

# **ASSEMBLY INSTRUCTION MANUAL**

## **SINGLE & DOUBLE GIRDER TOP RUNNING BRIDGES WITH INDIVIDUAL MOTOR DRIVEN TRUCKS**

**Single Girder Rated Loads;**  
1 thru 15 Tons / 2000 thru 30,000 lbs.  
1 thru 15 tonnes / 1000 thru 15,000 kg.

**Double Girder Rated Loads;**  
5 thru 20 tons / 10,000 thru 40,000 lbs.  
5 thru 20 tonnes / 5000 thru 20,000 kg.

**Follow all instructions and warnings in building this bridge.**

The building of any bridge presents some risk of personal injury or property damage. That risk is greatly increased if proper instructions and warnings are not followed. Before starting construction the builder should become thoroughly familiar with all warnings, instructions and recommendations in this manual.

**Retain this manual for future reference and use.**



## TO BUILD TOP RUNNING SINGLE & DOUBLE GIRDER CRANE BRIDGES

**THE INFORMATION CONTAINED IN THIS MANUAL IS FOR INFORMATIONAL PURPOSES ONLY AND THE MANUFACTURER DOES NOT WARRANT OR OTHERWISE GUARANTEE (IMPLIED OR EXPRESSLY) ANYTHING OTHER THAN THE COMPONENTS MANUFACTURED AND ASSUMES NO LEGAL RESPONSIBILITY (INCLUDING, BUT NOT LIMITED TO CONSEQUENTIAL DAMAGES) FOR INFORMATION CONTAINED IN THIS MANUAL.**

### GENERAL

The assembly and manufacturing instructions in this manual are for use in conjunction with the manufacturers components identified by catalog numbers listed in this manual.

The supplied components are designed to conform with the requirements of CMAA 70 Specifications for Top Running Bridge & Gantry Type Multiple Girder Electric Overhead Traveling Cranes & CMAA 74, Specification for Top Running & Under Running Single Girder Electric Traveling Cranes Utilizing Under Running Trolley Hoist and ANSI B30.2 Overhead and Gantry Cranes and ANSI B30.17, Safety Standard for Overhead and Gantry Cranes.

### NOTICE

It is the installer's responsibility to assure that the crane assembly complies in total with all applicable local, state and national codes and standards including those mentioned herein. Crane wiring should be done by a licensed electrician and be in accordance with the National Electric Code (ANSI/NFPA 70).

The crane bridges described in this manual are intended for normal indoor service. Bridges to be used for outdoor or unusual service require special consideration.

This manual illustrates specific configurations for the range of coverage shown, specifically from 10 foot thru 60 foot spans and up to and including 15 tonne single girder capacity and 10 foot thru 50 foot spans and up to and including 20 tonne double girder capacity. Minor deviations to the configurations shown may be made providing that any changes and/or alterations to those shown, be performed only by a properly qualified person. The manufacturer accepts no responsibility for any altered bridge configurations.

### ⚠ WARNING

**NON-FACTORY AUTHORIZATIONS OR MODIFICATION OF EQUIPMENT AND USE OF NON-FACTORY REPAIR PARTS CAN LEAD TO DANGEROUS OPERATION AND INJURY.**

**TO AVOID INJURY:**

- Do not alter or modify equipment without factory authorization.**
- Do use only factory provided replacement parts.**

Material listed by catalog numbers are applicable only to crane configurations outlined in this manual, specifically limited to a maximum rated load of 15 tonnes and a maximum span of 60 feet for single girder and maximum rated load of 20 tonnes and a maximum span of 50 feet for double girder.

For a complete list of end trucks and rail sizes refer to the Crane Kits and Components Rotating Axle End Truck Specification Book (YLT/P-2002-0409).

**RUNWAYS:** Runway beams on which these cranes will operate must be amply strong to support crane bridge, hoisting equipment, rated load and must meet all runway parameters listed in CMAA 70 Specifications for Top Running Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes and CMAA 74 Specification for Top Running and Under Running Single Girder Electric Overhead Cranes Utilizing Under Running Trolley Hoist. Runway rails must be level and parallel within  $\pm 1/8"$ . Rail joints must be smooth and held firmly in alignment either by bolted splice bars or welding. Rails should be securely fastened to runway beam.

### MATERIAL TO BE PURCHASED LOCALLY TO COMPLETE A CRANE BRIDGE

**STRUCTURAL STEEL:** All structural steel should be first quality, free from rust and excessive mill scale, and conform to ASTM A36, ASTM A 572 or ASTM A 992 Grade 50 Standard Specification for Structural Steel.

### BRIDGE GIRDERS

**BRIDGE BEAMS:** Girder selections can be accomplished by using one of the following methods.

1. Using the Yale Shaw-Box Crane Estimator Program located at [www.yaleshawbox.com](http://www.yaleshawbox.com) for authorized Yale Shaw-Box distributors.
2. Using the girder Selection Tables located in the hoist dimension & specification book for the hoist that you will be using in your bridge crane system.
3. Contact our customer service department for assistance at 800-742-9269.

The beam which is selected to be used for the bridge girder must be straight with flanges parallel to each other and flanges 90 degrees to the web. See Figure 1 below.

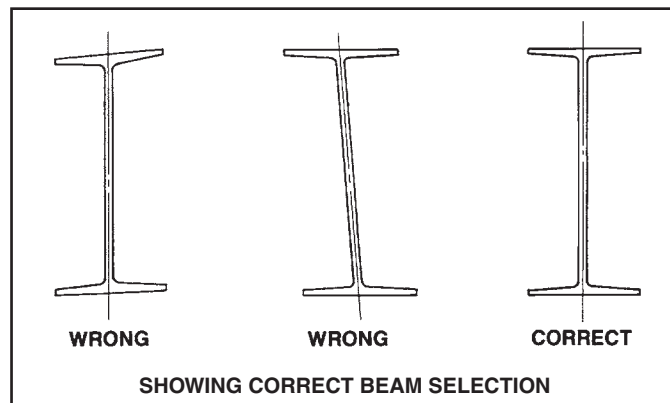


Figure 1.

## **⚠ WARNING**

Selection of structural steel beams must be verified by a qualified engineer. IT IS IMPORTANT THAT ALL INSTRUCTIONS BE FOLLOWED AND THAT COMPONENT APPLICATION LIMITS NOT BE EXCEEDED.

## **NOTICE**

Assembly of beam and channel requires welding. IT IS EXTREMELY IMPORTANT TO THE SAFETY OF THIS BRIDGE THAT THIS WELDING BE DONE BY A COMPETENT WELL TRAINED WELDER. It is our strong recommendation that the welder used in this construction be qualified as prescribed by the American Welding Society (AWS) Structural Welding Code - Steel D1.1-2008 and Specification for Welding Industrial and Mill Cranes D14.1 - 2005.

## **FABRICATION OF GIRDER(S) FOR BRIDGE BEAM WITH CAPPING CHANNEL**

Refer to Figure 2. Place channel on supports as shown in Step I. The beam is sighted for camber and placed with camber in direction shown in Step II. Weld one end of the channel to the beam. Clamp, with "C" clamps, the channel to the beam flange. Provide sufficient "C" clamps so as to hold the channel in contact with the beam.

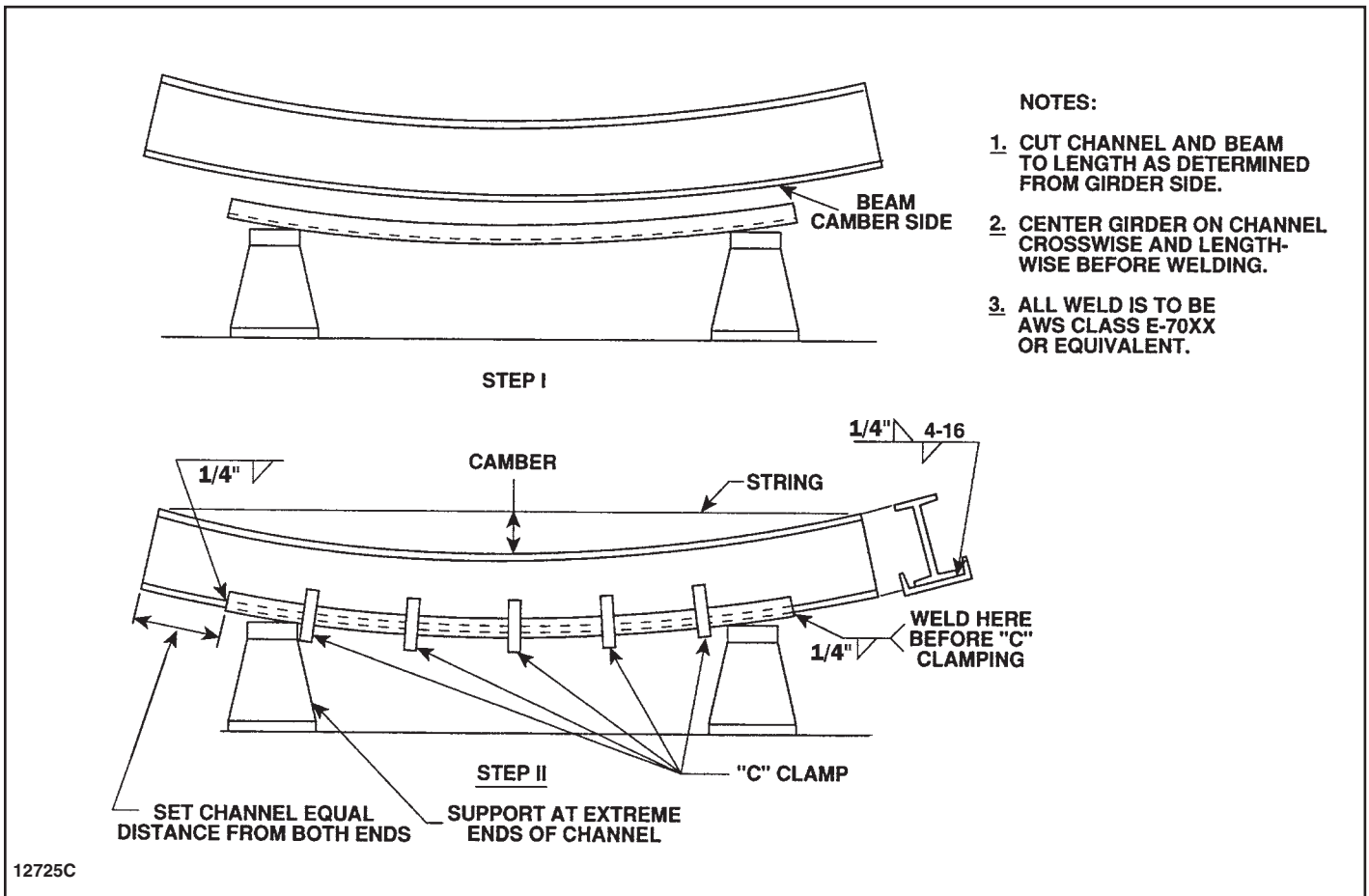


Figure 2.

Weld in accordance with the weld information given, starting at one end, staggering the weld from side to side, proceeding to the opposite end of the channel without interruption. It is important to stagger the weld from side to side in order to retain beam straightness. After welding, draw a taut string from end to end of beam as shown. Beam should either be parallel to string or have some camber. Camber should not exceed 1/888 of span.

### ASSEMBLING BRIDGE GIRDER TO END TRUCKS (SINGLE GIRDER ONLY)

1. Refer to figure 5 & 5A, Bridge Bolted Plate End Connection. Make the notch to the dimensions shown with a 1/2" radius at the intersection of the cuts with a cutting torch or plasma burner and smooth the burned area by grinding. Support beam about two feet from each end on a pair of horses, or other suitable support (adjustable, with clamping ability is preferred). Place beam on supports so that camber side is at top. In case of beams with capping channels the channel side is up. When setting up the beam on supports, make certain that **the bottom flange is level**, as shown in figure 3.

2. Locate end trucks in the notch of the girder, one at each end of the girder. Make certain trucks are level with each other and are level with the bottom flange of the beam as shown in Figure 3. The girder web is centered on the truck wheelbase.

It is quite possible that the top flange of the girder is not level even though the bottom flange is level. **DO NOT LEVEL FROM ROUGH TRUCK STRUCTURE.** Correct operation of the hoist-trolley requires that **the bottom flange is level**.

