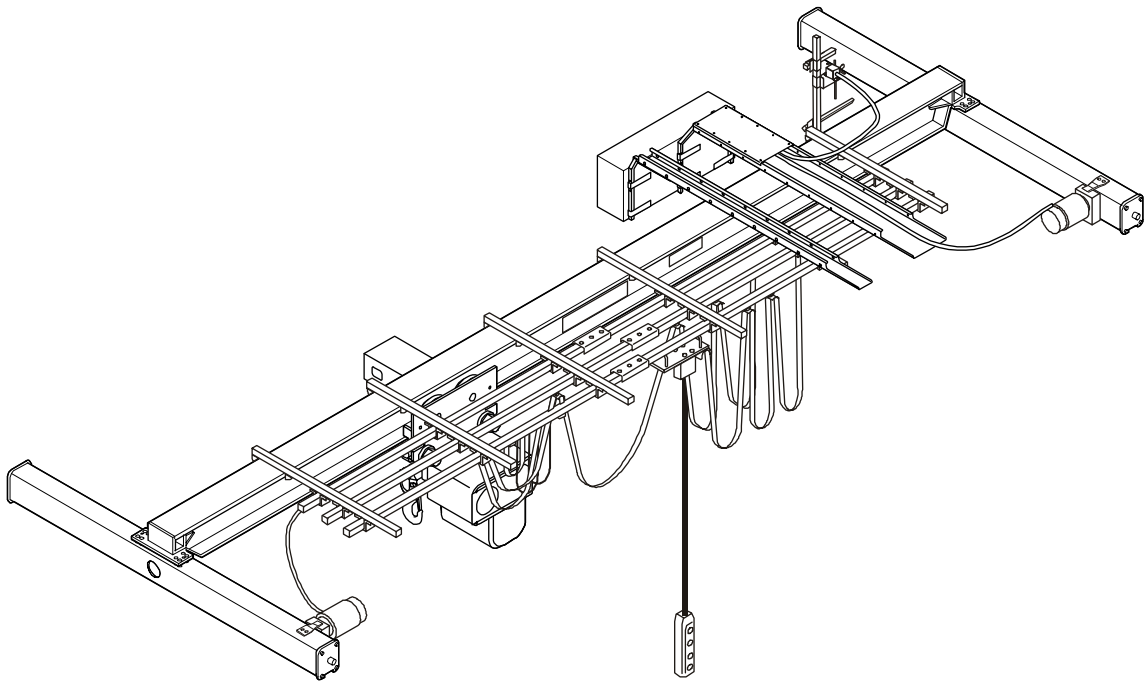




QL Crane Assembly Instructions



Single Girder, Top Running Crane 1 Hoist per Bridge



R&M Materials Handling, Inc
Springfield, Ohio USA
☎: 800 955-9967
www.rmhoist.com

LoadMate® Chain Hoist
QL Crane Assembly Instructions
Single Girder Top Running
November 2004

The QL Crane Assembly instructions have been prepared to acquaint you with the procedures necessary for assembly of the supplied crane components.

In addition to the QL Crane Assembly instructions, the following manuals are also included in the modular crane package:

- Installation and Maintenance Manual for the chain hoist
- Operator's manual for the chain hoist
- Installation, Operation and Maintenance Instructions for the TMU Motorized Trolley
- Installation and Maintenance Manual for the bridge drives
- Chain hoist wiring diagrams for crane applications
- Electrical Bill of Material for the crane controls

Proper installation is important to the performance of the equipment. Careful study of and adherence to the instructions will help ensure safe, dependable operation. It is also recommended that you keep the manuals for the equipment readily accessible to operators as well as maintenance and safety personnel.

Information in this manual is subject to change without notice.

[R&M Materials Handling, Inc](http://www.rmhoist.com)
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General

A **QL** Modular Crane Package includes:

- LoadMate® electric chain hoist
- End trucks including joint plates
- Bridge drives
- Bridge panel with cable plugs
- Complete festoon package featuring plugs for quick connections
- Festoon tow arm for hoist
- Bridge tow arm for main power
- Bridge travel limit switch
- Trolley end stops
- Pushbutton pendant on its own festoon rail
- Suggested beam size for bridge girder (beam furnished by others),
- Crane assembly instructions
- Installation & Maintenance Instruction manual for chain hoist
- Operator's manual for the chain hoist
- Installation & Maintenance Instructions for bridge drives and for trolley drive
- Manual of Hoist Wiring Diagrams for Cranes
- Electrical Bill of Material

Prior to permanent installation, qualified personnel shall check the equipment for any damage. Particular attention shall be taken to make sure that the hoist as well as the load chain and the limit switch mechanism on the hoist have not been damaged during shipment or handling.

IMPORTANT

Hoists/cranes are designed for lifting and transporting of materials only. Under no conditions or circumstances, either during initial installation or in regular use, are the hoists/cranes to be used for lifting or transporting of personnel.

Only trained and competent personnel may handle the hoist/crane. When using slings, chains or hook to handle the hoist/crane, use the designated lifting points or lugs. Never suspend the hoist by the counterweight, control enclosure or motors.

Power Connections

According to CMAA Specification #74, a minimum of two collectors for each runway conductor shall be used with inverter use. Inverter controls for the trolley drive and bridge drives are standard equipment in the **QL** modular crane packages.

In addition, the use of a ground shall be utilized, either through the frame ground or a conductor ground.

Proper grounding is important with inverter use. A poor ground could cause damage to the inverter or could create a shock hazard to personnel.

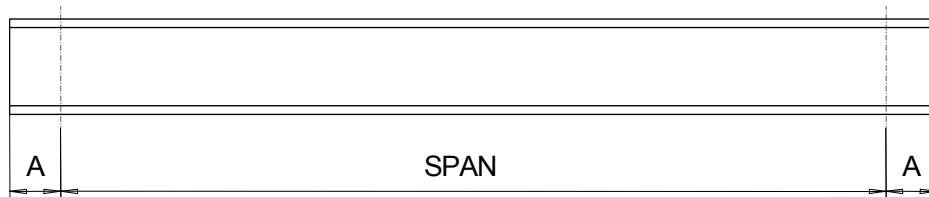


Bridge Beam

The shape of the suggested beam is normally a Wide Flange. It is the responsibility of the user to furnish the bridge beam.

The adequacy of the suggested beam for the crane application or a substitute bridge beam is the responsibility of the user and should be determined or verified by qualified personnel.

The trolley is pre-adjusted for the suggested bridge beam size or for a predetermined flange width. After installing the hoist on the beam the user shall make sure the trolley is properly adjusted. Trolley installation instructions are described in the trolley manual.



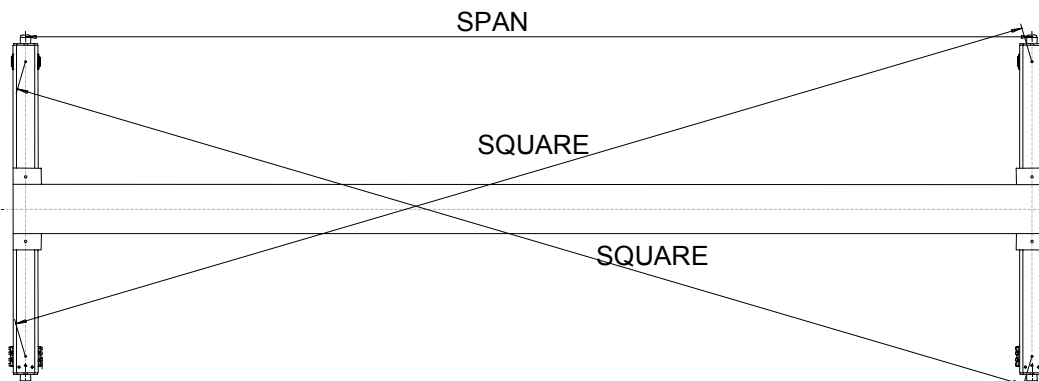
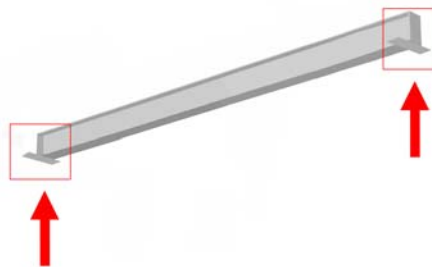
The length of the bridge beam may be estimated from the formula: $SPAN + 2A$. SPAN is horizontal distance center-to-center of runway rails and dimension "A" is the length from crane wheel center to the outside edge of the beam connection plate furnished on the end truck.

