

LodeRail™ Warranty

Columbus McKinnon warrants each new LodeRail system manufactured by it to be free from defects in material and workmanship under normal use and service. This warranty is limited to making good at Columbus McKinnon's factory any LodeRail which shall, within five (5) years commencing on the date of delivery to the original purchaser, be returned to Columbus McKinnon with transportation charges prepaid and which, upon Columbus McKinnon's examination, shall appear to Columbus McKinnon's satisfaction to have been defective. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, AND ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF COLUMBUS McKINNON, AND COLUMBUS McKINNON NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON TO ASSUME FOR IT ANY LIABILITY IN CONNECTION WITH THE SALE OF LODERAIL.

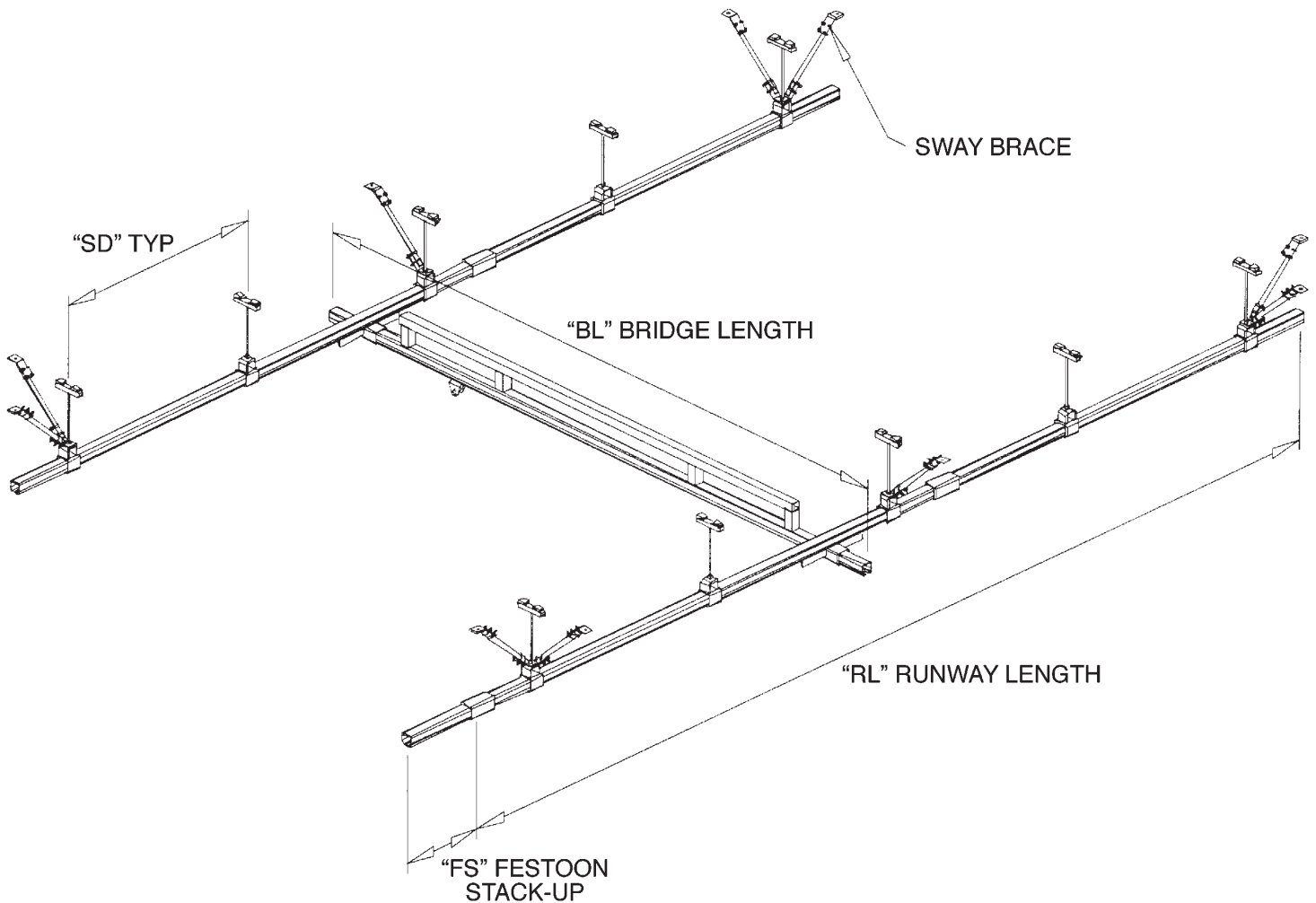
LodeRail™

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LodeRail™

CEILING MOUNTED CRANE SYSTEM

INSTALLATION PROCEDURE MANUAL



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You are now the owner of a ceiling mounted LodeRail system, one of the finest overhead crane systems available. Thank you for selecting a Columbus McKinnon Corporation product. The LodeRail system incorporates superb engineering design, carefully chosen material and excellent construction to provide you with a product that will deliver years of reliable performance for meeting your material handling needs. All LodeRail systems are pre-engineered to meet all applicable codes including seismic zone 4 conditions. This manual will guide you through the steps for installing your LodeRail system. The user must consult a qualified engineer to prepare the necessary drawings. Columbus McKinnon Corporation assumes no responsibility for determining the structural adequacy of whatever this system is attached to.

WARNING

IMPROPER INSTALLATION AND USE CAN RESULT IN PERSONAL INJURY.

TO AVOID INJURY:

- Carefully read and observe installation procedure.
- Refer to and comply with any applicable local, state, and federal codes and regulations.
- Have the integrity and adequacy of the overhead supporting structure verified by a qualified engineer.
- Do not use this system for support or transport of people.
- Do not alter or modify system – use only hardware and components provided.
- Do not exceed capacity of system or hoisting unit(s).
- Do stay clear of load(s) during operation.

STEP 1 – GENERAL INFORMATION AND CHECK LIST

Hoist weight is not to exceed 15 percent of rated capacity of crane.

Thoroughly read this installation procedure before beginning to install the system. Because of the many variations in roof, ceiling and other overhead structures, the suggestions and procedures in this manual may not be completely suited to your application. Use the services of a qualified engineer to prepare layout and design drawings using the information contained herein.

The following check list is not intended to be complete. Use common sense and good judgement. Also check local, state and federal regulations for any additional requirements. This system is not to be used for supporting or transporting people; use of this equipment for such application is a code violation and can result in serious bodily injury and/or property damage.

Modifications and Additions:

The system is supplied with a complete set of installation hardware (bolts, hex nuts, lock washers, flat washers, etc.). Do not replace factory furnished hardware with other material. **Do not make modifications or additions to any component of the system without the prior approval of a qualified engineer. Any warranty work performed on the LodeRail System must be pre-approved by LodeRail.**

Overhead Support Structural Members:

Be sure that a qualified engineer has determined that the overhead supports are adequate to support the loads and the design meets all applicable codes. Points and details to be evaluated and analyzed should at least include: (a) selection of a proper method of suspension and bracing to suit the application, (b) selection of proper clamps or hanger brackets, and (c) determining and establishing other requirements for your application.

Check List for Crane Operation:

- (1) Check for any obstructions to crane and trolley travel,
- (2) Check that there is a minimum of 2 inches of clearance at the end of the bridge girder (or the body of the hoist) and 3 inches above the crane through its entire travel,
- (3) For systems with festooning, check to make sure the festooning (flat electrical cable) cannot be pinched or snagged.

Check List Prior to Installation:

- (1) Qualified installers,
- (2) Proper equipment and tools,
- (3) Safe working area,
- (4) Standard safety attire, e.g., hard hat, back brace, safety shoes, safety glasses, fall arrest equipment, work gloves, etc.
- (5) Other safety precautions for your particular conditions.

