

## IMPORTANT INFORMATION:

- A copy of our “Safe Operating Practices” Manuals are always available free of charge either by downloading it from our Technical Publications website @ [www.airwinch.com](http://www.airwinch.com) or by contacting the Factory at (800) 866-5457 for North America and (206) 624-0466 for International. The Safe Operating Practices manual must be read prior to anyone operating a **Ingersoll-Rand** winch or hoist. The manual form numbers are as follows:

“Safe Operating Practices Non-Man Rider™ Winches” Manual, Form No. MHD56250

“Safe Operating Practices for Man Rider™ Winches” Manual, Form No. MHD56251

“Safe Operating Practices for Pneumatic, Hydraulic and Electric Hoists” Manual, Form No. MHD56295

- Available winch options may require additional supplements to the basic winch manual.
- For Man Rider™ winches ensure a copy of the Man Rider™ supplement is made available to the operator prior to winch operation.

### Winch Man Rider™ Supplements:

Model:	Publication No.
FA2, FA2.5, FH2, FH2.5	MHD56046
FA5	MHD56042 and MHD56220
FA10	MHD56252
FA2.5A	MHD56236
FA2B and HU40A	MHD56207
FH10MR	MHD56212
Fulcrum Electric	MHD56277
LS500HLP/ LS1000HLP	SAM0004

Model:	Publication No.
LS500RLP	SAM0011
LS1000RLP	SAM0012
LS150RLP	SAM0082
LS150RLP/500/ 1000	SAM0115
LS150RLP and LS150PLP-PH	SAM0120
LS500RLP-E	SAM0122
LS150RLP- DP5M-F	SAM0184
LS150HLP	SAM0222

- We strongly recommend that ALL maintenance on **Ingersoll-Rand** equipment be carried out by personnel certified by **Ingersoll-Rand**, or by **Ingersoll-Rand** Authorized Service Centers.
- Contact the Factory if in doubt about installation, operation, inspection and maintenance instructions.
- Use only Genuine **Ingersoll-Rand** parts when maintaining or repairing a winch, hoist or any component of a winch or hoist.
- ANSI / ASME recommends that a winch or hoist (or any components of a winch or hoist) that has been repaired be tested prior to being placed into service:
  - \* **Winches** - ANSI / ASME B30.7 (BASE MOUNTED DRUM HOISTS) Refer to section 7.2.2 - Testing.
  - \* **Hoists** - ANSI / ASME B30.16 (OVERHEAD HOISTS - UNDERHUNG) Refer to section 16.2.2 - Testing.

**PARTS, INSTALLATION AND MAINTENANCE MANUAL**  
for  
***Hercu-Link*<sup>TM</sup> AIR HOIST**  
**MODELS**

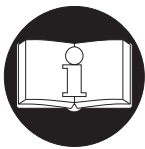
**HA3-025**  
(25 metric tons)

**HA3-075**  
(75 metric tons)

**HA3-050**  
(50 metric tons)

**HA3-100**  
(100 metric tons)

Tons in this manual are metric tons (1 metric ton = 2,200 lbs.)



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

**⚠ WARNING**

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

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

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## SAFETY INFORMATION

This manual provides important information for all personnel involved with 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 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 hoist or attached equipment for lifting, supporting or transporting people or lifting or supporting loads over people.
- Air powered hoists are designed to provide a 5 to 1 safety factor and are factory tested to 125% of rated load. The supporting structures and load-attaching devices used in conjunction with this hoist must provide adequate support to handle all hoist operations plus weight of hoist and attached equipment. This is the customer's responsibility. If in doubt, consult a registered structural engineer.

#### NOTICE

- Lifting equipment is subject to different regulations in each country. These regulations may not be specified in this manual.

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 load. From a safety standpoint, one factor is paramount: conduct all lifting or pulling operations in such a manner that if there were an equipment failure, no personnel would be injured. This means keep out from under a raised load and keep out of intended path of any load.

**Ingersoll-Rand** hoists are manufactured in accordance with the latest ASME B30.16 standards.

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

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

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

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

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

**Ingersoll-Rand** cannot know of, or provide all procedures by which product operations or repairs may be conducted and hazards and/or results of each method. If operation or maintenance procedures not specifically recommended by manufacturer are conducted, it must be ensured that product safety is not endangered by 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 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 and are intended to avoid unsafe operating practices which might lead to injury or property damage.

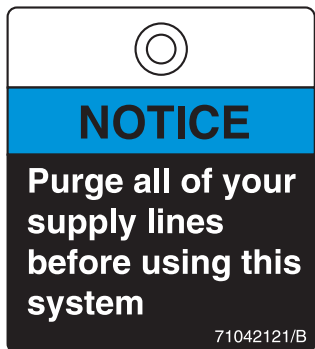
**Ingersoll-Rand** recognizes that most companies who use hoists have a safety program in force at their facility. In the event that some conflict exists between a rule set forth in this publication and a similar rule already set by an individual company, the more stringent of the two should take precedence.

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

1. Only allow personnel trained in safety and operation of this product to operate and maintain unit.
2. Only operate a hoist if you are physically fit to do so.
3. When a “**DO NOT OPERATE**” sign is placed on hoist, or controls, do not operate hoist until sign has been removed by designated personnel.
4. Before each shift, check both hoist and trolley for wear and damage. Never use a unit that inspection indicates is worn or damaged.
5. Never lift a load greater than rated capacity of hoist. Refer to “SPECIFICATIONS” section on page 7.
6. Keep hands, clothing, etc., clear of moving parts.
7. Never place your hand in throat area of a hook.
8. Always rig loads properly and carefully.
9. Never use load chain as a sling.
10. Be certain load is properly seated in saddle of hook. Do not tipload hook as this leads to spreading and eventual failure of hook.
11. Do not “side pull” or “yard”.
12. Make sure everyone is clear of load path and there are no objects in way of load. Do not lift a load over people.
13. Never use hoist for lifting or lowering people, and never allow anyone to stand on a suspended load.
14. Ease slack out of chain when starting a lift. Do not jerk load.
15. Do not swing a suspended load.
16. Never suspend a load for an extended period of time.
17. Never leave a suspended load unattended.
18. Pay attention to load at all times when operating hoist.
19. After use, properly secure hoist and all loads.
20. The operator must maintain an unobstructed view of load at all times.
21. Never operate a hoist with twisted, kinked or damaged chain.
22. After use, or when in a non-operational mode, unit should be secured against unauthorized and unwarranted use.
23. Do not do anything you believe may be unsafe.
24. Never splice a load chain by inserting a bolt between links or by any other means.
25. Do not force a chain or hook into place by hammering. Do not insert point of hook into a chain link.
26. Do not expose load chain to freezing temperatures, and do not apply sudden loads to a cold chain.
27. Follow lubrication instructions.
28. Do not attempt to repair load chains or hooks. Replace them when they become worn or damaged.
29. Periodically inspect hoist thoroughly and replace worn or damaged parts.
30. Shut off air supply before performing maintenance on hoist or trolley.
31. Do not use load chain as a ground (earth) for welding. Do not attach a welding electrode to a hoist or chain.
32. Avoid collision or bumping of trolley.

## WARNING LABELS AND TAGS

Each hoist is supplied from factory with warning labels and tags shown. If labels or tags are not attached to your hoist, order new labels or tags and install them. Refer to Label and Tag parts list in “PARTS” section. Read and obey all warnings and other safety information attached to this hoist. Labels or tags may not be shown actual size.



Tag part number 71042121 is attached to inlet air supply components.



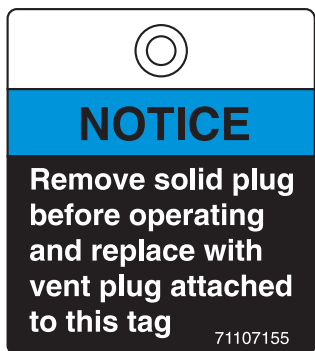
Tag part number 71107148 is attached to power head reduction gear assembly.



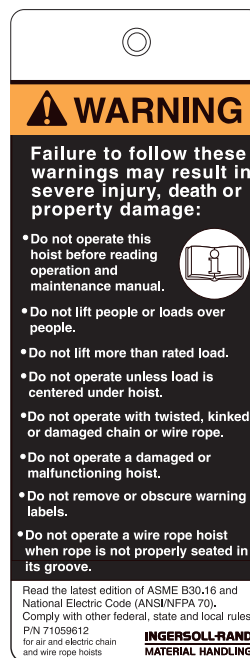
Tag part number 71042147 is attached to lubricator in inlet air supply line. Lubricator is an optional feature and may not be on all hoists.



Label part number 71107130 is attached to power head side.



Tag part number 71107155 is attached to reduction gear assembly brake housing and motor fill plug.



Tag part number 71059612 is attached to pendant assembly.

## MODEL CODE EXPLANATION

**Example: HA3-100HA3-10-6PA**      **HA 3 - 100 H A 3 - 10 - 6 P A**

**Series**

**HA** = Hercu-Link Air Powered Hoist

**Frame Size**

**3** = 32 mm Load Chain

**Capacity**

025 = 25 ton (55,000 lbs)\*

050 = 50 ton (110,000 lbs)\*

075 = 75 ton (165,000 lbs)\*

**100** = 100 ton (220,000 lbs)

**Suspension**

**H** = Hook mount

C = Clevis mount \*

D = Deck mount \*

P = Plain trolley\*

G = Geared trolley\*

V = Vane motor trolley\*

M = Piston motor trolley\*

R = Rack/pinion drive\*

**Trolley Flange Adjustment\***

M = No trolley used with hook

**A** = Standard

B = 2 in. (51 mm) extension

C = 4 in. (102 mm) extension

D = 6 in. (152 mm) extension

**Control Options**

1 = Pull rope

2 = 1 motor pendant (2 button)

**3** = 2 motor pendant (4 button)

4 = 3 motor pendant (6 button)

5 = 1 motor pendant with on/off

6 = 2 motor pendant with on/off

7 = 3 motor pendant with on/off

**Lift**

**10** = 10 ft. (3 m) is Standard

XX = Length of lift. (XX = Specify hose length (ft.). Max 75 ft. (23 m))

**Control Drop**

**6** = 6 ft. (1.85 m)(or Lift minus 4 ft.(1.22 m)) Standard  
Standard Hand Chain Drop for Geared Trolleys

XX = Control Drop Pendant or Hand Chain Length

**Options**

B = Trolley Bumpers\*

C = Low Temperature (10° or 20° C)\*

D = Trolley drive disc brake \*

G = Trolley Guide Rollers\*

L = Upper and Lower Limit Switch

**P** = Marine protection package

Q = 60 psi (4 bar/414 kPa) application package\*

R = Copper plate S•COR•E package\*

T = Galvanized chain container\*

Y = Hull bumper (for hook mounted shipyard hoists only)

Z = Sandblast and carbozinc primer only

- E = Compliance with European Machinery Directive and includes: emergency stop on pendant, main air shut-off valve overload protection device and upper/lower limit switch.

\*\*M1 = Material Traceability (Typical material results)

\*\*M2 = Material Traceability (Actual material results)

\*\*M3 = Material Traceability (Actual material results for these parts in finished, as-delivered condition)

\*\*N = Special paint \*

**Control Option**

**A** = Accu-Trol® pendant \*

(For information refer to Accu-Trol Parts, Operation and Maintenance Manual MHD56014.)

\* Features not covered in this manual. For additional information contact your nearest **Ingersoll-Rand** Office or distributor.

\*\* Documentation, witness testing and material traceability available; must be requested at time of order. Specify options or contact the factory or your nearest **Ingersoll-Rand** distributor for information.

# SPECIFICATIONS

## Description

The **HA3** air-powered hoist consists primarily of a power head assembly that acts as control for lower hook block movement. The power head assembly is made up of three main sections: gear reducer section, brake/motor section and sheave section.

Output shaft from piston motor is connected to brake shaft. The brake shaft is connected to drive shaft by way of a coupling that passes through center of brake and sheave section and acts as sun gear for first stage planetary reducer. The gear reducer section consists of three planetary assemblies with each planetary assembly being driven by sun gear from previous planetary assembly. Output from planetary reduction section is transmitted directly to load chain sheave(s).

Motor-driven brake shaft is connected to brake through a sprag clutch. In hoist “UP” direction, clutch allows shaft to rotate without releasing brake. No air pressure is applied to brake piston in “UP” direction.

Brake shaft cannot rotate in hoist “DOWN” direction until brake has been released. Brake is released by air pressure applied to annular brake piston and piston compresses brake springs, releasing brake discs. There are four sintered, bronze-type brake friction discs and five stationary brake discs.

Brake piston is actuated by air from main control valve. When control pendant “DOWN” button is pushed, it moves main control valve spool. The spool is designed to send air to brake in “DOWN” direction only. When pendant “DOWN” button is released, exhaust valves allow brake to set quickly and avoid downward load drift.

**Table 1 — Specifications**

Hoist Model			HA3-025	HA3-050	HA3-075	HA3-100
Capacity		metric tons	25	50	75	100
Load Chain Size		mm	32			
Chain Falls			1	2	3	4
Standard Lift		ft	10			
		m	3			
Speed at 90 psi (630 kPa/6.3 bar)	Lift	fpm	8	6	4	2
		m/min	2.44	1.8	1.22	0.61
	Lower	fpm	16	8	5.3	1.5
		m/min	4.88	2.44	1.62	0.46
Horsepower			26			
Air Consumption		scfm	700			
		cu. m/min	19.8			
Head Room	Hook Mount	in.	Contact Factory			110
		mm				2790
	Trolley Mount	in.	Contact Factory			
		mm				
Unit Weight	Hook Mount	lbs	Contact Factory			
		kg				
	Trolley Mount (Piston Motor)	lbs				
		kg				

## Traceability

Load bearing parts are documented to provide traceability. The documentation includes chemical and physical properties of the raw material, heat treating, hardening, tensile and charpy tests as required for the parts. Units with M2 or M3 in the model code have traceable load-bearing components. Components with part numbers ending in CH are charpy parts for use under extreme cold conditions. Traceability requirements must be stated when reordering these parts for continued certification.

Winches with M1, M2 or M3 in the model code have traceable load bearing components.

**M1** - Material Traceability certificates according to EN 10204 (Ex DIN 50049) 2.2 on load bearing parts. Conformity documents affirm (by the manufacturer) that parts are in compliance with the

requirements of the order based on non-specific inspection and testing (i.e., results are typical material properties for these parts).

