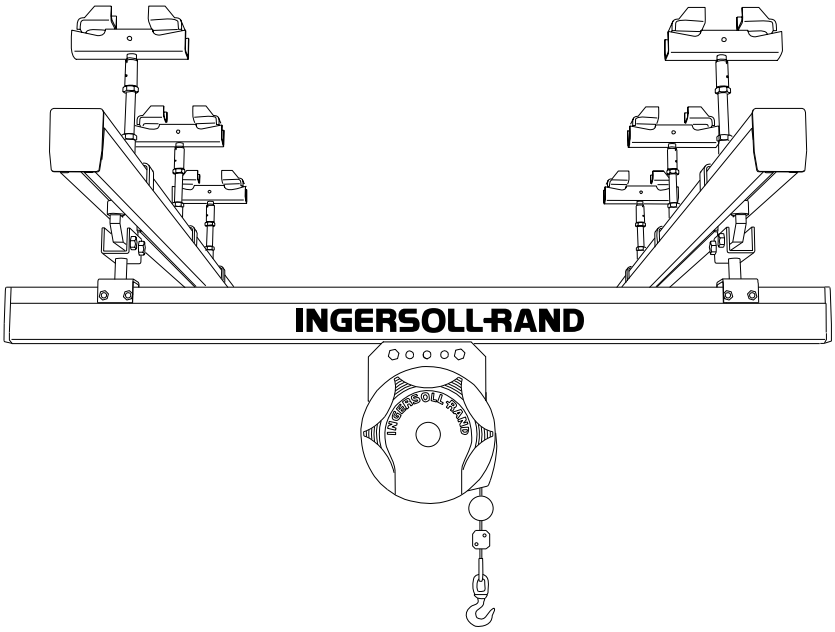
PARTS, INSTALLATION AND MAINTENANCE MANUAL
for
'R' SERIES RAIL SYSTEM



READ THIS MANUAL BEFORE USING THESE PRODUCTS. This manual contains important safety, installation and maintenance information. Make this manual available to all persons responsible for the operation, installation and maintenance of these products.

⚠WARNING

Do not use this rail system for lifting, supporting, or transporting people or lifting or supporting loads over people.

Always operate, inspect and maintain this rail system in accordance with applicable safety codes and regulations.

Refer all communications to the nearest Ingersoll-Rand Material Handling Office or Distributor.

Form MHD56091
Edition 1
August 1996
71148977

INGERSOLL-RAND
MATERIAL HANDLING

TABLE OF CONTENTS

SAFETY INFORMATION

This manual provides important information for all personnel involved with the safe installation and proper maintenance of this product. Even if you feel you are familiar with this or similar equipment, you should read this manual before installing or repairing the rail system.

Danger, Warning, Caution and Notice

Throughout this manual there are steps and procedures which, if not followed, may result in an injury. The following signal words are used to identify the level of potential hazard.

⚠ DANGER — Danger is used to indicate the presence of a hazard which ***will*** cause ***severe*** injury, death, or substantial property damage if the warning is ignored.

⚠WARNING — Warning is used to indicate the presence of a hazard which ***can*** cause ***severe*** injury, death, or substantial property damage if the warning is ignored.

⚠ CAUTION — Caution is used to indicate the presence of a hazard which ***will*** or ***can*** cause injury or property damage if the warning is ignored.

NOTICE — Notice is used to notify people of installation, operation, or maintenance information which is important but not hazard-related.

Safety Summary

⚠WARNING

• Do not use this rail system or attached equipment for lifting, supporting, or transporting people or lifting or supporting loads over people.
• The supporting structures and load-attaching devices used in conjunction with this rail system must provide an adequate safety factor to handle the rated load, plus the weight of all attached equipment. This is the customer's responsibility. If in doubt, consult a registered structural engineer.

The National Safety Council, Accident Prevention Manual for Industrial Operations, Eighth Edition and other recognized safety sources make a common point: Employees who work near suspended loads or assist in hooking on or arranging a load should be instructed to keep out from under the load. From a safety standpoint, one factor is paramount: conduct all lifting operations in such a manner that if there were an equipment failure, no personnel would be injured. This means keep out from under a raised load and keep out of the line of force of any load.

The Occupational Safety and Health Act of 1970 generally places the burden of compliance with the owner/employer, not the manufacturer. Many OSHA requirements are not concerned or connected with the manufactured product but are, rather, associated with the final installation. It is the owner's and user's responsibility to determine the suitability of a product for any particular use. It is recommended that all applicable industry, trade association, federal, state and local regulations be checked. Read all operating instructions and warnings before operation.

Rigging: It is the responsibility of the operator to exercise caution, use common sense and be familiar with proper rigging techniques. Refer to ASME B30.9 for rigging information, American National Standards Institute, 1430 Broadway, New York, NY 10018.

This manual has been produced by **Ingersoll-Rand** to provide dealers, mechanics, operators and company personnel with the information required to install, operate, maintain and repair the products described herein.

It is extremely important that mechanics and operators be familiar with the servicing procedures of these products, or like or similar products, and are physically capable of conducting the procedures. These personnel shall have a general working knowledge that includes:

1. Proper and safe use and application of mechanics common hand tools as well as special **Ingersoll-Rand** or recommended tools.
2. Safety procedures, precautions and work habits established by accepted industry standards.

Ingersoll-Rand can not know of, nor provide all the procedures by which product operations or repairs may be conducted and the hazards and/or results of each method. If operation or maintenance procedures not specifically recommended by the manufacturer are conducted, it must be ensured that product safety is not endangered by the actions taken. If unsure of an operation or maintenance procedure or step, personnel should place the product in a safe condition and contact supervisors and/or the factory for technical assistance.

SAFE OPERATING INSTRUCTIONS

The following warnings and operating instructions are intended to avoid unsafe operating practices which might lead to injury or property damage.

Ingersoll-Rand recognizes that most companies who use rail systems have a safety program in force at their facility. In the event that some conflict exists between a rule set forth in this publication and a similar rule already set by an individual company, the more stringent of the two should take precedence.

Load ratings are marked on both sides of each rail and are clearly visible to the operator. These ratings are established by **Ingersoll-Rand** through exhaustive testing.

⚠WARNING

• The total weight of the suspended load must not exceed the load rating marked on the rail.

Safe Operating Instructions are provided to make an operator aware of dangerous practices to avoid and are not necessarily limited to the following list. Refer to specific sections in the manual for additional safety information.

1. Only allow personnel trained in safety and operation of this rail system to operate and maintain this system.
2. When a "**DO NOT OPERATE**" sign is placed on the rail system, do not use until repairs or adjustments have been completed and the sign has been removed by designated personnel.
3. Before each shift, visually check the rail system for wear and damage. Never use a rail system that inspection indicates is worn or damaged.
4. Never exceed the rated capacity of the rail system. Refer to labels attached to the rail system.
5. Pay attention to loads suspended from the rail system at all times.
6. Make sure everyone is clear of the load path. Do not lift a load over people.
7. Never use the rail system and attached equipment for lifting or lowering people, and never allow anyone to stand on a suspended load.
8. Do not swing a suspended load.
9. Never suspend a load for an extended period of time.
10. Never leave a suspended load unattended.
11. Never weld or cut a load suspended from the rail system.
12. Do not operate rail system if jamming, overloading, or binding occurs.
13. Avoid collision or bumping of suspended components on the rail system.
14. To move a trolley or bridge rail, push on the load or load connector.

DESCRIPTION

Ingersoll-Rand Rail System packages can be custom-designed, to provide quick, do-it-yourself installation. The rails used in systems can be used as runways or bridges. Runways are suspended from the customer's building structure or floor mounted columns; bridges are suspended from either runways or existing runways. The rails are available in two sizes, 4 inch and 8 inch, and are manufactured from high strength 6005 aluminum alloy, which provides a lighter alternative to steel rails while providing smoothness and quite operation. Trolleys in the rail systems are equipped with smooth resin-molded wheels which resist flattening, and operate with sealed ball bearings and side-guide rollers. The system suspension hardware includes Ball Swivel Assemblies, which allows the runway to swing, thereby reducing the effort required for bridge movement. Provided with this hardware are safety wire rope assemblies which must be located at all suspension points.

Selection of Rail System

Range of Motion

It is essential for proper selection of material handling equipment to identify weight and range of motion requirements.

Single direction (Up/Down)

Positioners or hoists mounted in a fixed position are capable of only up/down movement. A stationary installation requires a dedicated lifting area and an additional device to bring and position materials before lifting.

Adding a second direction

(Either Left/Right or Front/Back)

A second direction of movement, either left/right or front/back, can be achieved by mounting the positioner or hoist from a trolley either in a runway or on an I-beam. This method allows the positioner or hoist to be moved to the material located at any point under the runway.

Adding a third direction

(Both Left/Right and Front/Back)

Both left/right and front/back movement can be achieved by attaching a bridge perpendicular to two parallel runways. This method allows the positioner or hoist to be moved anywhere within the area defined by the length of the runways and bridge.

Glossary of Terms

Positioner: Air operated **Ingersoll-Rand** lifting device which provides up-down motion of attached load.

Span: Distance between structural support.

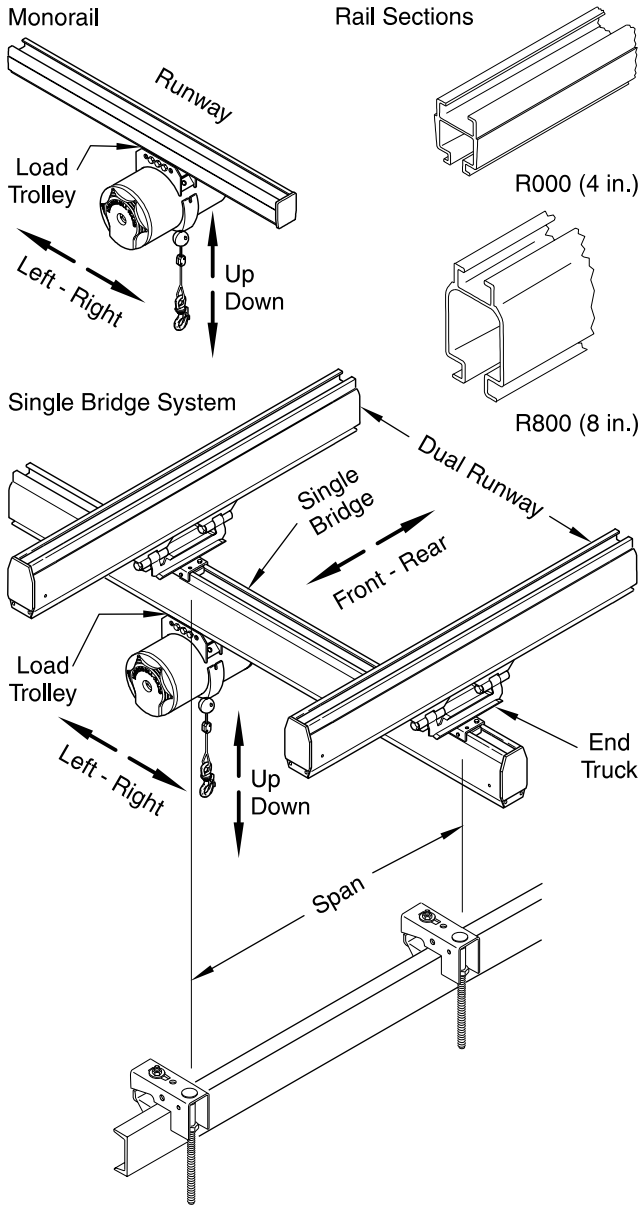
Rail: A section of extruded aluminum which hangs from and/or supports system components.

Runway: A section(s) of rail(s) which supports a lifting device (suspended from a trolley) or a bridge (suspended from trucks.) A runway provides one additional direction of motion (either left/right or front/back).

Bridge: A section of rail suspended via trucks from two parallel runways used to support a lifting device suspended from a trolley(s). A bridge used in conjunction with runways provides both left/right and front/back direction of motion.

Truck: A set of wheels and a rail bracket used to attach a bridge to a runway.

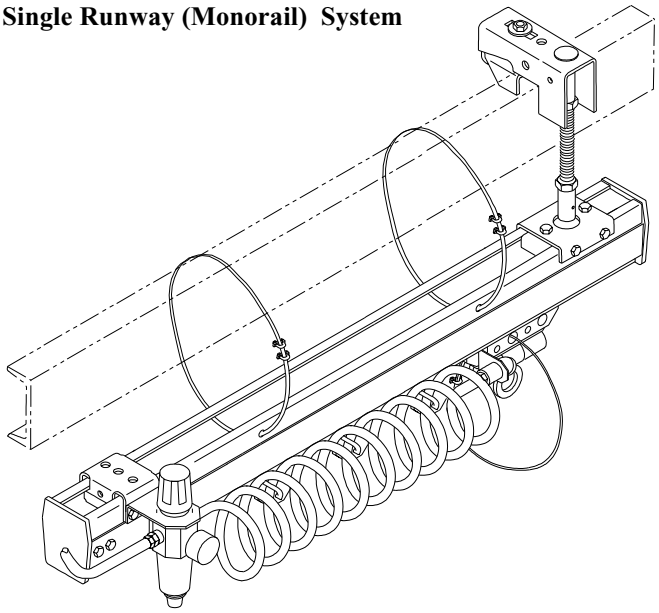
Trolley: A set of wheels and an attachment point used to suspend a hoist, positioner or hoses from a runway or bridge.



(Dwg. MHP0935)

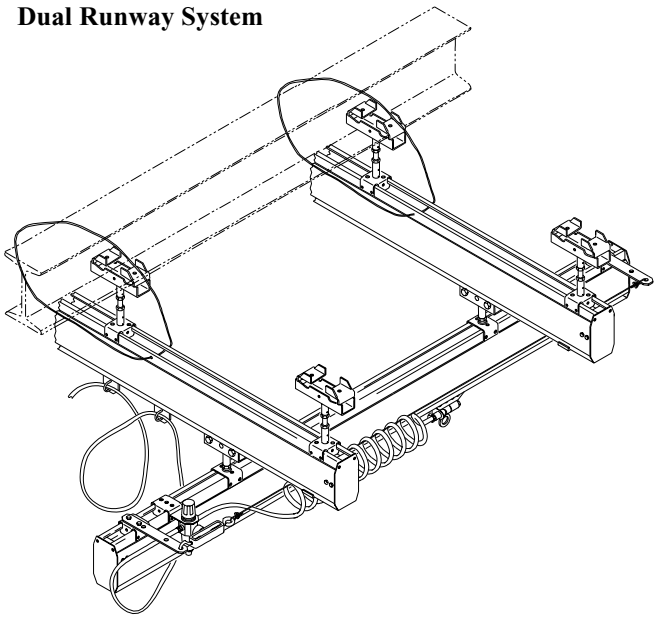
BASIC SYSTEM ILLUSTRATIONS

Single Runway (Monorail) System



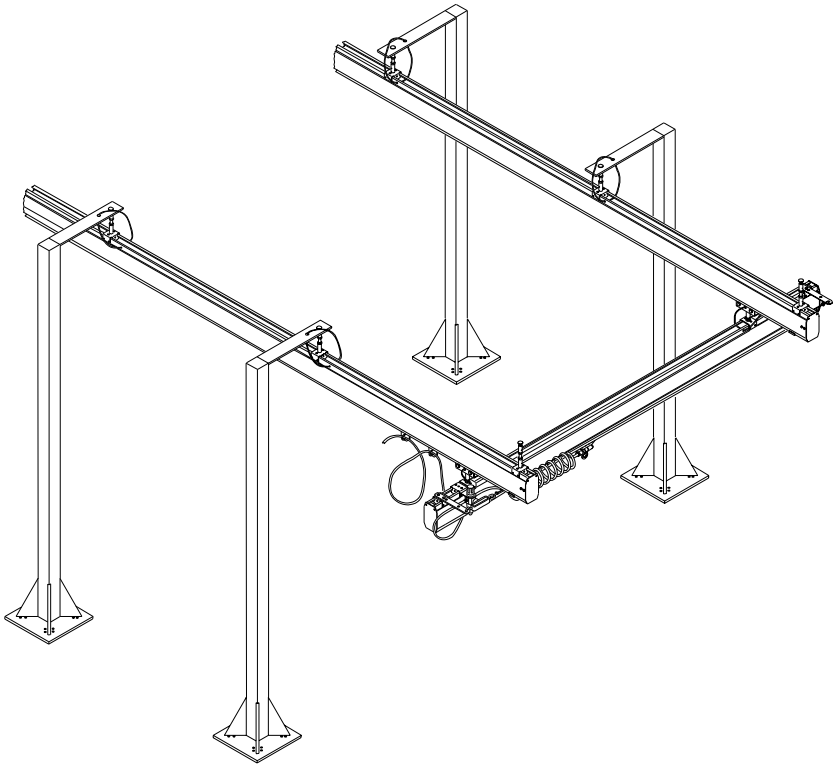
(Dwg. MHP0737)

Dual Runway System



(Dwg. MHP0738)

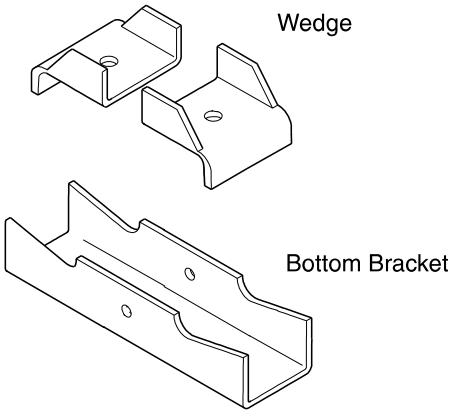
Single Bridge System with Column Supports



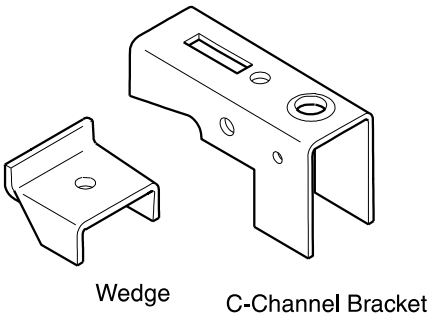
(Dwg. MHP0936)

