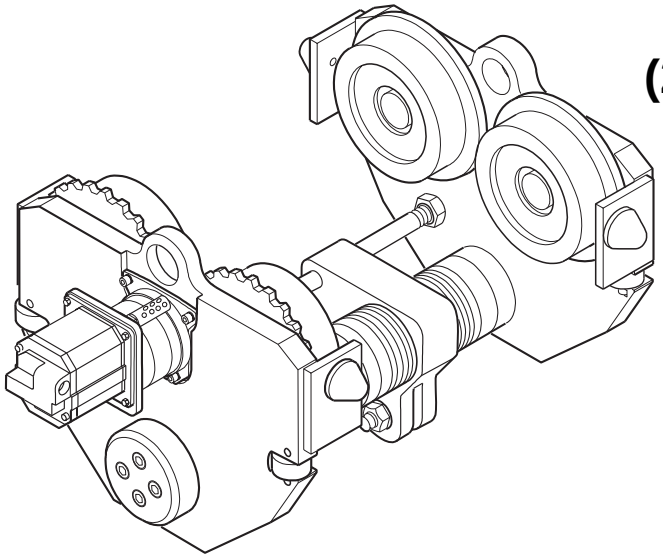
PARTS, OPERATION AND MAINTENANCE MANUAL
for
PLAIN, HAND CHAIN AND AIR POWERED TROLLEY
MODELS

TRU030
(3 metric ton)

TRU120
(12 metric ton)

TRU060
(6 metric ton)

TRU250
(25 metric ton)



(Dwg. MHP1652)

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 operation, installation and maintenance of these products.

⚠WARNING

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

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 MHD56156
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INGERSOLL-RAND
MATERIAL HANDLING

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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 a 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

• Do not use this trolley 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 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.

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 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 travel 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. Consult 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 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.

SAFE OPERATING INSTRUCTIONS

The following warnings and operating instructions have been adapted in part from American National (Safety) Standard ASME B30.16 (Overhead Hoists) and are intended to avoid unsafe operating practices which might lead to injury or property damage.

Ingersoll-Rand recognizes that most companies who use hoists and trolleys 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 unsafe practices to avoid and are not necessarily limited to the following list. Refer to specific sections in the manual for additional safety information.

Refer to the hoist manual for additional precautions and instructions.

1. Only allow personnel trained in safety and operation of this product to operate and maintain this trolley.
2. Only operate a trolley if you are physically able 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 or damage.
5. Never use a trolley that inspection indicates is worn or damaged.
6. Periodically, inspect the trolley thoroughly and replace worn or damaged parts.
7. Lubricate the trolley regularly.
8. When using an attached hoist, only lift loads less than or equal to the lower rated capacity of the trolley or hoist.
9. Only attach a hoist having a rated capacity equal to or less than the capacity of the trolley.
10. When using two hoists to suspend one load, select two trolleys each having a rated capacity equal to or more than the load. This provides adequate safety in the event of a sudden load shift.
11. Never place your hand inside the throat area of a hook.
12. Only operate a trolley when the load is centered under the trolley. Do not "side pull" or "yard."
13. Pay attention to the load at all times when operating the trolley.
14. Make sure all people are clear of the load path. Do not lift a load over people.
15. Never use the trolley for lifting or lowering people, and never allow anyone to stand on a suspended load.
16. Do not swing a suspended load.
17. Never suspend a load for an extended period of time.
18. Never leave a load suspended when the trolley is not in use.
19. Never weld or cut a load suspended by the trolley.
20. Always rig the load properly and carefully.
21. Remove all loads and shut off air supply before performing any maintenance.
22. Avoid collision or bumping of trolley.
23. After use, or when in a non-operational mode, the trolley should be secured against unauthorized and unwarranted use.

WARNING LABEL

Each trolley is supplied from the factory with the warning label shown. If the label is not attached to your unit, order a new label and install it. Refer to the parts list for the part number. Label may be shown smaller than actual size.

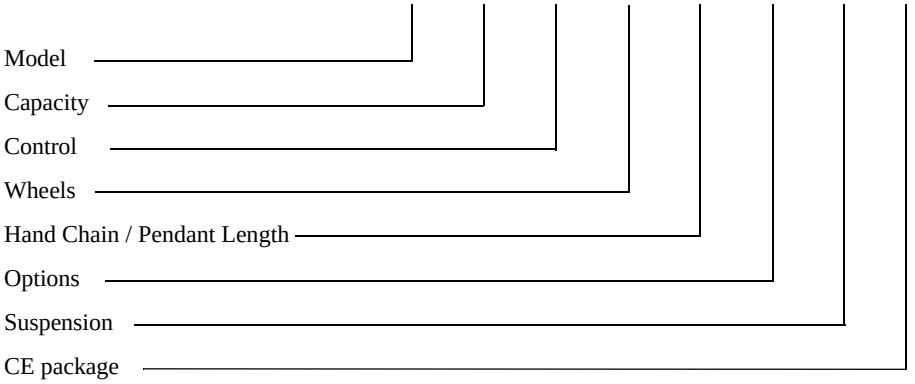
NOTICE

• Trolley warning label is located on side plate.

SPECIFICATIONS

Model Code Explanation

Example: TRU0302-U2MR-PN-E **TRU 030 2 - U 2M R - PN - E**



Model	Capacity (t = metric ton)
TRU	**030 = 3t** 060 = 6t 120 = 12t 250 = 25t
Control	**Wheels**
P = Plain G = Geared (not available on 25t trolley) 0 = Gear motor, no pendant **2 = Gear motor with one motor pendant** 3 = Gear motor with two motor pendant H = Hydraulic no Control (on request)	**U = Universal (3t and 6t models)** E = Flat beam (12t and 25t models) N = Tapered beam (12t and 25t models)
Hand Chain / Pendant Length	**Options**
2M = 2 metres (standard) XM = Specify length (in metre) OM = No hand chain or remote hoses	**R = Spark and corrosion resistance package *** P = Marine paint (150 microns) µ Q = Offshore paint (290 microns) µ Z = Sandblast and primer U = Emergency stop device (for pendant models only) A = Articulated Trolley (on request)
Suspension	**CE Package**
LS = Lug adaptor for Liftchain LCA on single fall LD = Lug adaptor for Liftchain LCA on double falls LT = Lug adaptor for Liftchain LCA on triple falls LQ = Lug adaptor for Liftchain LCA on quadruple falls HA = Hook-on adaptor **PN = Plain, no lug**	**-E = Compliance with the European Machinery Directives:** - Includes a main air shut off valve on air inlet - Implies the need to also select the option U (emergency stop)

*** Spark and corrosion resistance package.**
Option R includes the following:
- Stainless steel pins and fasteners 10 mm and smaller
- 20 microns zinc plated fasteners larger than 10 mm
- Solid bronze wheels
- Rubber bumpers
- Zinc plated hand chain (if any)
- Zinc plated hand wheel (if any)

Performance Specifications

		Model							
		TRU030		TRU060		TRU120		TRU250	
Maximum Load Capacity		6,600 lbs	3,000 kg	13,200 lbs	6,000 kg	26,400 lbs	12,000 kg	55,000 lbs	25,000 kg
Beam Size	**Minimum Width**	3.2 in	82 mm	3.7 in	98 mm	5.1 in	131 mm	5.6 in	143 mm
	Maximum Width	12.2 in	310 mm	12.2 in	310 mm	12.2 in	310 mm	12.2 in	310 mm
	Minimum Height	24.1 in	612 mm	30.7 in	781 mm	39.4 in	1001 mm	49.3 in	1253 mm
Minimum Turning Radius		6.56 ft	2 m	9.84 ft	3 m	9.84 ft	3 m	16.4 ft	5 m
Working Pressure *		90 psig	6.3 bar	90 psig	6.3 bar	90 psig	6.3 bar	90 psig	6.3 bar
Trolley Travel Speed**	**Rated Load**	56 ft/min	17 m/min	39.4 ft/min	12 m/min	39.4 ft/min	12 m/min	39.4 ft/min	12 m/min
	No Load	69 ft/min	21 m/min	49.2 ft/min	15 m/min	49.2 ft/min	15 m/min	49.2 ft/min	15 m/min
Maximum Air Consumption at 90 psi		46 scfm	1.3 m/min	67 scfm	1.9 m/min	67 scfm	1.9 m/min	67 scfm	1.9 m/min
Sound Level		Lpc (Peak Sound Pressure) does not exceed 130 dB.							
Trolley Weight (Plain)		341 lbs	155 kg	446 lbs	203 kg	741 lbs	337 kg	953 lbs	433 kg
Trolley Weight (Geared)		257 lbs	117 kg	462 lbs	210 kg	759 lbs	345 kg	990 lbs	450 kg

The following air supply specifications should be maintained at the trolley air motor:

Air Pressure	90 psig (6.3 bar/630 kPa)
Air Filtration	20 micron
Inlet Hose Size	1/2 in inside dia. (13 mm inside dia.)

*Speed variable depending on amount of pendant lever movement.

INSTALLATION

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

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

⚠WARNING

• Before installing read "SAFETY INFORMATION".
• To avoid an unbalanced load which may damage the trolley, the spacers (31-41 and 86-88) must be installed equally between side plates (6 and 7) and hoist bracket (9) to ensure hoist is centered on trolley.

NOTICE

• Trolley wheels ride on the top of the lower flange of the beam.
• During assembly lubricate gears, shafts, and bearings with applicable lubricants. Use of Loctite® on capscrew and nut threaded areas will help prevent corrosion.

Trolley Installation Over the Open End of the Beam

When installing a trolley on a beam, measure the beam flange and temporarily assemble the hoist on the trolley to determine the exact distribution and arrangement of the spacers. The distance between each wheel flange and the beam flange should be 3/32 to 5/32 in. (2 to 4 mm). The number of spacers (31-41 and 86-88) between the trolley side plate (6 and 7) and the hoist support must be the same on both sides in order to keep the trolley and hoist centered under the beam. The remaining spacers must be equally distributed on the outside of the side plates.

1. Fasten tightening washer (42) to one end of suspension shaft (8), using lockwashers (43) and capscrews (44), apply Loctite® 243 to capscrew threads.
2. Measure beam flange width and establish required position for spacers. Install required outside spacers on suspension shaft (8).
3. Thread a nut (29) onto each end of the screw rod (28), as far to the center as possible.
4. Insert one end of this rod into the side plate and fasten loosely with another nut (29).
5. Insert suspension shaft through side plate (6).
6. Install an equal number of spacers to each side of hoist support (9), on suspension shaft.
7. Install second side plate (7) on suspension shaft (ensure screw rod goes through this side plate). Place the rest of spacers on the suspension shaft and loosely secure with tightening washer, lockwashers and capscrews.
8. Verify trolley wheel to beam total clearance. Adjust spacer locations until clearance specification is attained (refer to Dwg. MHP1537 on page 7). Apply Loctite® 243 to capscrews and secure in place.
9. Screw inner nuts (29) out until they contact with side plates. Thread outside nuts (29) onto screw rod until tight against side plates. Check that side plates are perpendicular to beam.
10. Upon completion of installation, install trolley beam stops and conduct initial operating checks as described in "OPERATION" section. Check that side plates are vertical and parallel to each other.

Trolley Installation from Underneath the Beam

Pre-adjust trolley for installation using Dwg. MHP1537 on page 7 and the following instructions.

1. Fasten tightening washer (42) to one end of suspension shaft (8), using lockwashers (43) and capscrews (44), apply Loctite® 243 to capscrews threads.
2. Measure beam flange width and establish required position for spacers. Install required outside spacers on suspension shaft (8).
3. Thread a nut (29) onto each end of the screw rod (28), as far to the center as possible.
4. Insert one end of this rod into the side plate and loosely fasten with another nut (29).
5. Insert suspension shaft through side plate (6).
6. Install an equal number of spacers to each side of hoist support (9), on suspension shaft.

NOTICE

• The total clearance between the beam and the trolley wheel flanges is 3/16 to 5/16 inches (4 to 8 mm) when trolley is installed correctly. As shown in Dwg. MHP1537 on page 7, the difference between dimensions "X" and "Y" equals the total clearance.

7. Support the assembled portion of trolley on the beam.
8. Install second side plate (7).
9. Place the rest of spacers on the suspension shaft and secure loosely with tightening washer, lockwashers and capscrews.
10. Verify trolley wheel to beam total clearance. Adjust spacer locations until clearance specification is attained (refer to Dwg. MHP1537 on page 7). Apply Loctite® 243 to capscrews and secure in place.
11. Screw inner nuts (29) out until they contact with side plates. Thread outside nuts (29) onto screw or until tight against side plates. Check that side plates are perpendicular to beam.
12. Upon completion of installation, ensure trolley beam stops are installed and conduct initial operating checks as described in "OPERATION" section. Check that side plates are vertical and parallel to each other.

Hoist Installation

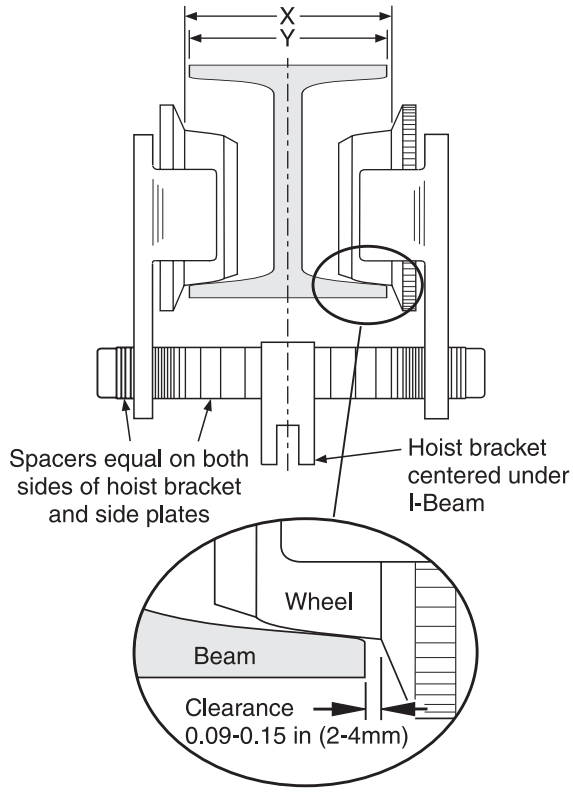
Hook Mount

When the hoist is suspended by a top hook, the supporting member should rest completely within the saddle of the hook and be centered directly above the hook shank. Do not use a supporting member that tilts the hoist to one side or the other.

1. Place the hoist top hook in the hoist support plate. Ensure hook latch is engaged.

Fixed Mount

When a fixed mount suspends the hoist, ensure that the mounting capscrews and nuts are tight. The hoist should hang level, if the hoist tilts then rotate the adapter 180°.



(Dwg. MHP1537)

Motor Installation

NOTICE

• To prevent damage to the motor, install trolley to beam and hoist to trolley before installing motor to trolley.

1. Align trolley assembly geared wheels (3) and drive pinion gear on air motor. Liberally coat drive pinion gear and geared wheel (3) teeth with grease (EP #1).
2. Secure motor to trolley by installing lockwashers (63) and capscrews (62).
3. Connect pendant air hoses to air motor or shut off valve if equipped. Refer to Dwg. MHP1598 on page 44.

⚠ CAUTION

• To avoid damaging the pendant hose, make sure the strain relief cable, not the pendant hose, is supporting the weight of the pendant.
• Check all hose connections are tight and that hoses are not twisted or crimped.

Air System Requirements

Air Supply

The 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) at the trolley motor.

Air Lines

The inside diameter of the trolley air supply hoses must not be smaller than 1/2 in. (13 mm) and 7/16 in. (12 mm) for hose fittings. Before making final connections, all air supply lines should be purged with moisture-free air before connecting to trolley motor inlet. 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 for Palair Plus, Palair Premium or Liftchain hoists. The trolley motor may be run without in line lubrication, however, accelerated gear wear may be experienced. Use a lubricator having an inlet and outlet size at least as large as the inlet size to the motor. Install the lubricator as close to the air inlet on the trolley motor as possible. The air line lubricator should be replenished daily and set to provide 2 to 3 drops per minute of ISO VG 32 (10W SAE) oil.

Air Line Filter

If trolley 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 motor. 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 motor 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 motor, or an aftercooler at the compressor that cools the air prior to distribution through the supply lines, are also helpful.

Motor

For optimum performance and maximum durability of parts, operate the trolley motor within the operating ranges provided in the "SPECIFICATIONS" section.

Storing The Trolley

1. Always store the trolley in a no load condition.
2. Wipe off all dirt and water.
3. Oil the hand chain.
4. Place in a dry location.
5. Before returning trolley to service follow instructions for Trolleys Not In Regular Service in the "INSPECTION" section.