**M2** - Material Traceability certificates according to EN 10204 (Ex DIN 50049) 3.1b on load bearing parts. Conformity documents affirm (by a department independent of the manufacturing department) that the actual parts are in compliance with the requirements of the order based on specific inspection and testing (i.e., results are actual material properties for these parts).

**M3** - Material Traceability certificates according to EN 10204 (Ex DIN 50049) 3.1b on load bearing parts. Conformity documents affirm (by a department independent of the manufacturing department) that the actual parts used in the product are in compliance with the order based on specific inspection and testing (i.e., results are actual material properties for these parts in a finished, as delivered condition).



## INSTALLATION

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

### ⚠ WARNING

- Before installing hoist read “SAFETY INFORMATION” section on page 3.

Hoists are supplied from factory with correct grade and quantity of lubricating oil. Before operation all oil levels must be checked and/or topped off with type of oil recommended in “LUBRICATION” section on page 20. Lubricate load chain before operating hoist.

### ⚠ CAUTION

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

Remove cover from shipping crate. Carefully remove steel straps. On units equipped with a trolley, attach wire rope sling to suspender lugs on trolley side plates and slowly lift into position. Lift hook-mounted hoists into position using hoist top hook.

Attach chain container to hoist with chain container bolt. For hook-mounted hoists, hang hook on end of chain from top hook mounting structure. For trolley-mounted hoists, bolt chain to bracket under trolley suspension yoke. Contact factory for additional information.

### ⚠ WARNING

- A falling load can cause injury or death. Before installing trolley and hoist, read “SAFETY INFORMATION” on page 3
- Depending on size of hoist selected it could weigh as much as 7400 lbs (3357 kg). If parts of trolley or hoist are dropped, they could cause injury or damage property. Adequately support hoist and trolley when lifting them into place on beam.

### Hook Mounted Hoist

Place hook over mounting structure, using swivel ring hooks (401) and hook (352) to lift hoist. Make sure hook latch is engaged. Hook mounted hoist can weigh up to 7,400 lbs (3357 kg) use adequate lifting equipment and extreme care when positioning hoist.

### ⚠ CAUTION

- Do not use swivel ring hooks (401) for lifting or suspending loads.

### Installing Trolley Over End of Beam

Preadjust trolley width for beam flange measurement. Refer to ‘Installing from Underneath Beam.’ Remove rail stop and slide trolley on end of beam. Reinstall rail stop. If this procedure cannot be used due to insufficient space or fixed limit stops the trolley must be installed from underneath beam using the procedure which follows.

### Installing Trolley From Underneath Beam

Refer to items in Dwg. MHP0352 on page 9.

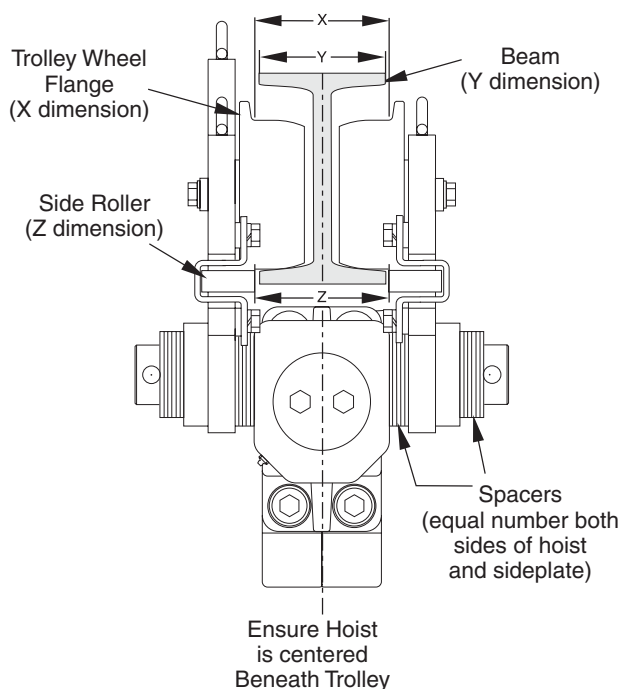
1. Measure beam flange width and compare with measurement between trolley wheel flanges. The correct total clearance between beam and trolley wheel flanges is 1/16 to 3/16 in. (1.6 to 4.7 mm). Refer to Dwg. MHP0340 on page 8.
2. To adjust trolley wheel spacing remove eight cotter pins (173) and four pins (174) at each side plate (150). Remove adjusting spacers (156) and side plates and add or subtract an equal number of adjusting spacers (156) between suspension yokes (170) and side plates.
3. When desired trolley wheel spacing measurement is achieved, install remaining adjusting spacers (156) on outside of one pair of side plates. Install suspension yoke pins (174) and cotter pins (173) on ends of suspension yokes (170). Use lifting lugs on trolley side plates to adequately support hoist and side plates and raise into place on beam flange.

### ⚠ CAUTION

- To avoid an unbalanced load which may damage trolley, hoist must be centered under trolley using spacers (156).

4. Using lifting lugs on second pair of trolley side plates raise into place beneath beam flange. Slide side plates onto suspension yokes and push side plates together.
5. Slide extra spacers (156) over free end of suspension yoke (170). Insert suspension yoke pin (174) into hole in suspension yoke (170). Secure by installing cotter pins (173) and bending ends apart.

### Beam Clearance and Trolley Spacer Placement



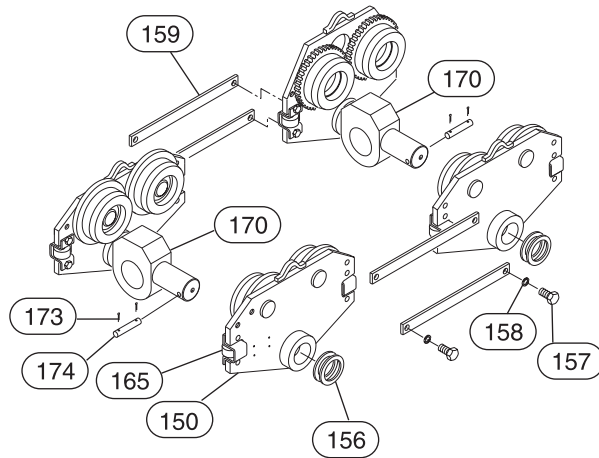
(Dwg. MHP0340)

### NOTICE

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

- The pin (174) and outside spacers (156) must hold trolley to adjustment in step 1. If side plates can be spread farther apart, install more outside spacers (156) between side plate (150) and pin (174).
- Measure beam flange width and compare with measurement between rollers. Side roller spacing measurement should be 1/16 to 3/16 in. (1.6 to 4.7 mm) greater than beam flange width. Refer to Dwg. MHP0340 on page 8.
- Prior to using, test trolley. Check that trolley side plates are vertical. Raise a load equal to rated capacity of hoist 6 to 7 ins. (130 to 180 mm) off floor and operate trolley along entire length of beam.
- Remove four tie plates (159) by removing capscrews (157) and lockwashers (158) after installation is complete. Ensure beam stops are installed.

### Trolley Installation



(Dwg. MHP0352)

### Rack Drive Installation

Optional Feature

#### Pre-Installation Checks

Refer to Dwg. MHP1177 on page 9.  
 Before welding rack segments onto trolley beam, install rack segments on the bottom of the beam lower flange and clamp in place. Mount trolley on the lower beam flange. Measure gap between outside diameter of drive pinion and root of rack segment teeth. Trolley drive pinion and rack teeth must have a 0.06 to 0.10 inch (1.5 to 2.5 mm) clearance.

#### Clearance Adjustment

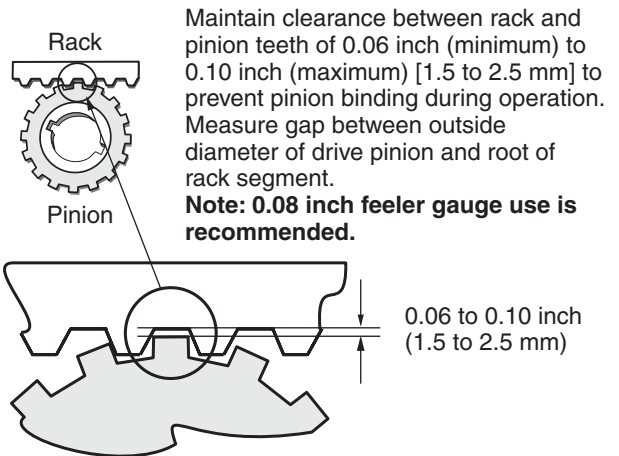
- Refer to Dwg. MHP1605 on page 10.  
 There is an adjustment screw located below reducer adapter.
- Loosen capscrews attaching trolley drive to sideplate.
  - Loosen jam nut and rotate adjustment screw to achieve clearance, refer to Dwg. MHP1177 on page 9.
  - Tighten jam nut and mounting screws.

#### If a larger adjustment is required.

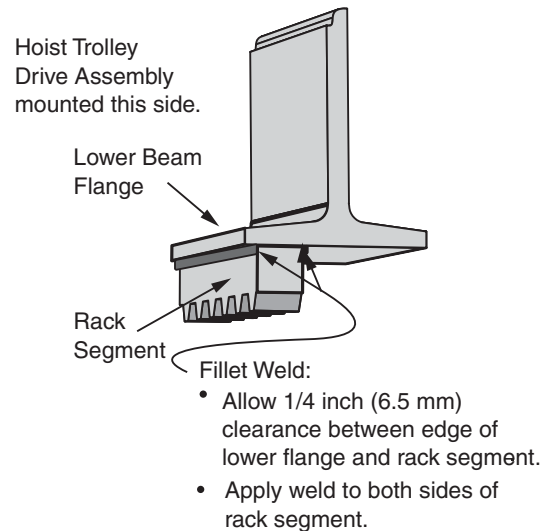
- Add shims between rack segment and beam to decrease distance.
- Remove material from rack segment to increase distance.

### Installing Rack Segments Onto Beam

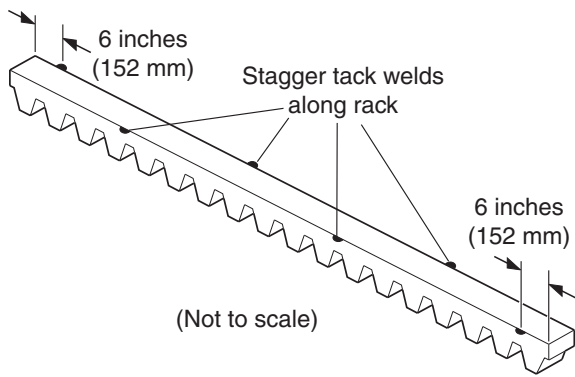
Refer to Dwgs. MHP1178 on page 9 and MHP1632 on page 10. Rack segments should be installed on outside edge of lower flange of the trolley beam. Allow 1/4 inch (6.5 mm) clearance between edge of lower flange and rack segment for fillet weld. Rack segments should be clamped tight against lower flange so that there is no sagging. Sagging of the rack could cause drive pinion to bind as it traverses along runway beam. Racks are provided in segments. These segments should be tack welded (refer to Dwg. MHP1632 on page 10) in place and trolley traversed the entire length. During this movement observe for any high or low spots and correct. Also check each segment connection for drive tooth contact and correct as necessary. When all clearances are achieved, weld both sides of rack to beam flange to prevent corrosion between rack segment and beam.



(Dwg. MHP1177)

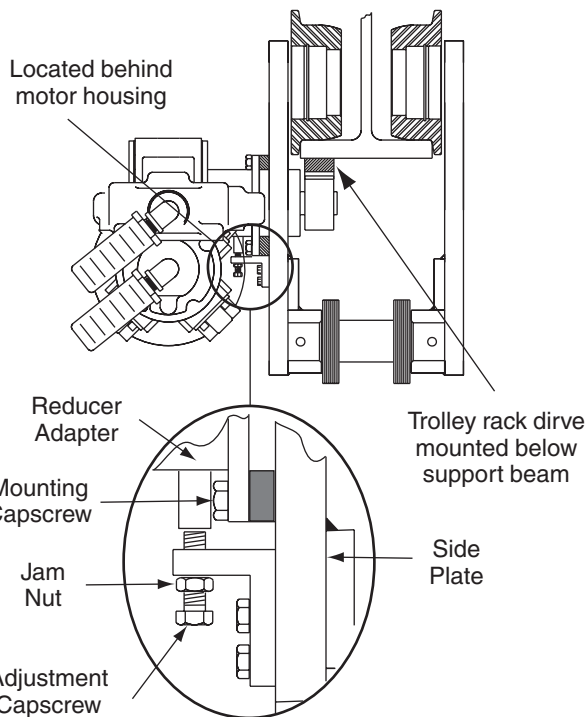
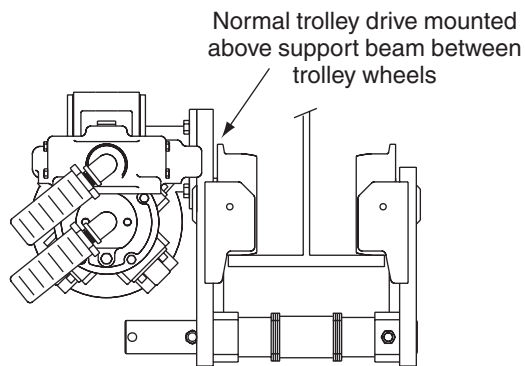


(Dwg. MHP1178)



(Dwg. MHP1632)

### Rack Drive



(Dwg. MHP1605)

### NOTICE

• **Converting from normal trolley drive to Rack Drive requires new sideplates in addition to other items. Contact Technical Support for assistance.**

### Chain Container

Optional Feature

### CAUTION

- **Adjust container support so that chain container does not contact load chain or hook.**
- **Operate hoist to naturally pile chain into chain container. Piling chain carelessly into container by hand may lead to kinking or twisting that may cause chain to jam the hoist.**

1. Check chain container size to make sure length of load chain is within capacity of chain container. Replace with a larger chain container, if required.
2. Attach chain stopper to last link of load chain free end.
3. Attach chain container to hoist.
4. Run bottom block to lowest point and run hoist in up direction to feed chain back into container.