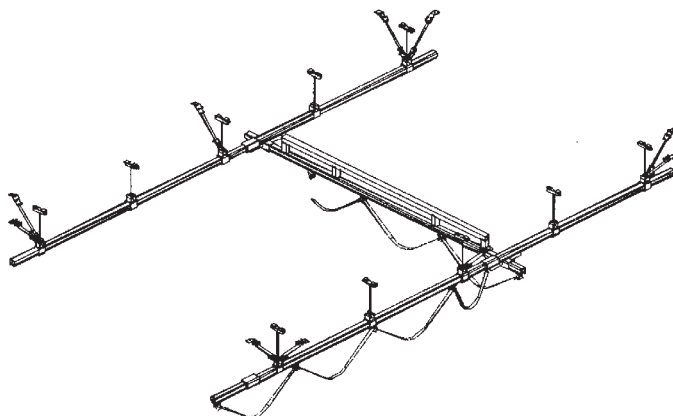


FIGURE 1

Plain Track Crane System

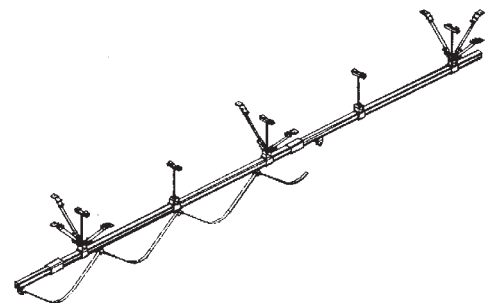


FIGURE 2

Plain Track Monorail System

CEILING MOUNTED LODERAIL CRANE SYSTEM

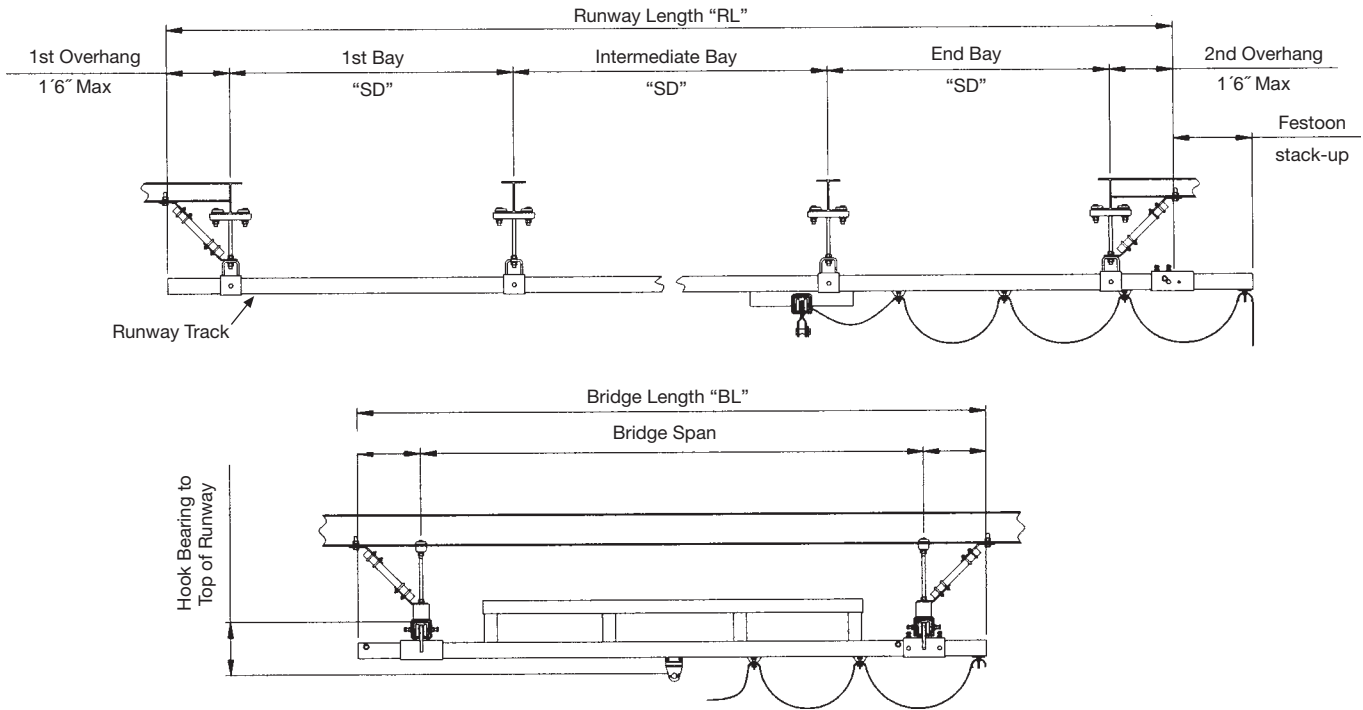


FIGURE 3

(Ceiling Mounted System with Plain Track Runway)

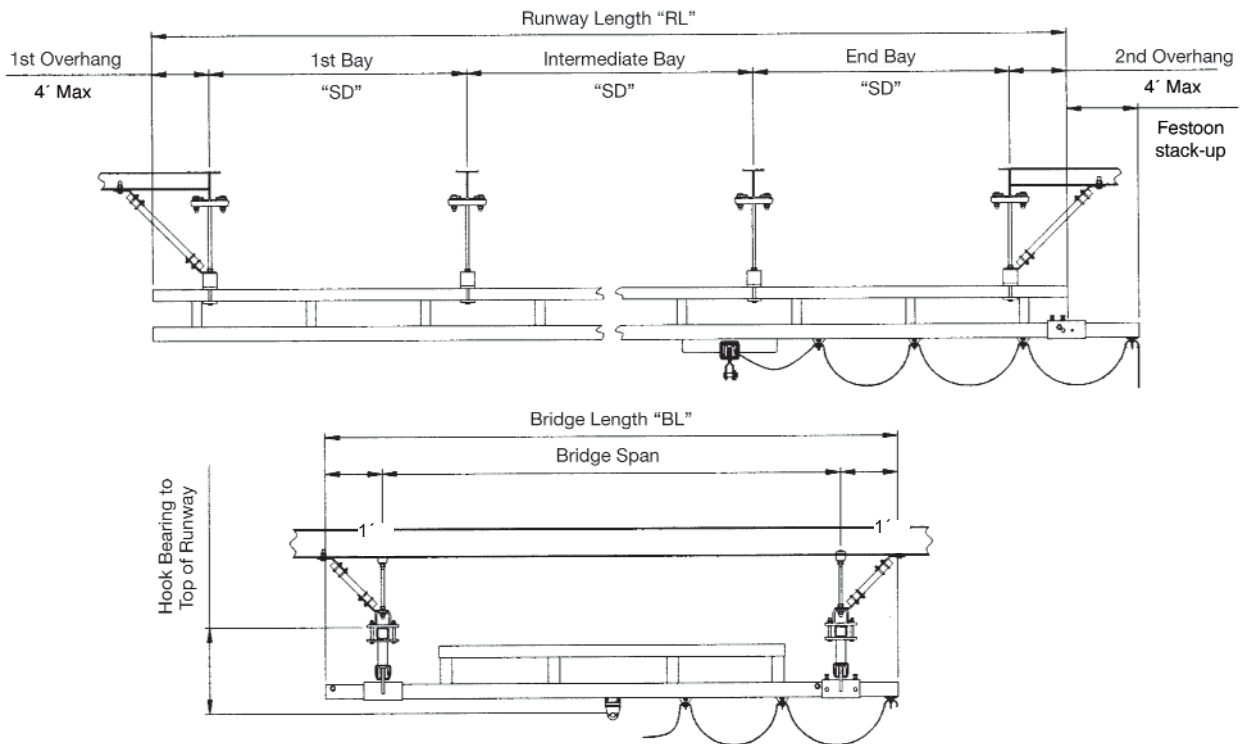


FIGURE 4

(Ceiling Mounted System with Trussed Runways)

STEP 2 – PLANNING AND STAGING

1. It is advisable to plan the installation of the crane. Check for accessibility and job site obstructions. Also, keep in mind that the final phase of the installation will be installing the bridge crane on to the runway. The simplest method is to roll the bridge crane on to the end of the runway. If the ends of the runway are going to be against obstructions, install the bridge crane before the last section of the runway track is erected. If this is not possible, see step 2-2 below.
2. See *Figure 5* for minimum access clearance required for crane installation and/or removal. Applications with very limited space will need to utilize a long wheel base end truck (20 ETLs, 10 ETLs, 05 ETLs OR 02 ETLs). These end trucks can be assembled with the runway track in place.
3. If your system is powered (electric or air), determine which runway track will carry the power supply. Runways using festooning (for electric or air power) are usually furnished with a stack-up section that mounts on one end of one runway. Determine placement of the stack-up section and allow space to accommodate this. See *Figure 5* for minimum space required. The stack-up section can be installed after the crane. Either the stack-up section or the crane installation will determine the minimum clearance required at one end of the runway.
4. Before proceeding with the layout, check the parts against the packing list, especially the bolts and anchors. Go over the packing list and identify all items. Review and understand the design and layout prints prepared by your engineer.
5. Plan to stage the material when unloading so that it will allow a good material flow. Clean the inside of the tracks and remove any dirt or debris.

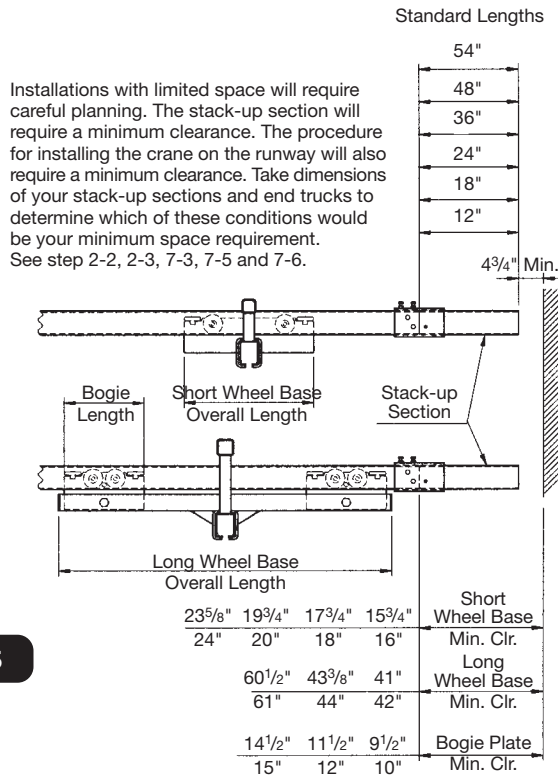


FIGURE 5

STEP 3 – Runway Track Installation

1. Runway alignment is the most important requirement for good crane operation. The runway alignment will directly depend on the alignment of the support brackets. All support hanger assemblies clamp to the bottom flange of support beams which provide flexibility for lateral adjustments.
2. *Figure 1* shows a layout of a typical ceiling mounted plain track system. Preferably select one of the corner supports in a clear area as a starting point for the layout. Layout and mark all hanger points for one side. Locate all hangers of the second side at a distance equal to the crane span. Mount support beam clamps (see *Figures 20-25*) at the hanger points. On the C-480 and 20CHB beam clamps, the threaded hanger rods or bolts must be inserted first before attaching the beam clamps. Tighten bolts until snug to be sure there is no possibility of falling off. Install the threaded hanger rods. Install nuts, lock washers, sway brace end fittings depending on hanger detail being used. If practical, you may set the bottom of the hex nut approximately to the elevation of the top of the runway bracket for all hanger rods.
3. Be reminded that for closed runway installations, install the crane before putting up the last section of runway track. You will need the long wheel base end trucks as stated in step 2-2.
4. You may start installing runway track on any bay that will make a good starting point.

