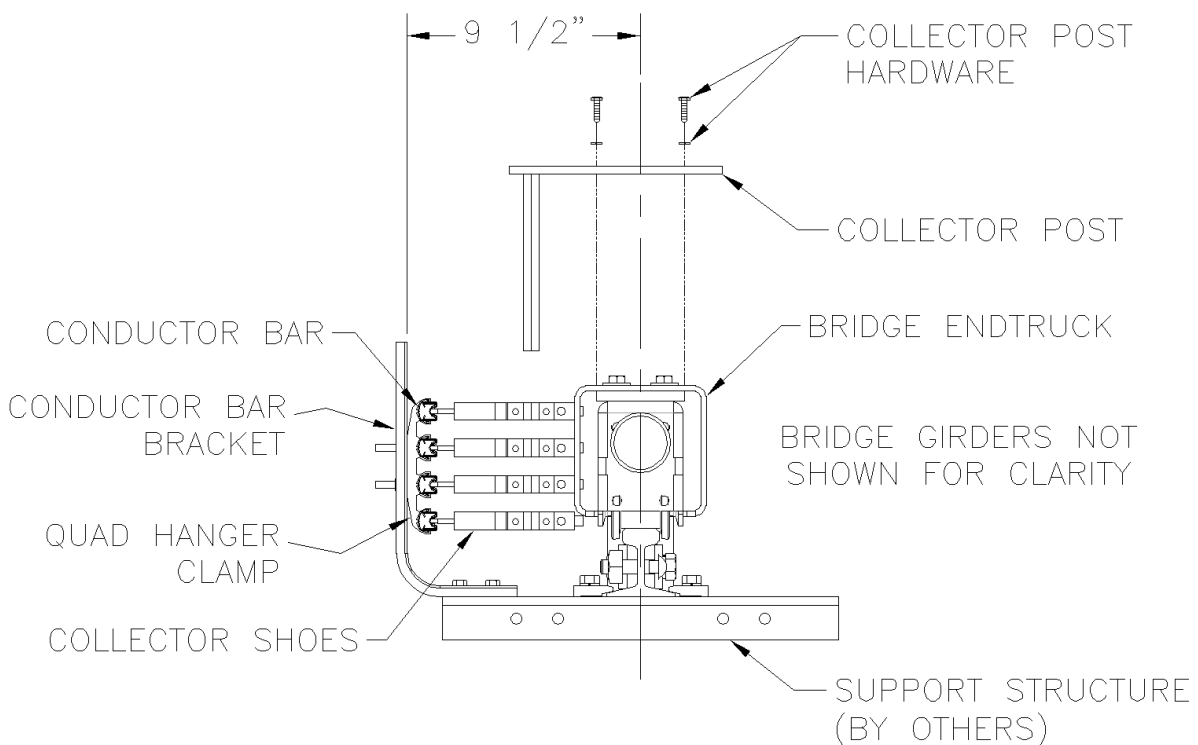


Figure 14 (Collector Post Installation)

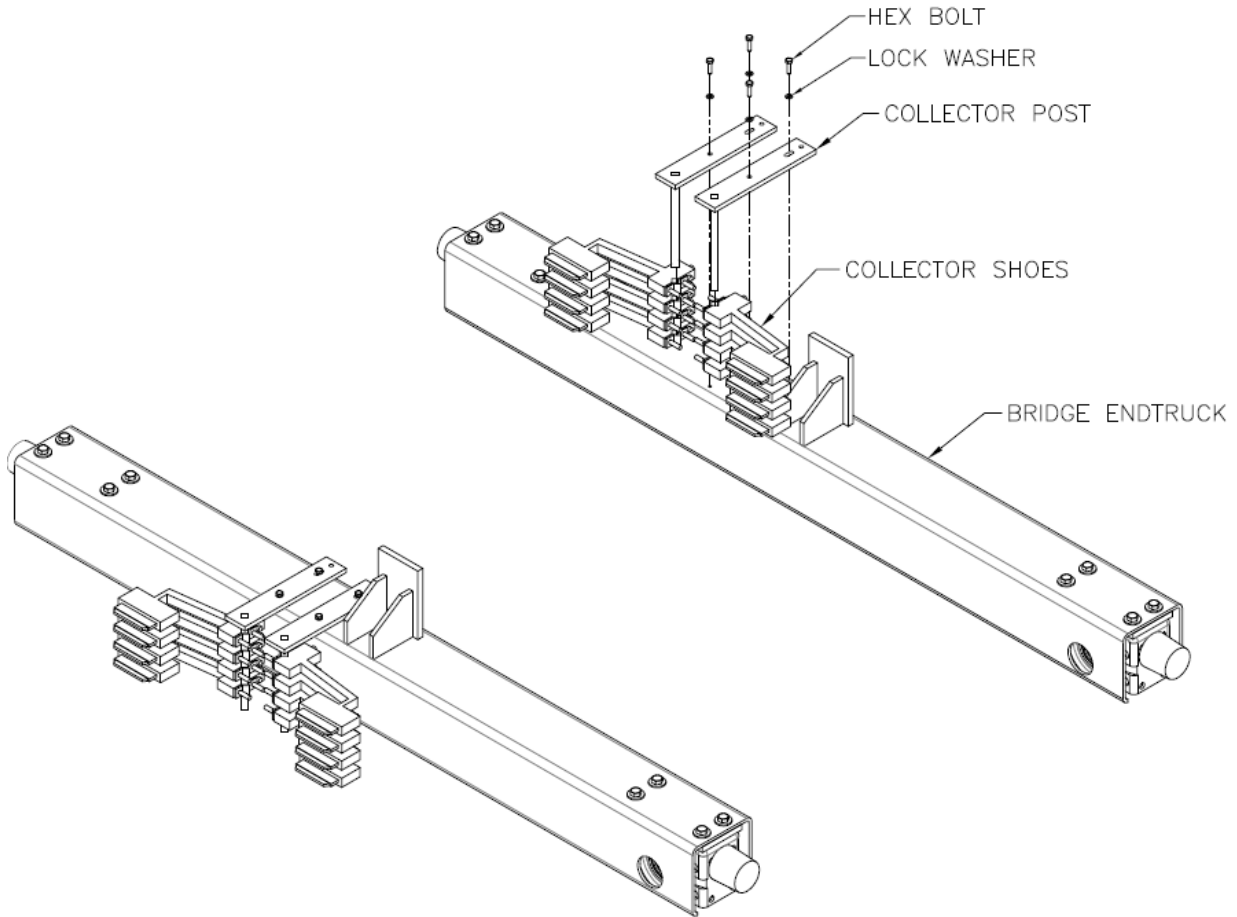


Figure 15 (Double Collector Post Installation Details-Motorized Systems)

Collector Shoe Installation

Locate the Collector Shoe Assemblies, supplied, and slide the rectangular opening over the Collector Post. Tighten up the locking screw and align the Collector Shoe in the Conductor Bar. See (Figures 14 & 15) for proper installation. On manual systems, there is only one Collector Post and four collector shoes. On Motorized systems, there are two Collector Posts and eight collector shoes. **Note: The bottom conductor bar should be marked as the ground bar during installation.**

Mast Assembly Installation

CAUTION: Make sure the Collector Ring, located at the top of the Mast Assembly, is not damaged during the Mast Assembly Installation.