### NOTICE

- **When feeding chain into chain container, begin with chain stopper end of chain so that it piles naturally.**

### Attaching Free End of Load Chain

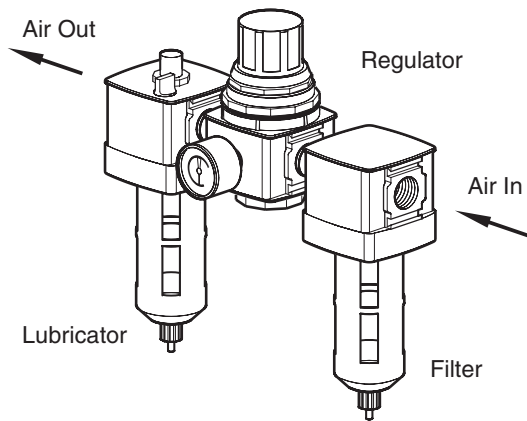
Attach free end of load chain to hoist or bottom hook assembly. Refer to Chaining Drawings in "MAINTENANCE" section on page 24.

### Air Supply

The air supply must be clean and free from moisture. Due to efficiency losses in air lines and air line components, air pressures should be checked at hoist motor. A minimum of 90 psi (6.21 bar/621 kPa) at hoist motor is required to provide rated hoist capacity. Due to efficiency losses in air lines, pressures of up to 130 psi (8.9 bar/896 kPa) at air supply may be required to achieve required operating pressure. Contact Technical Support Department for operating requirements with optional 60 psi (4 bar/414 kPa) system.

### Air Lines

The inside diameter of hoist air supply lines must not be smaller than 2 in. (51 mm) based on a maximum of 50 ft. (15 m) between air supply and hoist. Contact factory for recommended air line sizes for distances greater than 50 ft. (15 m). All air supply lines should be purged before making final connections and connecting to unit 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 lines.



(Dwg. MHP0191)

### Air Line Lubricator

Refer to Dwg. MHP0191 on page 11. Always use an air line lubricator with these motors. Use a lubricator having an inlet and outlet at least as large as inlet on motor. Install air line lubricator as close to air inlet on motor as possible.



- Lubricator must be located no more than 10 ft. (3 m) from hoist and trolley motors.

The air line lubricator should be replenished daily and set to provide 4 to 6 drops per minute of ISO VG 32 (10W SAE) oil. A fine mist will be exhausted from throttle control valve when operated and air line lubricator is functioning properly.

### Air Line Filter

Refer to Dwg. MHP0191 on page 11. It is recommended that an air line strainer/filter be installed as close as practical to motor air inlet port to prevent dirt from entering 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 air motor through supply lines is the chief factor in determining length of time between service overhauls. Moisture traps can help to eliminate moisture and other methods, such as an air receiver which collects moisture before it reaches motor or an aftercooler at compressor that cools the air prior to distribution through supply lines, are also helpful.

### Hoist and Trolley Motors

For optimum performance and maximum durability of parts, provide an air supply to operate hoist and trolley motors with 90 psi at 300 scfm (7.2 bar/724 kPa at 8 cu.m/m). The air motor should be installed as near as possible to compressor or air receiver.

\* Contact Technical Support Department for operating requirements with optional 60 psi (4 bar/414 kPa system).

### Shipping Plug Removal

Remove shipping plugs from brake housing, reducer assembly and motor before operating hoist.



- Failure to remove shipping plugs in brake housing may result in brake malfunction.

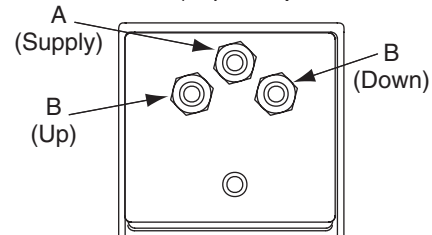
### Pendant

Check that all hose connections are tight and that hoses are not twisted or crimped. Refer to Dwg. MHP2391 on page 11 for hose connections. Pendant lengths up to 66 ft (20 m) are available. Contact the factory for pendant lengths greater than 66 ft (20 m).

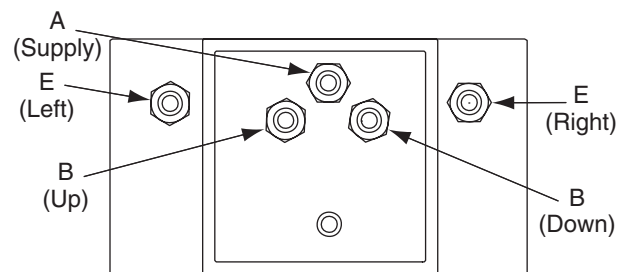


- To avoid damaging the pendant hose, make sure the strain relief cable, not the pendant hose, is supporting the weight of the pendant.

Single Motor Pendant PHS2E  
(Top View)



Two Motor Pendant PHS4E  
(Top View)



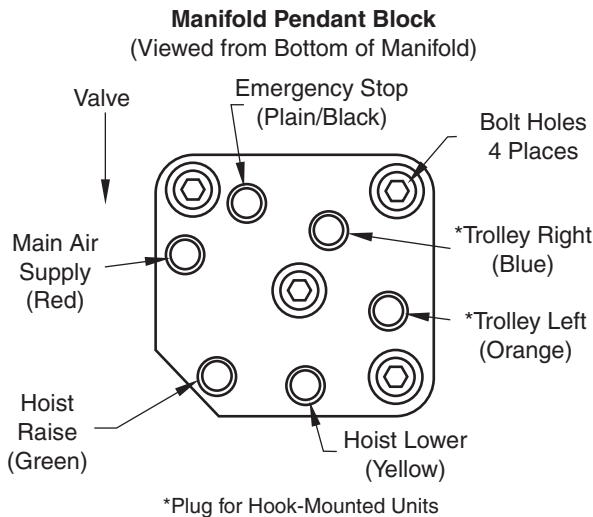
(Dwg. MHP2391)

## Pendant (Optional Style)

Pendant control is installed at factory. Hose fittings are color coded to ensure correct assembly. Check all hose connections are tight and that hoses are not twisted or crimped. Refer to Dwg. MHP0094 on page 12 and MHP0095 on page 12 for correct pendant hose connections.

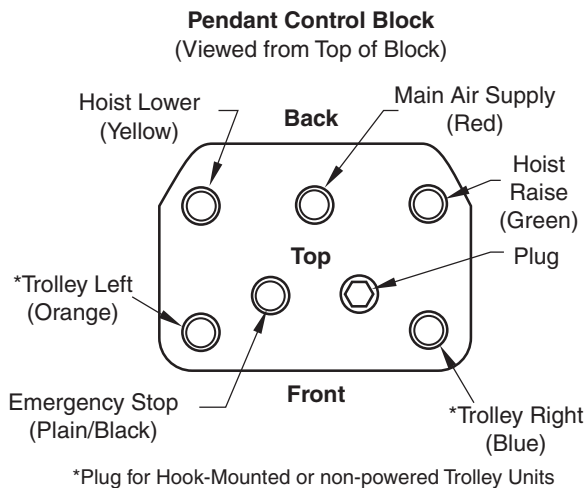
### ⚠ WARNING

• **Do not attempt to reverse air lines either at pendant station or hoist. This will give a false indication of operation which may result in serious damage to hoist.**



(Dwg. MHP0094)

Pendant control block shown is for standard pendant assembly illustrated on page 42. Refer to Accu-Trol® Pendant manual (Form number MHD56014) for optional Accu-Trol® Pendant control block.



(Dwg. MHP0095)

### ⚠ CAUTION

• **To avoid damaging pendant hose, make sure strain relief chain, not pendant hose, is supporting weight of pendant.**

Check strain relief chain is properly connected to hoist and pendant body.

## Emergency Air Shutoff

If supply air is wet and unfiltered, and/or hoist is operated in a dirty environment, hoist or trolley control valves may malfunction and become stuck in “ON” position. As a safeguard, an emergency main line shut-off valve is provided at pendant. The emergency valve shuts off air supply to entire unit when red pull/push button is pressed.

If it is necessary to use emergency air shut off valve, then malfunctioning control valve should be disassembled, cleaned, and/or repaired as required to clear malfunction before resuming operation.

## Storing Hoist

For hoists that have been in storage for a period of more than one month following start-up procedure is required.

1. Give hoist an inspection conforming to requirements of ‘Hoists Not in Regular Use’ in “INSPECTION” section on page 16.
2. Pour a small amount of ISO VG 32 (10W SAE) oil in motor inlet port.
3. Operate motor for 10 seconds to flush out any impurities.
4. The hoist is now ready to work.

## Trolley Drive Assembly Run-In Period

Maximum efficiency of trolley drive worm gear is obtained after a run-in period. The length of time required will depend on load applied and will be one to two hours at rated load and considerably longer at lighter loads.

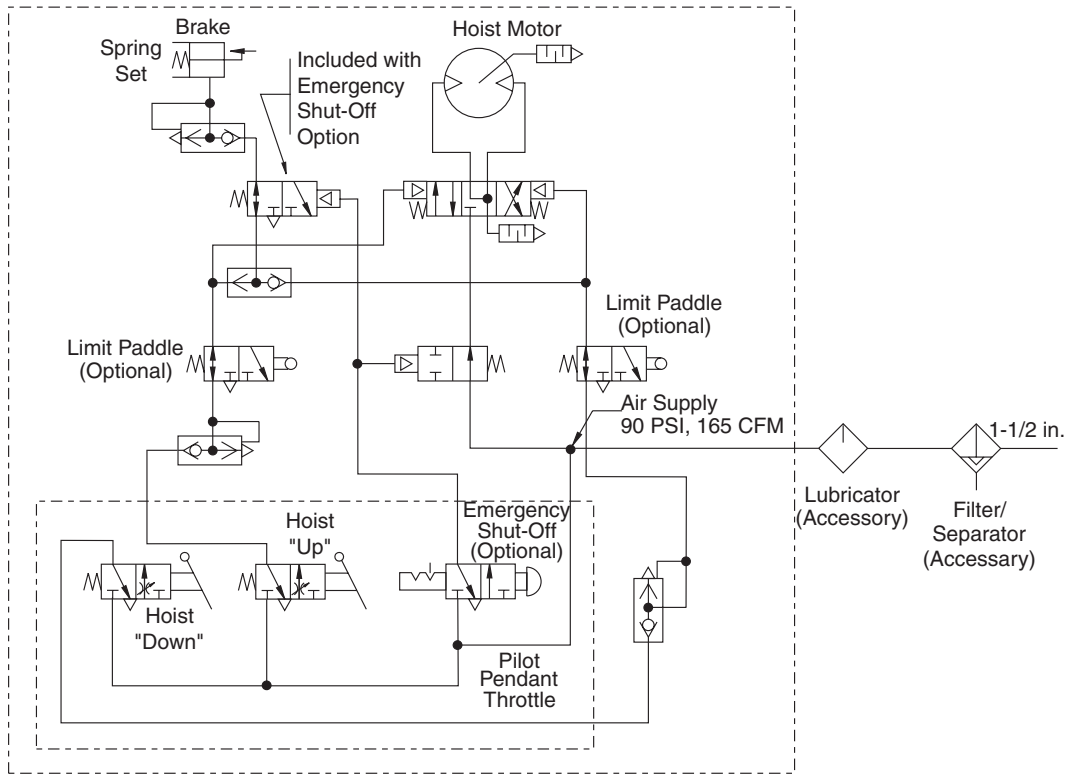
### NOTICE

• **Overloading will not decrease run-in time and it may damage worm gear.**

During run-in higher than normal temperature rise and lower efficiency and output torque can be expected.

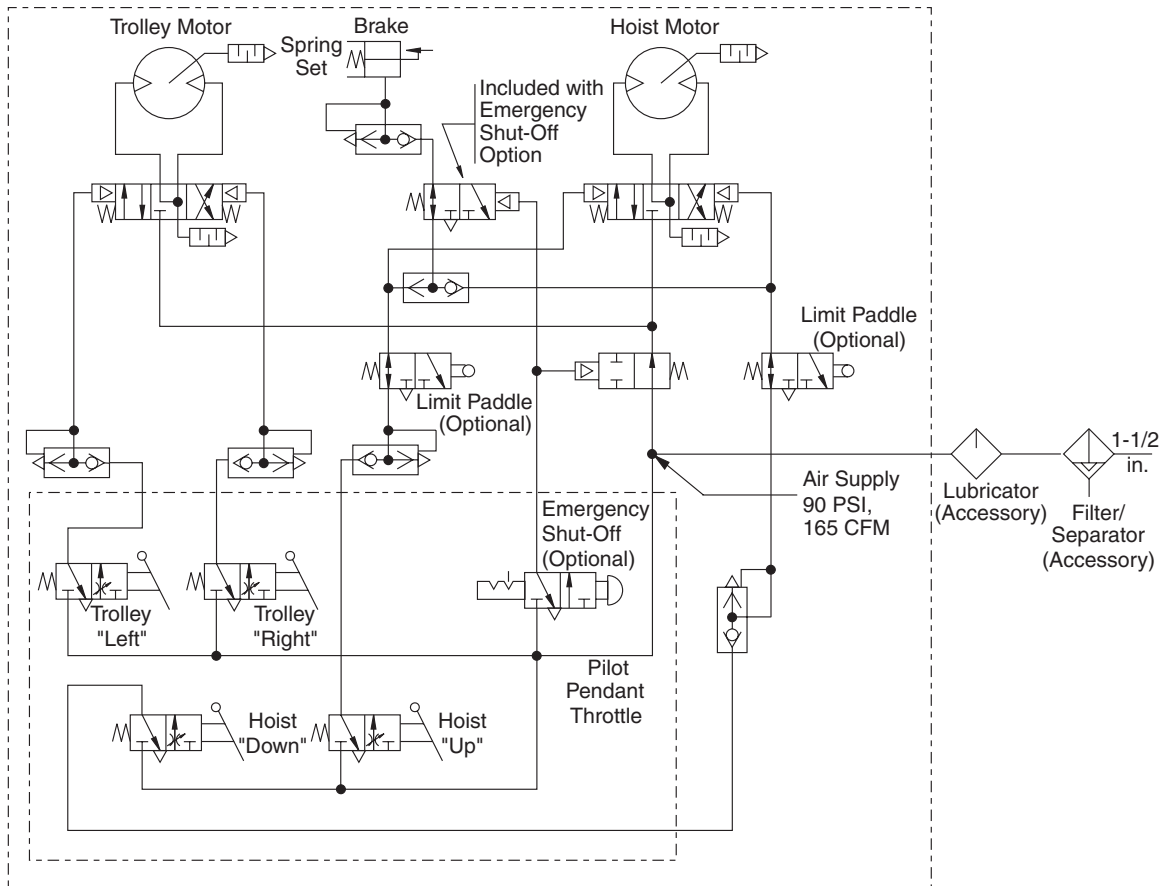
# AIR SCHEMATICS

## Hoist without air powered trolley



(Dwg. MHP2377)

## Hoist with air powered vane or piston motor trolley



(Dwg. MHP2378)



## OPERATION

The four most important aspects of hoist operation are:

1. Follow all safety instructions when operating hoist and trolley.
2. Allow only people trained in safety and operation of this product to operate hoist and trolley.
3. Subject each hoist to a regular inspection and maintenance procedure.
4. Be aware of hoist capacity and weight of load at all times.