COMPONENT IDENTIFICATION

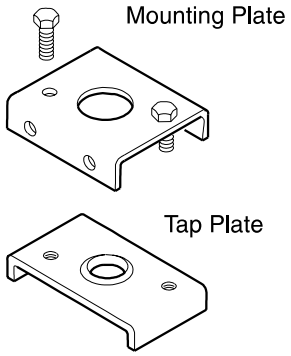
I-Beam Clamp



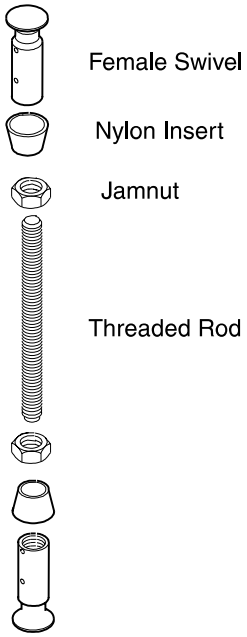
C-Channel Clamp



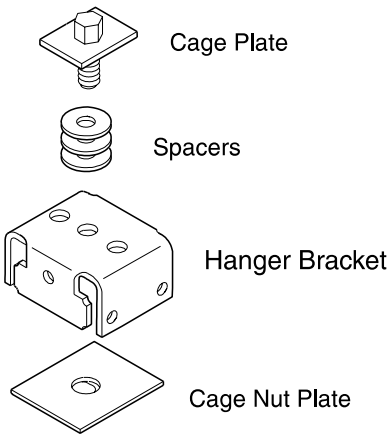
Rail Hanger Bracket



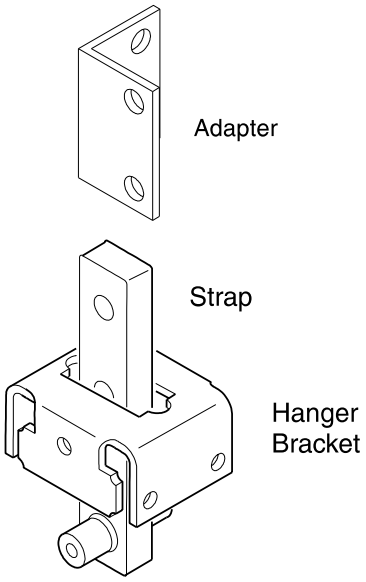
Connecting Rod and Swivel



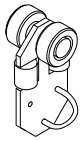
Fixed Hanger Bracket



Utility Hanger

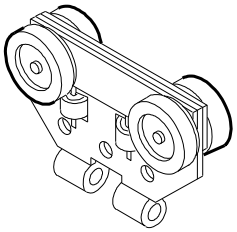


Hose Trolley

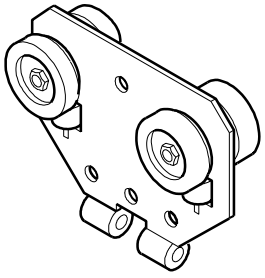


Load Trolleys

R000

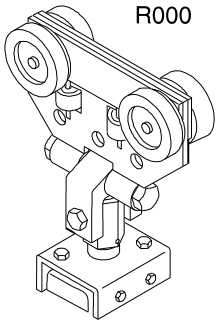


R800

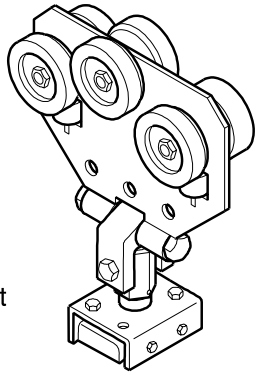


End Trucks

R000

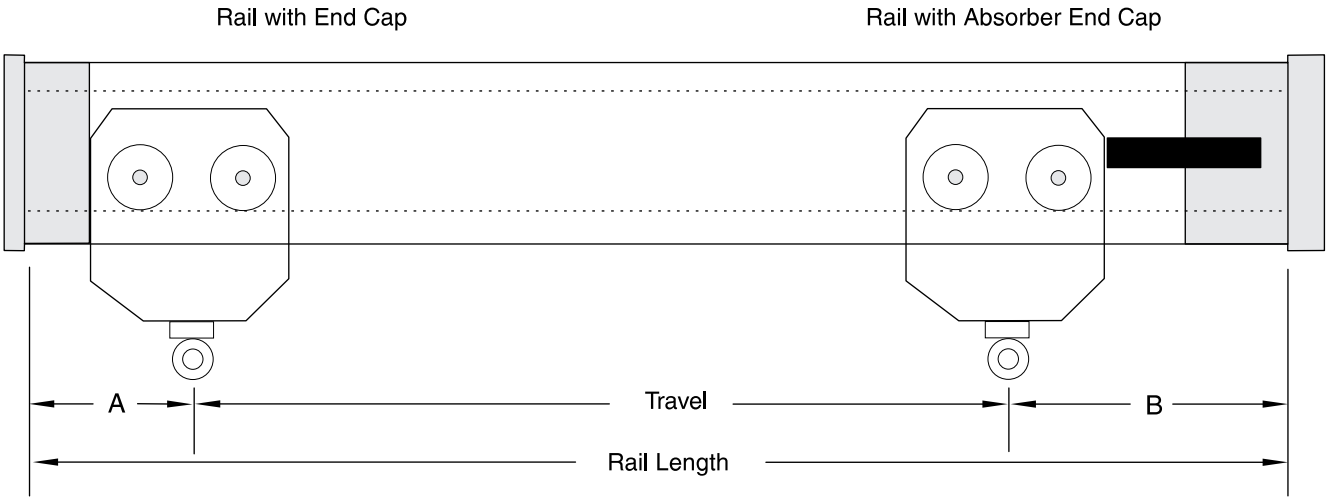


R800



(Dwg. MHP0994)

SPECIFICATIONS



(Dwg. MHP0900)

Table 1 Load Center Line to Rail End

	R000 (4 inch) Rail				R800 (8 inch) Rail					
	Load Trolley		Truck		Load Trolley		Single Truck		Double Truck	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
A	6	153	6	153	8	203	8	203	14	356
B	7.5	191	7.5	191	9.25	235	9.25	235	15	381

Table 2 Trolley and Trucks Weights

R000 Rail (4 inch)				R800 Rail (8 inch)					
Load/Hose Trolley		Truck		Load/Hose Trolley		Single Truck		Double Truck with Connect	
lb	kg	lb	kg	lb	kg	lb	kg	lb	kg
6.3 / 1.75	2.9 / 0.8	12	5.5	8.5 / 3.0	3.9 / 1.4	10.5	4.8	24.25	11

Table 3 Runway and Bridge Capacity

Span of Rail or Hanger Centers		R000 (4 inch) Rail Single Bridge		R800 (8 inch) Rail Single Bridge	
ft	**mm**	**lb**	**kg**	**lb**	**kg**
1 - 5	305 - 1524	850	386	2200	999
6	1829	700	318		
7	2134	600	272		
8	2438	450	204	2150	976
9	2743	350	159	1900	863
10	3048	300	136	1700	772
11	3353	250	114	1550	704
12	3658	200	91	1425	647
13	3962	175	79	1300	590
14	4267	150	68	1150	522
15	4582	125	57	1000	454
16	4877	115	52	900	409
17	5182	100	45	800	363
18	5486	90	41	700	318
19	5791	80	36	600	272
20	6096	75	34	550	250
21	6401	---		500	227
22	6706	---		475	216
23	7010	---		425	193
24	7315	---		400	182
25	7620	---		350	159

The above capacities were calculated with an allowance for the weight of a positioner (approximately 100 lbs (45 kg)). You need not subtract for weight of positioner.

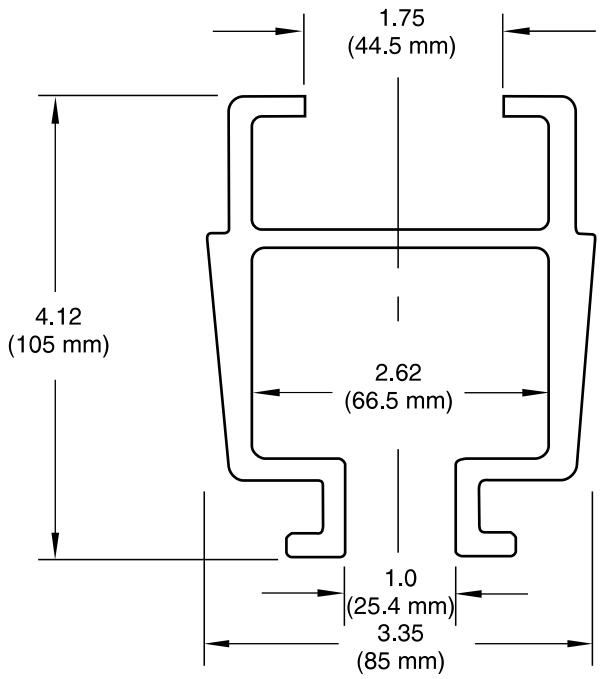
The MAXIMUM allowable span for the 4 inch rail is 20 ft. (6.1 m), for 8 inch rail is 25 ft. (7.6 m).

RAIL SECTIONS

Ingersoll-Rand R000 and R800 series enclosed rail is extruded from precision, 6005 class T-5, strength corrosion resistant aluminum. These rail have the strength to replace structural steel in most monorail, runway and bridge crane systems.

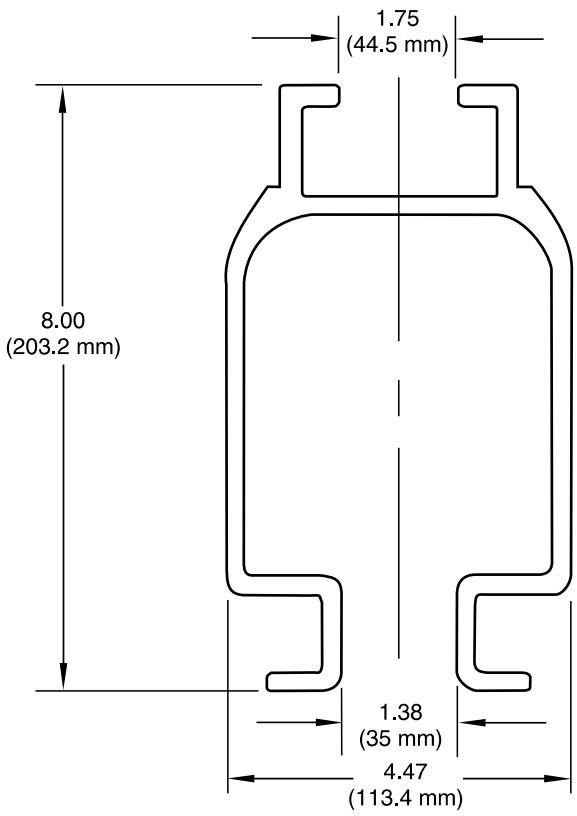
Rail Sizes
(Dimensions are in inches unless noted)
(Drawings Not to Scale)

R000



(Dwg. MHP0659)

R800



(Dwg. MHP0660)

Table 4 Rail Specifications

Rail Part Number	Vertical Height		Wall Thickness		Internal Running Surface		Weight Per Foot		Available in Lengths	
	in.	mm	in.	mm	in.	mm	lb.	kg	ft.	m
R000	4.12	105	0.31	8	2.38	60	3.33	1.5	up to 20	6.1
R800	8	203	0.25	6	3.59	91	6.96	3.15	up to 25	7.6

DESIGNING RAIL SYSTEMS

Site layout

Determine loads to be handled

With a suitable scale, weigh the heaviest item or load to be lifted. Also, try to anticipate if this load will increase. This weight can be entered in block 3 of worksheet (found at the end of this section). Design a Rail System that will handle future capacity as well as current requirements. It is easier to build in additional capacity at this time, than try to add capacity in the future.

Determine work area or area to move load around in.

This is critical to Rail System Design, the system should support only the required area. As area coverage increases, capacity drops and installation costs increase. **Ingersoll-Rand** recommends that you layout the area that you need covered by the rail system. Do this by marking the perimeter of the work area with items that are easily seen (also mark them for high visibility to avoid injury), such as; chairs, pylons or large cans. Position these and allow the operators in the area to do some of their tasks to see if the rail system support area is adequate. Now measure the length of this area and enter this in block 1 of worksheet. Next measure the width of the area (this will be the bridge Span) and enter this in block 2 of the worksheet. Again, spending the time to accurately define the rail system supported area will allow the system to cover the intended work area without having wasted space.

Determining Rail Support

Once the area to be covered by the rail system is accurately laid out then the question of how to support the rail system can be addressed.

⚠WARNING

• Consult a registered structural engineer for advice on the ability of overhead beams to carry the additional weight of rail system and load.

If there are overhead beams in the area this is the best way to suspend the rail system. Transfer the floor layout to the ceiling by using a plumb line or other suitable tools and mark the corners and a few intermediate points. You can now see what beams will be used. You can also see if the ceiling beams are perpendicular or parallel to the runway. If parallel to the runway, can they be used for support or will there have to be extensions added. For beams perpendicular, measure the distance between beams. This might exceed the hanger spacer distance (covered later in this section) and again extensions will have to be added. For both of these situations making the runway or bridge sections a little longer or shorter may be necessary to effect installation.

Connections to steel beams are normal and **Ingersoll-Rand** has clamps available to do this. Connections to wooden beams are also possible but will require additional Engineering support. There are also brackets that bolt directly onto steel beams. Although with these brackets, accurate positioning is critical and will require specialized measuring devices to ensure finished tolerances are maintained.

⚠WARNING

• Consult a registered structural engineer for advice on the ability of the floor to support and attach columns to carry the additional weight of rail system and load.

If there are no beams or they are determined unsuitable, then you must use a column support system. In this support method two key items to consider are:

1. What is the height that the load must be lifted.
2. Do the rail sections cross any traffic ways and how high do they need to be to clear. Enter this dimension in block 4.

Determining Rail Size

Using Capacity Chart

To determine rail capacity use the capacity chart Table 3. Establish the length of rail section in question. Refer to the worksheet at the end of this section on how to calculate rail section length. Locate the length of rail section or next longer length in the first column. Then read across to the third column for 4 inch rail and fifth column for 8 inch rail. This will be the MAXIMUM load that can be supported by that rail section. The chart can also be used to determine how long a rail section can be for a known load.

Example: If load is 650 lbs. (295 kg), then the bridge or monorail must not exceed 6 ft. (1.8 m) for 4 inch rail or 18 ft. (5.5 m) for 8 inch rail.

Column 1 can also be used for hanger spacing. If your hanger spacing is 12 ft.. (3.7 m) then the runway can support 200 lbs. (91 kg) for R000 rail and 1425 lbs. (647 kg) for R800 rail. By changing hanger spacing to 11 ft. (3.4 m) (adding another hanger assembly) you can increase the capacity to 250 lbs. (114 kg) for R000 rail and 1550 lbs. (704 kg) for R800.

Single Bridge

To increase the capacity of a single bridge the distance between end trucks needs to be shortened. The easiest way is to add an additional runway. By adding a third runway and reducing the spacing in between runways the capacity increases dramatically. A single bridge can be attached to more than two runways. If this solution can not be used then the only other way to increase capacity of the bridge section is to go to a double bridge assembly.

Double Bridge

At this time there are no standard calculations for a double bridge. If the particular application will require a double bridge to meet lifting requirements contact your nearest distributor or **Ingersoll-Rand**.

The double bridge assembly will require the following:

1. One rail section (5 ft. (1.5 m) for 4 inch rail, 7 ft. (2.1 m) for 8 inch rail). Load trolley will hang from this section.
2. One additional bridge rail.
3. Four truck assemblies (4 inch rail). Six double truck assemblies (8 inch rail). Do not order single truck assemblies.
4. One cross brace assembly (for every 10 ft. (3 m) of bridge span).
5. Four hanger brackets.
6. Four end caps.

Calculating Hanger Spacing
To determine hanger spacing for runways first determine the weight on each runway. This is the formula:

Live load + 1/2 (Weight of bridge)
Weight of bridge = Weight of rail section + trucks + trolleys, Table 2.
Weight of rail section = Length of rail section x Weight per ft., Table 4.

Example: Determine runway hanger spacing. Given: 8 inch rail, plastic end caps, 1000 lbs. (453.6 kg) live load and a 15 ft. (4.6 m) bridge.
Weight of rail section = 15 x 7 = 105 lbs. (47.6 kg).
Weight of bridge = 105 + 5.5 = 110 lbs. (49.9 kg).
Weight on rail = 1000 + 1/2 (110) = 1055 lbs. (478.5 kg)

Using Table 3: 1150 lbs. (522 kg) (always round weights UP), 8 inch rail.
Hanger spacing = 14 ft. (4.3 m)

Calculating Number of Hanger Assemblies needed
The number of hanger assemblies needed for one side is determined by dividing the runway length by the hanger spacing and adding 1.
Example: Runway length 20 ft. (6.1 m), hanger spacing 6 ft. (1.8 m) 20/6 + 1 = four hanger assemblies required.

NOTICE

• The maximum individual length for 4 inch rail sections is 20 ft. (6.1 m) and for 8 inch rail sections it is 25 ft. (7.5 m).

When the runway is longer than the maximum length of rail you must add the following items:
1. Splice Kit: A splice kit contains; one hanger bracket and two each socket capscrews, flat washers and locknuts.
2. Support Item: Either a clamp assembly or column.
3. Connecting rod and swivel.

Determining Trolleys and Trucks
For bridges there will be one load trolley per hoist or positioner. On runways there will be one load trolley per hoist or positioner. When used with a bridge assembly there will be two end trucks per bridge assembly. Hose trolleys are used to support air lines or power cables. There should be at least one hose trolley per 5 ft. (1.5 m) of air line or power cable.

End Caps
There are two types of end caps. One a plastic end cap and the other a shock absorber end cap. It is recommended that shock absorber end caps be used in all locations that can be bumped by a moving bridge or load trolley. These end caps will reduce shock loading of rail system and extend the life of the system.

⚠ CAUTION

• Do not use end caps as load stops. Abrupt stopping can cause uncontrolled swinging of the load. Collisions with end caps can damage system components.

The plastic end cap should only be used where there is only minimal chance of load trolley or bridge impact.

How to use Worksheet
The worksheet is designed to assist in calculating the number of items to order for an application and thereby generate a cost estimate for parts ONLY. It is a simple fill in the blanks form. On completion of the worksheet you will have the following information.
1. Length of Runway: Block 5.
2. Total Bridge Length: Block 7.
3. Rail section to use for bridge.
4. Rail section to use for runway.
5. Rail Height: Block 4. Used to verify clearance of rail section over traffic ways.
6. Hanger Bracket spacing: Block 17. Used in Installation of rail system.
7. Number of hanger assemblies required: Block 18.
8. Number of Splice Kits: Block 19.

For any installation of a system the quantities of support items (be they clamp assemblies, custom attachment brackets or columns) will be the same as Blocks 18 plus 19.

Ingersoll-Rand 'R' Series Rail System Worksheet
Single Bridge

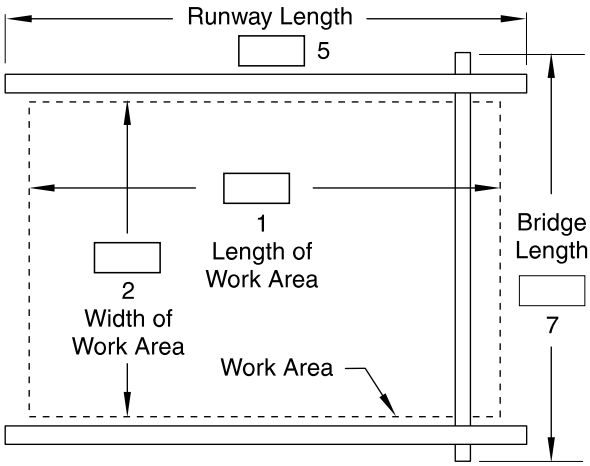
Company: _____ Date: _____

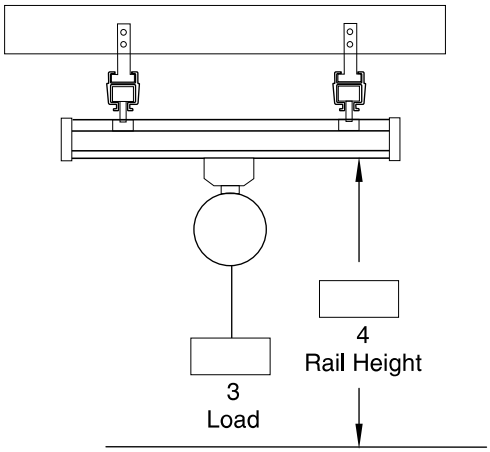
Person to Contact: _____ Phone: _____

Address: _____ FAX: _____

City: _____ State: _____ ZIP: _____

Section 1





(Dwg. MHP0904)

Section 2 Rail Selection

Runway Length: [ ] = [ ] + 2 [ ]
(minimum) 5 1 6 (Center of Load Line to Rail End allowance from Table 1)

Bridge Length: [ ] = [ ] + 2 [ ]
(minimum) 7 2 6 (Center of Load Line to Rail End allowance from Table 1)

Rail Section to use: Bridge [ ] Runway [ ]
8 9 (8 and 9 using Loads, Rail Lengths and Table 3)

Section 3 Hanger Spacing

Weight of Bridge: [ ] = ([ ] x [ ]) + (2 [ ] + [ ] + [ ])
10 7 11 (weight per/ft Table 4) 12 (End Trucks *) 13 (Load Trolley *) 14 (Hose Trolley *)
* (weight per item Table 2)

Weight on Runway: [ ] = 1/2 [ ] + [ ]
15 10 3

Using Table 3 with [ ] and [ ] Hanger Spacing [ ]
15 9 17 (from Table 3 Hanger Spacing)

Hangers Required: [ ] = ([ ] / [ ] + 1)
18 5 (Length of Runway) 17 (space between Hangers)

If runway is longer than (20 ft. (6.1 m) for 4 inch Rail or 25 ft. (7.6 m) for 8 inch Rail) add one Splice Kit per connection.