End Truck Type	Connection Plate Type	Dimension "A"
RT11, RT14	P4	2-15/16" [75mm]
RT20	L4	3-15/16" [100mm]

Beam Connection

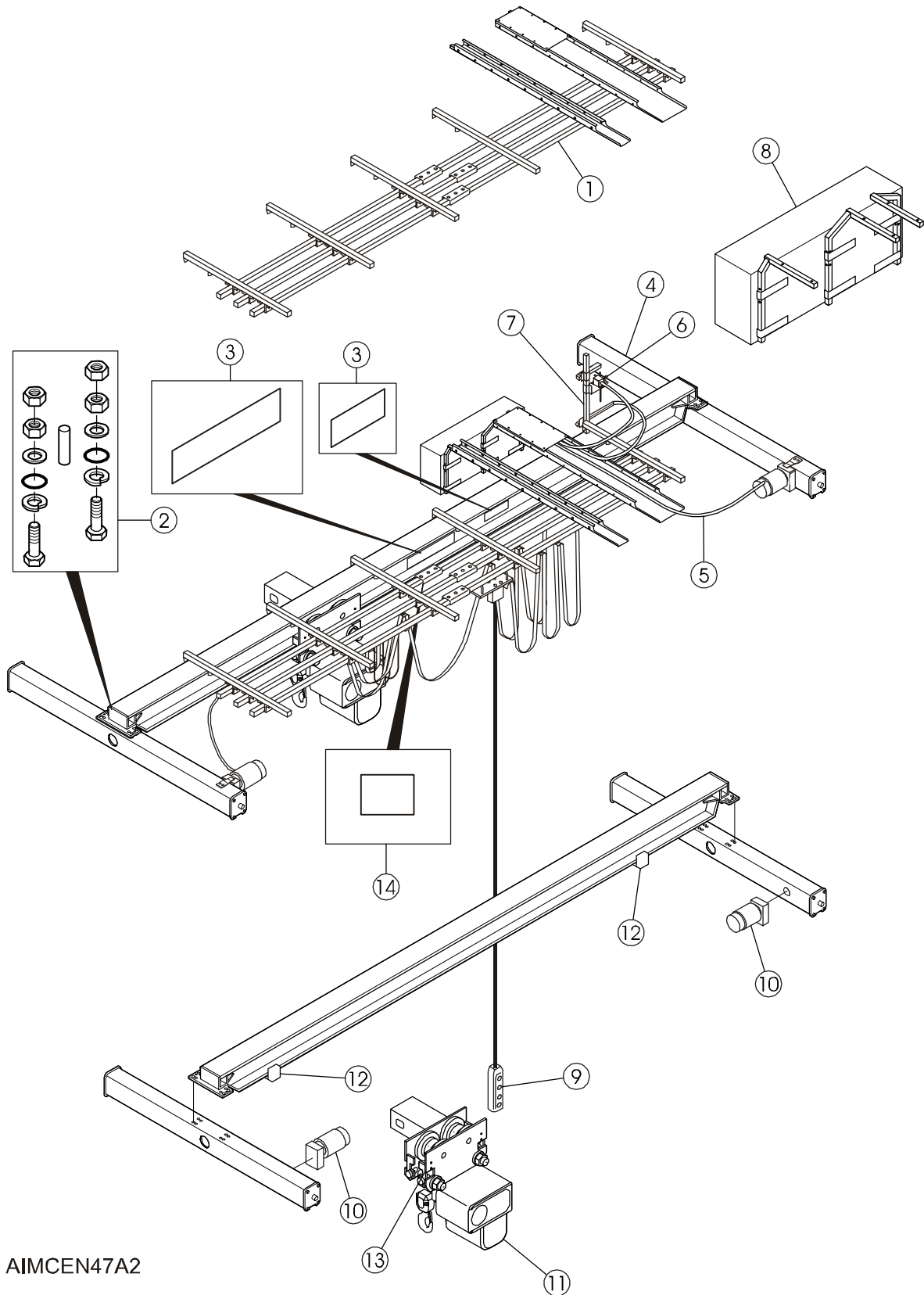
The adequacy of the joint connection is the responsibility of the user and should be determined by qualified personnel.

- Set end trucks to the desired span.
- Square the end trucks by measuring across the diagonals at the wheel centers.
- Place the beam at the center of the connection plates.
- Weld the beam to the connection plates.
- Paint bridge girder and end truck assembly.





Main Crane Components



AIMCEN47A2

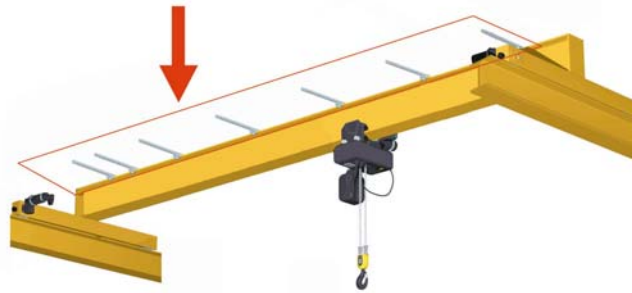


Main Crane Components

Parts List

- 1 Festoon rails + support rails
- 2 End truck fasteners
- 3 Capacity stickers
- 4 End truck
- 5 Bridge motor electrical cable
- 6 Bridge travel limit switch + cable
- 7 Crane collector arm assembly + cable
- 8 Bridge panel
- 9 Push button pendant station
- 10 Bridge drives
- 11 Hoist
- 12 Trolley end stop
- 13 Hoist tow arm (not shown)
- 14 Direction symbols (if furnished as option)

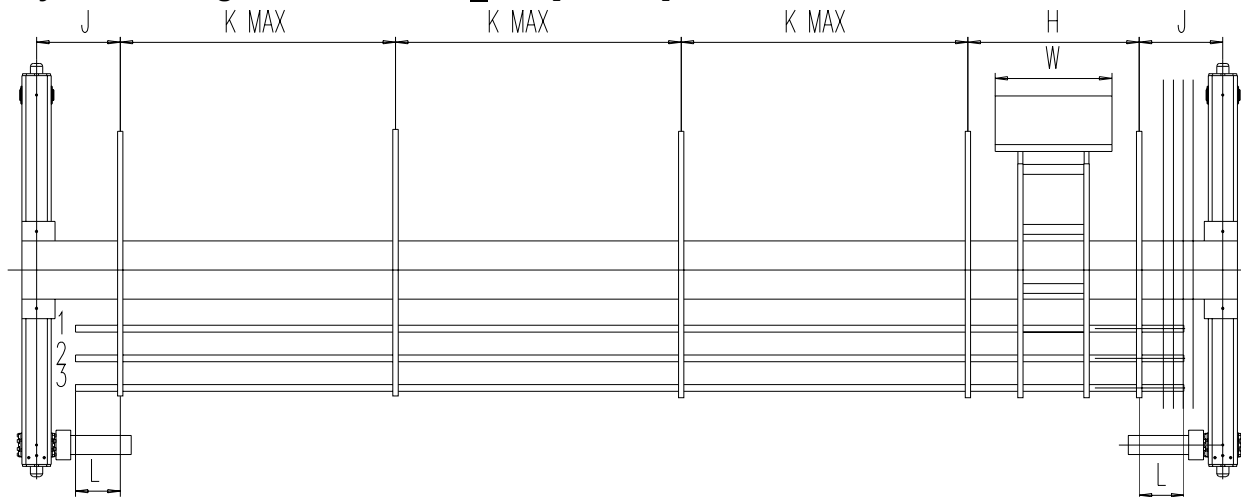
Layout of Festoon Rails (Old Style)



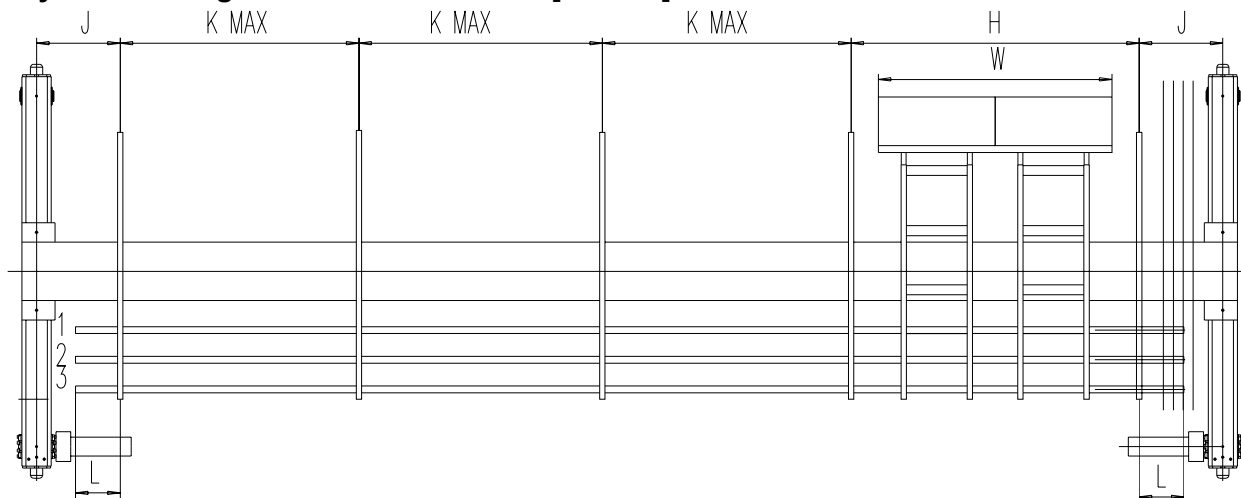
Dimension chart

Bridge Panel W in [mm]	Layout	H in [mm]	J in [mm]	K MAX in [mm]	L in [mm]
24 [600]	1	34.62 [880]	17 [432]	60 [1524]	9 [229]
36 [900]	2	46.50 [1181]	17 [432]	60 [1524]	9 [229]
47 [1200]	2	58.25 [1480]	17 [432]	60 [1524]	9 [229]