### **⚠ WARNING**

- **Only allow personnel trained in safety and operation of this product to operate hoist and trolley.**
- **Do not use this hoist for lifting, supporting or transporting people or lifting or supporting loads over people.**

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

### **Initial Operating Checks**

Hoists are tested for proper operation prior to leaving factory. Before hoist is placed into service the following initial operating checks should be performed.

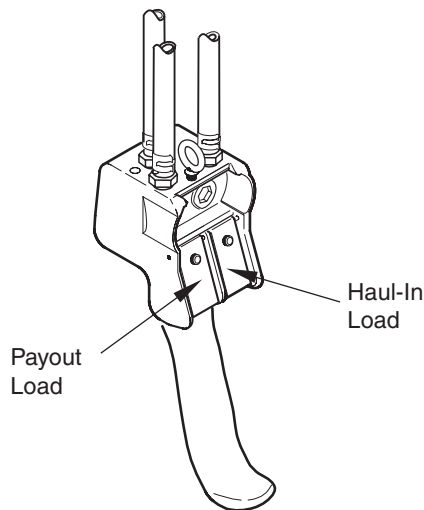
1. After installation of trolley mounted hoists, check to ensure hoist is centered below trolley.
2. Check for air leaks in supply hose and fittings to pendant, and from pendant to manifold.
3. When first running hoist or trolley motors a small amount of light oil should be injected into inlet connection to allow good lubrication.
4. When first operating hoist and trolley it is recommended that motors be driven slowly in both directions for a few minutes.
5. Operate trolley along entire length of beam.
6. Inspect hoist and trolley performance when raising, moving and lowering test load(s). Hoist and trolley must operate smoothly and at rated specifications prior to being placed in service.
7. Check that trolley (if equipped) and hook movement is in same direction as arrows or information on pendant control.
8. Raise and lower a light load to check operation of hoist brake.
9. Check hoist operation by raising and lowering a load equal to rated capacity of hoist 4 to 6 inches (100 to 150 mm) off floor.
10. Check operation of limit devices.
11. On trolley units, check 'O' ring on breather plug in trolley drive piston motor has been removed.
12. Check that solid plug (necessary only for shipping) is removed from power head reduction gear assembly and replaced with breather attached to notice tag supplied with hoist.

### **Hoist Controls**

#### **Pendant**

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.

#### **Two Lever Pendant Operation**



(Dwg. MHP2233)

Operation of hoist is same for all pendants listed in this section:

1. To lift a load, depress hoist pendant raise lever.
2. To lower a load depress hoist pendant lower lever.
3. To throttle lift or lowering speed, regulate the amount pendant lever is depressed. Depress lever completely for maximum speed; depress lever partially for slower speeds.
4. To stop lift or lowering function, release lever. Lever will spring back to "OFF" and hoist motor will stop.

#### **Single Function, Two Lever Pendant**

Refer to Dwg. MHP2233 on page 14.

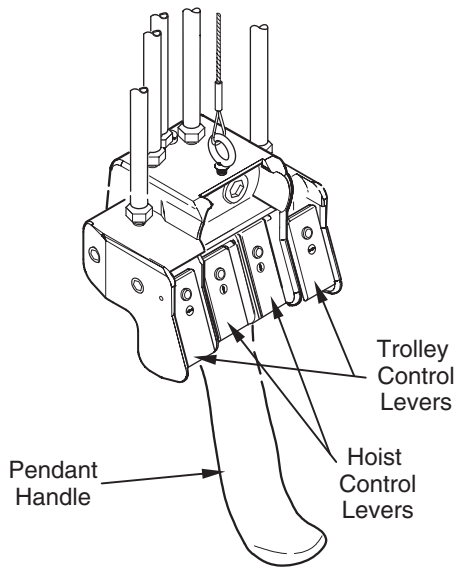
The two lever pendant is standard pendant supplied with hook mounted hoists and is designed to provide hoist operation only. Hoist operation must correspond to directions indicated by arrows located on pendant levers.

#### **Dual Function, Four Lever Pendant**

Refer to Dwg. MHP2392 on page 15.

The four lever pendant is standard pendant supplied with trolley mounted hoists, and is designed to provide both hoist and trolley operation. Hoist and trolley operation must correspond to directions indicated by arrows located on pendant levers.

### Four Lever Pendant Operation



(Dwg. MHP2392)

### Pilot Pendant Throttle with Emergency Stop (Optional Style)

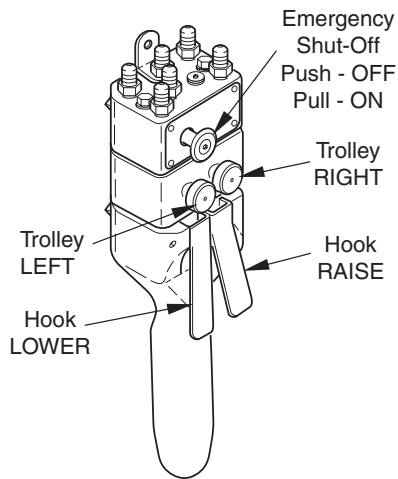
Refer to Dwg. MHP0395 on page 15.

The pendant control throttle is equipped with two separate levers for hoist operation. Pilot pressure from pendant throttle activates hoist control valve. Direction of hook travel is controlled by whichever lever is pressed.

Trolley operation is controlled by two buttons located above hoist control levers.

Additionally, an emergency shut-off feature is available on this pendant model.

### Four Function Pendant with Emergency Stop Operation

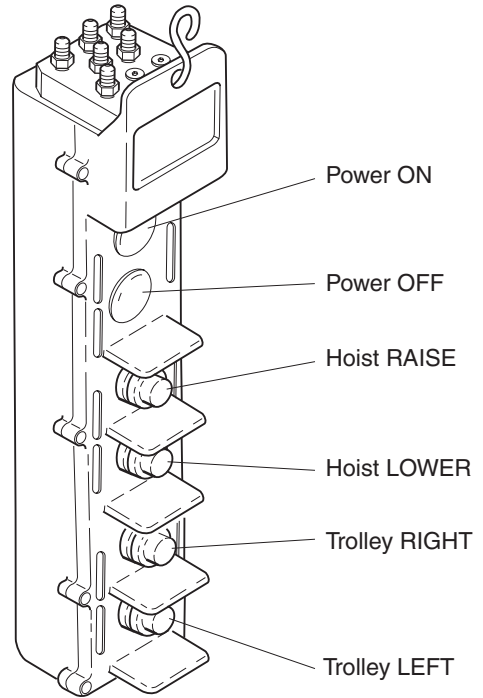


(Dwg. MHP0395)

### Accu-Trol® Pendant (Push Button Type)

The optional Accu-Trol® Pendant is available with 2, 4 or 6 buttons. Refer to Accu-Trol® Pendant manual form number MHD56014 for additional information.

### Accu-Trol® Pendant Operation



(Dwg. MHP0434)



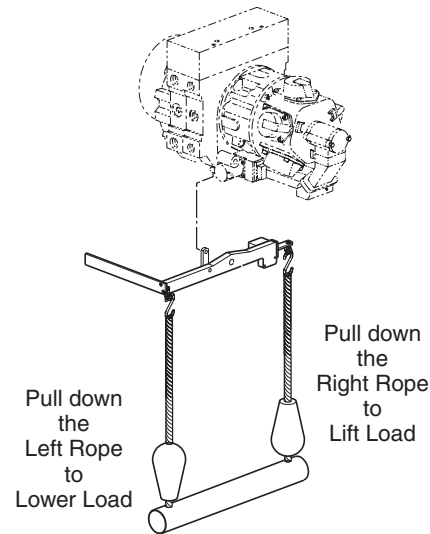
### Pull Rope (Optional Feature)

The hoist can be supplied with an optional manual pull rope control.

The pull rope provides operator with a local hoist operating station. The following operating directions are as viewed facing motor end of hoist.

1. To LIFT a load pull down on RIGHT pull rope.
2. To LOWER a load pull down on LEFT pull rope.
3. Pull rope to full travel for maximum speed; pull rope partially for slower speeds.
4. To stop lift or lowering of load, release pull rope. Hoist motor will stop.

### Pull Rope Operation



(Dwg. MHP1704)

## INSPECTION

Inspection information is based in part on American National Standards Institute Safety Codes (ASME B30.16).

### ⚠ WARNING

- All new, altered or modified equipment should be inspected and tested by personnel instructed in safety, operation and maintenance of this equipment to ensure safe operation at rated specifications before placing equipment in service.
- Never use a hoist that inspection indicates is damaged.

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 hoist operation. Periodic inspections are thorough inspections conducted by personnel trained in safety, operation and maintenance of this equipment.

ASME B30.16 states inspection intervals depend upon the nature of the critical components of equipment and severity of usage. The inspection intervals recommended in this manual are based on intermittent operation of hoist eight hours each day, five days per week, in an environment relatively free of dust, moisture and corrosive fumes. If hoist is operated almost continuously or more than eight hours each day, more frequent inspections will be required.

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

Deficiencies revealed through inspection, or noted during operation, must be reported to designated personnel instructed in safety, operation and maintenance of this equipment. A determination as to whether a condition constitutes a safety hazard must be made, and correction of noted safety hazards accomplished and documented by written report before placing 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 person who performed inspection, and kept on file where they are readily available for review.

### Load Chain Reports

Records should be maintained documenting condition of load chain removed from service as part of a long-range load chain inspection program. Accurate records will establish a relationship between visual observations noted during frequent inspections and actual condition of load chain as determined by periodic inspection methods.

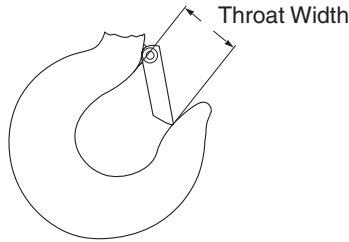
### Frequent Inspection

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

1. OPERATION. Check for visual signs or abnormal noises (grinding etc.) which could indicate a problem. Make sure all controls function properly and return to neutral when released. Check chain feed through hoist and bottom block. If chain binds, jumps, is excessively noisy or 'clicks', clean and lubricate chain. If problem persists, replace chain. Operate trolley along entire length of beam. Trolley should operate smoothly without sticking or binding. Do not operate hoist until all problems have been corrected.

- HOOKS. Check for wear or damage, increased throat width, bent shank or twisting of hook. Replace hooks which exceed throat opening discard width specified in Table 2 (refer to Dwg. MHP0040 on page 17) or are twisted (refer to Dwg. MHP0111 on page 17). If hook latch snaps past tip of hook, hook is sprung and must be replaced. Refer to the latest edition of ASME B30.10 "HOOKS" for additional information.

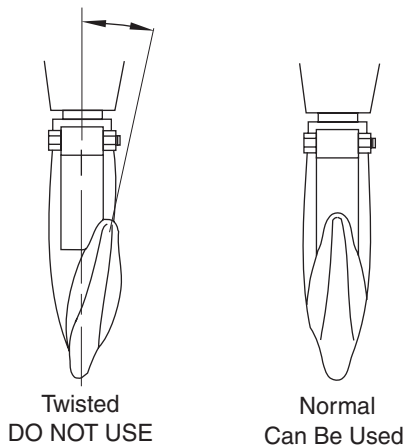
#### Hook Throat Width



(Dwg. MHP0040)

Table 2— Hook Throat Normal and Discard Width

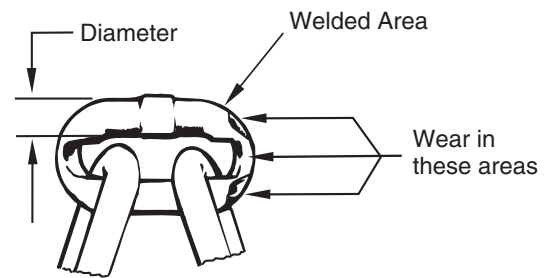
Hoist Model	Hook Type	Throat Width		Discard Width	
		in.	mm	in.	mm
HA3-025	Standard	4.0	101.6	4.6	116.8
HA3-050		4.75	120.6	5.46	138.7
HA3-075		6.5	165.1	7.47	189.8
HA3-100		6.3	160.0	6.93	176.0



(Dwg. MHP0111)

- UPPER AND LOWER LIMIT DEVICE. Test operation with no load. Upward travel must stop when bottom block hits hoist limit arm. Downward travel must stop when stop buffer at unloaded end of chain activates limit arm.
- AIR SYSTEM. Visually inspect all connections, fittings, hoses and components for indication of air leaks. Repair any leaks found.
- CONTROLS. During operation of hoist and/or trolley, verify response to pendant is quick and smooth. If response is slow or movement is unsatisfactory, do not operate hoist until all problems have been corrected.
- HOOK LATCH. Make sure hook latch is present and operating. Replace if necessary.
- CHAIN. Examine each of links for bending, cracks in weld areas or shoulders, traverse nicks and gouges, weld splatter,

corrosion pits, striation (minute parallel lines) and chain wear, including load bearing surfaces between chain links, refer to Dwg. MHP0102 on page 17. Replace a chain that fails any of inspections. Check chain lubrication and lubricate if necessary. Refer to 'Load Chain' in "LUBRICATION" section on page 20.



(Dwg. MHP0102)

### NOTICE

• The full extent of load chain wear cannot be determined by visual inspection. At any indication of load chain wear inspect chain and chain wheel in accordance with instructions in 'Load Chain' listed in "Periodic Inspection."