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

Operate the trolley from a position that allows you to observe the load and the intended path of movement of the 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.

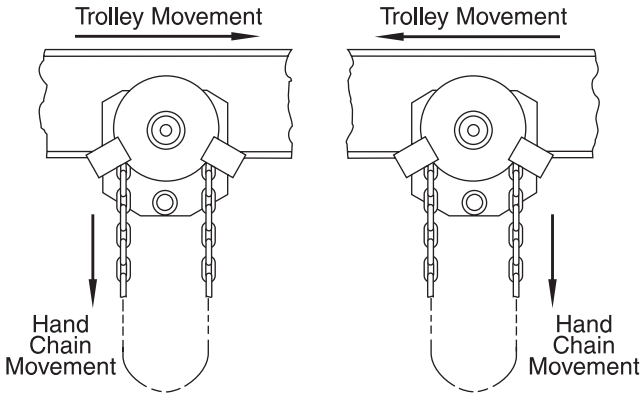
Plain Trolley

1. To move an unloaded hoist/trolley, push on the hoist load chain.
2. To move a loaded hoist/trolley, push on the load or the hoist load hook shank.

Geared Trolley

Refer to Dwg. MHP0100 on page 8.

1. When facing the trolley hand wheel:
2. Pull down on right side of hand chain (Clockwise rotation) to move left.
3. Pull down on left side of hand chain (Counterclockwise rotation) to move right.



(Dwg. MHP0100)

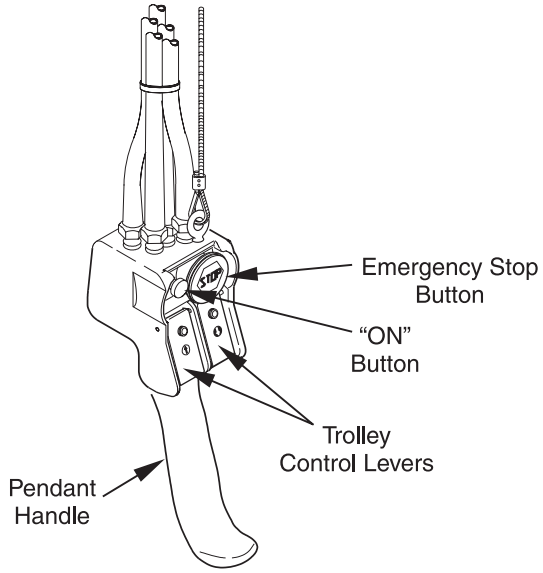
Powered Trolley

Direction of trolley travel and speed is controlled by the pendant throttle. Ensure direction arrows on pendant throttle match trolley movement.

Pendant Operation

The pendant can have from two to six buttons. The two-button pendant will control trolley movement along the support beam. A four-button pendant will control trolley movement and hoist operation. A six-button pendant would include the above movements plus control a bridge assembly allowing hoist movement in four directions. Always apply smooth even pressure to pendant levers, avoid quick starts and abrupt stops. This will allow safer control of suspended loads and reduce undue stress on components.

2 Lever Control



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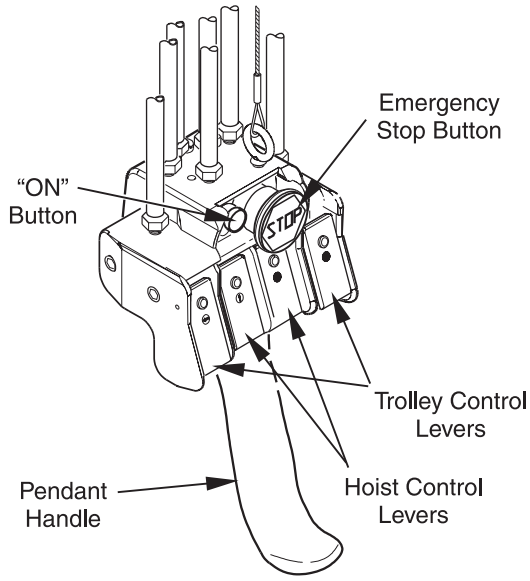
Emergency Stop

The Emergency Stop button, when activated, will immediately stop all operations of the trolley and hoist. The Emergency Stop button will remain depressed after activation. To reset Emergency Stop button, twist (rotate) Emergency Stop button clockwise until button releases and spring returns to its original position. Depress "ON" button.

4 Lever Control



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Initial Operating Checks

1. After installation, ensure the hoist is centered below the trolley.
2. On powered trolleys, check for air leaks in supply hose and fittings to pendant and trolley motor.
3. Raise a load equal to the lower of the rated capacities of either the trolley or hoist 3 to 4 inches (75 to 100 mm) off the floor.
4. Operate the trolley along the entire length of the 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. Check that trolley movement complies with the pendant arrows, on air powered trolley units.

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. (Powered 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. CONTROLS. (Powered Trolleys only) During operation of trolley, verify trolley response to pendant use is quick and smooth. If trolley responds slowly or movement is unsatisfactory, do not operate the trolley until all problems have been corrected.

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 gears, 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.
5. SIDEPLATES. Check side plates for spreading due to bending. Replace if spreading has occurred.
6. AIR MOTOR. (Powered Trolleys only) Check that loaded and unloaded operation of trolley is within specifications. Verify that trolley air motor operates smoothly, and responds quickly to pendant commands.
7. HAND CHAIN and HAND CHAIN WHEEL. (Geared Trolley Only) Check for damage or excessive wear. Replace if necessary.
8. 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 'TRU' Trolley

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

COMPONENT	**CONDITION**		**CORRECTIVE ACTION**		**NOTES**
	Pass	**Fail**	**Repair**	**Replace**	
Fasteners					
Shafts			- - -		
Bearings			- - -		
Brake					
Covers					
Controls					
Air System					
Supporting Structure					
Motor					
Drive Gears					
Wheels					
Side Plates			- - -		
Suspension Shaft Assembly					
Labels and Tags					
Emergency Stop*					
Other Components					

TESTING	**Pass**	**Fail**			
No Load					
Maximum Load**					

* Optional attachment. May not be equipped on all trolleys.

** Maximum Load is the lowest of rated components hoist or trolley.

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 gears, shafts, and bearings with applicable lubricants. Use of Loctite® on capscrew and nut threaded areas will help prevent corrosion.

Trolley Wheel Bearings

The trolley wheel bearings are sealed and permanently lubricated. They do not require additional lubrication. However, should the trolley wheels be disassembled for inspection or repair, repack the trolley wheel bearings. Use recommended grease in "Geared Trolley Wheels and Pinion Shaft" section.

Geared Trolley Wheels and Pinion Shaft

Lubricate exposed trolley drive pinion and wheel teeth. Brush with grease as often as necessary to keep teeth liberally covered. If the grease becomes contaminated with sand, dirt or other abrasive materials, clean off old grease and brush on new. For temperatures -20° to 50° F (-29° to 10° C) use ISO VG 46 (EP1) grease or equivalent. For temperatures 30° to 120° F (-1° to 49° C) use ISO VG 68 (EP2) grease or equivalent.

⚠ CAUTION

• When greasing pinion and geared wheels make sure excess grease is cleaned off trolley wheel riding surface and track or beam. Failure to keep beam and wheel contact surfaces clean could affect the safe operation of the trolley.

Air Motor

The trolley motor may be operated without in-line lubrication. If a lubricator is used it should be checked/replenished daily and set to provide 2 to 3 drops per minute at full throttle of high quality rust and oxidation inhibited lubricant ISO VG 32 (10W SAE). Refer to "ACCESSORIES" section for lubricator and air filter information.

⚠ CAUTION

• Shut off air supply before filling air line lubricator.

Hand Chain

Hand chain, used on geared trolleys, normally requires no lubrication.

Reduction Gear Box

The reduction gearbox and disc brake are filled with oil, to the correct level, prior to shipment. Check oil level before initial operation. These components are splash lubricated by the oil in the housing and have no other means of lubrication. It is therefore important to use high quality, rust and oxidation inhibited lubricant. Oil capacity is approximately 8 fl. oz. (250 ml).

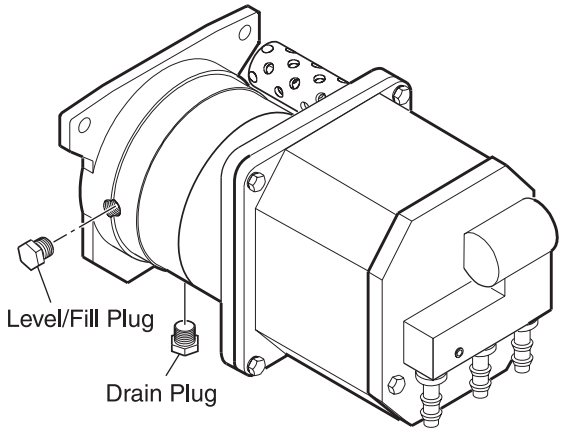
Initial Reduction Gear Assembly Oil Change

It is recommended that the first oil change be done after approximately 50 hours of initial operation. Always inspect removed oil for evidence of internal damage (metal shavings, dirt, water, etc.)

NOTICE

• Always collect lubricants in suitable containers and dispose of in an environmentally friendly manner.

Reduction Gear Drain and Fill



(Dwg. MHP1575)

To Drain

1. Place container under reduction gear drain plug (407) and remove plug.
2. Remove level/fill plug (407).

To Fill

1. Insert drain plug (407) and tighten.
2. Fill slowly until oil is level with fill plug. Refer to recommended lubricant chart.

Recommended Lubricant

Temperature	Recommended Viscosity
Below 32° F (0° C)	ISO VG 32 (10W SAE)
32° to 80° F (0° to 27° C)	ISO VG 68* (20W SAE)
Above 80° F (27° C)	ISO VG 100 (30W SAE)

* Unit is shipped with this lubricant.

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.
	Pinion shaft damaged.	Replace pinion shaft.
	Geared wheel(s) damaged.	Replace geared wheel(s).
	Motor damaged.	Disassemble, inspect and repair or replace damaged or worn air motor parts.
	Low 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.
	Pendant malfunction.	Troubleshoot and repair or replace damaged or worn pendant parts.
	Track or beam is contaminated.	Check beam for foreign matter or contamination.
Trolley will not stop or trolley wheels slip.	Oil or grease on trolley wheels or beam.	Clean beam track and trolley wheels.
	Pendant malfunction.	Inspect and repair or replace damaged or worn pendant parts.
	Brake malfunction.	Disassemble motor or reduction brake assembly and repair or replace components.
Poor motor performance or loss of power.	Low supply air pressure.	Check air supply line pressure. 90 psig (6.3 bar/630 kPa) at trolley motor required for efficient operation.
	Loose hose connections.	Check all hose fitting connections. Repair all leaking connections and damaged hose sections.
	Worn or broken rotor blades. (3 ton trolley)	Disassemble motor assembly. Repair or replace motor or rotor blades.
	Worn or broken motor gear bearings.	Disassemble motor and motor assembly. Replace bearings.
	Foreign contaminants building up in motor.	Disassemble motor, clean parts carefully and reassemble. Install a 20 micron filter to protect the air motor.
Hand Chain operation difficult/impossible.	Twisted chain.	Untwist chain. Ensure chain has even number of links.
	Chain Wheel damaged.	Replace Chain Wheel.
	Pinion Shaft damaged.	Replace Pinion Shaft.
	Geared Wheel(s) damaged.	Replace Geared Wheel(s).

⚠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 controls:
DANGER - 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.
• Disconnect air supply from trolley and hoist prior to conducting maintenance.

Proper use, inspections and maintenance increase the life and usefulness of your **Ingersoll-Rand** equipment. During assembly lubricate gears, shafts and bearings with applicable lubricants. Use of thread locking compound on capscrew and nut threaded areas will help prevent corrosion.

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.

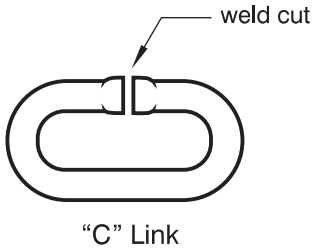
INTERVAL	MAINTENANCE CHECK
Start of each shift (Operator or Maintenance Personnel)	Make a thorough visual inspection of the trolley for damage. Do not operate the trolley if damaged.
	Operate the trolley slowly in both directions. Trolley must operate smoothly without sticking, binding or abnormal noises.
Yearly (Maintenance Personnel)	Inspect the trolley motor, 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.

Hand Chain Adjustment or Replacement

⚠CAUTION

• When cutting the weld side of a hand chain link, do not cut or nick the opposite side. A damaged link must be replaced to prevent premature failure. A falling hand chain can cause injury.

1. To create a “C” link, cut the weld side of the link with a hack saw. Clamp one side of the “C” link in a vise and bend it open by using pliers to grip the exposed part of the link. Refer to Dwg. MHP0014 on page 14.
2. If you are replacing the hand chain, disconnect it at the “C” link and carefully remove the hand chain.



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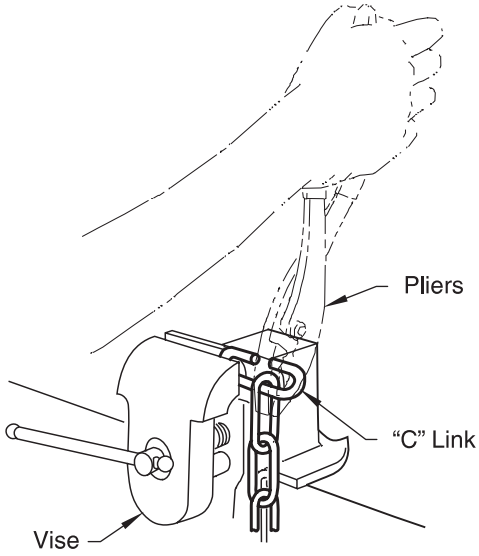


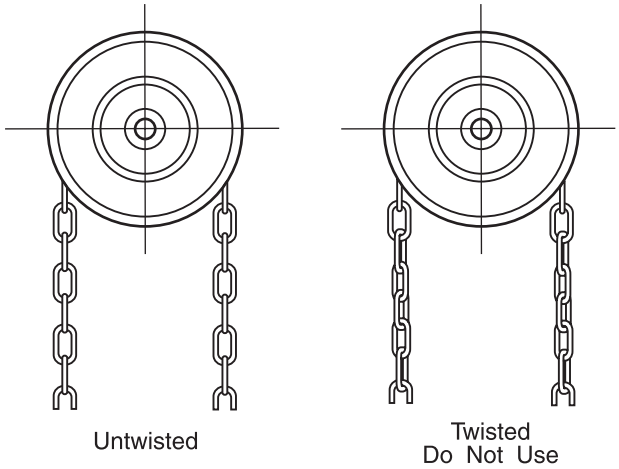
(Dwg. MHP0014)

3. To replace chain:
   a. Cut a length of chain that is twice the required hand chain drop plus 1 foot (30 cm).
   b. Run the new chain up through the left hand chain guide, around the chain wheel, making sure the hand chain is seated in the chain wheel pockets, and back down through the right hand chain guide.
4. To adjust chain length:
   a. Add or remove a length of chain that is twice the desired amount of chain adjustment.

NOTICE

• To prevent the hand chain from twisting maintain an even number of links.

5. Connect the hand chain ends with the “C” link(s), make the total number of links even, and bend the “C” link(s) shut.
6. Make sure the hand chain is not twisted. To untwist, open a “C” link and remove one hand chain link. Refer to Dwg. MHP0015 on page 15.



(Dwg. MHP0015)

Disassembly

General Instructions

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

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 the bearings from dirt by keeping them wrapped in a clean cloth.

NOTICE

• Prior to disassembly, record the number of spacers between side plates, hoist support, and tightening washer.
• 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 conduction 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 (refer to "SPECIFICATION" section) the weight of the trolley could require additional support. Adequately support the hoist and trolley when lifting or removing them from the beam.

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

Motor Removal

1. Mark pendant control lines and disconnect.
2. Disconnect air supply line.
3. Remove capscrews (62) and lockwashers (63). Remove motor assembly to a clean dust free work area.

Trolley Disassembly

NOTICE

• Prior to disassembly note the installation of the adjusting spacers (31-41 and 86-88). Install adjusting spacers during assembly, in the same configuration recorded during disassembly to ensure beam flange width and hoist position are retained.
• Prior to disassembly of trolley, first remove trolley motor and then remove hoist.

Remove the trolley from the beam by removing end stop and after adequately supporting trolley, run trolley off the beam.

⚠ CAUTION

• Support trolley adequately as it comes off beam to prevent injury and/or damage to equipment. If that is not possible, loosen or remove only one side plate. Refer to "Side Plate Disassembly".