Insure the bottom of the mast is resting on padding or other protective material to prevent it from scraping on the floor as it is raised into position.

Before bolting the Mast to the Trolley, clean the mating surfaces of dirt, debris, and paint. Remove any nicks or burrs from the bottom of the Trolley Plate and from the flange of the Rotation Bearing. Slowly begin raising the Mast Assembly into place taking care not to damage the Collector Ring Assembly on the top of the Mast Bearing Plate. Steady the Mast Assembly as it is lifted off the floor. Using a drift pin, align the holes in the Bearing to the holes in the mast head plate. Fasten the Mast Assembly to the Trolley Assembly using the supplied hardware. Hand tighten the fasters in place then torque the bolts to 92 ft-lbs. using an alternating star sequence. See (Figure 17) for an diagram of the bolt tightening sequence. See (Figure 18) below for bolt assembly.

CAUTION: Before rotation of the Mast Assembly can occur the Collector Ring Stay Arm must be installed or serious damage will result!!

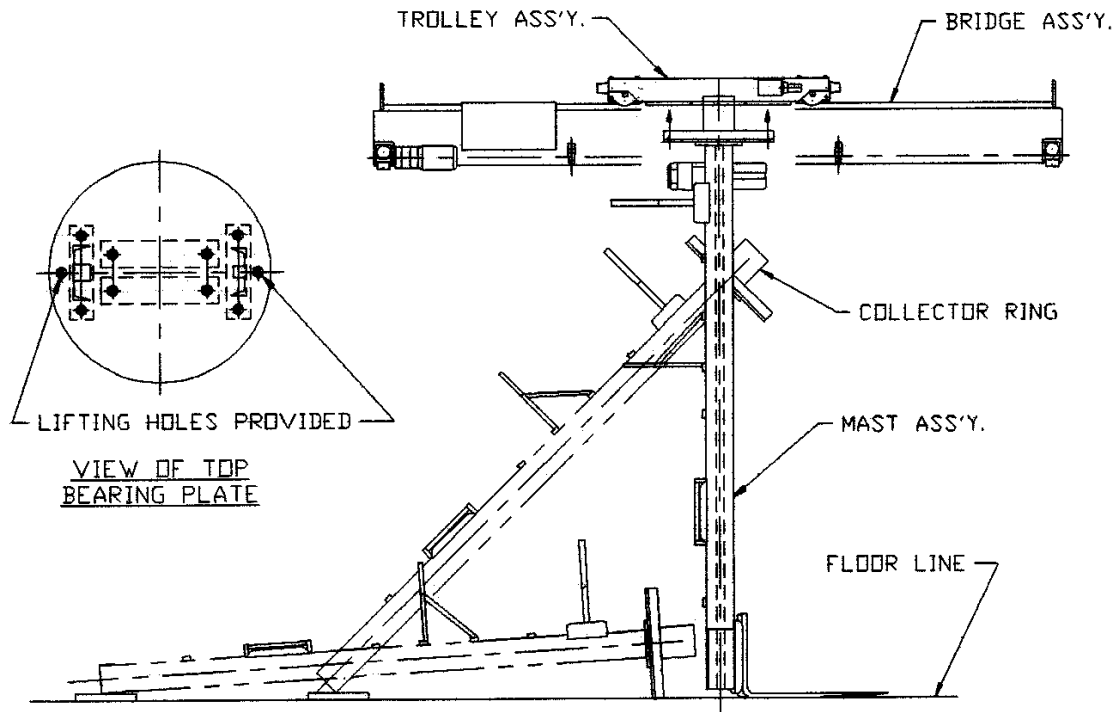


Figure 16 (Mast Installation)

TORQUE BOLTS
TO 92 FT-LBS.