Number of Splice Kits: [ ]
19

Rail system

Prior to installing the rail system, carefully inspect each component for possible shipping damage.

To ensure safe and proper rail system installation make this manual available to the installer.

⚠ CAUTION

• Owners and users are advised to examine specific, local or other regulations, including American National Standards Institute and/or OSHA Regulations which may apply to a particular type of use of this product before installing or putting rail system to use.

⚠ WARNING

• A falling load can cause injury or death. Before installing, read "SAFETY INFORMATION".

Load rating labels are installed on both sides of the rails so that they are clearly visible to the operators. The total weight of the suspended load must include all handling devices, positioner or hoist, hooks and associated equipment.

Make certain your rail system is properly installed. A little extra time and effort in so doing can contribute a lot toward preventing accidents and helping you get the best service possible.

Ensure the supporting member from which the rail system is suspended is strong enough to support the weight of the rail system plus the weight of a maximum rated load plus a generous factor of at least 500% of the combined weights.

Rails are available in lengths up to 20 ft. (6.1 m) for 4 inch rails and up to 25 ft. (7.6 m) for 8 inch rails. For longer runways, splice kits are used to connect rail sections. Check that joints are tight, rails are aligned laterally, longitudinally and level. Tighten splice bolts and locknuts to torque specified in Table 5.
All bolted connections must be tightened and torqued to specifications as shown in the Torque Specifications Table.

⚠ CAUTION

• Do not replace self-locking nuts with standard nuts and lockwashers. All fasteners for rail systems must be grade 5 or better. Use only fasteners provided by Ingersoll-Rand. Nuts that are torque prevailing have torque values. Do not exceed specified torque.

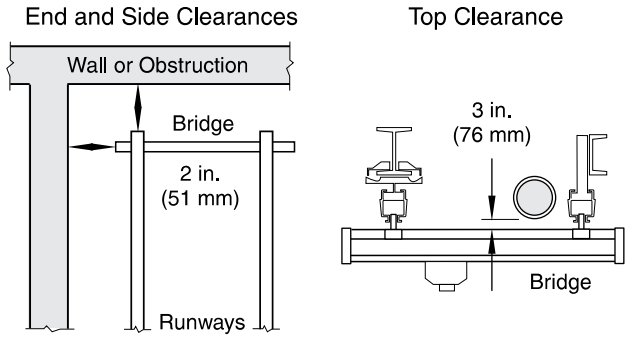
Table 5 Torque Specifications

Bolt Dia. in.	Grade 5 Tightening Torque			
	Dry		Lubricated	
	lb. ft	N m	lb. ft	N m
No. 10-24	3.5	5	3	4
No. 10-32	4	5	3	4
1/4-20	8	11	6	8
1/4-28	10	13	7	9
6/16-18	17	23	13	18
5/16-24	19	26	14	19
3/8-16	30	40	23	31
3/8-24	35	47	25	34
7/16-14	50	68	35	47
7/16-20	55	74	40	54
1/2-13	75	101	55	74
1/2-20	90	122	65	88
9/16-12	110	150	80	108
9/16-18	120	160	90	122
5/8-11	150	203	110	150
5/8-18	180	244	130	176
3/4-10	260	352	200	271
3/4-16	300	406	220	298
7/8-9	400	542	300	406
7/8-14	440	596	320	434

Positioning Overhead Supports

Clearance

Refer to Dwg. MHP0949
When positioning overhead supports ensure that when mounted, runways and bridge, clearances are maintained. These clearances are; 2 inches (51 mm) between runway ends and 3 inches (76 mm) between bridge and anything overhead.



(Dwg. MHP0949)

⚠ WARNING

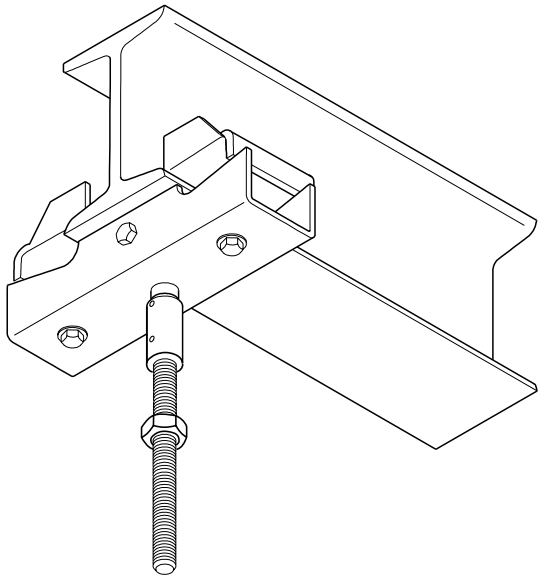
• Consult a registered structural engineer for advice on ability of beams to carry the additional weight of the rail system and load.

I-Beam and C-Channel Clamp Positioning

Loosely assembly the clamp components on the ground following the instructions below.

I-Beam Clamp

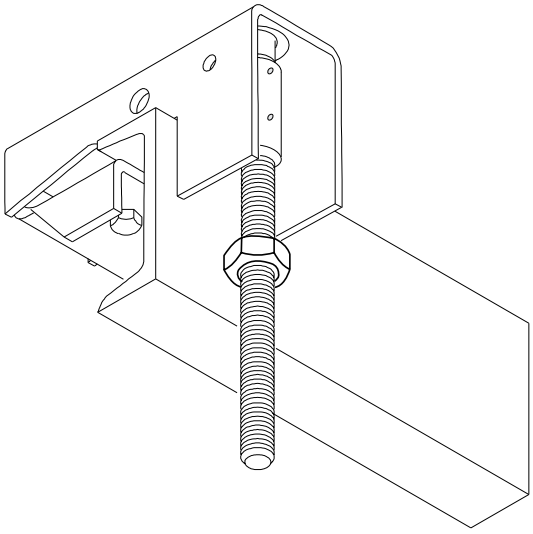
Refer to Dwg. MHP0944 and Dwg. MHP0741 on page 26
Take the bottom bracket (14) of the I-Beam clamp assembly (18) and attach the wedges (15) with capscrews (13), flat washers (16) and locknuts (17), only engage a couple of threads on locknuts. Next place a nylon insert (2) onto the female swivel (1) and insert this into the bottom bracket (14). Place a jam nut (9) onto the threaded rod (10) and spin down about 2 inches (51 mm). Screw this assembly into the female swivel (1) until the threads are visible in the first hole or it is covered.



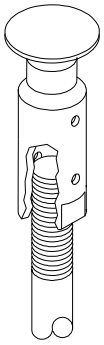
(Dwg. MHP0944)

C-Channel Clamp

Refer to Dwg. MHP0943 and Dwg. MHP0742 on page 28
Take the C-channel bracket (23) of the C-Channel clamp assembly (24) and attach the wedge (15) with capscrew (13), flat washers (16) and locknut (17), only engage a couple of threads on locknut. Next place a nylon insert (2) onto the female swivel (1) and insert this into the C-Channel bracket (23). Place a jam nut (9) onto the threaded rod (10) and spin down about 2 inches (51 mm). Screw this assembly into the female swivel (1) until the threads are visible in the first hole or it is covered.



(Dwg. MHP0943)



(Dwg. MHP0937)

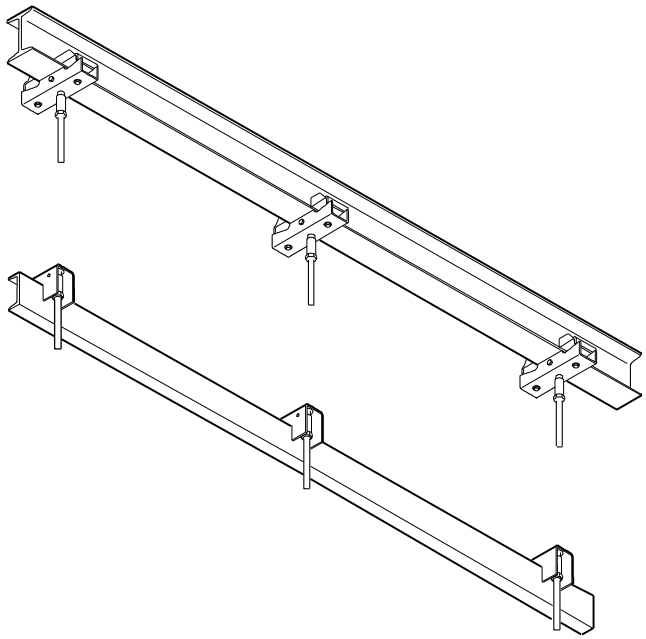
* Note: Clamps will be fully tightened in “Runway Installation” section.

⚠ CAUTION

• Threaded rod (10) MUST be engaged in female swivel (1) until threads are visible in first small hole on swivel end.

Clamp Positioning

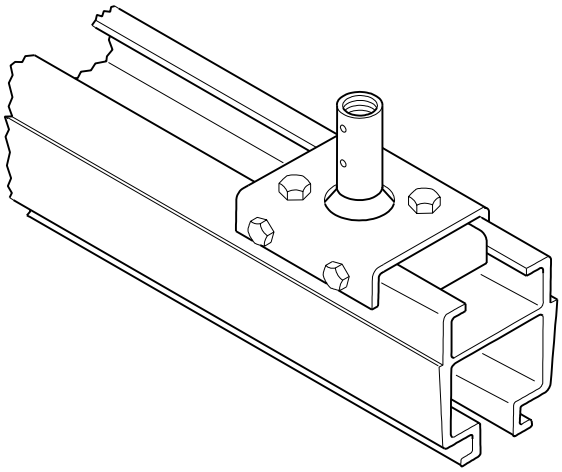
Refer to Dwg. MHP0943, MHP0944 and MHP1002
Place these assemblies onto the supporting beams. The I-Beam clamp assembly is loosely attached to the bottom flange of the beam (so clamp can move but not fall off). The center of the bottom bracket (14) is centered on the flange of the beam. * Refer to note.
The C-Channel clamp assembly is mounted over the top of the C-Channel (NOT UNDER) and loosely attached (so clamp can move but not fall off). * Refer to note.
Measure to the center of each hanger bracket assembly (21) when mounted using “Runway Installation” instructions below and use these measurements to roughly position the beam clamps. For this type of runway installation only the two end hanger assemblies (21) will be drilled and mounted to the rail section along with female swivel (1) and nylon insert (2). The intermediate hanger brackets are only clamped. The beam clamps will be moved along the supporting beam to put the connector rods in a vertical position.



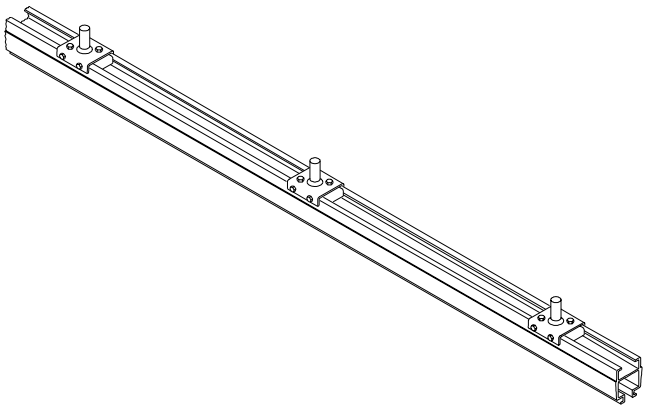
(Dwg. MHP1002)

Fixed Support Point with Swivel Connectors
Fixed support point brackets are a “Custom Designed” option. These are used when attaching a runway to wooden support beams or when permanently attached to steel beams. For this type of installation call **Ingersoll-Rand** for technical assistance.

Fixed Support Point Positioning
Refer to Dwg. MHP0942 and MHP1003
Mount the hanger brackets (21), female swivel (1) and nylon insert (2) in the runway and tighten using the hanger bracket capscrews. Refer to Dwg. MHP0942. Measure the center point of each hanger bracket (21) and record. Refer to “Hanger Bracket Installation” under “Runway Installation” for positions. Mark the position for the first fixed support point on the supporting beam. This becomes the base point for ALL fixed support points. Using the rail measurements, mark the supporting beam with the rest of the fixed support locations. Use the “Tolerances” from the “Hanging Runway Section” to check the positions of the fixed support locations and then attach them to the supporting beam. Insert a female swivel (1) and nylon insert (2) through the fixed support. Place a jam nut (9) onto the threaded rod (10) and spin down about 2 inches (51 mm). Screw this assembly into the female swivel (1) until the threads are visible in the first hole or it is covered. Refer to Dwg. MHP0937 on page 15.



(Dwg. MHP0942)



(Dwg. MHP1003)

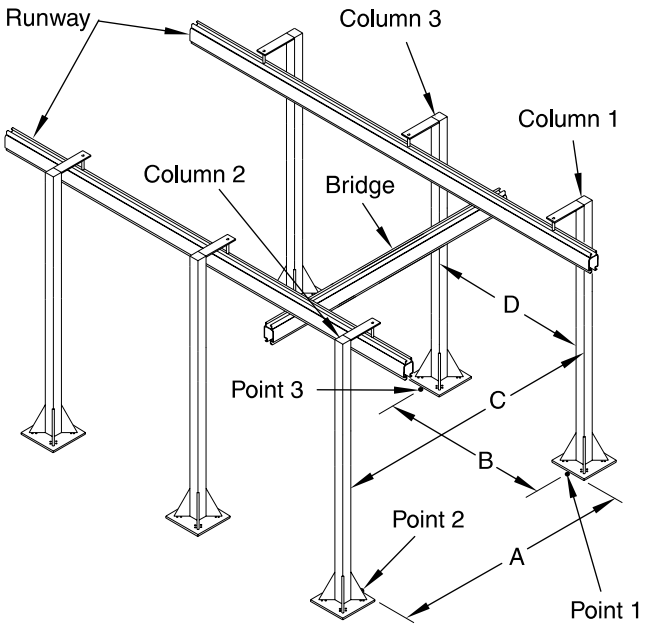
Column Positioning
Refer Dwg. MHP0938
To position columns there are two measurements that can be used. One is based on the baseplate and the other is using the upright portion of the column. When using the baseplate, the reference point will be in the middle of the baseplate under the tang on top. When using the uprights, the reference point is the flat side of the upright, facing the other upright.

Using the baseplate, mark point **1**. This should be half the distance of the bridge length and half the distance of the runway length from the center of the area covered by the rail system. From this point **1,** measure **A** (Bridge length - 6 inches (153 mm)) perpendicular to runway direction and mark, this becomes point **2**. Again from point **1,** measure **B** (Length of runway divided by number of columns -1) in the direction of the runway and mark, this becomes point **3**. Using the same measurements you can now mark positions for the rest of the columns. To verify that point **3** is perpendicular to points **1** and **2** use the following formula.

The distance from point **2** to **3** should = $\sqrt{A^2 + B^2}$

Using the column upright, position column **1** upright near the corner of the work area. This corner should be half the distance of the bridge length and half the distance of the runway length from the center of the area covered by the rail system. From column **1,** measure **C** (Bridge length - 18 inches (457 mm)) perpendicular to runway direction and position column **2**. Again from position **1,** measure **D** (Length of runway divided by number of columns -1) in the direction of the runway and position column **3**. Using the same measurements you can now position the rest of the columns. To verify that position **3** is perpendicular to positions **1** and **2** use the following formula.

The distance from column **2** to **3** should = $\sqrt{C^2 + D^2}$



(Dwg. MHP0938)

Check System Fit
Now that the columns are roughly in position, use the jacking bolts in the baseplates and bring the uprights to a vertical position. Prior to mounting the baseplates to the floor it is recommend that the rail sections be test fitted. Refer to the "Runway Installation" section and install the runway, without the load and hose trolleys. Next go to the "Bridge Installation" section and install the bridge, without the load and hose trolleys. Using the "Tolerance" from the Hanging Runway section verify all measurements. Baseplates can be shifted to attain tolerance requirements.

⚠ CAUTION

• If a column can not be placed at a rail hanger bracket location because of interference, another column and rail hanger assembly MUST be added. The spacing of rail hanger brackets has been calculated to support the anticipated load. If this spacing is exceeded, the rail system will not support the load and failure could occur.

⚠WARNING

• Consult a registered structural engineer for advice on how to attach columns to floor and requirements of floor to support rail system and load.

Once both runways have been test fitted and bridge span distance has been verified for entire runway, then the mounting holes for the column base plates can be marked. Remove the bridge from the runways and then disconnect the runways from the columns. Prepare baseplate mounting holes and anchors. When baseplate anchoring holes are ready then mount the columns (refer to tolerance from Runway Section for specifications).

Runway Installation

Splicing
If your package requires a runway longer that the rail sections, then you will have to splice sections together. Layout entire runway and roughly position all hanger brackets (21). Do not take apart a splice to slide rail hanger brackets into rail sections.

⚠ DANGER

• NEVER splice bridges. If you need a longer bridge contact Ingersoll-Rand.

A splice kit (127) will include:
1. One hanger bracket assembly.
2. Two each: capscrews, flat washers and locknuts.

You will need to order:
1. One rod and ball swivel assembly (20).
2. One extra clamp assembly, or column support.

Lay both rail sections on the floor, insert a tap plate (7) with female swivel (1) and nylon bushing (2) into one rail section. Install a capscrew (5) through mounting plate (11) and screw into tap plate a couple of turns. Slide both rail sections together. Insert capscrews (124) through lugs, place a flatwasher (125) and locknut (126) on capscrew and tighten a couple of turns. Move rail sections up or down to achieve as close a fit as is possible. Slide hanger assembly (21) onto rail until hanger is centered on connection. Tighten clamp screws (5) and capscrews (124). Using the mounting plate as a template drill both rail sections using a 13/32 drill. Insert capscrews (6) and locknut (12) and torque to specifications.