Side Plate Disassembly

1. Remove one nut (29) from outside of side plate.
2. Remove capscrews (44), lockwashers (43) and tightening washer (42) from same side plate. Separate side plate until it is free of beam.

Remove trolley to a clean dust free work area for repair.

1. Remove the other outside nut (29).
2. Remove all capscrews (44), lockwashers (43) and tightening washer (42).
3. Separate the side plate from suspender shaft (8).

Geared Trolley Hand Wheel Disassembly

This section details the disassembly of the geared trolley chain wheel.

1. Remove retainer ring (54).

2. Carefully remove hand wheel (53), catching key (52) as it comes free.

NOTICE

• Do not remove pinion shaft (51) or support (56) unless necessary for repair.

3. Press pinion shaft (51) out, towards center of trolley.
4. Remove capscrews (57), lockwashers (58) and support (56).

6 ton and 12 ton Trolleys

5. Remove the bushings (59).

Trolley Wheel Removal

3 ton and 6 ton Trolley

1. Remove retainer ring (4) and pull wheel off of axle.
2. Remove retainer ring (1) and pull bearing(s) (2) out of wheel.

12 ton Trolley

1. Remove nut (85) and pull wheel assembly away from side plate.
2. Remove seal (82) and discard. Separate spacer (81) and axle (84) from wheel assembly.
3. Remove retainer (1) and pull out bearings (2). Remove seal (83) and discard.

25 ton Trolley

1. Remove retainer ring (4) and pull wheel assembly off of axle.
2. Remove spacer (93).
3. Remove retainer ring (1) and spacer (81).
4. Remove front seal (82) and discard. Pull bearings (2) out of wheel. Remove real seal (82) and discard.

3 ton Motor/Power Unit Disassembly

Refer to Dwg. MHP1581 on page 42.

1. Disconnect air hoses from power unit.
2. Remove capscrews (62) and lockwashers (63).
3. Remove power unit assembly from trolley side plate.
4. Remove capscrews (220) and lockwashers (221).
5. Remove plate (222). Remove key (218) from spindle shaft (217).
6. Remove gears (226, 227, 229), washers (223) and thrust race (228) from motor housing (254).

Spindle assembly (214 through 219) should not be removed from plate (222) unless repair is required.

7. To remove spindle assembly from plate:
   a. Remove retainer ring (219).
   b. Tap end of spindle shaft (217) to remove from plate (222).
8. To disassembly spindle assembly:
   a. Remove retainer ring (219), pinion gear (214), key (218) and bearing (216) from spindle shaft (217).
9. To remove motor assembly (items 239 through 251):
   a. Remove capscrews (238) from brake cone (237).
   b. Grasping pinion shaft (231) pull assembly free of motor housing (254).
10. To disassemble motor assembly (items 239 through 251):
    a. Remove nut (230) and separate components (231 through 251).

6 to 25 ton Motor Disassembly

Refer to Dwg. MHP1651 on page 36.

1. Remove capscrews in motor cover (325) and separate from motor housing (331).

NOTICE

• Pins (309) do not have to be removed.

2. Remove and discard ‘O’ ring (336).
3. Remove capscrews (303) and separate motor housing (308) and motor cover.
4. Discard ‘O’ rings (307 and 311).
5. Remove retainer rings (315) and bearings (314).
6. Remove stop (322), slide valve (318), quad rings (319 and 321), springs (317) and slide valve (316). Discard quad rings.
7. Immobilize the motor gears with a rod between the teeth and remove locknuts (304).
8. Slide gears out of housing.
9. Remove screw (301) and washer (302). Press bearings (305) out of motor flange (306).

Motor Emergency Stop Valve Disassembly

Refer to Dwg. MHP1651 on page 36.

1. Remove capscrews securing cover (363). Remove cover.
2. Remove diaphragm (364).
3. Remove capscrews (355) securing cover (352). Remove cover and discard ‘O’ ring (353).
4. Remove spring (354).
5. Secure valve cone (365) and remove screw (358).
6. Remove valve cone (356), valve cone (365), seals (357) and washers (361). Push spacer (359) out of motor cover.

External Emergency Stop Valve Disassembly

Refer to Dwg. MHP1583 on page 40.

1. Remove capscrews (372) and cover (371). Remove and discard ‘O’ ring (353).
2. Remove spring (354).
3. Remove capscrews (372), cover (374) and ‘O’ ring (375), discard ‘O’ ring.
4. Remove diaphragm (364) and discard.
5. Secure valve cone (365) and remove screw (358).
6. Remove valve cones (356 and 365), seals (357) and washers (361).
7. Push spacer (359) out of valve body.

Reduction Gear Disassembly

Refer to Dwg. MHP1543 on page 38.

1. Remove plugs (407) from gear casing (406). Drain oil into a suitable container and dispose of it in an environmentally friendly manner.
2. Remove four capscrews (444) and flange (443) from gear casing (406). Flange was assembled with Loctite® and may be difficult to remove.
3. Remove two ‘O’ rings (441) and discard.
4. Remove two mufflers (445) in flange (443).
5. Lift out springs (439).

6. Remove coupling (431) from shaft. Remove 'O' ring (432) from groove in coupling bore.
7. Remove brake disc (437) and piston (435). Remove 'O' rings (436) and (434) from piston (435).
8. Remove retainer ring (429). Remove friction disc (428) from spline on shaft (418).
9. Remove brake body (427) and gasket (408).
10. Remove planet support (416) and bearing (423). Remove ring gear (424).
11. Remove retainer ring (421) and bearing (419) from sun gear shaft (418).
12. Remove ring gear (411) from gear case.
13. Remove retainer ring (403). Tap drive shaft (402) from bearing (404). Remove bearing (404) from gear case (406). Tap out bearing (409).
14. Remove bearing (423). Remove planet pins (413). Remove two bearings (414) and single spacer (415) from each planet gear (417).
15. Remove retainer ring (401).
16. Tap shaft (402) out of bearing (404).

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 mufflers for damage or excessive dirt.
5. Check bearings for freeness of rotation and wear. Replace bearings if rotation is rough or bearings are excessively worn.
6. 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. Examine all gear teeth carefully, and remove nicks or burrs.
5. Polish the edges of all shafts shoulders to remove small nicks which may have been caused during handling.
6. Remove all nicks and burrs caused by lockwashers.
7. Replace all seals, 'O' rings and gaskets.

Assembly

Trolley Wheel Assembly

3 ton and 6 ton Trolley

1. Press in bearings (2) and secure with retainer rings (1).
2. Place wheel on axle and secure with retainer ring (4).

12 ton Trolley

1. Insert seal (83).
2. Press in bearings (2) and secure with retainer ring (1).
3. Place spacer (81) on retainer and secure with seal (82).
4. Insert axle (84) through wheel assembly and side plate. Apply Loctite® 243 to threads and secure with nut (85).

25 ton Trolley

1. Insert seal (82).
2. Press in bearings (2), followed by seal (82).
3. Insert spacer (81) and secure with retainer ring (1).
4. Place wheel assembly on axle.
5. Place spacer (93) on axle and secure with retainer (4).

Geared Trolley Hand Wheel Assembly

6 ton and 12 ton Trolley

1. Press bushings (59) in both ends of support (56) until flush with support. Then follow steps below.

All Capacities

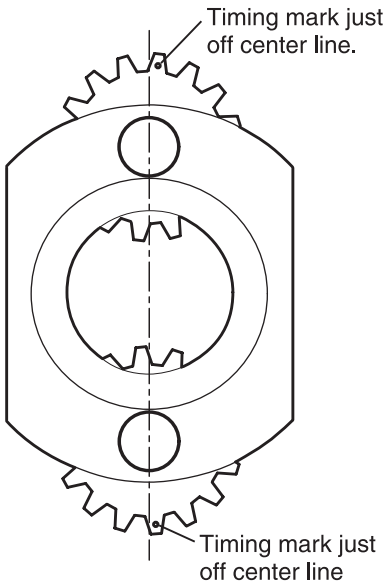
1. Secure support (56) to side plate (7) using capscrews (57) and lockwashers (58).
2. Lubricate pinion (51) with EP#1 grease and insert through wheels and side plate. Rotate wheels until gears on pinion mesh and pinion is firmly seated.
3. Place hand chain (55) on hand wheel (53) so that it is not twisted. Refer to Dwg. MHP0015 on page 15.
4. Insert key (52) into slot on pinion shaft and push hand wheel onto pinion shaft.
5. Secure with retainer (54).

Reduction Gear Assembly

Refer to Dwg. MHP1543 on page 38.

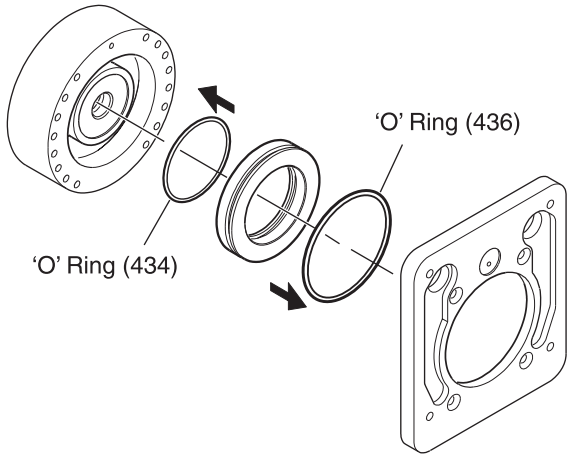
1. Install retainer ring (401) on drive shaft (402).
2. Install oil seal (425) in small bore of brake body (427). Lip of seal must be toward pin side of brake body. Install two pins (426) in brake body. Position pins in holes at top and bottom toward the end of the eight drilled port holes.
3. Install bearing (419) in planet support (416) and secure with retainer (421).
4. Install shaft (418) through bearing and tap until seated. Install retainer ring (422).
5. Install two bearings (414) in each planet gear (417) with a spacer (415) between the bearings. Install gears in planet support and locate with planet pins (413). The flats on the planet pins must be located nearest bearing (419).

6. Install oil seal (405) in gear case (406) with lip toward inside of gear case.
7. Install bearing (404) in gear case (406). Install drive shaft (402) through bearing and tap until seated. Turn assembly over and install bearing (409) in gear case.
8. Install ring gear (411) in gear case. Locate spline on drive shaft.
9. Install planet support assembly in ring gear (411). Position planet gears to obtain correct timing. Refer to Dwg. MHP1560 on page 18.



(Dwg. MHP1560)

10. Install ring gear (424) and verify timing position has been maintained.
11. Install bearing (423) on planet support (416).
12. Install gasket (408), check holes are correctly aligned.
13. Install brake housing (427). Use two loosely installed capscrews (444) to align parts while tapping into position.
14. Install friction disc (428) on spline of shaft (418). Install retainer ring (429).
15. Install 'O' ring (441) on mounting flange (443). Apply Silicone AS310 (Silicomet) or equivalent to brake housing face. Install four capscrews (444) using Loctite® 243 on the threads. Tighten capscrews.
16. Install 'O' ring (432) in bore of coupling (431) in center groove.
17. Install 'O' rings (434) and (436) on piston (435). Clean excess silicone from the bore of flange and brake housing. Area must be clean prior to installing piston.
18. Install piston. Ensure 'O' ring (434) in bore of piston is located toward brake housing. Refer to Dwg. MHP1627 on page 18.



(Dwg. MHP1627)

19. Install pin (438) in brake disc (437) and position brake disc on friction disc.
20. Install 'O' ring (442) in recess on flange and install bearing (433) in motor housing (331).
21. Place brake springs (439) in motor housing (331) using silicone to hold them in place. DO NOT USE GREASE. Install motor housing on flange.
22. Install coupling (431) on shaft.
23. Apply a bead of Loctite® 574 between motor housing and mounting flange.
24. Install motor housing on flange ensuring springs stay in place and pin (438) in brake disc locates in hole in motor housing.
25. Install two mufflers (445) in mounting flange (443).
26. Ensure two 'O' rings (442) are installed in motor housing prior to installing motor assembly.
27. Apply Loctite® 574 to surface between mounting flange (443) and motor housing. Install cover and secure with four screws (444).
28. Install plugs (407) in gear case (406).

3 ton Motor/Power Unit Assembly

Refer to Dwg. 1581 on page 42.
1. Slide end plate (249) on rotor (244) shaft.
2. Install bearing (251) on rotor (244) shaft.

Lubricate gears liberally with EP #1 grease. Coat rotor blades (245) and inside of cylinder (243) with ISO VG 32 (10W SAE) lubricant.

NOTICE

• During assembly make sure housing and components are clean.
• During installation of bearings (239 and 251) on rotor (244) shaft, press only on the inner race of bearing.

3. Insert rotor blades (245) into blade slots of rotor (244). Insert with blade straight side facing out.
4. Slide cylinder (243) over rotor (244). Align air inlet slots of cylinder (243) and end plate (249). Tap on over spring pin (242).
5. Install spacer (241) and end plate (240) to rotor (244).
6. Install bearing (239) on shaft of rotor (244).
7. Check motor assembly (items 239 through 251) operation. Rotor should turn easily in cylinder without binding. If rotor binds, tap splined end lightly to loosen.

8. Install locating pin (250) in end plate (240) and install motor assembly in motor housing (254). Align the locating pin (250) with groove in housing (254).
9. Install brake cone (237) in motor housing (254) and secure with capscrews (238).
10. Install brake lining (236) to brake cone (237).
11. Install finger spring (235). Assemble with fingers facing out (toward pinion shaft (231) splines).
12. Install spacer (if required) (232), washer (233) and 'O' ring (234) on pinion shaft (231).

NOTICE

• A torque of 2 to 3 inch-lbs. (0.225 - 0.34 Nm) to rotate spindle in both directions is required for proper installation of brake components. The use of the 0.010 inch (0.25mm) spacer (232) may or may not be necessary to achieve required torque.

13. Slide pinion shaft (231) over rotor (244) shaft and secure with nut (230).

Lubricate needle bearings in plate (222) with EP #1 grease prior to installing gears. Lubricate gears liberally with EP #1 grease.

14. Install washers (223) and thrust race (228) into motor housing (254).
15. If required, reassemble spindle components as follows:
    a. Install bearing (216), key (218), pinion gear (214) and retainer ring (219) on spindle shaft (217).
16. Install spindle shaft assembly in plate (222). Lock in place with retainer ring (215).
17. Install key (218) and retainer ring (219) on spindle shaft (217). Insert washers (223) and gears (226 and 229) into plate (222).
18. Slide gear (227) onto spindle shaft (217). Ensure key (218) is properly installed on spindle shaft (217) to hold gear (227).
19. Install plate (222) to motor housing (254) and secure with lockwashers (221) and capscrews (220).
20. Install power unit assembly to trolley side plate. Secure with lockwashers (63) and capscrews (62).
21. Test trolley and hoist operation as described in the "TESTING" section prior to returning to general use.

Motor Emergency Stop Valve Assembly

Refer to Dwg. MHP1651 on page 36.
1. Place a seal (357) and washer (361) onto cone valve (365) and insert into motor cover (325).
2. Slide valve cone (356), seal (357), washer (361) and spacer (359) onto screw (358) and insert into opposite side of motor cover. Screw into valve cone (365) until tight.
3. Place diaphragm (364) into recess in motor cover and secure with cover (363) and capscrews. Install capscrews with Loctite® 243.
4. Insert spring (354) into motor cover.
5. Insert 'O' ring (353) onto cover (352) and lubricate. Place cover into motor cover and secure with capscrews (355).

External Emergency Stop Valve Assembly

Refer to Dwg. MHP1583 on page 40.
1. Push spacer (359) into motor cover.
2. Place valve cone (356) and steel washer (357) onto screw (358) followed by washers (357) and (361). Insert this into motor cover through spacer (359).
3. Slide washer (361) and washer (357) over exposed screw end. Screw valve cone (365) onto screw and tighten.
4. Place diaphragm (364) into groove in motor cover.
5. Insert 'O' ring (375) into recess in cover (374) and lubricate.
6. Place cover onto motor cover. Apply Loctite® 243 to screw threads (372) insert into cover and tighten.
7. Insert spring (354) into motor cover over screw (358).
8. Place 'O' ring (353) into groove in cover (371) and lubricate.
9. Place cover into motor cover. Apply Loctite® 243 to screw threads (372), insert into cover and tighten.