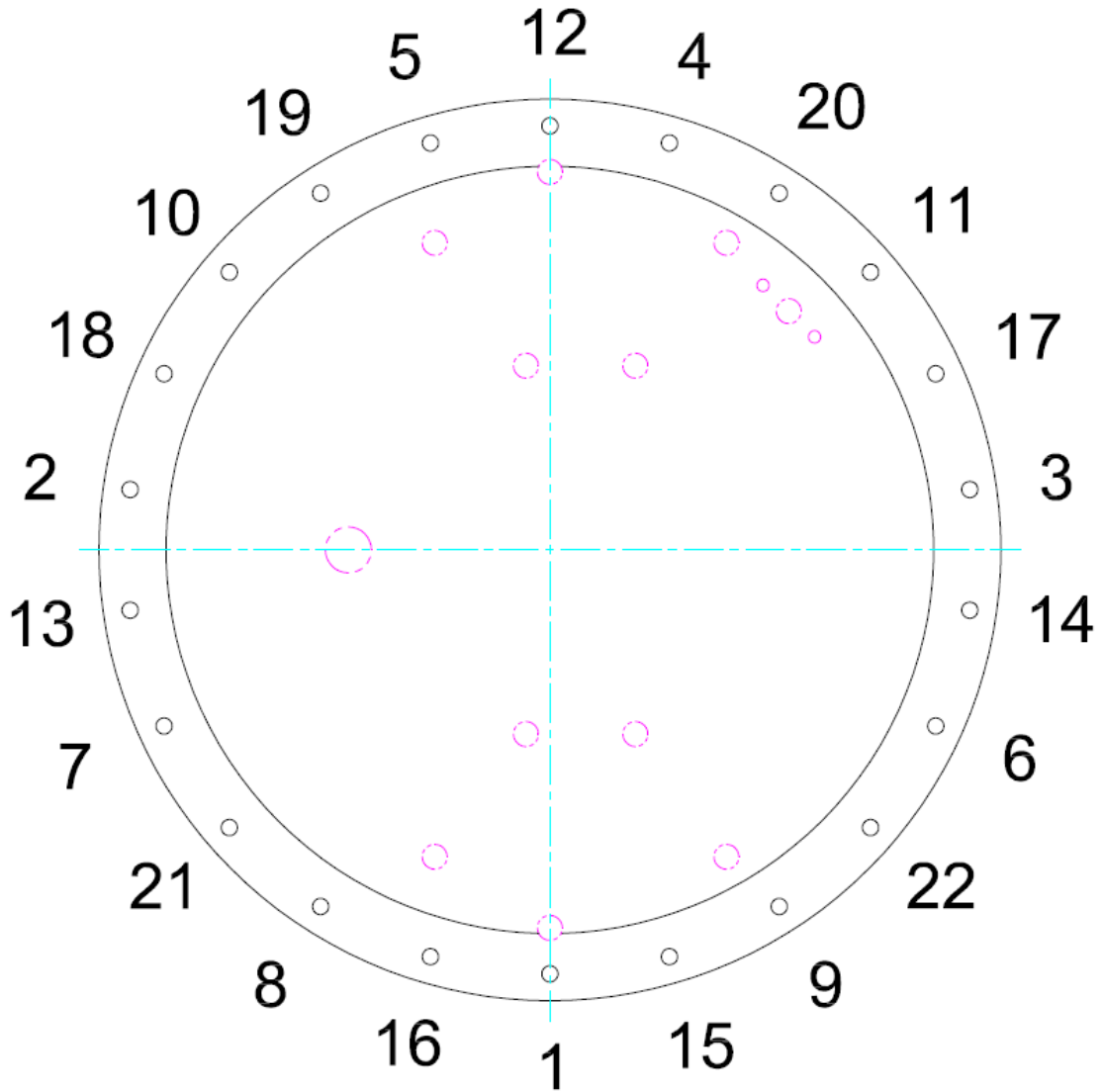


Figure 17 (Bolt Tightening Pattern)

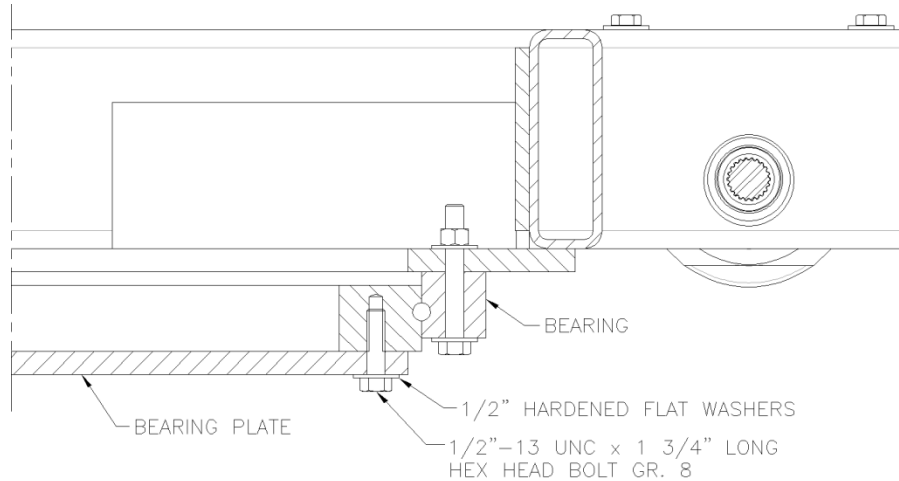


Figure 18 (Trolley Cut-A-Way View)

Collector Ring Installation

Note: The Collector Ring Set Screws may have worked themselves loose during shipment and should be checked before operating the Stacker Crane.

The Collector Ring is mounted to the top of the Mast Assembly as shown in (Figure 20). Before installation of the Collector Ring is complete, the Collector Ring Set Screws **MUST** be checked so as to prevent damage to the unit. Begin by removing the set screw plug located on the side and near the bottom of the collector ring. Rotate the collector ring so that the set screw access hole is lined up with a set screw. Place an Allen wrench through the access hole and into the set screw. Verify that the screw is tight to the collector post, then rotate the collector ring so that it lines up with the second set screw and repeat the procedure.

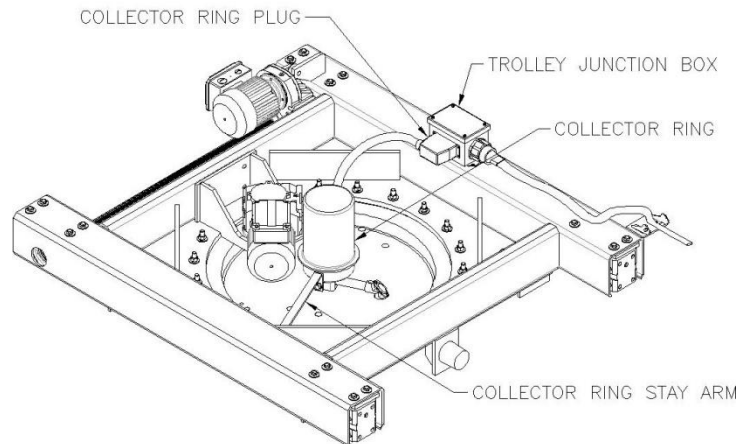


Figure 19 (Trolley Assembly)

Before the Stacker Mast is rotated, the Collector Ring Stay Arm must be installed. To install the Collector Stay Arm, place the long end of the stay arm through the ring stop located on the trolley base plate. Rotate the collector ring so it lines up with the flange of the stay arm and bolt in place with included hardware. **Note: The Collector Ring Stay Arm fits loose in the pipe ring, this is to allow for some misalignment.**

Once you have installed the Collector Ring Stay Arm, you can now plug the Collector Ring Plug into the Junction Box located on the side of the Trolley Assembly. After making the connection, lock down the plug cap (Figure 19).