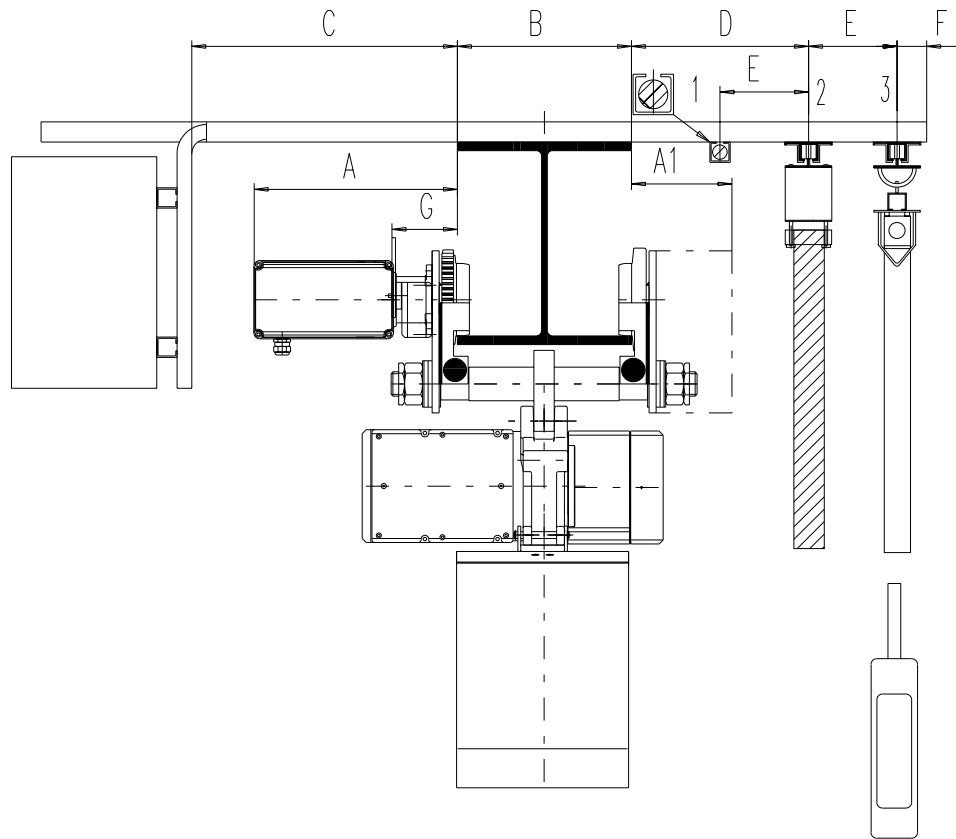
Layout 1 – Bridge Panel Width $W \leq 24"$ [600mm]



Layout 2 – Bridge Panel Width $W > 24"$ [600mm]



Note: Location of the bridge panel may be mirrored so the bridge panel is located at the opposite end of the crane. Runway conductors are located on the bridge panel end of crane.



Dimension B = Beam flange width

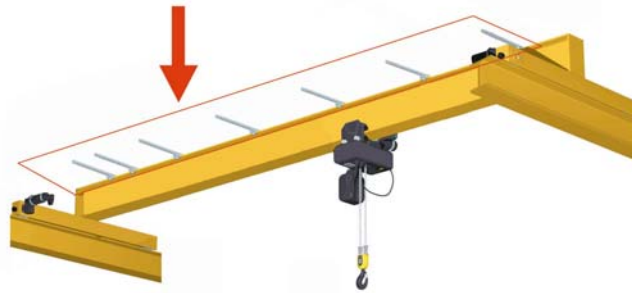
Hoist Type	A in [mm]	A1 in [mm]	C in [mm]	D in [mm]	E in [mm]	F in [mm]	G in [mm]
LM05	14 [355]	6 7/16 [163]	18 [457]	12 [406]	6-8 [150-200]	2 [50]	4 1/8 [105]
LM10	14 [355]	6 7/16 [163]	18 [457]	12 [406]	6-8 [150-200]	2 [50]	4 1/8 [105]
LM16	14 [355]	6 13/16 [173]	18 [457]	12 [406]	6-8 [150-200]	2 [50]	4 3/8 [112]
LM20	14 [355]	6 13/16 [173]	18 [457]	12 [406]	6-8 [150-200]	2 [50]	4 3/8 [112]
LM25	14 [355]	6 13/16 [173]	18 [457]	12 [406]	6-8 [150-200]	2 [50]	4 3/8 [112]

Position of the rails parallel with bridge girder

- 1st Rail = Round cable for bridge drive (located opposite end of bridge panel)
- 2nd Rail = Hoist power and control flat cable
- 3rd Rail = Sliding pendant



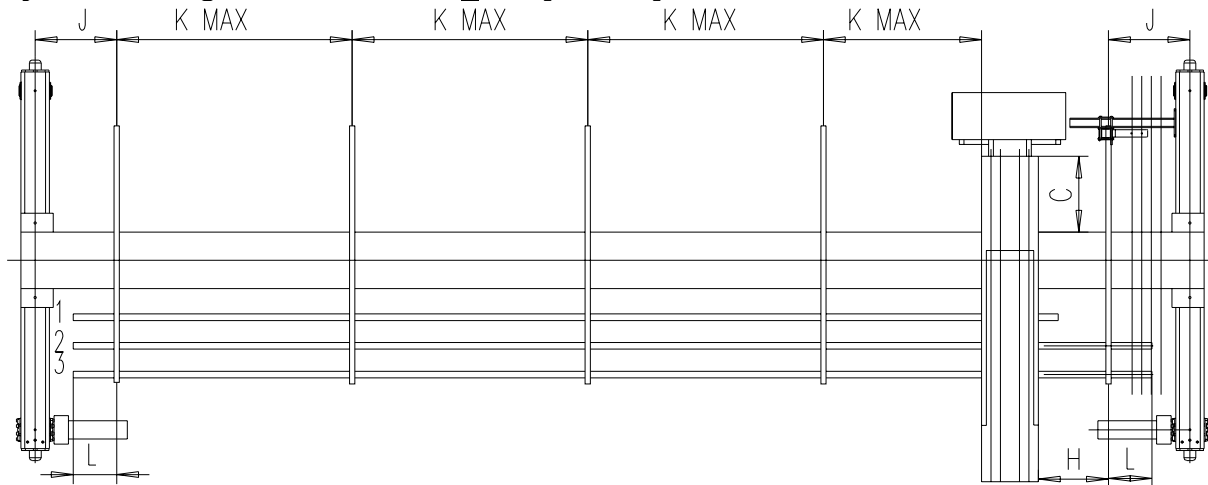
Layout of Festoon Rails (New Style)



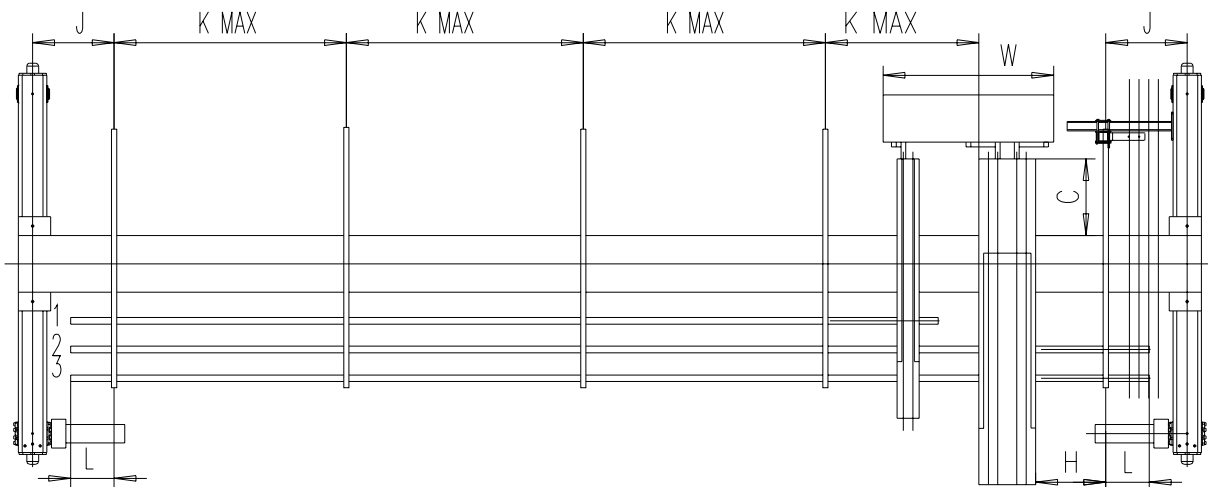
Dimension chart

Bridge Panel W in [mm]	Layout	C in [mm]	H in [mm]	J in [mm]	K MAX in [mm]	L in [mm]
24 [600]	1	16" [406]	15 3/4" [400]	17 [432]	60 [1524]	9 [229]
36 [900]	2	16" [406]	15 3/4" [400]	17 [432]	60 [1524]	9 [229]
47 [1200]	2	16" [406]	15 3/4" [400]	17 [432]	60 [1524]	9 [229]

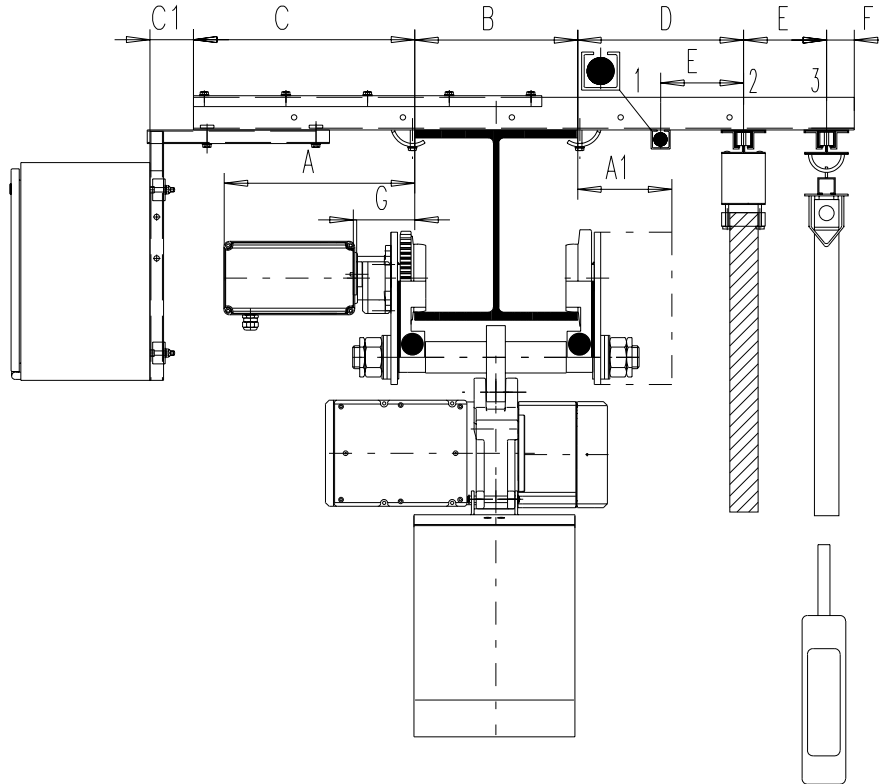
Layout 1 – Bridge Panel Width, $W \leq 24"$ [600mm]



Layout 2 – Bridge Panel Width, $W > 24"$ [600mm]



Note: Location of the bridge panel may be mirrored so the bridge panel is located at the opposite end of the crane. Runway conductors are located on the bridge panel end of crane.