Motor Assembly

Refer to Dwg. MHP1651 on page 36.
1. Press bearings (305) into motor flange (306).
2. Insert screw (301) through washer (302) and secure bearings.
3. Insert motor gears (312 and 313) into motor flange. Ensure drive gear (313) is in lower position.
4. Immobilize the motor gears with a rod between the teeth and install locknuts (304).
5. Insert 'O' rings (307) into recess in motor flange.
6. Slide motor housing (308) over motor gears, with large slide valve port facing away from motor flange. Press pins (309) into motor housing.
7. Insert slide valves (316) into valve ports followed by springs (317). Slide quad rings (319 and 321) onto slide valve (318), lubricate and insert into valve ports.
8. Press bearings (314) onto motor gears and secure with retainer rings (315).
9. Insert 'O' rings (311) into recesses in motor housing (308).
10. Lubricate stops (322) and insert into recesses in motor cover (325).
11. Place motor cover over motor housing, align pins and press together.
12. Apply Loctite® 243 to screws (328) holding motor cover, insert through cover and secure cover.

Trolley Assembly

1. Insert screw rod (28) through one side plate and loosely secure with nut (29).
2. Insert suspension shaft (8) through same side plates and loosely secure with capscrews (44), lockwashers (43) and tightening washer (42).
3. Place half of spacers on suspension shaft followed by hoist support (9) and then the other half of spacers.
4. Follow the steps in mounting the trolley in the "INSTALLATION" section.
5. Secure the motor assembly to side plate (7) using capscrews (62) and lockwashers (63).
6. Test the trolley and hoist operation as described in the "TESTING" section prior to returning to general use.

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.

⚠WARNING

• Only attach a hoist having a rated capacity equal to or less than the capacity of the trolley.

Trolley Operational Test

To ensure proper operation of the trolley conduct the following:

1. On powered trolleys, verify that pendant to trolley hoses are properly attached and that trolley movement agrees with the pendant lever arrows.
2. Operate trolley **without** a load. Verify trolley operates smoothly along entire length of the beam.
3. Operate trolley **with** a load. Verify trolley operates smoothly along entire length of the beam.

Trolley Load Test

NOTICE

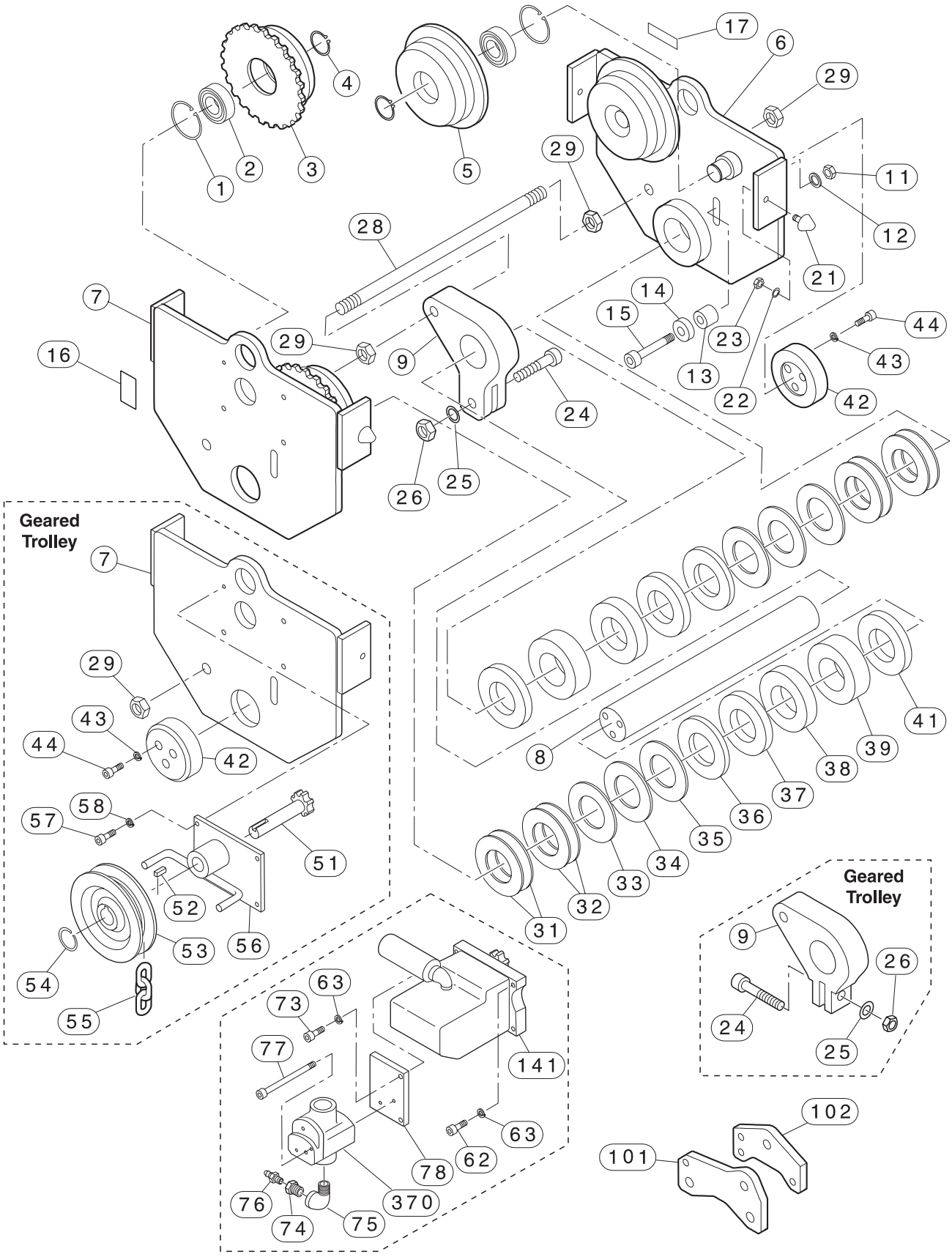
• Conduct load test with hoist attached to trolley. Refer to "SPECIFICATIONS" section in hoist manual for applicable maximum hoist load capacity.

With the hoist properly attached, conduct a load test to 125% of the **rated trolley capacity.**

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

TROLLEY DRAWINGS AND PARTS LIST TABLE OF CONTENTS

3 TON PLAIN, GEARED AND MOTORIZED TROLLEY ASSEMBLY PARTS DRAWING



(Dwg. MHP1522)

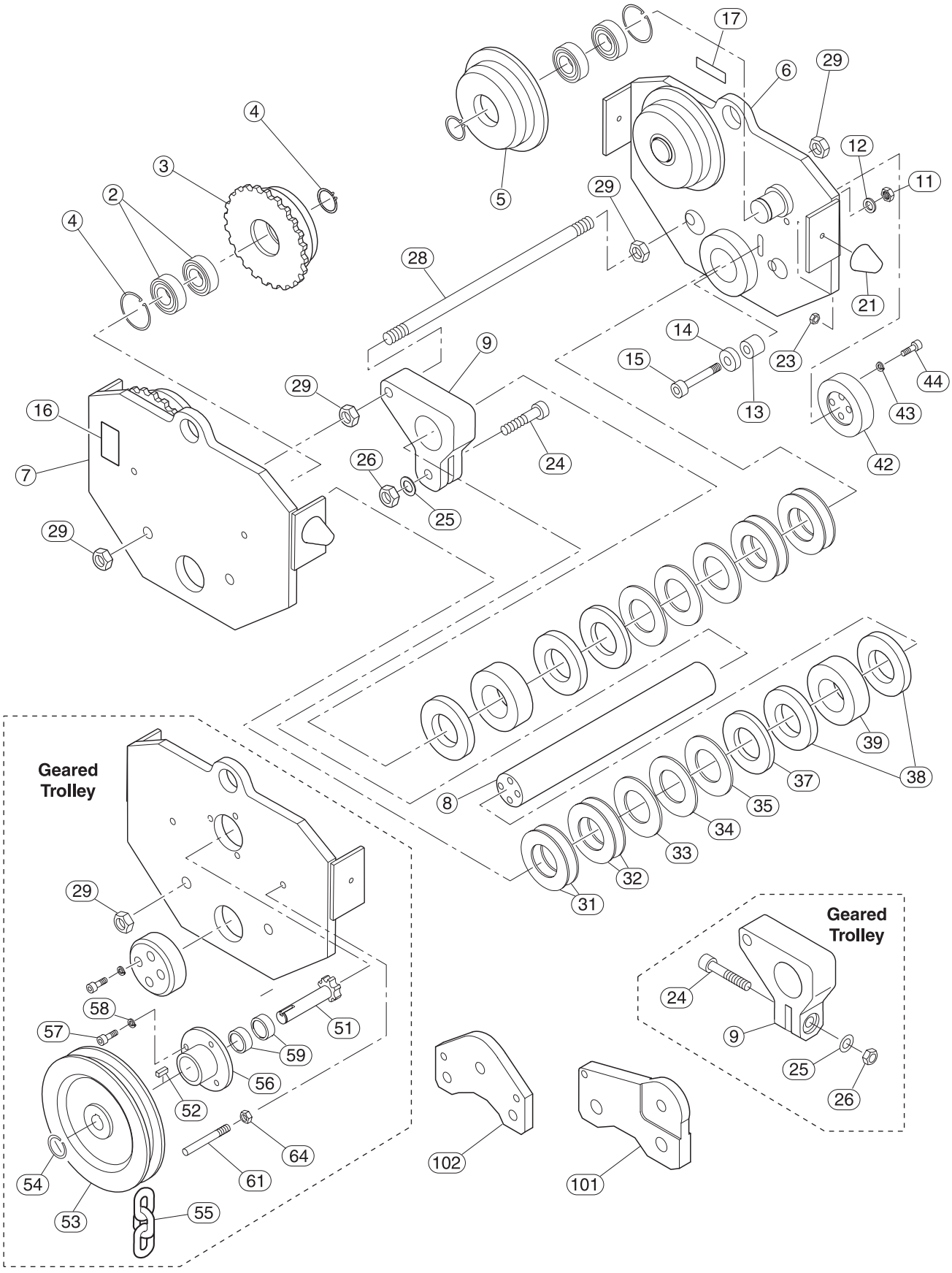
3 TON PLAIN, GEARED AND MOTORIZED TROLLEY ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	3 ton PART NO.			
			Plain	Geared	Motorized	Motor-E
1	Retainer Ring	4	47703062			
2	Bearing	4	50150006			
3	Geared Wheel	2	- - -	95247065		
	Geared Wheel (R Option)		- - -	95247071		
4	Retainer Ring	4	47700030			
5	Plain Wheel	( )	95247066 (4)	95247066 (2)		
	Plain Wheel (R Option)	( )	95247072 (4)	95247072 (2)		
6	Side Plate (Plain)	( )	95248070 (2)	95248070 (1)		
7	Side Plate (Geared)	1	- - -	95248069		
8	Suspension Shaft	1	95247067			
9	Hoist Support	1	95248073	95248074	95248073	
11	Nut	1	- - -	43706311		
12	Washer	1	- - -	45001112		
13	Spacer	1	- - -	55230138		
14	Bearing	1	- - -	50150001		
15	Capscrew	1	- - -	41329606		
16	Label Warning	1	04306445			
17	Label I-R	1	99990103			
21	Bumper (R Option)	4	69805541			
22	Lockwasher (R Option)	4	45201008			
23	Nut (R Option)	4	43003511			
24	Capscrew	1	41330106			
25	Lockwasher	1	45001414			
26	Nut	1	43707711			
28	Screw Rod	1	95240075			
29	Nut	4	43006011			
31	Spacer 0.098 in. (2.5 mm)	4	95240085			
32	Spacer 0.118 in. (3 mm)	4	95240084			
33	Spacer 0.138 in. (3.5 mm)	2	95240083			
34	Spacer 0.157 in. (4 mm)	2	95240082			
35	Spacer 0.197 in. (5 mm)	2	95240081			
36	Spacer 0.315 in. (8 mm)	2	95240080			
37	Spacer 0.59 in. (15 mm)	2	95240079			
38	Spacer 0.984 in. (25 mm)	2	95240078			
39	Spacer 1.673 in. (42.5 mm)	2	95240077			
41	Spacer 0.787 in. (20 mm)	2	95240076			
42	Tightening Washer	2	95240068			
43	Lockwasher	6	45201012			
44	Capscrew	6	41321306			
51	Pinion Shaft	1	- - -	96090173	- - -	
52	Key	1	- - -	60204724	- - -	
53	Hand Wheel	1	- - -	96090181	- - -	
54	Retainer Ring	1	- - -	47700020	- - -	
55	Hand Chain (bulk)	As Req'd	- - -	36099917	- - -	
56	Support	1	- - -	95240086	- - -	
57	Capscrew	4	- - -	41321806	- - -	
58	Lockwasher	4	- - -	45201008	- - -	
62	Capscrew	( )	- - -		41325006 (4)	41325006 (2)
63	Lockwasher	4	- - -		45201008	

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	3 ton PART NO.			
			Plain	Geared	Motorized	Motor-E
73	Capscrew	2	- - -			41330506
74	Fitting Reducer	1	- - -			61338032
75	Elbow	1	- - -			61330832
76	Fitting	1	- - -			61629732
77	Capscrew	2	- - -			41326706
78	Support Plate	1	- - -			96090275
101	Hoist Support (LCA030S 3t)	1	95247024			
102	Hoist Support (LCA030D 3t)	1	94247301			
141	Motor and Brake Assembly	1	- - -		45615	
370	Shut-off Valve Assembly 1/2 BSP	1	- - -			36170015