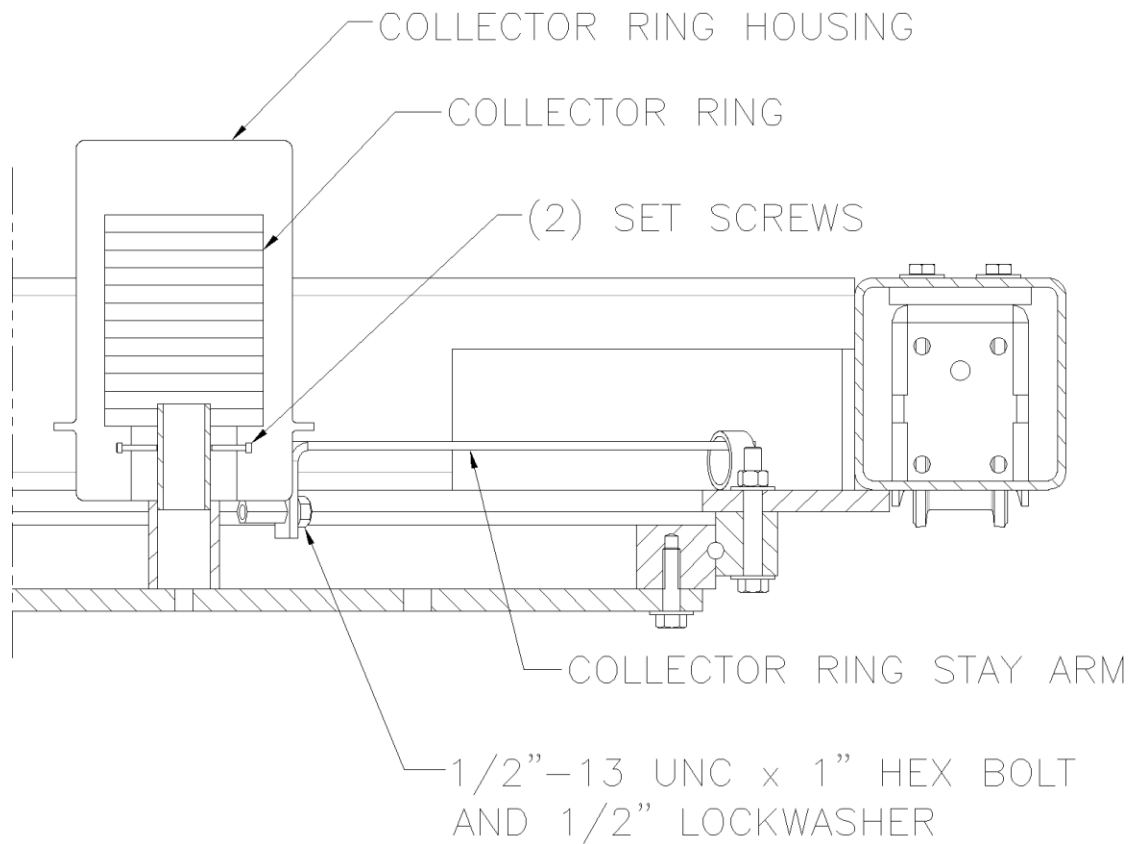


Figure 20 (Collector Ring Installation Details)

Flood Light Installation

Located at the top end of the Mast Assembly is a junction box which holds the Flood Light Housing. Find the LED Bulb and screw it into the lighting receptacle.

Toe Guard Adjustment

Adjust the factory mounted toe guard located on the bottom of the mast so that the bottom of the guard sits a minimum of 1/2" above the floor, accounting for any unevenness in the floor. To adjust the height of the toe guard, loosen the bolts that hold it to the mast and slide it vertically until the proper height is reached. Then tighten the bolts down to secure the toe guard position. See (Figure 21) for more details.

Backstop Installation

Mount the backstop assembly to the back stop brackets that are welded to the top of the mast. Position the backstop so that it extends away from the mast at a 90 degree angle, then adjust the vertical height of the backstop so that it is centered on the top beam of the rack. Secure the backstop assembly with the included hardware. See (Figure 21) for more details.

Chain bucket Installation

Remove any packing that may be on the inside of the chain bucket. Bolt the chain bucket to the mast with the included hardware. Feed the hoist chain down the chain bucket chute and into the chain bucket. After all the of the chain is fed into the chain bucket, attach the chain bucket chute to the mast with the included hardware. See (Figure 21) for more details.

Hoist Chain Lubrication

Before completion of the stacker system assembly, insure that the hoist chain is lubricated in accordance with the chain hoist manufacturer. A tube of chain lubrication has been included in the pallet of system components. See the chain hoist manual for more details.