Dimension B = Beam flange width

Hoist Type	A in [mm]	A1 in [mm]	C in [mm]	C1 in [mm]	D in [mm]	E in [mm]	F in [mm]	G in [mm]
LM05	14 [355]	6 7/16 [163]	16 [406]	3 1/8 [80]	12 [406]	6-8 [150-200]	2 [50]	4 1/8 [105]
LM10	14 [355]	6 7/16 [163]	16 [406]	3 1/8 [80]	12 [406]	6-8 [150-200]	2 [50]	4 1/8 [105]
LM16	14 [355]	6 13/16 [173]	16 [406]	3 1/8 [80]	12 [406]	6-8 [150-200]	2 [50]	4 3/8 [112]
LM20	14 [355]	6 13/16 [173]	16 [406]	3 1/8 [80]	12 [406]	6-8 [150-200]	2 [50]	4 3/8 [112]
LM25	14 [355]	6 13/16 [173]	16 [406]	3 1/8 [80]	12 [406]	6-8 [150-200]	2 [50]	4 3/8 [112]

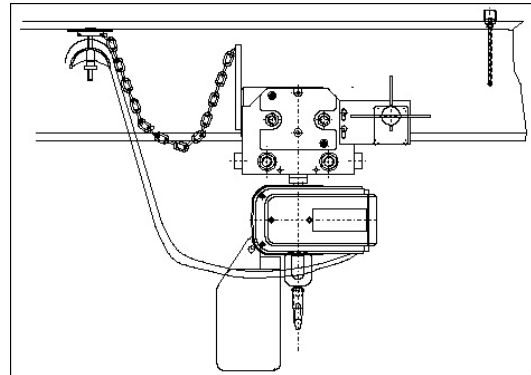
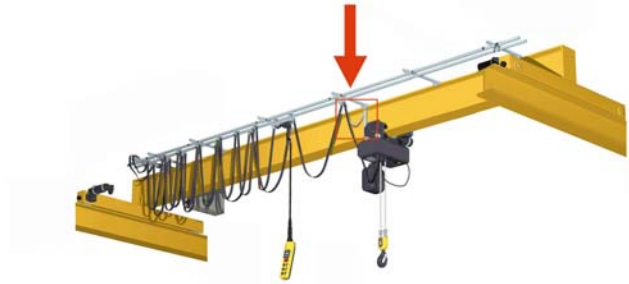
Position of the rails parallel with bridge girder

- ❑ 1st Rail = Round cable for bridge drive (located opposite end of bridge panel)
- ❑ 2nd Rail = Hoist power and control flat cable
- ❑ 3rd Rail = Sliding pendant

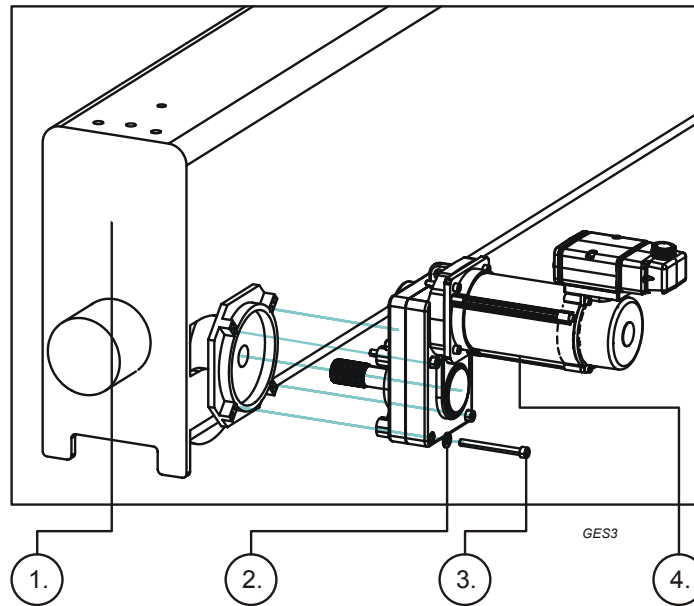


Hoist Tow Arm Assembly

Connect the chain to the lead festoon trolley (2nd rail) and to the hoist tow arm. Fasten tow arm to trolley as shown.



Bridge Drive Assembly



Parts List

1	End truck			
2	Washer	4 per drive	DIN125-A8-A3G (GES3 or GES4)	DIN125-A12-A3G
3	Socket head cap screw	4 per drive	DIN912-M8x85-8.8-A3G (GES3) DIN912-M8x100-8.8-A3G (GES4)	DIN912-M12x140-8.8-A3G
4	Bridge drive		GES3 or GES4 drive type	GES5 drive type



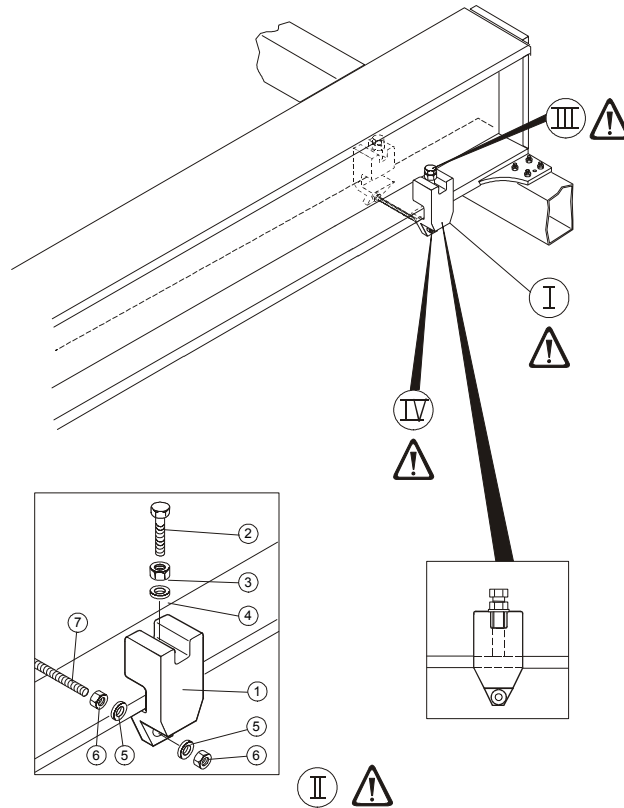
Explanations for NOTES in the drawing

Clean the spline and mounting flanges of dirt and of the rust protection wax. Grease the spline lightly before assembly. Use a rubber-head hammer to help slide the drive into place. Do not use a metal hammer.

Recommended tightening torque: M8 SHCS 15 ft-lb (20 Nm); M12 SHCS 55ft-lb (77Nm)

Remove the protection pin from the breather plug on drives that mount vertical only.

Trolley End Stop Assembly



AIMCEN60A

Before installing trolley mounted hoists, the end stops must be installed for all trolleys mounted on open-end beams.

The end stops must be properly mounted so that the bumpers absorb any impact forces. Do not allow the trolley wheels to impact rail stops. In addition, the end stops must be positioned on the beam so that the hoist unit does not impact the crane structure, end trucks and/or bridge drives.