SERVICE NOTES

6 TON PLAIN AND GEARED TROLLEY ASSEMBLY PARTS DRAWING

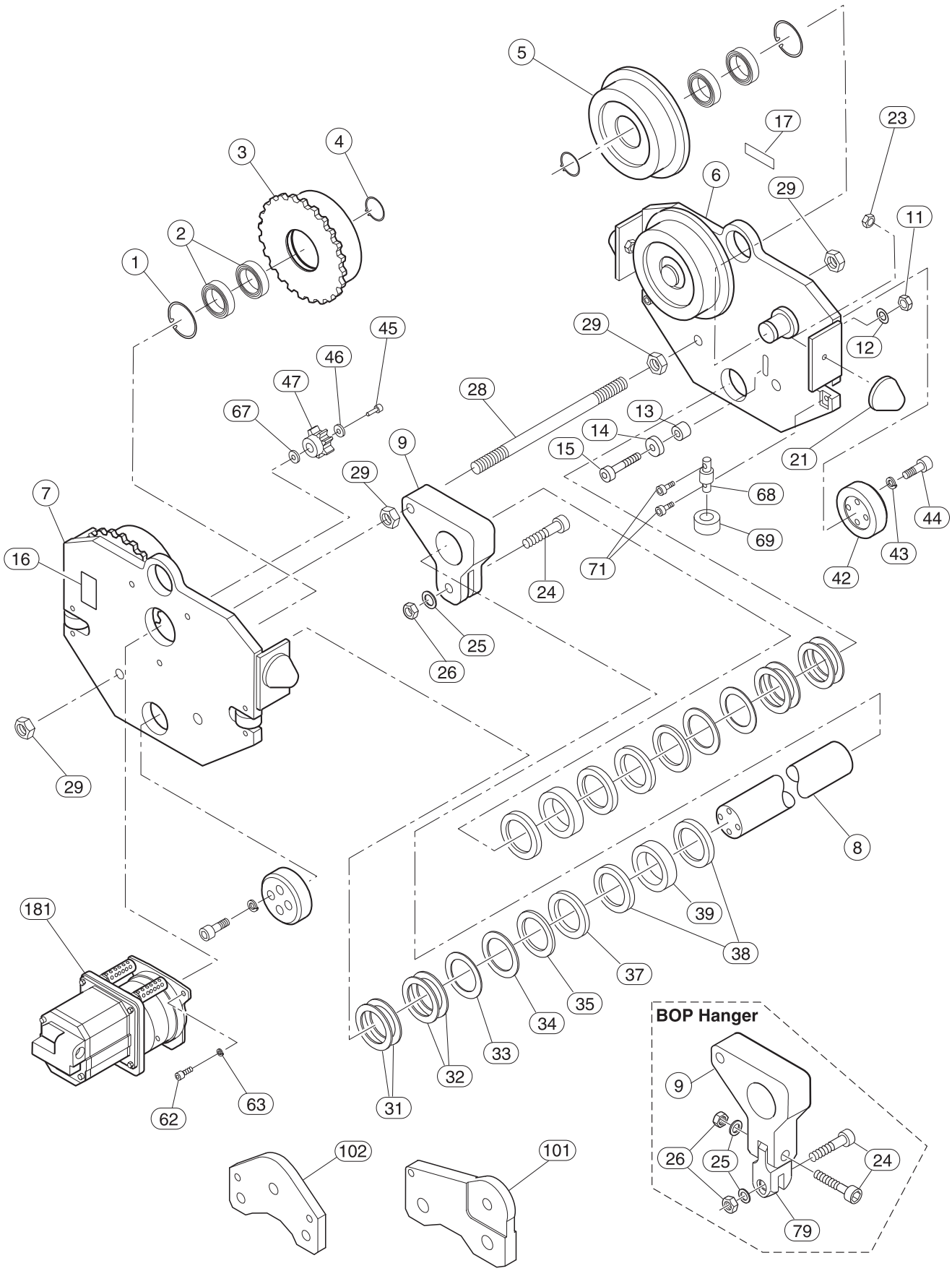


(Dwg. MHP1520

6 TON PLAIN AND GEARED TROLLEY ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	6 ton PART NO.	
			Plain	Geared
1	Retainer Ring	4	47703072	
2	Ball Bearing	8	50170007	
3	Geared Wheel	2	- - -	95230011
	Geared Wheel (R Option)			95230040
4	Retainer Ring	4	47700035	
5	Plain Wheel	( )	95230012 (4)	95230012 (2)
	Plain Wheel (R Option)		95230041 (4)	95230041 (2)
6	Side Plate (Plain)	( )	95238123 (2)	95238123 (1)
7	Side Plate (Geared)	1	- - -	95238122
8	Suspension Shaft	2	95237125	
9	Hoist Support	1	95238128	95237126
11	Nut	1	- - -	43706311
12	Washer	1	- - -	45001112
13	Spacer	1	- - -	95230138
14	Bearing	1	- - -	50150001
15	Capscrew	1	- - -	41329606
16	Label Warning	1	04306445	
17	Label I-R	1	99990102	
21	Bumper (R Option)	4	59852532	
23	Nut (R Option)	4	43706511	
24	Capscrew	1	41323706	
25	Washer	1	45001416	
26	Nut	1	43703711	
28	Screw Rod	1	95230137	
29	Nut	4	43004011	
31	Spacer 0.098 in. (2.5 mm)	4	95230129	
32	Spacer 0.118 in. (3 mm)	4	95230130	
33	Spacer 0.138 in. (3.5 mm)	2	95230131	
34	Spacer 0.157 in. (4 mm)	2	95230132	
35	Spacer 0.197 in. (5 mm)	2	95230133	
37	Spacer 0.59 in. (15 mm)	2	95230134	
38	Spacer 0.984 in. (25 mm)	4	95230135	
39	Spacer 1.673 in. (42.5 mm)	2	95230136	
42	Tightening Washer	2	95230124	
43	Lockwasher	8	45201012	
44	Capscrew	8	41321306	
51	Pinion Shaft	1	- - -	95230143
52	Key	1	- - -	95230029
53	Hand Wheel	1	- - -	95230141
54	Retainer Ring	1	- - -	47700025
55	Hand Chain (bulk)	As Req'd	- - -	35239901
56	Support	1	- - -	95230027
57	Capscrew	3	- - -	41323506
58	Lockwasher	3	- - -	45201010
59	Bushing	2	- - -	59104926
61	Chain Guide	2	- - -	95230142
64	Nut	2	- - -	43003611
101	Hoist Support (LCA060S 6t)	1	95237039	
102	Hoist Support (LCA060D 6t)	1	94127417	

6 TON MOTORIZED AND BOP TROLLEY ASSEMBLY PARTS DRAWING

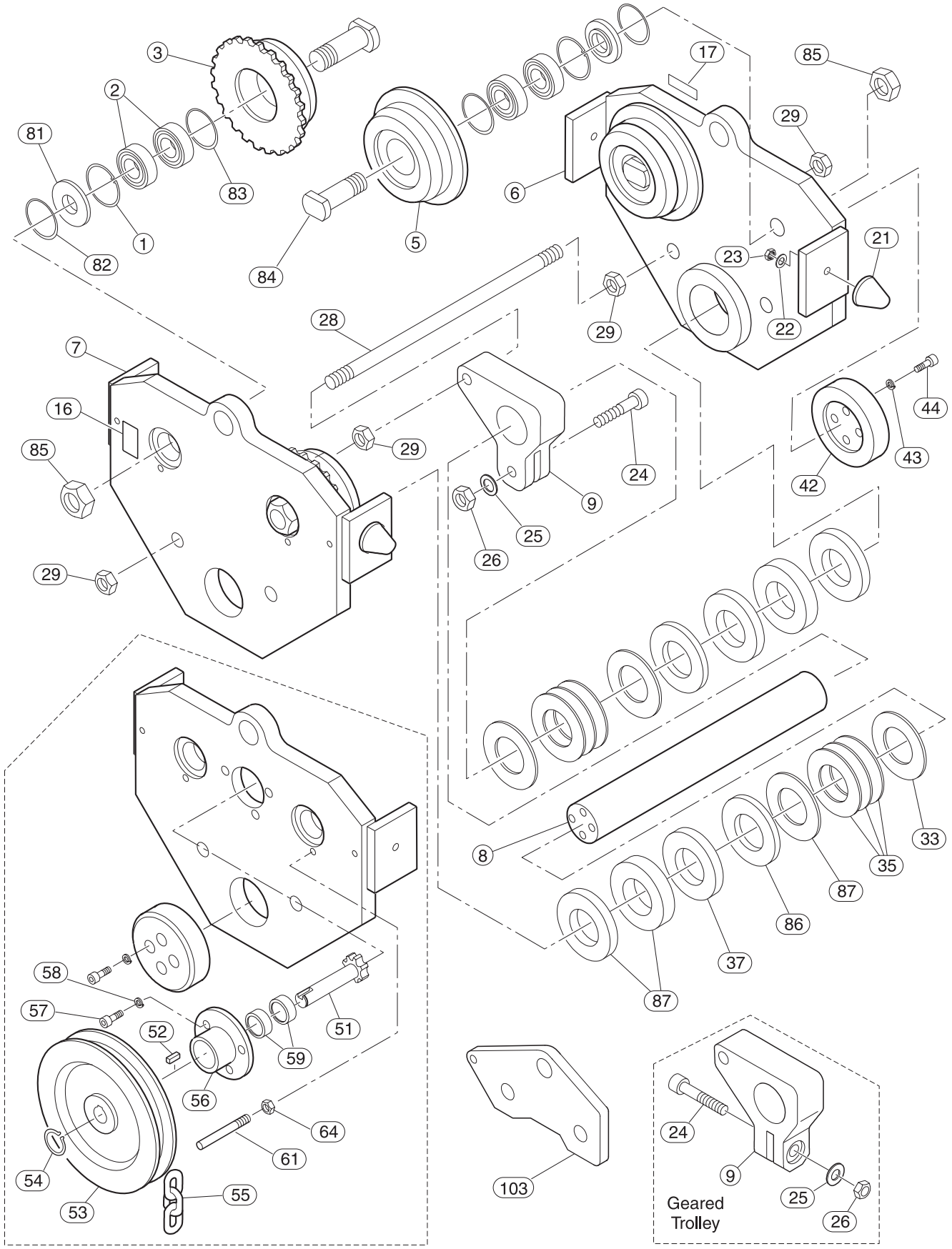


(Dwg. MHP1519)

6 TON MOTORIZED AND BOP TROLLEY ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	6 ton PART NO.	
			Motorized	BOP
1	Retainer Ring	4	47703072	
2	Bearing	8	50170007	
3	Geared Wheel	2	95230011	
	Geared Wheel (R Option)		95230040	
4	Retainer Ring	4	47700035	
5	Plain Wheel	2	95230012	
	Plain Wheel (R Option)		95230041	
6	Side Plate (Plain)	1	95238123	95238121
7	Side Plate (Geared)	1	95238122	95238120
8	Suspension Shaft	1	95237125	
9	Hoist Support	1	95238128	95237126
11	Nut	1	43706311	
12	Washer	1	45001112	
13	Spacer	1	95230138	
14	Ball Bearing	1	50150001	
15	Capscrew	1	41329606	
16	Label Warning	1	04306445	
17	Label I-R	1	99990102	
21	Bumper (R Option)	4	59852532	
23	Nut (R Option)	4	43706511	
24	Capscrew	()	41323706 (1)	41323706 (2)
25	Washer	()	45001416 (1)	45001416 (2)
26	Nut	()	43703711 (1)	43703711 (2)
28	Screw Rod	1	95230137	
29	Nut	4	43004011	
31	Spacer 0.098 in. (2.5mm)	4	95230129	
32	Spacer 0.118 in. (3mm)	4	95230130	
33	Spacer 0.138 in. (3.5mm)	2	95230131	
34	Spacer 0.157 in. (4mm)	2	95230132	
35	Spacer 0.197 in. (5mm)	2	95230133	
37	Spacer 0.59 in. (15mm)	2	95230134	
38	Spacer 0.984 in. (25mm)	4	95230135	
39	Spacer 1.673 in. (42.5mm)	2	95230136	
42	Tightening Washer	2	95230124	
43	Lockwasher	8	45201012	
44	Capscrew	8	41321306	
45	Screw	1	41325606	
46	Washer	1	45701008	
47	Drive Gear	1	95230010	
62	Capscrew	3	41323506	
63	Lockwasher	3	45201010	
67	Washer	1	45000424	
68	Roller Axle	4	- - -	95240064
69	Roller	4	- - -	69810341
71	Capscrew	8	- - -	41321306
79	Hoist Support	1	- - -	95237127
181	Motor and Reducer Assembly	1	75460001	
101	Hoist Support (LCA060S 6t)	1	95237039	
102	Hoist Support (LCA060D 6t)	1	34127417	

12 TON PLAIN AND GEARED TROLLEY ASSEMBLY PARTS DRAWING

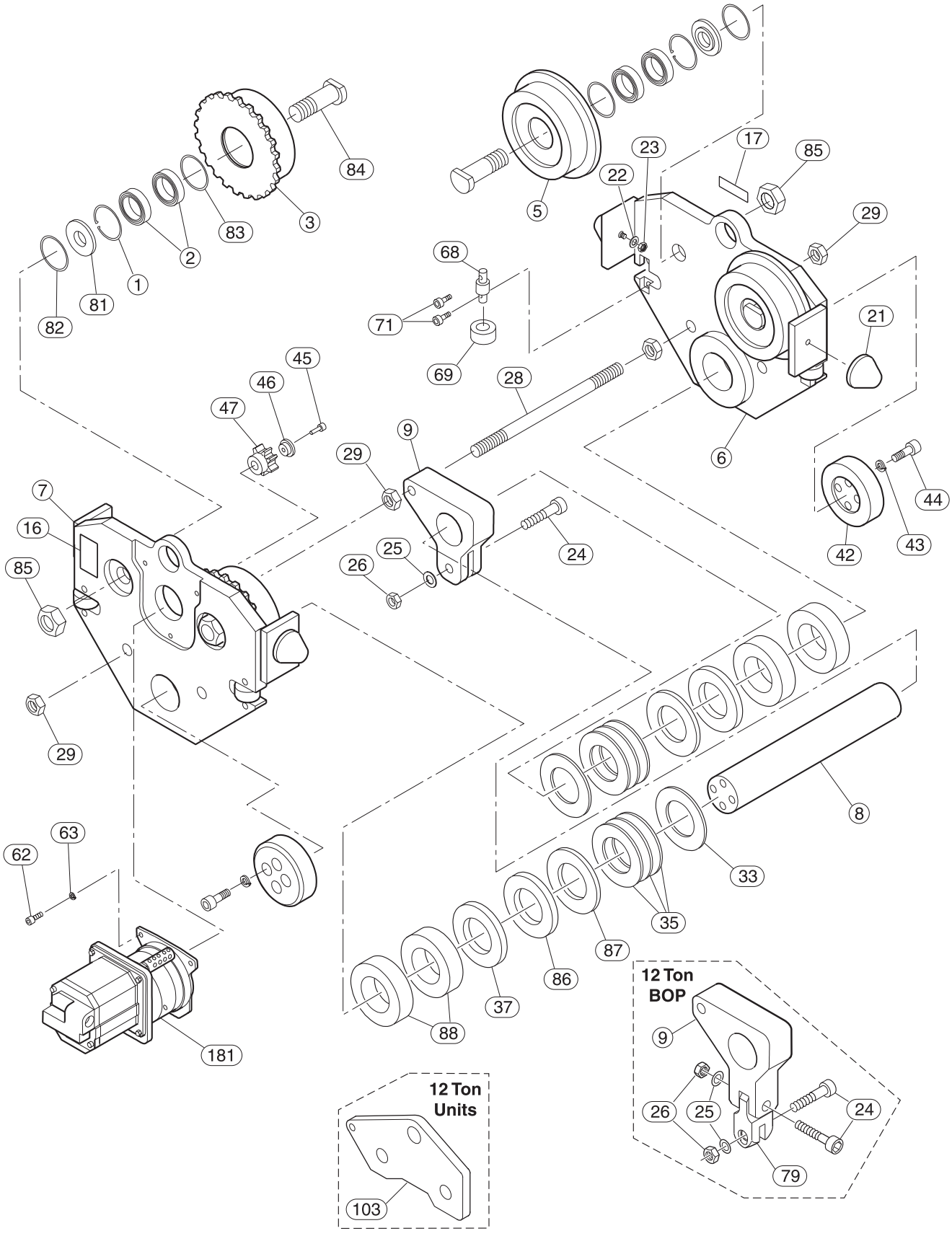


(Dwg. MHP1518)

12 TON PLAIN AND GEARED TROLLEY ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	12 ton PART NO.	
			Plain	Geared
1	Retainer Ring	4	47703072	
2	Bearing	8	51200007	
3	Geared Wheel Flat Beam -E	2	- - -	95447006
	Geared Wheel (R Option)			95447070
	Geared Wheel Taper Beam -N		- - -	95447008
	Geared Wheel (R Option)		- - -	95447017
5	Plain Wheel Flat Beam -E	( )	95447005 (4)	95447005 (2)
	Plain Wheel (R Option)	( )	95447069 (4)	95447069 (2)
	Plain Wheel Taper Beam -N	( )	95447007 (4)	95447007 (2)
	Plain Wheel (R Option)	( )	95447018 (4)	95447018 (2)
6	Side Plate (Plain)	( )	96298002 (2)	96298002 (1)
7	Side Plate (Geared)	1	- - -	96298001
8	Suspension Shaft	2	96297003	
9	Hoist Support	1	96298077	96298078
16	Label Warning	1	04306445	
17	Label I-R	1	99990102	
21	Bumper	4	69886832	
22	Washer (R Option)	4	45201012	
23	Nut (R Option)	4	43003611	
24	Capscrew	1	41321206	
25	Washer	1	45001424	
26	Nut	1	43706611	
28	Screw Rod	1	96290014	
29	Nut	4	43006111	
33	Spacer 0.138 in. (3.5 mm)	2	96290005	
35	Spacer 0.197 in. (5 mm)	6	96290006	
37	Spacer 0.59 in. (15 mm)	2	96290009	
42	Tightening Washer	2	96290004	
43	Lockwasher	8	45201016	
44	Capscrew	8	41325906	
51	Pinion Shaft	1	- - -	95230143
52	Key	1	- - -	95230029
53	Hand Wheel	1	- - -	95230141
54	Retainer Ring	1	- - -	47700025
55	Hand Chain (bulk)	As Req'd	- - -	35239901
56	Support	1	- - -	95230027
57	Capscrew	3	- - -	41323506
58	Lockwasher	3	- - -	45201010
59	Bushing	2	- - -	59104926
61	Chain Guide	2	- - -	95230142
64	Nut	2	- - -	43003611
81	Spacer	4	95440004	
82	Seal	4	58212629	
83	Seal	4	58304207	
84	Wheel Axle	4	95237017	
85	Nut	4	43006711	
86	Spacer 0.394 in. (10 mm)	2	96290008	
87	Spacer 0.236 in. (6 mm)	2	96290007	
88	Spacer 1.339 in. (34 mm)	4	96290010	
103	Hoist Support	1	95267155	