- LOAD CHAIN REEVING. Ensure welds on standing links are away from load sheave. Reinstall chain if necessary. Make sure chain is not capsized, twisted or kinked. Adjust as required. Refer to "MAINTENANCE" section on page 24.

### Periodic Inspection

According to ASME B30.16, 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:

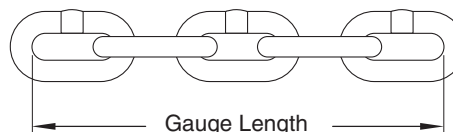
- FASTENERS. Check all rivets, split pins, capscrews and nuts. Replace if missing or tighten if loose.
- ALL COMPONENTS. Inspect for wear, damage, distortion, deformation and cleanliness. If external evidence indicates the need, disassemble. Check gears, shafts, bearings, sheaves, chain guides, springs and covers. Replace worn or damaged parts. Clean, lubricate and reassemble.
- HOOKS. Inspect hooks carefully for cracks using magnetic particle or other suitable non-destructive method. Inspect hook retaining parts. Tighten, repair or replace if necessary.
- LOAD CHAIN SHEAVES. Check for damage or excessive wear. Replace if necessary. Observe the action of load chain feeding through hoist. Do not operate a hoist unless load chain feeds through hoist and hook block smoothly and without audible clicking or other evidence of binding or malfunctioning.

5. **MOTOR.** If performance is poor, disassemble motor and check for wear or damage to bearings and shafts. The parts should be cleaned, lubricated and reassembled. Replace worn or damaged parts.
6. **BRAKE.** Raise a load equal to rated capacity of hoist 4 to 6 inches (100 to 150 mm) off floor and check ability of hoist to hold load without drift. If drift occurs, disassemble. Remove brake discs as described in the "MAINTENANCE" section on page 24. Check and clean brake parts each time hoist is disassembled. Replace brake friction discs if thickness is less than 0.072 inch (1.83 mm), or if oil groove pattern is not clearly visible.
7. **SUPPORTING STRUCTURE.** Check for distortion, wear and continued ability to support load.
8. **TROLLEY (optional feature).** Check that trolley wheels track beam properly and clearance between trolley wheel flanges and beam is correct. Refer to "INSTALLATION" section on page 8. Check that wheels and beam are not excessively worn. Inspect side plates for spreading due to bending. Do not operate hoist until problems have been corrected.
9. **LABELS AND TAGS.** Check for presence and legibility. Replace if necessary.
10. **END ANCHORS (Load chain).** Ensure load chain end is securely attached. Check chain stopper is correctly installed on free end of load chain.
11. **LOAD CHAIN.** Measure chain for stretching by measuring across five link sections all along chain, paying particular attention to most frequently reeved links. Refer to Dwg. MHP0041 on page 18. When any five-link section in working length reaches or exceeds discard length, listed in Table 3 on page 18, replace entire chain. Always use genuine **Ingersoll-Rand** replacement chain for regular and nickel-diffused load chains. When ordering load chain, specify which unit it will be used on. Chain will then be cut and tagged with the right number of links.

**Table 3 — Load Chain Normal and Discard Length**

Hoist Model	Chain Size	Normal Length		Discard Length	
	mm	in.	mm	in.	mm
HA3-025	32	17.72	450	18.15	461
HA3-050					
HA3-075					
HA3-100					

**Load Chain Length—Inspection**



(Dwg. MHP0041)

12. **CHAIN CONTAINER (optional feature).** Check for damage or excessive wear and that chain container is securely attached to hoist. Secure or replace if necessary.
13. **LIMIT ASSEMBLY.** Check limit arm moves freely.

**Hoists Not in Regular Use**

1. Hoists which have been idle for a period of one month or more, but less than one year, should be given an inspection conforming with the requirements of "Frequent Inspection" prior to being placed into service.
2. Hoists which have been idle for a period of more than one year should be given an inspection conforming with the requirements of "Periodic Inspection" prior to being placed into service.
3. Standby hoists should be inspected at least semiannually in accordance with the requirements of "Frequent Inspection." In abnormal operating conditions hoists should be inspected at shorter intervals.

# INSPECTION AND MAINTENANCE REPORT

## Ingersoll-Rand HA3 Air Hoist

<b>Model Number:</b>	<b>Date:</b>
<b>Serial Number:</b>	
<b>Reason for Inspection: (Check Applicable Box)</b>	<b>Inspected By:</b>
<input type="checkbox"/> 1. Scheduled Periodic Inspection ( _____ Quarterly _____ Semiannually _____ Yearly)	Operating Environment:  Normal ___ Heavy ___ Severe ___
<input type="checkbox"/> 2. Discrepancy(s) noted during Frequent Inspection	
<input type="checkbox"/> 3. Discrepancy(s) noted during maintenance	
<input type="checkbox"/> 4. Other: _____	

Refer to Parts, Operation and Maintenance Manual "INSPECTION" section on page 16 and to the appropriate National Standards and Codes of practice for general inspection criteria. If in doubt about an existing condition, contact the nearest **Ingersoll-Rand** distributor or factory for technical assistance.

COMPONENT	CONDITION		CORRECTIVE ACTION		NOTES
	Pass	Fail	Repair	Replace	
Fasteners					
Gears					
Shafts					
Bearings			---		
Load Bearing Sheaves					
Chain Guides					
Springs			---		
Covers					
Hooks			---		
Top	Actual Hook Throat Width: _____ inches / _____ mm (Refer to Table 2 on page 17 for min./max. acceptable widths.)				
	Hook Twist			---	
	Hook Crack Test Method Used: Dye Penetrant _____ Magnetic Particle _____ Other: _____				
Bottom	Actual Hook Throat Width: _____ inches / _____ mm (Refer to Table 2 on page 17 for min./max. acceptable widths.)				
	Hook Twist			---	
	Hook Crack Test Method Used: Dye Penetrant _____ Magnetic Particle _____ Other: _____				
Hook Latch			---		
Brake (10% Load Test)			---		
Brake (Visual Inspection)					
Tail Pin (End Anchor)					
Load Chain					
	Working length(s) maximum wear: _____ inches / _____ mm (refer to Table 3 on page 18)				
Supporting Structure					
Labels and Tags			---		
Other Components (List in NOTES section)					

Testing:	Pass	Fail	NOTES
Operational (No Load)			
Operational (10% Load)			
Operational (Maximum Test Load*)			

\* Refer to 'Load Test' in "MAINTENANCE" section for testing information.

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

# LUBRICATION

To ensure continued satisfactory operation of hoist, all points requiring lubrication must be serviced with correct lubricant at the proper time interval as indicated for each assembly. Correct lubrication is one of the most important factors in maintaining efficient operation.

The lubrication intervals recommended in this manual are based on intermittent operation of hoist eight hours each day, five days per week. If hoist is operated almost continuously or more than eight hours each day, more frequent lubrication will be required. Also, lubricant types and change intervals are based on operation in an environment relatively free of dust, moisture, and corrosive fumes. Use only those lubricants recommended. Other lubricants may affect performance of hoist. Approval for use of other lubricants must be obtained from your **Ingersoll-Rand** Technical Support Department or distributor. Failure to observe this precaution may result in damage to hoist and/or its associated components.

INTERVAL	LUBRICATION CHECKS
Start of each shift	Check flow and level of air line lubricator (approximately 4 to 6 drops per minute required at maximum motor speed).
	Check oil levels in hoist and trolley piston motors.
Monthly	Inspect and clean or replace air line filter.
	Lubricate all grease fittings.
	Check oil level in brake and reduction gear assembly.
Semiannually	Drain and replace oil in trolley and hoist piston drive motors.
Yearly	Drain and refill oil in hoist brake and reduction gear assembly.

## Pivot Points and Bushings

Lubricate grease fittings monthly with 2 or 3 pumps from a grease gun or more frequently, depending on severity of service.

**Table 4— Recommended Lubricants**

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

## Hoist Motor

The motor is splash lubricated by oil in motor housing and has no other means of lubrication. It is therefore important to use only good quality, non-detergent motor oil to ensure maximum performance and minimum downtime for repairs. Refer to 'Recommended Lubricants' section.

Oil capacity for the K5B-546L motor is 3 quarts (2.8 litres). Add oil through filler opening until oil flows from level plug hole. Add oil slowly to prevent spilling.

The motor should be level-checked daily or at the start of each shift after any accumulated water has been drained off. When motors are operated in temperatures below freezing, wait long enough at end of shift for water to separate from oil but not long enough for it to freeze. Drain water then refill to level plug (721), located on side of motor housing (720). If desired, all oil may be drained at end of shift and motor refilled with new oil.

**Table 5 — Hoist Motor Recommended Oil**

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

\* Units are shipped from factory with ISO VG 68 (SAE 20W) lubricant. Motor oil capacity is approximately 3 quarts (2.8 litres).

## Piston Trolley Drive Motor

The motor is splash lubricated by oil in motor housing and has no other means of lubrication. It is therefore important to use only high quality, rust and oxidation-inhibiting lubricant to insure maximum performance and minimum down time for repairs. Allow oil to settle prior to topping off. Oil capacity for HA3 trolley drive motor is 0.1 pints (65 ml). Refer to Table 6 on page 20 for recommended oil.

**Table 6— Piston Trolley Motor Recommended Oil**

Ambient Temperature	Recommended Oil Type
Below 32° F (0° C)	ISO VG 68 (20W SAE)
30° to 80° F (0° to 26° C)	ISO VG 100 (30W SAE)*
Above 80° F (26° C)	ISO VG 150 (40W SAE)

\* Trolley Motors are shipped from factory with ISO VG 100 (30W SAE) oil.

## Bottom Hook Block Assembly

To prevent moisture entering bottom block assemblies they should periodically be disassembled and repacked with grease. Apply grease to grease fitting until grease escapes through breather. Refer to Table 4 on page 20 for recommended grease types at specific temperature ranges. Refer to Table 7 on page 20 for required quantity of grease.

**Table 7— Bottom Hook Lubrication Quantities**

Hoist Model	Capacity	Grease Required to Pack Hook Assembly	
	metric tons	oz	grams
HA3-025	25	7.2	204
HA3-050	37.5	16.5	468
HA3-075	50	30.8	873
HA3-100	100	48	1361

## Load Chain

### **⚠ WARNING**

• Failure to maintain clean and well lubricated load chain will result in rapid load chain wear that can lead to chain failure which can cause severe injury, death or substantial property damage.

1. Lubricate load chain weekly, or more frequently, depending on severity of service.
2. In a corrosive environment, lubricate more frequently than normal.
3. Lubricate each link of load chain and apply new lubricant over existing layer.
4. Lubricate hook and hook latch pivot points.
5. If required, clean chain with acid free solvent to remove rust or abrasive dust build-up and lubricate chain.
6. Use **Ingersoll-Rand LUBRI-LINK-GREEN®** or an ISO VG 320 to 220 (SAE 50 to 90 EP) oil.

## Trolley Drive Assembly

The gear housing is filled at factory and shipped with oil, a non-toxic, high quality, Extreme Pressure (EP), rust- and oxidation-inhibiting worm gear AGMA #7 lubricant that is suitable for an ambient temperature of 50° F to 125° F (10° C to 52° C).

Before placing hoist in operation, make certain that vented pipe plug has been installed in gear housing.

Fill gear housing through vented fill plug hole to height of level plug hole located in cover. The gear housing oil capacity is approximately 0.4 gals (1.5 lts.).

After first 10 hours of operation oil should be changed. Thereafter it should be changed every 100 hours of service or every 6 months, whichever occurs first.

The oil is drained by removing pipe plug located underneath gear housing. If oil drains too slowly, removing vented fill plug may speed up draining. The oil should be replaced using one of the recommended lubricants or its equivalent.

**Table 8 — Trolley Drive Recommended Lubricants**

Ambient Temperature	Recommended Lubricant
-10° to 50° F (-23° to 10° C)	AGMA #5 (EP 5)
50° to 125° F (10° to 52° C)	AGMA #7 (EP 7)

## Reduction Gear Assembly

The reduction gear assembly is shipped with oil from factory. Check oil level before initial hoist operation. If hoist is used at a normal frequency replace oil in reduction housing once every year.

To ensure correct performance, highest efficiency and long life, it is essential that lubricating oil be maintained at correct level. Oil capacity for reduction gear assembly is 2.3 gals (8.7 lts).

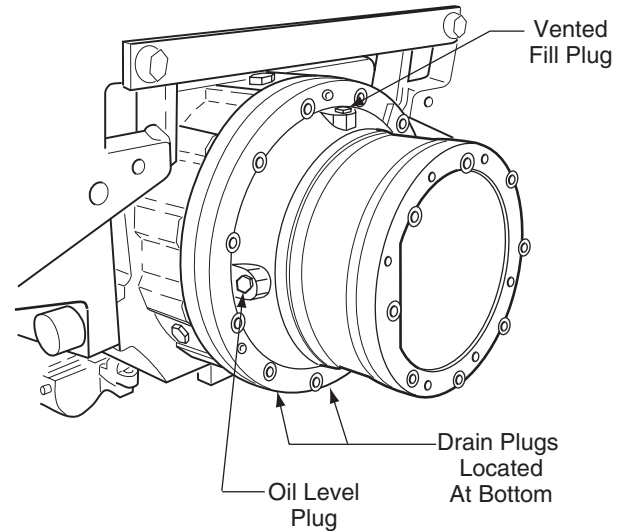
### **⚠ CAUTION**

• Do not over fill. Excess oil will reduce operating efficiency and increase oil temperature.

Use only high quality lubricants in reduction gear assembly such as ISO VG 200 EP motor oil or high grade EP4 gear oil.

The recommended grade of oil must be used at all times since use of unsuitable oil may result in excessive temperature rise, loss of efficiency and possible damage to gears. Check vented fill plug is unrestricted.

## Reduction Gear Level and Fill Plug Locations



(Dwg. MHP2390)

## Disc Brake

The disc brake housing is filled and shipped with oil from factory. Check oil level before initial hoist operation. If hoist is used at a normal frequency replace oil in disc brake housing once every year.

To ensure correct performance, highest efficiency and long life, it is essential that lubricating oil be maintained at correct level. Oil capacity for disc brake housing is 0.3 gals (1.14 lts).

### **⚠ CAUTION**

• Do not over fill. Excess oil will reduce operating efficiency and increase oil temperature.

### **NOTICE**

• When filling brake, air may be supplied through brake port allowing oil to fill faster. Remove existing air supply and connect direct to brake.