Parts List

- 1 End stop
- 2 Bolt
- 3 Nut
- 4 Washer
- 5 Washer
- 6 Nut
- 7 Threaded rod

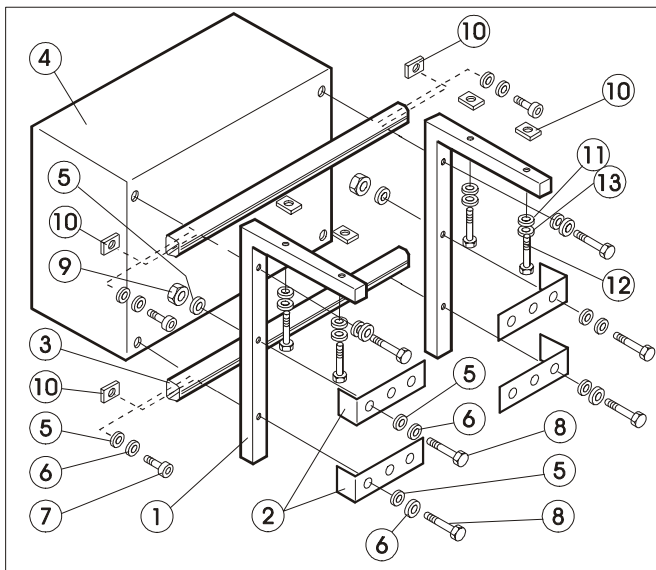
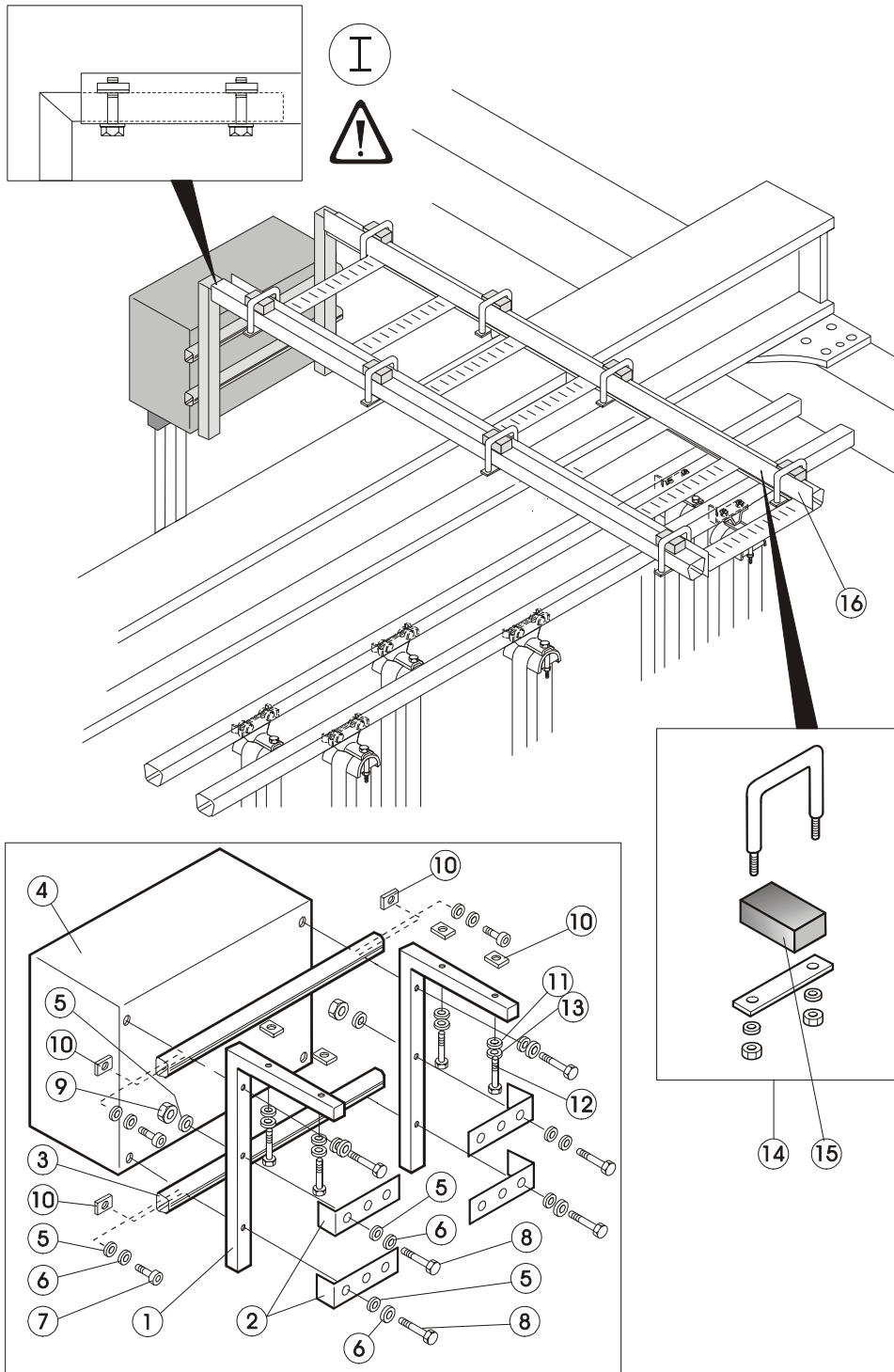


Explanation for NOTES in the drawing

- | |
|---|
| Mount and position the trolley end stop on the bridge girder. |
| Turn nuts (item 6) on each end of threaded rod until snug making sure the end stops are squared on the beam flange. |
| Tighten top bolts (item 2) on each end stop. |
| Tighten nuts (item 6) on each end of threaded rod. |
| Lock top bolt by tightening nut (item 3) against end stop. |
| Make sure that the trolley bumper contacts the center of end stop! |



Bridge Panel Support Assembly (Old Style)



AIMCEN03C



Bridge Panel Support Assembly (Old Style)

Parts List

- 1 Support bracket
- 2 Plate
- 3 C-rail
- 4 Bridge panel
- 5 Washer
- 6 Spring washer
- 7 Bolt
- 8 Bolt
- 9 Nut
- 10 Square nut (for C-rail)
- 11 Washer
- 12 Bolt
- 13 Spring washer
- 14 Clamp
- 15 Rubber spacer
- 16 Ladder frame & C-rail



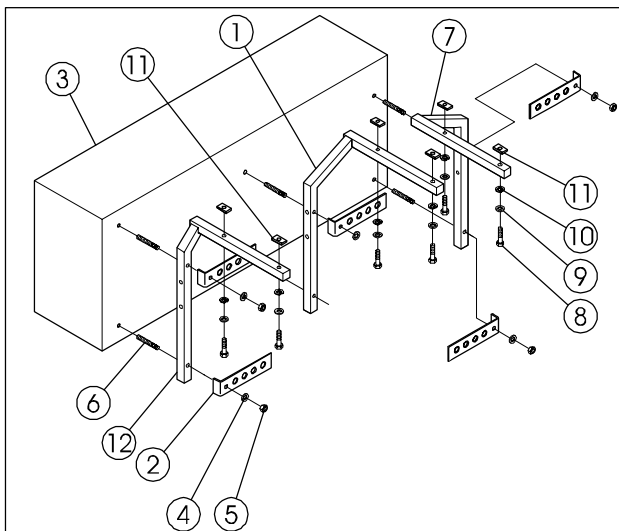
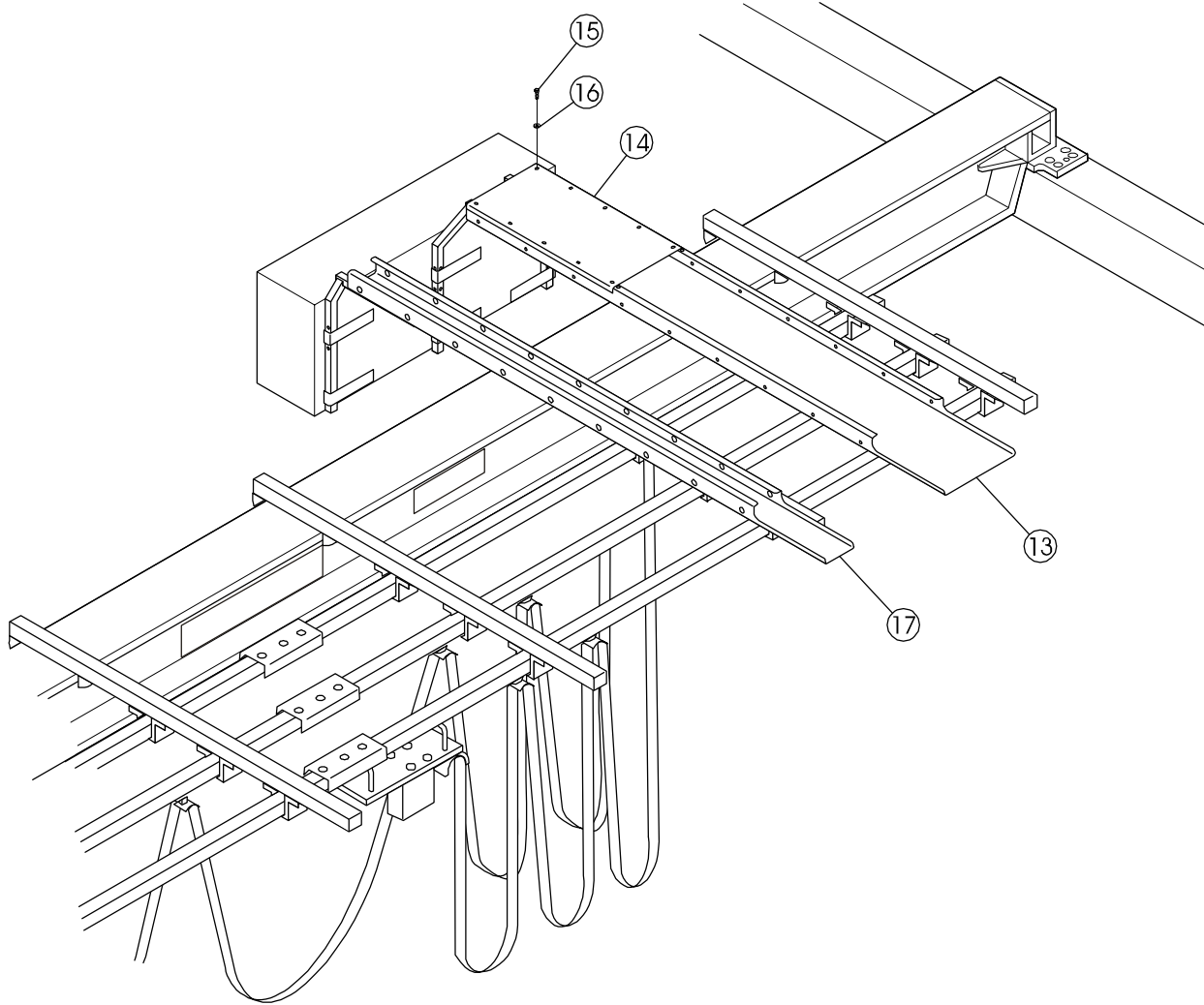
Explanation for NOTES in the drawing

Mount the support brackets to bridge panel before mounting bridge panel to crane.
Slide bridge panel assembly onto the C-rails of the ladder frame assembly.

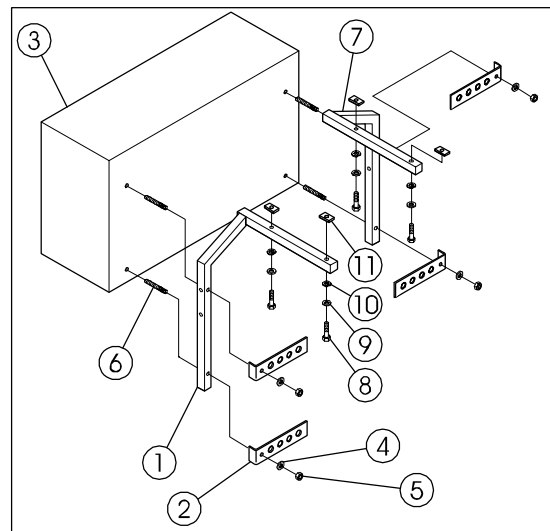
The ladder frame assembly for the bridge panel does not support any festoon C-rails that run parallel with the bridge girder.



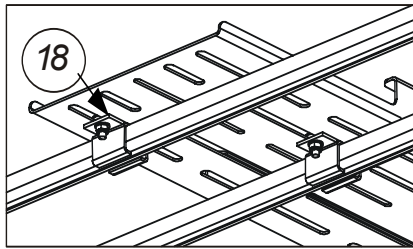
Bridge Panel Support Assembly (New Style)



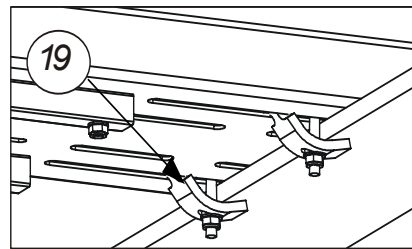
AIMCEN03D



Bridge Panel Support Assembly (New Style)

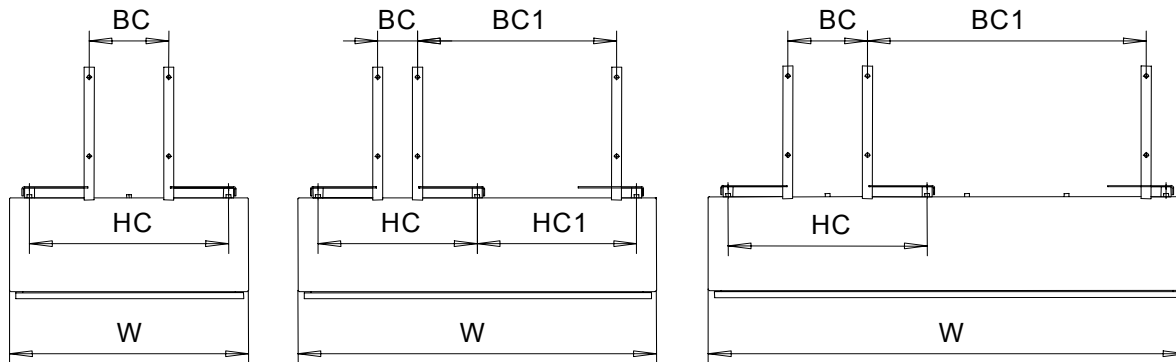


View of the rail clamps on the support plate & cable tray for the bridge panel



View of the beam clip for the support plate & cable tray for the bridge panel

Bracket Location Dimensions



Bridge Panel, W in [mm]	BC in [mm]	BC1 in [mm]	HC in [mm]	HC1 in [mm]
23 5/8" [600]	7 7/8" [200]	---	19 11/16" [500]	---
35 7/16" [900]	3 15/16" [100]	19 11/16" [500]	15 3/4" [400]	15 3/4" [400]
47 1/8" [1200]	7 7/8" [200]	27 9/16" [700]	19 11/16" [500]	---

Parts List

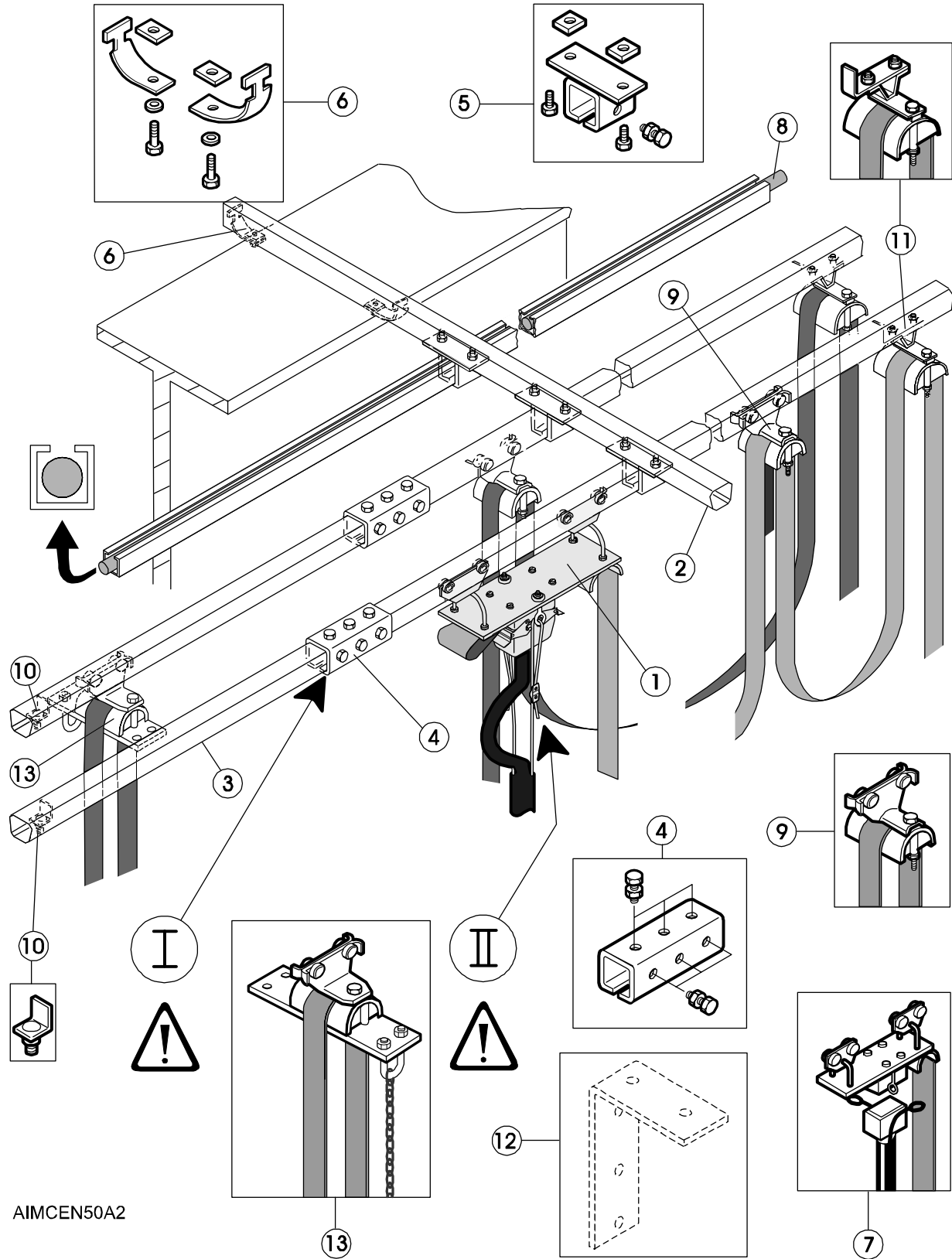
- | | | | |
|----|---|----|--------------------------------|
| 1 | Enclosure support bracket – left hand 150 mm | 15 | Screw DIN933-M8x20-8.8-A3G |
| 2 | Cable holding bracket | 16 | Flat washer M8 DIN125-A8-A3G |
| 3 | Bridge panel enclosure | 17 | Auxiliary support plate |
| 4 | Flat washer M8 DIN125-A8-A3G | 18 | Rail clamp + fastener hardware |
| 5 | Locking nut M8 DIN985-M8-8-A3G | 19 | Beam clip + fastener hardware |
| 6 | Threaded stud DIN913-M8x40-A3G | | |
| 7 | Enclosure support bracket – right hand 150 mm | | |
| 8 | Screw DIN933-M8x45-8.8-A3G | | |
| 9 | Lock washer | | |
| 10 | Flat washer M8 DIN125-A8-A3G | | |
| 11 | Square nut | | |
| 12 | Enclosure support bracket – 50 mm | | |
| 13 | Support plate and cable tray | | |
| 14 | Cover | | |



Explanation for NOTES in the drawing

Mount the brackets to bridge panel before mounting bridge panel to the support plate.
 The festoon rails are clamped to the support plate and cable tray and to the auxiliary support plate for the bridge panel. Use rail clamps.

Festoon Assembly



AIMCEN50A2



Festoon Assembly

Parts list

- 1 Pendant trolley
- 2 Support arm
- 3 C-rail
- 4 Track coupler + fastener hardware (4 bolts per coupler)
- 5 Rail clamp + fastener hardware
- 6 Beam clip + fastener hardware
- 7 Pendant trolley detail
- 8 Cable for drive motor 2
- 9 Cable trolley
- 10 End stop + fastener hardware
- 11 End clamp (stationary) + fastener hardware
- 12 Clip for cable attachment if furnished as option
- 13 Tow trolley for hoist power and control festoon cables



Explanation for NOTES in the drawing

Make sure that the C-rails are positioned into the track coupler so the rail joint is visible at the center holes of the coupler.

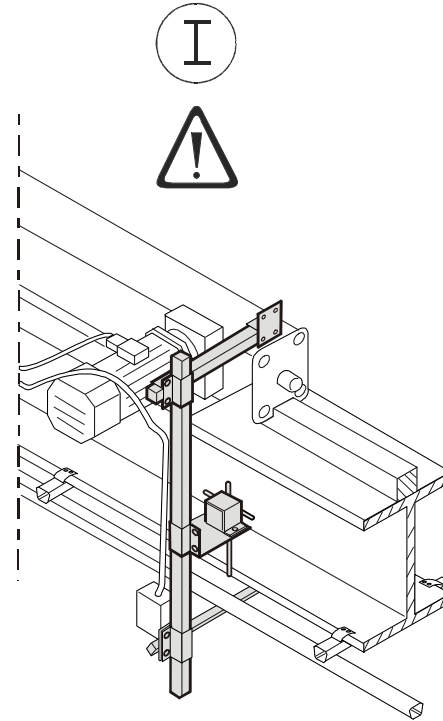
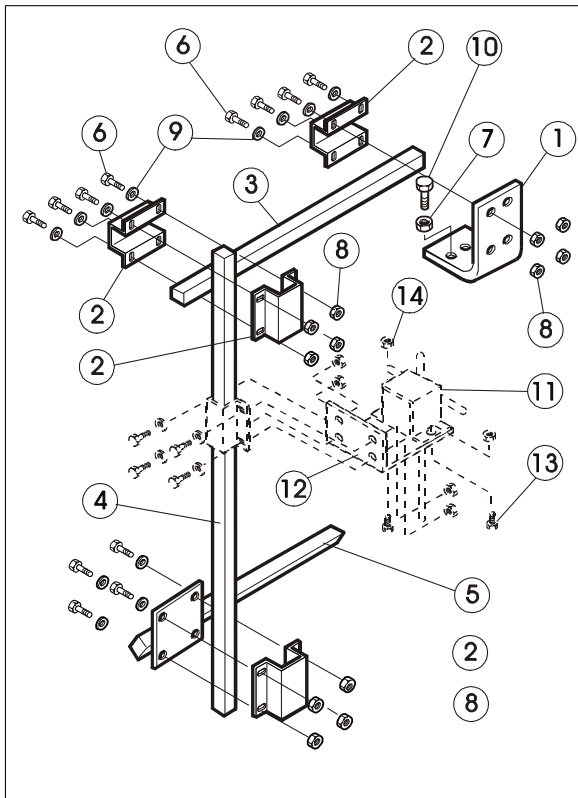
After properly positioning the C-rail into the track coupler, tighten each bolt on coupler. Lock each coupler bolt by tightening the nut against the coupler.

Make sure that the C-rail joint is smooth for tow trolley travel

Fasten each C-rail to each support arm by using the bracket. Tighten the bolts.

Tighten the strain relief wires on both sides of the plug so that pendant cable is making a loop as shown. Tighten each wire clamp.

Tow Arm Assembly for Crane (Old Style)



AIMCEN48B

Parts List

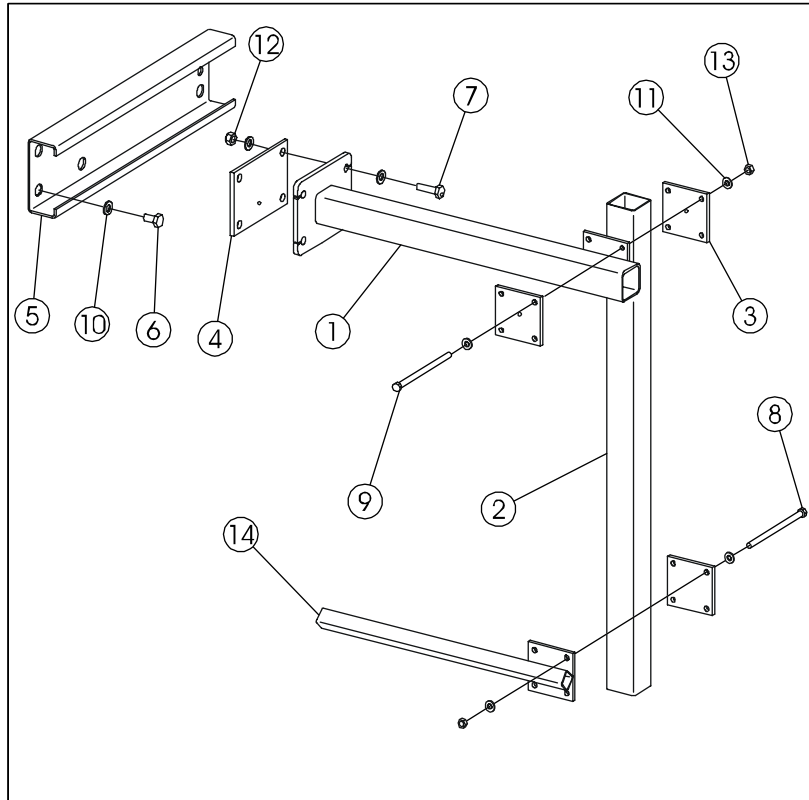
- 1 Plate
- 2 Clamp
- 3 Tube
- 4 Tube
- 5 Tow arm or collector arm
- 6 Bolt
- 7 Washer
- 8 Nut
- 9 Washer
- 10 Bolt
- 11 Limit switch
- 12 Plate
- 13 Bolt
- 14 Nut



Explanation for NOTES in the drawing

If necessary, cut off excess length of the square tubes.
 Power supply.

Tow Arm Assembly for Crane (New Style)



The mounting bracket (item 5) is to allow the location of the tow arm to be adjusted as needed.

Parts List

- 1 Horizontal tow arm
- 2 Vertical tube
- 3 Clamping plate
- 4 Mounting plate (optional with item 5)
- 5 Mounting bracket
- 6 M10 x 20 screw (DIN933-M10x20-8.8-A3G)
- 7 M10 x 35 screw (DIN933-M10x35-8.8-A3G)
- 8 M8 x 80 screw (DIN931-M8x80-8.8-A3G)
- 9 M8 x 140 screw (DIN931-M8x140-8.8-A3G)
- 10 Flat washer M10
- 11 Flat washer M8
- 12 M10 locking nut (DIN985-M10-8-A3G)
- 13 M8 locking nut (DIN985-M8-8-A3G)
- 14 Collector arm



Explanation for NOTES in the drawing

If necessary, cut off excess length of the square tubes.



Bridge Travel Limit Switch

The limit switch for bridge travel is supplied as standard in the [QL](#) Modular Crane Packages. Unless otherwise specified at order inquiry, this limit switch will operate as a slow-down limit.

The function of a slow-down limit is to deactivate bridge fast speed and to changeover to slow speed when the bridge-travel limit switch is tripped as the crane approaches either end of the runway. Bridge fast speed is deactivated until the limit switch is reset back to its neutral position. Reversing the direction of the crane so that the limit switch turnstile strikes again the trip device resets the limit switch. Once the switch is reset back to its neutral position, bridge fast speed becomes available again.

The limit switch is a maintained type and it is equipped with a turnstile. The trip device must be located on the runway beam positioned to trip the turnstile.

The user is responsible for furnishing and mounting the trip device of which is made from either rod or bar stock.

The bridge panel is Ready-to-Run after the user connects all the applicable plugs including the limit switch.

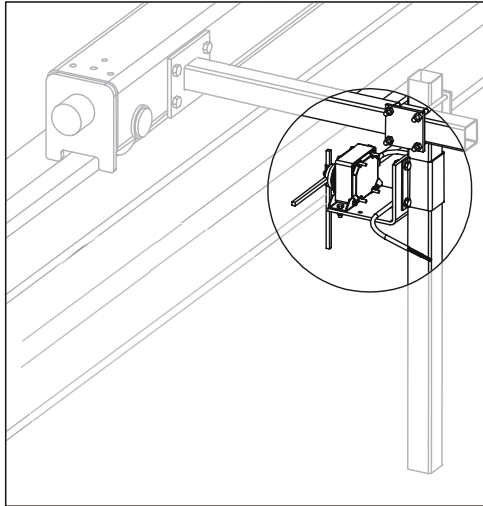
Not Installing Bridge Travel Limit Switch

[R&M](#) strongly recommends installing the supplied limit switch for bridge travel as a precaution against damaging impact. If the user decides not to install the bridge limit switch, then wire jumpers must be added to the bridge controls to accommodate for the missing limit switch connection. Adding these jumpers bypasses the limit switch circuit and brings online bridge fast speed that otherwise is disabled because the switch was not installed.

Refer to the wiring diagrams, in particular, the wiring diagram for the bridge panel that are included with your manuals before making any jumper connections.

Install a jumper from terminal X1: 50 to limit switch input(s) on the inverter in the bridge panel. Depending on the inverter type, there could be more than one limit switch input on the inverter. Each one of these limit switch connections on the inverter must be jumper connected. For example, if multiple switch inputs on the inverter are being used, then add a jumper from terminal X1: 50 to Input "A", then from Input "A" to Input "B" and so on.

Bridge Travel Limit Switch Mounting (New Style)



Parts List

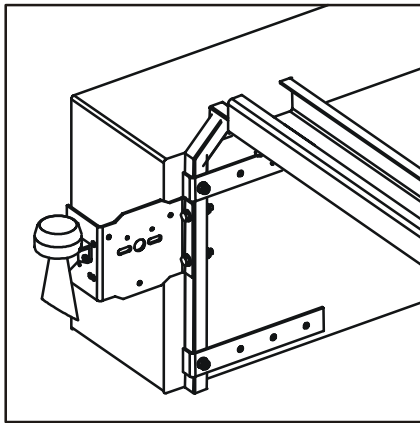
- 1 Limit switch
- 2 Angle bracket
- 3 Mounting hardware



Explanation for NOTES in the drawing

Mount the limit switch to the crane tow arm.

Horn Location & Mounting (New Style)



Parts List

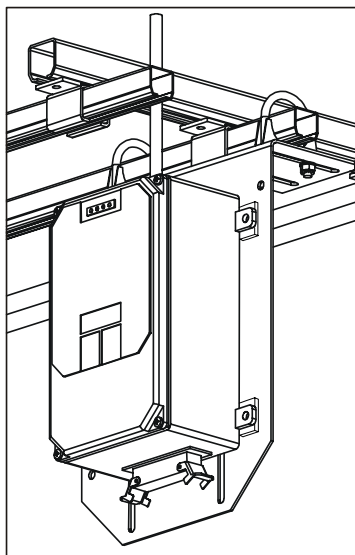
- 1 Horn
- 2 Mounting bracket
- 3 Mounting hardware



Explanation for NOTES in the drawing

Mount the horn to the bridge panel bracket as shown.

Radio Receiver Mounting (New Style)



Parts List

- 1 Mounting plate
- 2 U-bolt hardware
- 3 Rubber bushings



Explanation for NOTES in the drawing

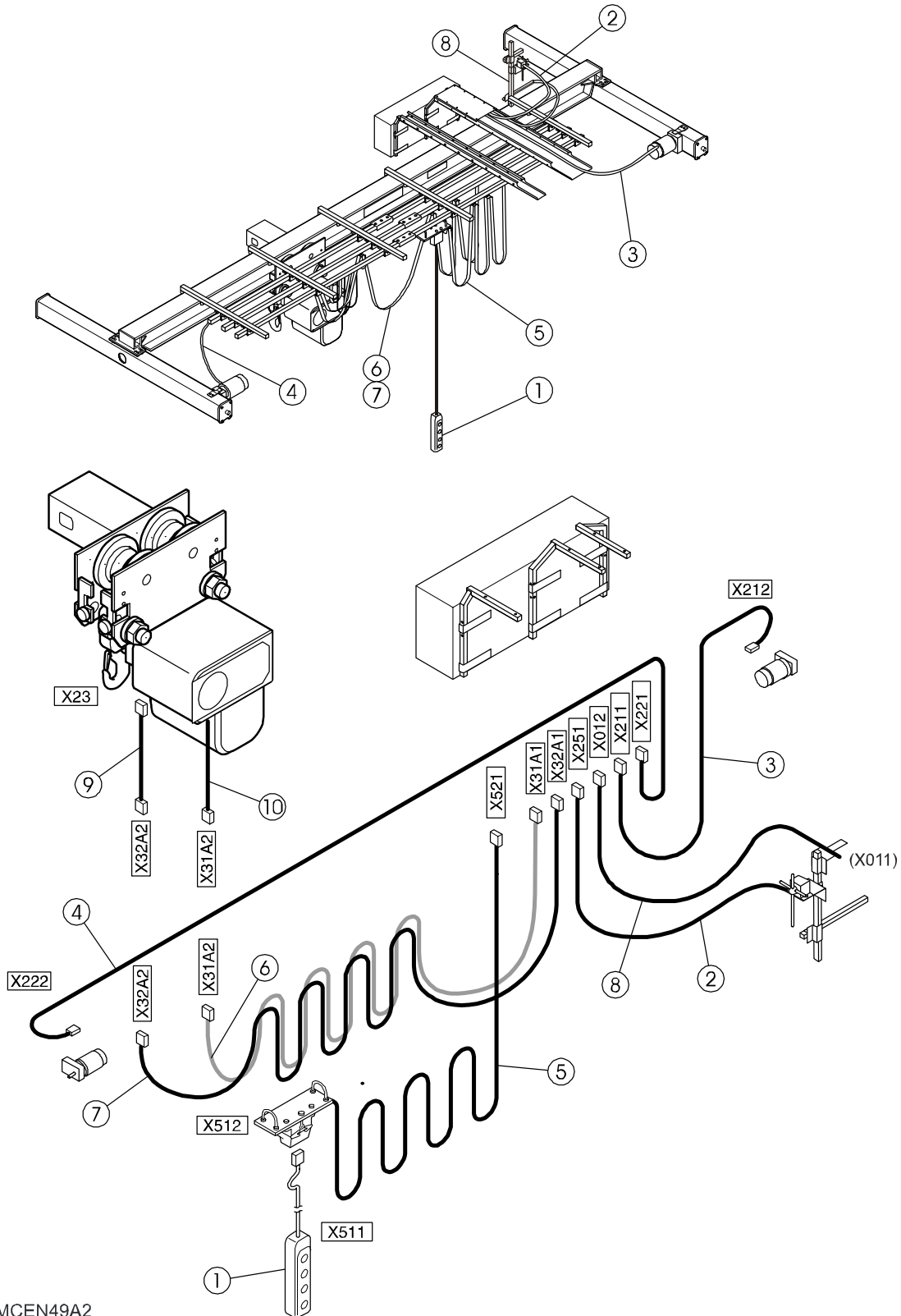
Insert the rubber bushings between the plate and the mounting feet of the radio receiver.

Mount the plate to the end of one of the festoon C-rails (2nd or 3rd rail) at the bridge panel end, and with the radio receiver facing out.

Make sure that the hoist clears the mounting plate.



Plug Identification and Layout



AIMCEN49A2

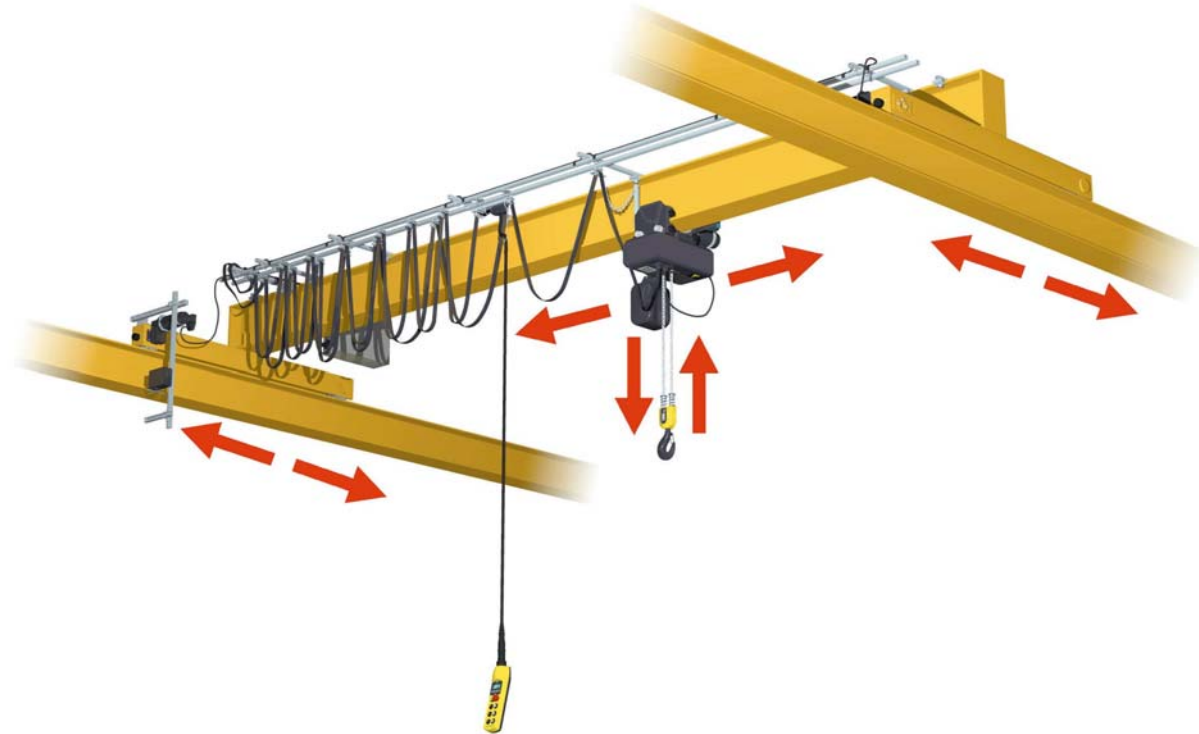


Plug Identification and Layout

Parts Lists

- 1 Pendant
- 2 Cable for bridge travel limit switch
- 3 Cable for bridge motor
- 4 Cable for bridge motor 2
- 5 Cable for pendant trolley
- 6 Cable for hoist power
- 7 Cable for hoist control
- 8 Cable for crane main power supply
- 9 Plug adapter for hoist control
- 10 Plug adapter for hoist power. Hardwired to hoist.

Operational Tests



- ✓ Check that fuses are in place in the bridge control panel
- ✓ Switch on power supply
- ✓ Proceed with tests on all crane motions
- ✓ Adjust the hoist trolley end stops on bridge girder

Proper Crane Motion

Crane traveling motions are set for when the operator is standing on the push button side of the bridge, facing the load. If the direction of the bridge drive travel does not correctly correspond with respect to the bridge button being depressed, check the following possibilities:

1. If all motions are opposite with respect to the pushbutton markings, swap two of the main power leads at the bridge panel (for a complete hoist and trolley motion check, see start-up section in the hoist's Installation, Operation and Maintenance manual and the trolley's manual).
2. Then, if necessary, change the bridge travel direction by switching plugs X-211 and X-221 at the bridge panel.