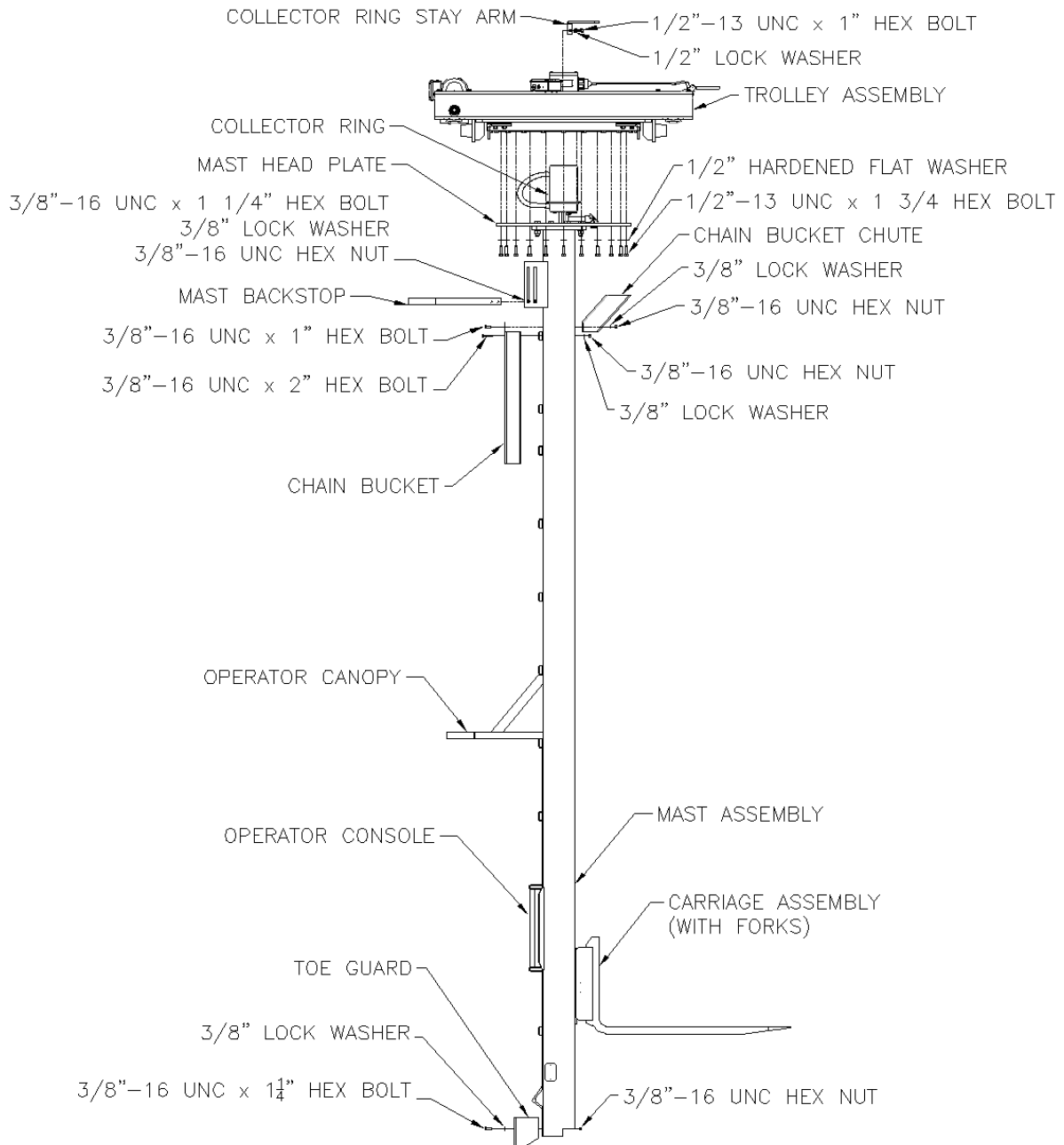


Figure 21 (Installation of Mast to Trolley)

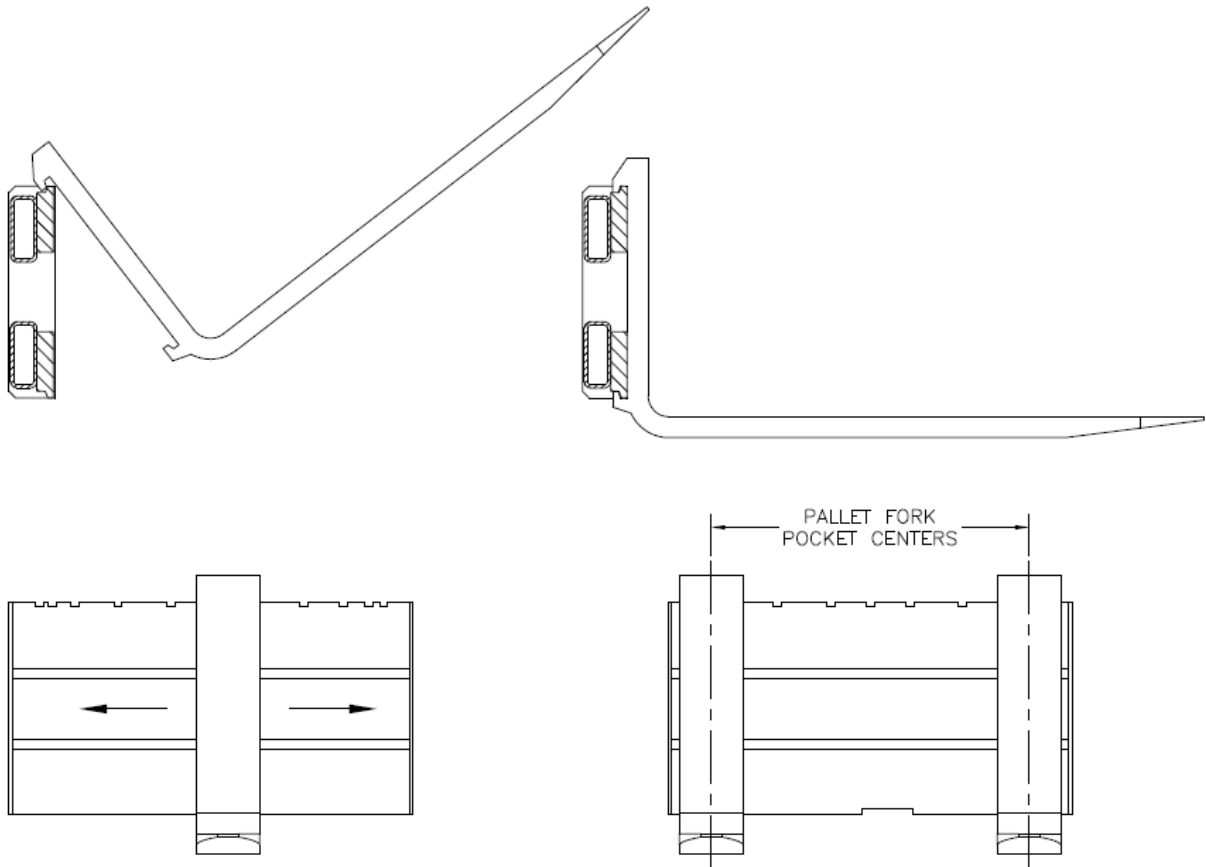


Figure 22 (Fork Installation Details)

Fork Installation

Lift fork and place top tongue of fork in the groove on the top portion of the carriage bar, aligning the bottom tongue of the fork with the notch in the bottom portion of the carriage bar. Lower fork down until the tongue on the bottom of the fork is fully inserted into the notch on the bottom portion of the carriage bar. Slide fork left or right on the carriage bars and repeat this procedure for the second fork. Once both forks are on the carriage bars, adjust the fork spacing to match the pallet fork pockets. See (Figure 22) for more details.

STACKER TEST AND OPERATION:

CAUTION: BEFORE TURNING POWER ON FOR THE UNIT, DOUBLE CHECK ALL ELECTRICAL CONNECTIONS AND CLEAR AWAY ALL HAND TOOLS AND LIFTING EQUIPMENT!!

Begin by turning the power on for the unit, then if the unit has a motorized bridge, trolley or rotation turn the key switch, located in the pendant controls, to the on position. When the key switch is turned on the floodlight will light and the system will be ready for operation.

Checking Hoist Operation

Note The Hoist is shipped with the Carriage Assembly drawn up to the top of the Mast Assembly. Take special care to lower the Hoist before raising the Hoist.