Use only high quality lubricants in disc brake housing assembly such as ISO VG 200 EP motor oil or high grade EP4 type gear oil.

The recommended grade of oil must be used at all times since use of unsuitable oil may result in excessive temperature rise, loss of efficiency and possible damage to brake discs and sprig clutch.

Fill brake housing to height of level plug.

## Seals and Bearings

If hoist is disassembled, clean all parts thoroughly and coat bearings and seals with clean grease. Use sufficient grease to provide a good protective coat. Lubricate grease fittings monthly with 2 or 3 pumps of a grease gun. For correct grease type, refer to Table 4 on page 20.

## TROUBLESHOOTING

This section provides basic troubleshooting information. Determination of 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 winch symptoms, probable causes and remedies.

Symptom	Cause	Remedy
Hoist will not operate.	No air supply to hoist, or too little CFM or PSI.	Check PSI (bar) at hoist inlet. Refer to "SPECIFICATIONS" section on page 7 for correct CFM (cu.m/min) and PSI (bar).
	Valve or limit arm sticking.	Check limit arm for free movement.
	Emergency valve "OFF".	Reset Emergency valve and push "ON" button.
	Pendant malfunction.	Check PSI (bar) at pendant. Minimum operating pressure in pendant line is 55 PSI (380 kPa/3.8 bar).
	Hoist is overloaded.	Reduce load to within rated capacity.
	Motor is damaged.	Repair or replace. Refer to "MAINTENANCE" section on page 24. Check oil level in motor and gearbox.
	Lubricator is low on oil.	Fill lubricator.
	Brake is not releasing ("DOWN" direction only).	Check brake release circuit and PSI (bar) at brake inlet (55 PSI (380 kPa/3.8 bar) minimum).
Load continues to move when hoist is stopped. "UP" direction.	Valve or limit arm sticking.	Check limit arm for free movement.
	Dump valves not releasing.	Check pendant hose dump valves.
	Pendant lever sticking.	Check lever and restore free movement.
Load continues to move when hoist is stopped. "DOWN" direction.	Valve or limit arm sticking.	Check limit arm for free movement.
	Dump valves not releasing.	Check pendant hose dump valves (old style pendants).
	Brake is slipping.	Check brake springs and brake disc linings for wear. Refer to "MAINTENANCE" section on page 24.
	Hoist is overloaded.	Reduce load to within rated capacity.
	Pendant lever sticking.	Check lever and restore free movement.
Hoist will not lift rated capacity.	Hoist is overloaded.	Reduce load to within rated capacity.
	No air supply to hoist or too little CFM or PSI.	Check PSI (bar) at hoist inlet. Refer to "SPECIFICATIONS" section on page 7 for correct CFM (cu.m/min) and PSI (bar).
	Main air valve travel is restricted.	Check limit arm and linkage for free movement.
	Brake is not releasing.	Check brake release circuit and PSI (bar) at brake inlet (55 PSI (3.8 bar) minimum).
	Exhaust is restricted.	Inspect vents and replace muffler.
	Motor is damaged.	Check for worn motor bearings.
	Motor or gearbox is out of oil.	Check oil levels in motor and gearbox. Fill to recommended level.
Hook can be lowered but not raised.	Hoist is overloaded.	Reduce load to within rated capacity.
	No air supply to hoist or too little CFM or PSI.	Check at hoist power supply connection with hoist under load. Raise pressure to rated capacity.
	Pendant malfunction.	Check PSI (bar) at air inlet connection (green fitting) on pendant.
Hook can be raised but not lowered.	Brake is not releasing.	No breather in gearbox. Remove solid square head plug in outboard end of gearbox only and install vented (breather) plug. Check PSI (bar) at brake inlet. (55 PSI (380 kPa/3.8 bar) minimum.) Check brake and pendant dump valves, if used (old style pendants).
	Brake piston seals leaking.	Install repair kit. Refer to Parts section.
	Low air pressure.	Check PSI (bar) at valve inlet. Raise pressure to rated capacity.
	Pendant malfunction.	Check PSI (bar) at yellow fitting connection on pendant.

Symptom	Cause	Remedy
Load chain jumps on sheave or is making a snapping sound.	Worn or rusted chain.	Refer to “INSPECTION” section on page 16 to determine wear limit. Replace if necessary.
	Incorrect chain.	Replace with correct chain.
	Worn sheave or chain guide.	Replace worn parts.
	Capsized hook.	Correct as described in “MAINTENANCE” section on page 25.
	Hoist not in line with load.	Align hoist with load. Do not “yard” or “side pull.”
	Incorrectly reeved load chain.	Check load chain is correctly reeved.
	No oil on load chain.	Lubricate load chain.

**Trolley (optional feature)**

Trolley will not stop or trolley wheels slip.	Damaged beam.	Repair or replace beam.
	Excessive oil, grease or paint on track of beam.	Clean off oil, grease or paint.
	Trolley not spaced for beam clearance.	Check trolley spacing. Refer to “INSTALLATION” section on page 8.
Air-powered trolley does not operate.	Pendant lever sticking.	Check lever and restore free movement.
	Emergency valve in “OFF” position.	Reset Emergency valve and push “ON” button.
	No air supply to trolley or too little CFM (cu. m/min.) or PSI (kPa/bar).	Check PSI (bar) at trolley inlet. Refer to manufacturer’s specifications.
	Control valve is sticking.	Refer to “MAINTENANCE” section on page 24.
	No oil in trolley motor or gearbox.	Check oil levels in trolley motor and gearbox and fill to required level.
	Wheels are obstructed.	Remove obstruction.
	Motor is damaged.	Repair or replace. Refer to “MAINTENANCE” section on page 24.



## ⚠ WARNING

- Never perform maintenance on hoist while it is supporting a load.
- Before performing maintenance, tag controls:  
**WARNING - DO NOT OPERATE - EQUIPMENT BEING REPAIRED.**
- Only allow personnel trained in operation and service of this hoist to perform maintenance.
- After performing any maintenance on hoist dynamically test hoist to 100% of its rated capacity, in accordance with ASME B30.16 standards, before returning hoist to service. Testing to more than 100% of rated capacity may be required to comply with standards and regulations set forth in areas outside the USA.
- Shut off air system and depressurize air lines before performing any maintenance.

Proper use, inspections and maintenance increase the life and usefulness of your **Ingersoll-Rand** equipment. During assembly, lubricate gears, nuts, capscrews and all machined threads with applicable lubricants. Use of antiseize compound and/or thread lubricant on capscrew and nut threaded areas prevents corrosion and allows for easy disassembly of components.

### Maintenance Intervals

The Maintenance Interval Chart below is based on intermittent operation of equipment for eight hours each day, five days per week. If equipment is in operation for more than eight hours a day or is operated in severe applications or environments, more frequent maintenance should be performed.

INTERVAL	MAINTENANCE CHECK
Start of each shift	Make a thorough visual inspection of hoist for damage. Do not operate hoist if damage is found.
	Operate in both directions. Hoist must operate smoothly without sticking, binding or abnormal noises.
	Check operation of pendant control and brake.
Semiannually	Inspect disc brake friction linings and sprag clutch assembly. Clean or replace parts as required.
Yearly	Inspect hoist gearing, shafts and bearings for damage or wear. Repair or replace as necessary.
	Check all of supporting members, including trolley if used. Repair or replace as required.

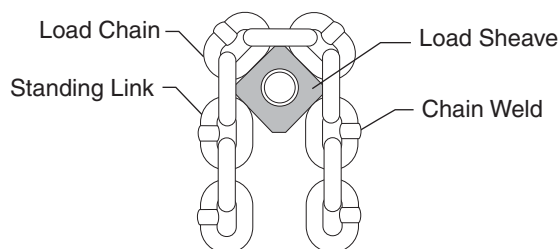
### Disc Brake Adjustment

No disc brake adjustment is required. If brake fails to hold load, brake must be disassembled, inspected, repaired and tested prior to placing hoist in service. When any part of friction disc thickness measures 0.072 in. (1.83 mm) or less, or if oil groove pattern is not clearly visible, friction discs must be replaced.

### Load Chain Replacement

#### Load Chain Weld Placement

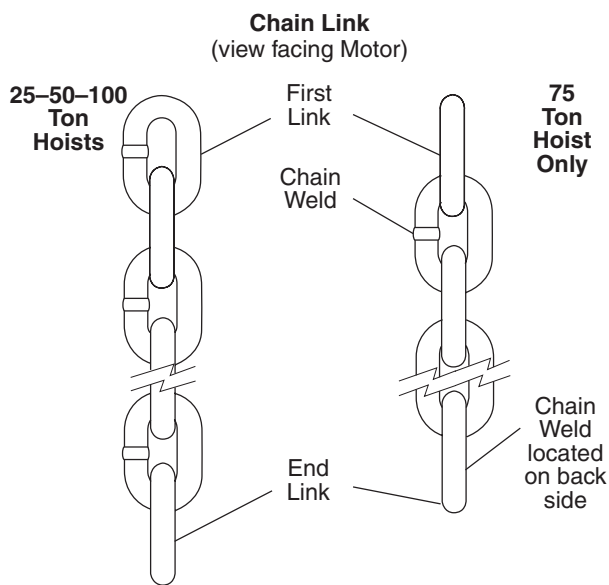
It is suggested that a short length of 32 mm load chain be available when replacing hoist load chain. Feeding a short length of load chain through bottom block assembly or power head assembly prior to installing new load chain may simplify installation. Weld on perpendicular load chain must always face away from sheaves. Refer to Dwg. MHP0042 on page 24.



(Dwg. MHP0042)

#### Replacement Load Chain Link Arrangement

Correct load chain installation requires that load chain have either an even or odd number of total chain links. Refer to Dwg. MHP2336 on page 24 for illustration of how to determine chain arrangement.



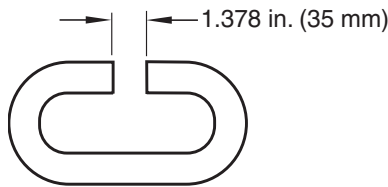
(Dwg. MHP2336)

#### Load Chain 'C' Link

Load chain replacement for all hoist models can be accomplished efficiently and easily by using existing load chain to install new load chain.

1. Using an abrasive wheel, cut a section from end link of existing chain to form a 'C' link. Refer to Dwg. MHP2337 on page 25.

### 'C' Link Dimension



"C" Link

(Dwg. MHP2337)

### ⚠ CAUTION

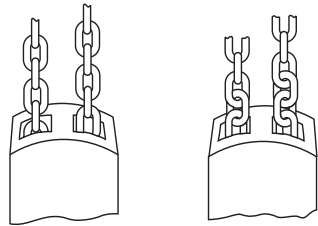
• Do not distort link in any manner. The link must be able to pass over chain sheaves without binding.

2. Connect new chain to old chain by inserting end of new chain into 'C' link. Make certain welds and links on new chain match positioning of welds and links on chain being replaced. For model-specific information, refer to the appropriate hoist model diagram.

### Determining Twisted, Kinked or 'Capsized' Load Chain

Ensure chain is not twisted, kinked or 'capsized' during installation. Refer to Dwgs. MHP0020 on page 25 and MHP0043 on page 25.

#### Twisted Chain

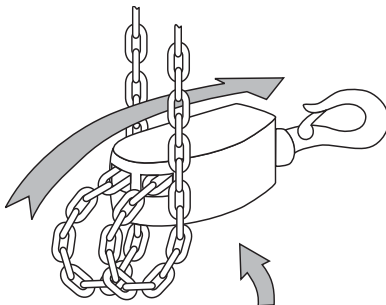


Appearance of chain that is Not Twisted

Appearance of chain that Is Twisted

(Dwg. MHP0020)

#### Capsized Chain



Make certain the bottom block has NOT been flipped through the chain falls

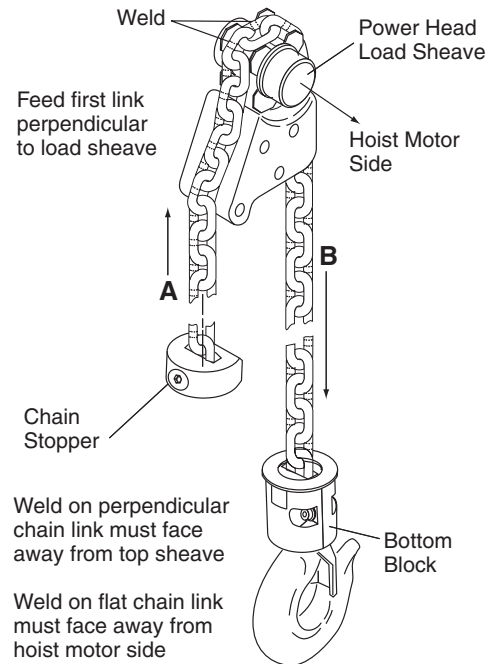
(Dwg. MHP0043)

### HA3-025 Hoist

Refer to Dwg. MHP2338 on page 25.

1. The hoist should be installed and connected to air supply. Reduce hoist air pressure to 60 psi (4 bar/414 kPa).
2. Remove chain bucket, if used.
3. Remove load chain stopper.
4. Remove bottom block assembly.
5. Cut new load chain to length. Load chain must have an even number of links (first and last links must be at 90° to each other). Refer to Dwg. MHP2336 on page 24.
6. Run hoist slowly in lifting direction until load chain free end is approximately 2 ft. (0.6 m) from hoist.
7. Using a 'C' link which is the same size as load chain to old taking care that weld on perpendicular *standing* links on new load chain are facing away from hoist load sheave.
8. Run hoist slowly until new load chain has passed 2 to 3 feet (0.6 to 1 m) through hoist. Remove 'C' link and old chain.
9. Install chain stopper in last link of load chain free end.
10. Install bottom block assembly.
11. Lubricate entire length of load chain before operating hoist. Refer to "LUBRICATION" section on page 20.

### HA3-025 Chain Reeving



(Dwg. MHP2338)

### HA3-050 Hoist

Refer to Dwg. MHP2339 on page 26.