12 TON MOTORIZED AND BOP TROLLEY ASSEMBLY PARTS DRAWING

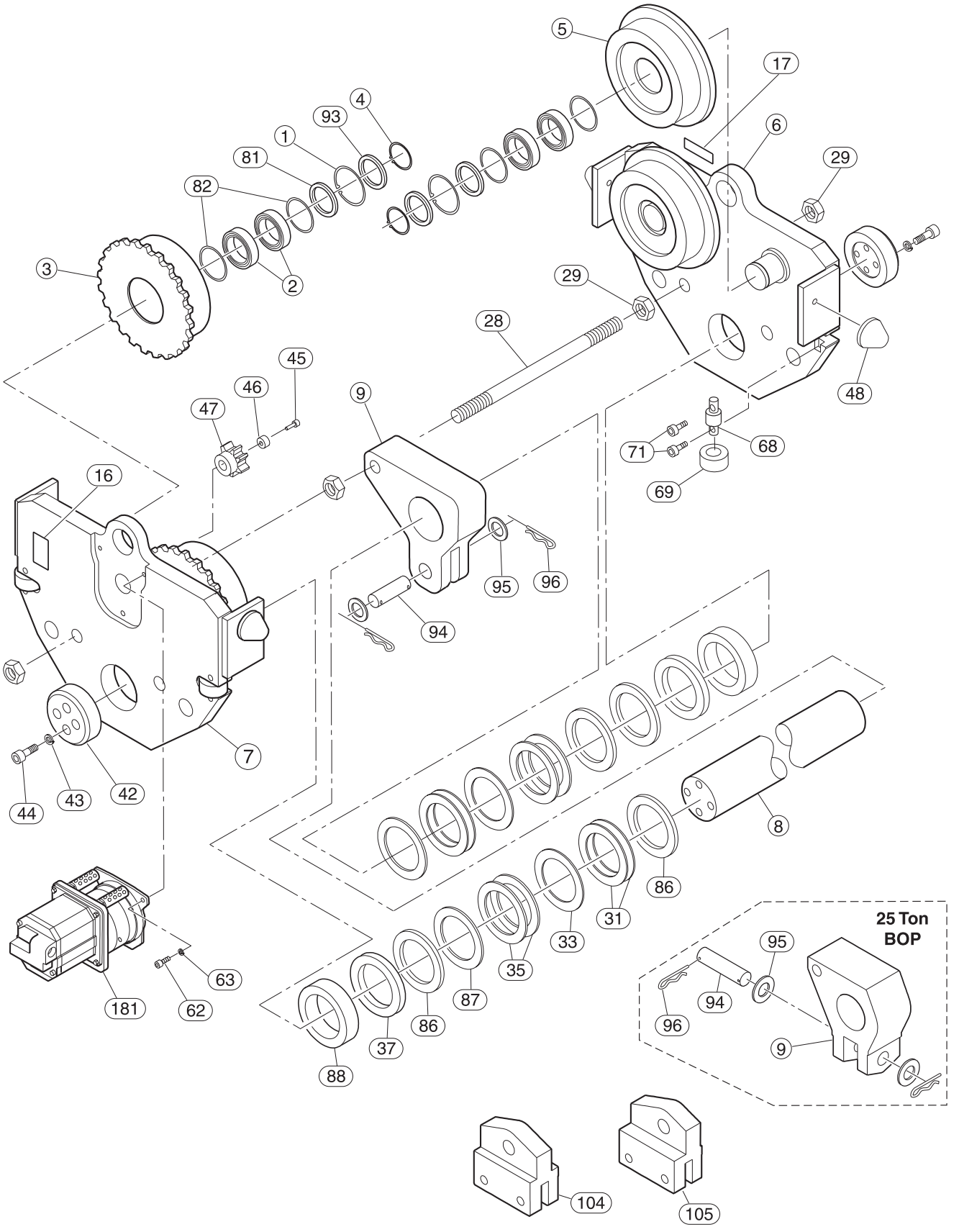


(Dwg. MHP1517)

12 TON MOTORIZED AND BOP TROLLEY ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	12 ton PART NO.	
			Motorized	Motor-BOP
1	Retainer Ring	4	47703072	
2	Bearing	8	51200007	
3	Geared Wheel Flat Beam -E	2	95447006	
	Geared Wheel (R Option)		95447070	
	Geared Wheel Taper Beam -N		95447008	
	Geared Wheel (R Option)		95447017	
5	Plain Wheel Flat Beam -E	2	95447005	
	Plain Wheel (R Option)	2	95447069	
	Plain Wheel Taper Beam -N	2	95447007	
	Plain Wheel (R Option)	2	95447018	
6	Side Plate (Plain)	( )	96298002	96378005
7	Side Plate (Geared)	1	96298001	96378004
8	Suspension Shaft	2	96297003	
9	Hoist Support	1	96298077	96298078
16	Label Warning	1	04306445	
17	Label I-R	1	99990102	
21	Bumper	4	69886832	
22	Washer (R Option)	4	45201012	
23	Nut (R Option)	4	43003611	
24	Capscrew	( )	41321206 (1)	41321206 (2)
25	Washer	( )	45001424 (1)	45001424 (2)
26	Nut	1	43706611 (1)	43706611 (2)
28	Screw Rod	1	96290014	
29	Nut	4	43006111	
33	Spacer 0.138 in. (3.5 mm)	2	96290005	
35	Spacer 0.197 in. (5 mm)	6	96290006	
37	Spacer 0.59 in. (15 mm)	2	96290009	
42	Tightening Washer	2	96290004	
43	Lockwasher	8	45201016	
44	Capscrew	8	41325906	
45	Screw	1	41324906	
46	Washer	1	96290013	
47	Drive Gear	1	96290012	
62	Capscrew	()	41323506	
63	Lockwasher	3	45201010	
68	Roller Axle	4	- - -	96290045
69	Roller	4	- - -	69810341
71	Capscrew	8	- - -	41312706
79	Hoist Support	1	- - -	96297079
81	Spacer	4	95440004	
82	Seal	4	58212629	
83	Seal	4	58304207	
84	Wheel Axle	4	95237017	
85	Nut	4	43006711	
86	Spacer 0.394 in. (10 mm)	2	96290008	
87	Spacer 0.236 in. (6 mm)	2	96290007	
88	Spacer 1.339 in. (34 mm)	4	96290010	
103	Hoist Support	1	95267155	
181	Motor and Reduction Assembly	1	35460001	

18 AND 25 TON MOTORIZED ASSEMBLY PARTS DRAWING

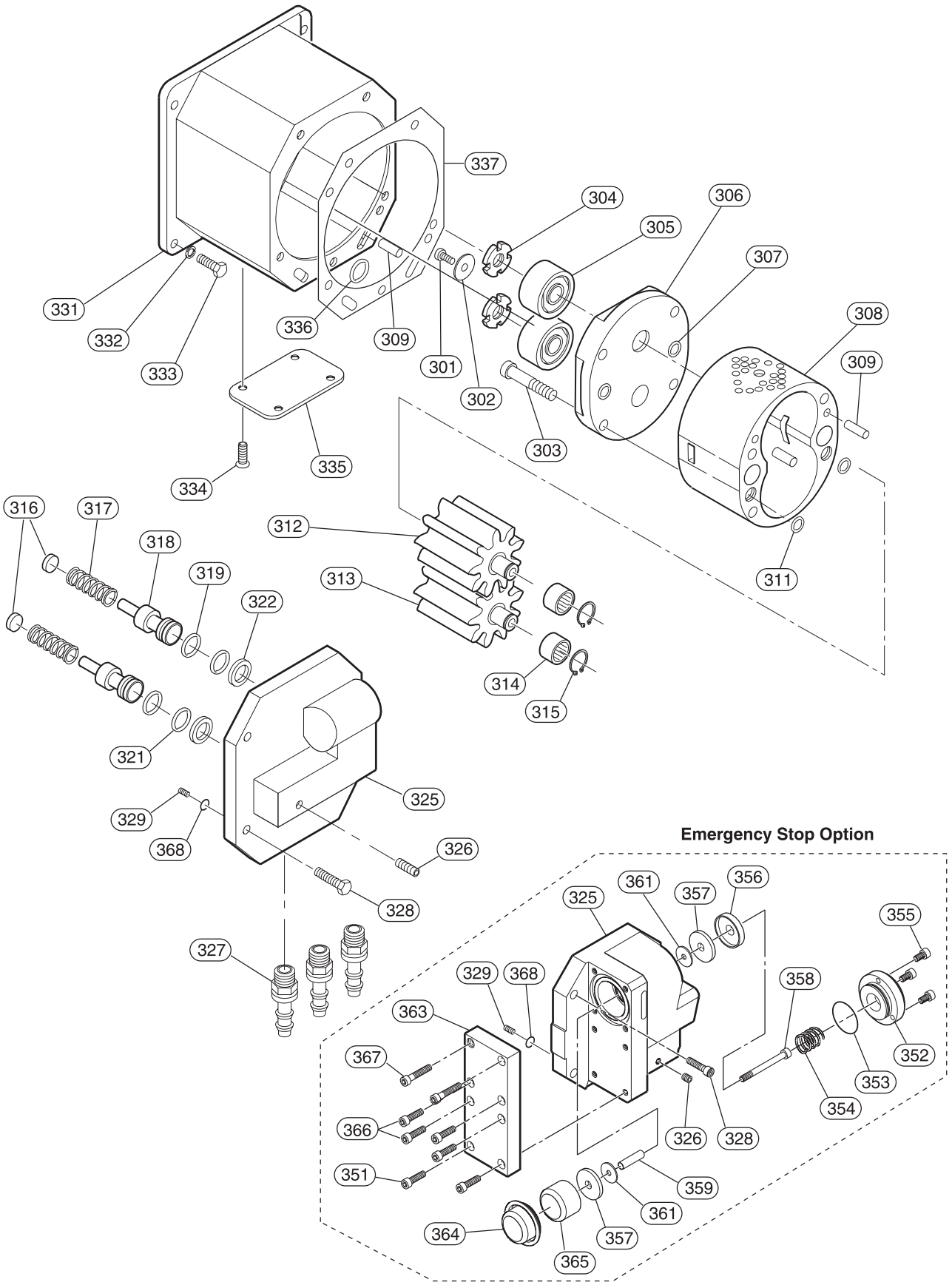


(Dwg. MHP1516)

18 AND 25 TON MOTORIZED ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	18 and 25 ton PART NO.	
			Motorized	Motor BOP
1	Retainer Ring	4	47703100	
2	Ball Bearing	8	51200011	
3	Geared Wheel -E	2	96297019	
	Geared Wheel -E-R		96297053	
	Geared Wheel -N		96297021	
	Geared Wheel -N-R		95967043	
4	Retainer Ring	4	47707055	
5	Plain Wheel -E	2	96297020	
	Plain Wheel -E-R		96297054	
	Plain Wheel -N		96297022	
	Plain Wheel -N-R		95967076	
6	Side Plate (Plain)	1	96298043	95968118
7	Side Plate (Geared)	1	96298042	95968117
8	Suspension Shaft	2	96297033	
9	Hoist Support	1	96298081	96298082
16	Label Warning	1	04306445	
17	Label I-R	1	99990102	
28	Screw Rod	1	96290031	
29	Nut	4	43006711	
31	Spacer 0.098 in. (2.5 mm)	4	96290023	
33	Spacer 0.138 in. (3.5 mm)	2	96290028	
35	Spacer 0.197 in. (5 mm)	4	96290024	
37	Spacer 0.59 in. (15 mm)	2	96290027	
42	Tightening Washer	2	96290032	
43	Lockwasher	8	45201020	
44	Screw	8	41328506	
45	Screw	1	41324906	
46	Washer	1	96290013	
47	Drive Gear	1	96290012	
48	Bumper Assembly (R Option)	4	36290012	
62	Screw	3	41323506	
63	Lockwasher	3	45201010	
68	Roller Axle	4	- - -	96290045
69	Roller	4	- - -	69810341
71	Capscrew	8	- - -	41312706
81	Spacer	4	95960045	
82	Seal	8	58324111	
86	Spacer 0.394 in. (10 mm)	2	96290026	
87	Spacer 0.236 in. (6 mm)	2	96290025	
88	Spacer 1.339 in. (34 mm)	4	96290029	
93	Spacer	4	95960044	
94	Axle	1	96297083	
95	Washer	2	45001139	
96	Cotter Pin	2	47863832	
104	Hoist Support (25t)	1	95908063	
105	Hoist Support (18t)	1	95908065	
181	Motor and Reduction Assembly	1	75460001	

2 HP MOTOR ASSEMBLY PARTS DRAWING

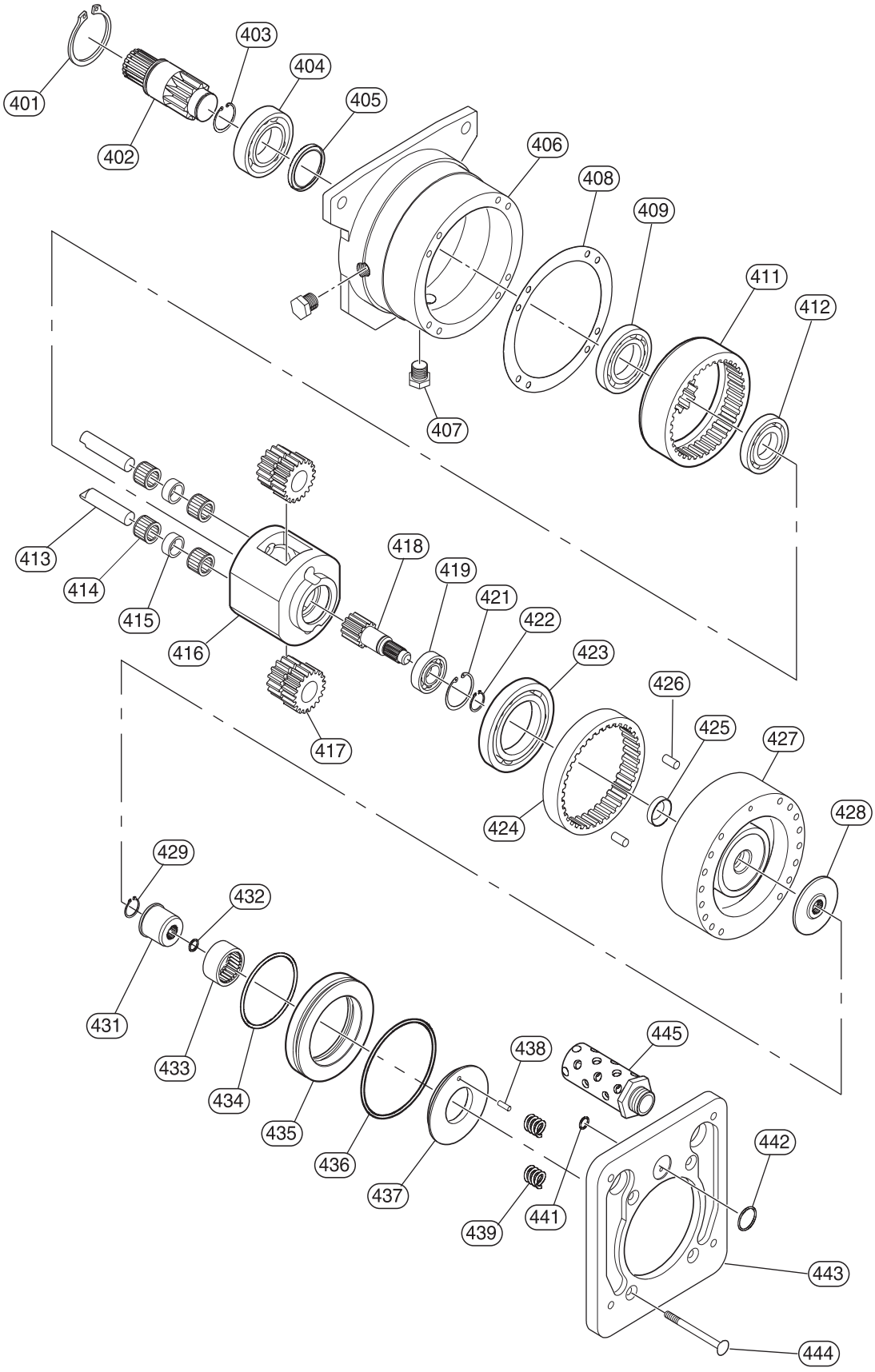


(Dwg. MHP1651)