STEP 4 – Trussed Track Installation (*Figure 6*)

1. Typically, trussed tracks are suspended from the center of the splice (except at the overhangs). For a runway that has a splice on either end (or both ends), connect the splice bars to the top tube using the two $\frac{5}{8}$ inch diameter bolts. Slide a coupler on the bottom track of each splice end, all the way in to one side, and secure it in place with the set screws. Mount the lower bracket of the hanger assembly onto the ends of the runway top tube. The bracket will straddle the splice bars at the splice end of the runway. Raise and suspend the track from the hanger rods. Install the sway brace (see *Figures 25 and 26*) at the hanger points designated on your drawings. Complete installation of all the runways and sway braces.

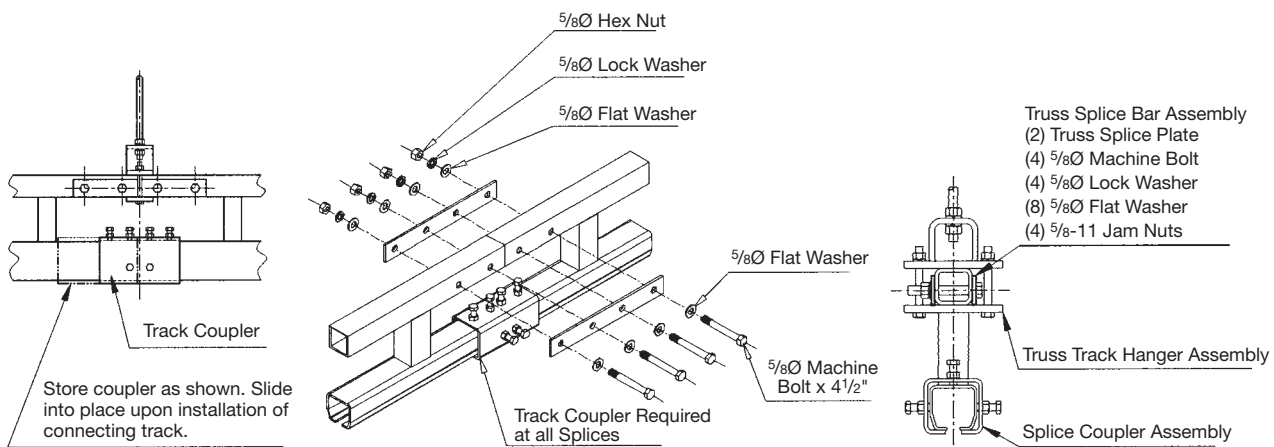
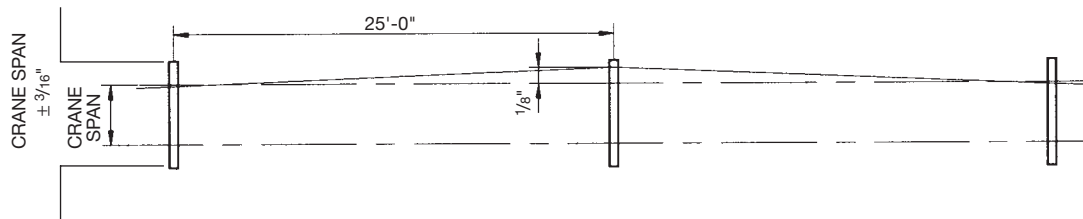


FIGURE 6 (Example of a trussed track with a hanger rod and beam clamp)

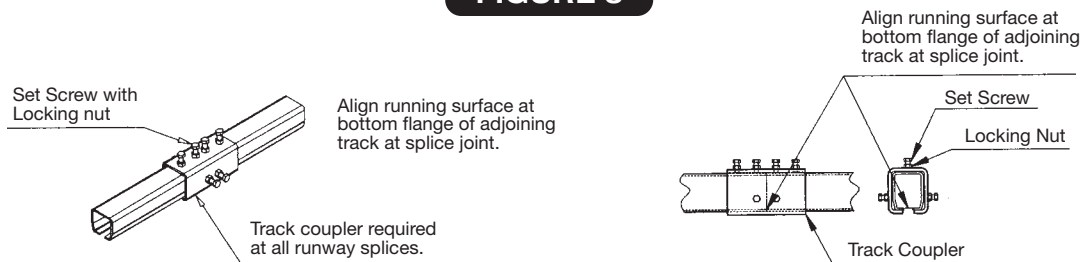
- Align the runway track. Set them to the proper span and elevation. Lateral and vertical alignment should be maintained to (+/-) 1/8 inch in 25 feet and crane span to (+/-) 3/16 inch in 25 feet (see Figure 7).

FIGURE 7



- Check the track alignment at the splice points and **make sure that the bottom flanges of both adjoining tracks are aligned laterally and vertically** (see Figure 8). This joint must be flush to provide for a smooth transition. Use the top screws of the coupler to clamp down on the track and the screws on the side (do not over tighten) to make lateral adjustments. Make sure that all the screws are snug and then tighten the locking hex nuts on each screw. See chart on page 12 for torque setting.

FIGURE 8



- Check all connections. **Make sure that all connections are tight with lock washers under all hex nuts.** See chart on page 12 for torque settings.

Plain Track Installation (Figure 9)

- Plain tracks are suspended 12 inches off to one side of the end of the crane. Slide on the correct quantity of plain track hanger brackets for the track, spaced not more than 6 feet apart, from center to center. Raise and suspend the track from the hanger rods. Before installing the next adjoining track, insert a track coupler on the end of one of the tracks (see Figure 8). Install the sway braces (see Figure 26) at the hanger points designated on your drawings. Complete installation of all the runways and sway braces.

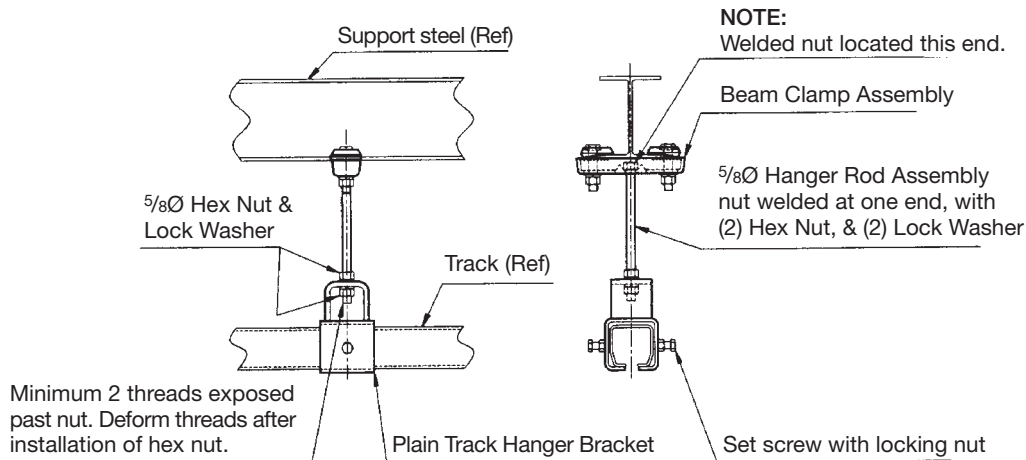


FIGURE 9 (Example of a plain track with a hanger rod and beam clamp.)

- Align the runway track. Lateral and vertical alignment should be maintained to (+/-) 1/8 inch in 25 feet and crane span to (+/-) 3/16 inch in 25 feet (see Figure 7). Check the track alignment at the splice points and **make sure that the bottom flanges of both adjoining tracks are aligned laterally and vertically** (see Figure 8). This joint must be flush to provide for a smooth transition. Use the top screws of the coupler to clamp down on the track and the screws on the side (do not over tighten) to make lateral adjustments. Make sure that all the screws of the couplers and track hangers are snug and then tighten the locking hex nuts on each screw. Do not over tighten. See chart on page 12 for torque setting.
- Check all connections. **Make sure that all connections are tight with lock washers under all hex nuts.** See chart on page 12 for torque settings.

STEP 5 – CRANE ASSEMBLY AND INSTALLATION

(Read step 6 before installing the crane)

1. Assemble the crane on the floor. The ends of the bridge girder are prepared differently depending on whether your system is manual or powered and the type of power supply. See *Figure 10* and chart below.

Crane Power Supply	Bridge Girder End Condition
None	Both ends Identical (end stop hole 1 1/2" from each end)
Conductor Bars	Both ends Identical (end stop hole 1 1/2" from each end)
Festooning (Electric or Air)	End stop hole 1 1/2" from one end, 1'-4 1/2" minimum from other end

2. Trolleys for the festooning on the bridge girder will stack up at the end with the hole that is spaced farther from the end. Mount and set the center of the end truck (with the set screws) 12 inches from this end of the bridge track. For manual systems or for bridge girders with bar electrification, both ends are identical. Use the screws on the sides of the end truck coupler to square the bridge girder to the end truck (do not over tighten) and the screws on top for clamping down. Use a carpenter's square or take dimensions using symmetrical reference points on the end truck and the crane track. Make sure all the set screws are snug and then tighten hex nuts on set screws (see chart on page 12 for torque setting). Install the other end truck. Immediately install the bridge girder end stop (1/2" diameter bolt, hex nut, lock washer and rubber bumper) on to this end of the bridge girder to prevent the loose end truck from sliding off. See *Figure 10*. Check both end trucks to make sure all wheels are properly mounted and secure.
3. The fixed end truck will go on the runway that will have the runway electrification (see *Figure 2*). Raise the crane and slide it into the runway track. Immediately install the runway end stops (1/2" diameter bolt, hex nut, lock washer and rubber bumper) and the stack-up section (see step 2-3). If the last sections of the runways have not been installed (refer to step 2-1), securely tie off the crane at both ends to the runway. Check that the fixed end truck remains square to the bridge girder and readjust if necessary using the set screws on the end truck coupler. Re-tighten as per step 5-2 above.
4. Inspect the hoist trolley and make sure that the cotter pin is split and well wrapped around the bearing pin. See *Figure 10*. Install the trolley on the bridge girder from the fixed end. Immediately install the second bridge girder end stop. Install the correct quantity of festoon trolleys (if being used) from the fixed end and immediately install a Festoon Clamp Assembly on the end of the crane track making sure the bolts are tight (see chart on page 12 for torque setting).
5. For long wheel base end trucks (see *Figure 11*), assemble the end truck load bars onto the ends of the bridge girder following the same procedure for standard end trucks as described above in steps 5-2 through 5-3. Slide two end truck bogies into each runway and immediately install all the runway end stops and the stack-up section (see step 2-3). If there is sufficient space at one end of the system, the bogies can be mounted on the end truck load bars before sliding the crane onto the runway track (see step 2-2).
6. Raise the crane and hold it in position and make the connections of the end truck load bars to the bogies. Install the equalizer pin and the self-locking hex nut (see chart on page 12 for torque setting). See *Figure 11*. Complete the installation of the crane as described in steps 5-4 above.
7. Install the correct quantity of festoon trolleys (if applicable) on the runway from the stack-up section. See *Figure 12*. Immediately install a Festoon Clamp Assembly on the end of the stack-up section making sure the bolts are tight (see chart on page 12 for torque setting).
8. Install the festooning (flat electrical cable) starting from a convenient point. The festooning is continuous from its connection point on the hoist to its final point at the end of the runway stack-up section, threaded through all the festoon trolleys and the end clamps. Space the trolleys every 6 feet of festoon cable on the runway and every 5 feet on the crane. Allow sufficient cable at each end to make the connections to the hoist and to end-user furnished electrical junction box, which should be installed within 24 inches of the conductor bars. Raise the festoon trolley saddle until festoon cable is firmly held.

FIGURE 10

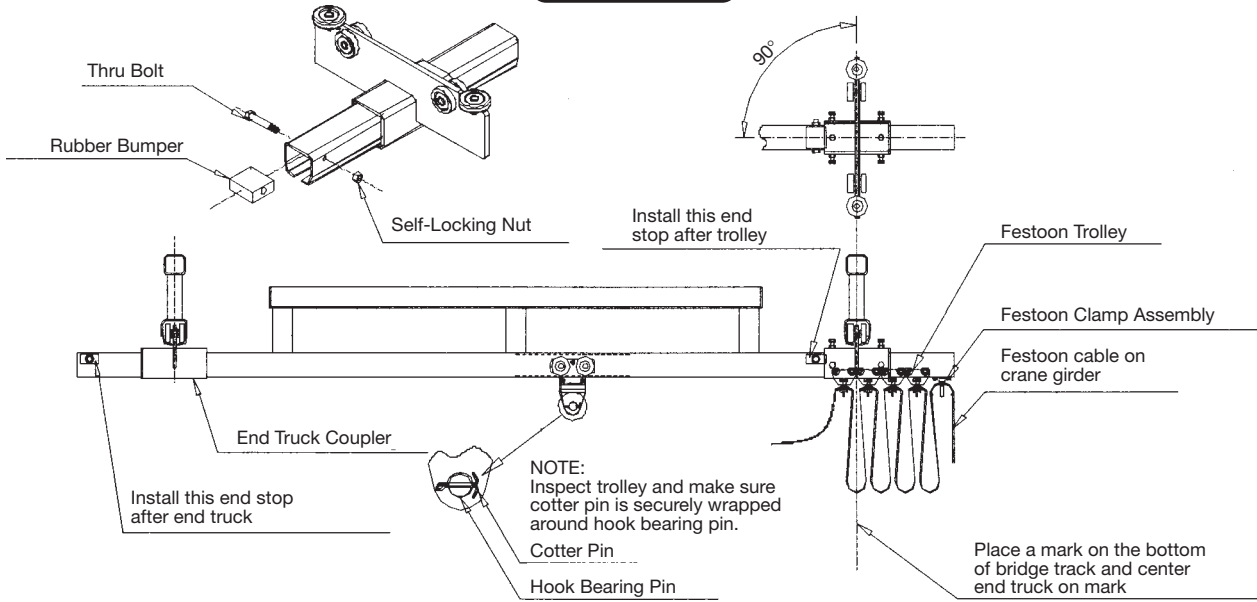


FIGURE 11

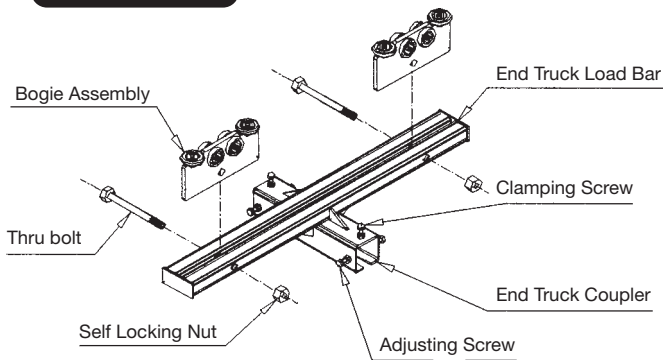
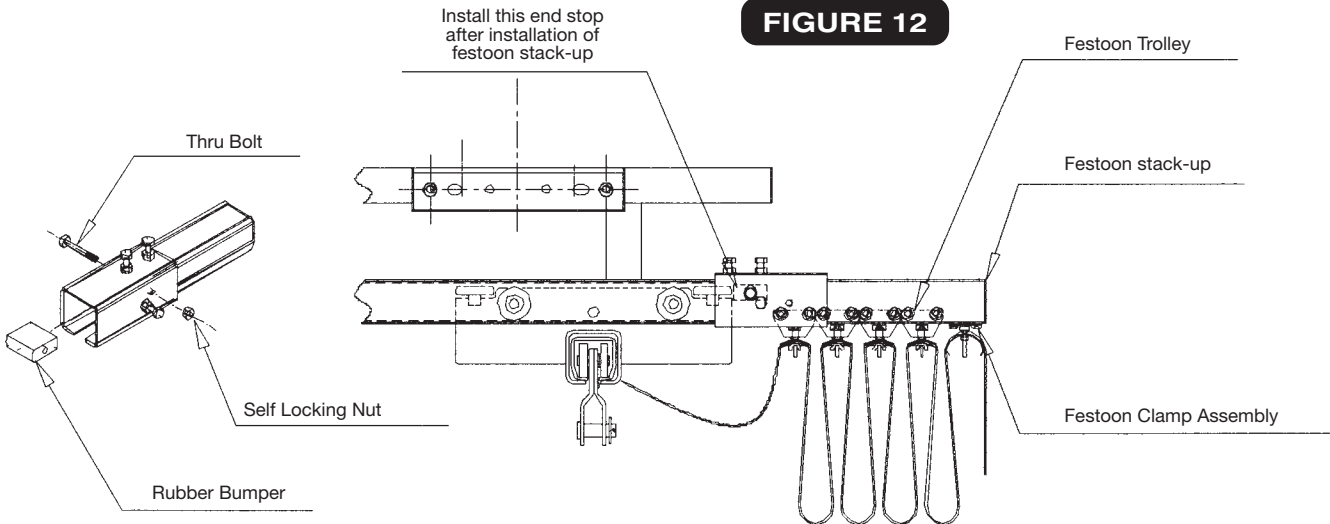


FIGURE 12



STEP 6 – SYSTEMS USING CONDUCTOR BARS

1. LodeRail systems can be powered electrically or pneumatically. Festooning is used for delivering electric and pneumatic power. The steps for installing this type of power supply are included above in steps 5-1 through 5-8. In lieu of flat cable electrification, electric conductor bars may be used on the runway, the crane, or on both.
2. Systems using conductor bars on the bridge girder will need adjustable end stops **in addition** to the fixed end stops described in steps 5-2 and 5-4. See *Figure 13*.

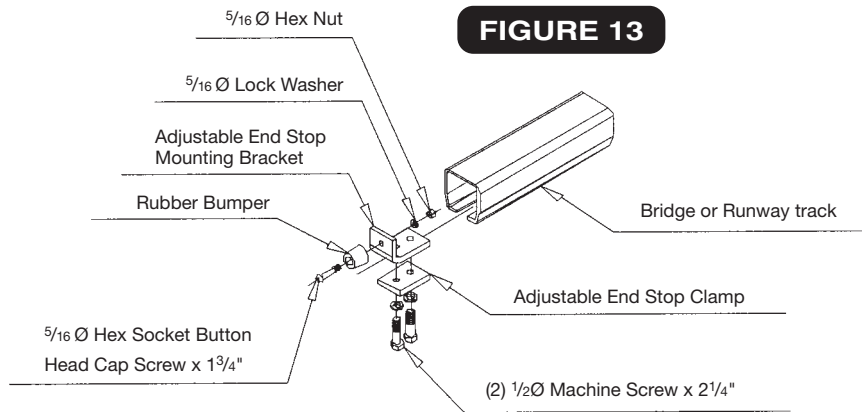


FIGURE 13

3. Four conductors on the crane or on the runway are required by the National Electric Code. Brackets are furnished to accommodate all four bars.
4. For trussed runways, install a conductor support bracket assembly on every other vertical tube on the runway (see *Figure 14*). For plain track runways, space the conductor support brackets every 6 feet or less (see *Figure 15*). Mount the conductor bars on the brackets covering the full length of the runway as per step 6-6 on page 10. Slide on the collectors (with tow chains attached) on the conductors at any convenient point or time. Mount the tow arm on the end truck with screws (see chart on page 12 for torque setting). Attach the “S” hooks of the tow chains to the tow arms. Be sure to close the “S” hooks.

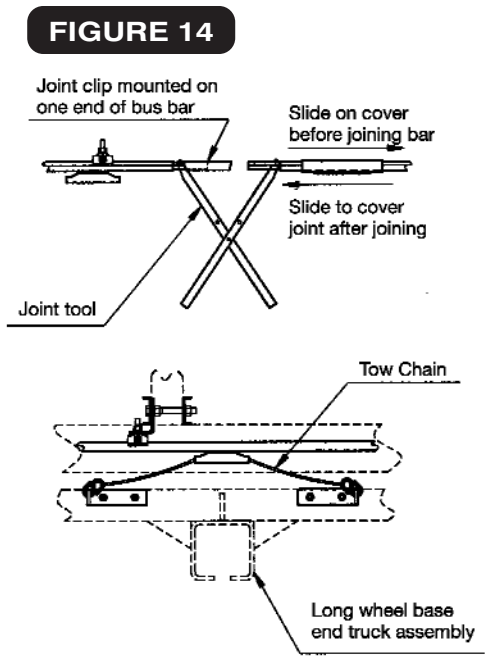
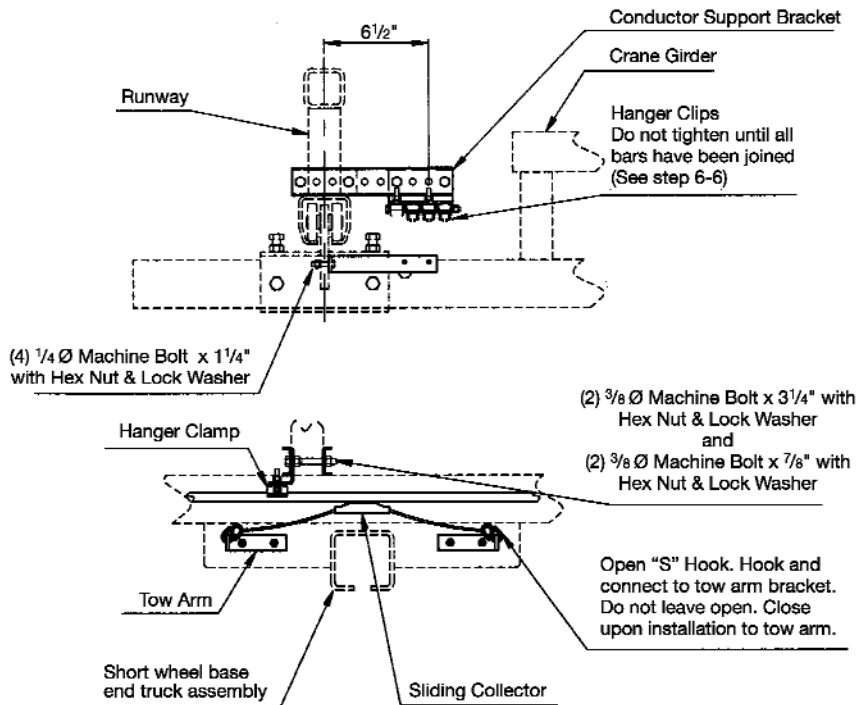


FIGURE 14

CEILING MOUNTED LODERAIL CRANE SYSTEM

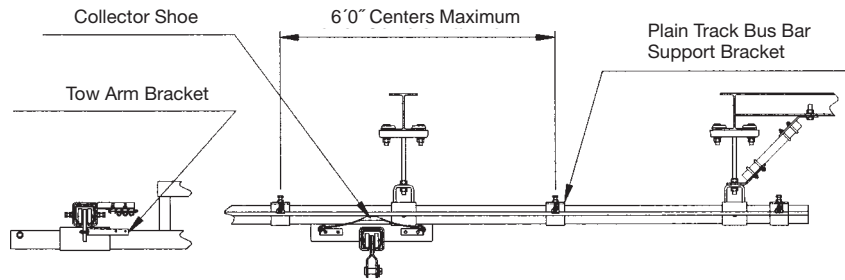
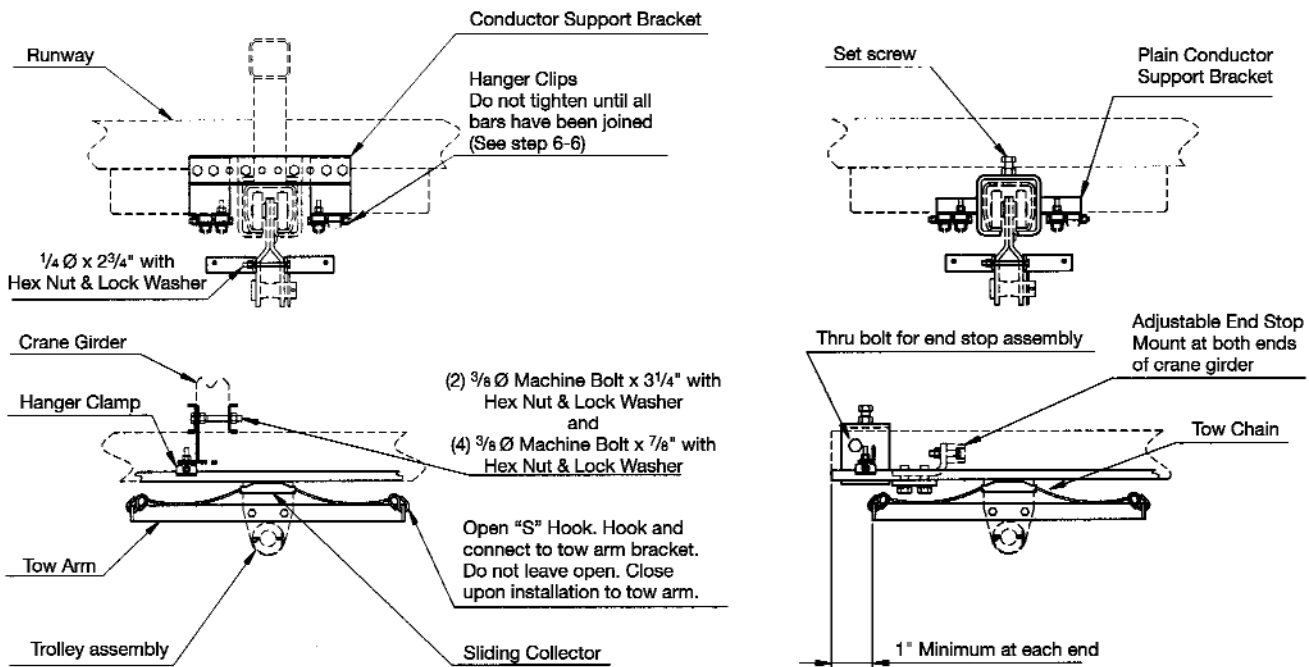


FIGURE 15

5. Install a conductor support bracket on every other vertical tube on the crane and a plain track type 5. bracket at each end of the crane (see Figure 16). Mount the conductor bars on the brackets covering the full length of the crane as per step 6-6 below. Slide on the collectors (with tow chains attached) on the conductors at any convenient point or time. Mount the tow arm on the trolley with screws (see chart on page 12 for torque setting). Attach the "S" hooks of the tow chains to the tow arms. Move the trolley towards each end of the crane and set the adjustable end stops to keep the ends of the pusher bracket 1 inch in from the ends of the track (see Figure 16). Be sure



Truss Track Bracket

FIGURE 16

Plain Track Bracket

(See Truss Track for similar details)

to tighten the bolts of the adjustable end stops (see chart on page 12 for torque setting).

6. Conductor bars are furnished in standard 10-foot sections with a joint clip on one end of the bar (see Figure 14). End of adjacent conductor slides into joint clip and is pulled up tight with a joint tool (furnished with system). Slide hanger clips on bar. Secure the clip mounting bolt to the support bracket. Make sure the bar slides smoothly inside each hanger clip (until joining operation is completed). Slide on the joint cover over bar. Insert joint tool into the holes at ends of the bars. Draw the bars together until they butt. Slide cover over joint. Tighten all clamps and bolts (see chart on page 12 for torque setting).
7. Check all bolts and nuts making sure lock washers are installed under the hex nuts or bolts.

See chart on *page 12* for torque setting.

STEP 7 – INSTALLING THE HOIST

1. Before installing the hoist, carefully read the manufacturer’s instructions and manual. Contact the supplier of your hoist if you have any questions. It is extremely important to follow the correct procedure for installing your hoist.
2. The hoists used with the LodeRail systems are the hook mounted type (see *Figure 17*). The hoist

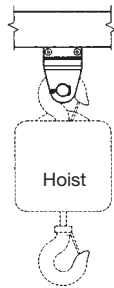


FIGURE 17

(Hook Mounted Hoist)

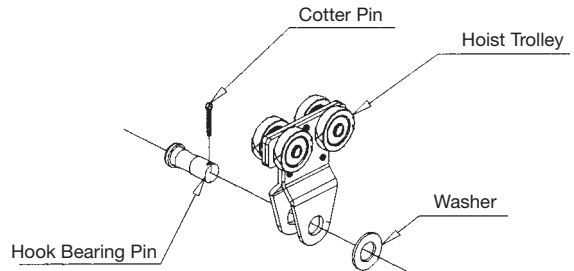


FIGURE 18

(250 to 2,000-Pound Capacity Trolley)

will have a hook on the top of its body that mounts on the hook bearing pin of the trolley.

3. 250-pound to 2,000-pound capacity trolleys are single unit assemblies with four wheels (see *Figure 18*). 4,000-pound capacity trolleys are made up of two 2,000-pound capacity

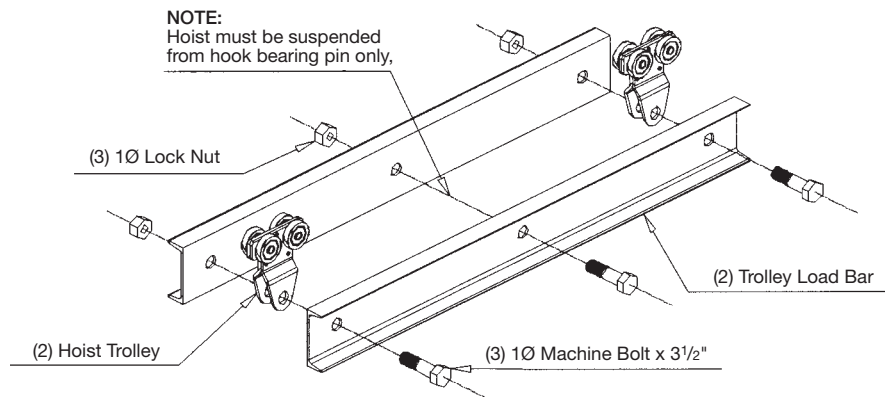


FIGURE 19

(4,000-Pound Capacity Trolley)

Hoist is to suspend from hook bearing pin only (Figure 18 & 19) and not from any other part of the trolley.

trolleys and a pair of load bars (see *Figure 19*).

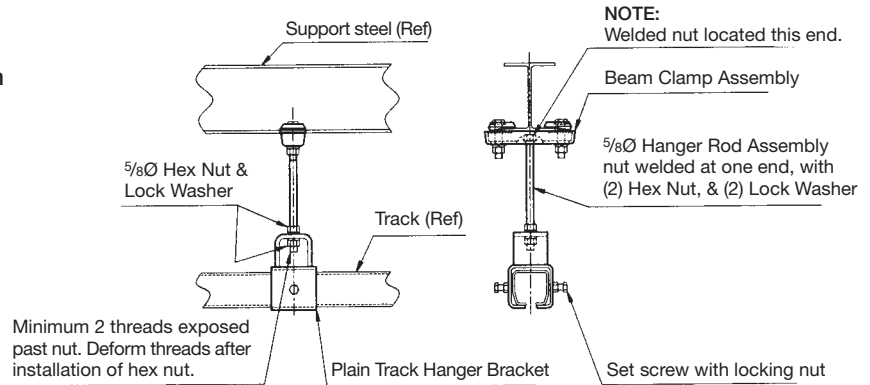
TORQUE SETTINGS

STEP NO.	LOCATION	BOLT SIZE	TORQUE SETTING
4-4	Beam Clamps	5/8" diameter	compress lock washer + 1/2 to 3/4 turn
4-4	Lower Bracket of Hanger Rod suspensions	5/8" diameter	compress lock washer + 1/2 to 3/4 turn
4-4	Hex Nuts on Hanger Rods	5/8" diameter	compress lock washer + 1/4 to 1/2 Turn
4-4	Bolts for Top Tube Splice Bars	5/8" diameter	compress lock washer + 1/4 to 1/2 Turn
4-4	Runway Coupler Set Screw Hex Nuts	1/2" diameter	1/4 to 1/2 Turn after full contact of hex nut
4-7	Bolts for Top Tube Splice Bars	5/8" diameter	compress lock washer + 1/4 to 1/2 Turn
4-7	Beam Clamps	5/8" diameter	compress lock washer + 1/2 to 3/4 turn
4-7	Lower Bracket of Hanger Rod suspensions	5/8" diameter	compress lock washer + 1/2 to 3/4 turn
4-7	Hex Nuts on Hanger Rods	5/8" diameter	compress lock washer + 1/4 to 1/2 Turn
4-7	Runway Coupler Set Screw Hex Nuts	1/2" diameter	1/4 to 1/2 Turn after full contact of hex nut
5-2	End Truck Coupler Set Screw Hex Nuts	1/2" diameter	1/4 to 1/2 Turn after full contact of hex nut
5-2	Bridge Girder End Stop	1/2" diameter	self locking hex nut, 0" to 1/32" slack
5-3	Runway End Stop	1/2" diameter	self locking hex nut, 0" to 1/32" slack
5-4	Bridge Girder Festoon End Clamp	5/16" diameter	compress lock washer + 1/4 to 1/2 Turn
5-7	Runway Festoon End Clamp	5/16" diameter	compress lock washer + 1/4 to 1/2 Turn
6-2	Adjustable End Stop on Bridge Girder	1/2" diameter	compress lock washer + 1/2 to 3/4 Turn
6-7	Conductor Brackets and Clamps	Assorted	1/4 to 1/2 turn after full contact of hex nut
7-3	Equalizer Pin (Bogies to Load Bar)	1" diameter	self locking hex nut, 0" to 1/32" slack

Up To 8" Flange Width

FIGURE 20

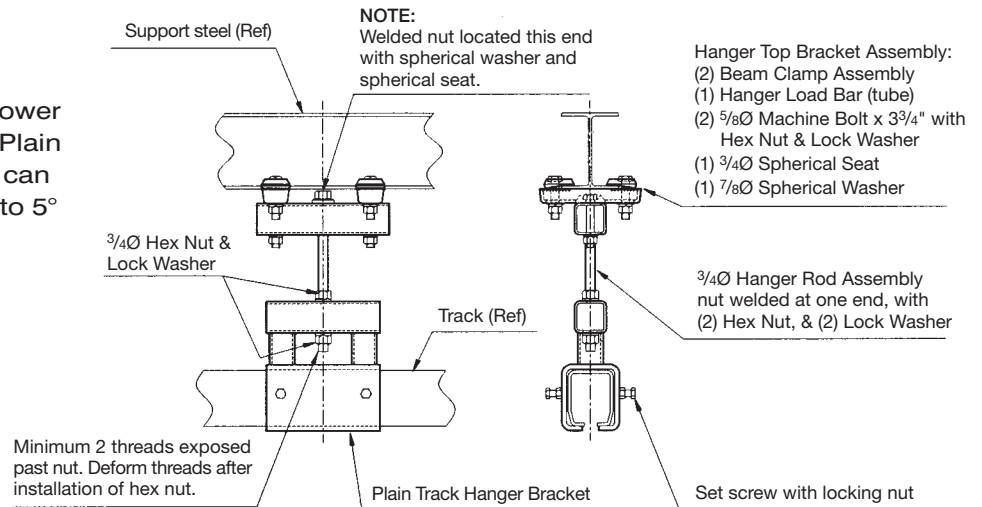
Beam Clamps with Hanger Rod and Lower Hanger Bracket for Plain Track (Hanger rods can be out of plumb up to 5° maximum)



Capacity	Beam Clamp	250 lbs.	500 lbs.	1,000 lbs.	2,000 lbs.
Hanger Assembly No.		05PHBC	05PHBC	10PHBC	20PHBC
Rod Diameter		5/8	5/8	5/8	5/8
Maximum Flange Width	LT-480	8	8	8	8
Maximum Flange Thickness	LT-480	5/16	5/16	5/16	5/16
Maximum Flange Width	20CHB	9 7/8	9 7/8	9 7/8	9 7/8
Maximum Flange Thickness	20CHB	1/2	1/2	1/2	1/2

FIGURE 21

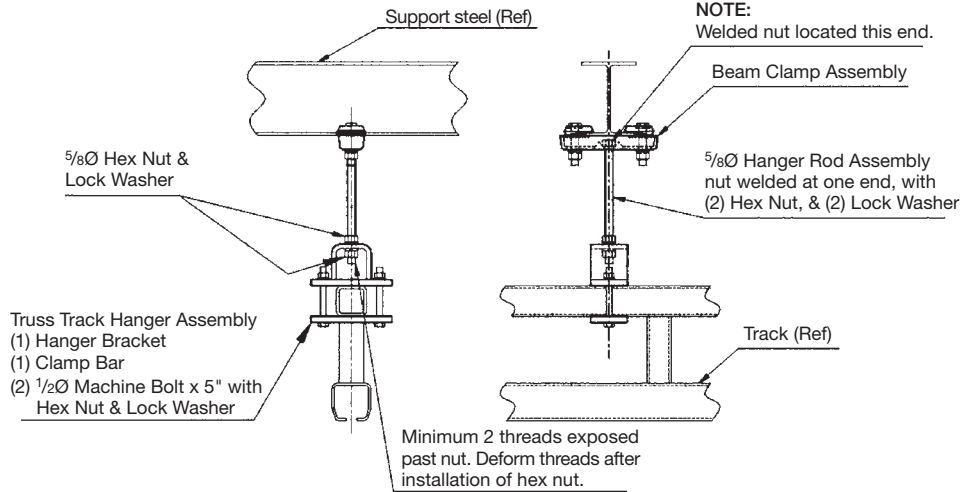
Beam Clamps with Hanger Rods and Lower Hanger Bracket for Plain Track (Hanger rods can be out of plumb up to 5° maximum)



Capacity	Beam Clamp	4,000 lbs.
Hanger Assembly No.		40THBC
Rod Diameter		3/4
Maximum Flange Width	LC-480	8
Maximum Flange Thickness	LC-480	5/16
Maximum Flange Width	20CHB	9 7/8
Maximum Flange Thickness	20CHB	1/2

FIGURE 24

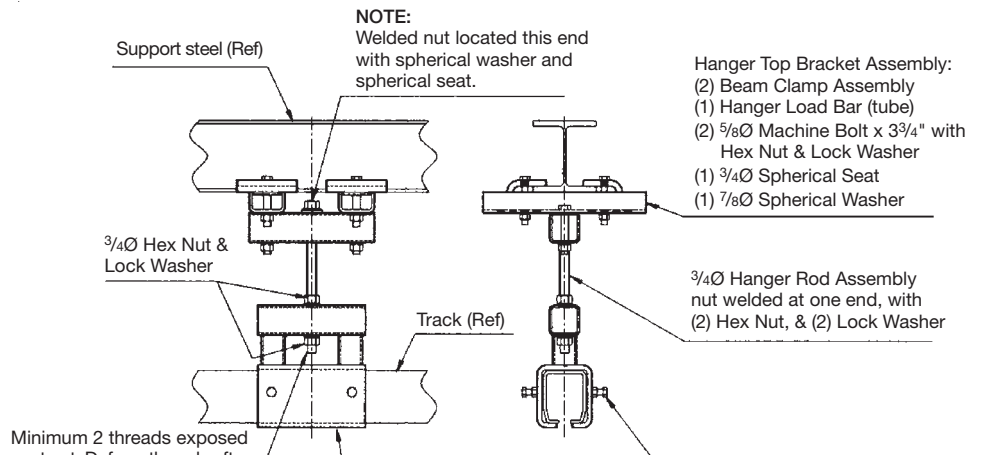
Beam Clamps with Hanger Rods and Lower Bracket for Trussed Track
(Hanger rods can be out of plumb up to 5° maximum)



Capacity	Beam Clamp	250 lbs.	500 lbs.	1,000 lbs.	2,000 lbs.
Hanger Assembly No.		05THBC	05THBC	10THBC	20THBC
Rod Diameter		5/8	5/8	5/8	5/8
Maximum Flange Width	LTC-480	8	8	8	8
Maximum Flange Thickness	LTC-480	5/16	5/16	5/16	5/16
Maximum Flange Width	20CHB	9 7/8	9 7/8	9 7/8	9 7/8
Maximum Flange Thickness	20CHB	1/2	1/2	1/2	1/2

FIGURE 25

Beam Clamps with Hanger Rods and Lower Bracket for Trussed Track
(Hanger rods can be out of plumb up to 5° maximum)



Capacity	Beam Clamp	4,000 lbs.
Hanger Assembly No.		40THBC
Rod Diameter		3/4
Maximum Flange Width	C-480	8
Maximum Flange Thickness	C-480	5/16
Maximum Flange Width	20CHB	9 7/8
Maximum Flange Thickness	20CHB	1/2

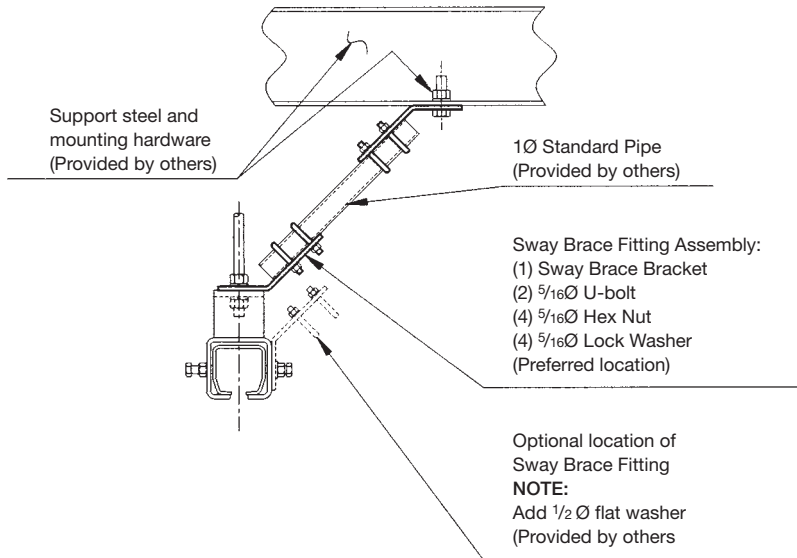


FIGURE 26

Example of Plain Track System
with Sway Brace End Fitting
Part No. LT-C562

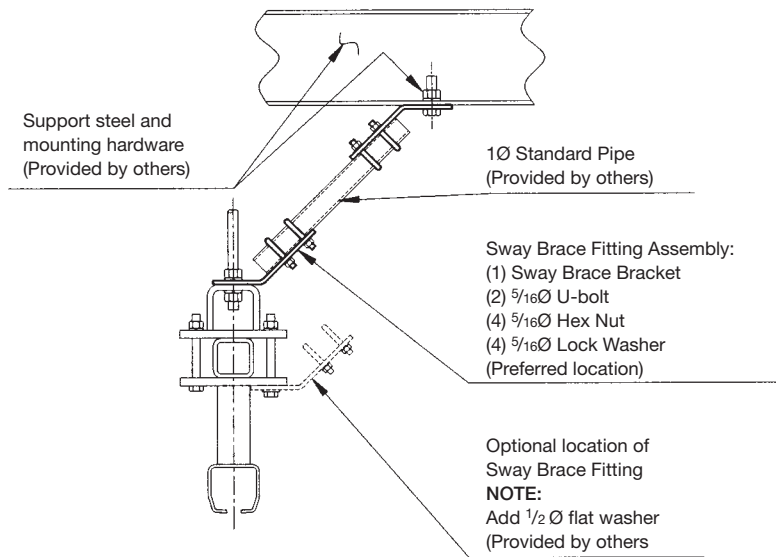


FIGURE 27

Example of Trussed Track
System with Sway Brace End
Fitting Part No. LT-C562

Where track is suspended from hanger rods, sway bracing is required to avoid damage from lateral and longitudinal loads. A typical sway brace uses a 1" standard pipe with the LT-C562 end fittings. The end fittings are furnished with U-bolts that will clamp around the outside of a 1" standard pipe. The sway brace is most effective if installed at an angle of approximately 45° with the hanger rod. The spacing and the location of the sway bracing is determined by a combination of the length of the system and the distance of the drop from the ceiling. Columbus McKinnon Corporation recommends sway bracing for any system that uses a hanger rod suspension. All four corners of the system should be braced both laterally and longitudinally, and bracing must be located at or near each support location.

Sway brace member may also vary due to its length and the type of resistance that it provides. If the slenderness limit (defined by AISC or other codes) of the 1" pipe is exceeded, it is recommended that structural tubing or structural angles be used.

Consult a professional engineer for approval of the bracing system and braces.

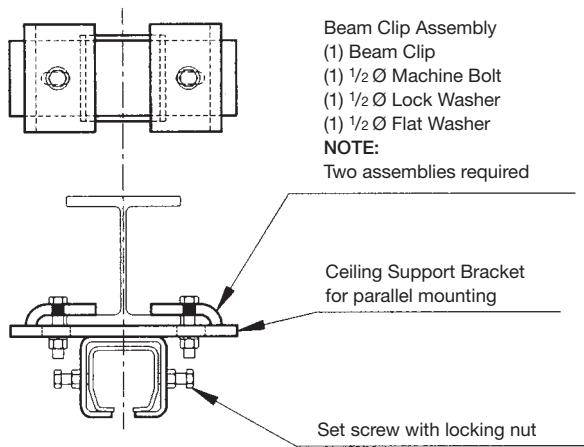


FIGURE 28
 Parallel Mount

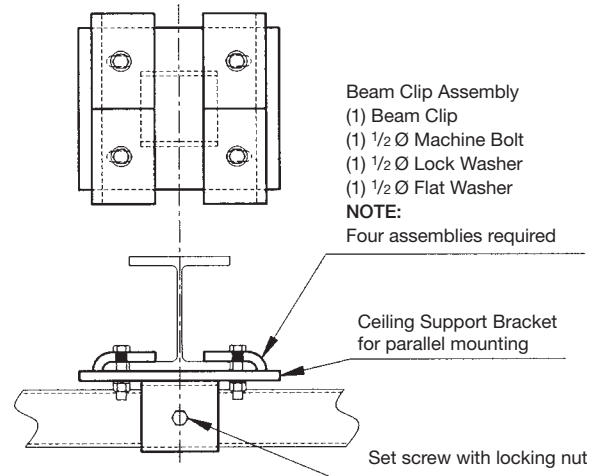


FIGURE 29
 Perpendicular Mount

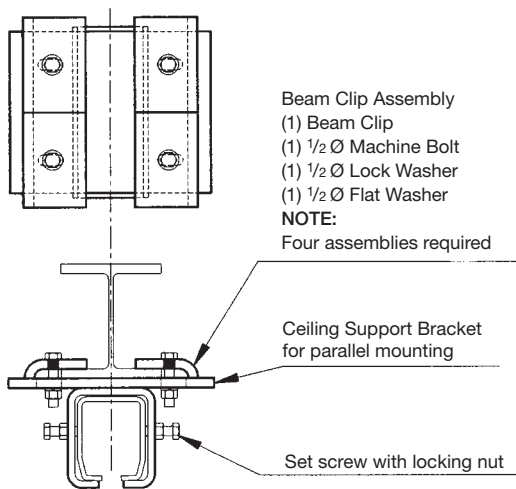


FIGURE 30
 Parallel Mount

Figures 28, 29 and 30 are direct to support clamp connections. Supporting members must be level and flat.

CRANE OPERATION AND PERIODIC INSPECTION

FOR CEILING MOUNTED LODERAIL

CRANE OPERATION

Overhead cranes are versatile machines that handle material overhead and can pick and place material within the crane's bridge length and runway length. However, to avoid accidents it is important that crane operators be qualified as well as properly trained and instructed regarding crane operation. The following information is provided as a guide to assist crane owners. Reference should also be made to ANSI/ ASME B30.11 titled Monorails and Underhung Cranes, ANSI/ASME B30.16 titled Overhead Hoists (Underhung) and applicable OSHA regulations, state codes and local codes.

CRANE OPERATOR QUALIFICATIONS

Crane operators must meet the qualification requirements contained in ANSI/ASME B30.11. For floor operated equipment, operators are required to pass a practical operating examination with qualification limited to the specific equipment for which they were examined.

Attaching the Load

- Make certain that the hoist chain/rope is free of kinks and twists, and not wrapped around the load.
- Make sure load to be moved is directly under hoist and does not exceed hoist/crane capacity.
- Attach the load to the hoist load hook. Make sure load is applied to base or bowl of hook and not against hook latch.
- Make certain that load, hoist load hook, sling, and other attachments are clear of all obstacles.

Hoist Motion

Refer to the hoist manufacturers operating instructions and ANSI/ASME B30. 16. Park empty hoist hook above head level to avoid personnel from bumping into hook.

Trolley Motion

Before moving the load, to avoid load swinging make sure hoist is directly over load. Always apply trolley motion slowly and reduce trolley speed gradually. Stay clear of load during movement.

Bridge Motion

Before moving the load, to avoid load swinging make sure hoist is directly over load. Always initiate bridge motion slowly. When approaching the location where the load is to be spotted, gradually reduce the bridge speed to zero.

GENERAL INFORMATION

- For proper crane operation, crane operators need to be familiar with the main parts of the crane and be thoroughly familiar with crane controls, crane functions, and crane movements. The operator should also know the location and be able to operate the main runway conductor disconnect means for all crane power.
- The crane operator is directly responsible for proper operation of the crane. Whenever there is a safety concern, the crane should be stopped and no load moved until the matter has been resolved to the operator's satisfaction. No person is to ride on the load or hook at any time.
- At the beginning of each shift, test the crane and any attachments by moving the crane trolley, bridge, and hoist and checking for proper operation. Observe for unusual motions and noises. Refer findings to appropriate supervisor.

OPERATING GUIDELINES

- Operate crane smoothly. Remove slack from slings and attachments before lifting load. Avoid jerky motions.
- Center load hook over load to avoid swinging of load. Lift only vertically from under crane hoist. Do not make side pulls.
- Make sure everyone is aware load is to be moved and is clear of load.
- Make sure load does not exceed capacity or working load limit of hoist, crane, sling or other attachments.
- Before moving the load, verify that load sling or other load attachment is fully seated in hook bowl/saddle and that hook latch is closed.

- When moving the load make sure the load clears all potential obstructions while keeping the load as near the floor as possible. This will enhance load control while minimizing the hazard of the suspended load.
- When approaching runway and trolley stops, approach them slowly with caution to avoid impact loading.
- Always be aware of others in the area of the crane and advise others of the intention to operate the crane to move the load.
- Do not leave a suspended load unattended. When a load is suspended, the crane controls should be in the operator's possession.
- Minimize the potential of snagging by securing loose sling hooks and attachments. Also, remove slings and attachments from crane hoist hook when not in use. Dangling hooks can snag objects when moving empty crane hoist hook.
- Do not carry loads or empty crane hoist hooks over personnel. Use extreme caution when using magnet and vacuum devices. Power loss can result in load loss.
- Observe the following when leaving the crane unattended:
 - Raise hook(s) to a position above head level to prevent personnel from coming in contact with hooks.
 - Spot the crane at an approved designated location.
 - Place all controls in "off" position.
 - Make sure main power switch is in "off" position.
 - Observe area before leaving to make certain area is secure.
- During any and all maintenance or in the event of an emergency, warning signs or signals should be displayed and the main line disconnect switch locked in the off position per ANSI Z244.1.

**FOR ADDITIONAL INFORMATION
READ AND OBSERVE ANSI/ASME B30.11 AND B30.16 AND
HOIST MANUFACTURERS MANUAL.**

PERIODIC INSPECTION

Every 2000 hours of crane operation or yearly, perform a close visual inspection of the entire crane assembly. Pay particular attention to the items cited in the following torque settings Table.

TORQUE SETTINGS

INSTALLATION STEP NO.	LOCATION	BOLT SIZE	TORQUE SETTING
4-4	Beam Clamps	5/8" diameter	compress lock washer + 1/2 to 3/4 turn
4-4	Lower Bracket of Hanger Rod suspensions	5/8" diameter	compress lock washer + 1/2 to 3/4 turn
4-4	Hex Nuts on Hanger Rods	5/8" diameter	compress lock washer + 1/4 to 1/2 Turn
4-4	Bolts for Top Tube Splice Bars	5/8" diameter	compress lock washer + 1/4 to 1/2 Turn
4-4	Runway Coupler Set Screw Hex Nuts	1/2" diameter	1/4 to 1/2 Turn after full contact of hex nut
4-7	Bolts for Top Tube Splice Bars	5/8" diameter	compress lock washer + 1/4 to 1/2 Turn
4-7	Beam Clamps	5/8" diameter	compress lock washer + 1/2 to 3/4 turn
4-7	Lower Bracket of Hanger Rod suspensions	5/8" diameter	compress lock washer + 1/2 to 3/4 turn
4-7	Hex Nuts on Hanger Rods	5/8" diameter	compress lock washer + 1/4 to 1/2 Turn
4-7	Runway Coupler Set Screw Hex Nuts	1/2" diameter	1/4 to 1/2 Turn after full contact of hex nut
5-2	End Truck Coupler Set Screw Hex Nuts	1/2" diameter	1/4 to 1/2 Turn after full contact of hex nut
5-2	Bridge Girder End Stop	1/2" diameter	self locking hex nut, 0" to 1/32" slack
5-3	Runway End Stop	1/2" diameter	self locking hex nut, 0" to 1/32" slack
5-4	Bridge Girder Festoon End Clamp	5/16" diameter	compress lock washer + 1/4 to 1/2 Turn
5-7	Runway Festoon End Clamp	5/16" diameter	compress lock washer + 1/4 to 1/2 Turn
6-2	Adjustable End Stop on Bridge Girder	1/2" diameter	compress lock washer + 1/2 to 3/4 Turn
6-7	Conductor Brackets and Clamps	Assorted	1/4 to 1/2 turn after full contact of hex nut
7-3	Equalizer Pin (Bogies to Load Bar)	1" diameter	self locking hex nut, 0" to 1/32" slack