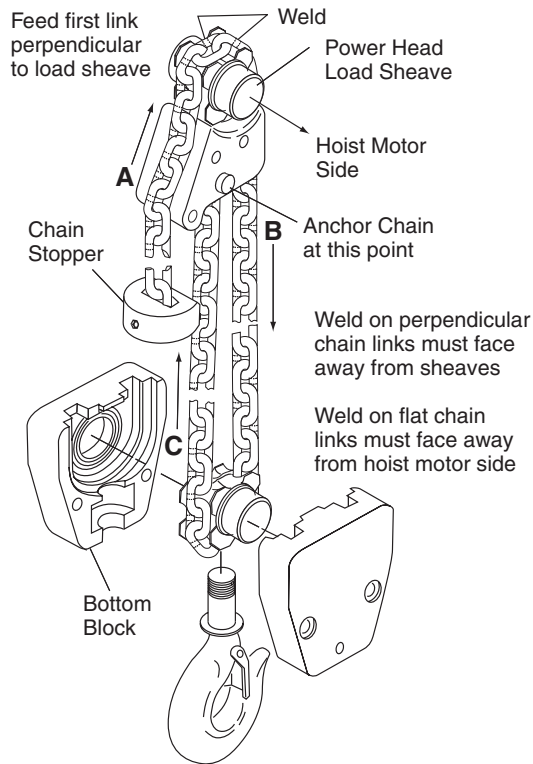
1. The hoist should be installed and connected to air supply. Reduce hoist air pressure to 60 psi (4 bar/414 kPa).
2. Remove chain bucket, if used.
3. Remove load chain stopper.
4. Run hoist slowly in lifting direction until bottom block assembly is approximately 3 ft. (1 m) from hoist power head. Firmly support and secure bottom block assembly in this position.

**⚠ WARNING**

• Do not begin chain replacement until bottom block assembly is fully secured and supported. If bottom block assembly or chain are dropped, they could cause injury or damage property.

5. Cut new load chain to length. Load chain must have an even number of links (first and last links must be at 90° to each other). Refer to Dwg. MHP2336 on page 24.
6. Remove pins that anchor load chain to power head assembly.
7. Using a 'C' link which is the same size as load chain join new load chain to free end on old chain taking care that weld on perpendicular *standing* links on new chain are facing away from hoist load sheave.
8. Run hoist slowly until new load chain has passed through hoist. Continue running hoist and pull chain by hand through bottom block assembly. Begin feeding chain at position 'A' and work alphabetically. Remove 'C' link and old chain.
9. Anchor end of load chain to power head assembly. Install chain stopper in last link of load chain free end.
10. Lubricate entire length of load chain before operating hoist. Refer to "LUBRICATION" section on page 20.

**HA3-050 Chain Reeving**



(Dwg. MHP2339)

**HA3-075 Hoist**

Refer to Dwg. MHP2340 on page 26.

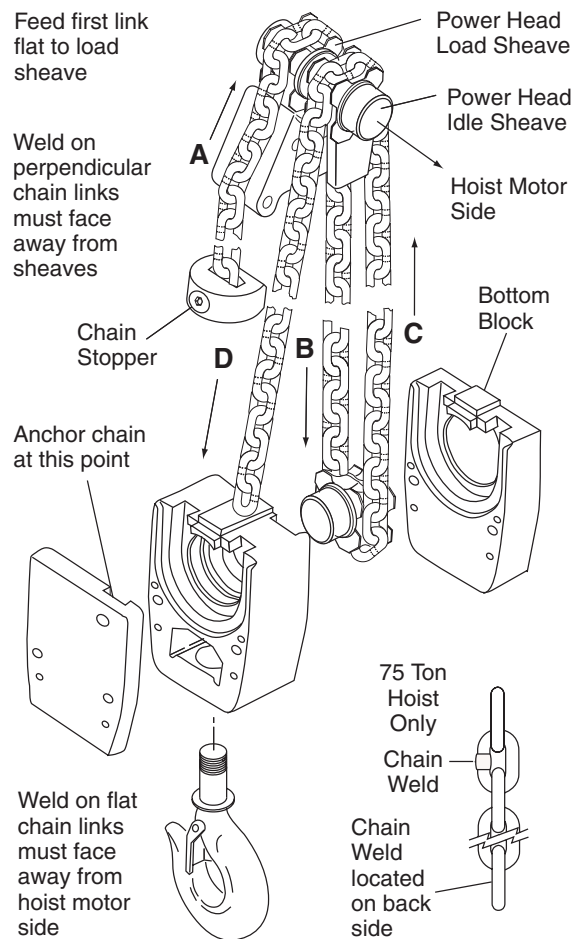
1. The hoist must be installed and connected to air supply. Reduce hoist air pressure to 60 psi (4 bar/414 kPa).
2. Remove chain bucket, if used.
3. Remove chain stopper.
4. Run hoist slowly in lifting direction until bottom block assembly is approximately 3 ft. (1 m) from hoist power head. Firmly support and secure bottom block assembly in this position.

**⚠ WARNING**

• Do not begin chain replacement until bottom block assembly is fully secured and supported. If bottom block assembly or chain are dropped, they could cause injury or damage property.

5. Cut new load chain to length. Load chain must have an odd number of links (first and last links must be in same plane/parallel to each other). Refer to Dwg. MHP2336 on page 24.
6. Remove capscrew and cotter pin that anchor load chain to bottom block assembly.
7. Using a 'C' link which is same size as load chain, join new load chain to free end on old chain taking care that weld on perpendicular *standing* links on new chain are facing away from hoist load sheave.
8. Run hoist slowly until new load chain has passed through hoist. Continue running hoist and pull chain by hand through bottom block assembly. Begin feeding chain at position 'A' and work alphabetically. Remove 'C' link and old chain.
9. Attach end of load chain to bottom block assembly. Install chain stopper in last link of load chain free end.
10. Lubricate entire length of load chain before operating hoist. Refer to "LUBRICATION" section on page 20.

**HA3-075 Chain Reeving**



(Dwg. MHP2340)

## HA3-100 Hoist

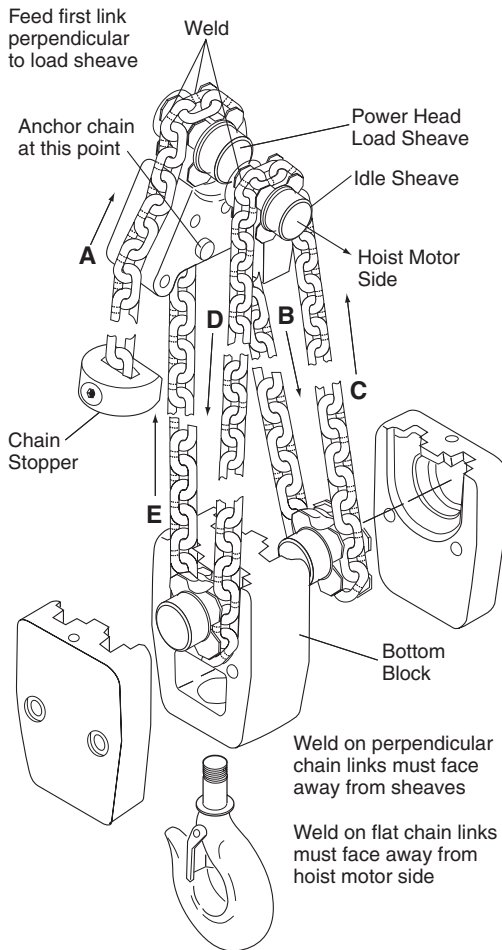
Refer to Dwg. MHP2341 on page 27.

1. The hoist must be installed and connected to air supply. Reduce hoist air pressure to 60 psi (4 bar/414 kPa).
2. Remove chain bucket, if used.
3. Remove chain stopper.
4. Run hoist slowly in lifting direction until bottom block assembly is approximately 3 ft. (1 m) from hoist power head. Firmly support and secure bottom block assembly in this position.



• **Do not begin chain replacement until bottom block assembly is fully secured and supported. If bottom block assembly or chain are dropped, they could cause injury or damage property.**

### HA3-100 Chain Reeving



(Dwg. MHP2341)

5. Cut new load chain to length. Load chain must have an even number of links (first and last links must be at 90° to each other). Refer to Dwg. MHP2336 on page 24.
6. Remove pins that anchor load chain to power head assembly.

7. Using a 'C' link which is the same size as load chain join new load chain to free end on old load chain taking care that weld on perpendicular *standing* links on new load chain are facing away from hoist load sheave.
8. Run hoist slowly until the new load chain has passed through hoist. Continue running hoist and pull chain through bottom block assembly. Begin feeding chain at position 'A' and work alphabetically. Remove 'C' link and old chain.
9. Anchor end of load chain to power head assembly. Install chain stopper in last link of load chain free end.
10. Lubricate entire length of load chain before operating hoist. Refer to "LUBRICATION" section on page 20.

### General Disassembly

The following instructions provide the necessary information to disassemble, inspect, repair, and assemble the hoist. Complete assembly drawings of the hoist components are provided in the "PARTS" section.

If hoist is being completely disassembled for any reason, follow the order of the topics as they are presented.

It is recommended that all maintenance work on hoist be performed on a bench in a clean dust-free work area.

In the process of disassembling hoist, observe the following:

1. Turn off air system and depressurize air lines before performing any maintenance. Disconnect hoses from hoist and trolley. Plug or cap openings to keep out dirt and contaminants.
2. Never disassemble hoist any further than is necessary to accomplish the needed repair. A good part can be damaged during the course of disassembly.
3. Never use excessive force when removing parts. Tapping gently around the perimeter of a cover or housing with a soft hammer, for example, is sufficient to break the seal.
4. Do not heat a part with a flame to free it for removal, unless the part being heated is already worn or damaged beyond repair and no additional damage will occur to other parts.
5. In general, hoist is designed to permit easy disassembly and assembly. The use of heat or excessive force should not be required.
6. Keep the work area clean to prevent dirt and other foreign matter from getting into bearings and other moving parts.
7. All seals and 'O' rings should be discarded once they have been removed. New seals and 'O' rings should be used when assembling the hoist.
8. When grasping a part in a vise, always use leather or copper covered vise jaws to protect the surface of part and help prevent distortion. This is particularly true of machined surfaces, threaded members and housings.
9. Do not remove any part which is press fit in or on a subassembly unless the removal of that part is necessary for repairs or replacement.
10. To avoid damaging bearings during hoist assembly or disassembly always tap or press on bearing inner race for shaft fit bearings or outer race for bore fit bearings.

## CAUTION

- Use extreme care when performing any maintenance on hoist. Hoist weight may exceed 7,400 lbs (3357 kg) use appropriately rated equipment for moving.

### Powerhead Disassembly

Refer to Dwg. MHP 2343 on page 34.

1. Remove chain from hoist, by removing retainer ring (171) and chain anchor pin (170) from lead stripper (159).
2. Disconnect all hoses from hoist motor. Drain oil from reducer, brake and motor assemblies.
3. Place powerhead assembly in horizontal position and support on blocks.
4. Remove capscrews (703) and lockwashers (702) from motor assembly.
5. Remove motor assembly using the proper equipment necessary to support weight of the component.
6. If motor repair or general maintenance is required refer to 'Motor Disassembly' section on page 28.
7. Remove limit arm (301) as an assembly by removing capscrew (303) that secures it to motor end frame (152). It is not necessary to remove valves (312) or spacers (304) unless damaged.
8. Using side holes in frames (154) and (153), rotate powerhead assembly vertically with motor end frame (152) down. Place blocks along either side of motor end frame (152) to protect brake shaft (102) from damage.
9. Remove capscrews (202) and lockwashers (702) that secure reduction gear assembly (200).
10. Using the proper equipment necessary to support weight of component, remove reduction gear assembly from reduction gear frame end (154) taking care not to damage or distort the drive shaft (151).
11. It is not recommended to disassemble reduction gear.
12. Remove drive shaft (151) taking care not to damage teeth or distort shape.
13. It is not recommended to remove bushing (169) from drive shaft (151).
14. Remove capscrews (161) and (162) from reduction gear end frame (154) and pry from center frame (153).
15. Remove capscrews (166) and wear pads (158) from reduction gear end frame (154) and center frame (153). Check wear pads (158) for damage or wear. Refer to "INSPECTION" section on page 16.
16. Remove drive sheave (155) and lead stripper (159) at the same time. Carefully pry from center frame (153) both drive sheave and lead stripper. It may be necessary to use a rubber mallet to loosen lead stripper from dowel pins (168). Dowel pins (168) do not need to be removed.
17. Remove 'O' rings (163) and (164) and bearings (157) from drive sheave (155). Discard 'O' rings.
18. Using side holes on frames (152) and (153), rotate motor end frame (152) so that motor end frame side is up, this will make disassembly of brake easier.

## NOTICE

- Brake assembly is spring loaded, use care when removing motor adapter (53).

19. Remove capscrews (109) from brake housing (110), and carefully remove motor adapter (53), springs are located between reaction ring (101) and piston (104).
20. Remove reaction ring (101) and piston (104).

21. Remove 'O' ring (116) and discard.
22. Remove from piston (104), seals (113) and (114), check for damage or wear.
23. Remove brake shaft (102) as an assembly, then remove drive discs (111) and friction discs (112), check for wear.
24. Remove retainer ring (108) and thrust washer (107) from brake shaft assembly.
25. It is not recommended to remove from brake shaft (102) the hub (103), sprag clutch (105) or bushings (106), unless damage or wear is visible.
26. Remove brake housing (110) and 'O' ring (123) from motor end frame (152). Discard 'O' ring.
27. Remove capscrews (161) from motor end frame (152) and pry center frame (153) from motor end frame. It is not necessary to remove dowel pins (165).
28. Remove idler sheave assembly (156) from motor end frame (152).
29. Remove 'O' rings (163) and (164) and bearings (157) from idler sheave (156). Discard 'o' rings.

### Top Hook Disassembly

Refer to Dwg. MHP2345 on page 38.

1. Remove hoist from mounting structure.
2. To remove hook and plate assembly (hook cannot be removed before hook plate) remove capscrews (403) and separate hook plate assembly from power head.
3. To remove hook (352) from hook plate (400) drive out roll pins (355) and remove nut (353) from threaded hook end.
4. Remove hook (352) and bearing (354) from hook plate (400).

## CAUTION

- Do not use swivel ring hook (401) for lifting load, use for installation only.

### Bottom Block Disassembly

#### HA3-100 Hoist

Refer to Dwg. MHP2344 on page 39.