2 HP MOTOR ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.	
			Without Emergency Stop	With Emergency Stop
300	Motor Assembly without Emergency Stop (includes items 301 through 328)	1	36090437	- - -
	Motor Assembly with Emergency Stop (includes items 301 through 328 and 351 through 368)		- - -	36090430
301	Screw	1	41306706	
302	Washer	1	96090032	
303	Capscrew	4	41300806	
304	Locknut	2	57000002	
305	Bearing	2	50600002	
306	Motor Flange	1	96090008	
• 307	'O' Ring	( )	58222329 (2)	58222329 (3)
308	Motor Housing	1	96090277	96090007
309	Pin	6	46000416	
• 311	'O' Ring	2	58205029	
312	Idle Gear (Set Only)	1	36090128	
313	Driving Gear (Set Only)			
314	Needle Bearing	2	56461912	
315	Retainer Ring	2	47801339	
316	Slide Valve	2	94120030	
317	Spring	2	94240224	
318	Slide Valve	2	94240212	
• 319	Quad-ring	2	58231229	
• 321	Quad-ring	2	58228929	
322	Stop	2	96090042	
325	Motor Cover	1	96090079	96090270
326	Set Screw	1	42007707	42008307
327	Fitting	( )	61652632 (3)	61652632 (5)
328	Screw	4	41312206	- - -
329	Setscrew	2	42007407	
331	Motor Housing	1	96180015	
332	Lockwasher	4	45201006	
333	Capscrew	4	41322606	
334	Capscrew	4	41104503	
335	Cover	1	96180036	
• 336	'O' Ring	2	58224929	
• 337	Gasket	1	96180066	
351	Capscrew	6	- - -	41322206
352	Cover	1	- - -	96170059
• 353	'O' Ring	1	- - -	58214829
354	Spring	1	- - -	69158732
355	Capscrew	3	- - -	41326306
356	Valve Cone	1	- - -	96170053
• 357	Seal	2	- - -	96170056
358	Screw	1	- - -	41308206
359	Spacer	2	- - -	96170055
361	Washer	2	- - -	45700005
363	Cover	1	- - -	96090271
• 364	Diaphragm	1	- - -	67716341
365	Valve Cone	1	- - -	96170054
366	Screw	4	- - -	41322306
367	Screw	2	- - -	41324306
• 368	'O' Ring	2	- - -	58212229
•	Recommended Spare			

MOTOR-REDUCER WITH BRAKE PARTS DRAWING



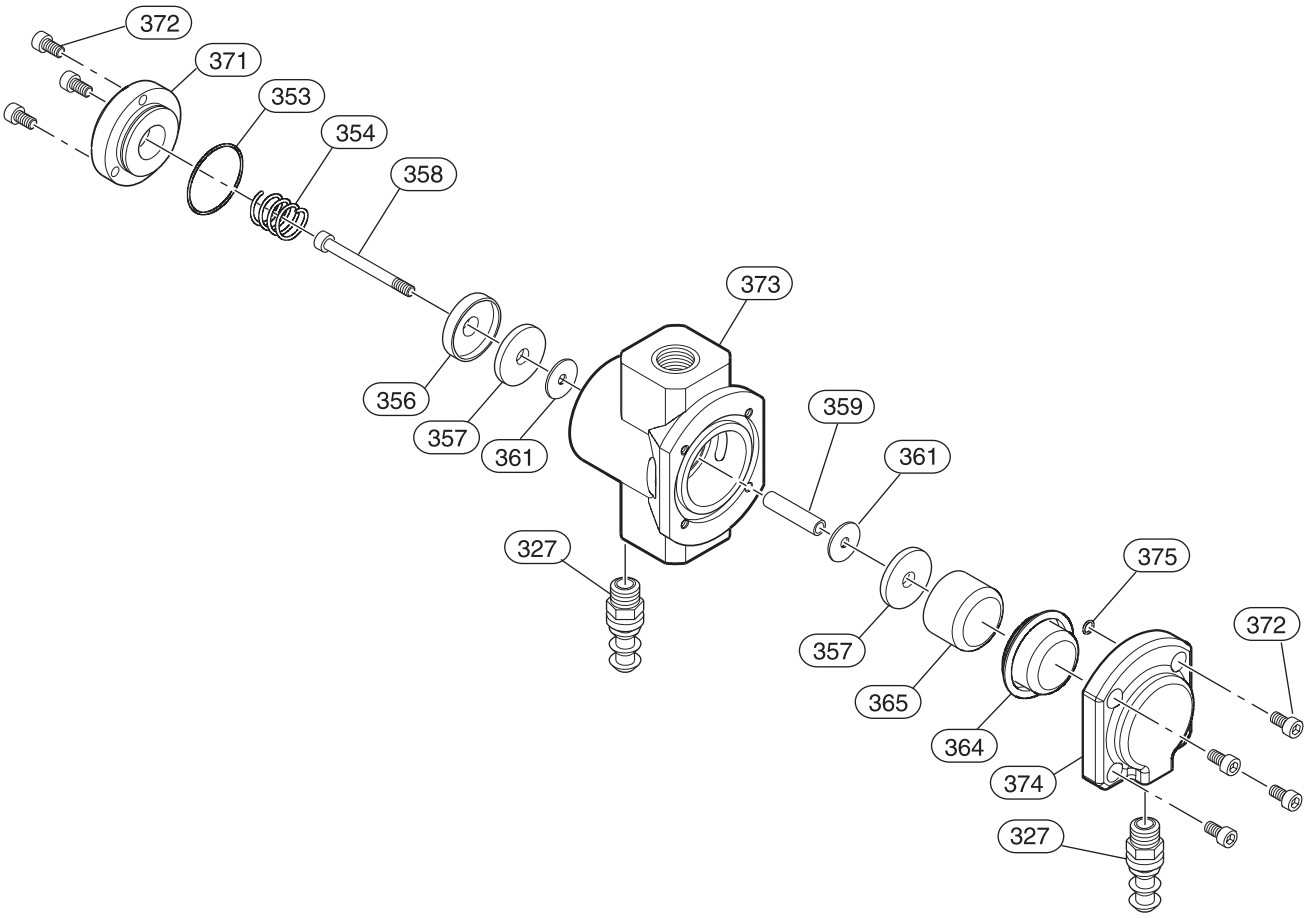
(Dwg. MHP1543)

MOTOR-REDUCER WITH BRAKE PARTS LIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.
181	Motor and Reducer Assembly (Incl's Motor on page 36)	1	35460001
401	Retainer Ring	1	47700030
402	Drive Shaft	1	95460008
403	Retainer Ring	1	47802139
404	Bearing	1	50050006
405	Seal Washer	1	58017530
406	Gear Case	1	95460007
407	Plug	2	65125832
• 408	Gasket	1	96180042
409	Bearing	1	50800006
411	Ring Gear	1	96090094
412	Bearing	1	50800005
413	Planet Axle	2	96090039
414	Needle Roller Bearing	4	56501513
415	Spacer Ring	2	96090095
416	Planet Support	1	96090014
417	Double Planet Gear	2	96090096
418	Shaft Sun Gear	1	96180011
419	Bearing	1	50000002
421	Retainer Ring	1	47703032
422	Retainer Ring	1	47700015
423	Bearing	1	50800009
424	Ring Gear	1	96090038
425	Seal Washer	1	58019830
426	Pin	2	46001116
427	Brake Body	1	96180057
428	Friction Disc	1	96090049
429	Retainer Ring	1	47700012
431	Coupling	1	96180014
• 432	'O' Ring	1	58218229
433	Needle Roller Bearing	1	56323225
• 434	'O' Ring	1	58232229
435	Brake Piston	1	96090113
• 436	'O' Ring	1	58232329
437	Brake Disc	1	96180012
438	Pin	1	46406118
439	Spring	4	69165532
• 441	'O' Ring	1	58212529
• 442	'O' Ring	1	58218129
443	Flange	1	95460009
444	Screw	4	41103903
• 445	Muffler	2	68497432

• Recommended Spare

SHUT-OFF VALVE ASSEMBLY PARTS DRAWING



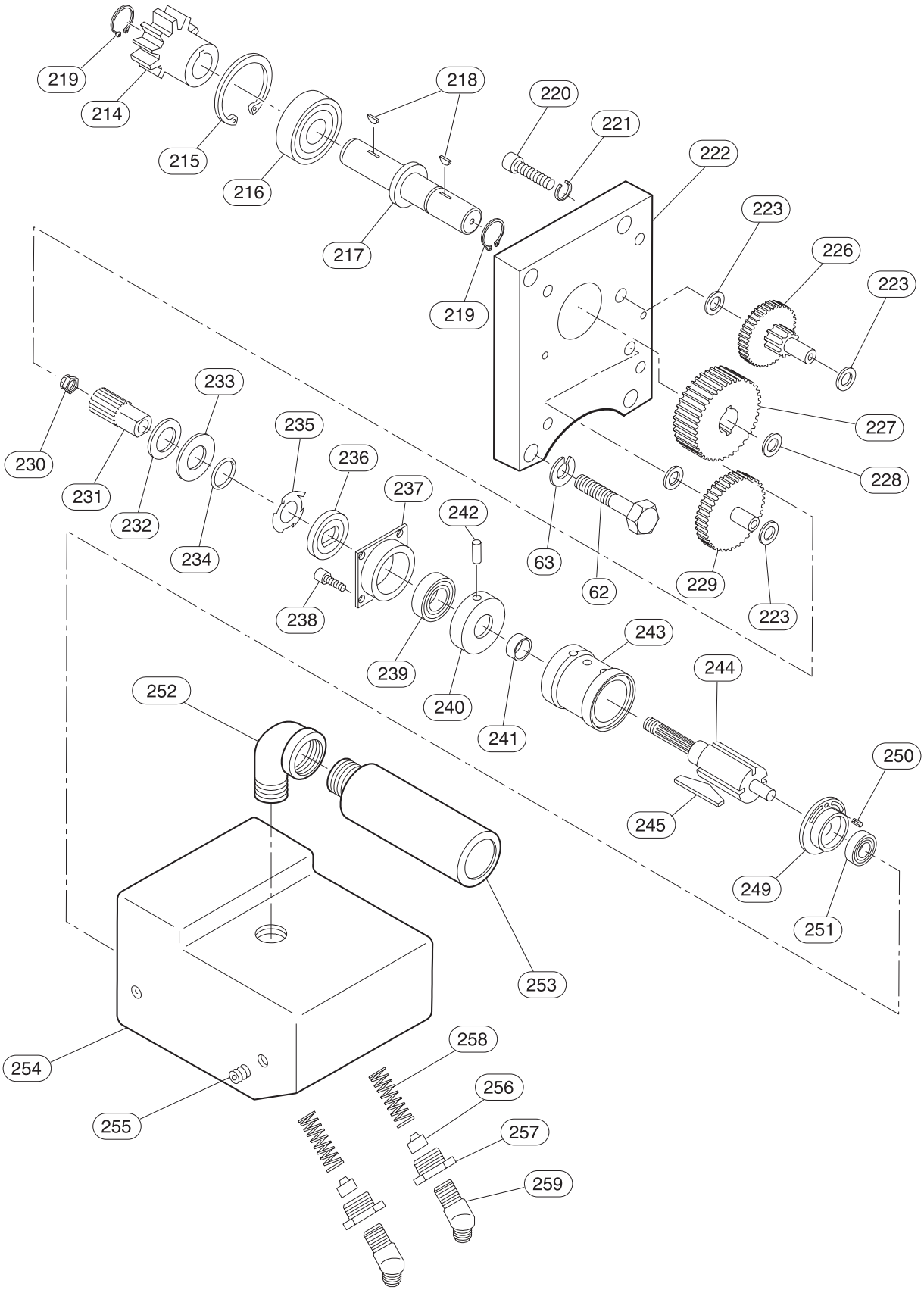
(Dwg. MHP1583)

SHUT-OFF VALVE ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.
			1/2 BSP
370	Shut-off Valve Assembly (Includes items 327 through 375)	1	36170015
327	Fitting	2	61652632
353	'O' Ring	1	58214829
354	Spring	1	69158732
356	Valve Cone	1	96170053
• 357	Seal Washer	2	96170056
358	Screw	1	41326106
359	Spacer	1	96170055
361	Washer	2	45700005
• 364	Diaphragm	1	67716341
365	Valve Cone	1	96170054
371	Cover	1	96170059
372	Screw	7	41326306
373	Body	1	96170051
374	Cover	1	96170052
• 375	'O' Ring	1	58209229

• Recommended Spare

3 TON TROLLEY MOTOR ASSEMBLY PARTS DRAWING



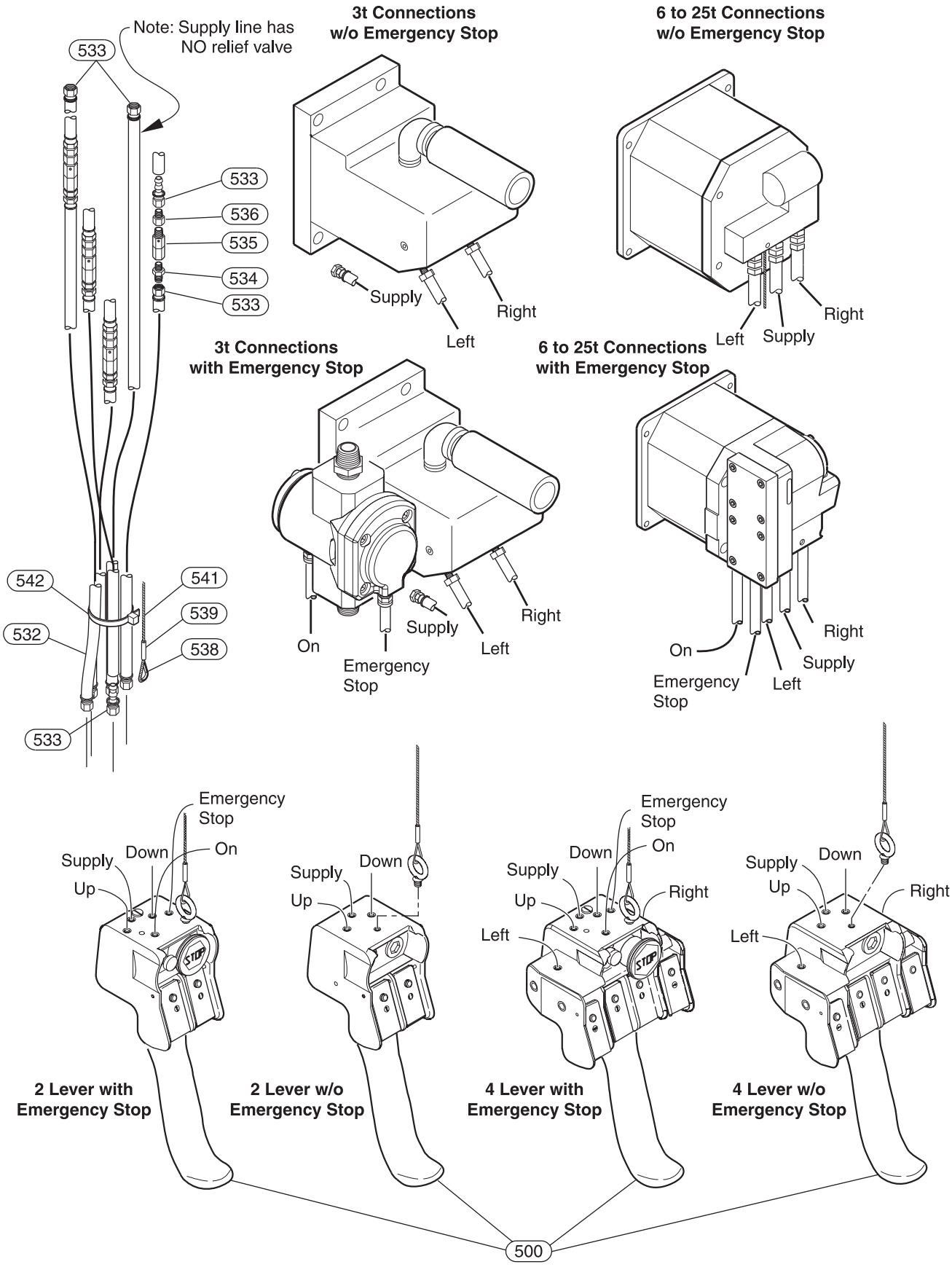
(Dwg. MHP1581)

3 TON TROLLEY MOTOR ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.
- - -	Power Unit Assembly	1	45615
- - -	Motor Assembly (Items 239 to 251)	1	45612
62	Capscrew	4	41325006
63	Lockwasher	4	45201008
214	Pinion Gear	1	45624
215	Retainer Ring	1	Y147-16
216	Bearing	1	39163
217	Spindle Shaft	1	45606
218	Key	2	37142
219	Retainer Ring	2	Y145-18
220	Capscrew	4	Y99-42
221	Lockwasher	4	Y14-416-C
222	Plate	1	45614
223	Washer	4	Y48-14
226	Gear	1	44768
227	Gear	1	44020-1
228	Thrust Race	1	42384
229	Gear	1	44767
230	Nut	1	Y192-1-Z
231	Pinion Shaft	1	45608
232	Spacer	1	37128
233	Washer	1	73473
• 234	'O' Ring	1	Y325-13
• 235	Finger Spring	1	30297
• 236	Brake Lining	1	45619
237	Brake Cone	1	45617
238	Capscrew	4	Y154-52
239	Bearing	1	30469
240	End Plate	1	45620
241	Spacer	1	30437
242	Roll Pin (Included with Cylinder, item 243)	2	Y178-20
243	Cylinder (Includes Roll Pin, item 242)	1	37683
244	Rotor	1	45605
• 245	Rotor Blade	4	30741
249	End Plate	1	31601
250	Pin	1	32814
• 251	Bearing	1	Y65-7
252	Elbow	1	Y43-3-C
253	Muffler	1	43874-1
254	Motor Housing	1	45613
255	Pipe Plug	2	Y227-2
256	Piston	2	45603
257	Inlet Adapter	2	45609
• 258	Spring	2	45793
259	Fitting Hose Adapter	2	61629732