Begin this operation by pressing the down push-button to lower the Carriage Assembly to the bottom of the Mast Assembly. **SEE INSTRUCTIONS FOR PROPER ELECTRICAL PHASING BELOW BEFORE PROCEEDING ANY FURTHER.** Once the Carriage has reached the bottom of the Mast install the Pallet Forks and adjust them to the desired width. Press the Up push-button and the Carriage Assembly should begin to ascend up the Mast. Be careful when running the Carriage up to the top of the Mast. Carriage stops have been installed to prevent over travel and the Hoist is equipped with an overload slip clutch. However, overloading for extended periods of time could damage the Hoist Motor or overload clutch.

PROPER ELECTRICAL PHASING OF THE UNIT IS CRITICAL TO SAFE OPERATION.

To check the phasing of the stacker crane, use the pendant controls for the hoist. While watching the carriage, push the down button to the first step (slow speed) on the pendant. Do this for no more than 2 seconds. If the carriage traveled in the down direction, the phasing is correct. If the carriage traveled in the up direction, the phasing is incorrect.

Note: If the phasing is incorrect, DO NOT switch the wires in the pendant or the bridge panel as this may cause equipment damage and/or injury to the operator!

To fix the system phasing, switch the L1 with the L2 or L3 in the floor disconnect. After making this switch, run through the above phasing test procedure again.

Checking for Scuffing or Binding

If the Bridge motion is motorized check for free travel motion along the entire length of the rails. The double flanged wheels must run freely along the rails without scuffing or binding on the sides of the rails. If any scuffing or binding should occur, see ***Rail Alignment*** .

Checking for Trolley Motion

If the Trolley motion is motorized check for free travel motion along the entire length of the Bridge rails. The double flanged wheels must run freely along the rails without scuffing or binding on the sides of the rails. If any scuffing or binding should occur, double check to see that the Trolley is positioned correctly on the Bridge Assembly.

Checking for Rotation

If Rotation is hand propelled check to see if the Mast Assembly rotates freely. **Note: Mast rotation forces up to 40 ft-lbs. of torque is normal.** If the Mast rotation is stiff see *Trouble Shooting*.

If Rotation is motorized press the clockwise push-button, the Mast should rotate in the clockwise direction at 2 rpm. Then press the counter clockwise push-button, the Mast should rotate in the counter clockwise direction at 2 rpm.

CARRIAGE SAFETY STOP DEVICE

A Carriage Safety Stop Device has been installed in the Carriage Assembly, to prevent a load from free-falling to the floor. This device shown in (Figure 23), has been installed for the operators safety. Regular monthly visual inspection of this device is required. Physical testing of the device should be done annually.

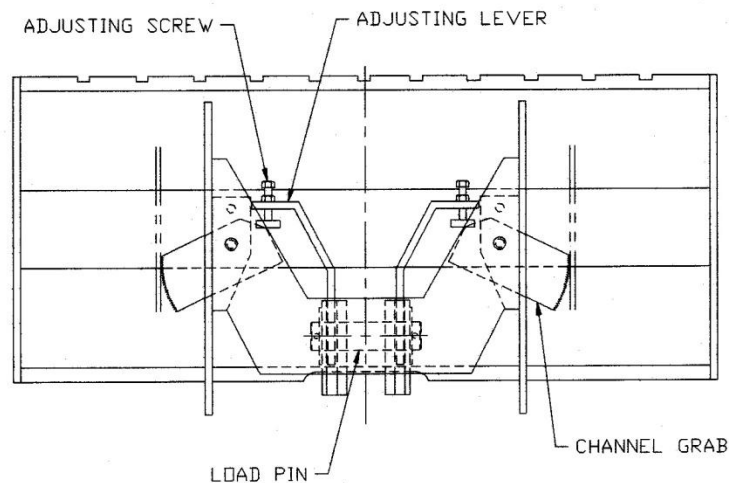


Figure 23 (Carriage Safety Stop Details)

Monthly Visual Inspection

To visually inspect the Carriage Safety Stop Device, lower the Carriage Assembly to the bottom of the Mast, letting the Hoist Chain go slack. Stand on the side of the Mast Assembly and looking down into the Carriage Assembly operate the Up Push-Button. As the Hoist Block begins to rise check to see if the Channel Grabs pivot in the Carriage Assembly. Release the Up Push-Button and press the Down Push-Button. As the Hoist Block begins to lower check the Channel Grabs operation. Do this test three to four times to verify the safety stop device works properly. **Note: The Channel Grabs movement is very short and full lifting of the Carriage is not necessary.**

Physical Test Procedure

To physically test the Carriage Safety Stop Device you will need a 2" x 4" piece of lumber about 36" long and a piece of rope or chain. **CAUTION: When doing a physical test on the Safety Stop Device do not place a load on the pallet forks! Rope off the test area to keep out unauthorized personnel.**

Press the Up push-button to raise the Carriage above the height of the 2" x 4" piece of lumber. Locate the 2" x 4" piece of lumber directly under the center of the Lower Carriage Bar. Then press the Down push-button until the Carriage rests on the 2" x 4" and the chain goes about 3" slack. **CAUTION: Do not allow anything under the Carriage while it is supported by the 2" x 4".** Tie the rope or chain around the bottom side of the 2" x 4", making sure to have enough rope to be a safe distance from the unit. Pull the rope taut, then pull the 2" x 4" out from under the Carriage. The Carriage Assembly should not drop more than 1" to 1-1/2". If the Carriage drops more than the required distance see **Carriage Assembly Adjustments**.

Dynamic Load Test

- 1.) Using a test load of 125% of the rated capacity of the system, raise the load at least two complete revolutions of all drums, sheaves, gears or chain lift wheel. Lower to within 2 or 3 inches of the floor and hold at this point for one (1) minute.
- 2.) Repeat the above hoisting cycle one (1) more time during which the power to the hoisting equipment shall be completely turned off. Once during the lifting cycle and once during the lowering cycle. There shall be no slippage of the load or over-heating of the brake or clutch during this cycle.
- 3.) Hoist the test load a sufficient distance so the load is supported by the crane and held by the hoist brake or clutch. Transport the test load with the trolley for the full length of the bridge as allowed by dimensions of test weight and test area.

- 4.) Transport the test load by means of the bridge for a distance determined feasible by confines of the test area with the trolley as close to extreme north end of the crane as practical and in the other direction with the trolley as close to the south end of the crane as practical.
- 5.) Lower the test load, stopping by the brake or clutch.
- 6.) The hoist limit or slip clutch device shall be checked with an empty carriage traveling in increasing speeds up to the maximum speed. The limit switch or clutch shall trip in sufficient time to prevent contact of the load block with any part of the trolley or crane.



S A M P L E F O R M

DYNAMIC LOAD TEST DATA SHEET

Stacker Crane Number: _____

Inspection Date: _____

Inspector: _____

Crane Operator: _____

Load Cell or Scale Number: _____

Load Cell Scale Last Calibration Date: _____

Test Weight in Pounds: _____

- 1.) Using a test load of 125% of the rated capacity of the **SYSTEM**, raise the load at least two complete revolutions of all drums, sheaves, gears or chain lift wheel. Lower to within 2 or 3 inches of the floor and hold at this point for one (1) minute.
- 2.) Repeat the above hoisting cycle one (1) more time during which the power to the hoisting equipment shall be completely turned off. Once during the lifting cycle and once during the lowering cycle. There shall be no slippage of the load or over heating of the brake or clutch during this cycle.
- 3.) Hoist the test load a sufficient distance so the load is supported by the crane and held by the hoist brake or clutch. Transport the test load with the trolley for the full length of the bridge as allowed by dimensions of test weight and test area.
- 4.) Transport the test load by means of the bridge for a distance determined feasible by confines of the test area with the trolley as close to extreme north end of the crane as practical and in the other direction with the trolley as close to the south end of the crane as practical.
- 5.) Lower the test load, stopping by the brake or clutch.
- 6.) The hoist limit or slip clutch device shall be checked with an empty carriage traveling in increasing speeds up to the maximum speed. The limit switch or clutch shall trip in sufficient time to prevent contact of the load block with any part of the trolley or crane.

TROUBLESHOOTING:

Problem

Bridge moves with difficulty. (Usually caused by scuffing or binding of the wheel flanges on the sides of the railheads.)

Solution

Check **Rail Levelness**. If the rail is level, check **Rail Alignment**. If the rail alignment is correct, check to see if the wheels move freely. Raise each corner of the Bridge and spin each wheel. If any wheel does not spin freely contact your distributor for service.

Problem

Trolley moves with difficulty.

Solution

Check to see that the Trolley is properly seated on the Bridge beam rails. If the Trolley is properly seated on the rails, check to see that the Bridge beams are level. If the Bridge beams are out of level, check **Rail Levelness**. If the crane rails are level, check to see if the wheels move freely. Raise each side of the Trolley and spin each wheel. If any wheel does not spin freely contact your distributor for service.

Problem

Mast rotation is difficult. (Mast rotation forces up to 40 ft-lbs. of torque is normal.)

Solution

Insure that the bearing bolts are torqued evenly at 92 ft-lbs and that they are tightened in an alternating star pattern. See (Figure 17). Check to see that the Trolley is properly seated on the Bridge beam rails. If the Trolley is properly seated on the rails, check to see that the Bridge beams are level. If the Bridge beams are out of level, check **Rail Levelness**. If the crane rails are level, contact your distributor for service.

Problem

Hoist function problems.

Solution

Consult trouble shooting guide in Hoist service manual.

Problem

Flood Light does not light.

Solution

Check the fuse located in the transformer circuit. If the fuse is not blown, check the flood lamp. If the flood lamp is bad, replace the flood lamp.

CARRIAGE ASSEMBLY ADJUSTMENTS:

Carriage Safety Stop Adjustment

IMPORTANT NOTE: Only trained and authorized personnel may perform maintenance or adjustments on this stacker crane. For information on training, please contact the sales office. To adjust the Carriage Safety Stop Device press the Down push-button to lower the Carriage to a comfortable working level. If necessary, remove the Pallet Forks to gain full access to the front of the Carriage Assembly.

CAUTION: Before making any adjustments to the Carriage Safety Stop Device make sure the Disconnect is OFF, locked out and properly tagged!!!!

Slide a 1/8" thick x 1 1/2" wide x 12" long Feeler Gage down between the Mast channel frame and the Channel Grab, as shown in (Figure 24). Loosen the lock nut which locks the Adjusting Screw. Turn the Adjusting Screw clockwise to decrease the gap or counter clockwise to increase the gap. Do not over tighten the Adjusting Screw. It may be necessary to turn the Adjusting Screw counter clockwise one quarter turn to remove the Feeler Gage. After removing the Feeler Gage, turn the Adjusting Screw one quarter turn in the clockwise direction, if it was necessary to back off the adjusting screw. Then lock the Adjusting Screw with the lock nut. Make sure you adjust both Channel Grabs. This will insure that the Carriage Safety Stop Device will operate properly. For the procedure to test the Carriage Safety Stop Device see **CARRIAGE SAFETY STOP DEVICE**.

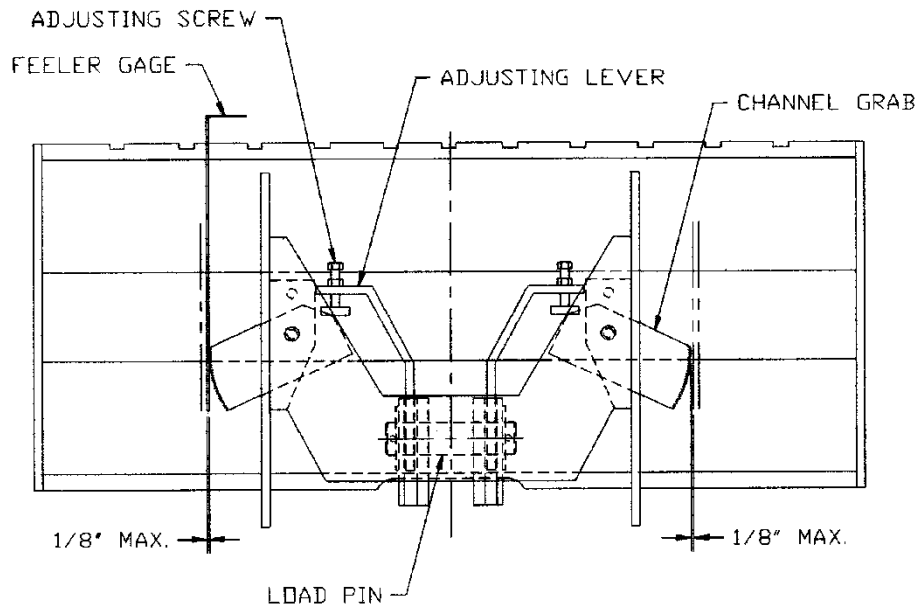


Figure 24 (Safety Stop Adjustment)

LUBRICATION:

Item	Interval	Lubricant	Viscosity
Rotation Bearing Raceway*	100 Hours	Mobilux EP 2	160 cSt @ 40° C
Rotation Gear†‡	100 Hours	Moblitac 375 NC	5000 cSt @ 40° C
Carriage Cam Rollers	6 Months	Shell Alvania RL 2	98 cSt @ 40° C
Bridge Motor Gear Box‡	3 Years	Mineral Oil CLP 220	220 cSt @ 40° C
Trolley Motor Gear Box‡	3 Years	Mineral Oil CLP 220	220 cSt @ 40° C
Rotation Motor Gear Box‡	3 Years	Mineral Oil CLP 220	220 cSt @ 40° C

*Acceptable alternate lubricants include: Aralub HLP 2, Spheerol EPL 2, Centoplex EP 2, Lagermeister EP 2, Gadus S2 V220 2, and Multis EP 2.

†Acceptable alternate lubricants include: Aralub MKA-Z 1, Mollub-Alloy 9790/2500-1, Grafloscon C-SG 0 ultra, Ceplattyn KG 10 HMF, Mobilgear OGL 461, Malleus OGH, and Ceran AD Plus.

‡For Systems with these options.

1. The Hoist has been lubricated at the Factory. Scheduled lubrication should be performed as noted in the Hoist Maintenance Manual.
2. **Motorized units** - The four (4) Bridge Wheels are permanently greased and require no further lubrication.
Manual units – The four (4) Bridge Wheels are permanently greased and require no further lubrication.
3. **Motorized units** - The four (4) Trolley Wheels are permanently greased and require no further lubricating.
Manual units – The four (4) Trolley Wheels are permanently greased and require no further lubricating.
4. The rotation bearing on both manual and motorized systems must be lubricated before and after any prolonged period of system stoppage. Shorter lubrication intervals are required in environments with high humidity, extensive dust or dirt, and significant fluctuations in temperatures.

OVERALL SYSTEM VIEW:

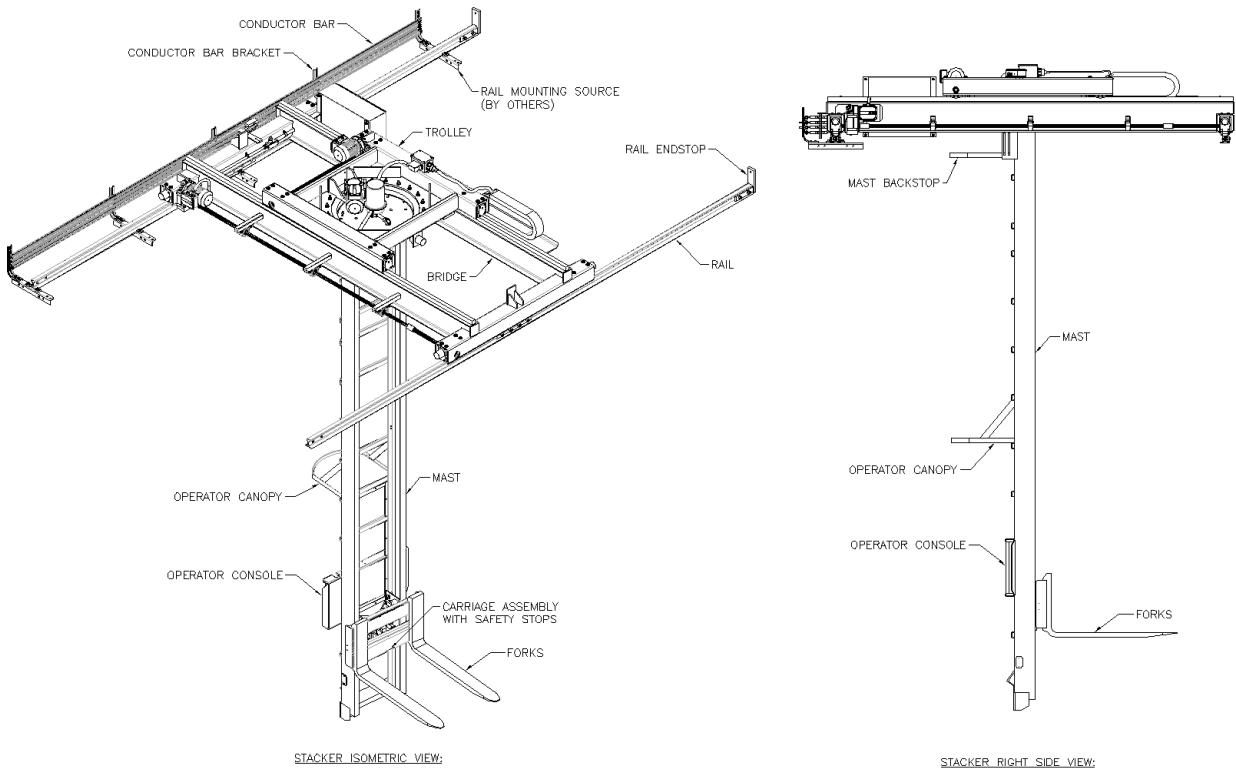


Figure 25 (System View)



WARNING: INSTRUCTIONS FOR ASSEMBLY ARE SET FORTH ON THESE PAGES. PROPER ASSEMBLY IS THE RESPONSIBILITY OF THE PURCHASER AND IS NOT COVERED BY ANY WARRANTY OF THE SELLER. BUYER IS CAUTIONED NOT TO SUBSTITUTE PARTS OR HARDWARE. SELLER DISCLAIMS ALL LIABILITY TO ANY SUBSTITUTION OF PARTS OR HARDWARE NOT APPROVED IN WRITING BY SELLER.

INSTALLATION DETAIL DRAWINGS THAT FOLLOW ARE INTENDED AS BASIC GUIDES TO INSTALLATION OF STANDARD COMPONENTS. DEPENDING UPON THE SPECIFICS OF THE SYSTEM, THERE MAY BE LIMITATIONS REGARDING THE USE OF THESE STANDARD COMPONENTS AND/OR A REQUIREMENT FOR SPECIAL INSTALLATION TECHNIQUES.