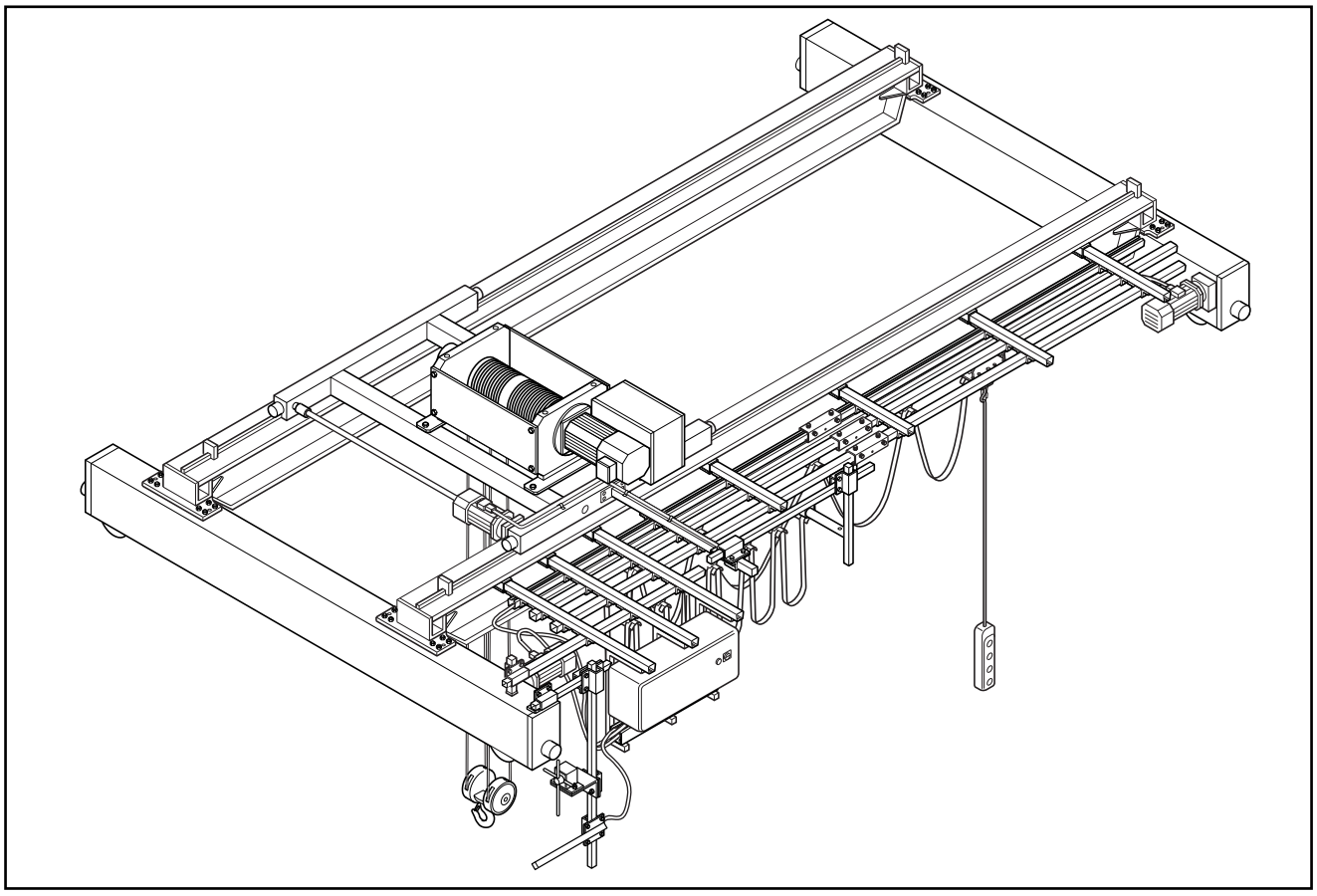
R&M
MATERIALS
HANDLING
INC.

QC 2000 MODULAR CRANE

ASSEMBLING INSTRUCTIONS



DOUBLE GIRDER

R&M MATERIALS HANDLING INC.

INDEX	PAGE NO.

IMPORTANT ASSEMBLY INSTRUCTIONS

1. Ensure you have all correct assembly instructions before starting assembly.
2. Ensure you have the correct component package for your span and capacity.
3. Ensure the crane layout is the correct one for the application.
4. Use the correct size main girder.
5. Do not exceed maximum crane spans or capacities for any girder connection type.
6. Ensure you check alignment of drilling jigs before using.
7. Do not substitute metric girder connection hole sizes with English sizes.
8. Do not substitute any girder connection bolts or roll pin sizes with English sizes.
9. Use roll pins with all girder connections.
10. Tighten girder connection bolts to correct torque.
11. Plastic hammer may only be used to install traveling components.
12. Use bridge travel limit switch whenever possible.
13. Adjust hoist trolley and crane end stops correctly.
14. Perform a test run for assembled crane before shipping to job site.
15. Adjust crane collector pole at job site and cut excess tubing.
16. Run crane the length of the runway and adjust end stops.

QC2000 BULLETIN DGT-1

BEFORE STARTING ASSEMBLY, MAKE SURE THAT YOU HAVE ALL CORRECT ASSEMBLY INSTRUCTIONS AND THE COMPLETE MODULAR CRANE COMPONENT PACKAGE. DO NOT MIX OR REPLACE COMPONENTS FROM ONE SET TO ANOTHER BEFORE CONFIRMING THAT THEY ARE INTERCHANGEABLE. MAKE SURE YOU ARE ALWAYS USING CORRECT COMPONENTS.

CRANE LAYOUT

There are two possibilities for crane layout depending on the location of the crane power supply in the building and the required push button side of the crane. All assembly instructions in this guide are shown in the crane layout drawing. If the other crane layout is desired, assemble bridge accessories in a mirror image. To maintain correct crane movement directions, bridge drive motor plugs (X-15, X-16) should be simply switched with each other at the bridge panel. Before starting crane assembly, make sure that the crane layout is the correct one for the application.

- *Assemble the main girder and main girder/end truck connection per instructions in this guide.*
- *Install the hoist per instructions in the "Installation, Operation, and Maintenance Instructions".*
- *Assemble crane festoon system per instructions in this guide.*

CRANE TEST RUN

All modular crane components and cable connections are already factory tested before shipping, but to complete the quality cycle of R&M Materials Handling, a test run **must be done** before shipping the crane to the job site.

1. Switch off mainline switch on bridge panel.
2. Connect correct power to crane main power supply cable.
3. Turn on power.
4. Turn on mainline switch on bridge panel.
5. Energize mainline contactor by pressing "start" button on pushbutton pendant.
6. Mainline contactor requires energizing after cutting off power or shutting down crane with Emergency stop.
7. Press "hoist down" button for brief moment while watching block and wire rope.
8. If block raises while pressing "hoist down" button, switch off mainline switch and change phasing of crane main power supply by switching any two of the three wires. Refer also to hoist "Installation, Operation, and Maintenance Instruction" bulletin, Section 2, Initial Start-up, for more information regarding proper phasing of motors.
9. Turn on mainline switch and energize mainline contactor.
10. Press "down" button and check bottom block is lowering.
11. **NOTE:** When bottom block is on ground and wire rope is loose, be careful when raising the block to ensure wire rope is tracking properly in the grooves of rope drum. Never operate hoist if wire rope jumps a groove on rope drum. Damage to wire rope may result.
12. Raise bottom block carefully and check the operation of hoist upper limit switches. Refer also to hoist "Installation, Operation, and Maintenance" bulletin, Section 2, Initial Start-up, for more information regarding No Load operational checks.
13. Test other hoisting direction and both trolley directions. Test both fast and slow speeds, if provided.
14. Test Bridge drives and check drive wheels are turning in same direction. Test both fast and slow speeds, if provided. (Fast speed does not function if bridge travel limit switch is not in center position.)
15. Check operation of bridge travel limit switch.
16. Bridge travel limit switch acts as slowdown limit for two-speed and inverter controls, and shutoff limit for single-speed control when arm of limit switch is tripped into either position from center. Limit switch shall always be returned to center position for proper operation of bridge drives.
17. Check to make sure all motor brakes open while motors are running.
18. Check that emergency stop button on pushbutton pendant shuts off power to crane by de-energizing mainline contactor.

Direction of crane traveling motion is set for operator standing on the pushbutton side of bridge. If direction of crane traveling motion from pushbutton is not as desired, change X-15 and X-16 plugs at bridge panel. Do not change hardware in bridge panel.

1. Change main power phasing if all crane motions are opposite.
2. Change bridge travel motions by switching X-15 and X-16 plugs at bridge panel.
3. Check that bridge limit switch is connected and in "center" position if fast speed of drives is not working.
4. If crane does not start to operate, check that main line disconnect switch is "on" at bridge panel and that you have pressed the start button on the pendant to energize main line contactor.

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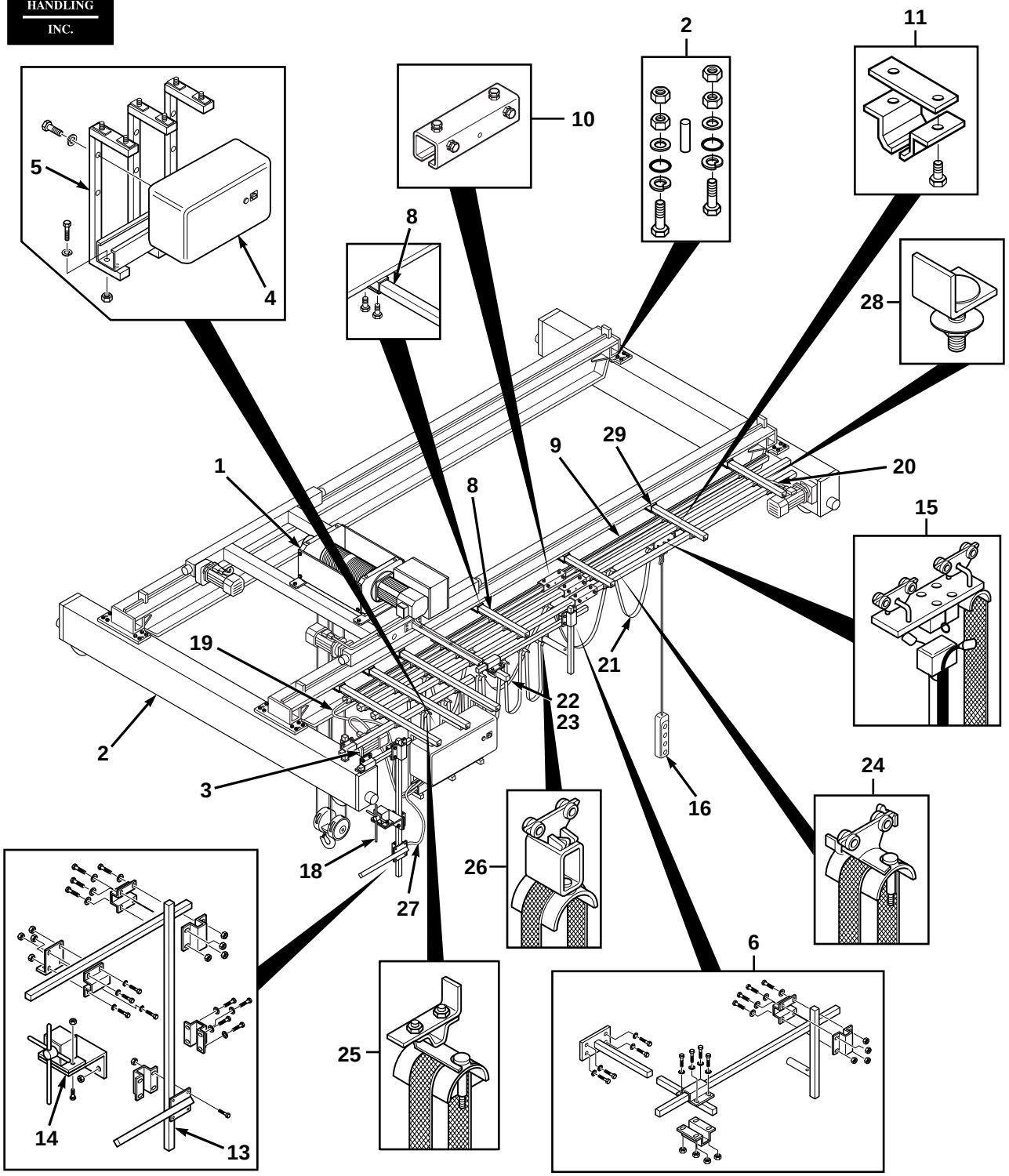
CRANE LAYOUT/DOUBLE GIRDER



1. Hoist
2. End carriage & fasteners
3. Traveling machinery
4. Bridge panel
5. Bridge panel support
6. Hoist power towing arm
8. Profile support rail
9. C-track
10. Joint clamp
11. Track support clamp
13. Crane power towing arm
14. Bridge travel limit switch
15. Pendant trolley
16. Push button station
18. Cable for limit switch
19. Cable for drive motor 1
20. Cable for drive motor 2
21. Cable for pendant trolley
22. Cable for hoist power
23. Cable for hoist control
24. Cable trolley
25. End clamp
26. Towing trolley
27. Cable for crane main power supply
28. End stop for pendant trolley
29. Support rail bracket

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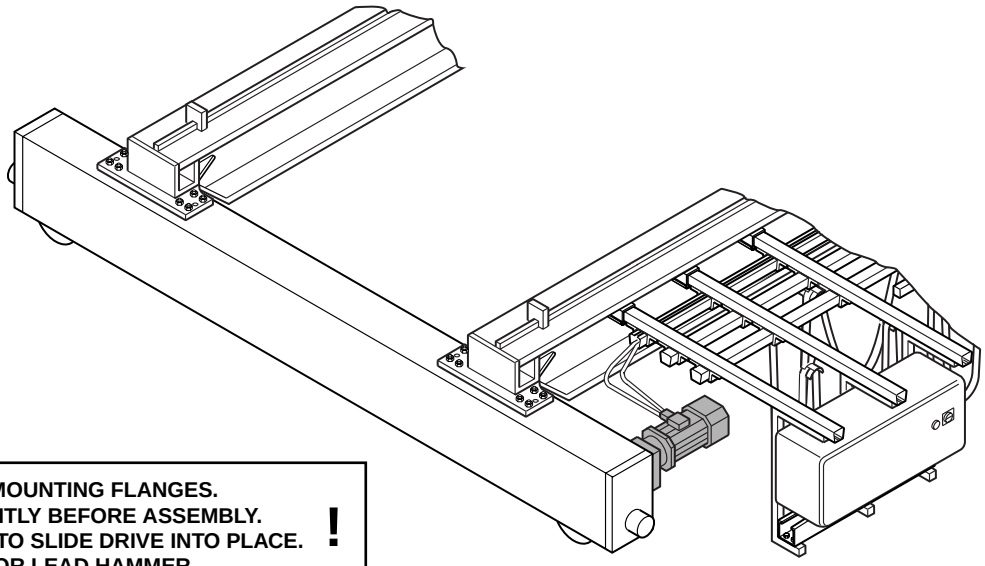
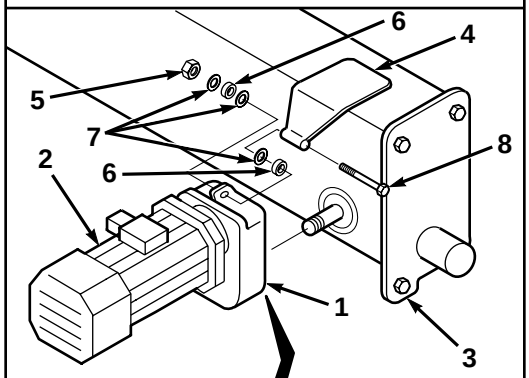
BRIDGE DRIVE ASSEMBLY



! • CLEAN THE SPLINE AND MOUNTING FLANGES. GREASE THE SPLINE LIGHTLY BEFORE ASSEMBLY.
• USE A PLASTIC HAMMER TO SLIDE DRIVE INTO PLACE. DO NOT USE ANY METAL OR LEAD HAMMER. !

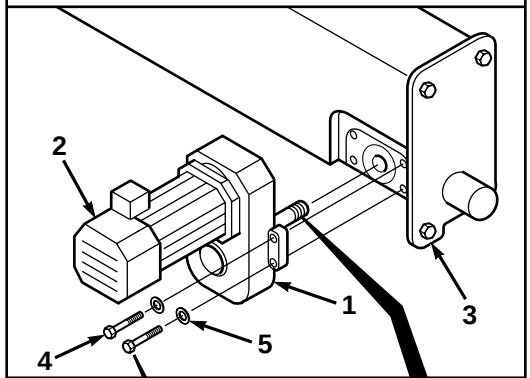
TM4 & TM5 BRIDGE DRIVES



Parts Listing

1. Gear reducer
2. Motor
3. End truck
4. Torque arm
5. Nut
6. Spacer
7. Washer
8. Bolt

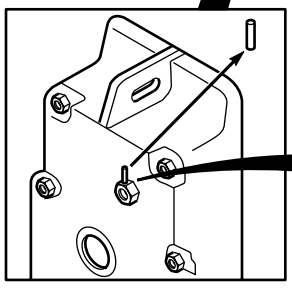
DS3 BRIDGE DRIVE

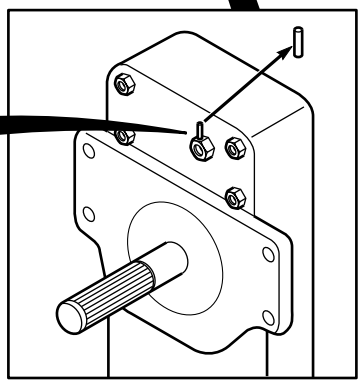


Parts Listing

1. Gear
2. Motor
3. End truck
4. Bolt
5. Washer

! • TIGHTENING TORQUE 30 LB-FT. !





! • REMOVE THE PROTECTION PIN FROM BREATHER PLUG. !

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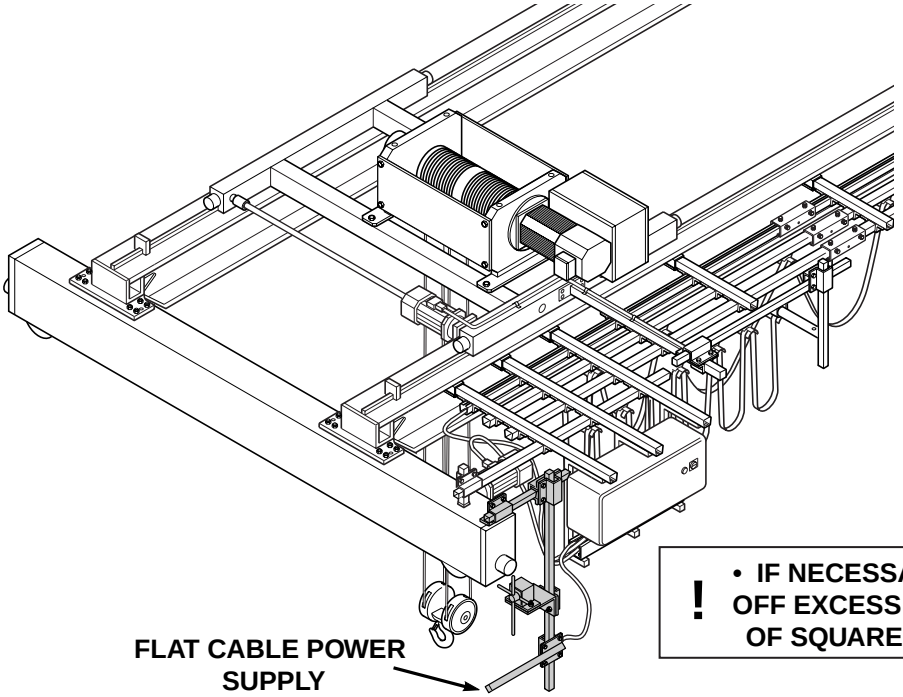
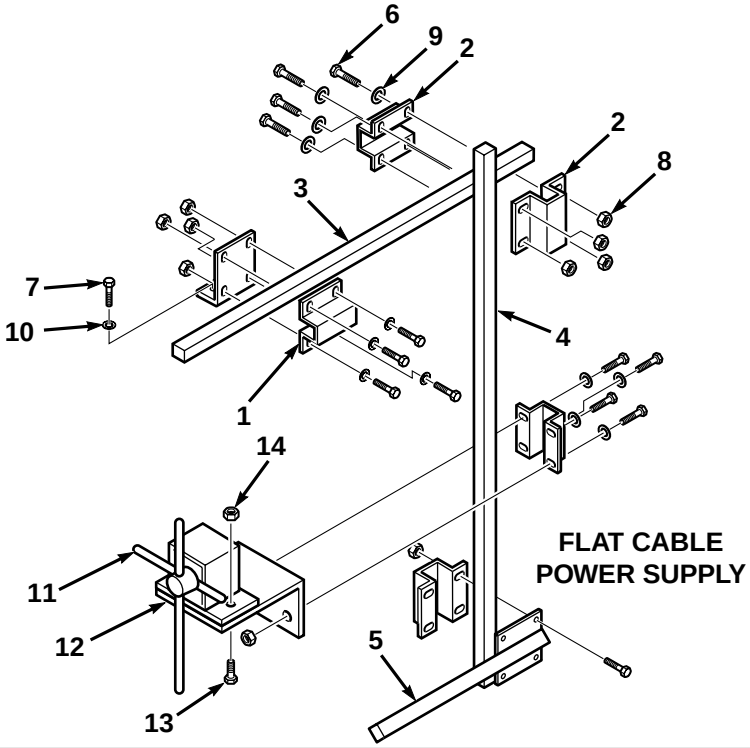


! • IF NECESSARY, CUT OFF EXCESS LENGTH OF SQUARE TUBES. !



Parts Listing

1. Plate
2. Clamp
3. Tube
4. Tube
5. Towing arm
6. Bolt
7. Bolt
8. Nut
9. Washer
10. Washer
11. Limit switch
12. Plate
13. Bolt
14. Nut

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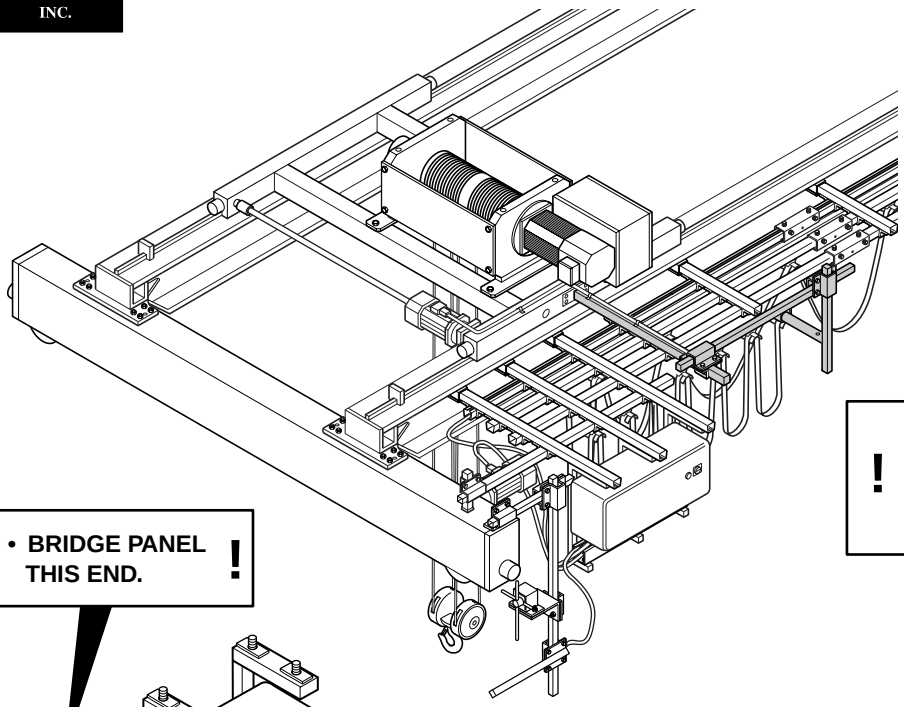
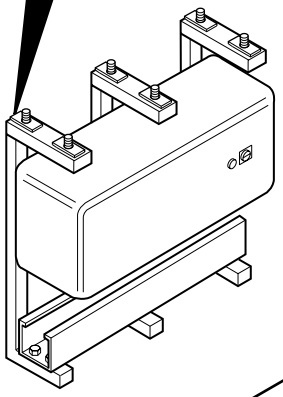
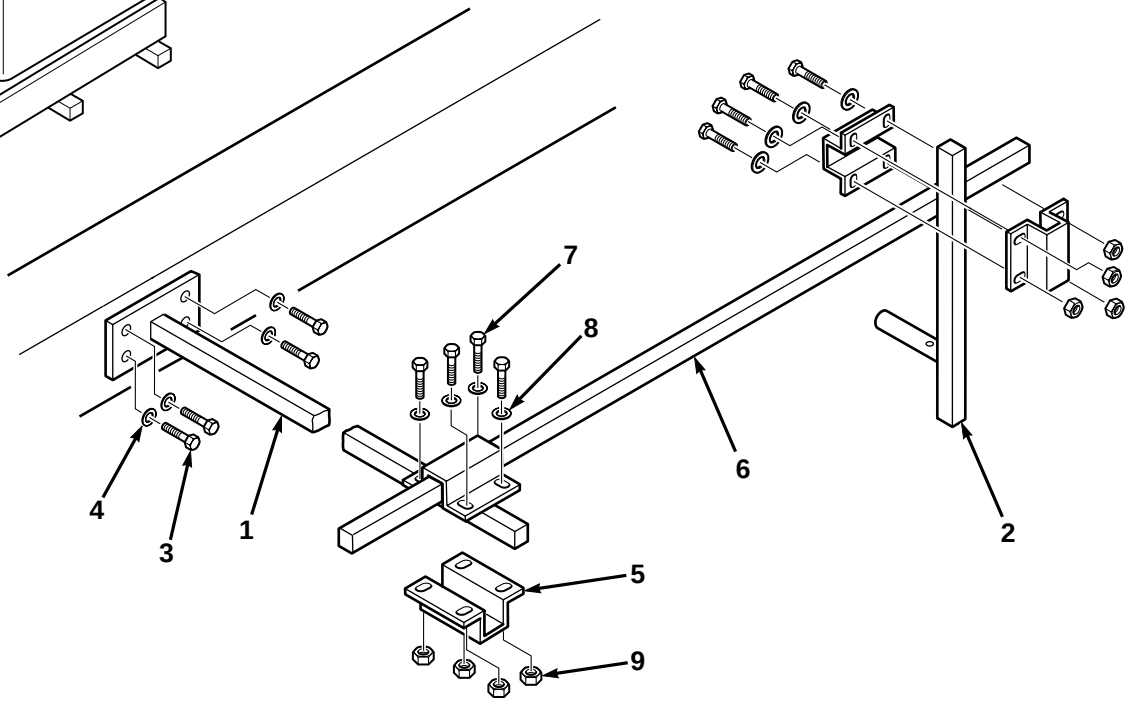
HOIST POWER TOWING ARM ASSEMBLY



! • BRIDGE PANEL THIS END. !



! • ADJUST HOIST POWER TOWING ARM LEAVING ENOUGH ROOM FOR CABLE TROLLEYS TO COLLECT. !



Parts Listing

1. Support tube
2. Towing arm
3. Bolt
4. Washer
5. Clamp
6. Square tube
7. Bolt
8. Washer
9. Nut

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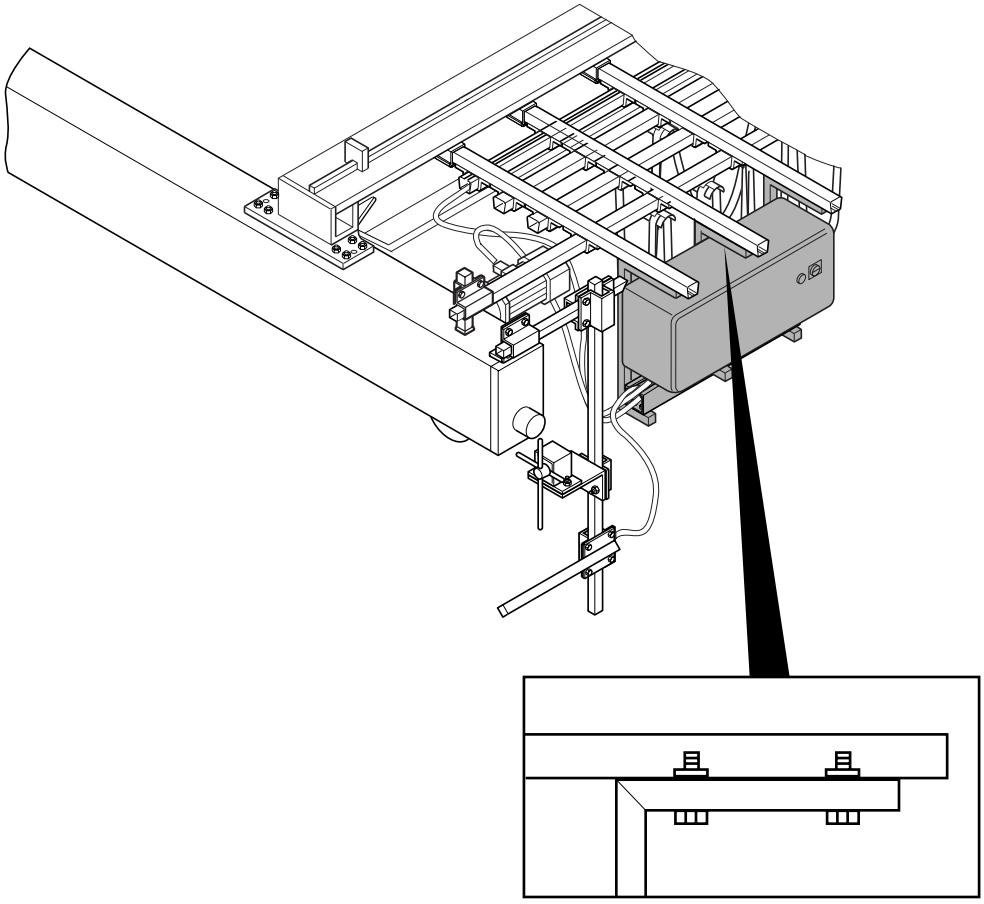

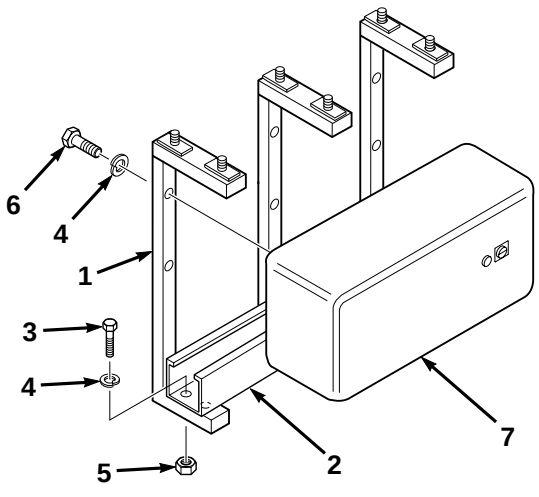

Parts Listing

1. Frame
2. Cable tray
3. Bolt
4. Washer
5. Nut
6. Bolt
7. Bridge panel

! • ASSEMBLE THE FRAME TO BRIDGE PANEL FIRST. • SLIDE ASSEMBLY TO SUPPORTING C-RAIL. !

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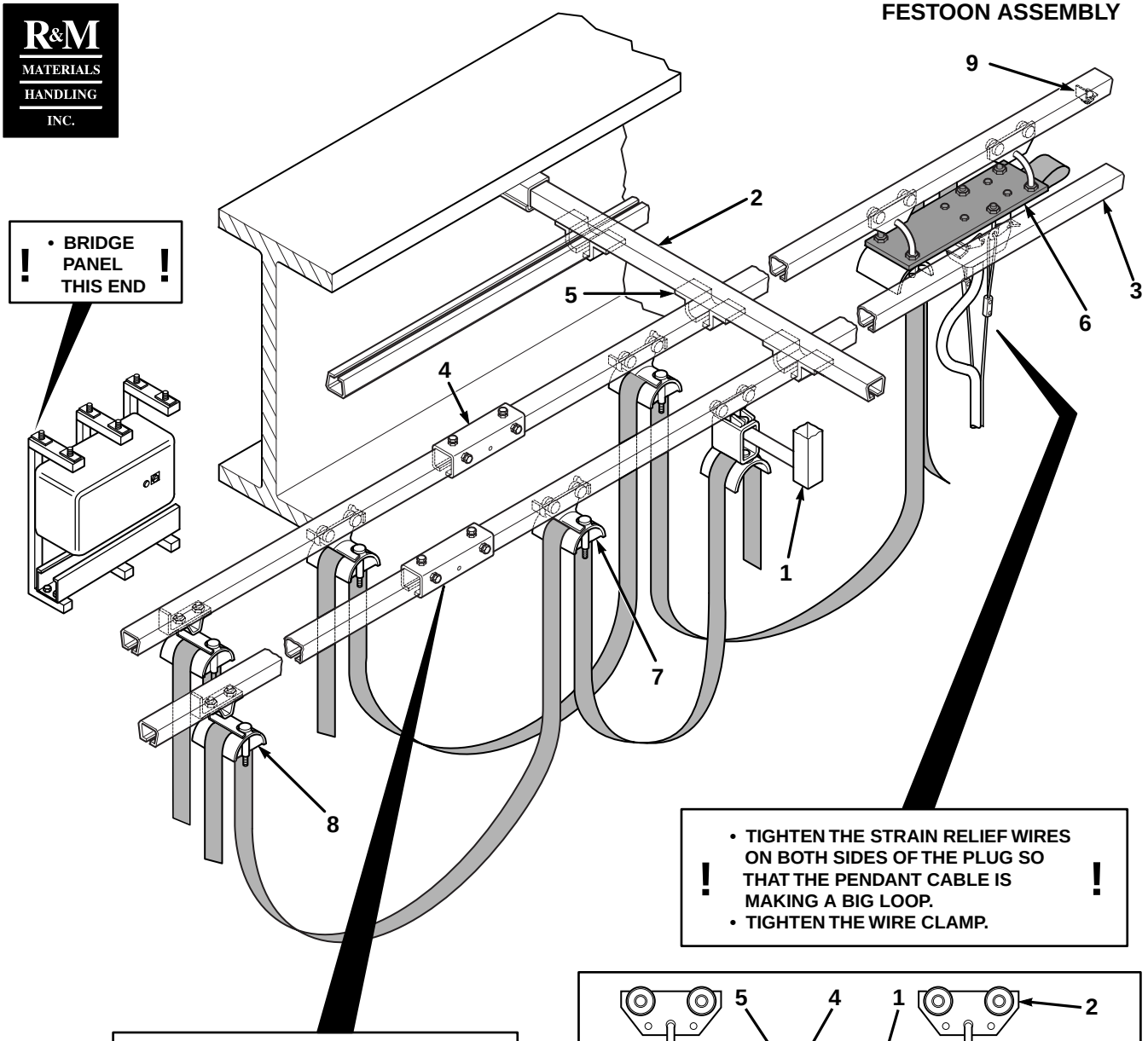
FESTOON ASSEMBLY



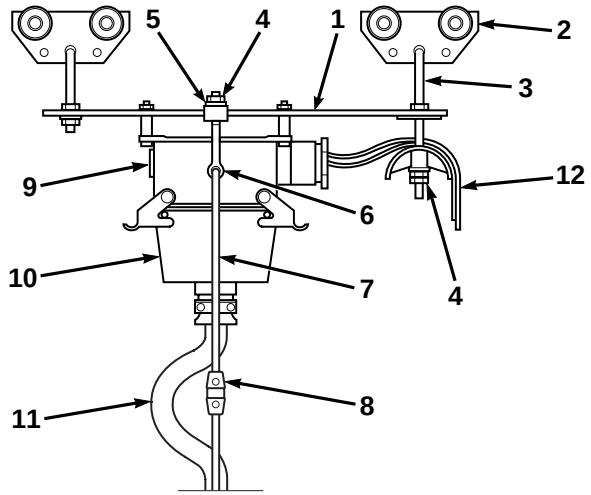
! • BRIDGE PANEL THIS END !

! • TIGHTEN THE STRAIN RELIEF WIRES ON BOTH SIDES OF THE PLUG SO THAT THE PENDANT CABLE IS MAKING A BIG LOOP.
• TIGHTEN THE WIRE CLAMP. !

! • MAKE SURE THE JOINT IS SMOOTH FOR TROLLEY TRAVEL. !

Parts Listing

1. Hoist power towing arm
2. Profile support rail
3. C-track
4. Joint clamp
5. Track support clamp
6. Pendant trolley
7. Cable trolley
8. End clamp
9 . End stop for pendant trolley



Parts Listing

1. Plate
2. Trolley
3. U-bolt
4. Nut
5. Rubber washer
6. Eye bolt
7. Strain relief wire
8. Wire clamp
9. Plug female
10. Plug male
11. Pendant cable
12. Cable to bridge panel

QC2000 BULLETIN DGT-1

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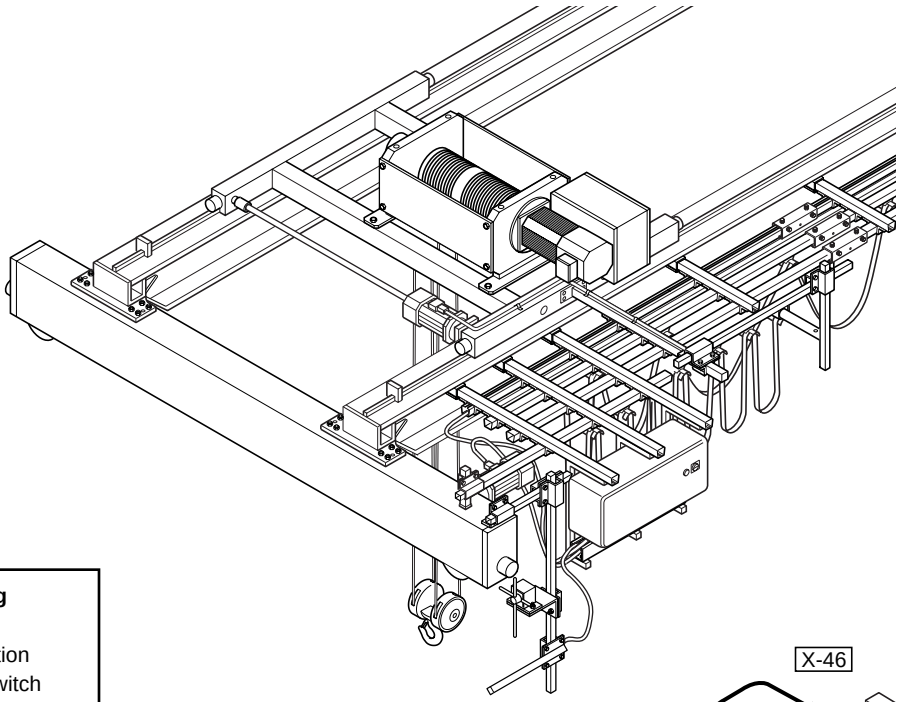
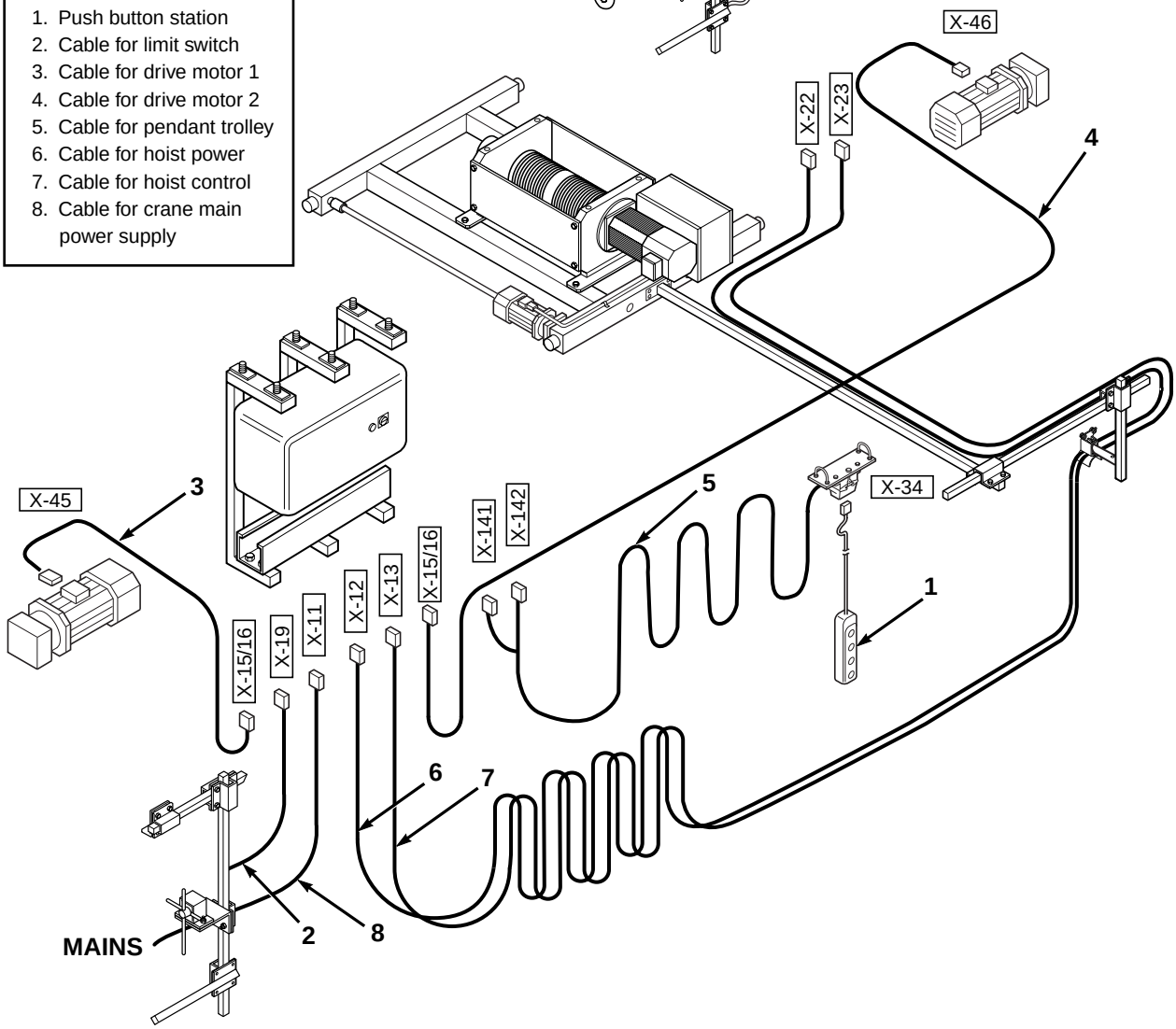


Parts Listing

1. Push button station
2. Cable for limit switch
3. Cable for drive motor 1
4. Cable for drive motor 2
5. Cable for pendant trolley
6. Cable for hoist power
7. Cable for hoist control
8. Cable for crane main power supply



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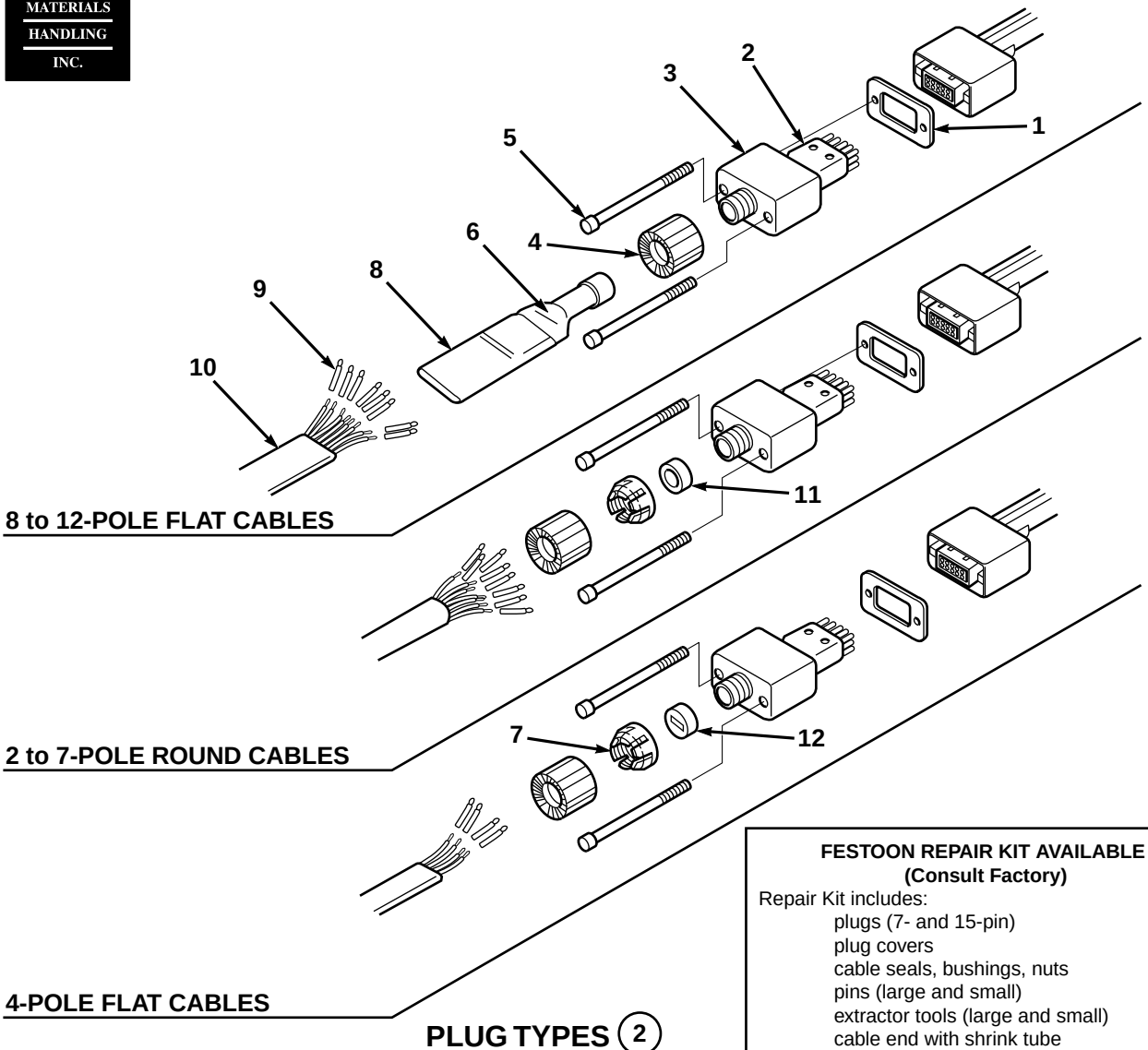
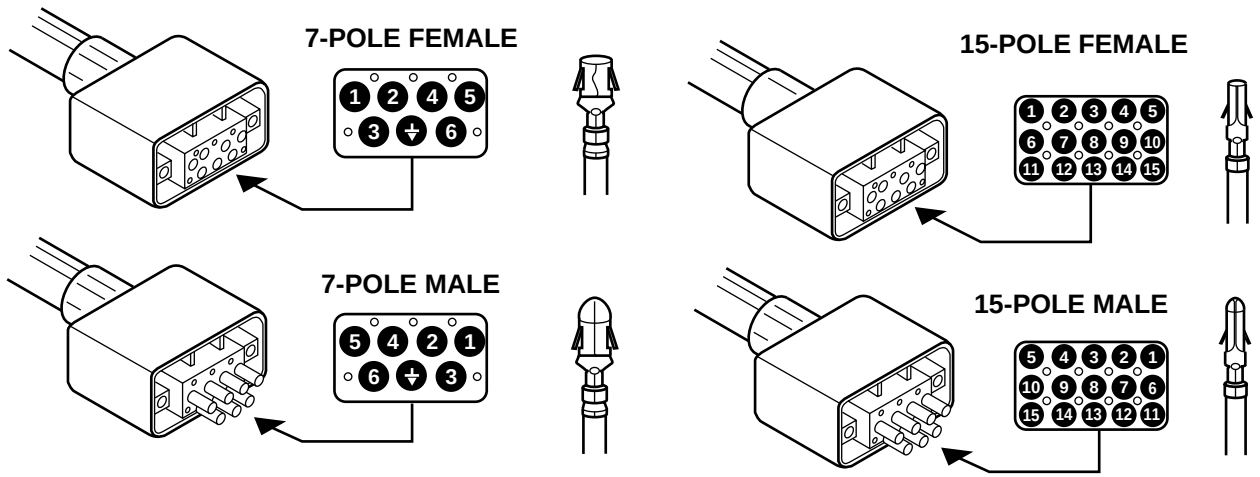
PLUG CONNECTION ASSEMBLY
QC Kit, Cranes, Plastic Plug



FESTOON REPAIR KIT AVAILABLE
(Consult Factory)

Repair Kit includes:
- plugs (7- and 15-pin)
- plug covers
- cable seals, bushings, nuts
- pins (large and small)
- extractor tools (large and small)
- cable end with shrink tube

PLUG TYPES (2)

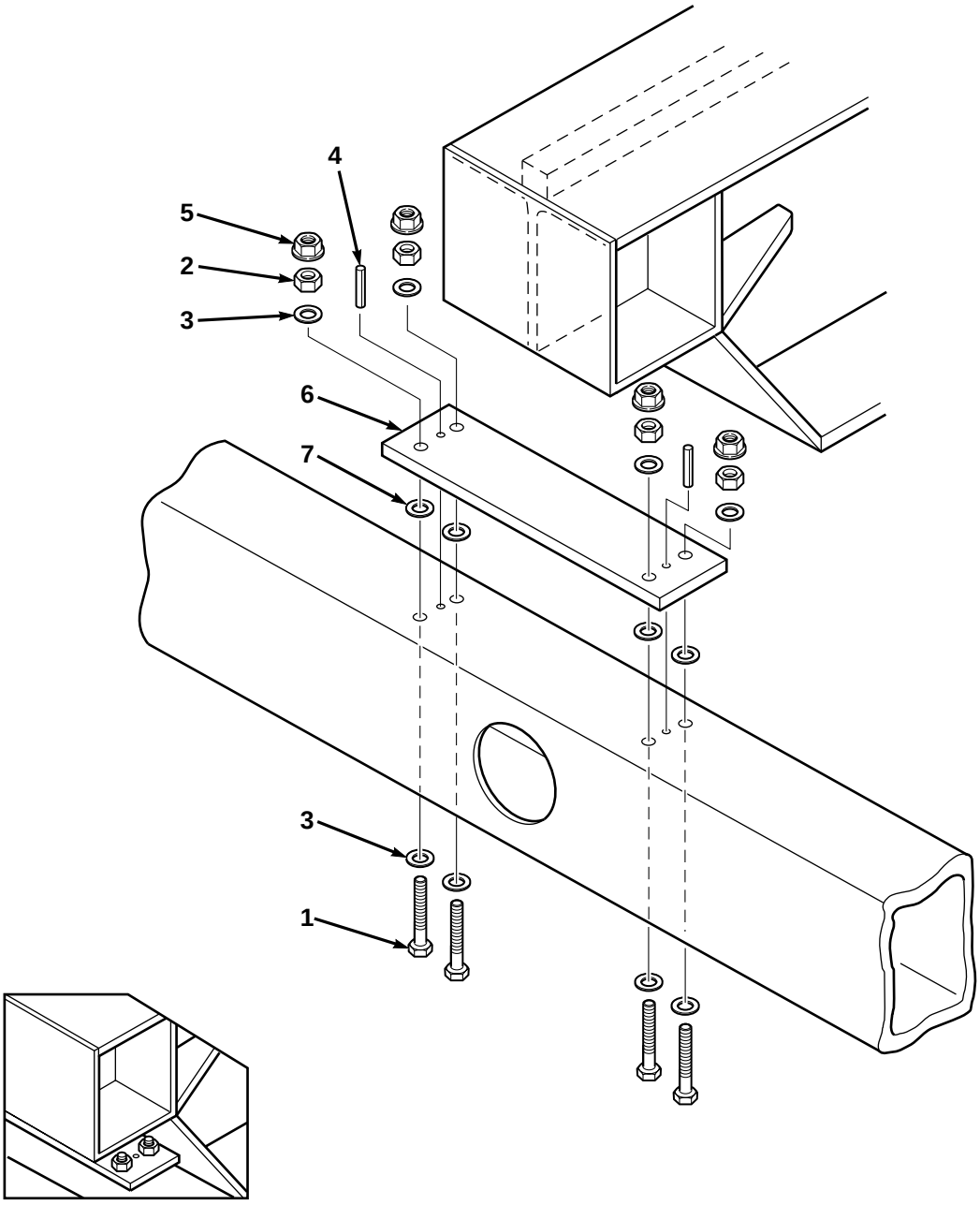


Parts Listing

1. Seal
2. Plug
3. Plug cover
4. Nut
5. Bolt
6. Cable end
7. Bushing
8. Shrink tube
9. Molex connector
10. Cable
11. Round cable seal
12. Flat cable seal

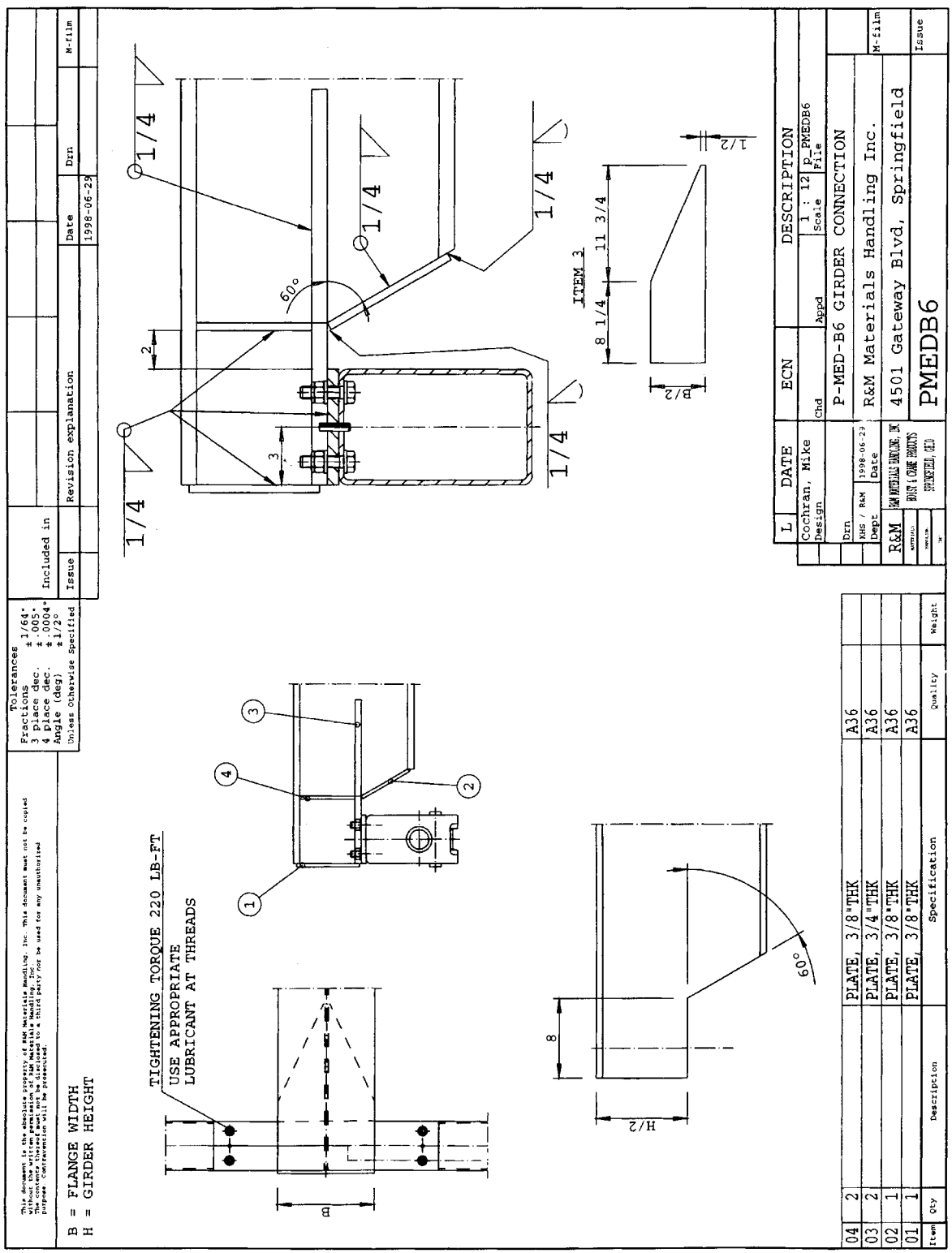
QC2000 BULLETIN DGT-1

P-MED-B6

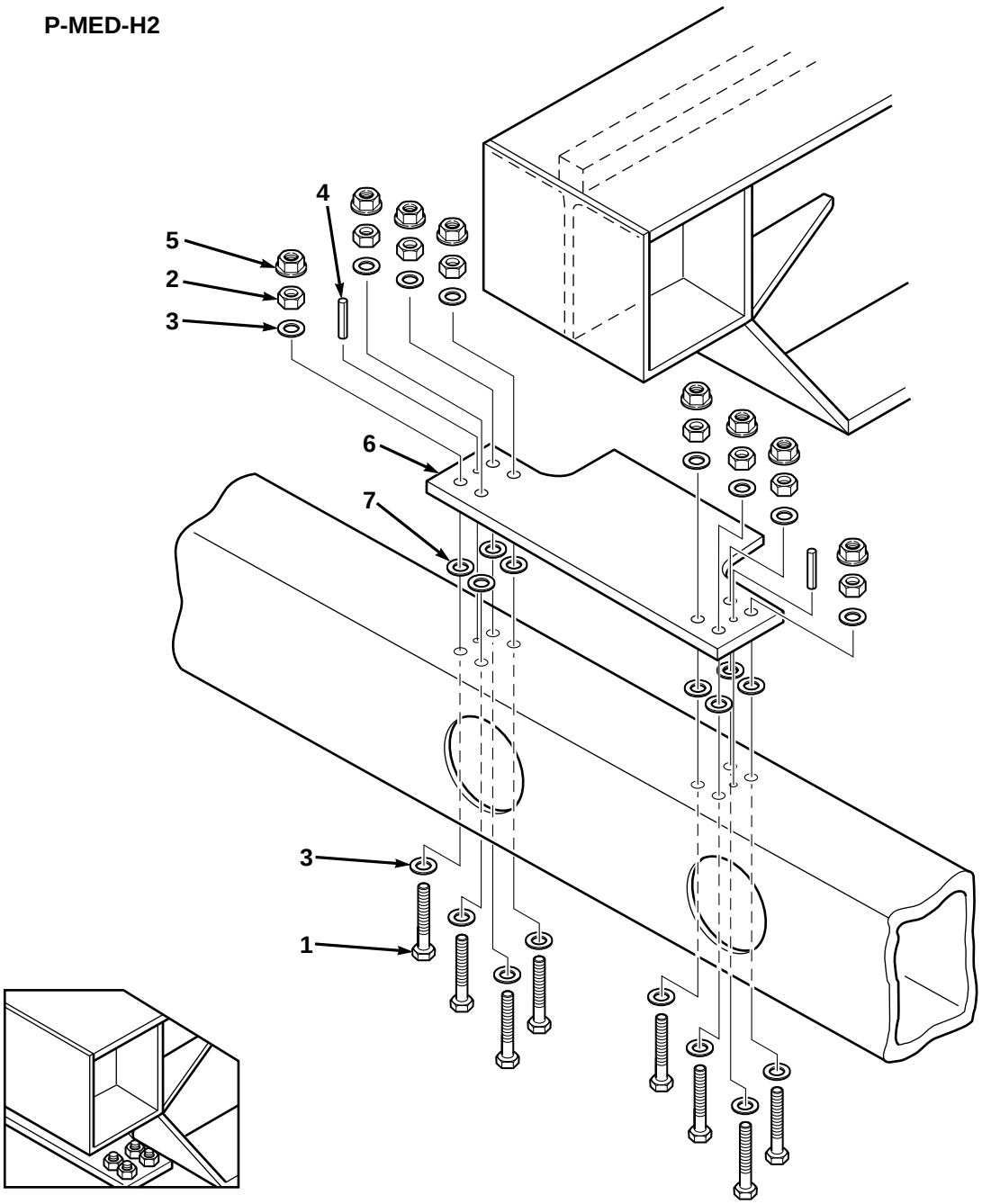


Parts Listing

1. Bolt
2. Nut
3. Washer
4. Spring pin
5. Pal-nut
6. Joint plate
7. Friction ring

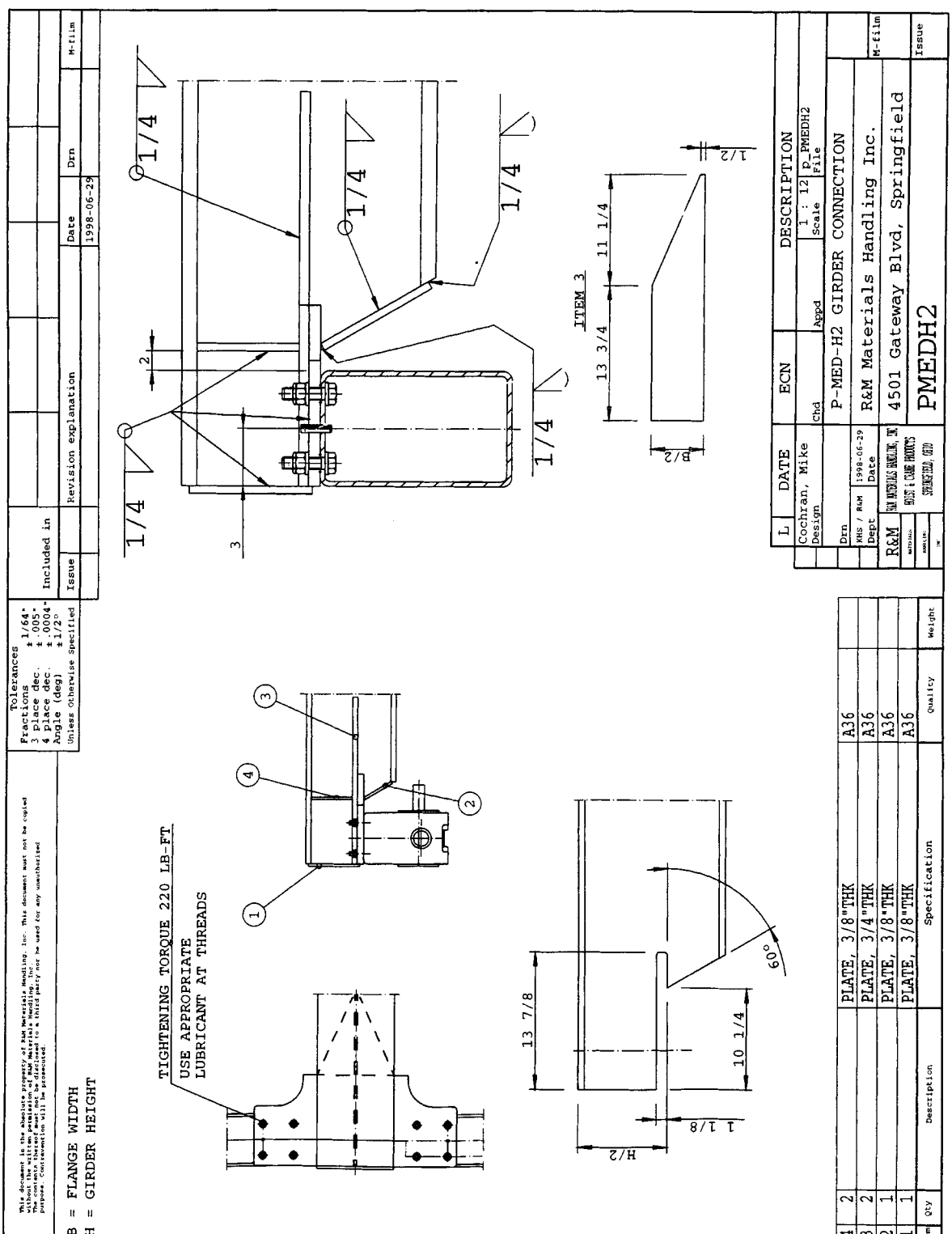

B = FLANGE WIDTH
H = GIRDER HEIGHT
TIGHTENING TORQUE 220 LB-FT
USE APPROPRIATE
LUBRICANT AT THREADS
ITEM 3
60°
1/4
P-MED-B6 GIRDER CONNECTION
R&M Materials Handling Inc.
4501 Gateway Blvd, Springfield
PMEDB6

P-MED-H2



Parts Listing

1. Bolt
2. Nut
3. Washer
4. Spring pin
5. Pal-nut
6. Joint plate
7. Friction ring


B = FLANGE WIDTH
H = GIRDER HEIGHT
TIGHTENING TORQUE 220 LB-FT
USE APPROPRIATE
LUBRICANT AT THREADS
ITEM 3
13 3/4
11 1/4
13 7/8
10 1/4
1 1/8
60°
1/4
1/2
P-MED-H2 GIRDER CONNECTION
R&M Materials Handling Inc.
4501 Gateway Blvd, Springfield
PMEDH2
Cochran, Mike
1998-06-29
1 : 12
P_PMEDH2
Tolerances
Fractions ±1/64"
3 place dec. ±.005"
4 place dec. ±.0004"
Angle (deg) ±1/2°
Unless Otherwise Specified
Included in
Revision explanation
Date
1998-06-29
Drn
M-film
Issue
Item Qty Description Specification Quality Weight
04 2 PLATE, 3/8"THK A36
03 2 PLATE, 3/4"THK A36
02 1 PLATE, 3/8"THK A36
01 1 PLATE, 3/8"THK A36

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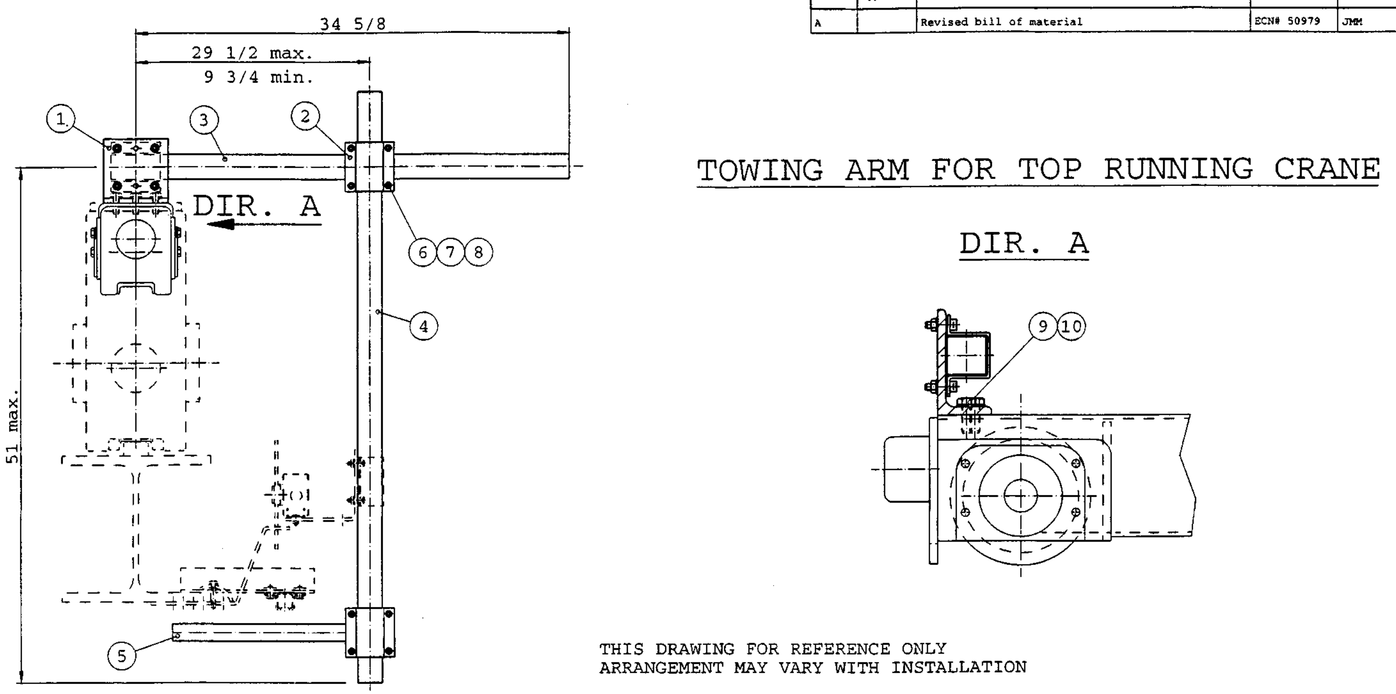
Issue	Appear x	Revision explanation	Date	Drn	M-film
A		Revised bill of material	ECN# 50979	JMM	

TOWING ARM FOR TOP RUNNING CRANE



THIS DRAWING FOR REFERENCE ONLY
ARRANGEMENT MAY VARY WITH INSTALLATION

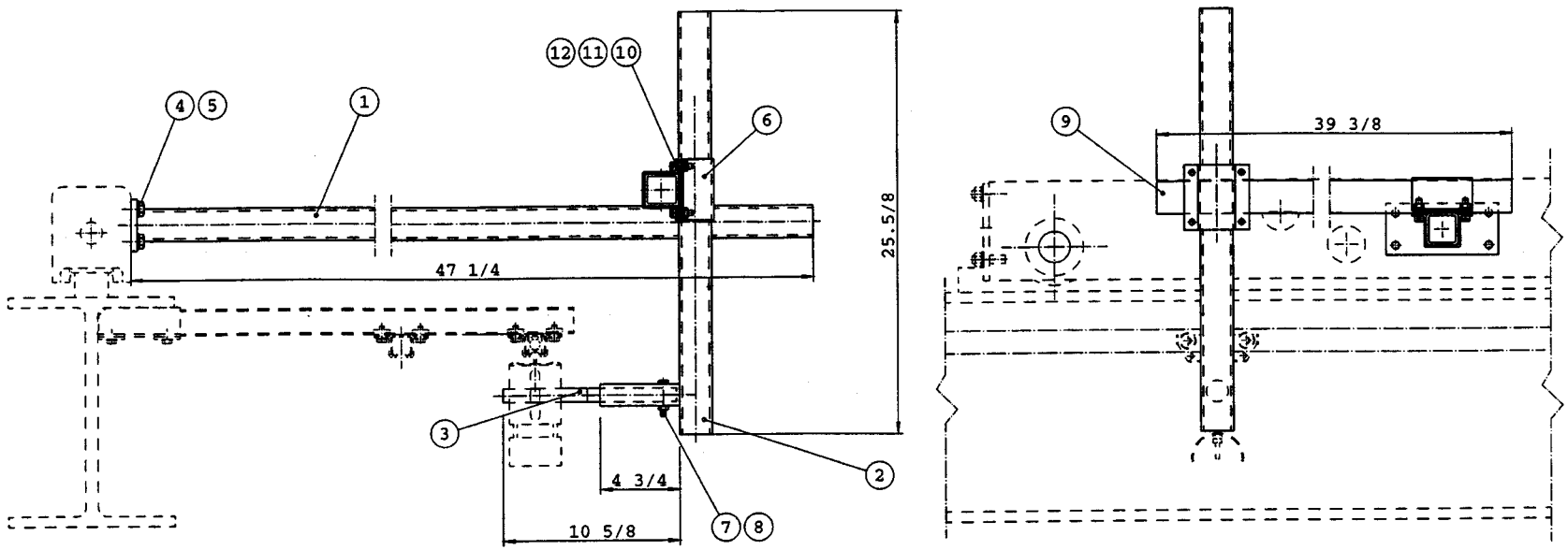
Item	Qty	Description	Specification	Quality	Weight
10	3	6231010111	A12 LOCK WASHER	DIN127	
09	3	6500120353	M12*35 BOLT	DIN933	
08	12	6231000091	WASHER, 9mm I.D.	DIN126	
07	12	6140900081	M8 SELF LOCKING NUT	DIN985	
06	12	6500080303	M8*30 BOLT	DIN912	
05	1	MCF042B	TOWING ARM		
04	1	MCF021A(4)	SQUARE TUBE, 50*50*2-1500		
03	1	MCF021A(1)	SQUARE TUBE, 50*50*2-750		
02	4	D3124-6	FIXING PLATE		
01	1	MCF010B	MOUNTING BRACKET		

L	DATE	ECN	DESCRIPTION
Design: Cochran, Mike	Chd	Appd	Scale: 1 : 8 / File: p_2309648002
Drn			Crane Towing Arm Assy.
Dept: XHS / R&M	Date: 1994-07-15		R&M Materials Handling Inc.
R&M MATERIALS HANDLING INC.	R&M MATERIALS HANDLING, INC. HOIST & CRANE PRODUCTS SPRINGFIELD, OHIO		4501 Gateway Blvd, Springfield
		Issue: A	2309648002

A3 2309648002

Included in					

Issue	Appear x	Revision explanation	Date	Drn	H-film
			1998-07-27		



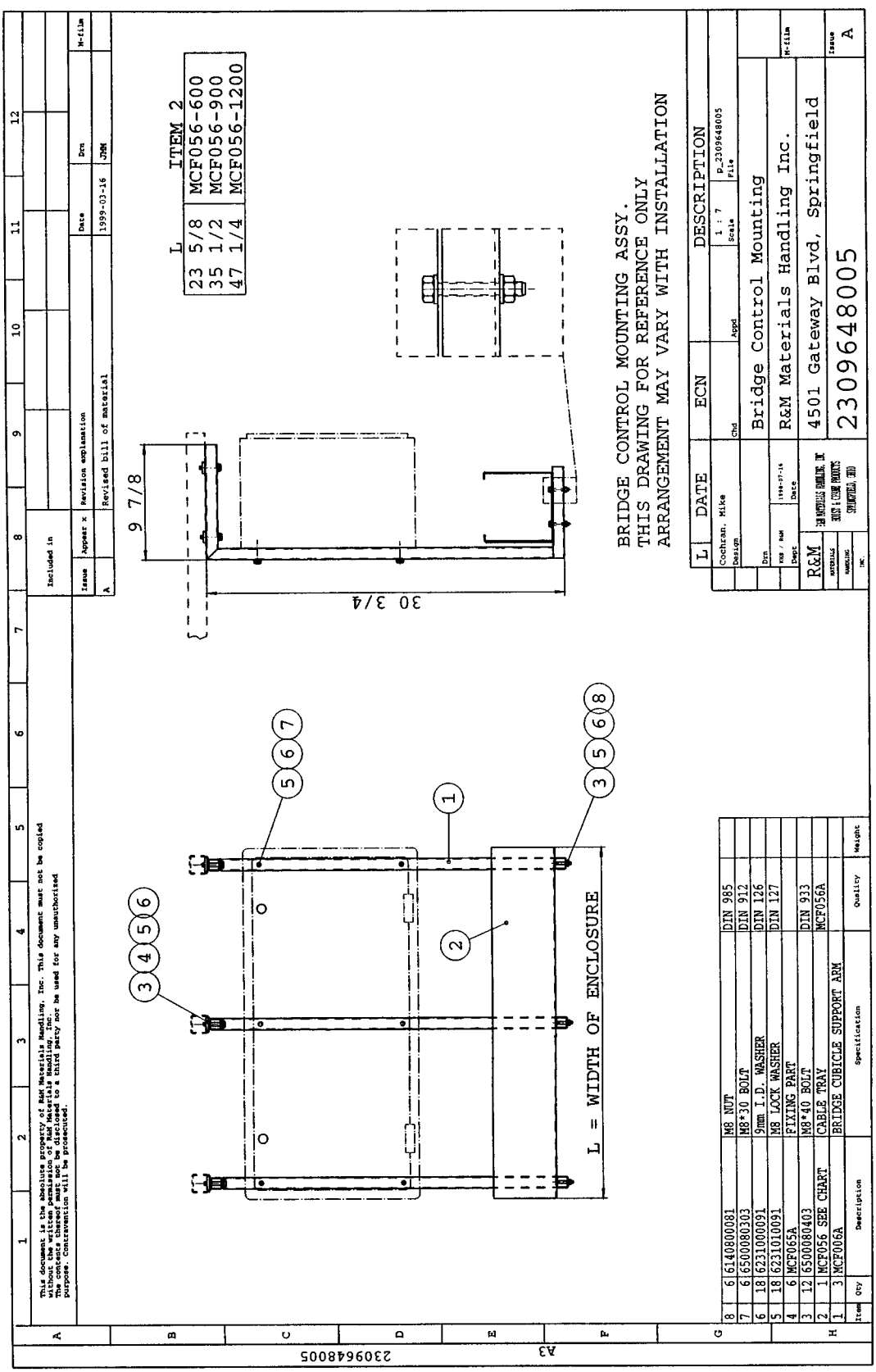
THIS DRAWING FOR REFERENCE ONLY
ARRANGEMENT MAY VARY WITH INSTALLATION
RIGHT HAND BRIDGE PANEL LOCATION CONFIGURATION SHOWN

Item	Qty	Description	Specification	Quality	Weight
12	8	6231000091	Flat Washer, I.D.=9mm	DIN126	
11	8	6140900081	M8 Self Locking Nut	DIN985	
10	8	6510080253	M8*25 Bolt	DIN912	
09	1	MCF021A-3	Square Tube, 50*50*2-1000		
08	1	6140900081	M8 Self Locking Nut	DIN985	
07	1	6500080603	M8*60, Hex Head Bolt	DIN933	
06	4	D3124-6	Tube clamp bracket		
05	4	6231000111	Flat Washer, 14mm I.D.	DIN126	
04	4	6500120303	M12*30 Hex Head Bolt	DIN933	
03	1	MCF013	DG Tow Arm Extension		
02	1	MCF012	DG Tow Arm Adjustment Tube		
01	1	MCF014	DG Tow Arm		

L	DATE	ECN	DESCRIPTION

Cochran, Mike Design	Chd	Appd	1 : 6 Scale / p_2309648006 File
Drn	DG Towing Arm Assembly		
KMS / R&M Dept / 1998-07-27 Date	R&M Materials Handling Inc.		H-film
R&M MATERIALS HANDLING INC. — R&M MATERIALS HANDLING, INC. HOIST & CRANE PRODUCTS SPRINGFIELD, OHIO	4501 Gateway Blvd, Springfield		
	2309648006		Issue

HOIST TOWING ARM ASSEMBLY


BRIDGE CONTROL MOUNTING ASSY.
THIS DRAWING FOR REFERENCE ONLY
ARRANGEMENT MAY VARY WITH INSTALLATION
L = WIDTH OF ENCLOSURE
ITEM 2
L
23 5/8 MCF056-600
35 1/2 MCF056-900
47 1/4 MCF056-1200
9 7/8
30 3/4
Bridge Control Mounting
R&M Materials Handling Inc.
4501 Gateway Blvd, Springfield
23096480005
DESCRIPTION
DATE
ECN
Issue A
1999-03-16
Revised bill of material
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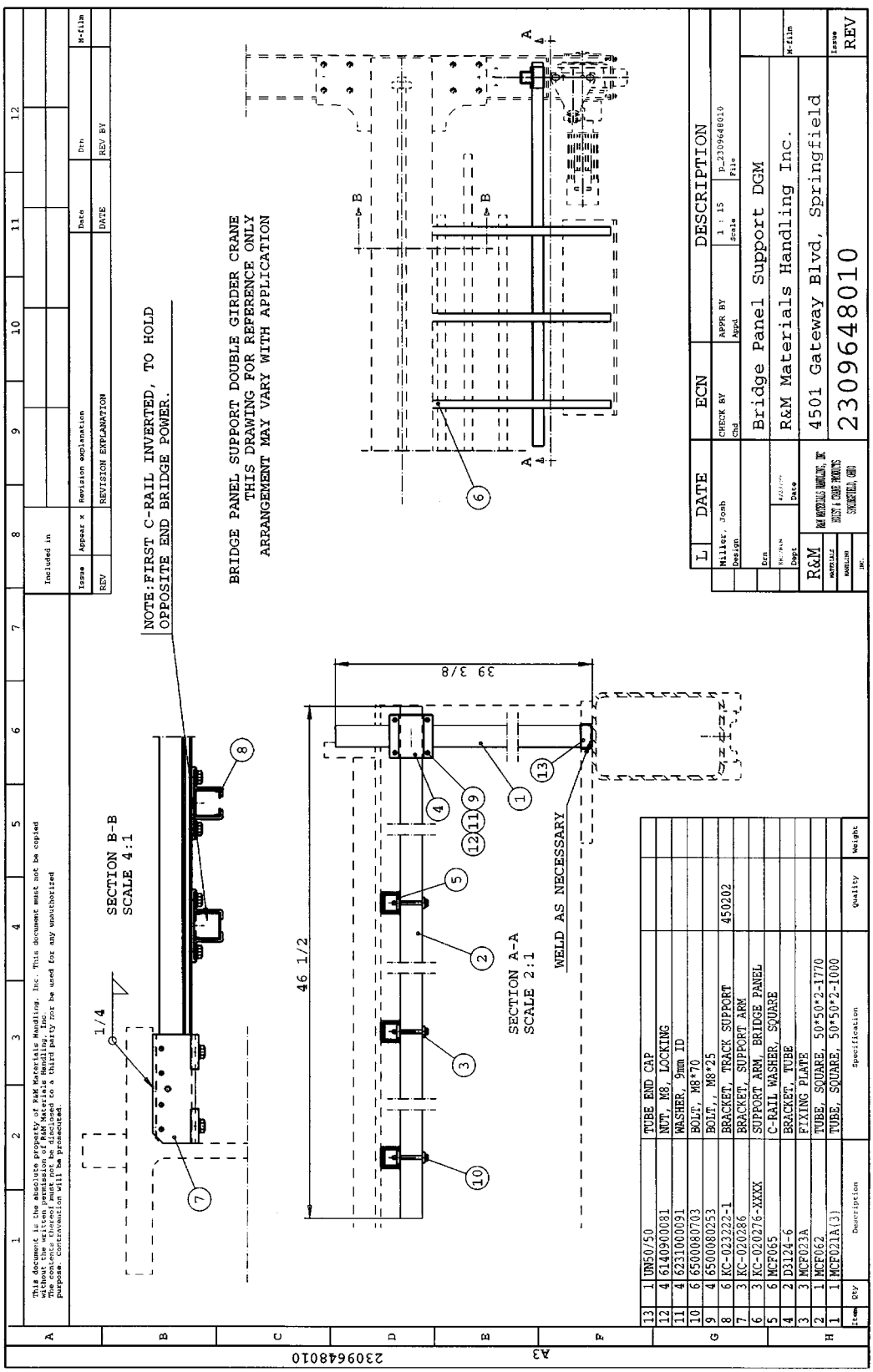
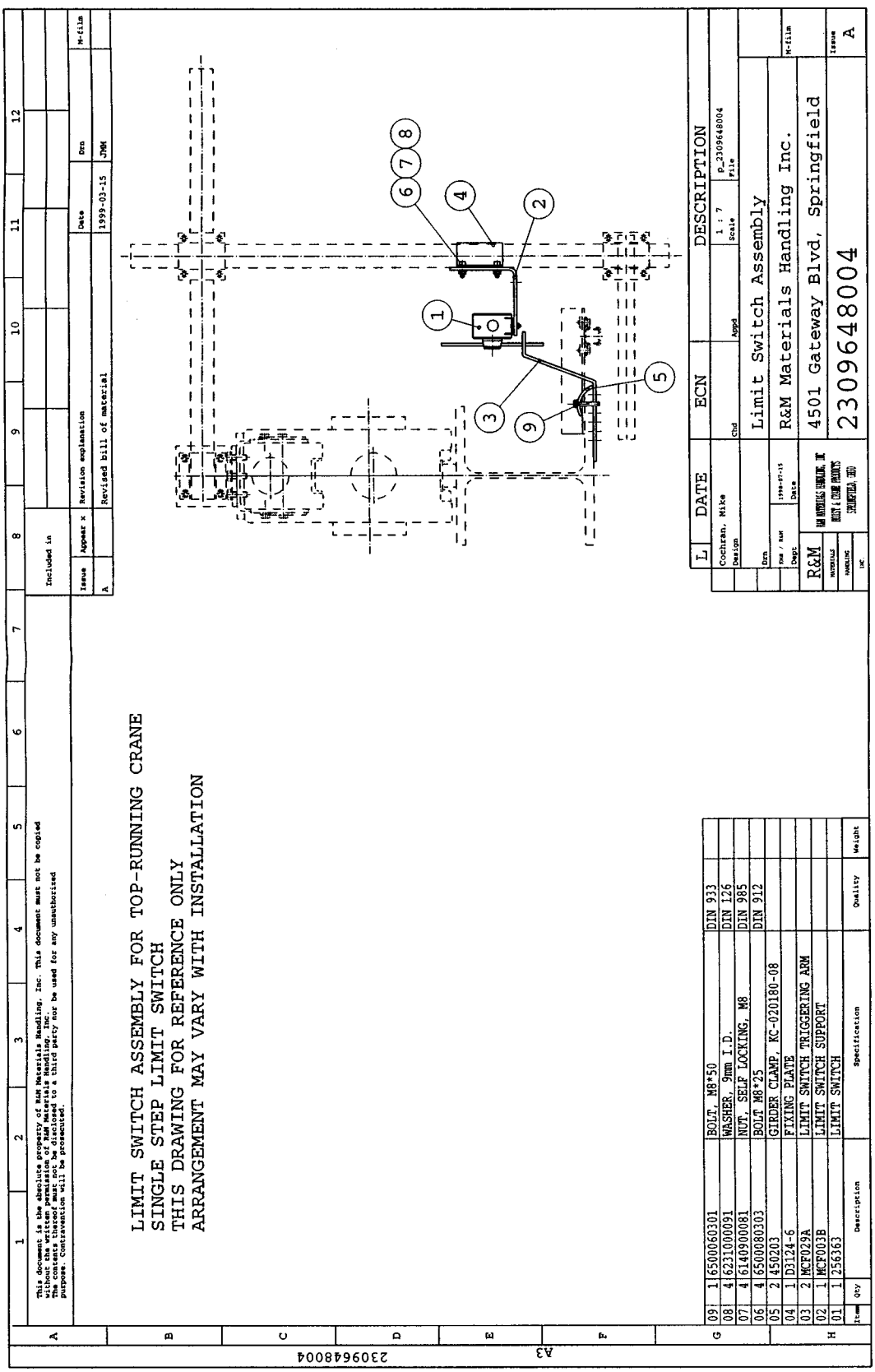
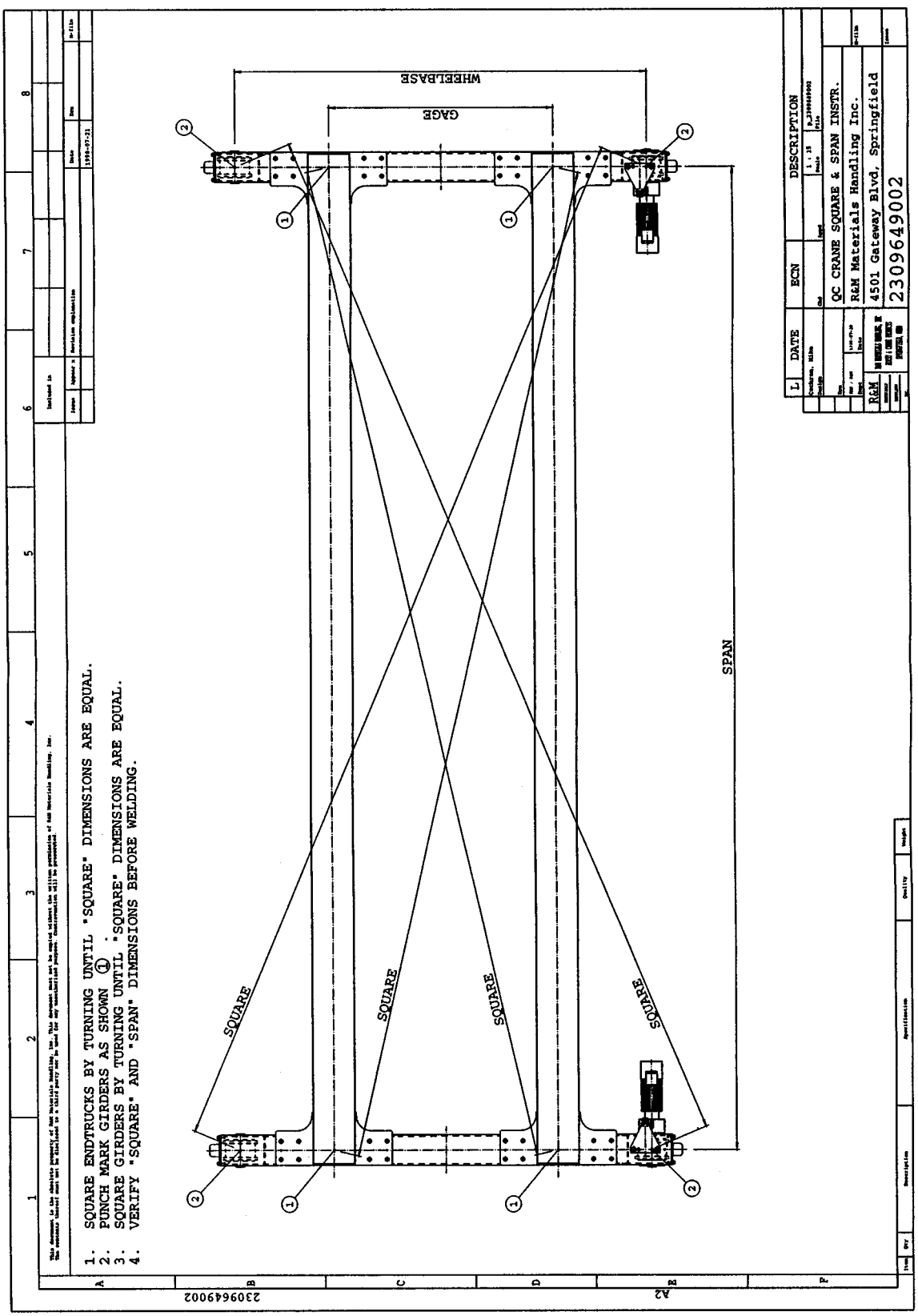
6 6140800081 M8 NUT DIN 985
7 6 6500080303 M8*30 BOLT DIN 912
6 18 6231000091 9mm I.D. WASHER DIN 126
5 18 6231010091 M8 LOCK WASHER DIN 127
4 6 MCF065A FIXING PART
3 12 6500080403 M8*40 BOLT DIN 933
2 1 MCF056 SEE CHART CABLE TRAY MCF056A
1 3 MCF006A BRIDGE CUBICLE SUPPORT ARM
Item Qty Description Specification Quality Weight
A3
23096480005



Item	Qty	Description	Specification	Quality	Weight
13	1	UN50/50	TUBE END CAP		
12	4	6140900081	NUT, M8 LOCKING		
11	4	6231000091	WASHER, 9mm ID		
10	6	6500080703	BOLT, M8*70		
9	4	6500080253	BOLT, M8*25		
8	6	KC-023222-1	BRACKET, TRACK SUPPORT	450202	
7	3	KC-020286	BRACKET, SUPPORT ARM		
6	3	KC-020276-XXXX	SUPPORT ARM, BRIDGE PANEL		
5	6	MCP065	C-RAIL WASHER, SQUARE		
4	2	D3124-6	BRACKET, TUBE		
3	3	MCF023A	FIXING PLATE		
2	1	MCF062	TUBE, SQUARE, 50*50*2-1770		
1	1	MCF021A(3)	TUBE, SQUARE, 50*50*2-1000		


LIMIT SWITCH ASSEMBLY FOR TOP-RUNNING CRANE
SINGLE STEP LIMIT SWITCH
THIS DRAWING FOR REFERENCE ONLY
ARRANGEMENT MAY VARY WITH INSTALLATION
Limit Switch Assembly
R&M Materials Handling Inc.
4501 Gateway Blvd, Springfield
230964800 4
A3
Revised bill of material
1999-03-15
JMH
Cochran, Mike
1 : 7
P_2309648004
1999-07-15
Item Qty Description Specification Quality Weight
09 1 6500060301 BOLT, M8*50 DIN 933
08 4 6231000091 WASHER, 9mm I.D. DIN 126
07 4 6140900081 NUT, SELF LOCKING, M8 DIN 985
06 4 6500080303 BOLT M8*25 DIN 912
05 2 450203 GIRDER CLAMP, KC-020180-08
04 1 D3124-6 FIXING PLATE
03 2 MCF029A LIMIT SWITCH TRIGGERING ARM
02 1 MCF003B LIMIT SWITCH SUPPORT
01 1 256363 LIMIT SWITCH


WHEELBASE
GAGE
SPAN
SQUARE
SQUARE
SQUARE
SQUARE
1. SQUARE ENDTRUCKS BY TURNING UNTIL "SQUARE" DIMENSIONS ARE EQUAL.
2. PUNCH MARK GIRDERS AS SHOWN ①.
3. SQUARE GIRDERS BY TURNING UNTIL "SQUARE" DIMENSIONS ARE EQUAL.
4. VERIFY "SQUARE" AND "SPAN" DIMENSIONS BEFORE WELDING.
DESCRIPTION
ECN
DATE
QC CRANE SQUARE & SPAN INSTR.
R&M Materials Handling Inc.
4501 Gateway Blvd, Springfield
2309649002
2309649002