3. To check the distance between the trucks, push all truck wheels in one direction. The distance from the outside of the wheel on one side of the span to the inside of the wheel on the other side of the span should equal the span length, see figure 4. The tolerance on this distance is  $\pm 1/32$ "

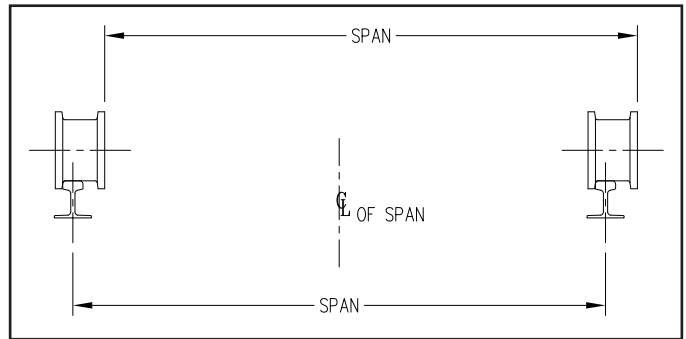


Figure 4. Checking Wheels

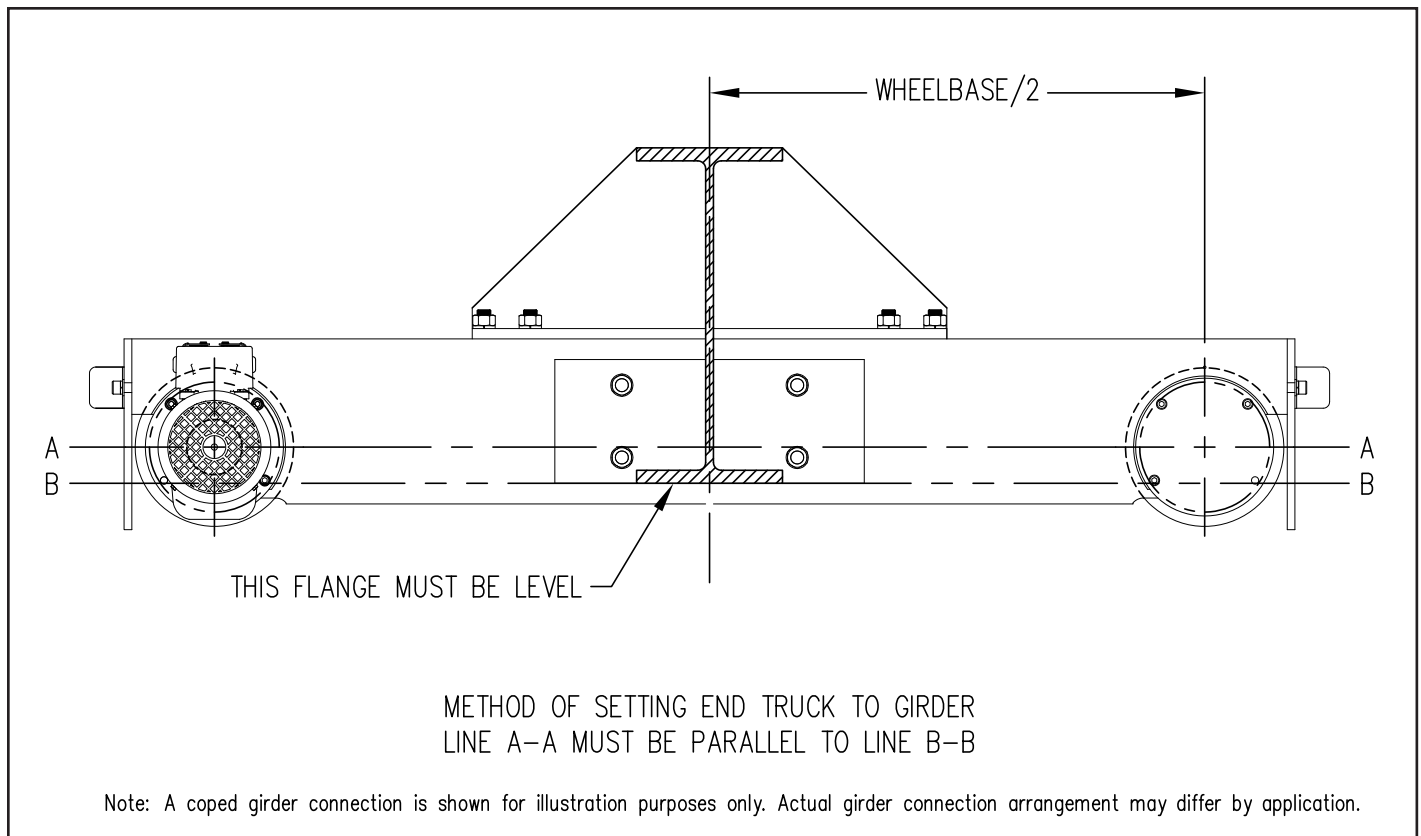


Figure 3.

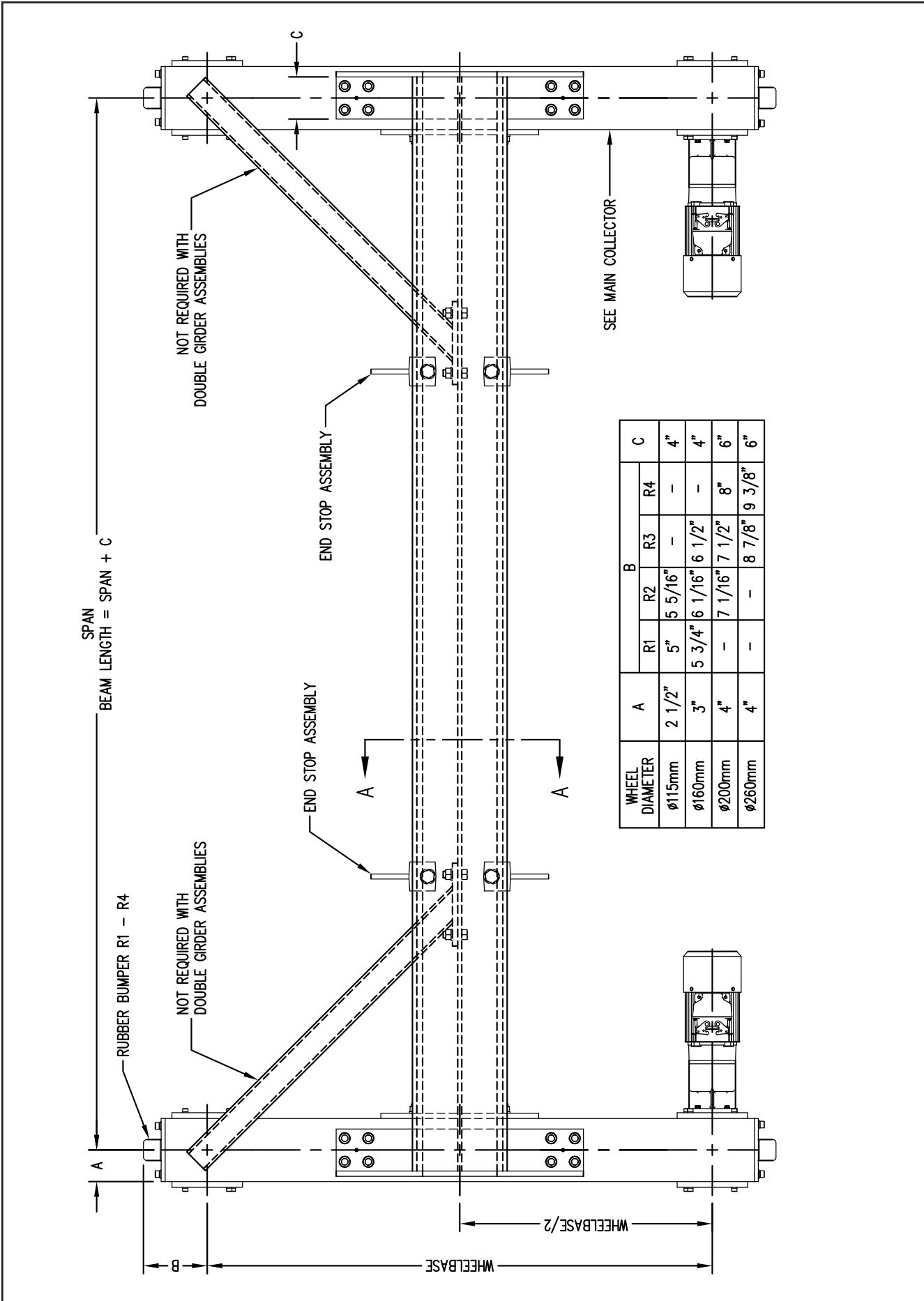
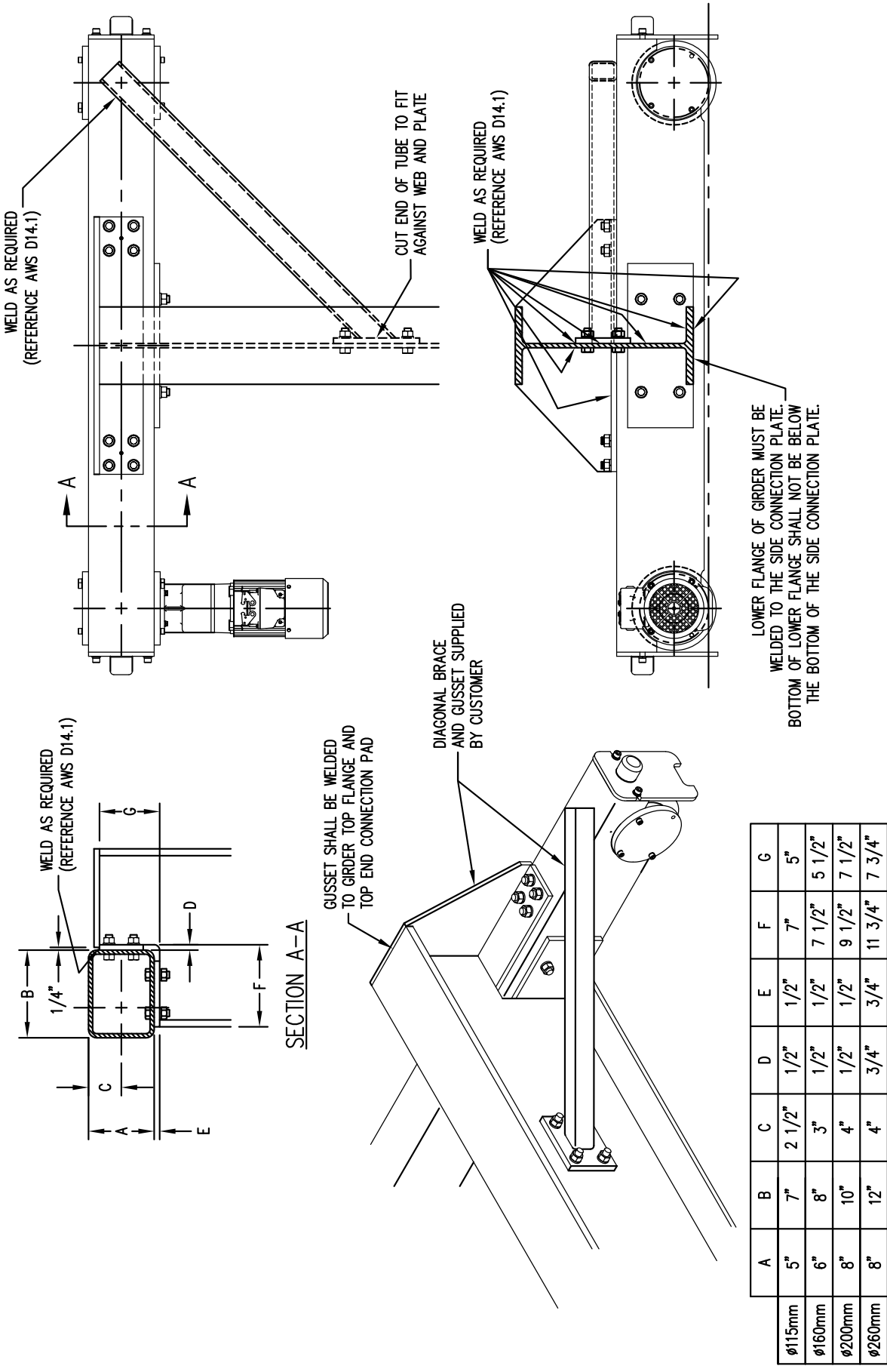


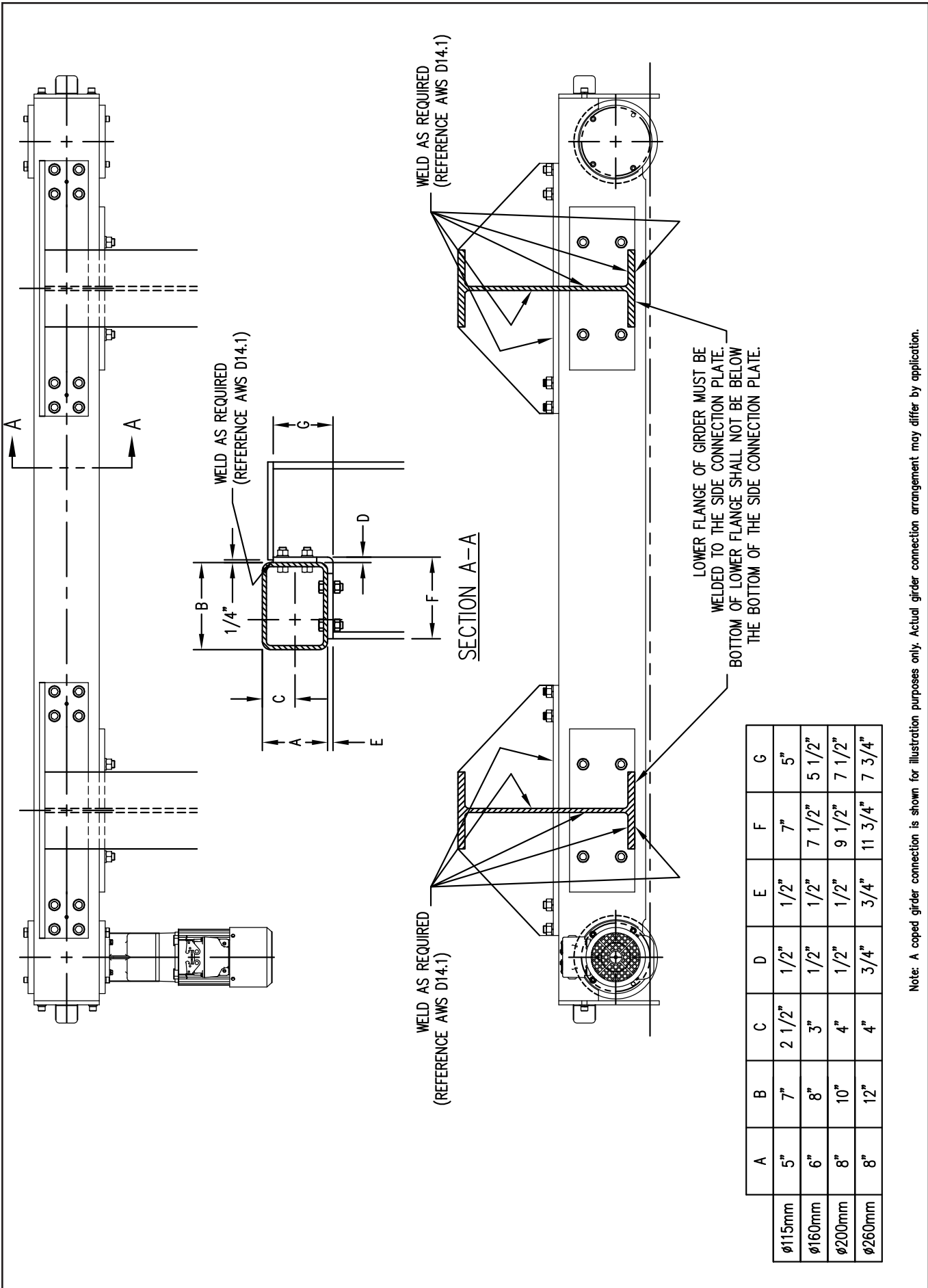
Figure 5. Bridge Bolted Plate End Connection



Note: A coped girder connection is shown for illustration purposes only. Actual girder connection arrangement may differ by application.

Figure 5a. Bridge Bolted Plate End Connection - Single Girder

	A	B	C	D	E	F	G
Ø115mm	5"	7"	2 1/2"	1/2"	1/2"	7"	5"
Ø160mm	6"	8"	3"	1/2"	1/2"	7 1/2"	5 1/2"
Ø200mm	8"	10"	4"	1/2"	1/2"	9 1/2"	7 1/2"
Ø260mm	8"	12"	4"	3/4"	3/4"	11 3/4"	7 3/4"



Note: A coped girder connection is shown for illustration purposes only. Actual girder connection arrangement may differ by application.

Figure 5b. Bridge Bolted Plate End Connection - Double Girder

4. There are measuring dimples available on the face of the truck above the axles. To check the squareness, use a spring scale on the end of a steel tape and measure diagonally across the crane. Then measure across the opposite diagonal with the same force on the scale. These dimensions should be within 1/16" of each other.

Any other method of squaring the trucks that gives comparable results may be used.

After squaring the trucks double check the span at both ends of the trucks.

5. After assuring that the trucks are accurately positioned and squared, complete girder connections as shown in figure 3.

6. Girder Connection plates come bolted and tack welded to the end truck from the factory.

After preparing the connection plates for welding, weld the girder beam on the top connection plate for top mounted girders. For coped girders, weld the girder on both the top and side mounted connection plates. Bottom of the girder beam shall not be below the bottom of the side connection plate as shown in figure 6.

Customer supplied gusset plates shall be welded to the top flange of the girder and top edge of the girder connection plate. If needed, additional customer supplied diagonal bracing may be installed as shown in Figure 5a.

### ASSEMBLING BRIDGE GIRDER TO END TRUCKS (DOUBLE GIRDER ONLY)

1. Refer to figure 5 & 5B. Bolt Plated End Connection. Make the notch to the dimensions shown with a 1/2" radius at the intersection of the cuts with a cutting torch or plasma burner and smooth the burned area by grinding. Support beam about two feet from each end on a pair of horses, or other suitable support (adjustable, with clamping ability is preferred). Place beam on supports so that camber side is at top. In case of beams with

capping channels the channel side is up.

When setting up the beams on supports, make certain that **the top flanges at the trucks are level** as shown in figure 6.

2. Locate end trucks in the notch of the girders, one at each end of the girders. Make certain girders are level with each other and are level at the four points as shown in figure 6.

It is quite possible that the bottom flange of the girders are not level even though the girders are set in accordance with step 2. **DO NOT LEVEL FROM ROUGH TRUCK STRUCTURE.** Correct operation of the hoist-trolley requires that **the top flanges are level.** Girder webs shall be vertical.

3. To check the distance between the trucks, push all truck wheels in one direction. The distance from the outside of the wheel on one side of the span to the inside of the wheel on the other side of the span should equal the span length, see figure 7. The tolerance on this distance is  $\pm 1/32"$ .

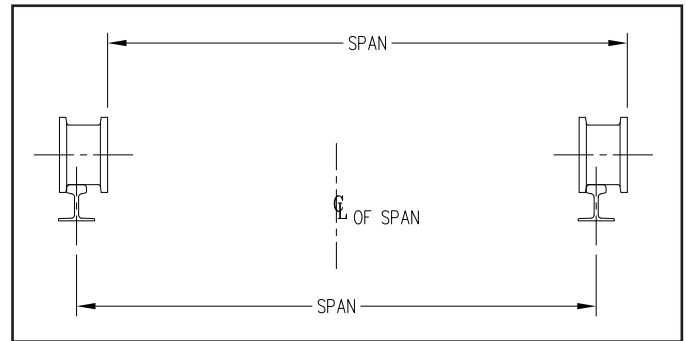
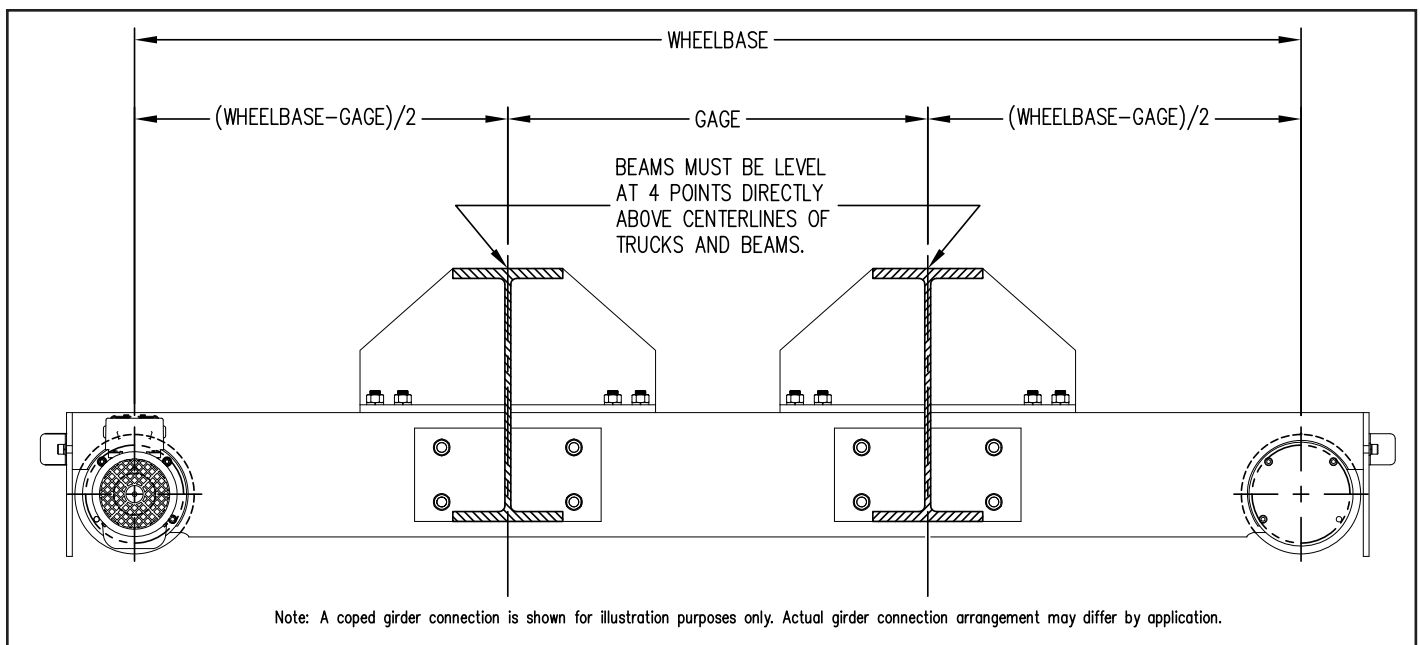


Figure 7. Checking Wheels



Note: A coped girder connection is shown for illustration purposes only. Actual girder connection arrangement may differ by application.

Figure 6. Method of Setting End Truck to Girders



4. For Squaring Crane there are measuring dimples available on the inside faces of the truck above the axles. To check the squareness, use a spring scale on the end of a steel tape and measure diagonally across the crane. Then measure across the opposite diagonal with the same force on the scale. These dimensions should be within 1/16" of each other.

Any other method of squaring the trucks that gives comparable results may be used.

After squaring the trucks double check the span at both ends of the trucks.

5. After assuring that the trucks are accurately positioned and squared, complete girder connections.

6. Girder Connection plates come bolted and tack welded to the end truck from the factory.

After preparing the connection plates for welding, weld the girder beam on the top connection plate for top mounted girders. For coped girders, weld the girder on both the top and side mounted connection plates. Bottom of the girder beam shall not be below the bottom of the side connection plate as shown on figure 6.

Customer supplied gusset plates shall be welded to the top flange of the girder and top edge of the girder connection.

### COLLECTOR POLE AND BRACKET MOUNTING

Refer to figure 8 for collector pole and bracket mounting location. Weld collector pole mounting bracket sleeve to the end truck on the drive wheel side closest to the bridge panel. The builder must check to ensure that the proper spacing and location of the collector pole and collectors will clear all obstructions.

### **▲WARNING**

**The trolley frame and bridge frame shall not be considered as electrically grounded through the bridge and trolley wheels and its respective tracks. A 4th runway conductor and collector shall be provided for grounding.**

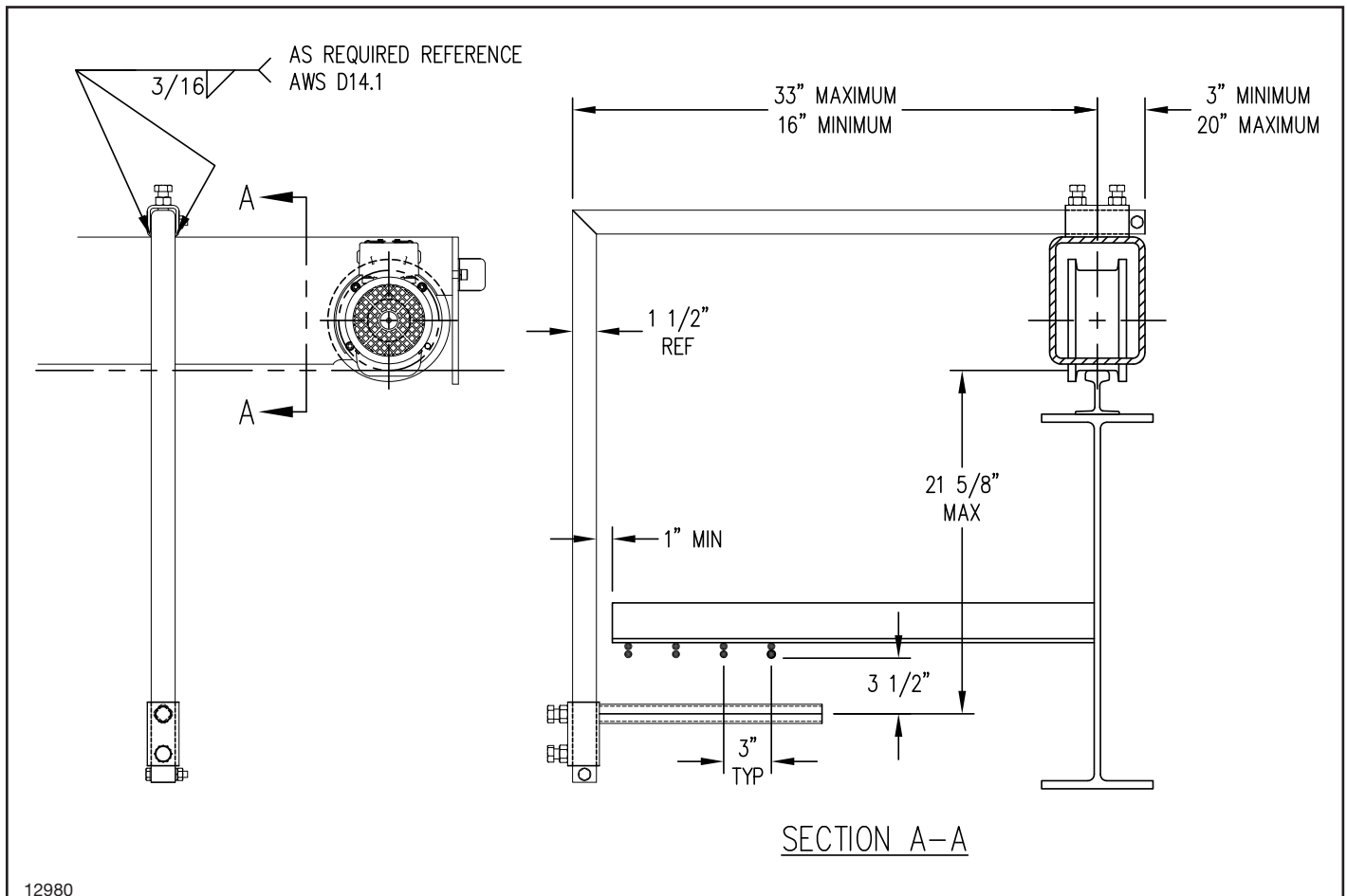
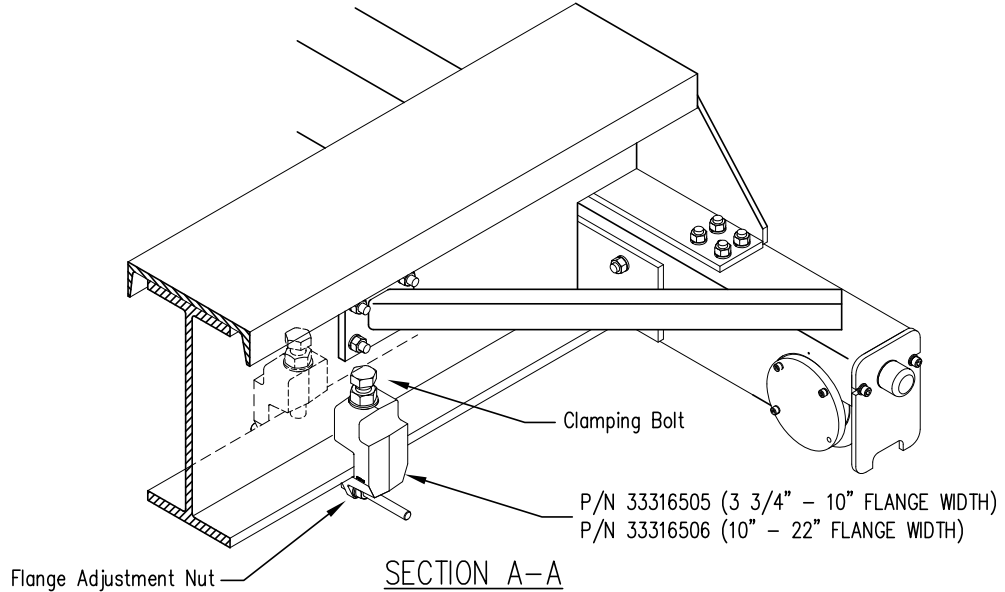


Figure 8. Main Collector Assembly.

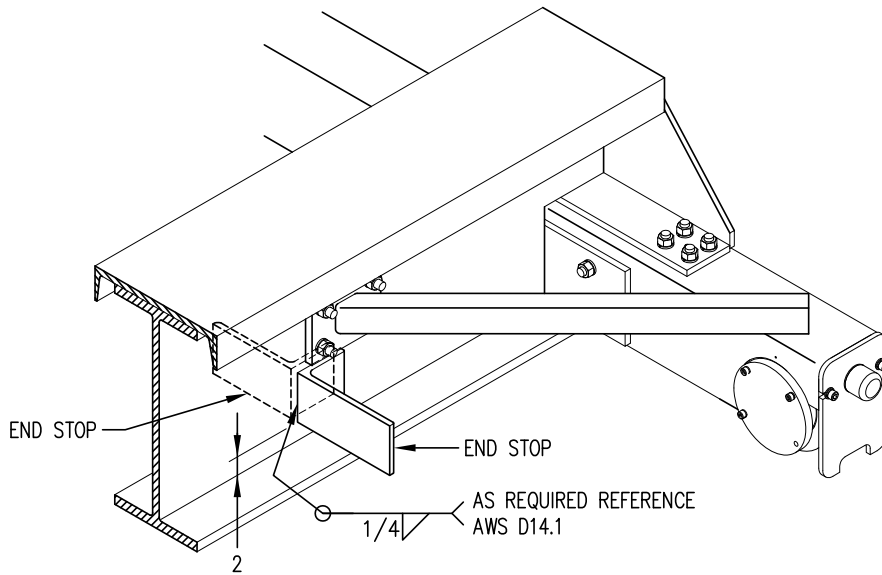
## END STOP ASSEMBLY

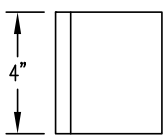
NOT FOR USE ON PATENTED TRACK,  
FLANGE WIDTHS LESS THAN 3 3/4", OR  
GREATER THAN 22"



(Position trolley stops to desired location depending on application)

## TROLLEY STOPS SUPPLIED BY CUSTOMER



TROLLEY STOPS		
BRIDGE BEAM FLANGE WIDTH	ANGLE SIZE	 LONGEST SIDE OF ANGLE MOUNTED PERPENDICULAR TO GIRDER WEB
3 5/8 TO 4	3 1/2 X 3 1/2 X 1/2	
4 1/8 TO 6 1/4	5 X 3 1/2 X 1/2	
6 5/8 TO 8 1/4	6 X 3 1/2 X 1/2	
8 5/8 TO 10 1/2	7 X 4 X 1/2	
10 5/8 TO 13	8 X 4 X 1/2	

Note: A coped girder connection is shown for illustration purposes only. Actual girder connection arrangement may differ by application.

**Figure 9. Bridge Details.**

## PAINTING

After all welding is completed and prior to installing the cross conductors, wire brush all steel and remove all scale, weld splatter, flux and any other foreign matter. Grease spots are to be cleaned using commercially available solvent. Wash with clear water an area six inches either side of all welds to remove flux residue.

The electrical panel must be closed, and areas such as the switch handle, Off-On identification, drive wheel open spline hole, and nameplate, etc., must be masked prior to painting.

Any national brand zinc-rich, chromate primer may be used and applied according to the manufacturer's directions. Final coat is recommended to be high gloss enamel, especially suited for steel surfaces and as recommended by any national brand paint manufacturer. Application must be in accordance with manufacturer's recommendations.

## MARKINGS

Codes require that the capacity of the bridge be shown on both sides of the crane, legible from the floor. Normal practice for marking is to use capacity in tons. For example: 1 TON, 2 TON, etc. Stencil forms are readily available that may be used with brush on or spray-can paint. Commercially available block letters and numerals with adhesive backing could also be used. Selection of size should be such that the sign can be easily read from the operating floor.

The builder's name shall also be placed on the crane in a prominent location along with a serial number or other means of crane identification.

## NOTICE

The crane builder and user are responsible for marking the crane and also to check for compliance with all local, state and national codes.

## INSTRUCTIONS FOR ASSEMBLING INDIVIDUAL DRIVES TO END TRUCKS

1. The gearmotor and brake are shipped as an assembly. Bolt this assembly to the drive wheel bearing cage with the supplied four hex head bolts with lockwashers. Using a torque wrench, tighten all bolts to 7.5 lb. ft. torque for 115 mm (4.5") and 160 mm (6.3") end trucks and 18 lb. ft. torque for 200 mm (7.9") and 260 mm (10.2") end trucks.

2. The electrical enclosure and fused disconnect switch is to be mounted where required by the crane builder. Assure all clearances.

## INSTALLING END STOPS

1. Locate and weld trolley stop angles or install end stop assemblies in the desired position on the girder depending on your application as shown on figure 9.

2. Ensure that the trolley stop angles or end stops are positioned to make contact with the trolley bumpers.

3. If you are installing the adjustable end stop assemblies, once

they are positioned correctly, tighten the flange adjustment nut to 48 ft. lbs. torque and the clamping nut to 207 ft. lbs. torque.

## WARNING

**Trolley stops (clip angles) or end stop assemblies must be installed on both ends of the bridge beam to prevent hoist trolley from running off the end of the beam, which could result in injury to the operator and others and damage to the load and other property.**

## PUSH BUTTON SYSTEM

The preferred way of operating the controllers on the crane from the floor is a festooned system sold as a kit. This is to be installed as shown in the literature supplied with this system.

## REMOVAL OF GIRDER FROM END TRUCKS (if required for shipping)

1. Because the girder connection plates are tack welded at the factory, these tack welds must be removed by grinding before the girder & plates can be removed.

2. Before the top girder connection plate can be removed, the positioning roll pins (top plate only) must be removed. Using a metal punch and hammer, drive the 8mm roll pin through the plate and end truck. The pin should drop into the inside of the end truck tube. Locate and save these pins for assembly.

3. After tack welds and roll pins are removed, all girder connection plate nuts & bolts can be removed.

4. The girder and plates can now be safely removed from the end trucks.

## RE-INSTALLING GIRDER & CONNECTION PLATES TO THE END TRUCKS

1. Position the girder and connection plates onto the end trucks.

2. Using the roll pins that were removed during girder removal, drive the roll pins into the top connection plates into the end truck tube until flush with top of connection plate.

3. The connection plate bolt holes should now be lined up with the bolt holes in the end truck.

4. Using a wrench or socket, tighten all nuts onto the bolts, using a torque wrench, tighten all nuts to 160 lb. ft. torque for 115 mm (4.5") & 160 mm (6.3") end trucks (M16 class 8.8) and 325 lb. ft. torque for 200 mm (7.9") & 260 mm (10.2") end trucks (M20 class 8.8).

## CRANE INSTALLATION

Prior to the start of any crane erection the building should be measured for spans of rails and clearances. These measurements should be checked against the corresponding crane measurements to insure correctness of "fit". After assurances

that the crane fits the building, determine orientation of the crane position with respect to the runway.

These types of cranes are usually lifted into position on the runway rails in one piece.

Immediately after the crane is placed on the runway rails check wheel flange clearances to the rail. Clearance between side of rail head and inside flange of wheel will vary from 3/8" to 1-1/8" depending on the wheel and rail combination and whether or not the truck is centered on the rail. Total wheel float should not be less than the 3/4" recommended by CMAA Specification #70.

**NOTE:** It is suggested that the trolley and hoist be installed on the crane bridge at this time so that all wiring connections can be completed.

### FUSE AND MAINLINE DISCONNECT PANELS

Mainline disconnect panels and fuse bridge control panels are provided as options to assist users in complying with OSHA codes. When ordering with crane, they will be completely installed inside of electrical enclosures.

Electrical service is to be connected to the crane equipped with fuse panels and mainline disconnect panels as shown in the proper wiring diagram. Wiring diagrams are shown on figure 10.

## **⚠ CAUTION**

**Power supply must be same voltage, frequency and phase as specified on crane motor nameplate.**

### BEFORE PLACING CRANE IN OPERATION

1. Load testing the crane shall be performed in accordance with ANSI/ASME B30.2 or B30.17, local, state and/or provincial codes and regulations. A written report should be prepared during the performance of this test and placed on file.

2. Please refer to the Operation, Service and Parts Manual #115326-19 for complete operation, service and maintenance information before placing the crane in service.

## LUBRICATION

See Operation, Service and Parts Manual (115326-19)

## SPECIFICATIONS

Specifications may be purchased from:

<u>Specification</u>	<u>Address</u>
ANSI	American National Standards Institute 11 W. 42nd Street, 13th Floor New York, NY 10036
ASCE	American Society of Civil Engineers 1801 Alexander Bell Drive Reston, VA 20191-4400
ASTM	American Society for Testing and Materials 100 Barr Harbor Drive West Conshohocken, PA 19428-2959
AWS	American Welding Society 550 N. W. LeJune Road Miami, FL 33126
CMAA	Material Handling Industry 8720 Red Oak Blvd., Suite 201 Charlotte, NC 28217-3992 (CMAA is Crane Manufacturers Association of America, Inc.)
NFPA	National Fire Protection Association 11 Tracy Drive Avon, MA 02322-9908
OSHA	Superintendent of Documents U.S. Government Printing Office Washington, DC 20402 (OSHA is Title 29 CFR Parts 1901.1 to 1910.999)

# Festoon Systems Bill of Material

Components	Quantity Per Span						Quantity Per Span						Quantity Per Span						Quantity Per Span						Quantity Per Span					
	Pendant Festooning						Hoist & Trolley Festooning 14 AWG						Hoist & Trolley Festooning 10 AWG						Hoist & Trolley Festooning 8 AWG						Hoist & Trolley Festooning 6 AWG					
	10'	20'	30'	40'	50'	60'	10'	20'	30'	40'	50'	60'	10'	20'	30'	40'	50'	60'	10'	20'	30'	40'	50'	60'	10'	20'	30'	40'	50'	60'
	4518646-19	4518646-29	4518646-39	4518646-49	4518646-59	4518646-69	4518646-14	4518646-24	4518646-34	4518646-44	4518646-54	4518646-64	4518646-10	4518646-20	4518646-30	4518646-40	4518646-50	4518646-60	4518646-18	4518646-28	4518646-38	4518646-48	4518646-58	4518646-68	4518646-16	4518646-26	4518646-36	4518646-46	4518646-56	4518646-60
CSA Approved Flat Cable #16-8C	52'	73'	94'	115'	136'	157'	30'	41'	52'	63'	74'	85'	30'	41'	52'	63'	74'	85'	30'	41'	52'	63'	74'	85'	30'	41'	52'	63'	74'	85'
CSA Approved Flat Cable #14-4C							30'	41'	52'	63'	74'	85'																		
CSA Approved Flat Cable #10-4C													30'	41'	52'	63'	74'	85'												
CSA Approved Flat Cable #8-4C																			30'	41'	52'	63'	74'	85'						
CSA Approved Flat Cable #6-4C																									30'	41'	52'	63'	74'	85'
Male Connector & Housing 4 Pole																			1	1	1	1	1	1	1	1	1	1	1	1
Male Connector & Housing 6 Pole							1	1	1	1	1	1	1	1	1	1	1	1												
Male Connector & Housing 10 Pole							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Male Connector & Housing 16 Pole	1	1	1	1	1	1																								
Female Connector & Housing 4 Pole																			1	1	1	1	1	1	1	1	1	1	1	1
Female Connector & Housing 6 Pole							1	1	1	1	1	1	1	1	1	1	1	1												
Female Connector & Housing 10 Pole							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Control Trolley	1	1	1	1	1	1																								
Tow Trolley							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Intermediate Trolley	1	3	5	7	8	9	1	3	5	7	8	9	1	3	5	7	8	9	1	3	5	7	8	9	1	3	5	7	8	9
Fixed Cable Clamp	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cross Arm 60"	5	7	9	11	13	15	5	7	9	11	13	15	5	7	9	11	13	15	5	7	9	11	13	15	5	7	9	11	13	15
Roller Track 10'	2	4	6	8	10	12	2	4	6	8	10	12	2	4	6	8	10	12	2	4	6	8	10	12	2	4	6	8	10	12

**Note:** 1 pendant festoon and 1 hoist & trolley festoon required per system.

\*\*Cable lengths include 10 ft. of hook up on panel end and 5 ft of hook up on hoist end. Cable length for pendant will have 10 ft. of hook for panel and 1 extra foot for connection to Pendant Trolley.

# Festoon Systems Bill of Material

Components	Quantity Per Span						Quantity Per Span					
	Single Girder						Double Girder					
	10'	20'	30'	40'	50'	60'	10'	20'	30'	40'	50'	60'
	4518646-81	4518646-82	4518646-83	4518646-84	4518646-85	4518646-86	4518646-91	4518646-92	4518646-93	4518646-94	4518646-95	4518646-96
Cross Arm Support Bracket	10	14	18	22	26	30	10	14	18	22	26	30
Girder Clips	10	14	18	22	26	30						
Cross Arm Mounting Sleeve							5	7	9	11	13	15
Track Splice		2	4	6	8	10		2	4	6	8	10
End Stop	2	2	2	2	2	2	2	2	2	2	2	2
Cable Clips	3	5	7	9	11	13	3	5	7	9	11	13
Panel Support Hardware (Bag)	1	1	1	1	1	1	1	1	1	1	1	1
Hardware Packing List	1	1	1	1	1	1	1	1	1	1	1	1
Tow Arm Single Girder - P/N 234874-01	1	1	1	1	1	1						
Tow Arm Double Girder - P/N 234874-02							1	1	1	1	1	1

Shipped separate are the following power connections cables:

Components		Cable Length				
Description	Part Number	20'	30'	40'	50'	60'
Bridge panel to collectors & Near Motor	117855-01					
Bridge panel to motor opposite bridge panel - length varies	448661-XX	26	36	46	56	66
Pendant station	Varies with hoist					

## Notes

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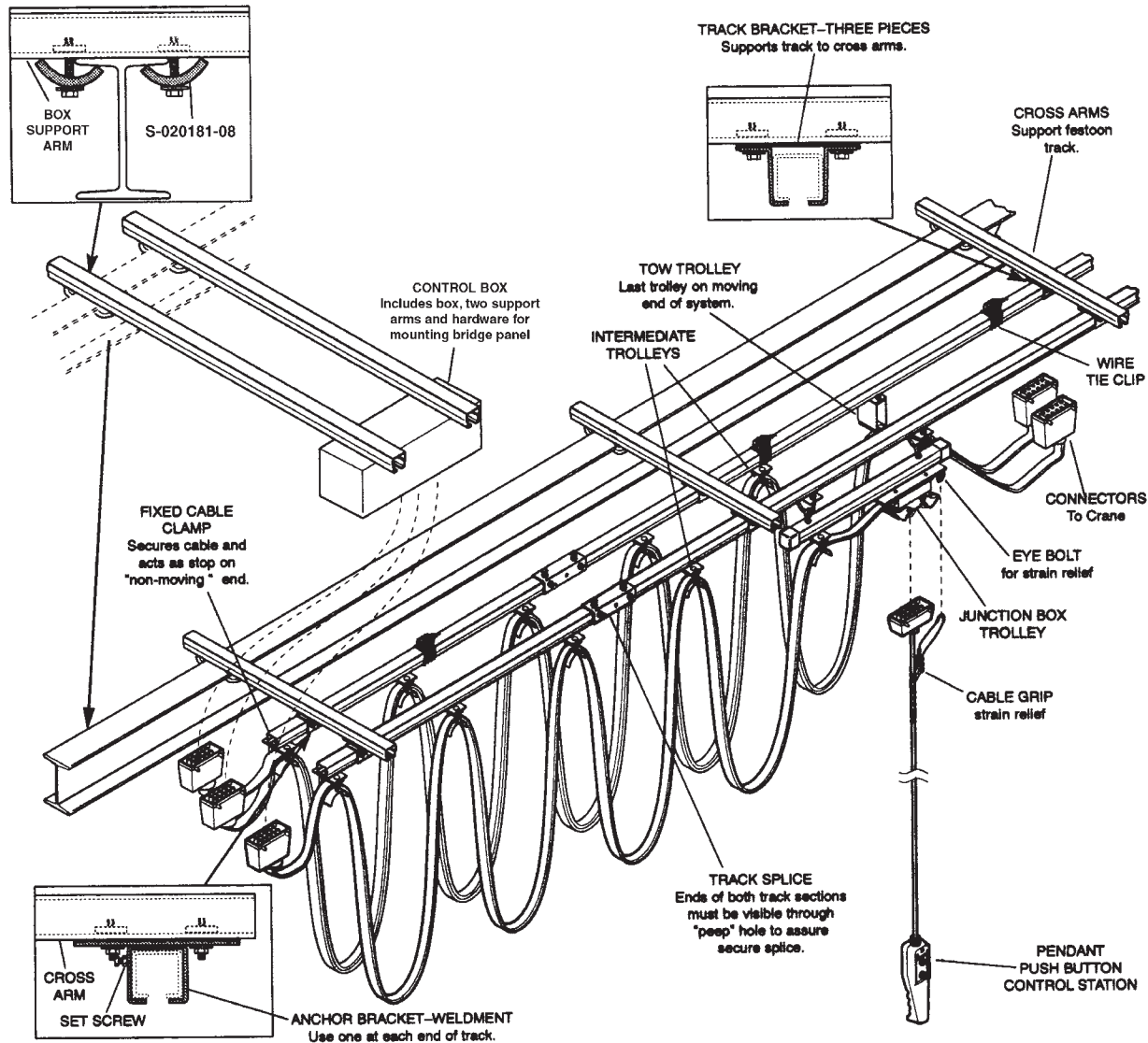


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# Figure 10 - Steel Track Festoon System

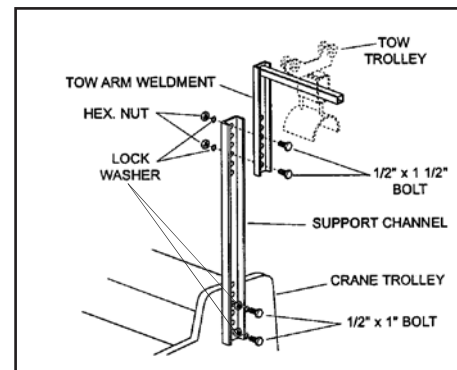


## INSTALLATION OVERVIEW

1. Clamp cross arms to supporting I-beam. Spacing between arms must not exceed 6' (1.8m) on center. Securely tighten clamps.  
**Note:** Use channel J Clips (provided) for both cross arms and control box support rails if beam is capped with channel - must purchase J Clips separately.
2. Hang festoon rail sections from bottom of arms using anchor brackets (one each end of system) and track brackets. Use track splices to join track sections. View through hole in splice to make sure both sections of track are inserted half way. Carefully level and align track. Securely tighten all set screws on anchor brackets and splice brackets. **Note:** Festoon systems come in ten foot increments. If required, cut off last c-rail sections. If more than 5' is cut off, it may also be necessary to remove one trolley and adjust cable loops accordingly.
3. Insert end stop into ends of tracks opposite fixed end. Clamp tightly in place.
4. Insert tow trolley and junction box trolley into fixed end of appropriate track, followed by intermediate trolleys. (See illustrations above). Insert fixed cable clamp into track with stop angle on clamping bar facing in. Securely tighten in place.
5. Plug connectors on cable assemblies into control box, crane or pendant control.
6. Snap on wire tie clips at desired locations.
7. Install Tow Arm Kit as shown on opposite side.

## TOW ARM INSTALLATION

1. Move festoon tow trolley into position next to Crane trolley. Measured height from opening in tow trolley to hoist side plate.
2. Mount support channel in tapped holes on hoist side plate using 1/2" x 1" hex head bolts. See illustration at right.
3. Assemble Tow Arm Weldment to Support Channel at appropriate height using 1/2" x 1 1/2" hex head bolts, lock washers and hex nuts. Square tub on Tow Arm Weldment must be in center of and extended through opening on tow trolley.
4. Slowly run hoist through entire length of travel. Check for binding in tow trolley opening or obstruction to tow arm.



## MOUNTING PREPARATIONS

Refer to page 15, figure 10 to familiarize yourself with the arrangement of a finished system before starting. Then determine which end of the crane the bridge control panel will be mounted at as shown in figure 11. This is the starting point of the system where all cables connect into the bridge control panel and is to be at the main collector end of the bridge.

Once it is known how the system will be mounted on the bridge mark the top flange of the girder to indicate the mounting locations of the track and panel support arms. The festoon track support arms are to be spaced at 5' - 0" center- to-center (no more than 6' - 0") beginning 18" in from the end of the bridge girder.

The bridge control panel support arms are only for the support of the panel and can be mounted on the same side as the festoon conductor tracks or on the opposite side. The bridge panel support arms are to be mounted centered at 12" to align with the track nuts in the top of the panel's enclosure. The panel must be mounted so as to clear any obstructions (end trucks, bracing and hoist) yet close enough for the festoon cables, motor power connection cables and main collector cable to reach the panel.

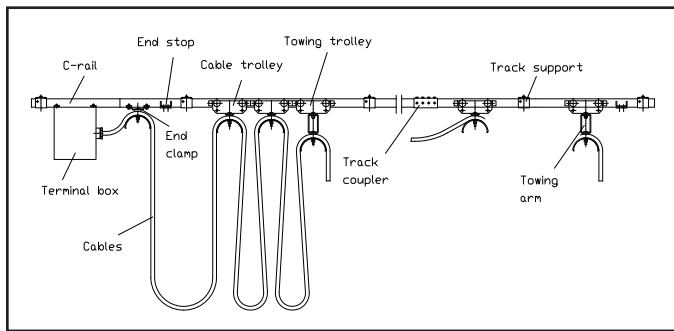


Figure 11.

## C-RAIL MOUNTING TO BRIDGE GIRDER

Rail mounting with support arms on the upper flange connection cables and main collector cable to reach the panel.

To mount the track support arms slide two girder clips into the support arm as shown in figure 12. Do not tighten the clip bolts, spread them apart enough to allow straddling the top flange of the bridge beam, extend the arm to the required distance and tighten the girder clip bolts. For single girder applications, if a capping channel with deep legs is used special J clips are required (sold separately) to mount the support arms to the top flange.

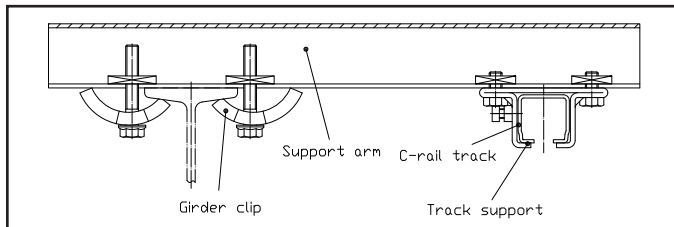


Figure 12.

For double girder applications, you must weld the support arm bracket under the top beam flange as shown in figure 13 & 14.

Once the track support arms are secured to the bridge girder's top flange slide in two track support brackets into each arm, one for the festoon cross conductor track and one for the festoon pendant station track. Position and space the brackets to the

required distance and spacing and tighten the bolts.

Then slide the long runs of track into the support brackets, couple the ends of the track together (splice couplings used on spans greater than 20') and tighten the hardware to secure the track.

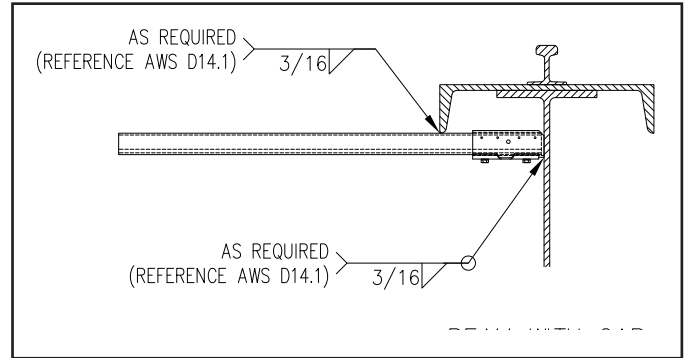


Figure 13.

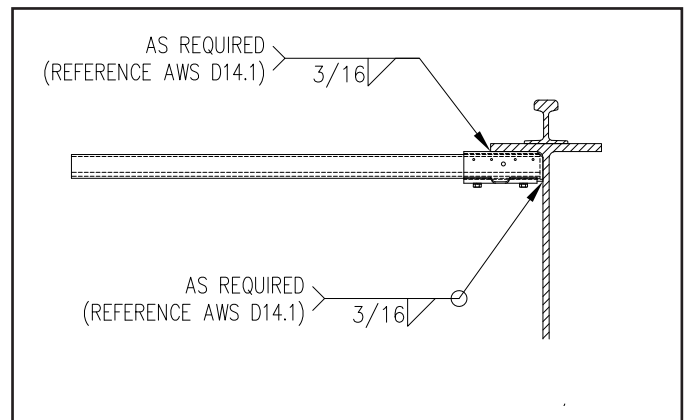


Figure 14.

## MOUNTING OF FESTOON END STOPS IN THE TRACKS

Install the end stops in the rail at the ends opposite the bridge control panel.

## TRACK SUPPORT BRACKET WITH LOCKING SCREW

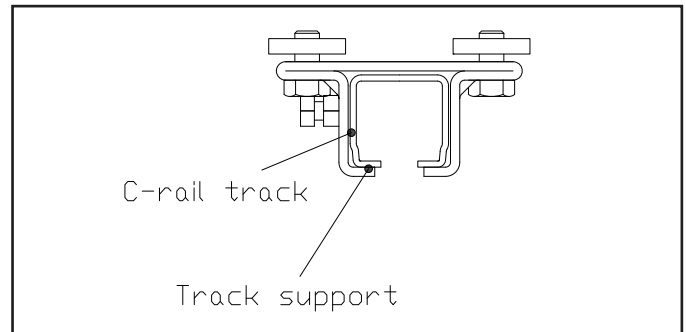


Figure 15.

The track support brackets are slipped onto the C rail and mounted to the support arm with the rail as shown in figure 15. Clamp the C-rail in the track support bracket with the locking screw. Alternatively, it is also possible to mount the track support brackets to the support arm first, and insert the C rail sections and clamp them with the locking screws afterwards.



## TRACK SUPPORT BRACKET

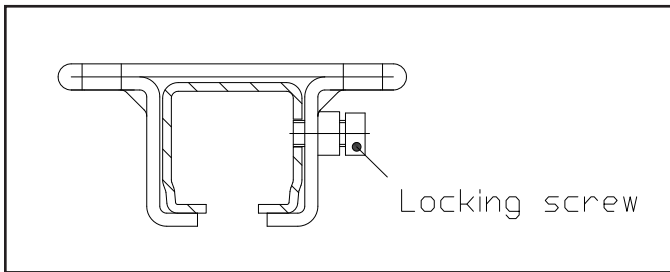


Figure 16.

In the first and last track support bracket the C rail has to be secured against sliding in the horizontal direction. Therefore, 6.2 millimeter diameter holes are drilled into the side of the rail for the locking screws as shown in figure 16.

**Note:** The locking screws can not dent or bend the inner wall of the rail as the rollers of the trolleys may be damaged.

## TRACK COUPLER

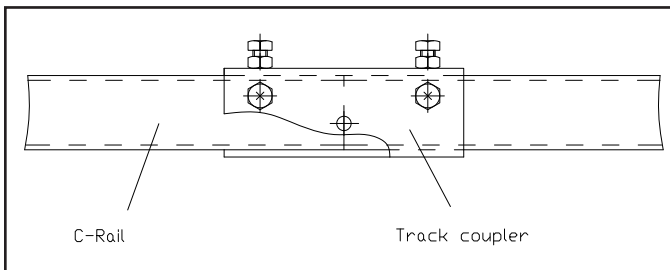


Figure 17.

The track coupler is slid halfway onto the first joint of the C rail and then clamped. The correct position can be verified at the sight hole of the coupler. The second C rail piece is inserted and clamped gap-free. The C-rails need to be cut at a right angle and deburred. Be sure that the locking screws are tightened equally to avoid any displacement of the rails in the coupler area.

## FESTOON END STOP

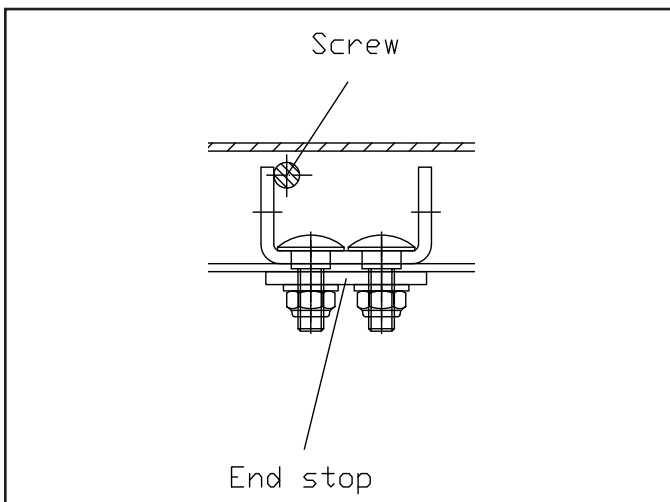


Figure 18.

The end stop is inserted into the C rail and clamped at the end of the travel distance of the festoon as shown in figure 18.

## END CLAMP

The end clamp is inserted behind the end stop and then clamped tightly as shown in figure 19.

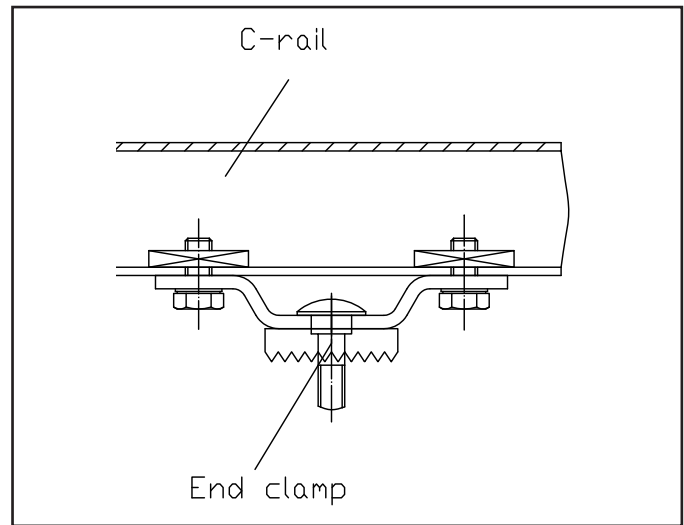


Figure 19.

## INSTALLATION OF THE CABLE SYSTEMS

### Festoon cable systems

A flat cable festoon system is comprised of two runs of track running the length of the crane bridge with trolleys carrying flat cables for power and control transmission. For single girder applications, the track closest to the bridge girder contains the festoon cross conductors that supply power and control to the hoist and trolley, the other is for the festoon control pendant station. For Double girder applications, the pendant track is closest to the bridge girder and power & control is on the outside for connecting to top arm.

There are two sets of cables provided with carrier trolleys and connection plugs mounted for easy installation. The festoon cross conductor cable assembly has a tow trolley with an extended "pocket" for the trolley's tow arm and plugs marked 1 & 3 and 2 & 4. For single girder this arrangement goes in the track closest to the bridge girder, tow trolley end first (outside for double girder). The festoon control pendant cable assembly has a control trolley where the pendant cable plugs into at one end. The control trolley end goes in first.

Each run of festoon track is provided with an end stop for one end to prevent the cable trolleys from running out and a cable end clamp for mounting at the bridge control panel end of the track to secure the cable.

### Motor, main collector connection cables.

In addition to the trolley suspended festooned cables there are three round (SO) power connection cables shipped in a separate package. One is a 15' - 0" long cable with a single connection plug for the bridge panel and leads to wire into the main collectors. One is a 10' - 0" long cable with two connection plugs to connect the bridge panel with the bridge drive motor adjacent to the panel. The third varies with the span of the crane and connects the panel to the bridge drive motor at the opposite end of the crane. The third cable lies across the festoon track support arms and is held to the arms with Cable Clips

Part Number S-23790-1. The clips snap onto the topside of the support arms and have a wire tie that secures the SO motor power cable to them.

**Control pendant station**

The pendant station SO control cable is wired into a plug half that facilitates easy connection plugging into a mating half on the control trolley. There is also a strain reliever cable running alongside and attached to the SO cable with the cable's termination wrapped around a "tear drop" fitting and secured with a clamp.

The strain reliever cable must be attached to the eyebolt on the control trolley and shorted if required to provide slack in the control cable prevent it from being torn out of its' plug. To shorten and attach the strain cable to the control trolley, loosen up the cable clamp and remove the cable from the clamp. Then slip the "tear-drop" fitting and cable over the control trolley eyebolt. After this step is complete, pull the strain reliever cable up over the fitting and through the eyebolt until the SO control cable has adequate slack and tighten the strain reliever cable clamp.

**Connection to Hoist & Trolley - Towing Arrangement**

Tow arm assembly and mounting to the hoist's trolley frame is illustrated on page 15. The tow arm has two sections with multiple mounting holes permitting a wide range of adjustability

accommodating most all trolley and beam depth requirements. The horizontal portion of the tow arm protrudes through the festoon cross conductor's tow trolley's "towing box" allowing the moving hoist and trolley to push and pull the festoon cables along with it. Check to insure that the horizontal portion of the tow arm does not interfere with the festoon pendant cables. If it does, cut the section back.

**Bridge Panel Mounting**

The bridge control enclosure has four (4) holes in the top for the mounting hardware that consists of four (4) sets of a bolt, flat washer and square track nut. The bolt and flat washer are inserted through the mounting holes from inside the enclosure with the track nuts fastened (do not tighten) to the bolts outside of the enclosure.

The panel is mounted to it's support arms by sliding the track nuts into the arms, positioning the panel the required distance from the girder and tightening the bolts as shown in figure 21.

**Special Precautions During Assembly**

During the assembly of the track it is recommended that you check for trouble-free movement of the trolleys within the rail with the help of one of the supplied cable trolleys. If a trolley with horizontal guide rollers is used, even a slight lateral imperfection of the rail can cause a jamming of the trolleys.

## Notes

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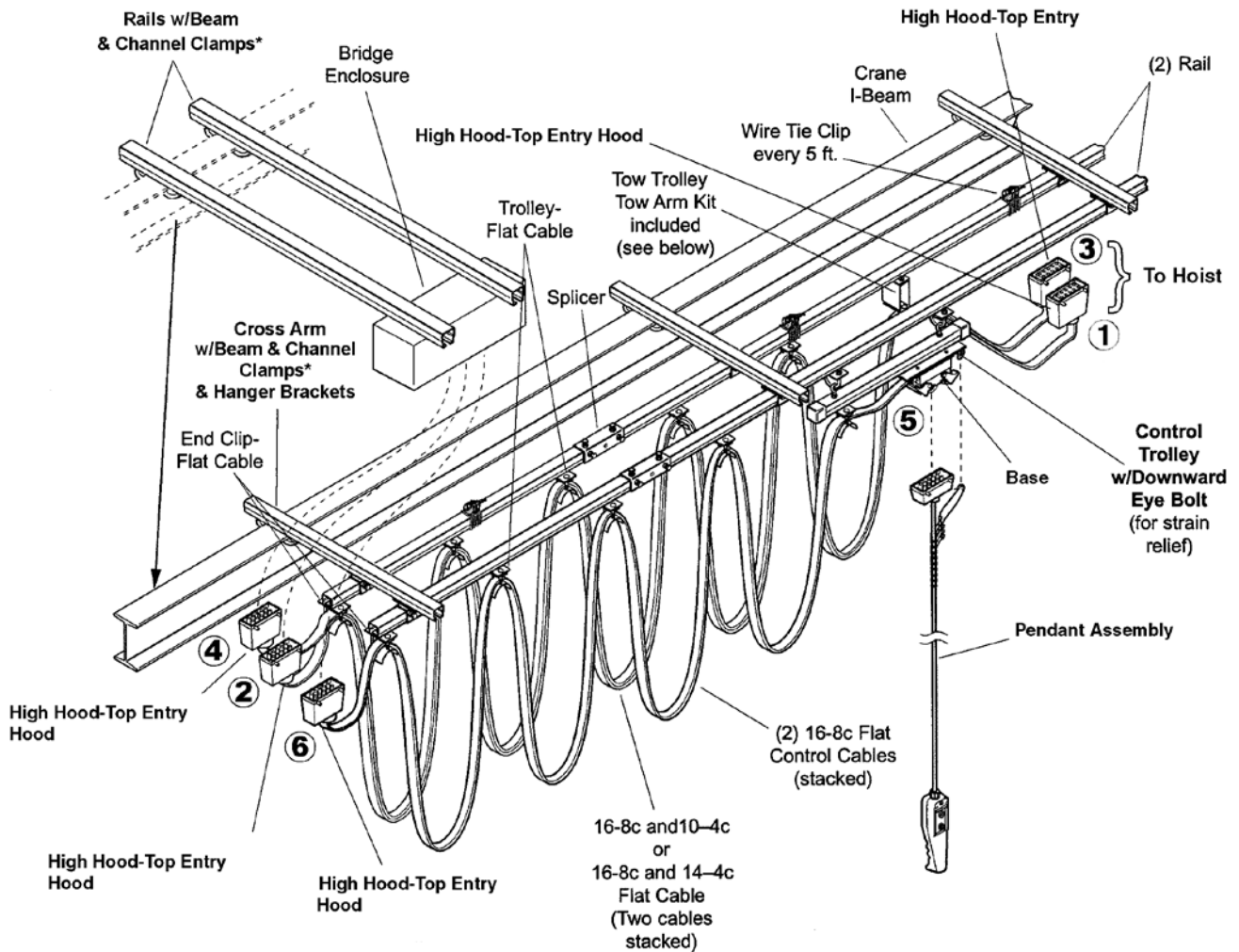
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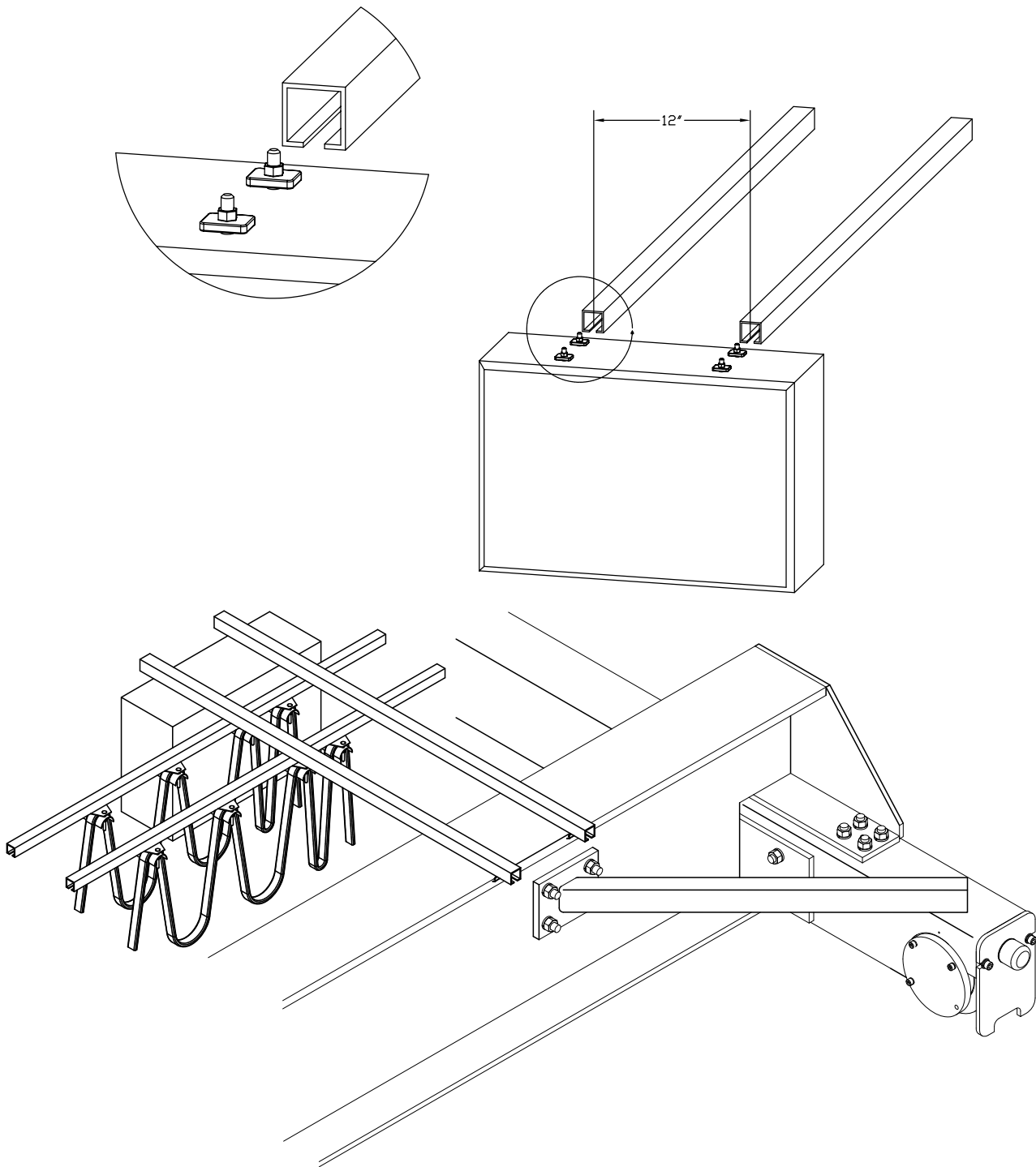
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# Figure 20 - Festoon Cable Plugs Connections



## Figure 21 - Mounting the Bridge Panel



Note: A coped girder connection is shown for illustration purposes only. Actual girder connection arrangement may differ by application.

The festoon kit comes with four 1-inch long bolts for hanging the bridge panel as shown in figure 19. Insert each bolt with a lock washer and the sealing rubber washer through the panel from the inside with the threads facing the outside. Make sure the rubber side of the

washer is against the panel to maintain the type 4 rating. Twist a square nut on each bolt two or three full turns. Hang the bridge panel by sliding the square nuts onto the track. Tighten the bolts from inside the panel.

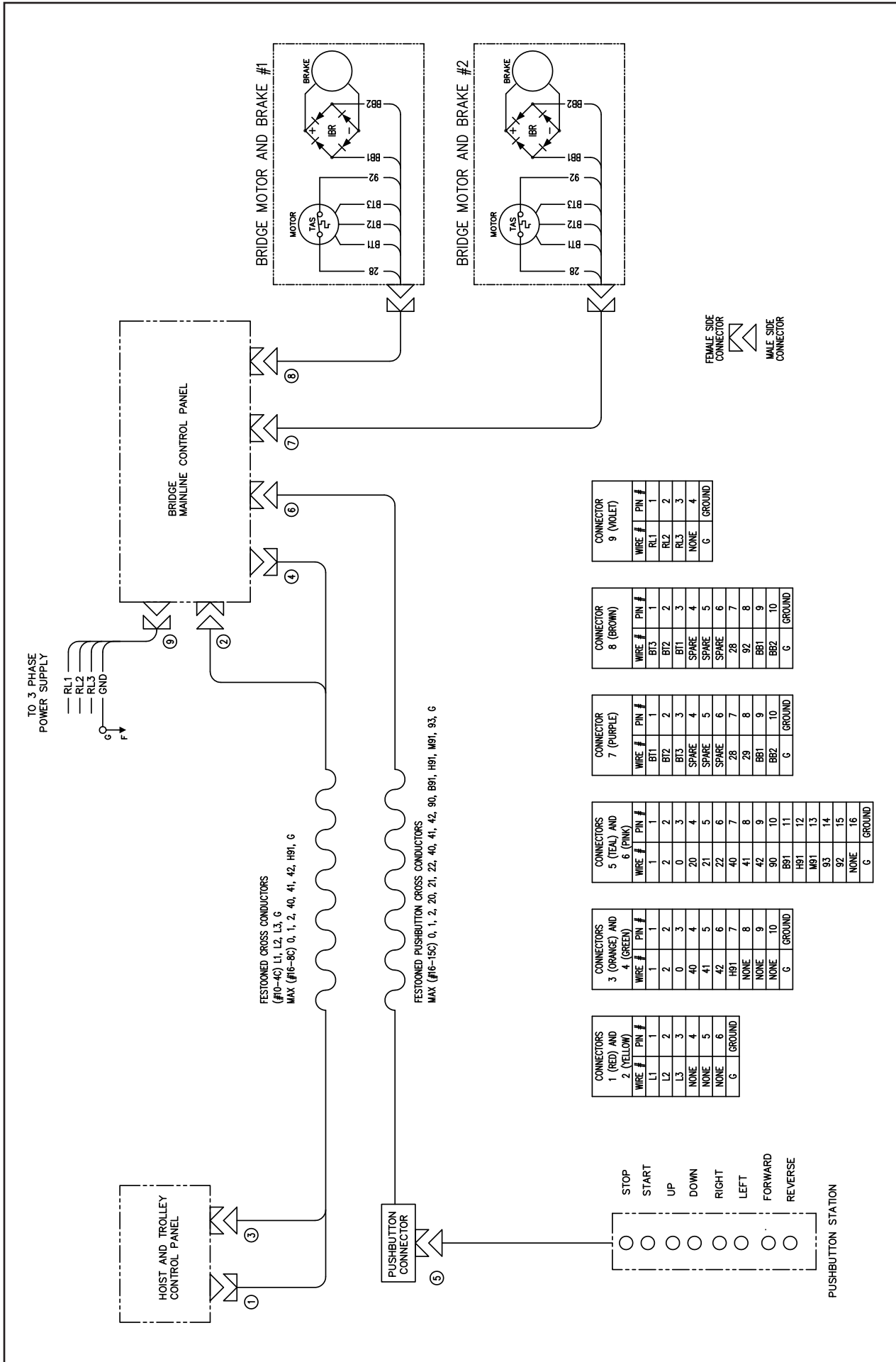


Figure 22. Interconnection Wiring Diagram

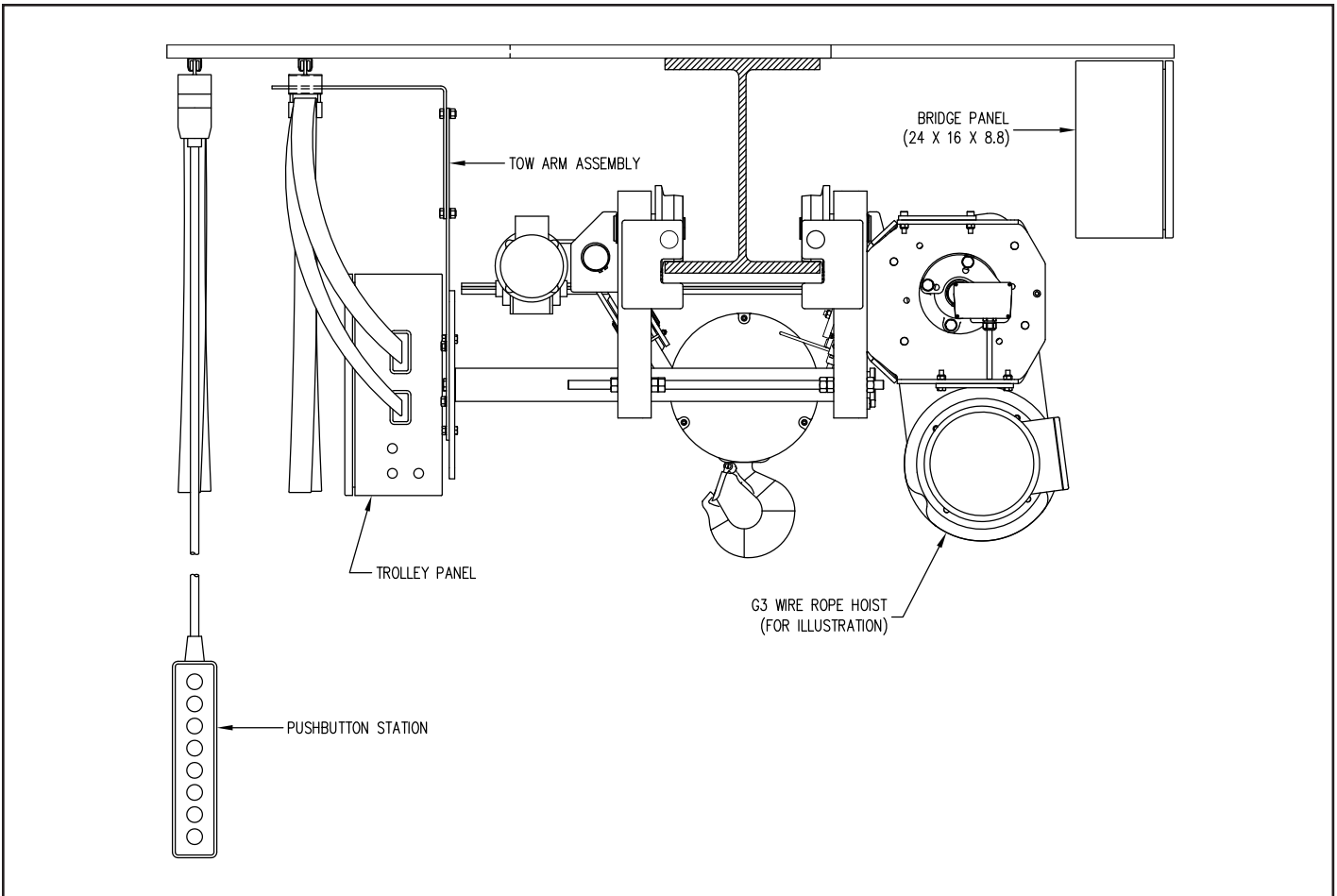


Figure 23.

### World Series / Global King Easy Connect

Install the bridge panel opposite side of the hoist control panel. Figure 23 shows the bridge panel opposite of the festooning. When constructing the system per figure 23, the cables will need to pass over the girder to the panel.

Depending on preferred clearance, the bridge panel may be assembled to the girder in different ways. In figure 24, the bridge panel is displayed in line with the pushbutton festoon.

Other variations are possible depending on personal preferences.

<b>⚠ WARNING</b>
<b>DO NOT UNPLUG CONNECTORS WHILE CIRCUIT IS ENERGIZED.</b>
<b>BEFORE PLUGGING IN CONNECTORS REMOVE POWER FROM SYSTEM</b>

<b>⚠ WARNING</b>
<b>Working in or near exposed energized electrical equipment presents the danger of electric shock.</b>
<b>TO AVOID INJURY:</b> <b>Disconnect power and lockout/tagout the disconnecting means before removing cover or servicing this equipment.</b>

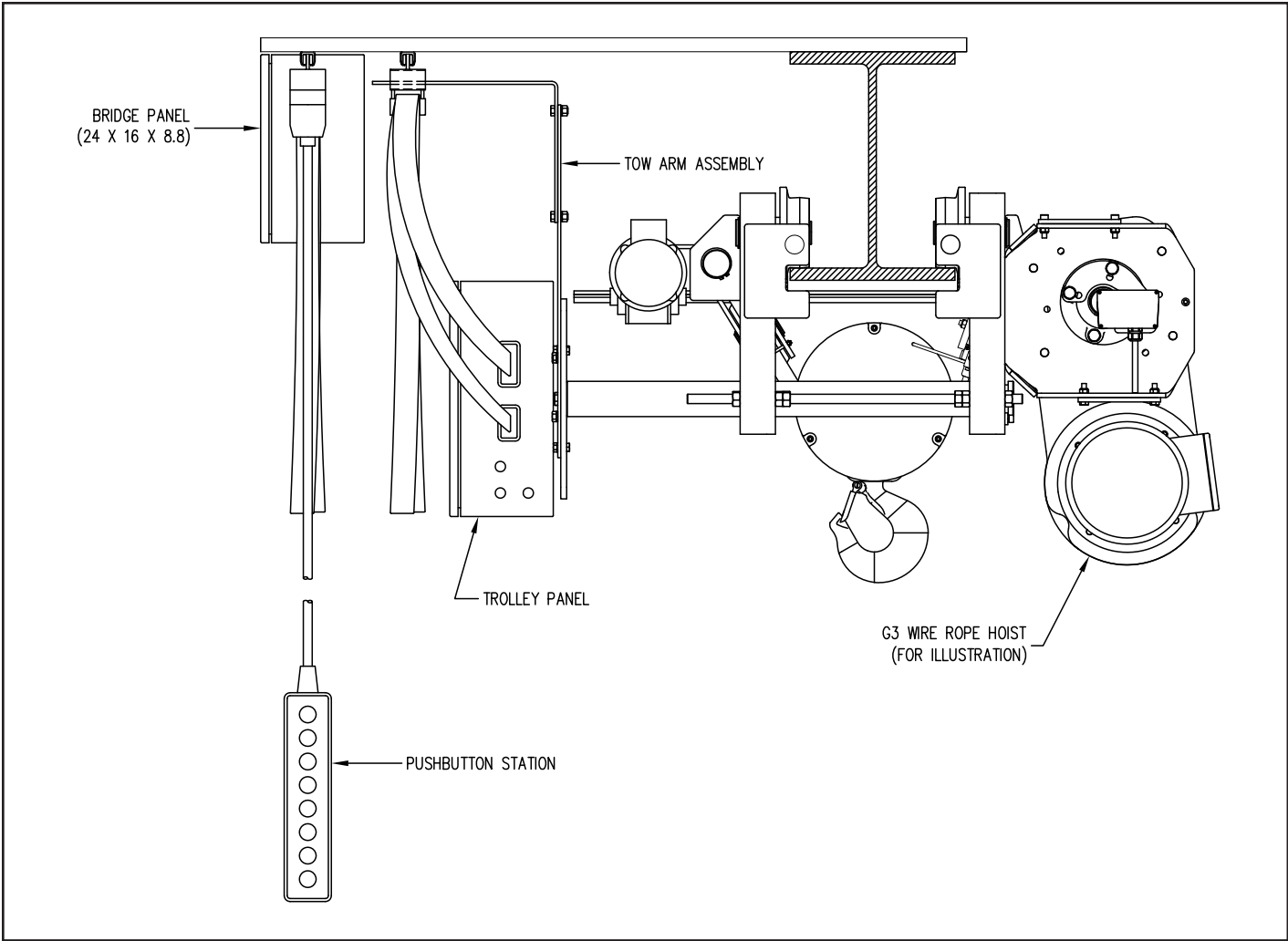


Figure 24.



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