• Recommended spare

PENDANT HOSE ASSEMBLY PARTS DRAWING



(Dwg. MHP1598)

PENDANT HOSE ASSEMBLY PARTS LIST

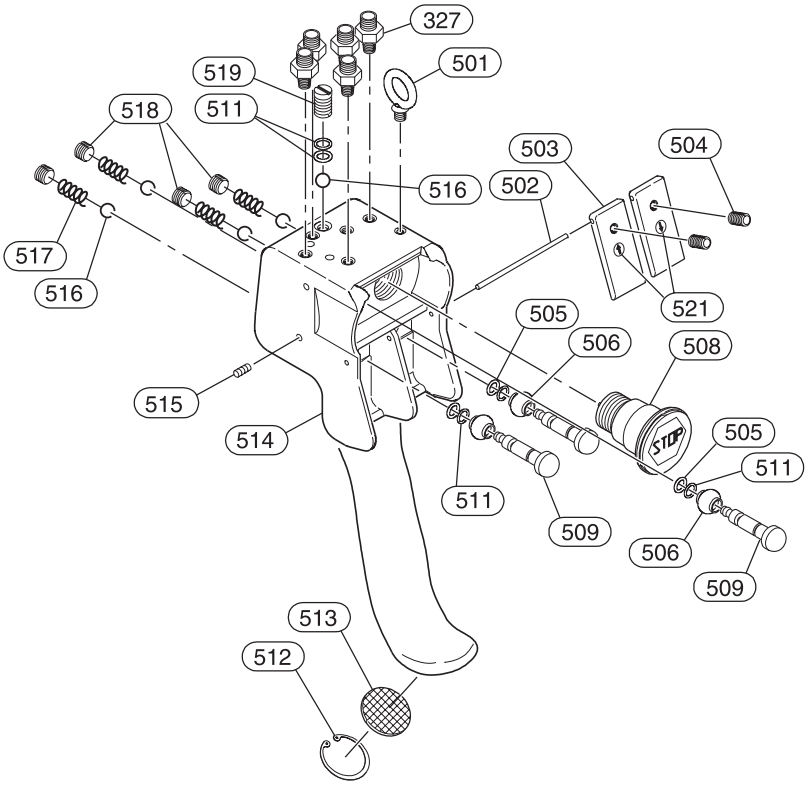
ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.
500	Pendant Assembly	1	Refer to Pendant Assembly Parts List
532	Hose (specify length when ordering)	3 (5)	50923
533	Fitting, Hose End	As Req'd.	51029
534	Fitting, Connector	As Req'd.	71048268
535	Exhaust Valve Kit (required for hose lengths greater than 20 ft. (6 m)) (Incl's items 533 (2), 534 (1), 535 (1), and 536 (1))	As Req'd.*	20417
536	Fitting Connector	As Req'd.	71048284
538	Thimble	1	71111827
539	Sleeve Clamp	1	54799
541	Strain Relief Wire (specify length when ordering)	1	71073506
542	Hose Tie	As Req'd.	54235

( ) Quantity required for Remote Control with Emergency Stop

* 0 - 19 ft. (0 - 6 m) Hose Length, 0 Exhaust Valve Kits Required
20 - 39 ft. (6 - 12 m) Hose Length, 2 Exhaust Valve Kits Required
40 - 59 ft. (12 - 18 m) Hose Length, 4 Exhaust Valve Kits Required Service Notes

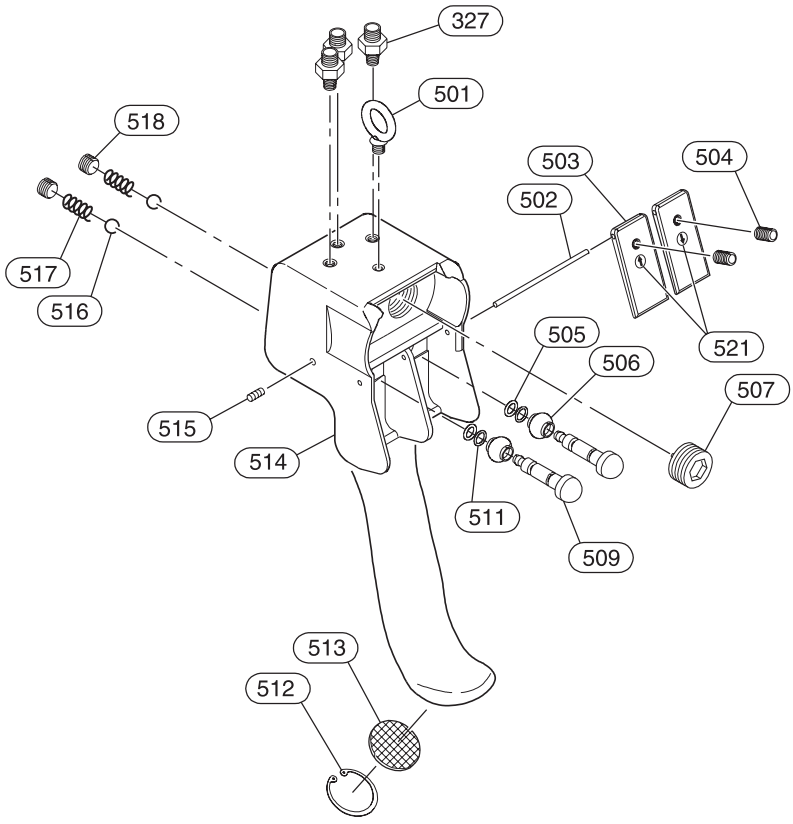
TWO LEVER PENDANT CONTROL ASSEMBLY PARTS DRAWING

2 Lever with Emergency Stop



(Dwg. MHP1544)

2 Lever without Emergency Stop



(Dwg. MHP1558)

TWO LEVER PENDANT CONTROL ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.				
			Without Emergency Stop			With Emergency Stop	
327	Fitting	3 (5)	71078158				
500	Pendant Assembly	1	PHS2E	PHS2E-R	PHS2E-F	PHS2E-U	PHS2E-RU
501	Lifting Eye	1	64222332				
502	Pin	1	95790040				
503	Lever	2	95790122				
504	Screw	2	42008607				
• 505	'O' Ring	2 (3)	58235329				
506	Protector	2 (3)	95790107				
507	Plug	1	65129541			- - -	
508	Emergency Stop Valve	1	- - -			95790108	
509	Valve	2 (3)	95790104				
• 511	'O' Ring	2 (5)	58209229				
512	Retainer Ring	1	47713030				
513	Exhaust Washer	1	67600303				
514	Pendant Handle	1	Not sold separately. Order new pendant, item 500.				
515	Screw	2 (3)	42008307				
• 516	Ball	2 (5)	69401625				
517	Spring	2 (4)	69128541				
518	Plug	2 (4)	65107741				
519	Plug	1	- - -			95790106	
521	Label Kit	1	95790111				
*	Label: "Read the Manual"	1	96180098				
*	Label: "Do Not Use Lifting Personnel"	1	96180100				

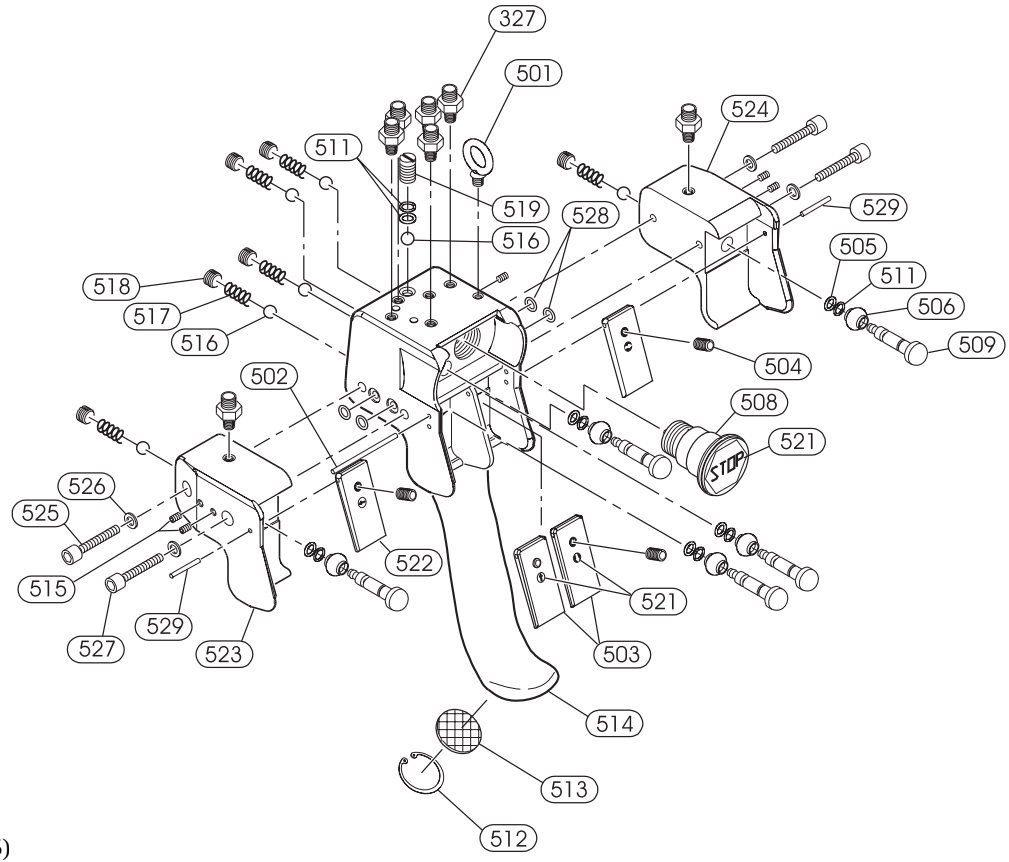
• Recommended Spare

* Not illustrated
( ) Quantity Required for Pendants with Emergency Stop

-R = S•COR•E
-F = Food Grade
-U = With Emergency Stop
-RU = Emergency Stop and S•COR•E

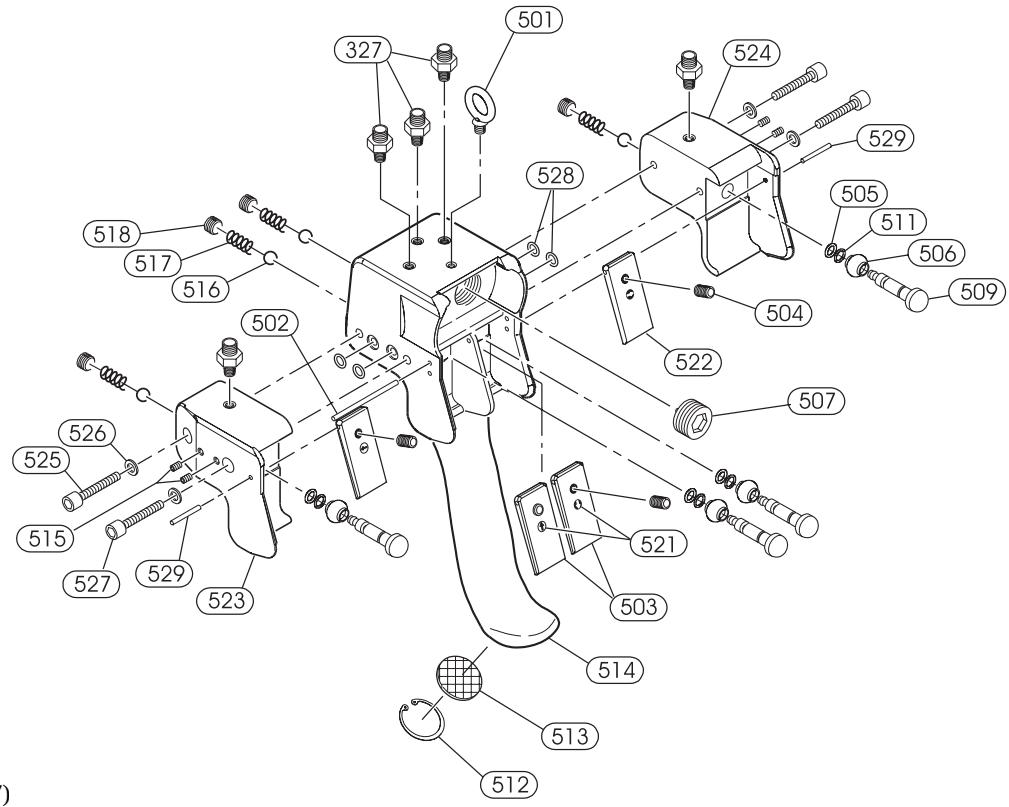
FOUR LEVER PENDANT CONTROL ASSEMBLY DRAWING

4 Lever with Emergency Stop



(Dwg. MHP1545)

4 Lever without Emergency Stop



(Dwg. MHP1577)

FOUR LEVER PENDANT CONTROL ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.	
			Without Emergency Stop	With Emergency Stop
500	Pendant Assembly	1	PHS4E	PHS4E-U
327	Fitting Hose	5 (7)	71078158	
501	Lifting Eye	1	64222332	
502	Pin	1	95790040	
503	Lever	2	95790122	
504	Screw	4	42008607	
• 505	'O' Ring	4 (5)	58235329	
506	Protector	4 (5)	95790107	
507	Plug	1	65129541	- - -
508	Emergency Stop Valve	1	- - -	95790108
509	Valve	4 (5)	95790104	
• 511	'O' Ring	4 (7)	58209229	
512	Retainer Ring	1	47713030	
513	Exhaust Washer	1	67600303	
514	Pendant Handle *	1	Order item 500	
515	Screw	4 (5)	42008307	
• 516	Ball	4 (7)	69401625	
517	Spring	4 (6)	69128541	
518	Plug	4 (6)	65107741	
519	Plug	1	95790106	- - -
521	Label Kit	1	95790111	
522	Lever	2	95790128	
523	Attachment (Left)	1	95790125	
524	Attachment (Right)	1	95790126	
525	Screw	2	41330506	
526	Washer	4	45201005	
527	Screw	2	41322106	
• 528	'O' Ring	4	58218229	
529	Pin	2	95790127	
**	Label: "Read the Manual"	1	96180098	
**	Label: "Do Not Use Lifting Personnel"	1	96180100	

• Recommended Spare

* Not sold separately. Order new pendant

** Not illustrated

( ) Quantity Required for Pendants with Emergency Stop

ACCESSORIES

DESCRIPTION	PART NO.
Lubricant	LUBRI-LINK-GREEN
Grease (EP#1)	ARO 33153
Spindle Oil	ARO 29655
Lubricator (1/2 inch NPT inline)	L20-04-000
Lubricator (1/2 inch BSP inline) (CE only)	L26-04-A29
Air Filter NPT	F20-04-000
Air Filter BSP (CE only)	F26-C4-A29
Motor Mounting Kit (3t Motorized)	TR-KSTUD

PARTS ORDERING INFORMATION

The use of other than genuine **Ingersoll-Rand** Material Handling replacement parts may adversely affect the safe operation of this product.

For your convenience and future reference it is recommended that the following information be recorded.

Trolley Model Number _____

Trolley Serial Number _____

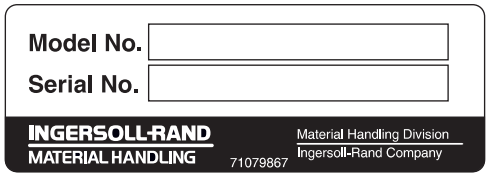
Date Purchased _____

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.

NOTICE

• Trolley label is located on side plate.

Each trolley is supplied from the factory with the trolley label shown. Label may not be shown actual size.



Continuing improvement and advancement of design may cause changes to this trolley 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 trolley has expired, it is recommended that the trolley be disassembled, degreased and parts separated as to materials so that they may be recycled.

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.

NOTICE

• Ingersoll-Rand Replacement Parts are specifically designed to ensure optimum performance of your equipment. Use of other than genuine Ingersoll-Rand Material Handling parts may adversely affect safe operation and may also void the warranty.

For additional information contact:

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

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 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, Order Status and Technical Support

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

Web Site
www.ingersoll-rand.com

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Fax: (562) 948-1828

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Southern Pines, NC 28387
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Fax: (416) 213-4506

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