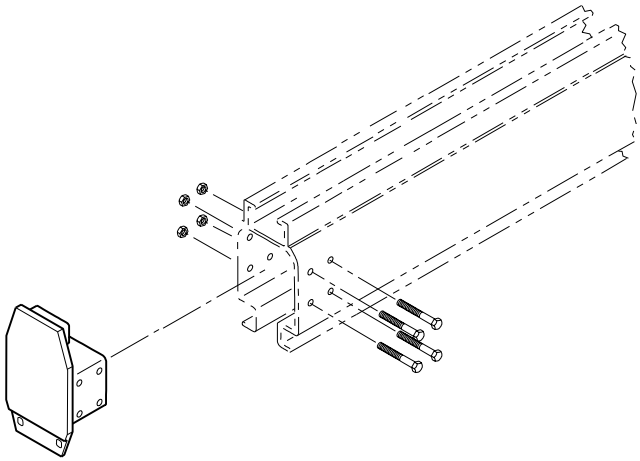
⚠WARNING

• A hanger support must be located over every splice.

Hanger Bracket, Installation
Refer to Dwg. MHP0942 and MHP1003
With runway(s) on the floor slide hanger assemblies (21) with female swivels (1) and nylon bushings (2) into rail section. Tighten end hanger assemblies 12 inches (305 mm) from the end of the runway. The rest of the hanger assemblies are evenly spaced along the runway (except for splices) and tighten. For I-Beam and C-Channel installations you can now drill the end hanger brackets using the mounting plate as a template and a 13/32 drill. Install capscrews (6) and locknuts (12) and tighten. For other installations the runway ends can not be drilled at this time because the threaded rods need to hang vertical and the hanger assemblies are the only movable parts.

For installations with an air supply line, slide a hanger bracket (105) into runway after last hanger assembly (21) and before end cap. This will be in the runway that is closest to the air supply point. The hanger bracket (105) will be attached later in installation.

End Cap Installation
Refer to Dwg. MHP1006 and MHP1057
For plastic end caps use drawing MHP1006 on page 18 to locate the position for drilling mounting holes. Using a 13/32 drill two holes for 4 inch rails and four holes for 8 inch rail. For shock absorber end cap installation use the end caps themselves as a template and drill both ends of the runways using a 13/32 drill. Slide the end caps into the same ends of the runways and insert capscrews (6) and locknuts (12) and tighten. The other end caps will be installed later.



(Dwg. MHP1057)

Hanging Runway Section

⚠ DANGER

• Devices used to support personnel during installation need to be rated safe for person PLUS weight of rail section or other component being supported. Do not use rail sections as support for ladders. Rail sections can not be locked and movement can occur causing ladders to fall.

When lifting a runway section into place, locate a person at each end of runway and one person per every 15 feet (5 m) of runway. Starting at one end, attach female swivel (1) in hanger brackets to threaded rod (10) one at a time working along runway to opposite end.

⚠ CAUTION

• Threaded rod (10) MUST be engaged in female swivel (11) until threads are visible in first small hole on swivel end.

Level runway using a standard leveling device. Swivel assembly must hang vertical. Move hanger bracket in rail to achieve this. When runway is level and connector rod is hanging vertical then, using hanger brackets as templates drill runway rails and mount fastener hardware. Tighten all clamp fasteners to the proper torque specifications.

Tolerance

Proper runway rail alignment is essential to provide a rail system with easy travel and to reduce excess wear. Runway rails and bridge rails should be leveled using a standard leveling device, which will align the rail system within the following tolerances.

Fig. 1 Elevation Tolerance Adjacent Runways

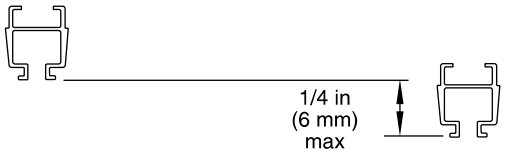
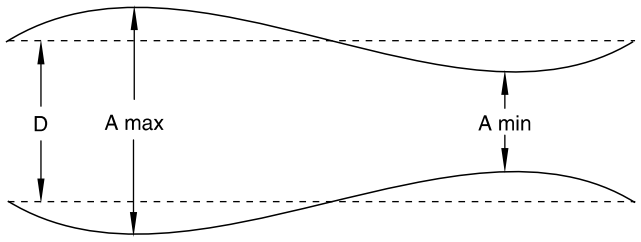
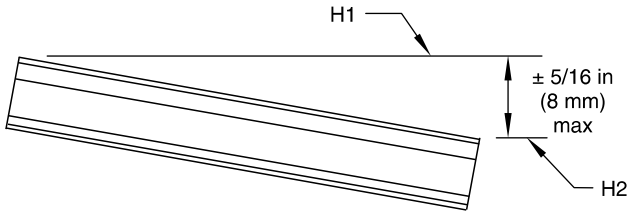


Fig. 2 Parallel Tolerances Between Runways



D = Distance to Centerline of Runway
A max = D + 1/2 in (13 mm)
A min = D - 1/2 in (13 mm)

Fig. 3 Level Tolerance Along a Runway



(Dwg. MHP0892)

1. Threaded rods and columns must be vertical.
2. Runways and bridge must be level within 1/8 inch (3 mm) maximum throughout the entire span.
3. Runway-to-runway elevation must be within 1/4 inch (6 mm) maximum throughout the length of runway. Refer to fig. 1.
4. Centering runway to runway must be within 1/2 inch (13 mm) maximum length of runway. Runways must be straight and parallel, level and at the same elevation. Refer to fig. 2.
5. The height difference tolerance between points on the runway rail should not exceed ± 5/16 inch (8 mm). Refer to fig 3.
6. Longitudinal leveling: Overall length 1/4 inch (6 mm) maximum rate of change, for lengths over a 20 foot (6 m) center, 1/8 inch (3 mm) maximum.
7. Elevation for multiple runways: Overall length 1/4 inch (6 mm) maximum rate of change over a 20 foot (6 m) center 1/8 inch (3 mm) maximum. Rate of change for lengths over a 20 foot (6 m) center 1/8 inch (3 mm) maximum.
8. Centering Single Runways: Parallel to conveyor or station. Overall length 1/2 inch (13 mm) maximum rate of change for length over a 20 foot (6 m) center 1/8 inch (3 mm) maximum.
9. Laser leveling devices can also be used. When using these devices, follow manufacture's safety recommendations.

Truck and End Cap Installation

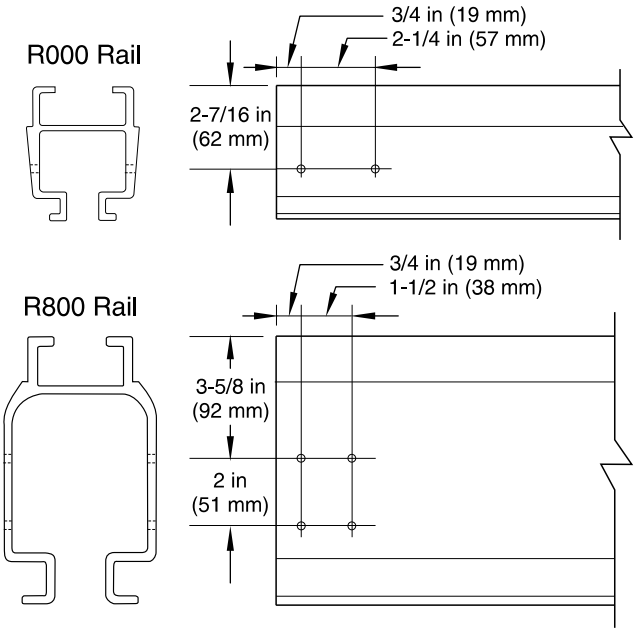
The last step in runway installation is to insert the trolleys and or trucks. If this is a single runway installation you would insert load and hose trolleys. The order will depend on which end of the runway the air supply is located. For other installations insert end truck and hose trolleys, again the order of insertion will depend on where the air supply is located. End trucks will have swivel assemblies and hangers for bridge section already assembled. Finally place end cap into runway, install fasteners and tighten.

Bridge Installation

Hanger Bracket, End Cap Positioning

Refer to Dwg. MHP1006

For plastic end caps use drawing MHP1006 to locate the position for drilling mounting holes. Using a 13/32 inch drill and drill two holes for 4 inch rails and four holes for 8 inch rail. For shock absorber end cap installation use the end caps themselves as a template and drill both end of the runways using a 13/32 inch drill. Then measure in from each end of the bridge 6 inches (153 mm) for 4 inch rail, 8 inches (203 mm) for 8 inch rail and mark. This mark will be the center position of the end truck hanger



(Dwg. MHP1006)

Hanging Bridge

⚠ DANGER

• Devices used to support personnel during installation need to be rated safe for person PLUS weight of rail section or other component being supported. Do not use rail sections as support for ladders. Rail sections can not be locked and movement can occur causing ladders to fall.

When lifting a bridge section into place, locate a person at each end of the bridge and one person per every 15 feet (5 m) of bridge section. Starting at one end, slide bridge into the end truck hanger to a distance of about 8 inches (203 mm) (do not use hanger mark at this time) and finger tighten hanger clamp screws. Then on the other end, slide the bridge onto the end truck hanger. Position the middle of this hanger over the mark made in step above and finger tighten clamp screws. Loosen clamp screws on other side of bridge and slide hanger over hanger mark, again finger tighten clamp screws. Observe both end truck swivels, they should be in the vertical position. If not, move BOTH hangers equal amounts, in or out, to achieve vertical positions. Fully tighten the clamp screws.

Using the end truck hanger brackets as a template drill the bridge section using a 13/32 inch drill. Insert the fastening hardware and tighten. From the hanger plate, place a mark 2 inches (153 mm) towards the middle of the bridge from the edge of the hanger and down 7/8 inch (22.3 mm) for 4 inch rail; 1-1/8 inches (28.6 mm) for 8 inch rail. This will be for the safety cable.

Next level the bridge. Use a standard leveling device to check (refer to Tolerance in Hanging Runway in "INSTALLATION" section for specifications). If the bridge section is not level then the runway on ONE side will have to move up or down. If you run out of adjustment (can not turn female swivel (1) any more) then it will be necessary to shorten the threaded rod (10). Do this by cutting 1/4 inch (6 mm) off the threaded rod (10). Continue cutting 1/4 inch (6 mm) increments until you can adjust the female swivel (1). If threaded rod (10) is too short, you will have to order a longer section. The maximum length is 36 inches (914 mm).

⚠ CAUTION

• Ensure that rail height difference does not exceed tolerance.

End Cap and Trolleys Installation
Install the load and hose trolleys, depending on which side of the bridge the air hose is coming from. Then mount and fasten the last end cap.

Positioner or hoist and Air line Installation
Mount the hoist or positioner to load trolley on the bridge. Ensure that the hoist or positioner hangs vertically. There is a hanger bracket (105) on one of the runways which is close to the air supply point. Position this hanger bracket in the runway to allow easy access and protection for the air regulator (131). For column installations a good place is between runway and column upright. Using the hanger bracket as a template drill runway with a 13/32 inch drill. Mount regulator bracket to hanger bracket (105) with capscrews (6) and locknuts (12) torque to specifications. Attach air line from supply point to regulator. Move the bridge with hoist or positioner to the farthest point from the air regulator. Attach the air line to the regulator and string the air line through all hose trolleys and connect to hoist or positioner. Maintain a slight loop of air line between hose trolleys (air line should hang loose, without tension). Tighten all U-clamps (153).

⚠ CAUTION

• Do not use an air line lubricator with an Ingersoll-Rand positioner.

Safety Checks

Function/Travel Check Without Load

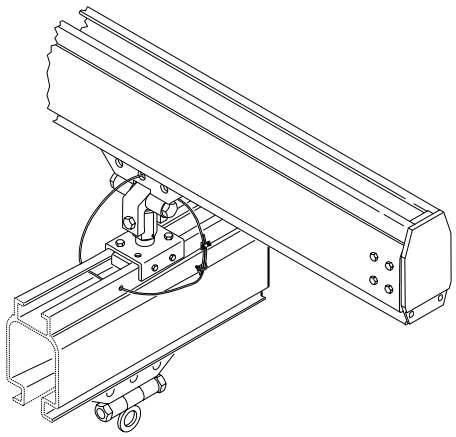
1. Move bridge along entire runway watching for binding, grinding or erratic movement.
2. Move Positioner or hoist along entire bridge watching for binding, grinding or erratic movement.

Function/Travel Check with Load
Attach a 50% of capacity load and raise 5 to 10 inches (127 to 254 mm). Repeat steps above, in addition, during movement, stop at numerous positions and let load hang. Load should NOT move. Correct any problems.

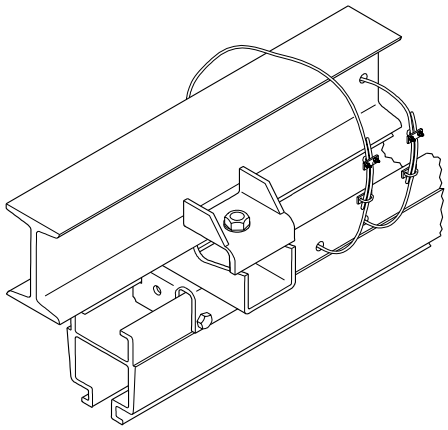
Locking Rail System

Refer to Dwg. MHP0940 and MHP0941
Lock the rail system using the following steps:

1. Fasten jam nuts (9) on all female swivels (1).
2. Install lockwire through the top two open holes in all female swivels (1). For proper procedure refer to your own company procedure for lockwire installation.
3. Install safety cable.
   a. Drill a 1/4 inch (6.4 mm) hole in rail section, 2 inches (153 mm) from hanger and down 7/8 inches (22.3 mm) for 4 inch rail, 1-1/8 inches (28.6 mm) for 8 inch rail. On end hanger brackets, holes should be towards center of runway.
   b. Safety cable should go over supporting beam, if this is not possible, then drill a 1/4 inch (6.4 mm) hole through the middle of the supporting beam. Safety cable can also be passed through the fixed point support.
   c. Pass safety cable through holes and cut to length so that there is 3 inches (76 mm) overlap. Cable should have no slack.
   d. Attach two cable clamps 1 inch (25 mm) apart with tightening nuts facing opposite. On Bridges, Refer to Dwg. MHP0940.
   e. From the hanger plate, place a mark 2 inches (153 mm) towards the middle of the bridge from the edge of the hanger and down 7/8 inch (22.3 mm) for 4 inch rail; 1-1/8 inches (28.6 mm) for 8 inch rail. Drill a 1/4 inch (6.4 mm) hole in this position. This will be for the safety cable.
   f. Safety cable will go through hole in end truck and through drilled hole in bridge. Cut to length so that there is 3 inches (76.2 mm) of overlap. Cable should have no slack.
   g. Attach two cable clamps 1 inch (25 mm) apart with tightening nuts facing opposite.
4. Retighten all bolt connections (suspension hardware, trolleys, attaching hardware, etc.) two weeks after installation, and again after two months of operation, to ensure safe operation of the system. Refer to Table 5 Torque Specifications in the "INSTALLATION SECTION".



(Dwg. MHP0940)



(Dwg. MHP0941)

OPERATION

The four most important aspects of rail system operation are:
1. Follow all safety instructions when operating rail system.
2. Allow only people trained in safety and operation on this product to operate rail system.
3. Subject each rail system to a regular inspection and maintenance.
4. Be aware of the rail system capacity and weight of load at all times.

Operators must be physically competent. Operators must have no health condition which might affect their ability to act, and they should have good hearing, vision and depth perception. The rail system operator must be carefully instructed in their duties and must understand the operation of the rail system, including a study of the manufacturer's literature. The operator must thoroughly understand proper methods of hitching loads and should have a good attitude regarding safety. It is the operator's responsibility to refuse to operate the rail system under unsafe conditions.

Operating Checks

Before Use

Prior to using the rail system (each day or each shift) the following operating checks should be performed.
1. Ensure that positioner or hoist is securely attached to load trolley.
2. Check all safety wire ropes to insure that none are broken or supporting a rail section.
3. Check all hanger assemblies, looking for broken or loose assemblies.
4. Inspect all rail sections for cracks or broken splices.
5. Inspect bridge section for bends, warping or cracks.
6. Check air lines for leaks.
7. Inspect load line connection for damage.
8. Keep operating area clear of obstructions.

During Use
1. Check to see that positioner or hoist is directly over the load. Do not lift the load at an angle (side pull or yard).
2. Observe performance of load while being raised, lowered and moved. System should operate smoothly.
3. To move an unloaded system, push on the lifting device load cable or chain.
4. To move a suspended load, push on the load or the load attachment shank.
5. When operating the rail system, keep load as close to the floor as practical.

After Use
1. If any problems are observed during operation notify maintenance personnel.
2. At the end of use locate positioner or hoist and load line in an area out of the way to avoid accidental contact and injury to other personnel.

⚠WARNING

• The rail system is not designed or suitable for lifting, lowering or moving persons. Never lift loads over people.
• Do not use end stops to position a load. Excessive wear of suspension components can result from continuous collision with end stops. Hand-pushed loads must be kept under control at all times to avoid impacting the end stops.
• Always maintain control of the load while it is being moved.
• Ensure intended path of movement is clear.

INSPECTION

There are two types of inspection, the frequent inspection performed by the operator and periodic inspections performed by personnel trained in the operation and repair of this rail system.

Careful inspection on a regular basis will reveal potentially dangerous conditions while still in the early stages, allowing corrective actions to be taken before the condition becomes dangerous.

Any deficiency revealed through inspection must be reported to an appointed person. A determination must be made as to whether a deficiency constitutes a safety hazard before resuming operation of the rail system.

Records and Reports

Some form of inspection record should be maintained for each rail system, listing all points requiring periodic inspection. A yearly written report should be made on the condition of the critical parts of each rail system. These reports should be dated, signed by each person who performed the inspection, and kept on file where they are readily available to authorized personnel. The Inspection and Maintenance Report provided in this section may be copied and used for this purpose.

Frequent Inspection

On rail systems in continuous service, frequent inspection should be made at the beginning of each shift. In addition, visual inspections should be conducted during regular service for any damage or evidence of malfunction.

1. OPERATION. Check for visual signs or abnormal noises (grinding etc.) which could indicate a potential problem. If trolleys bind, jump, or are excessively noisy, clean and inspect the trolleys and rail system. If problem persists, check for worn and/or damaged parts, replace as required. Do not operate the system until all problems have been corrected.
2. AIR SYSTEM. (optional) Visually inspect all connections, fittings, hoses and components for indication of air leaks. Repair any leaks found. Check and clean the filter in the system. Ensure hoses do not rub or interfere with moving parts.

Periodic Inspection

Frequency of periodic inspection depends on the severity of usage:

NORMAL	HEAVY	SEVERE
yearly	semiannually	quarterly

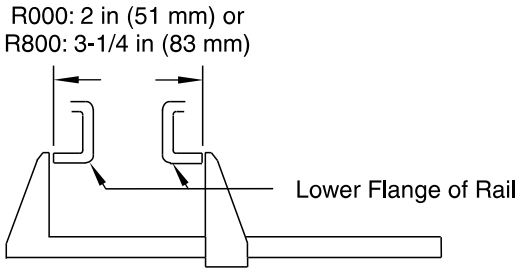
Removal of trucks and trolleys from rails may be required for a through inspection. Keep accumulative written records of periodic inspections to provide a basis for continuing evaluation. Inspect all the items in “Frequent Inspection”. Also inspect the following:

1. LABELS and TAGS. Check for presence and legibility. Replace if necessary.
2. FASTENERS. Check all capscrews, locknuts and jam nuts. Replace all loose locknuts with new ones. If jam nuts are loose ensure swivels are still holding components within tolerance (refer to Tolerance in Hanging Runway Section) and tighten.
3. LOCKWIRES. If loose or broken remove. Ensure components being held by lockwire are still within tolerance (refer to Tolerance in Hanging Runway Section) and install new lockwire (refer to Locking Rail System).
4. SAFETY CABLE. Cable clamps should be tight. Cables should be tight but NOT supporting the rail.
5. TROLLEYS and TRUCKS. Remove all trucks and trolleys check for the following:
   a. Cleanliness, excess grime and dirt build up will require more frequent inspection and cleaning.
   b. Wheels, are they round with no flat spots, do they spin freely?
   c. Are wheels parallel to inner plate? If not replace axle. Are there gouges in ends of inner plate? If minor, grind smooth, if major, replace plate.
   d. Check lugs for signs of wear and cracks in welds.
   e. Clean all components. If problems are found replace component.
6. SUPPORTING STRUCTURES. Check for distortions, wear or cracks and continued ability to support load.

Runways and Bridge(s)

Refer to Dwg. MHP0991

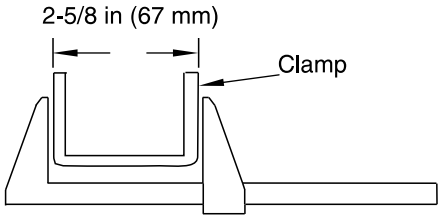
Check runways and bridge(s) for wear, damage, distortion or deformation. Measure lower flange of rails (one measurement per 5 ft. (1.5 m) of rail). If greater than 2 inches (51 mm) for R000 rail, replace section. If greater than 3-1/4 inches (83 mm) for R800 rail, replace section.



(Dwg. MHP0991)

Beam Clamps

Inspect all beam clamps for signs of distortion, wear or cracking. Measure width of clamp, if greater than 2-5/8 inches (67 mm) replace.



(Dwg. MHP0992)

Columns

Check floor around mounting holes in baseplate for cracks. Check mounting hardware for tightness. Inspect all welds for cracks. Use a 4 ft. (1.2 m) straight edge and check column upright on two adjoining sides. A gap of more that 1/4 inch (6.4 mm) will require column to be replaced.

Rail Systems Not in Regular Use

1. A rail system which has been idle for a period of one month or more, but less than one year, should be given an inspection conforming with the requirements of “Frequent Inspection” prior to being used.
2. A rail system which has been idle for a period of more than one year should be given an inspection conforming with the requirements of “Periodic Inspection” prior to being used.

INSPECTION AND MAINTENANCE REPORT

Ingersoll-Rand Rail Systems

Model Number:	**Date:**
Serial Number:	**Inspected by:**

Reason for Inspection: (Check Applicable Box)

	1. Scheduled Periodic Inspection (___ Monthly ___ Yearly)	Operating Environment:
	2. Discrepancy(s) noted during Frequent Inspection	
	3. Discrepancy(s) noted during maintenance	Normal ___ Heavy ___ Severe ___
	4. Other: _____	

Refer to the Parts, Operation and Maintenance Manual “INSPECTION” section for general inspection criteria.
Also refer to appropriate National Standards and Codes of practice. If in doubt about an existing condition contact the nearest Ingersoll-Rand Distributor or the factory for technical assistance.

COMPONENT	CONDITION		CORRECTIVE ACTION		NOTES
	Pass	Fail	Repair	Replace	
Supporting Structure					
Columns					
Hangers Brackets					
Clamps					
Runways					
Bridges					
End Trolley Trucks					
End/Mid Stops					
Load Trolley					
Safety Cables					
Fasteners			---		
Lockwires			---		
Air System					
Splice Kits					
Labels and Tags			---		
Other Components (in NOTES section)					

LUBRICATION

The **Ingersoll-Rand** Rail System has been designed to require minimal lubrication. The runways and bridges require no lubrication; although some attachments do require lubrication.

Whenever a Rail System is disassembled for overhaul or replacement of parts, lubricate as follows:

1. Lubricate the hook and hook latch pivot points on lifting device. Hook and latch should swivel/pivot freely.
2. Lubricate plunger on shock absorber end caps. Lubricate eye bolts, end truck pivots and guide roller pins.
3. Use **Ingersoll-Rand** LUBRI-LINK-GREEN or a SAE 50 to 90 EP oil.

Trolley and Trucks

The trolley wheels have anti-friction bearings which are lubricated for life and only require replacement under extreme conditions. If these wheels must be replaced, they can be ordered separately there is no need to replace the entire trolley assembly.

TROUBLESHOOTING

This section provides the basic troubleshooting information. Specific causes to problems are best identified by through inspections performed by personnel instructed in safety, operation and maintenance of this equipment. The chart below provides a brief guide to common rail symptoms, probable causes and remedies.

Symptom	Cause	Remedy
Change in rolling effort or erratic operation.	Dirt or obstruction in rail.	Clean all parts and inspect for wear.
	Damaged or bent rail.	Inspect all parts and replace those damaged. Determine cause of damage prior to operation.
	Misaligned rails or runways.	Check for loose or broken attachments. Tighten if loose or replace if broken.
	Worn or damaged wheels and/or guide rollers.	Inspect wheels and rollers. Replace damaged parts.
Unusal noises.	Broken guide and/or wheel.	Inspect and replace damaged parts.
	Dirt or obstruction in rail.	Clean all parts and inspect for wear.
Load Creeping.	Runway or Bridge not level.	Level components to specifications (refer to Tolerance in Hanging Runway Section) and lock system (refer to Locking System).

⚠WARNING

• Never perform maintenance on the rail system while it is supporting a load.
• Before performing maintenance, tag system:
DANGER - DO NOT OPERATE -
EQUIPMENT BEING REPAIRED.
• Only allow personnel trained in the operation and service of this rail system to perform maintenance.
• After performing any maintenance on the rail system, dynamically test rail system to 100% of its rated capacity, before returning rail system to service. Testing to more than 100% of rated capacity may be required to comply with standards and regulations set forth in areas outside of the USA.
• Shut off air system and depressurize air lines before performing any maintenance.

General Maintenance Instructions

Maintenance required for this system is minimal, but must be performed according to the proposed maintenance schedule in this manual. In the process of maintaining the rail system, observe the following:

1. Turn off air system and depressurize air lines before performing any maintenance. Disconnect hoses from lifting device. Plug or cap openings to keep out dirt and contaminants.
2. Never disassemble the rail system any further than is necessary to accomplish the needed repair. A good part can be damaged during the course of disassembly.
3. Never use excessive force when removing parts. Tapping gently around the perimeter of a part with a soft hammer, for example, is sufficient to break the seal.
4. Do not heat a part with a flame to free it for removal, unless the part being heated is already worn or damaged beyond repair and no additional damage will occur to other parts.

In general, the rail system is designed to permit easy disassembly and assembly. The use of heat or excessive force should not be required.

5. Keep the work area clean to prevent dirt and other foreign matter from getting into bearings and other moving parts.
6. When grasping a part in a vise, always use leather or copper covered vice jaws to protect the surface of the part and help prevent distortion. This is particularly true of threaded members and machined surfaces.
7. Do not remove any part which is press fit in or on a subassembly unless the removal of the part is necessary for repairs or replacement.
8. To avoid damaging bearings during rail system assembly or disassembly always tap or press on the bearing inner race for shaft fit bearings or the outer race for bore fit bearings.
9. Retighten all bolt connections (suspension hardware, trolleys, attaching hardware, etc.) two weeks after installation, and again after two months of operation, to ensure safe operation of the system. Refer to Torque Specifications Table 5 in the “INSTALLATION” section.

The following maintenance schedule is provided to prevent failures and identify component wear. This chart should be used as a guideline and modified as needed, based on system use and/or local requirements for safe operation. This schedule does not contain daily inspections that may be required by local regulations.

Table 6 Maintenance Schedule

ITEM	CARE	INTERVAL
I-Beam Clamp	I	6 months
Main Bracket	I	
Wedges	I, T	
Threaded Rod	I, T	
Jamb Nuts	I, T	
Swivel Assembly	I	
Locknuts*	R	
Rail Hanger Assembly	I, C	Yearly
Rails and Bridges	I, C, L	
End Trucks and Load Trolleys	I, C	
Rail Stops	I, T	
Shock Absorbers	I, T	
End Caps	I, T	
Splice Kits	I, T	6 months
Air Regulators System	I, C	Yearly
Safety Cables	I, R	6 months
Bolts	I, C, T	

I = Inspect

C = Clean

T = Tighten to specifications

L = Level to specifications

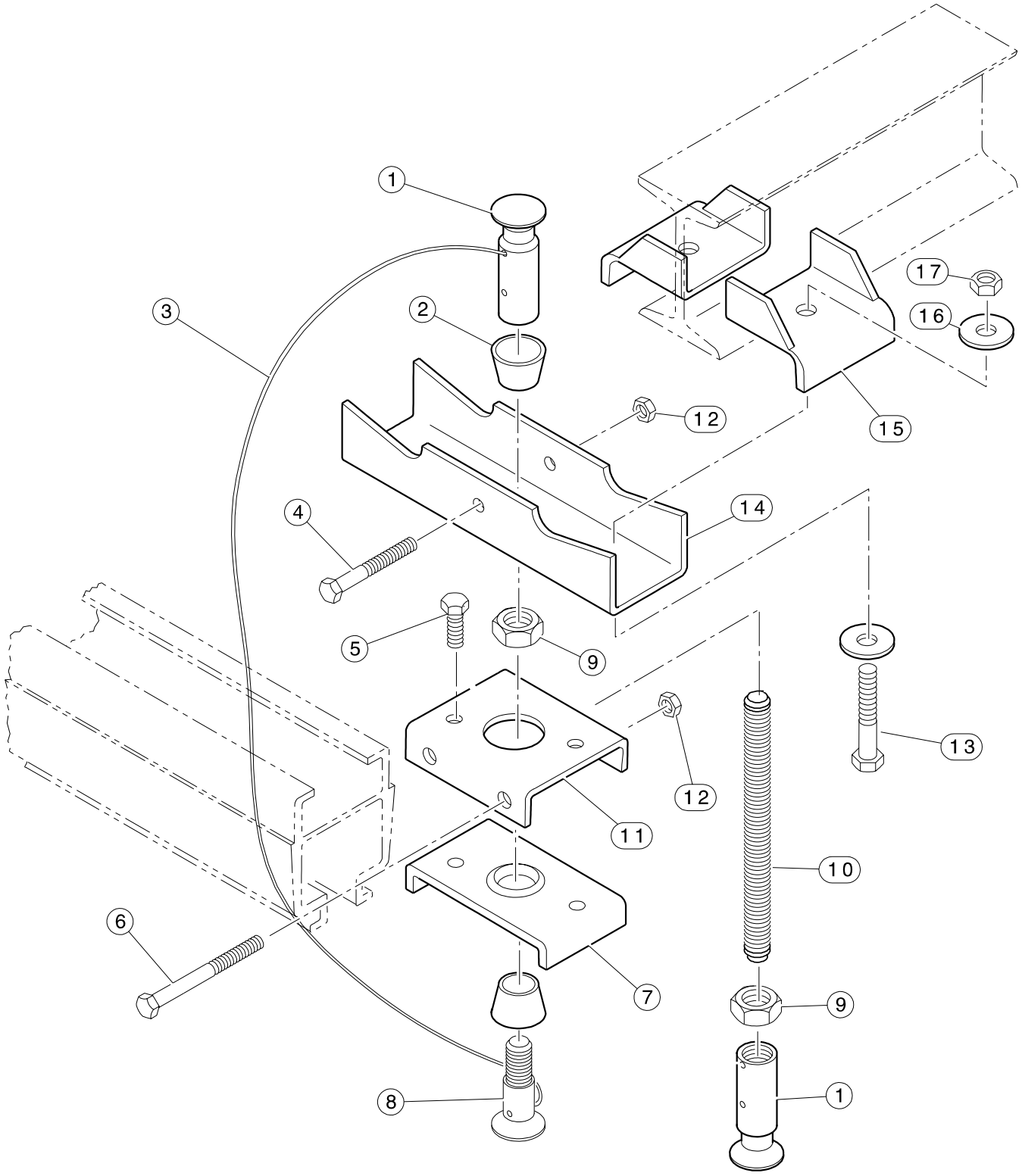
R = Replace

* Locknuts on end caps and rail splice kits must be replaced if removed.

If there are problems with the rail system (worn or damaged components), and replacement is required, locate part numbers in Parts Section and order replacements. Some components can only be ordered as complete assemblies. If they are worn or damaged, the complete assembly must be replaced, not just the worn parts.

SERVICE NOTES

PIVOT I-BEAM HANGER PARTS DRAWING

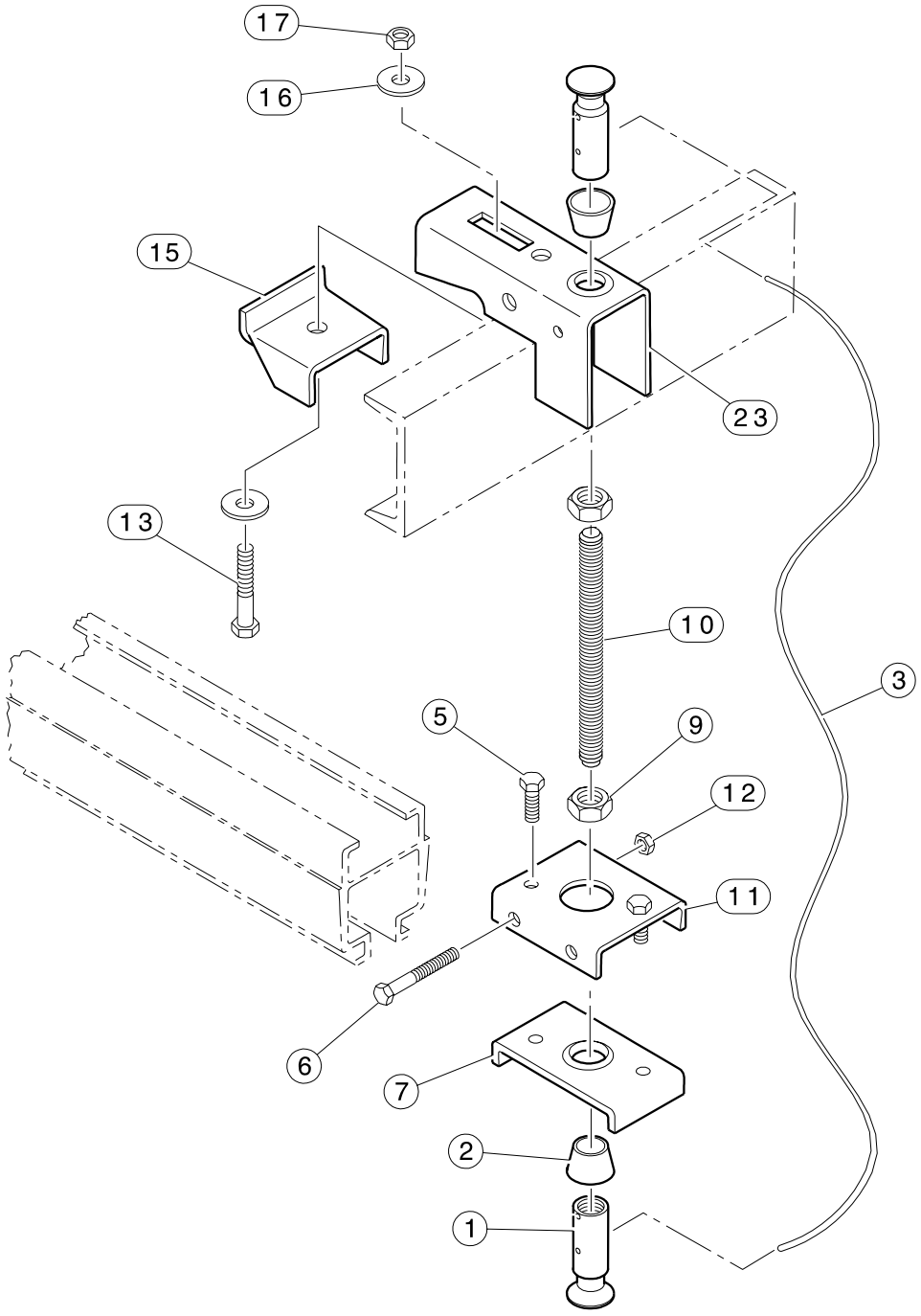


(Dwg. MHP0741)

PIVOT I-BEAM HANGER PARTS LIST

Item No.	Description of Part	Qty. Total	Part Number
18	I-Beam Clamp Assembly for 2.33 - 5 in. (59 - 127 mm) wide beam flange (Incl's items 4, 12, 13, 14, 15, 16 and 17)	As Required	R015
	I-Beam Clamp Assembly for 5 - 7 in. (127 - 178 mm) wide flange (Incl's items 4, 12, 13, 14, 15, 16 and 17)		R054
19	Rod and Ball Swivel Low Profile Assembly (Incl's items 1, 2, 8 and 9)	1	R046
20	Rod and Ball Swivel Assembly with 6 in. Extension Rod (Incl's items 1, 2, 9 and 10)	1	R010-6
	Rod and Ball Swivel Assembly with 12 in. Extension Rod (Incl's items 1, 2, 9 and 10)		R010-12
21	Rail Hanger Assembly - No Drill (Incl's items 5, 6, 7, 11 and 12)	1	R005
1	Swivel Head - female	1 or 2	KP4046F
2	Insert - nylon	2	KP4156
3	Locking Wire	1	
4	Capscrew	1	54751
5	Capscrew	2	50853
6	Capscrew	2	53539
7	Tap Plate	1	KP4084
8	Swivel Head - male	1	KP4046M
9	Jam Nut	1 or 2	50914
10	Threaded Rod 6 in. (152 mm)	1	KP4107-6
	Threaded Rod 12 in. (305 mm)		KP4107-12
11	Mounting Plate Bracket	1	KP4174
12	Locknut	5	50170
13	Capscrew	2	51763
14	Bottom Bracket Clamp (2.33 - 5 in. (59 - 127 mm) wide beam flange)	1	KP4090
	Bottom Bracket Clamp (5 - 7 in. (127 - 178 mm) wide beam flange)		KP4091
15	Wedge	2	KP4093
16	Flat washer	4	71064844
17	Locknut	2	51750

PIVOT C-CHANNEL HANGER PARTS DRAWING

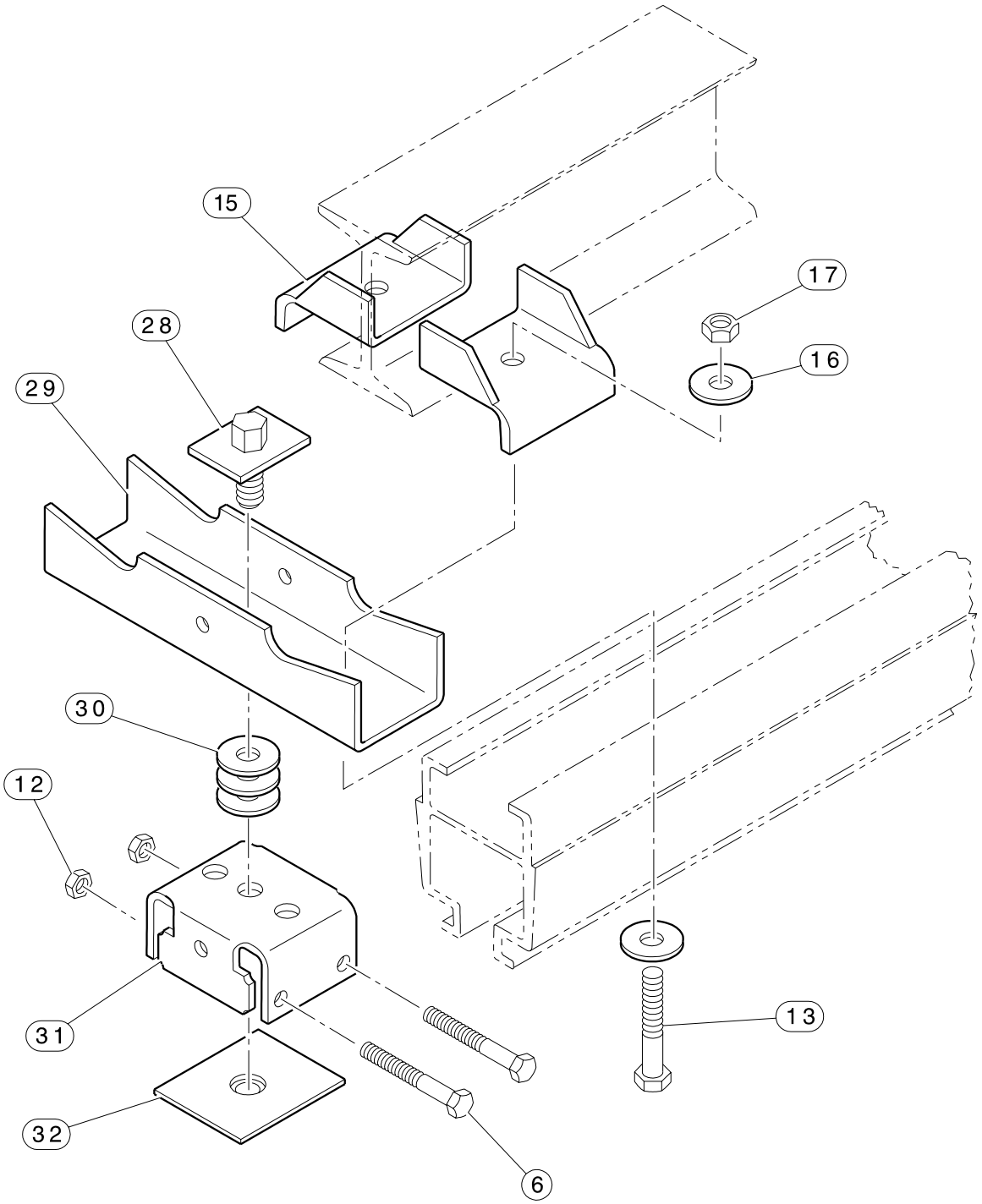


(Dwg. MHP0742)

PIVOT C-CHANNEL HANGER PARTS LIST

Item No.	Description of Part	Qty. Total	Part Number
24	C-Channel Rail Hanger up to 3 in. Top Mounted Clamp (Incl's items 13, 16, 17, 15 and 23)	As Required	R007
20	Rod and Ball Swivel Assembly with 6 in. Extension (Incl's items 1, 2, 9 and 10)	1	R010-6
	Rod and Ball Swivel Assembly with 12 in. Extension Rod (Incl's items 1, 2, 9 and 10)		R010-12
21	Rail Hanger Asssmbly - No Drill (Incl's items 5, 6, 7, 11 and 12)	1	R005
1	Swivel Head - female	2	KP4046F
2	Insert - nylon	2	KP4156A
3	Locking Wire	1	
5	Capscrew	2	50853
6	Capscrew	2	53539
7	Tap Plate	1	KP4084
9	Jam Nut	2	50914
10	Threaded Rod 6 in. (152 mm)	1	KP4107-6
	Threaded Rod 12 in. (305)		KP4107-12
11	Mounting Plate Bracket	1	KP4174
12	Locknut	2	50176
13	Capscrew	1	51763
15	Wedge	1	KP4093
16	Flat washer	2	71064844
17	Locknut	1	51750
23	C-Channel Bracket, Single	1	KP4096

FIXED I-BEAM CLAMP PARTS DRAWING

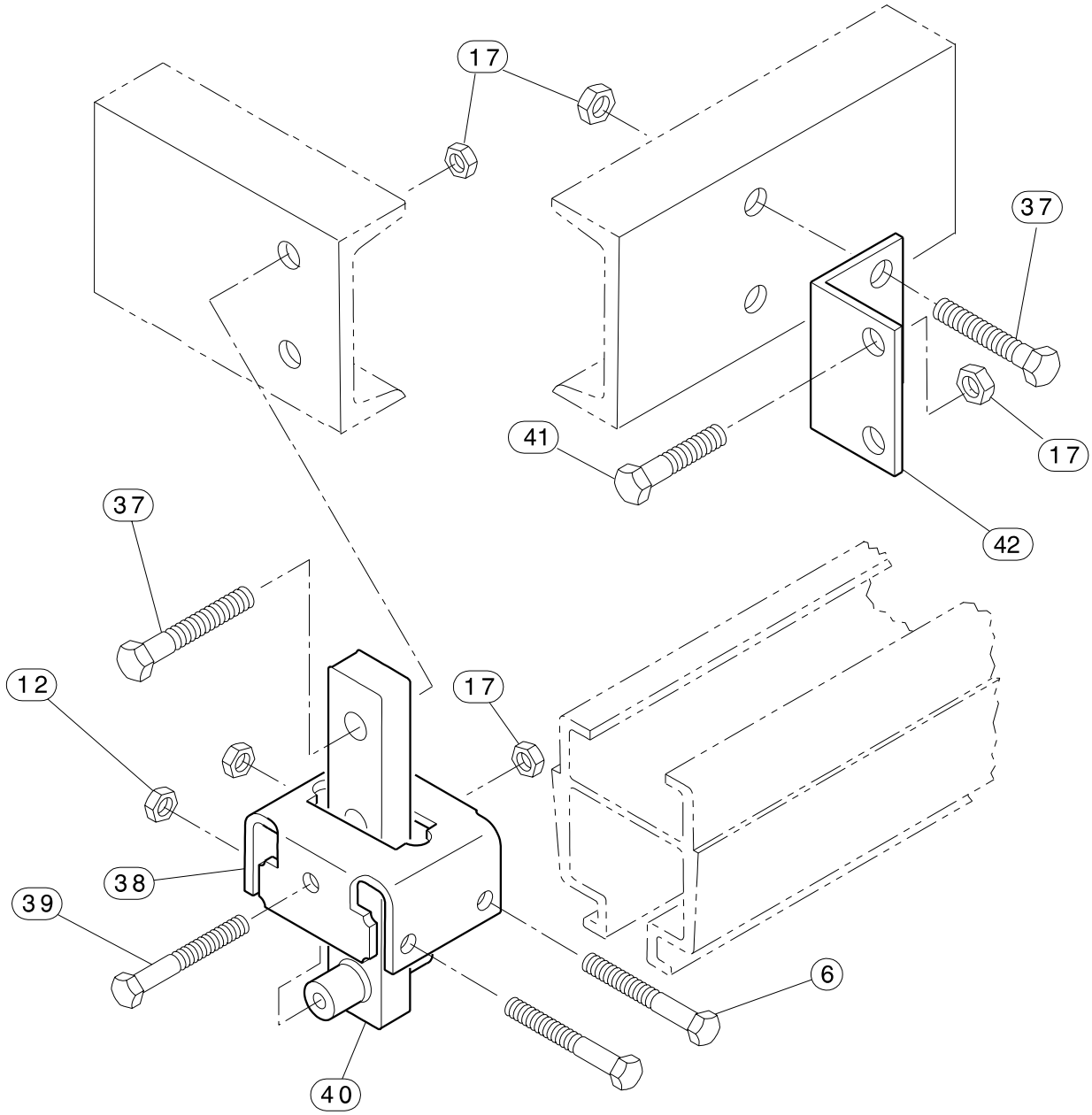


(Dwg. MHP0740)

FIXED I-BEAM CLAMP PARTS LIST

Item No.	Description of Part	Qty. Total	Part Number	
			R000 Rail	R800 Rail
- - -	I-Beam Clamp Assembly for 3 - 5 in. wide beam flange (Incl's items 13, 16, 17, 15 and 29)	As Required	R012	
	I-Beam Clamp Assembly for 5 - 7 in. wide beam flange (Incl's items 13, 16, 17, 15 and 29)		R013	
- - -	Fixed Rail Hanger Assembly (Incl's items 6, 12, 28, 30 31 and 32)	1	R004	R801
6	Capscrew	2	53539	
12	Locknut	2	50170	
13	Capscrew	2	51763	
15	Wedge	2	KP4093	
16	Flat washer	4	71064844	
17	Locknut	2	51750	
28	Cage Plate Bolt	1	KP4069	
29	Bottom Bracket (2.33 - 5 in. (59 - 127 mm) wide beam flange)	1	KP4078	
	Bottom Bracket (5 - 7 in. (127 - 178 mm) wide beam flange)		KP4079	
30	Spacer	3	KP4088	
31	Fixed Hanger Bracket	1	KP4085	KP4860
32	Cage Nut Plate	1	KP4089	

UTILITY RAIL HANGER DRAWING



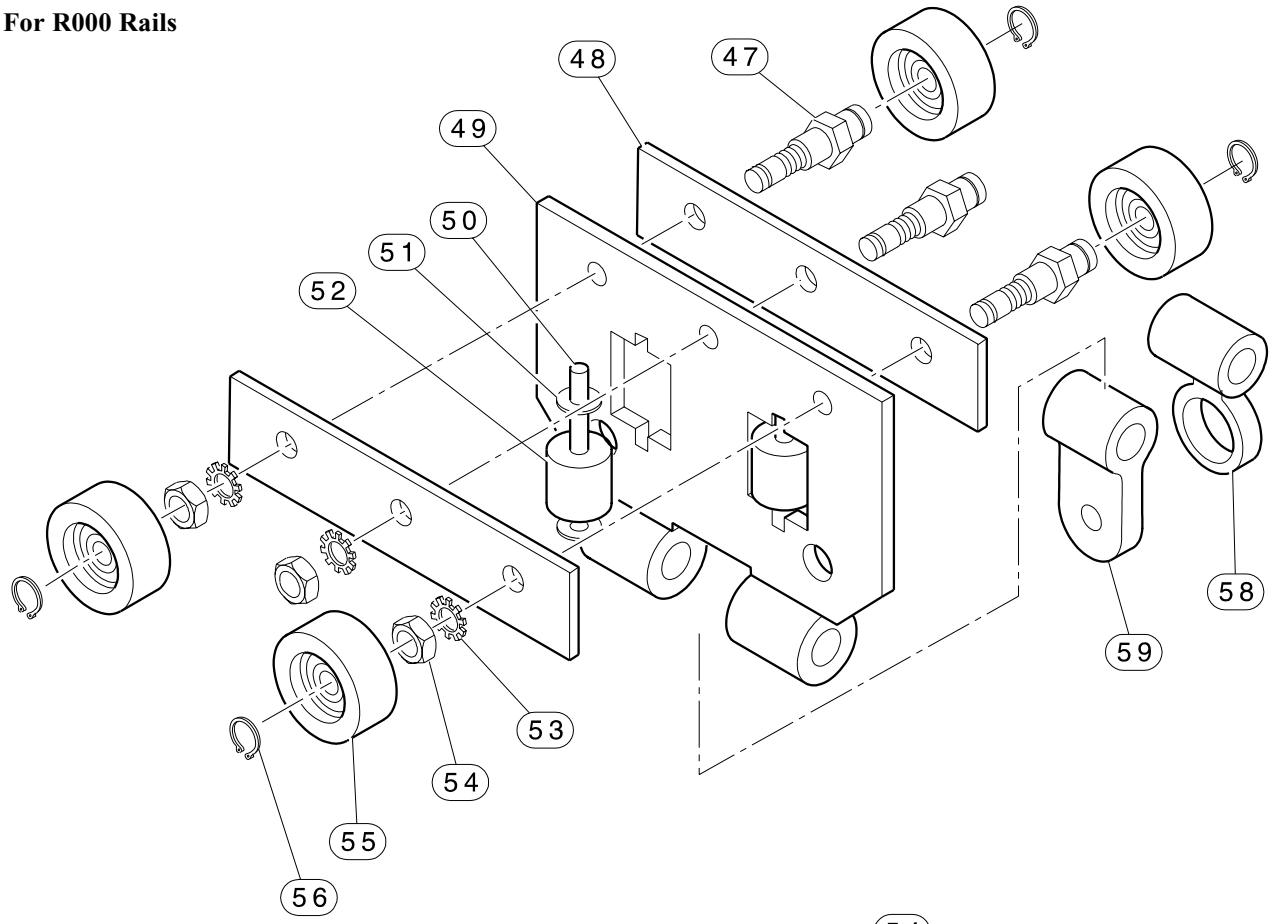
(Dwg. MHP0744)

UTILITY RAIL HANGER PARTS LIST

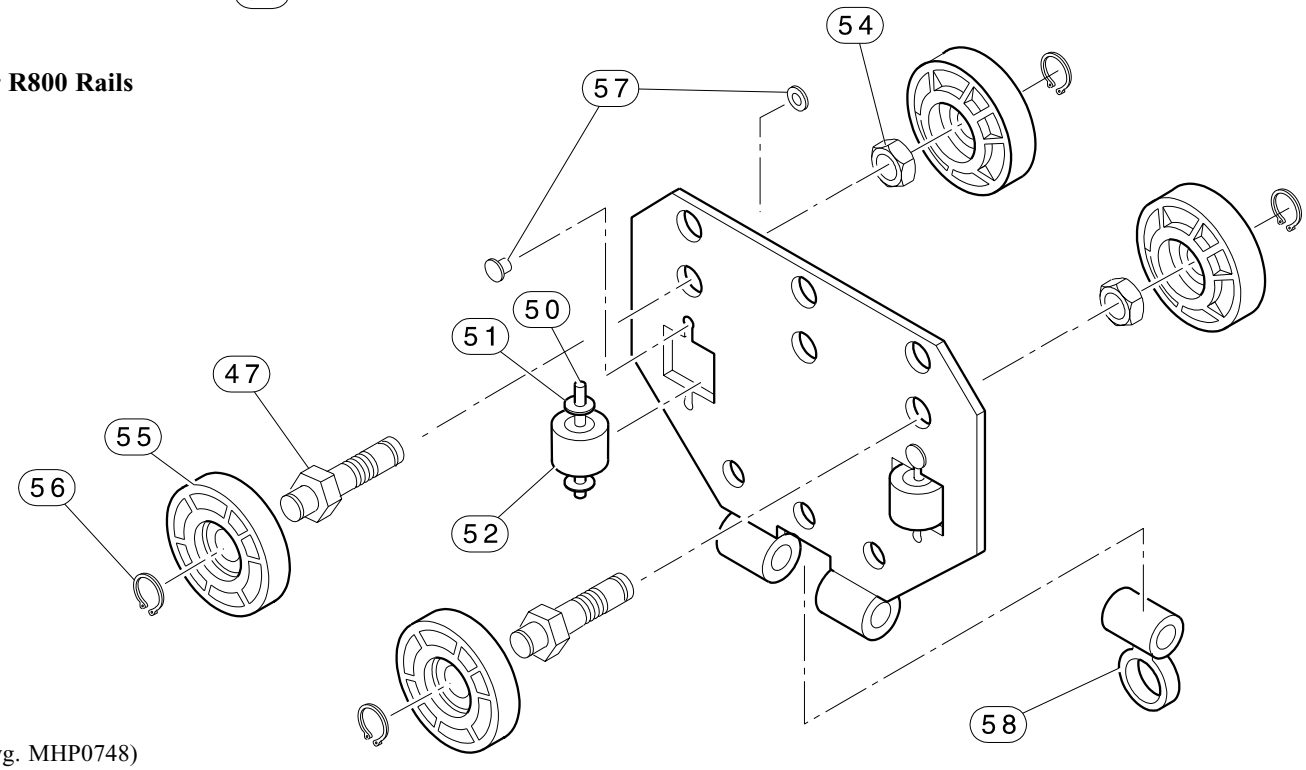
Item No.	Description of Part	Qty. Total	Part Number	
			R000 Rail	R800 Rail
27	Utility Rail Hanger Assembly perpendicular to rail (Incl's items 6, 12, 17, 37, 38 and 39)	As Required	FR015	FR010
33	Adapter - parallel to rail (Incl's items 17, 37, 41 and 42)		KP4023A	
6	Capscrew	2	53539	
12	Locknut	2	50170	
17	Locknut	5	51750	
37	Capscrew	2	50197	
38	Hanger Bracket	1	FR004	FR801
39	Capscrew	1	50884	
40	Strap	1	KPF4015	
41	Capscrew	2	50183	
42	Adapter	1	KPF4023	

LOAD TROLLEY AND END TRUCK PARTS DRAWING

For R000 Rails



For R800 Rails



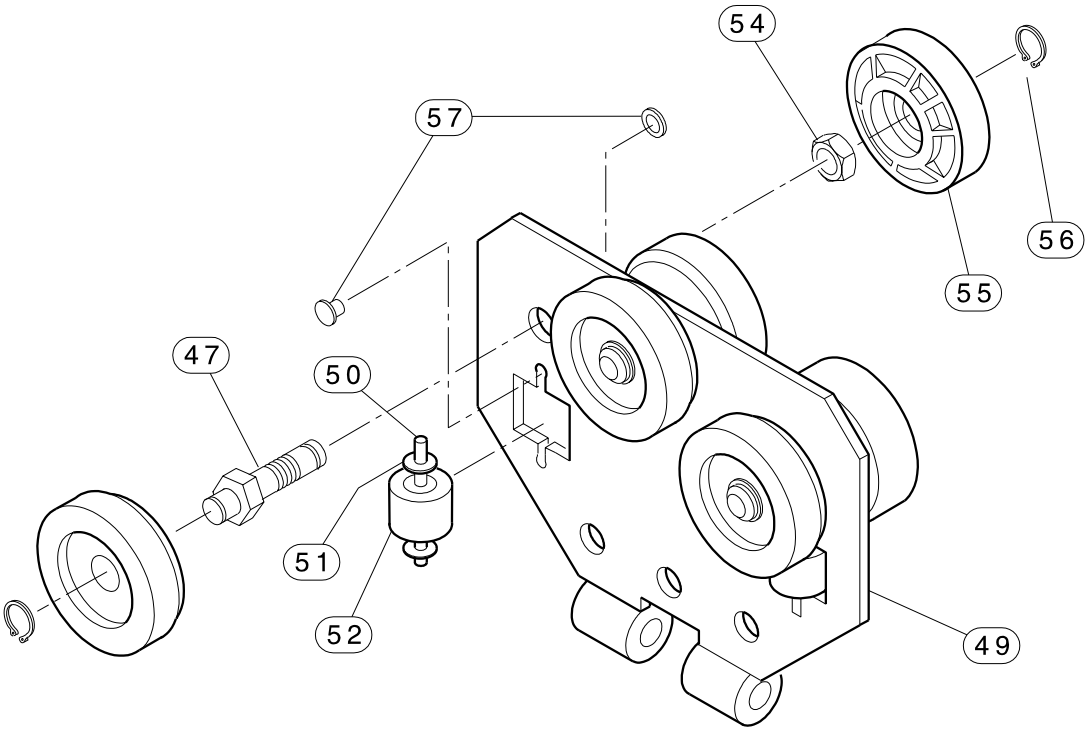
(Dwg. MHP0748)

LOAD TROLLEY AND END TRUCK PARTS LIST

Item No.	Description of Part	Qty. Total	Part Number	
			R000 Rail	R800 Rail
43	Load Trolley/End Truck Trolley Assembly (without hinge lugs)	1	R001	R806
	Load Trolley/End Truck Trolley Assembly (with hinge lugs)	1	R003	R819
47	Axle	See ( )	KP4144 (3)	KP4838 (2)
48	Outer Plate	2	KP4159	- - -
49	Inner Plate Assembly (without hinge lugs)	1	KP4160	KP4840
	Inner Plate Assembly (with hinge lugs)		KP4146	KP4855
50	Pin Guide Roller	2	KP4133	
51	Guide Roller Washer	4	KP4132	
52	Guide Roller	2	KP4134	KP4836
53	Washer	3	50839	
54	Locknut	See ( )	53128 (3)	51011 (2)
55	Wheel*	4	* Refer to Note	
56	Axle Retainer Ring	4	71127005	54136
57	Rivet	2	- - -	T312500500F
58	Eye Bolt	1	KP4147	
59	Male Tab	1	KP4148	- - -

* Only available in Load Trolley/End Truck Trolley Assembly (43).

R800 END TRUCK WITH KICK-UP PARTS DRAWING AND LIST

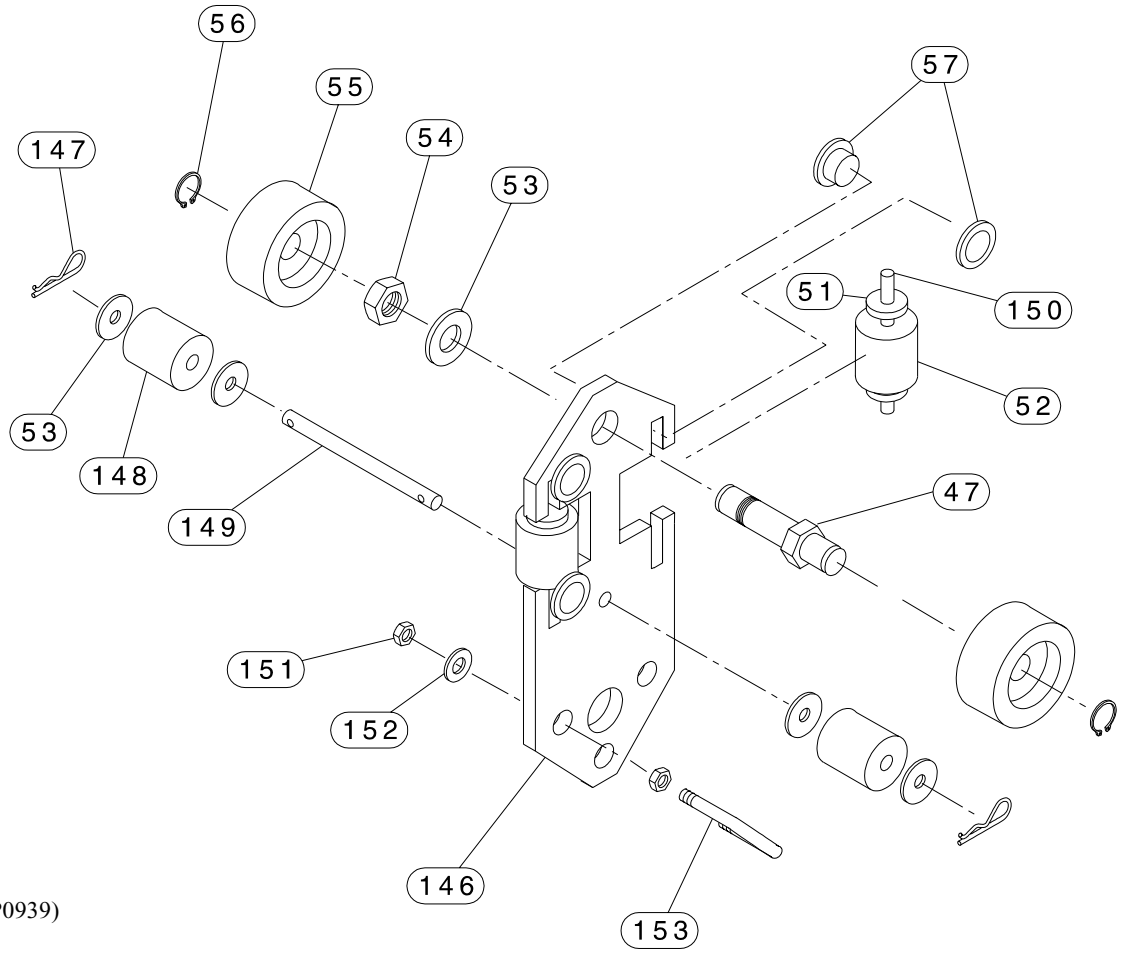


(Dwg. MHP0932)

Item No.	Description of Part	Qty. Total	Part Number
96	End Truck with Kick-Up Assembly (without Lug)	As Required	R813
	End Truck with Kick-Up Assembly (with Lug and Eye Bolt)		R819E
	End Truck with Kick-Up Assembly (with Lug and Tab)		R819T
47	Axle	3	KP4838
49	Inner Plate	1	KP4819A
50	Guide Roller Pin	2	KP4133
51	Guide Roller Washer	4	KP4132
52	Guide Roller	2	KP4836
54	Locknut	3	51011
55	Wheel*	3	* Refer to Note
56	Retainer Ring	3	54136

* Only available with End Truck Kick-Up Assembly (96)

HOSE TROLLEY DRAWING AND PARTS LIST

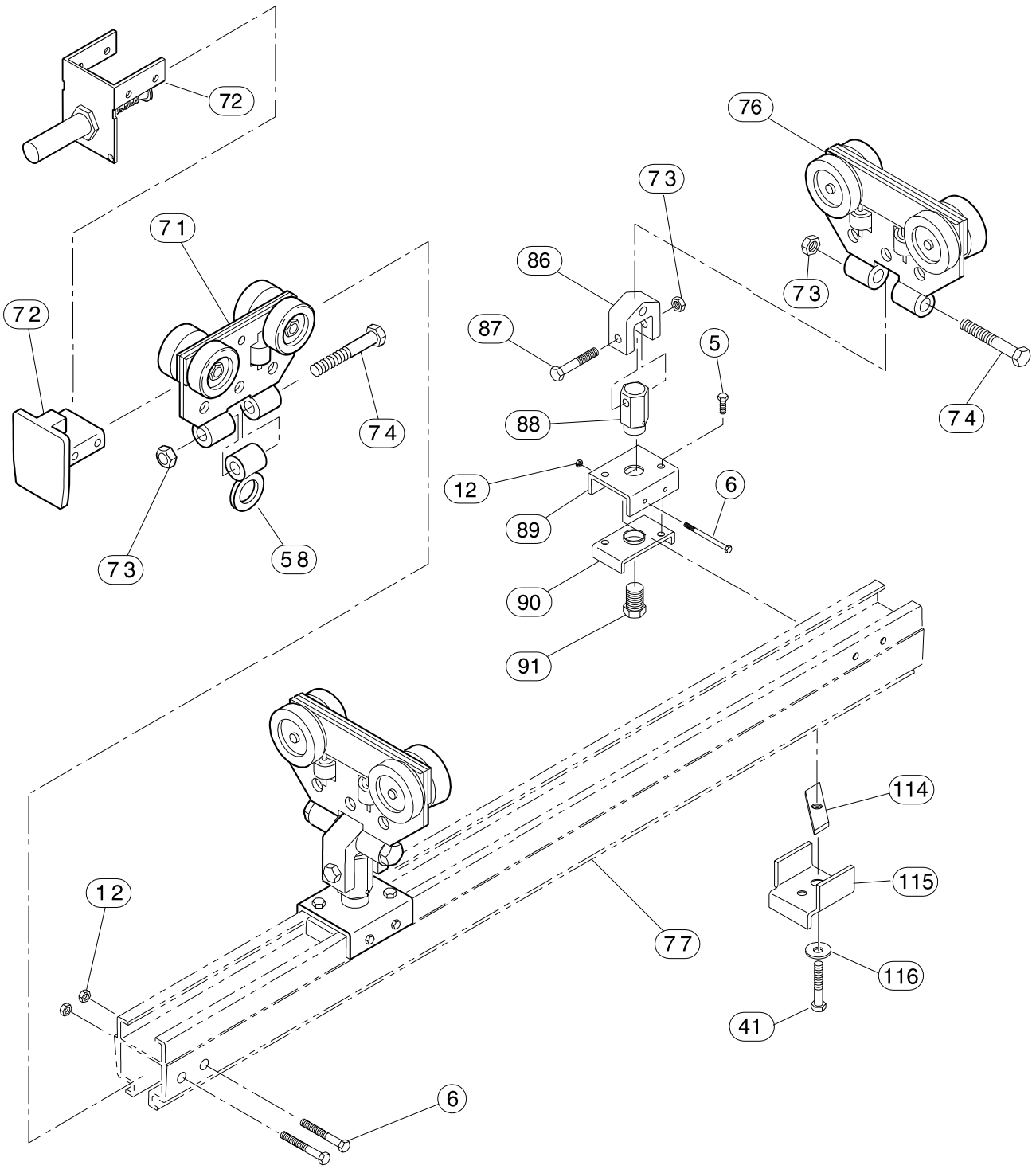


(Dwg. MHP0939)

Item No.	Description of Part	Qty. Total	Part Number	
			R000 Rail	R800 Rail
130	Hose Trolley Assembly	As Required	R019	R814
47	Axle	1	KP4144	
51	Washer	4	KP4132	
52	Guide Roller	2	KP4134	KP4836
53	Washer	4	50839	
54	Locknut	2	53128	
55	Wheel*	2	* Refer to Note	
56	Retainer Ring	2	71127005	
57	Rivet	4	T312500500F	
146	Hose Trolley Plate	1	KP4123	
147	Cotter Pin	2	53450	
148	Bottom Guide Roller	2	KP4134	
149	Bottom Guide Roller Pin	1	KP4126	
150	Guide Roller Pin	2	KP4125	
151	Locknut	2	54587	
152	Flat washer	2	50177	
153	“U” Bolt*	1	* Refer to Note	

* Available only as part of Hose Trolley Assembly (130).

R000 SINGLE BRIDGE PARTS DRAWING



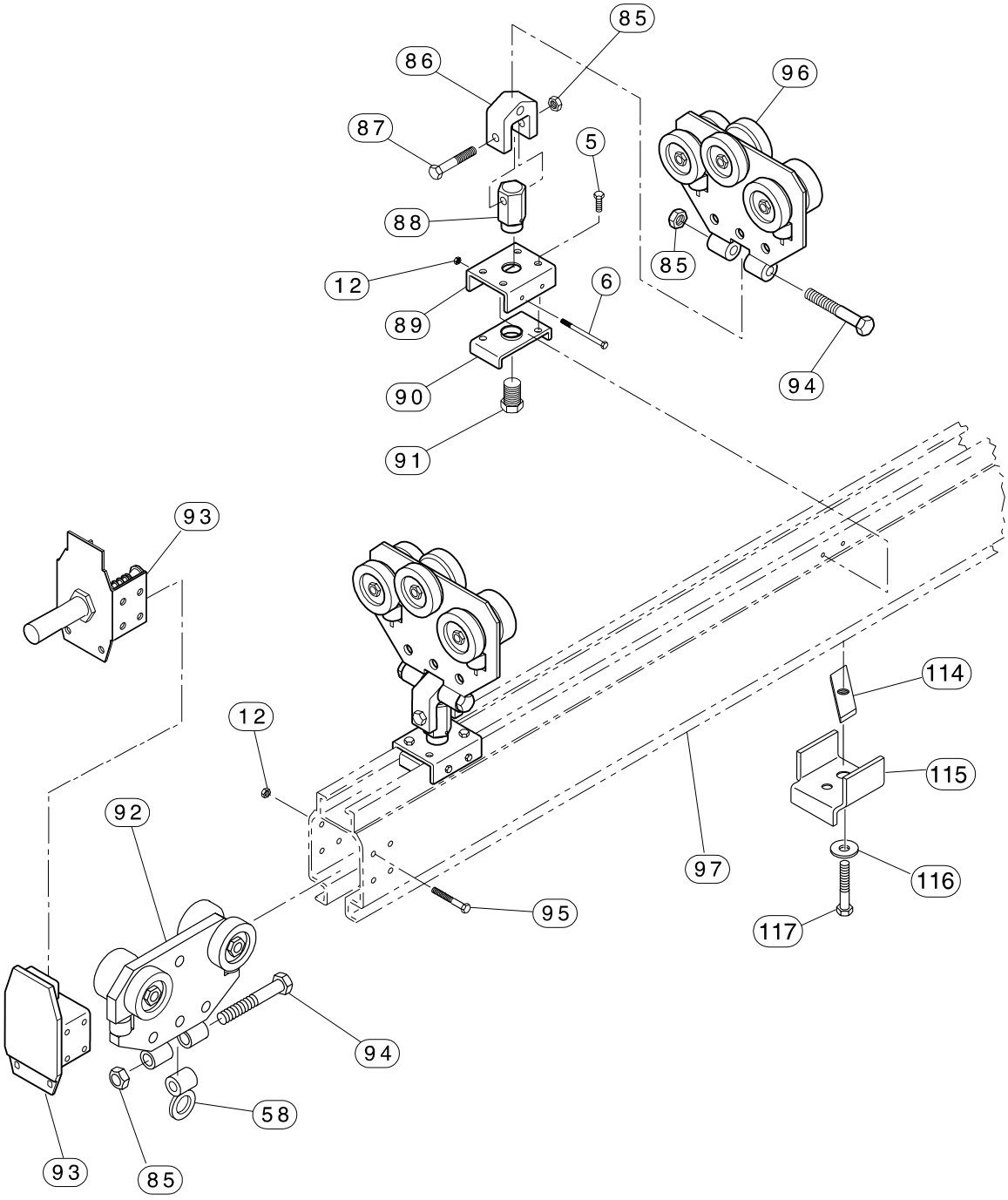
(Dwg. MHP0746)

R000 SINGLE BRIDGE PARTS LIST

Item No.	Description of Part	Qty. Total	Part Number
6	Capscrew	4	53539
12	Locknut	4	50170
41	Capscrew	1	50197
58	Eye Bolt	1	KP4147
71	Load Trolley	1	R003
72	End Cap (plastic)	1	R011
	End Cap (shock absorber)		R058
73	Locknut	1	50812
74	Capscrew	1	KP4180
76	End Truck Assembly (Incl's. items 5, 6, 12, 73, 74, 86, 87, 88, 89, 90 and 91)	1	R060
77	Rail Section (4 in.)	As Required	R000-(specify)*
86	Connector	1	KP4024
87	Capscrew	1	53997
88	End Truck Pivot	1	KP4168
89	Mounting Plate	1	KP4178
90	Tap Plate	1	KP4175
91	Capscrew	1	54221
113	Mid Rail Stop Assembly (Incl's items 41, 114, 115 and 116)	1	R070
114	Mid Rail Lock Bar	1	KP4118
115	Mid Rail Clamp	1	KP4119
116	Lockwasher	1	50181

* Rail Section is ordered by Part Number-(ft. required). i.e. R000-10 specifies a R000 (4 in.) Rail Section - 10 ft. long.

R800 SINGLE BRIDGE PARTS DRAWING



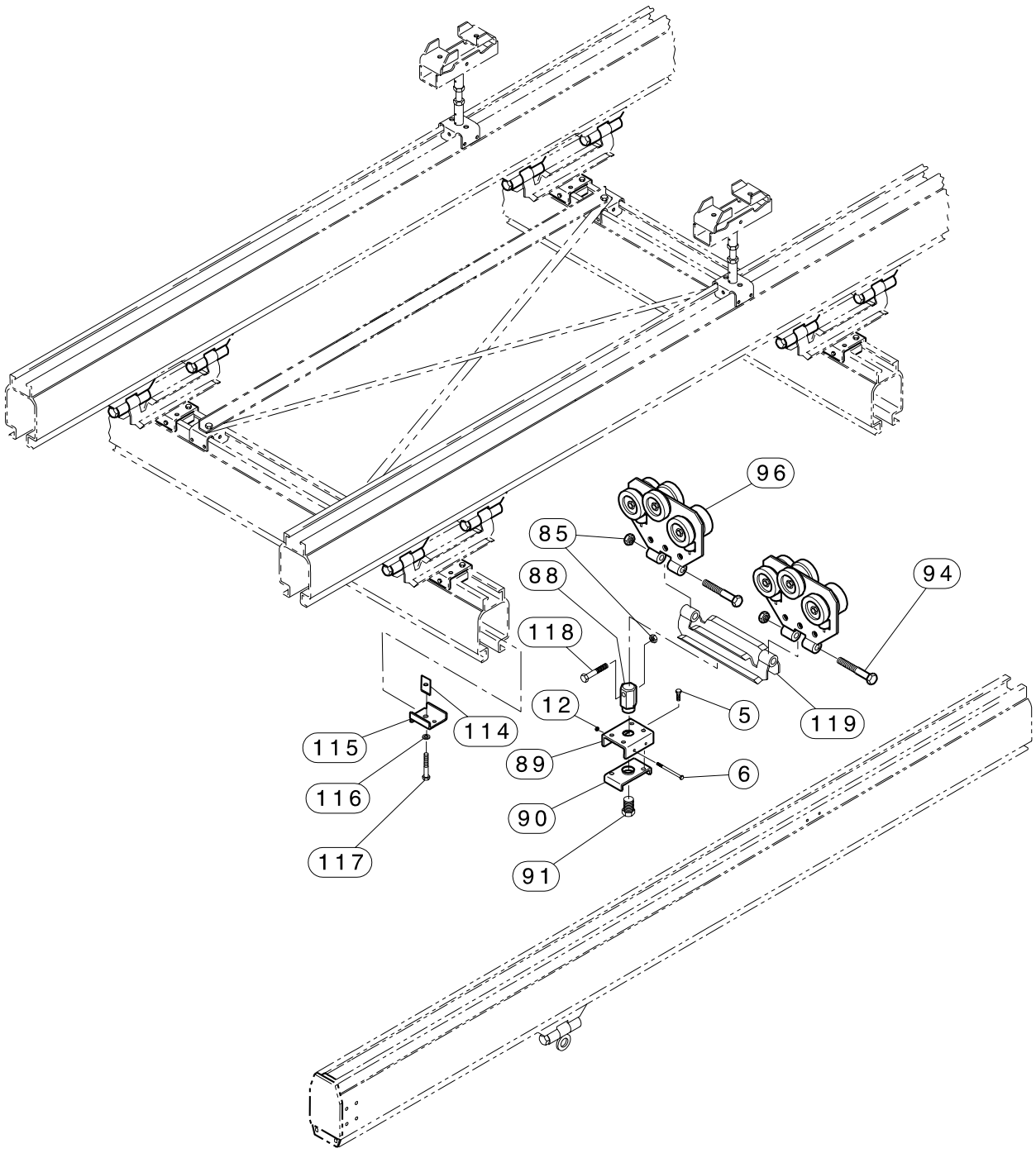
(Dwg. MHP0933)

R800 SINGLE BRIDGE PARTS LIST

Item No.	Description of Part	Qty. Total	Part Number
5	Capscrew	2	50853
6	Locknut	2	53539
12	Locknut	6	50170
58	Eye Bolt	1	KP4147
85	Locknut	2	50812
86	Connector	1	KP4024
87	Capscrew	1	53997
88	End Truck Pivot	1	KP4168
89	Mounting Plate	1	KP4178
90	Tap Plate	1	KP4175
91	Capscrew	1	54221
92	Load Trolley (Incl's. items 58, 85 and 94)	1	R819
93	End Cap (shock absorber)	2	R805
	End Cap (plastic)		R804
94	Capscrew	2	KP4180
95	Capscrew	4	53840
97	Rail Section (8 in.)	As Required	R800-(specify)*
96	End Truck Assembly (Incl's items 5, 6, 12, 85, 86, 87, 88, 89, 90, 91, 94 and 96)	1	R807
113	Mid Rail Stop Assembly (Incl's items 114, 115, 116 and 117)	1	R811
114	Mid Rail Lock Bar	1	KP4843
115	Mid Rail Clamp	1	KP4842
116	Lockwasher	1	50181
117	Capscrew	1	52225

* Rail Section is ordered by Part Number-(ft. required). i.e. R800-15 specifies a R800 (8 in.) Rail Section - 15 ft. long.