1. Always make sure load chain is removed before disassembly.
2. Remove capscrews (356) securing hook blocks (351) to hook center block (350) and pry hook blocks (351) from both sides of hook center block (350). (Engagement of dowel pins (165) may make removal difficult).
3. Drive out pins (355) from nut (353) in threaded hook section. Pull hook (352) from hook center block (350) and remove bearing (354) and nut (353).
4. Remove bearings (157), sheaves (156) and 'O' Rings (163) and (164) from hook blocks (351) and hook center block (350). Discard 'O' Rings (163) and (164).

### Hoist Motor Disassembly

Refer to Dwg. MHP2348 on page 36.

1. Remove five capscrews (109) from exhaust flange (744). **Do not** remove the two capscrews (747) from throttle valve assembly (260).
2. Remove pilot control valve housing (621) by pulling it out of motor housing (720) as an assembly with exhaust flange (744).

## CAUTION

- Do not remove the exhaust flange (744) until rotary valve (740) has been removed from rotary valve housing (739).



3. Remove rotary valve (740) by pulling it out from assembly through the motor housing end of rotary valve housing (739).
4. Remove exhaust flange (744) and control valve assembly (621) by removing capscrews (747) and (749), respectively.
5. Remove each cylinder head (705) by removing four capscrews (704). Remove head gasket (713).
6. Pull cylinder liner (701) straight out.
7. Position piston (708) at top of its stroke. In this position, with cylinder liner pulled out in step 6, wrist pin (707) can be removed. Remove one retainer ring (709) from either side of piston (708). Push wrist pin (707) out by hand from one side. If wrist pin is too tight it is acceptable to carefully heat piston to 200° F (93° C) or less and then push wrist pin out.

## NOTICE

• **If piston, wrist pin, connecting rod or cylinder liner are to be re-assembled, number each set. Also add radial alignment marks for each piston and cylinder liner to motor housing.**

8. Remove remaining cylinder liners and pistons as described in steps 6 and 7. To remove crank assembly, all pistons and cylinder liners must be removed.
9. Crank assembly (727) can now be removed with oil slinger (726) by pulling straight out from motor housing (720). Use care while guiding connecting rods (710) through inside of motor housing.

### 2 Lever Pendant Disassembly

Refer to Dwg. MHP1977 on page 42.

1. Remove fittings (265) and lifting eye (250).
2. Unscrew plugs (254). Remove springs (255) and balls (256).
3. Tap out pin (257) and remove levers (263).
4. Remove setscrews (260) from pendant handle (264).
5. Remove valve assemblies (262). Remove 'O' rings (253) and (259) and protector (261) from valve assemblies. Discard 'O' rings.
6. Remove plug (270) from pendant handle (264).
7. Remove retainer ring (268) and exhaust washer (267).

### 4 Lever Pendant Disassembly

Refer to Dwg. MHP1980 on page 42.

1. Remove fittings (265) and lifting eye (250).
2. Unscrew plugs (254). Remove springs (255) and balls (256).
3. Remove capscrews (280) and (283) and washers (281) from attachment (left) (286). Remove attachment (left) taking care not to damage pin (284). Separate pin (284), lever (257) and 'O' rings (282) from attachment (left). Discard 'O' rings.
4. Repeat step 3 for attachment (right) (287).
5. Tap out pin (257) and remove levers (263).
6. Remove valve assemblies (262). Remove 'O' rings (253) and (259) and protector (261) from valve assemblies. Discard 'O' rings.
7. Remove plug (270) from pendant handle (264).
8. Remove retainer ring (268) and exhaust washer (267).

## Cleaning, Inspection and Repair

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

### Cleaning

Clean all hoist component parts in solvent (except for the friction discs). The use of a stiff bristle brush will facilitate the removal of accumulated dirt and sediments on the gears and frames. If bushings have been removed it may be necessary to carefully scrape old Loctite® from the bearing bores. Dry each part using low pressure, filtered compressed air.

## ⚠ 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.**
- **Do not use trichloroethylene to clean parts.**
- **If trolley suspension yoke bushings are loose or worn they must be replaced. Failure to observe this precaution will result in additional component damage.**

### 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 all bushings for wear, scoring, or galling.
3. Inspect shafts for ridges caused by wear. If ridges caused by wear are apparent on shafts, replace the shaft.
4. Inspect all threaded items and replace those having damaged threads.
5. Measure the thickness of the friction discs (112). If the friction discs are less than 0.072 in. (1.83 mm) or if oil groove pattern is not clearly visible replace the friction discs (112).
6. Check mufflers (173) and (176) for damage or excessive dirt.
7. Inspect trolley yoke bushings for wear, scoring, or galling. If wear exceeds discard dimensions in Table 9 replace bushings.

**Table 9 — Bushing Inspection Specifications**

Hoist Model	Item No.	Bushing Part No.	Original Bore Size		Discard Bore Size	
			in.	mm	in.	mm
HA3-025	Contact Factory		3.253	82.6	3.315	84.2
HA3-050			3.437	87.3	3.500	89
HA3-075			4.50	114.3	4.562	116
HA3-100						

8. Check bearings for ease of rotation and wear. Replace bearings if rotation is rough or bearings are excessively worn.
9. Check the sprag clutch assembly for wear, flat spots on the sprags or damage. If any of these conditions exist, replace parts.
10. Inspect sprag clutch wear area on brake hub (103) and on brake shaft (102) for ridges or galling. If either condition exists replace parts.

## NOTICE

• **If brake hub (103), sprag clutch (105) or brake shaft (102) require replacement, it is recommended that all three parts be replaced at the same time.**

## 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 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 all 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 shaft 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 Instructions



• Use extreme care when performing any maintenance on hoist. Hoist weight may exceed 7,400 lbs (3357 kg) use appropriately rated equipment for moving.

## Powerhead Assembly

Refer to Dwg. MHP 2343 on page 34.

1. Place motor end frame in a vertical position with motor side down, for procedures 2 through 14.
2. Lubricate and install 'O' rings (163) and (164) and bearings (157) to idler sheave (156).
3. Install idler sheave assembly (156) in motor end frame (152) and install a short length of chain. Refer to 'Load Chain Weld Placement' and Dwg. MHP0042 in "MAINTENANCE" section on page 24.
4. If vertical stripper (160) was removed during disassembly, install and secure using capscrews (167) to center frame (153).
5. Install pins (165) if removed during disassembly.
6. Align pins (165) in motor end frame (152) with center frame (153) and carefully lower center frame onto motor end frame using appropriately rated equipment.
7. Install capscrews (161) and torque to approximately 909 to 1030 ft lbs (1299 to 1471 Nm).
8. Install wear pads (158) with capscrews (166) in reduction gear end frame (154) and center frame (153). Apply a small amount of Loctite® 242 to threads.
9. Lubricate and install 'O' rings (163), (164) and bearings (157) on both sides of drive sheave (155).
10. Install dowel pins (165) and (168) if removed during disassembly.
11. Install drive sheave assembly (155) and lead stripper (159) together. Align dowel pins (168) in lead stripper with holes in center frame (153).
12. Install a short length of chain around drive sheave (155) and lead stripper (159). Refer to 'Load Chain Weld Placement' and Dwg. MHP0042 in "MAINTENANCE" section on page 24.
13. Install reduction gear end frame (154) onto center frame (153) being careful to align dowel pins (165) and (168).

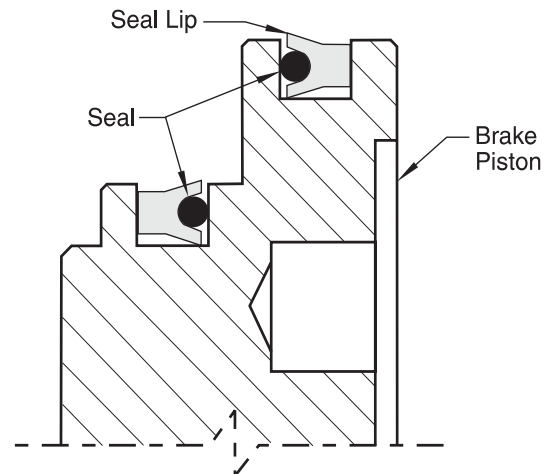
14. Install capscrews (161) and (152) in reduction gear frame and torque to approximately 909 to 1030 ft lbs (1299 to 1471 Nm).
15. Using holes on both sides frames, rotate powerhead assembly so reduction gear frame (154) side is down for easier installation of brake.
16. Lubricate and install 'O' ring (123). Align capscrew holes and position brake housing (110) on motor end frame (152).

## NOTICE

• If hub (103) and sprag clutch (105) were removed from brake shaft (102) be sure to install this assembly so teeth of hub (103) are pointing toward motor end frame (152).

17. Clean brake shaft assembly and inspect parts for wear before assembling brake.
18. Install on brake shaft (102), hub assembly (103) and thrust washer (107) secure with retainer ring (108).
19. Inspect and install drive discs (111) and friction discs (112) on hub (103). Alternate discs, starting with friction disc (112) followed by a drive disc (111).
20. Lubricate and install seals (113) and (114) in brake piston (104) grooves so seal lips face each other. Do not overstretch seals during this procedure. Refer to Dwg. MHP0139 on page 30.
21. Install brake shaft assembly (102) and piston assembly (104) in brake housing (110).
22. Install brake piston assembly in brake housing so stepped side enters first. Gently tap into position using a soft mallet until seated.

## Brake Seal Installation



(Dwg. MHP0139)

23. Install springs (117), 'O' ring (116) and reaction ring (101) on brake shaft (102).
24. Install motor adapter (53) to brake housing (110) and secure with capscrews (109). Torque to approximately 106 to 121 ft lbs (151 to 173 Nm).
25. Using side holes in frames of hoist rotate hoist assembly vertically so motor end frame (152) is down. Place blocks along either side of motor end frame (152) to protect brake shaft (102) from damage.
26. Install drive shaft (151) and bushing (169) through reduction gear end frame side so it engages with brake shaft. Use care when installing so no damage will occur to either shaft.
27. Rotate drive shaft (151) clockwise and check for brake shaft (102) to rotate. If brake shaft does not move, gently rotate drive shaft (151) until teeth engage brake shaft. Continue this step until brake shaft (102) rotates with drive shaft.

## NOTICE

• Use care when installing reduction gear assembly (200) to powerhead assembly. Damage or distortion to drive shaft (151) may occur if not properly supported while installing reduction gear assembly.

28. Install reduction gear assembly (200) to reduction gear end frame (154) and secure with capscrews (202) and lockwashers (702), apply a small amount of Loctite® 242 to threads of capscrews. Torque to 80 to 90 ft lbs (114 to 129 Nm).
29. Using holes on both sides of frames, rotate powerhead assembly horizontally, providing blocks on either side for support.
30. Install motor assembly (700) to motor end frame (152) and secure with capscrews (703) and lockwashers (702), apply a small amount of Loctite® 242 to threads of capscrews. Torque to 80 to 90 ft lbs (114 to 129 Nm).
31. After chain has been reeved, install cotter pin (170) in lead stripper (159) and secure with retainer ring (171). Refer to Dwg. MHP2341 on page 27.

### Hoist Motor Assembly

Refer to Dwg. MHP2348 on page 36.

1. Assemble pilot control valve assembly (621) and manifold (750) to rotary valve housing (739) using four capscrews (747) and lockwashers (749). Install two capscrews (747) and lockwashers (749) that attach exhaust flange (744) to throttle valve housing.
2. Tighten capscrews (747) and (749) to 25 ft lbs (34 Nm). Throttle handle should move fully left and right without sticking or binding, and should center (by spring force) automatically when released.
3. Install two seal rings (741) on each end of rotary valve (740). Place bearing (742) onto the rear of rotary valve (740) and press into position. Press only on bearing inner race. With rotary valve housing (739) exhaust flange down, install rotary valve into housing.
4. Install 'O' ring (737) into motor housing (720).
5. Install rotary valve housing gasket (812) onto rotary valve housing. With exhaust flange down on bench, install motor housing (720) onto rotary valve housing. Check for any evidence of damage to 'O' ring when rotary valve housing is fully engaged. Install and tighten capscrews (109) to 50 ft lbs (68 Nm).
6. If removed, press crank bearing (724) on crank assembly (727). Apply pressure only on inner race of bearing.
7. Place crank assembly on a work bench with oil slinger (726) down and slide the sleeve (728) (with tang up) on crankpin.
8. Slide connecting rod bushing (729) over sleeve (728) and first connecting rod ring (730) with chamfer up.
9. Install connecting rods (710) in same order as removed, with all feet pointing in same direction, using first connecting rod ring (730) to hold one side of connecting rod feet.
10. Slide second connecting rod ring over other side of connecting rod feet with chamfer on ring facing down (toward stem of connecting rod).
11. Slide crank shaft valve end over crank pin while simultaneously aligning tang on sleeve (728) with slot in crank shaft.
12. Rotate and position crank shaft valve end relative to crank pin to allow installation of lock pin (731).
13. Tap lock pin (731) in place and install pin nut (733). Torque nut to 60 ft lbs (81 Nm).
14. Install cotter pin (732) and bend ends over.

15. Install roll pin (734) and bearing (742) into valve end of crank shaft.
16. Check that all connecting rods move freely around crank. Position crank assembly into motor housing (720). Ensure bearing (724) is seated and connecting rods (710) are centered in cylinder holes.

## NOTICE

• Make certain roll pin (734) and three lugs on rotary valve (740) line up with corresponding hole and lugs on crank shaft.  
• Do not allow rotary valve to slide back in rotary valve housing (739). If rotary valve slides in too far, seal ring (741) will lock-up in internal grooves of rotary valve housing (739) and restrict further assembly.

17. Rotate crank assembly until one connecting rod (710) is at the top of its stroke. Install a piston (708) with its rings (706) and (711) to connecting rod with wrist pin (707) and retaining rings (709).
18. Install a new cylinder head gasket (713) before installing cylinder liner (701).
19. Install cylinder liner over the piston by compressing both piston rings and with a single band ring compressor.
20. Install cylinder head (705) over cylinder and secure cylinder head to motor housing with four capscrews (704). Torque capscrews to 60 ft lbs (81 Nm).
21. Repeat Steps 17 through 20 with remaining cylinders.
22. Rotate motor by hand. Motor should rotate without binding.
23. Install mounting flange (52) and gasket (722) on front of motor housing. Make sure notches on both parts are aligned.
24. Lightly lubricate 'O' ring (737) and install in groove on motor adapter.
25. Temporarily install capscrews and nuts finger tight to retain motor adapter.
26. Install eye bolts and vent cap assembly (715) in motor housing.
27. