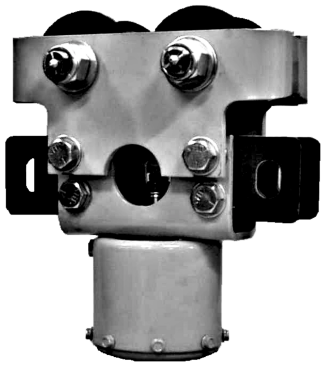
PARTS, OPERATION AND MAINTENANCE MANUAL
for

TROLLEYS

BTP-MR3/6
3 metric ton *Man Rider*®
6 metric ton Utility

BRAKE TROLLEY/M2-3
1.5 metric ton *Man Rider*®
3 metric ton Utility

BRAKE TROLLEY/M2-6
3 metric ton *Man Rider*®
6 metric ton Utility



(Dwg. MHP2145)

Unless otherwise noted, tons in this manual are metric tons (2,200 lb)

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

This manual applies only to products covered and designed by Ingersoll-Rand that are identified for personnel handling.

Always operate, inspect and maintain this trolley in accordance with American National Standards Institute safety code (ASME B30.16) and any other applicable safety codes and regulations.

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

Form MHD56223
Edition 1
March 2000
71369300

INGERSOLL-RAND
MATERIAL HANDLING

SAFETY INFORMATION

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

Danger, Warning, Caution and Notice

Throughout this manual there are steps and procedures which, if not followed, may result in an hazard. 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

• Be sure to check all regulations, local, state, federal and country, that may apply to the use of a trolley or trolley system for handling people before using a Man Riding trolley.
• The supporting structures and load-attaching devices used in conjunction with this trolley must provide an adequate safety factor to handle the rated load, plus the weight of the trolley and attached equipment. This is the customer's responsibility. If in doubt, consult a registered structural engineer.

Ingersoll-Rand Material Handling trolleys are manufactured in accordance with the latest ASME B30.16 standards.

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 or pulling 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 intended path of any load.

The Occupational Safety and Health Act of 1970 generally places the burden of compliance with the user, 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 information required to install, operate, maintain and repair the products described herein.

It is extremely important that mechanics and operators be familiar with 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 cannot know of, or 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.

GENERAL INFORMATION

Ingersoll-Rand offers in its trolley product line a limited number of models referred to as ***Man Rider*** which are designed and manufactured for the purpose of supporting people.

In furnishing customers *Man Riding* trolleys, **Ingersoll-Rand** does not warrant the suitability of these trolleys for any particular use. It is the owner's and user's responsibility to determine the suitability of a ***Man Rider*** trolley for a particular application. Further, it is the owner and user's responsibility to check and satisfy all local, state, federal and country requirements pertaining to the handling of persons.

⚠WARNING

• Additional safety devices not supplied by Ingersoll-Rand may be required in personnel handling systems to comply with applicable codes and regulations.
• Be sure to check all regulations, local, state, federal and country, that may apply to the use of a trolley or trolley system for handling people before using these products.

Operating Limitations

Man Rider trolleys manufactured by **Ingersoll-Rand** are furnished with limitations; approval for use in *Man Riding* applications automatically terminates for any of the following reasons:

1. Trolley does not meet other applicable codes or standards.
2. Trolley is not part of an approved system.
3. Trolley is not properly maintained in a new condition with all parts intact and properly adjusted.
4. Trolley is used in applications not approved by codes and regulations, or applications inconsistent with manufacturer's operation and maintenance manual.
5. Changes in any of the standards or regulations after **Ingersoll-Rand's** initial shipment of the product.

SAFE TROLLEY OPERATING INSTRUCTIONS

Man Rider Operating Instructions

⚠WARNING

• Failure to follow these instructions may result in termination of all applicable warranties. Ingersoll-Rand assumes no liability for any loss or damage resulting from operation of *Man Rider* trolleys if these operating instructions are not followed.

1. System supervisor or operator must maintain visual or audio contact with personnel being supported at all times.
2. Personnel operating the trolley system or being transferred are to have sufficient instruction/training concerning that operation before any movement takes place.
3. The trolley installation must be arranged to conform to the statutory regulations covering personnel handling.
4. Prior to any personnel movement, the trolley shall be inspected to ensure safe operation.
5. The supporting apparatus (basket, etc.) shall be inspected and certified for personnel *Man Riding* application prior to use.
6. The trolley shall not be overloaded.
7. The trolley shall not be operated without testing. (Refer to "Inspection and Testing" procedures.)
8. The trolley shall not be operated in a damaged condition.
9. The trolley shall not be operated in an improperly equipped or maintained condition.
10. Do not attach the trolley to an unsafe supporting structure. The supporting structure should have a higher load carrying capacity than the capacity of the trolley.
11. Do not operate trolley if any personnel are capable of coming into contact with moving parts.
12. All signs and warning notices must be permanently posted on the trolley.
13. Never leave an unattended load suspended.

General Operating Instructions

Ingersoll-Rand recognizes that most companies 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.

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 people trained in safety and operation of this product to operate and maintain this trolley.
2. Only operate a trolley if you are physically fit to do so.
3. When a "**DO NOT OPERATE**" sign is placed on the trolley, or controls, do not operate the trolley until the sign has been removed by designated personnel.
4. Before each shift, the operator should inspect the trolley for wear and damage. Never use a trolley that inspection indicates is worn or damaged.
5. Never support a load greater than the rated capacity of the trolley. Refer to nameplate attached to trolley and "SPECIFICATIONS" section.
6. Keep hands, clothing, etc., clear of moving parts.
7. Always ensure that you, and all other people, are clear of the path of the trolley.
8. Do not leave a suspended load unattended.
9. After use, or when in a non-operational mode, the trolley should be secured against unauthorized and unwarranted use.

SPECIFICATIONS

Description

Plain Trolley BTP-MR3/6 and **Brake Trolley/M2-3 and M2-6** are designed for use in approved personnel handling systems. **Brake Trolley/M2-3 and M2-6** are supplied with a spring applied and air released, automatic brake. In normal position, the brake is always on, providing a positive stop.

When air is supplied the brake is released allowing trolley movement.

General Specifications:		**BTP-MR3/6**		**BRAKE TROLLEY/M2-3**		**BRAKE TROLLEY/M2-6**	
Maximum Load Capacity (Utility Rating)		13200 lbs	6000 kg	6600 lbs	3000 kg	13200 lbs	6000 kg
Maximum Load Capacity (***Man Rider*** Rating)		6600 lbs	3000 kg	3300 lbs	1500 kg	6600 lbs	3000 kg
Beam Size	Minimum Width	4.0 inches	101.6 mm	3.8 inches	96.5 mm	4.0 inches	101.6 mm
	Maximum Width	5.0 inches	127 mm	4.2 inches	106.7 mm	5.0 inches	127 mm
	Minimum Height	7.8 inches	198.1 mm	5.7 inches	144.8 mm	7.8 inches	198.1 mm
Minimum Beam Curve Radius		60 inches	1524 mm	48 inches	1219 mm	60 inches	1524 mm
Horizontal Holding Capacity		Not available on plain trolleys		600 lbs	272 kg	600 lbs	272 kg

Brake Trolley Air Specifications:

Minimum Operating Pressure	Not available on plain trolleys	85 psig (5.8 bar/586 kPa)
Maximum Operating Pressure		125 psig (8.6 bar/862 kPa)
Recommended Air Pressure		90 psig (6.3 bar/630 kPa)
Air Inlet Hose Size		1/4 inch
Brake Actuator Inlet Port		1/4 inch NPT

INSTALLATION

Prior to installing trolley, carefully inspect it for possible shipping damage.

Make certain your trolley is properly installed. A little extra time and effort can prevent accidents and help you get the best service possible.

⚠WARNING

• Before installing read "SAFETY INFORMATION".
• To avoid an unbalanced load which may damage trolley, spacers must be installed equally between sideplates.

NOTICE

• Trolley wheels ride on top of lower flange of beam.

Trolley Installation

NOTICE

• Trolleys are preassembled at factory. To install onto rail may require partial disassembly of trolley to rearrange spacers to establish necessary wheel to flange clearance.

When installing a trolley on a beam, measure beam flange and temporarily assemble trolley to determine distribution and arrangement of the spacers. Distance between each wheel flange and beam flange should be 3/32 to 5/32 in. (2 to 4 mm). Refer to Dwg. MHP2150 on page 6.

BTP-MR3/6 (Plain) Trolley

Refer to Dwg. MHP2148 on page 15 for parts identification. On plain trolley units washers between trolley side plates (15) adjust trolley width and establish trolley wheel clearance adjustments. Refer to Dwg. MHP2150 on page 6.

1. Measure beam flange width and establish required quantity of washers (17).
2. Remove nuts (18), outside washers (17) and sideplate (15).
3. Add or remove washers (17) to establish trolley wheel clearances and ensure trolley sideplates (15) are vertical and parallel to each other when assembled.

Over Beam Installation:

1. Install sideplate (15), remaining washers (17) and nuts (18) onto capscrews (16).

NOTICE

• A minimum of one washer (17) is required between sideplate (15) and nut (18).

2. Slide assembly onto end of rail.

3. Verify trolley wheel to beam total clearance. Adjust spacer locations until clearance specification is attained. Refer to Dwg. MHP2150 on page 6. Dry torque capscrews (16) and nuts (18) to 474 – 537 ft lbs (643 – 728 Nm).
4. Install beam end stops.

Under Beam Installation:
1. Position assembly on rail. Install sideplate (15), remaining washers (17) and nuts (18) onto capscrews (16).

NOTICE

• A minimum of one washer (17) is required between sideplate (15) and nut (18).

2. Verify trolley wheel to beam total clearance. Adjust spacer locations until clearance specification is attained. Refer to Dwg. MHP2150 on page 6. Dry torque capscrews (16) and nuts (18) to 474 – 537 ft lbs (643 – 728 Nm).
3. Ensure that beam end stops are installed.

Upon completion of installation conduct initial operating checks as described in "OPERATION" section on page 7. Check that side plates are vertical and parallel to each other.

Brake Trolley

Refer to Dwgs. MHP2146 on page 16 or MHP2149 on page 18 for parts identification.
On brake trolley units the number of washers between the trolley side plates (15) and brake adapter (22) must be the same on both sides in order to center the unit beneath the beam and establish clearance requirements as shown in Dwg. MHP2150 on page 6.
1. Measure beam flange width and establish required quantity of washers (17).
2. Remove nuts (18), outside washers (17) and sideplate (15).
3. Slide brake adapter (22) and attached components off capscrews (16) as an assembly. Add or remove washers (17) to establish trolley wheel to beam flange clearance.
4. Slide brake adapter (22) and attached components onto capscrews (16) as an assembly.

Brake Operation/Installation Requirements
Installation of brake trolley onto beam requires that the brake be pressurized. It is recommended that an air supply of 90 psig (6.3 bar/630 kPa) with a shut off valve located between air source and trolley brake be used to provide brake operation during installation. The attached air hose must be long enough to allow movement of brake trolley onto rail to complete assembly.

1. Connect brake air supply hose to 1/4 inch NPT fitting located on brake actuator.

⚠ CAUTION

• When air pressure is supplied to brake, the brake will operate and release brake, causing brake shoe (23) to move towards brake actuator (26). Ensure hands, tools and components are clear of movement path.
• During installation onto rail, the brake must be pressurized and in the release position. Ensure air pressure is not lost during installation onto beam.

2. Apply air pressure to actuate brake. Verify trolley assembly can be placed on rail without contact with brake shoe (23).
3. Continue installation for 'Over the Beam' or 'Under the Beam' as applicable.

Over Beam Installation:
1. Install washers (17) onto capscrew (16).

⚠ CAUTION

• The same number of washers must be used between both sideplates (15) and the brake adapter (22) assembly to prevent an unbalanced load which may damage the trolley.

2. Install sideplate (15), remaining washers (17) and nuts (18) onto capscrews (16).

NOTICE

• A minimum of one washer (17) is required between sideplate (15) and nut (18).

3. Slide assembly onto end of rail.
4. Verify trolley wheel to beam total clearance. Adjust spacer locations until clearance specification is attained. Refer to Dwg. MHP2150 on page 6. Dry torque capscrews (16) and nuts (18) to 474 – 537 ft lbs (643 – 728 Nm).
5. Install beam end stops.

Under Beam Installation:
1. Install washers (17) onto capscrew (16). Position assembly on rail.

⚠ CAUTION

• The same number of washers must be used between both sideplates (15) and brake adapter (22) assembly to prevent an unbalanced load which may damage the trolley.

2. Install sideplate (15), remaining washers (17) and nuts (18) onto capscrews (16).

NOTICE

• A minimum of one washer (17) is required between sideplate (15) and nut (18).

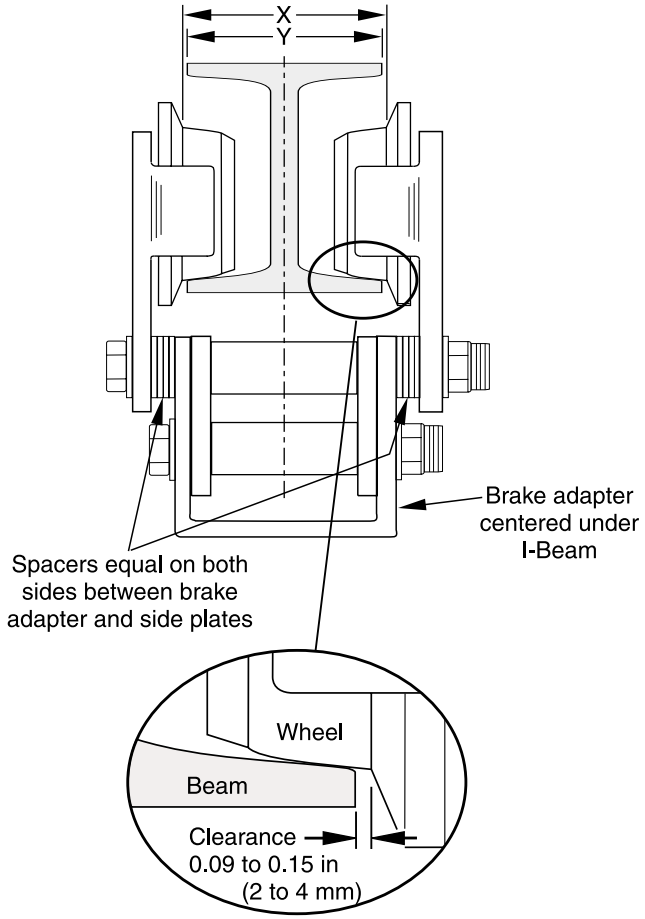
3. Verify trolley wheel to beam total clearance. Adjust spacer locations until clearance specification is attained. Refer to Dwg. MHP2150 on page 6. Dry torque capscrews (16) and nuts (18) to 474 – 537 ft lbs (643 – 728 Nm).
4. Ensure that beam end stops are installed.

⚠ CAUTION

• When air system is isolated from brake actuator and hose is removed, the brake shoe will engage the rail. Ensure personnel and tools are clear of the brake shoe to prevent injury and damage.

Upon completion of installation isolate air system pressure from brake. If necessary, remove hose at brake actuator and install system hose. Conduct initial operating checks as described in "OPERATION" section on page 7. Check that side plates are vertical and parallel to each other.

Trolley Wheel to Flange Clearance Requirments



(Dwg. MHP2150)

Brake Adjustment

Brake adjustment is not required. Correct assembly ensures brake shoe (23) does not contact any other trolley components (actuator housing, brake adapter, etc.) during operation.

In normal position, brake is engaged. Ensure brake shoe (23) engages rail and trolley does not move in either direction.

For brake load test, refer to ‘Testing’ on page 14 in “MAINTENANCE” section.

When brake actuator is supplied with air, brake releases. Ensure brake shoe (23) moves away from rail and trolley moves freely in both directions on rail.

Air System Requirements

Air Supply

Air supply must be clean and free from moisture. Refer to “SPECIFICATIONS” section for air consumption at rated operating pressure of 90 psig (6.3 bar/630 kPa).

Air Lines

The inside diameter of the trolley brake air supply hoses must not be smaller than 1/4 in. (6.4 mm). Before making final connections, all air supply lines should be purged with moisture-free air before connecting to trolley brake. Supply lines should be as short and straight as installation conditions will permit. Long transmission lines and excessive use of fittings, elbows, tees, globe valves (etc.) cause a reduction in pressure due to restrictions and surface friction in the lines.

Air Line Lubricator (optional feature)

The use of an air line lubricator is optional. The trolley brake may be run without in line lubrication, however, accelerated wear may be experienced. Use a lubricator having an inlet and outlet size at least as large as the inlet size to the brake. Install the lubricator as close to the air inlet on the brake as possible. The air line lubricator should be replenished daily and set to provide 3 to 4 drops per minute of ISO VG 32 (10W SAE) oil.

Air Line Filter

If trolley brake is to be used in corrosive or moist atmospheres it is recommended that an air line strainer/filter be installed as close as practical to the brake. The strainer/filter should provide 20 micron filtration and include a moisture trap. Clean strainer/filter periodically to maintain its operating efficiency.

Moisture in Air Lines

Moisture that reaches the trolley brake through the supply lines is the chief factor in determining the length of time between service overhauls. Moisture traps can help to eliminate moisture. Other methods, such as an air receiver which collects moisture before it reaches the trolley brake, or an aftercooler at the compressor that cools the air prior to distribution through the supply lines, are also helpful.

Storing The Trolley

1. Always store the trolley in a no load condition.
2. Wipe off all dirt and water.
3. Place in a dry location.
4. Before returning trolley to service follow instructions for Trolleys Not In Regular Service in the “INSPECTION” section on page 7.

OPERATION

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

General Operating Information

Trolleys covered in this manual are designed to be used in a ***Man Rider*** system. Operation of these trolleys results from their arrangement with and attachment to additonal components not covered in this manual. For specific operation requirements, safety rules, warnings and operating conditions refer to the system documentation.

Operate the trolley from a position that allows observation of load and the intended path of movement of load.

Do not walk in the path of a moving trolley, or walk backwards when moving a trolley. Always look in the direction you are moving.

Check that controls match operation.

Supporting Loads on Trolleys

Correct installation of attached components to the trolleys is required to ensure safe and efficient trolley operation. Each of the trolley models described in this manual have unique load attaching requirements.

BTP-MR3/6

Refer to Dwg. MHP2148 on page 15.
Loads are attached and supported by the two suspension shafts (capscrews) (16).

To install the attaching part may require the removal of spacers (9) to compensate for the width of the attachment on the shafts. Ensure the trolley wheel to flange clearance is maintained, and that an equal number of spacers are located on each side of the attachment. Refer to Dwg. MHP2150 on page 6.

BRAKETROLLEY/M2-3

Refer to Dwg. MHP2146 on page 16.
To ensure the trolley is balanced and supporting the load equally, attach the vertical load equally among the four suspension plates (21).

BRAKETROLLEY/M2-6

Refer to Dwg. MHP2149 on page 18.
To ensure the trolley is balanced and supporting the load equally, attach the vertical load equally among the four hanger plates (25).

Initial Operating Checks

1. After installation, ensure the trolley is centered below the rail, and that brake is centered below the trolley.
2. On brake trolleys, check for air leaks in supply hose and fittings.
3. Support a load equal to the lower of the rated capacities of either the trolley or the associated components.
4. Operate trolley along entire length of beam.
5. Check trolley performance when moving test load(s). Trolley must operate smoothly at rated specifications prior to being placed in service for general use.
6. On brake trolleys, verify brake prevents trolley movement when air is not supplied to brake. Ensure brake releases and trolley movement is smooth when air is supplied to brake.

INSPECTION

⚠WARNING

• All new or repaired equipment should be inspected and tested by personnel trained in safety, operation and maintenance of this equipment to ensure safe operation at rated specifications before placing equipment in service.

Frequent and periodic inspections should be performed on equipment in regular service. Frequent inspections are visual examinations performed by operators or personnel trained in safety and operation of this equipment and include observations made during routine equipment operation. Periodic inspections are thorough inspections conducted by personnel trained in the safety, operation and maintenance of this equipment. ASME B30.16 states inspection intervals depend upon the nature of the critical components of the equipment and the severity of usage.

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

Deficiencies revealed through inspection, or noted during operation, must be reported to designated personnel trained in safety, operation and maintenance of this equipment. A determination as to whether a condition constitutes a safety hazard must be decided, and the correction of noted safety hazards accomplished and documented by written report before placing the equipment in service.

Records and Reports

Inspection records, listing all points requiring periodic inspection should be maintained for all load bearing equipment. Written reports, based on severity of service, should be made on the condition of critical parts as a method of documenting periodic inspections. These reports should be dated, signed by the person who performed the inspection, and kept on file where they are readily available for review.

NOTICE

• During assembly/disassembly visually inspect each component for distortion, wear and damage. Replace items indicating damage, distortion and/or excessive wear. Proper use, inspections and maintenance will increase the life and usefulness of your Ingersoll-Rand equipment.

Frequent Inspection

On trolleys 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 evidence of any damage or malfunction.

1. OPERATION. Operate the trolley so that it travels a few feet (1 metre). During the few feet (1 metre) of travel, check for visual signs or abnormal noises which could indicate wear or damage. Check for smooth operation. Do not operate the trolley until all problems have been corrected.
2. AIR SYSTEM. (Brake Trolleys only) Visually inspect all connections, fittings, hoses and components for indication of air leaks. Verify hoses are in good condition. Repair any leaks found.
3. BRAKE. Ensure brake prevents movement of trolley. During system operation ensure brake release is quick and trolley operation is smooth.

Periodic Inspection

According to ASME B30.16 (Overhead Hoists), frequency of periodic inspection depends on the severity of usage:

NORMAL	**HEAVY**	**SEVERE**
yearly	semiannually	quarterly

Disassembly may be required for HEAVY or SEVERE usage. 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. FASTENERS. Check retainer rings, cotter pins, capscrews and nuts. Replace if missing or damaged and tighten if loose.
2. ALL COMPONENTS. Inspect for wear, damage, distortion, deformation and cleanliness. If external evidence indicates the need, disassemble. Check shafts and bearings. Replace worn or damaged parts. Clean, lubricate and reassemble.
3. SUPPORTING STRUCTURE. Check for distortion, wear and continued ability to support load.
4. WHEELS. Check that the trolley wheels track the beam properly and clearance between each trolley wheel flange and beam equals 3/32 to 5/32 in. (2 to 4 mm). Adjust as necessary. Visually check for flat spots or out of round, replace if either condition is found.
5. SIDEPLATES. Check side plates for spreading due to bending. Replace if spreading has occurred.
6. BRAKE. Check that brake engages and disengages smoothly, and responds quickly to system operation.
7. LABELS. Check for presence and legibility. Replace if necessary.

Trolleys Not In Regular Use

1. A trolley that has been idle for a period of one month or more, but less than six months, shall be given an inspection conforming with the requirements of “Frequent Inspection” before being placed into service.
2. A trolley that has been idle for a period of over six months shall be given a complete inspection conforming with the requirements of “Periodic Inspection” before being placed into service.
3. Standby trolleys shall be inspected at least semiannually in accordance with the requirements of “Frequent Inspection”. If abnormal operating conditions apply, trolleys may require more frequent inspections.

INSPECTION AND MAINTENANCE REPORT

Ingersoll-Rand Plain and Brake Trolleys

Model Number:		**Date:**
Serial Number:		**Inspected by:**
Reason for Inspection: (Check Applicable Box)		
	1. Scheduled Periodic Inspection _____ Quarterly _____ Semiannually _____ Yearly	**Operating Environment:**
	2. Discrepancy(s) noted during Frequent Inspection	Normal _____ Heavy _____ Severe _____
	3. Discrepancy(s) noted during maintenance	
	4. Other: _____	

COMPONENT	**CONDITION**		**CORRECTIVE ACTION**		**NOTES**
	Pass	**Fail**	**Repair**	**Replace**	
Fasteners					
Shafts			- - -		
Bearings			- - -		
Brake Actuator			- - -		
Brake Shoe			- - -		
Covers					
Air System					
Supporting Structure					
Wheels					
Side Plates			- - -		
Suspension Shaft Assembly					
Labels and Tags			- - -		
Other Components					

TESTING	**Pass**	**Fail**	
No Load			
Maximum Load**			
Brake Actuator			

** Maximum Load is the lowest of rated components in ***Man Rider*** trolley system.

This page may be photocopied and use by inspectors or maintenance personnel.

LUBRICATION

Proper use, inspections and maintenance increase the life and usefulness of your **Ingersoll-Rand** equipment. During assembly lubricate shafts and bearings with applicable lubricants.

⚠ CAUTION

• Lubricants such as oil or grease must be removed from trolley wheel and rail mating surfaces, and from brake shoe and rail mating surfaces to ensure trolley operates safely and efficiently. Periodically inspect rail, trolley wheels and brake shoe surfaces for cleanliness.

Trolley Wheel Bearings

Trolley wheel bearings are lubricated by applying grease through the grease fitting located in the end of the axle.

Periodically inspect wheel assemblies for cleanliness. Remove old grease and, using a grease gun, apply two strokes of grease to bearings.

If trolley wheels are disassembled for inspection or repair, repack the trolley wheel bearings. Also, apply a light coat of grease to axle non-threaded shaft section. Refer to 'Recommended Grease' table.

Recommended Grease

Temperature	Type Grease
-20° to 50° F (-30° to 10° C)	EP 1 multipurpose lithium based grease
30° to 120° F (-1° to 49° C)	EP 2 multipurpose lithium based grease

TROUBLESHOOTING

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

SYMPTOM	CAUSE	REMEDY
Trolley will not operate.	Trolley is overloaded.	Reduce load to within rated capacity.
	Trolley wheel bearings are damaged.	Replace trolley wheel bearings.
	Brake actuator not releasing.	Replace brake actuator.
	Brake shoe worn or damaged.	Replace brake shoe.
	Low brake supply air pressure.	Check air supply line pressure. 90 psig (6.3 bar/630 kPa) required for efficient operation.
	Loose hose connections.	Check all hose fitting connections. Repair all leaking connections and damaged hose sections.
	Track or beam is contaminated.	Check beam for foreign matter or contamination. Clean beam and remove foreign matter.
Trolley will not stop or trolley wheels slip.	Oil or grease on trolley wheels or beam.	Clean beam track and trolley wheels.
	Brake actuator damaged.	Replace brake actuator.
	Brake shoe worn or damaged.	Replace brake shoe.

⚠WARNING

• Never perform maintenance on the trolley while it is supporting a load. A falling load can cause injury or death and damage to property.
• Before starting maintenance, tag trolley:
WARNING - DO NOT OPERATE - EQUIPMENT BEING REPAIRED.
• Only allow personnel trained in service and repair on this equipment to perform maintenance.
• After performing any maintenance on the trolley, test trolley to 125% of its rated capacity before returning to service. Testing to more than 125% of rated capacity may be required to comply with standards outside the USA.

Proper use, inspections and maintenance increase the life and usefulness of your **Ingersoll-Rand** equipment. During assembly lubricate shafts and bearings with applicable lubricants.

Maintenance Intervals

The Maintenance Interval chart is based on intermittent operation of the trolley eight hours each day, five days per week. If trolley is in operation more than eight hours per day, or in severe applications or environments, more frequent maintenance should be performed.

INTERVAL	MAINTENANCE CHECK
Start of each shift (Operator or Maintenance Personnel)	Make a thorough visual inspection of trolley for damage. Do not operate trolley if damaged.
	Operate trolley slowly in both directions. Trolley must operate smoothly without sticking, binding or abnormal noises.
Yearly (Maintenance Personnel)	Inspect trolley brake, wheels, shafts and bearings for wear and damage. Repair or replace as necessary.
	Check all supporting members for indications of damage or wear. Repair or replace as required.

Disassembly

The following instructions provide the necessary information to disassemble, inspect, repair, and assemble the trolley. Parts drawings are provided in the “Parts” section.

General Instructions

In the process of disassembling the trolley, observe the following:

1. Never disassemble the trolley any further than necessary to accomplish the needed repair. A good part can be damaged during the course of disassembly.
2. Never use excessive force when removing parts. Tapping gently around the perimeter of a cover or housing with a soft hammer, for example, is sufficient to break the seal.
3. 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 trolley is designed to permit easy disassembly and assembly. The use of heat or excessive force should not be necessary.

4. When removing bearings from shafts, it is best to use a bearing puller. When removing bearings from housing, drive out the bearing with a sleeve slightly smaller that the outside diameter of the bearings. The end of the sleeve must be square. Protect bearings from dirt by keeping them wrapped in a clean cloth.

NOTICE

• Prior to disassembly, record the number of spacers between side plates on plain trolleys, and between sideplates and brake adapter on brake trolleys.
• During maintenance assembly/disassembly visually inspect components for distortion, wear and damage. Replace any item indicating damage, distortion and/or excessive wear.

⚠CAUTION

• Observe proper safety precautions when conducting maintenance on or around trolleys. It is recommended that trolley be removed from beam and moved to a clean work area.
• Depending on the model of the trolley the weight of the trolley could require additional support. Adequately support the trolley when lifting or removing from beam.

5. On brake trolleys, after any air system repair, purge the air system with moisture-free air before connecting to brake inlet. Ensure air lines are disconnected from trolley brake during purge.

Trolley Removal from Beam

Refer to Dwg. MHP2148 on page 15, MHP2146 on page 16 or MHP2149 on page 18.

⚠CAUTION

• Trolley may be part of a system. Prior to removing trolley from beam flange, separate trolley from system using instructions provided in the system documentation.
• On brake trolleys, air pressure must be supplied to actuate and release brake during trolley removal from beam.

NOTICE

• Note the placement and quantity of washers (17) between sideplates (15) on plain trolleys, and between sideplates (15) and brake adapter (22) on brake trolleys. During assembly, the spacer arrangement ensures trolley wheel flange to rail clearance and trolley centering on beam are maintained.

1. With air applied to brake (brake trolley only), remove nuts (18), washers (17), sideplate (15) from capscrews (16).
2. Note quantity and remove washers (17).
3. Remove trolley from beam.

4. On brake trolley, remove brake adapter (22) and attached components as an assembly.

⚠ CAUTION

• When air pressure is isolated, or hose is disconnected from brake actuator (26), the brake will actuate causing brake shoe (23) to move. Ensure personnel, components and tools are clear of brake shoe path to prevent injury and damage.

5. Isolate air system and remove air hose from brake actuator (26).
6. Trolley may now be moved to a clean work area for futher disassembly.

BTP-MR3/6 (Plain) Trolley Disassembly

Refer to Dwg. MHP2148 on page 15.
1. To complete disassmbly, remove washers (17) and slide capscrews (16) out of sideplate (15).
2. Remove single washers from capscrews.
3. To disassemble the wheel assemblies (2) from sideplates (15), refer to “Wheel Disassembly” section on page 12.

RRAKETROLLEY/M2-3 Disassembly

Refer to Dwg. MHP2146 on page 16.
1. Remove washers (17) from capscrews (16) and remove capscrews and one washer (17) each from sideplate (15).
2. Remove nuts (18) and washers (17) from capscrews (19). Remove capscrews and separate suspension plates (21) and four spacers (20) from brake adapter (22).
3. Separate brake assembly (27) from brake shoe (23), remove cotter pin (35) and tap pin (34) out of yoke (33).
4. Remove yoke from brake actuator (28), match mark parts and unscrew (counterclockwise rotation) yoke (33) from brake actuator shaft threads.
5. Remove brake actuator (28) from brake adapter (22), remove nuts (26) and lockwashers (24) and separate parts.
6. Disassemble the wheel assemblies (2) from sideplates (15), refer to “Wheel Disassembly” section on page 12.

BRAKETROLLEY/M2-6 Disassembly

Refer to Dwg. MHP2149 on page 18.
1. Remove washers (17) from capscrews (16) and remove capscrews and one washer (17) each from sideplate (15).
2. Remove nuts (14) and washers (13) from capscrews (19). Remove capscrews and separate hanger plates (25), suspension plates (21), spacer plates (31) and spacers (20) and (36) from brake adapter (22).
3. Separate brake assembly (27) from brake shoe (23), remove cotter pin (35) and tap pin (34) out of yoke (33).
4. Remove yoke from brake actuator (28), match mark parts and loosen locknut (30). Unscrew (counterclockwise rotation) yoke (33) from brake actuator shaft threads.
5. Remove brake actuator (28) from brake adapter (22), remove nuts (26) and lockwashers (24) and separate parts.
6. Disassemble the wheel assemblies (2) from sideplates (15), refer to “Wheel Disassembly” section on page 12.

Wheel Disassembly

Wheel disassembly should only be accomplished if required to repair or replace parts.

Refer to Dwg. MHP2148 on page 15.
1. Pry cover (3) from trolley wheel (5).
2. Secure axle (4) and remove locknut (11) and nut (10).
3. Remove washers (9).
4. Remove remaining assembly from sideplate (15).
5. Remove spacer (8) from axle (4) and remove retainer ring (7) from trolley wheel (5).
6. Remove axle and bearing (6) from trolley wheel.
7. Separate axle from bearing.

Cleaning, Inspection and Repair

Use the following procedures to clean, inspect, and repair the components of the trolley.

Cleaning

⚠ CAUTION

• Bearings that are loose, worn or rotate in the housing must be replaced. Failure to observe this precaution will result in additional component damage.

Clean all trolley components parts in solvent. The use of a stiff bristle brush will facilitate the removal of accumulated dirt and sediments on the gears and frames. Dry each part using low pressure, filtered compressed air.

Inspection

All disassembled parts should be inspected to determine their fitness for continued use. Pay particular attention to the following:
1. Inspect all gears for worn, cracked, or broken teeth.
2. Inspect shafts for ridges caused by wear. If ridges caused by wear are apparent on shafts, replace the shaft.
3. Inspect all threaded items and replace those having damaged threads.
4. Check bearings for freeness of rotation and wear. Replace bearings if rotation is rough or bearings are worn.
5. Check side plates for cracks or bending, replace if one of these conditions is found.

Repair

Actual repairs are limited to the removal of small burrs and other minor surface imperfections from gears and shafts. Use a fine stone or emery cloth for this work.
1. Worn or damaged parts must be replaced. Refer to the applicable parts listing for specific replacement parts information.
2. Inspect all remaining parts for evidence of wear or damage. Replace or repair any part which is in questionable condition. The cost of the part is often minor in comparison with the cost of redoing the job.
3. Smooth out minor nicks, burrs, or galled spots on shafts, bores, pins, or bushings.
4. Polish the edges of all shafts shoulders to remove small nicks which may have been caused during handling.
5. Remove all nicks and burrs caused by lockwashers.

Assembly

BTP-MR3/6 (Plain) Trolley Assembly

Refer to Dwg. MHP2148 on page 15.
To install wheel assemblies onto sideplates, refer to "Wheel Assembly" section on page 13.

1. Place washers (17) on capscrews (16) and install capscrews in sideplate (15).
2. Place required washers (17) on capscrews (16).
3. To complete assembly and install onto the beam, refer to the instructions in "BTP-MR3/6 (Plain) Trolley Installation" on page 4.

BRAKE TROLLEY/M2-3 Assembly

Refer to Dwg. MHP2146 on page 16.
To install wheel assemblies onto sideplates, refer to "Wheel Assembly" section on page 13.

1. Place washers (17) on capscrews (16) and install capscrews in sideplate (15).
2. Install same quantity of washers (17) as noted during removal onto capscrews (16).

NOTICE

• If washer (17) placement was not documented during disassembly, correct installation will require following the steps outlined in "Brake Trolley Installation" on page 5. Use the procedure to install trolley and ensure correct wheel to flange clearance and trolley alignment to beam.

3. Place brake actuator (28) onto brake adapter (22). Place lockwashers (24) and nuts (26) on brake actuator studs. Torque nuts to 170 – 193 ft lb (230 – 261 Nm).
4. Slide suspension plates (21) and four spacers (20) into brake adapter (22) and align with four capscrew shaft holes in adapter.
5. Place washers (17) on capscrews (19) and install capscrews into lower holes in brake adapter (22). Ensure capscrews go through the lower holes in suspension plates (21) and lower spacers (20).
6. Place washers (17) and nuts (18) on capscrews. Torque capscrews to 474 – 537 ft lbs (643 – 728 Nm).
7. If removed, install yoke (33) onto brake actuator (28) shaft and align matchmarks made during disassembly.
8. Place brake shoe (23) onto yoke and secure with pin (34). Install cotter pin (35) into pin (34) and bend ends over to secure.
9. Slide assembly onto capscrews (16). Ensure capscrews align with upper spacers (20).
10. Place required washers (17) on capscrews (16).
11. To complete assembly and install onto the beam, refer to the instructions in "Brake Trolley Installation" on page 5.

BRAKE TROLLEY/M2-6 Assembly

Refer to Dwg. MHP2149 on page 18.
To install wheel assemblies onto sideplates, refer to "Wheel Assembly" section on page 13.

1. Place washers (17) on capscrews (16) and install capscrews in sideplate (15).
2. Install same quantity of washers (17) as noted during removal onto capscrews (16).

NOTICE

• If washer (17) placement was not documented during disassembly, correct installation will require following the steps outlined in "Brake Trolley Installation" on page 5. Use the procedure to install trolley and ensure correct wheel to flange clearance and trolley alignment to beam.

3. Place brake actuator (28) onto brake adapter (22). Place lockwashers (24) and nuts (26) on brake actuator studs. Torque nuts to 170 – 193 ft lb (230 – 261 Nm).
4. Slide suspension plates (21), space plates (31) and spacers (20) and (36) into brake adapter (22) and align with four capscrew shaft holes in adapter.
5. Place washers (13) on capscrews (19) and install capscrews into lower holes in brake adapter (22). Ensure capscrews go through the lower holes in suspension plates (21), spacer plates (31) and lower spacers (20).
6. Place washers (13) and nuts (14) on capscrews (19). Torque capscrews to 474 – 537 ft lbs (643 – 728 Nm).
7. If removed, install yoke (33) onto brake actuator (28) shaft and align matchmarks made during disassembly. Tighten locknut (30) against bottom of yoke.
8. Place brake shoe (23) onto yoke and secure with pin (34). Install cotter pin (35) into pin (34) and bend ends over to secure.
9. Slide assembly onto capscrews (16). Ensure capscrews align with upper spacers (36).
10. Place required washers (17) on capscrews (16).
11. To complete assembly and install onto the beam, refer to the instructions in "Brake Trolley Installation" on page 5.

Wheel Assembly

Refer to Dwg. MHP2148 on page 15.

1. Lubricate and install bearing (6) into trolley wheel (5) and secure in place with retainer ring (7).
2. Lightly lubricate and install axle (4) through bearing (6).
3. Slide spacer (8) onto axle and install assembly into sideplate (15).
4. Slide washers (9) onto axle.
5. Secure axle and thread nut (10) onto axle. Torque nut to 500 ft lb (678 Nm).
6. Thread locknut (11) onto axle ensuring it mates face to face with nut (10). Torque locknut to 60 ft lb (81 Nm).
7. Repeat steps 1 through 6 for each wheel assembly.
8. Refer to "Trolley Wheel" lubrication requirements on page 10.

Testing

Prior to initial use, all new or extensively repaired trolleys shall be tested by or under the direction of a person trained in maintenance and repair of this trolley and a written report furnished confirming the rating of the tested equipment.

NOTICE

• Trolley is part of a *Man Rider* system. Ensure trolley performs correctly, and meets all standards required by the system operation documentation.

Trolley Operational Test

To ensure proper operation of the trolley conduct the following:

1. On brake trolleys, verify air hoses are properly attached. Verify brake holds trolley in place on beam when air is not supplied to brake. Verify brake releases and trolley operates smoothly along beam when air is suppled to brake. Ensure no sticking or hesitation of brake shoe or brake actuator occurs.
1. Operate trolley *without* a load. Verify trolley operates smoothly along entire length of beam.
2. Operate trolley *with* a load. Refer to 'Trolley Test Load' table for maximum test loads. Verify trolley operates smoothly along entire length of beam.

Trolley Test Load

Trolley Model	Test Load	
	lbs	kg
BTP-MR3/6	16,535	7500
BRAKE TROLLEY/M2-3	8,267	3750
BRAKE TROLLEY/M2-6	16,535	7500

4. On brake trolleys, conduct a brake load test. Ensure brake is engaged and air supply is disconnected from brake actuator. Test brake by applying a *horizontal* line-pull equal to weight listed in 'Brake Test Load' table. Brake must hold trolley in position.

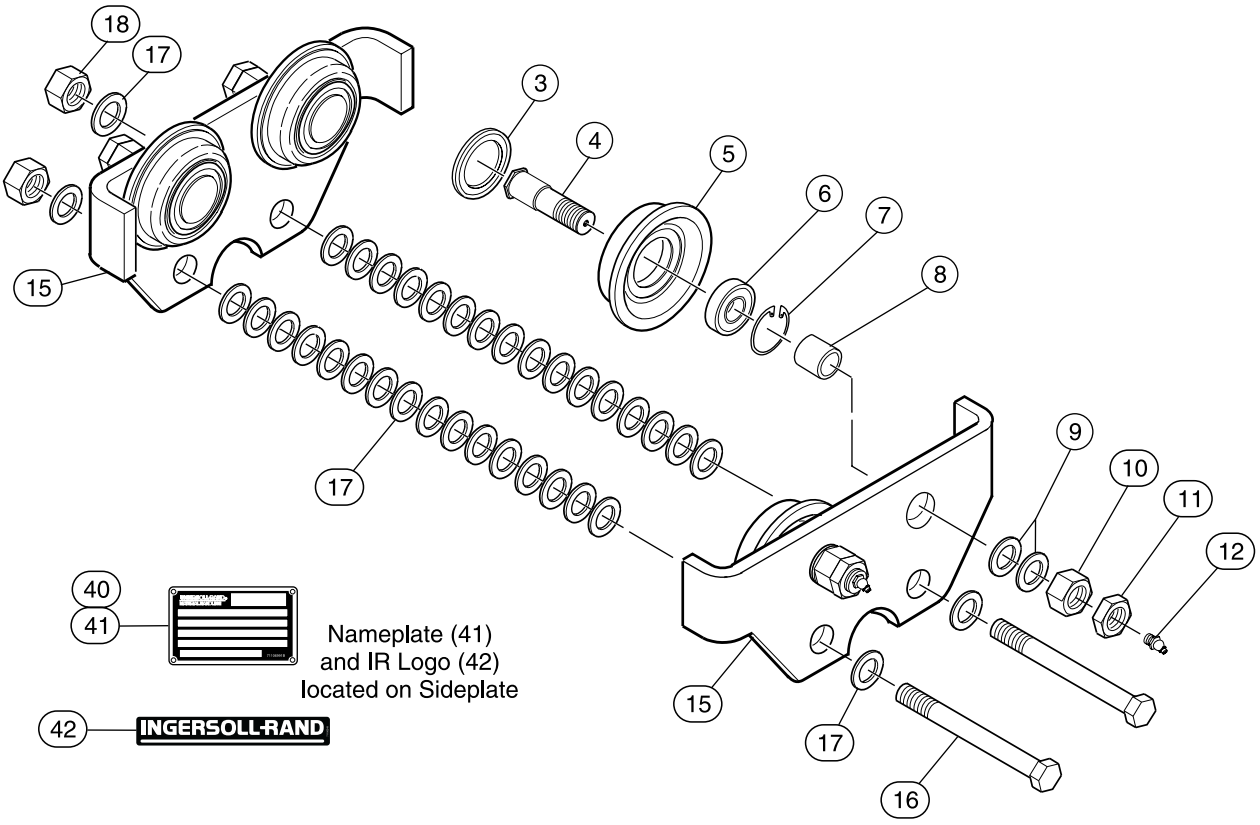
Brake Test Load

Trolley Model	Test Load	
	lbs	kg
BRAKE TROLLEY/M2-3	600	272
BRAKE TROLLEY/M2-6		

NOTICE

• Testing to more than 125% of rated load may be required to comply with standards and regulations set forth in areas outside of the USA.

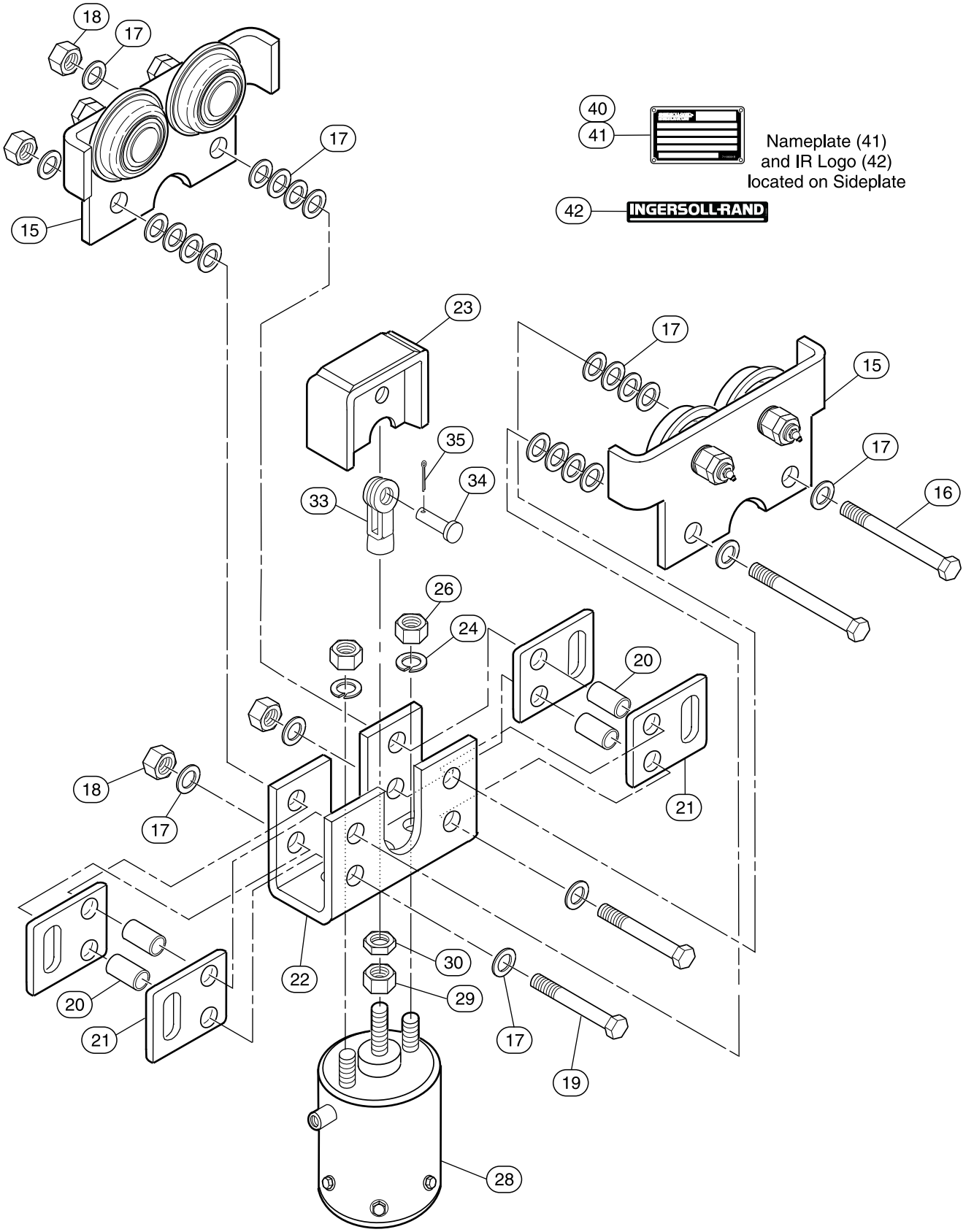
BTP-MR3/6 (PLAIN) TROLLEY ASSEMBLY DRAWING AND PARTS LIST



(Dwg. MHP2148)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER	ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
50	Trolley Assembly (Plain)	1	BTP-MR3/6	10	Nut	1	71370647
				11	Locknut	1	71370639
2	Wheel Assembly (includes items 3 through 12)	4	27842	12	Grease Fitting	1	53095
				15	Sideplate	2	27869
3	Cover	1	D10-826A	16	Capscrew	2	71370654
4	Axle	1	27873	17	Washer	110	71370167
5	Trolley Wheel	1	27852	18	Nut	2	52286
6	Bearing	1	71371330	40	Rivet	4	71028849
7	Retainer Ring	1	51764	41	Nameplate	1	71106991-R
8	Spacer	1	27877	42	I-R Logo	1	71106249
9	Washer	2	52251				

BRAKETROLLEY/M2-3 ASSEMBLY PARTS DRAWING

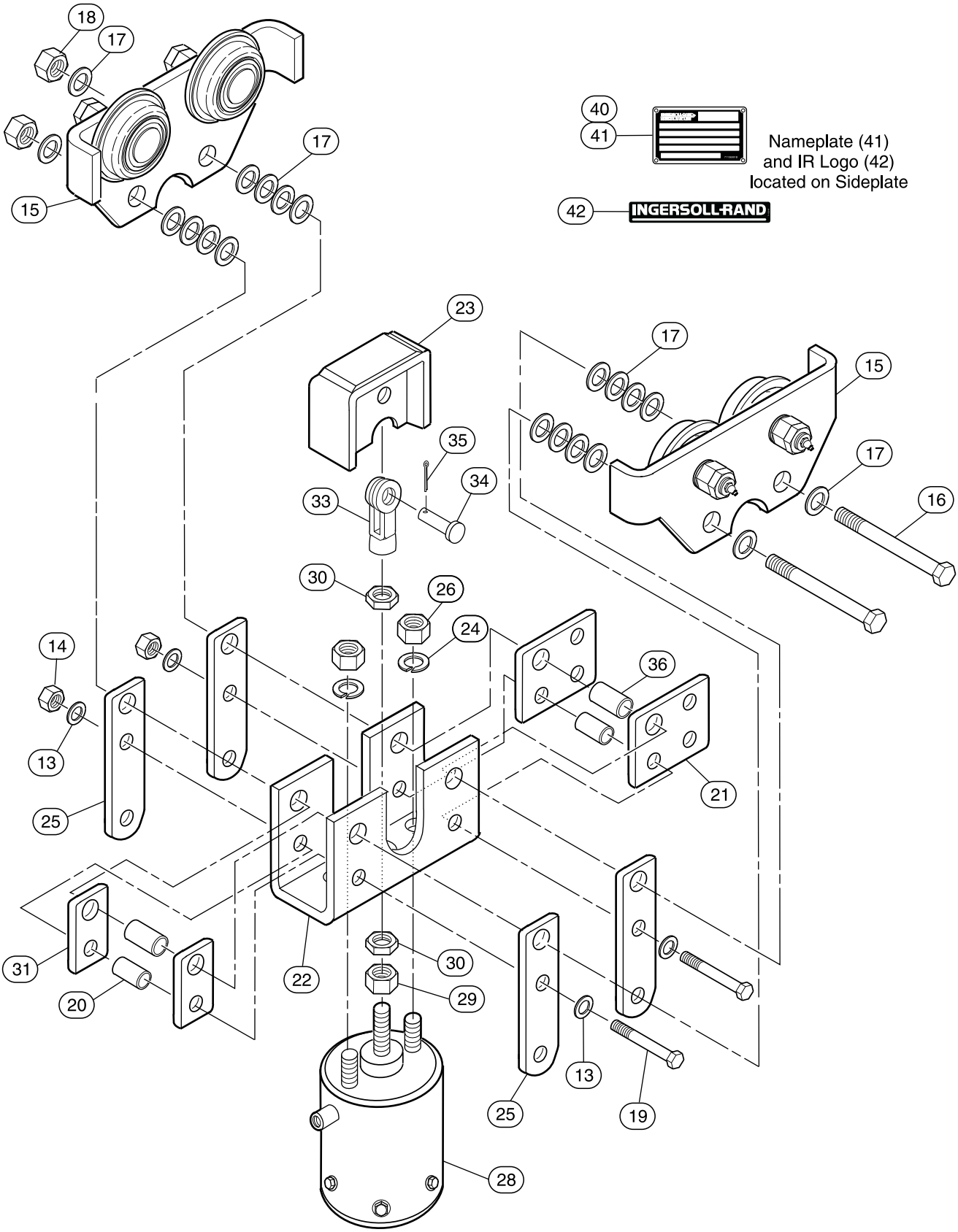


(Dwg. MHP2146)

BRAKETROLLEY/M2-3 ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
51	Trolley Assembly	1	BRAKETROLLEY/M2-3
2	Wheel Assembly (includes items 3 through 12) Refer to Dwg. MHP2148 on page 15 for location of items 3 through 12	4	27792
3	Cover	1	D10-826A
4	Axle	1	27788
5	Trolley Wheel	1	27786
6	Bearing	1	71368823
7	Retainer Ring	1	52578
8	Spacer	1	27824
9	Washer	3	71368849
10	Nut	1	71370035
11	Locknut	1	71369870
12	Grease Fitting	1	53095
15	Sideplate	2	27766
16	Capscrew	2	71368914
17	Washer	40	71368831
18	Nut	4	71125579
19	Capscrew	2	71368906
20	Spacer	4	27787
21	Suspension Plate	4	27768
22	Brake Adapter	1	27767
23	Brake Shoe	1	27793
24	Lockwasher	2	51008
26	Nut	2	71370043
27	Brake Assembly (includes items 28 through 30)	1	27922
28	Brake Actuator	1	Order Item 27
29	Nut	1	
30	Locknut	1	
32	Yoke Assembly (includes items 33 through 35)	1	71368815
33	Yoke	1	Order Item 32
34	Pin	1	
35	Cotter Pin	1	
40	Rivet	4	71028849
41	Nameplate	1	71106991-R
42	I-R Logo	1	71106249

BRAKETROLLEY/M2-6 ASSEMBLY PARTS DRAWING



(Dwg. MHP2149)

BRAKETROLLEY/M2-6 ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
52	Trolley Assembly	1	BRAKETROLLEY/M2-6
2	Wheel Assembly (includes items 3 through 12) Refer to Dwg. MHP2148 on page 15 for location of items 3 through 12	4	27842
3	Cover	1	D10-826A
4	Axle	1	27873
5	Trolley Wheel	1	27852
6	Bearing	1	71371330
7	Retainer Ring	1	51764
8	Spacer	1	27877
9	Washer	2	52251
10	Nut	1	71370647
11	Locknut	1	71370639
12	Grease Fitting	1	53095
13	Washer	4	71368831
14	Nut	2	71125579
15	Sideplate	2	27843
16	Capscrew	2	71370654
17	Washer	52	71370167
18	Nut	2	52286
19	Capscrew	2	71370662
20	Spacer	2	27787
21	Suspension Plate	2	27845
22	Brake Adapter	1	27844
23	Brake Shoe	1	27850
24	Lockwasher	2	51008
25	Hanger Plate	4	27846
26	Nut	2	71370043
27	Brake Assembly (includes items 28 through 30)	1	27923
28	Brake Actuator	1	Order Item 27
29	Nut	1	
30	Locknut	2	
31	Spacer Plate	2	27883
32	Yoke Assembly (includes items 33 through 35)	1	71368815
33	Yoke	1	Order Item 32
34	Pin	1	
35	Cotter Pin	1	
36	Spacer	2	27849
40	Rivet	4	71028849
41	Nameplate	1	71106991-R
42	I-R Logo	1	71106249

SERVICE NOTES

SERVICE NOTES

PARTS ORDERING INFORMATION

The use of other than **Ingersoll-Rand** Material Handling replacement parts may adversely affect the safe operation and performance of this product.
For your convenience and future reference it is recommended that the following information be recorded.

Model Number _____

Serial Number _____

Date Purchased _____

When ordering replacement parts, please specify the following:
1. Complete model number and serial number as it appears on the nameplate.
2. Part number(s) and part description as shown in this manual.
3. Quantity required.

The nameplate is located on the trolley sideplate.

NOTICE

• Continuing improvement and advancement of design may cause changes to this equipment 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.
• Sections of this manual may not apply to your trolley.

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

Return Goods Policy

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.
Trolleys that have been modified without **Ingersoll-Rand** approval, mishandled or overloaded will not be repaired or replaced under warranty. A printed copy of the warranty which applies to this trolley is provided inside the back cover of this manual.

Disposal

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

For additional information contact:

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

or

Ingersoll-Rand Material Handling
Douai Operations
111, avenue Roger Salengro
59450 Sin Le Noble, France
Phone: (33) 3-27-93-08-08
Fax: (33) 3-27-93-08-00

LIMITED WARRANTY

Ingersoll-Rand Company (I-R) warrants to the original user its 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 en route 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

Technical Support

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

Web Site:
www.ingersoll-rand.com

Regional Sales Offices

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

Detroit, MI
1872 Enterprise Drive
Rochester, MI 48309
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Fax: (248) 293-5800

Houston, TX
450 Gears Road
Suite 210
Houston, TX 77067-4516
Phone: (281) 872-6800
Fax: (281) 872-6807

Los Angeles, CA
13107 Lakeland Road
Santa Fe Springs, CA
90670-0525
Phone: (562) 777-0808
Fax: (562) 777-0818

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) 213-4500
Fax: (416) 213-4510
Order Desk
Fax: (416) 213-4506

Regional Sales Offices
Edmonton, Alberta
9720 - 54 Avenue
Edmonton, Alberta
T6E 0A9
Phone: (780) 438-5039
Fax: (780) 439-7382

Montreal, Quebec
3501 St. Charles Blvd.
Suite 104
Kirkland, Quebec
H9H 4S3
Phone: (514) 695-9040
Fax: (514) 695-0963

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