R800 RAILS AND DUAL BRIDGE PARTS DRAWING

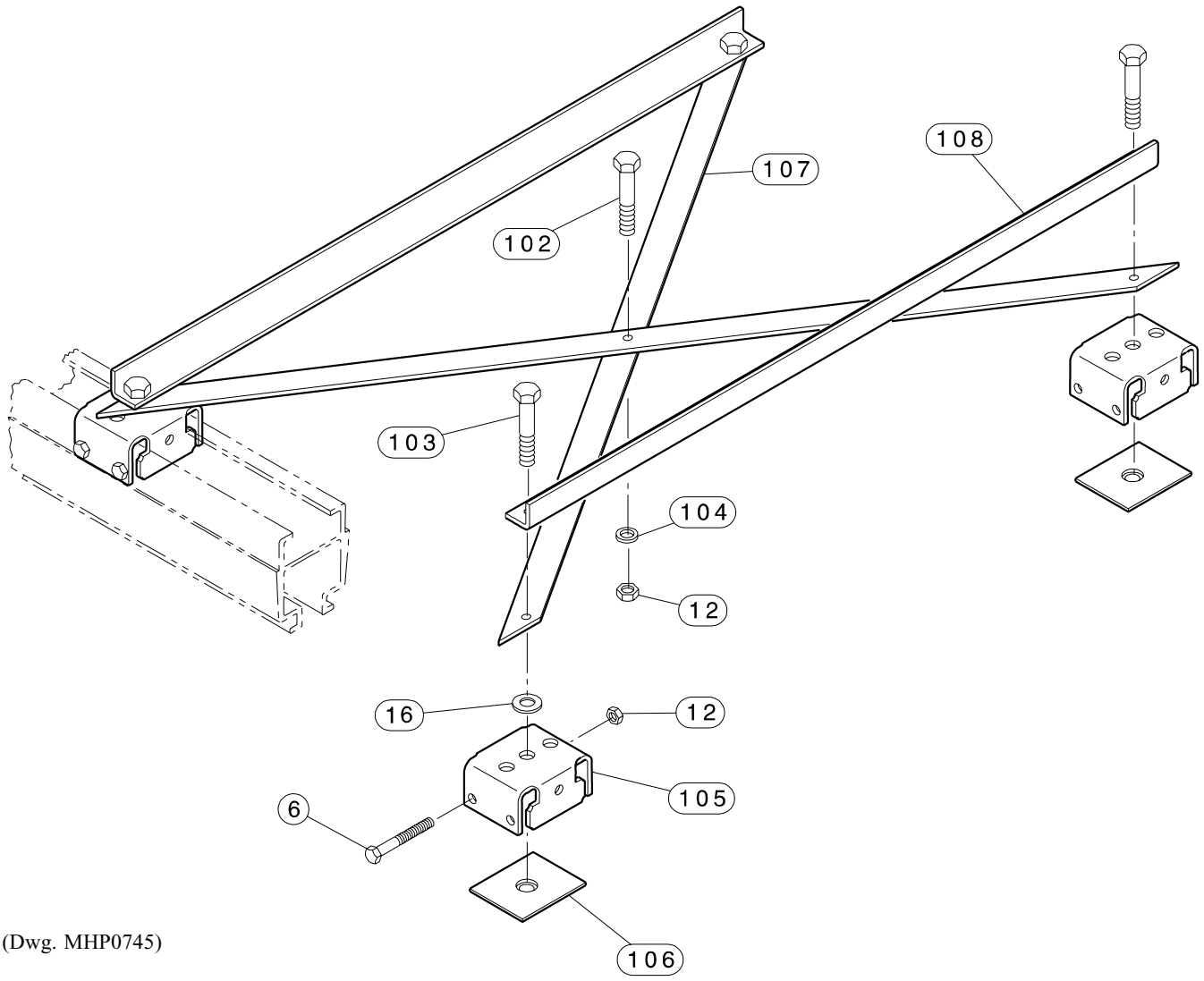


(Dwg. MHP0747)

R800 RAILS AND DUAL BRIDGE PARTS LIST

Item No.	Description of Part	Qty. Total	Part Number
5	Capscrew	2	50853
6	Capscrew	2	53539
12	Locknut	2	50170
85	Locknut	1	50812
88	Truck Pivot	1	KP4168
89	Mounting Plate	1	KP4174
90	Tap Plate	1	KP4175
91	Capscrew	1	54221
94	Capscrew	2	KP4180
96	End Truck with Kick-Up	1	R813
113	Rail Stop Assembly (Incl's items 114, 115, 116 and 117)	1	R811
114	Mid Rail Lock Bar	1	KP4843
115	Mid Rail Clamp	1	KP4842
116	Lockwasher	1	50181
117	Capscrew	1	52225
118	Capscrew	1	KP4182
119	"T" Bar Connector	1	KP4164
120	Dual Truck Assembly (Incl's items 5, 6, 12, 85, 88, 89, 90, 91, 94, 96, 118 and 119)	As Required	R818

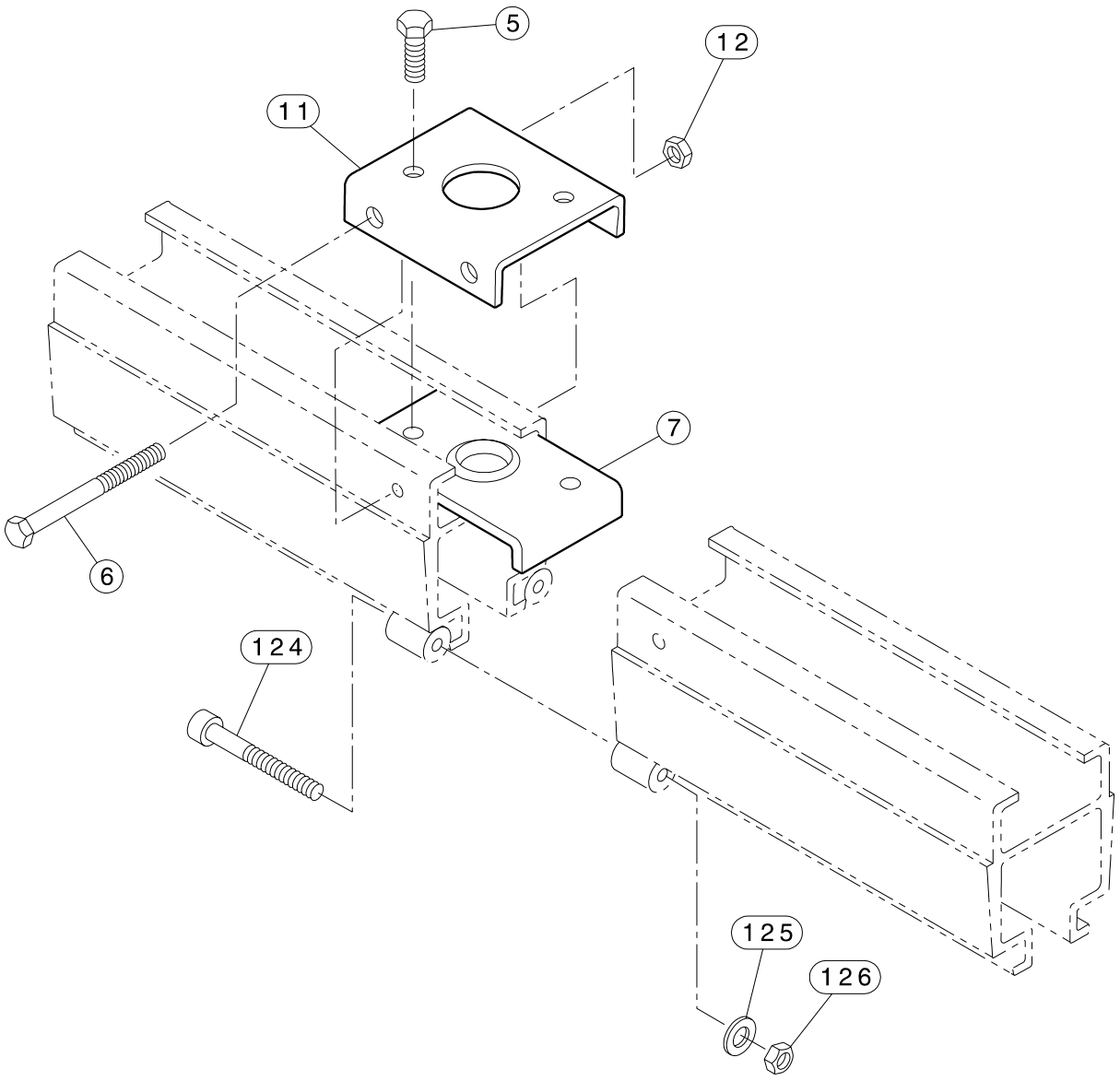
R800 DUAL BRIDGE CROSS BRACE DRAWING AND PARTS LIST



(Dwg. MHP0745)

Item No.	Description of Part	Qty. Total	Part Number
100	Cross Bracing Assembly (specify Bridge width and length) (Incl's items 12, 17, 102, 103, 104, 107 and 108)	1	R812
99	Hanger Assembly (Incl's items 105 and 106)	4	KP4055
6	Capscrew	8	53539
12	Locknut	9	50170
16	Flatwasher	4	71064844
102	Capscrew	1	51780
103	Capscrew	4	50973
104	Flat washer	1	50177
105	Rail Hanger	4	KP4085
106	Cage Nut Plate	4	KP4089
107	Cross Brace	2	KP4166
108	Brace	2	KP4165

SPLICE KIT DRAWING AND PARTS LIST



(Dwg. MHP0929)

Item No.	Description of Part	Qty. Total	Part Number	
			R000 Rail	R800 Rail
127	Splice Kit (Incl's items 21, 124, 125 and 126)	1	R067	R803
21	Rail Hanger Assembly - No Drill (Incl's items 5, 6, 7, 11 and 12)	1	R005	
5	Capscrew	2	50853	
6	Capscrew	2	53539	
7	Tap Plate	1	KP4084	
11	Mounting Plate	1	KP4174	
12	Locknut	2	50170	
124	Socket Capscrew	2		53539
125	Flat washer	2	51676	50177
126	Locknut	2	53541	50170

PARTS ORDERING INFORMATION

Rail Systems are designed and constructed to provide long, trouble-free service. In time it may become necessary to order and install new parts to replace those that have been subjected to wear.

The use of other than **Ingersoll-Rand** Material Handling replacement parts may result in decreased performance, and may, at the company's option invalidate the warranty. For prompt service and genuine **Ingersoll-Rand** Material Handling parts, provide your nearest Distributor with the following:

1. Complete information regarding the rail system.
2. Part number and part description as shown in this manual.

Return Goods Policy

If it becomes necessary to return the complete Rail System or certain sections to the factory, contact the Distributor from whom you purchased the Rail System, or the nearest **Ingersoll-Rand** Distributor in your locality.

Ingersoll-Rand will not accept any returned goods for warranty or service work unless prior arrangements have been made and written authorization has been provided from the location where the goods were purchased.

NOTICE

• Continuing improvement and advancement of design may cause changes to this rail system which are not included in this manual. Manuals are periodically revised to incorporate changes. Always check the manual edition number on the front cover for the latest issue.

Disposal

When the life of the rail system has expired, it is recommended that the rail system be disassembled, degreased and parts separated as to materials so that they may be recycled.

For additional information contact:

Ingersoll-Rand Material Handling
2724 Sixth Avenue South
Seattle, Wa. 98124 USA
Phone: (206) 624-0466
Fax: (206) 624-6265

or

Ingersoll-Rand Material Handling
Douai Operations
111, avenue Roger Salengro
59450 Sin Le Noble, France
Phone: (33) 27-93-08-08
Fax: (33) 27-93-08-00

WARRANTY

LIMITED WARRANTY

Ingersoll-Rand Company (**I-R**) warrants to the original user its Hoists and Winches (Products) to be free of defects in material and workmanship for a period of one year from the date of purchase. **I-R** will repair, without cost, any Product found to be defective, including parts and labor charges, or at its option, will replace such Products or refund the purchase price less a reasonable allowance for depreciation, in exchange for the Product. Repairs or replacements are warranted for the remainder of the original warranty period.

If any Product proves defective within its original one year warranty period, it should be returned to any Authorized Hoist and Winch Service Distributor, transportation prepaid with proof of purchase or warranty card.

This warranty does not apply to Products which **I-R** has determined to have been misused or abused, improperly maintained by the user, or where the malfunction or defect can be attributed to the use of non-genuine **I-R** parts.

I-R makes no other warranty, and all implied warranties including any warranty of merchantability or fitness for a particular purpose are limited to the duration of the expressed warranty period as set forth above. I-R's maximum liability is limited to the purchase price of the Product and in no event shall I-R be liable for any consequential, indirect, incidental, or special damages of any nature rising from the sale or use of the Product, whether based on contract, tort, or otherwise.

Note: Some states do not allow limitations on incidental or consequential damages or how long an implied warranty lasts so that the above limitations may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which may vary from state to state.

IMPORTANT NOTICE

It is our policy to promote safe delivery of all orders.

This shipment has been thoroughly checked, packed and inspected before leaving our plant and receipt for it in good condition has been received from the carrier. Any loss or damage which occurs to this shipment while enroute is not due to any action or conduct of the manufacturer.

VISIBLE LOSS OR DAMAGE

If any of the goods called for on the bill of lading or express receipt are damaged or the quantity is short, do not accept them until the freight or express agent makes an appropriate notation on your freight bill or express receipt.

CONCEALED LOSS OR DAMAGE

When a shipment has been delivered to you in apparent good condition, but upon opening the crate or container, loss or damage has taken place while in transit, notify the carrier's agent immediately.

DAMAGE CLAIMS

You must file claims for damage with the carrier. It is the transportation company's responsibility to reimburse you for repair or replacement of goods damaged in shipment. Claims for loss or damage in shipment must not be deducted from the **Ingersoll-Rand** invoice, nor should payment of **Ingersoll-Rand** invoice be withheld awaiting adjustment of such claims as the carrier guarantees safe delivery.

You may return products damaged in shipment to us for repair, which services will be for your account and form your basis for claim against the carrier.

United States Office Locations

For Order Entry and Order Status

Ingersoll-Rand
Distribution Center
P.O. Box 618
510 Hester Drive
White House, TN 37188
Phone: (615) 672-0321
Fax: (615) 672-0801

For Technical Support

Ingersoll-Rand
Material Handling
P.O. Box 24046
2724 Sixth Avenue South
Seattle, WA 98124-0046
Phone: (206) 624-0466
Fax: (206) 624-6265

Regional Sales Offices

Chicago, IL
888 Industrial Drive
Elmhurst, IL 60126
Phone: (630) 530-3800
Fax: (630) 530-3891

Detroit, MI
23192 Commerce Drive
Farmington Hills, MI 48335
Phone: (810) 476-6677
Fax: (810) 476-6670

Houston, TX
Suite 150
2500 East T.C. Jester
Houston, TX 77008
Phone: (713) 864-3700
Fax: (713) 864-2244

Los Angeles, CA
11909 E. Telegraph Road
Santa Fe Springs, CA 90670
Phone: (310) 948-4189
Fax: (310) 948-1828

Philadelphia, PA
P.O. Box 425
900 E. 8th Ave., Suite 103
King of Prussia, PA 19406
Phone: (610) 337-5930
Fax: (610) 337-5912

International Office Locations

Offices and distributors in principal cities throughout the world. Contact the nearest **Ingersoll-Rand** office for the name and address of the distributor in your country or write/fax to:

Ingersoll-Rand
Material Handling
P.O. Box 24046
2724 Sixth Avenue South
Seattle, WA 98124-0046
USA
Phone: (206) 624-0466
Fax: (206) 624-6265

Canada
National Sales Office
Regional Warehouse
Toronto, Ontario
51 Worcester Road
Rexdale, Ontario
M9W 4K2
Phone: (416) 675-5611
Fax: (416) 213-4510
Order Desk
Fax: (416) 213-4506

Regional Sales Offices

Calgary, Alberta
44 Harley Road S.E.
Calgary, Alberta
T2V 3K3
Phone: (403) 252-4180
Fax: (403) 252-4462

Edmonton, Alberta
1430 Weber Center
5555 Calgary Trail N.W.
Edmonton, Alberta
T6H 5G8
Phone: (403) 438-5039
Fax: (403) 437-3145

Montreal, Quebec
3501 St. Charles Blvd.
Kirkland, Quebec
H9H 4S3
Phone: (514) 695-9040
Fax: (514) 695-0963

British Columbia
201-6351 Westminster Hwy
Richmond, B. C.
V7C 5C7
Phone: (604) 278-0459
Fax: (604) 278-1254

Latin America Operations
Ingersoll-Rand
Production Equipment Group
730 N.W. 107 Avenue, Suite 300
Miami, FL 33172-3107 USA
Phone: (305) 559-0500
Fax: (305) 559-7505

Europe, Middle East and Africa
Ingersoll-Rand
Material Handling
Douai Operations
111, avenue Roger Salengro
59450 Sin Le Noble, France
Phone: (33) 27-93-08-08
Fax: (33) 27-93-08-00

Asia Pacific Operations
Ingersoll-Rand (Japan) Ltd.
Shin-Yokohama Square Bldg.
(5th Floor)
2-3-12 Shin-Yokohama,
Kouhoku-Ku,
Yokohama-shi, Kanagawa
Pref. 222 Japan
Phone: 81-45-476-7800
Fax: 81-45-476-7806

Russia
Ingersoll-Rand Company
World Trade Center
Office 1101
Krasnopresnenskaya Nab. 12
Moscow, Russia 123610

Printed in USA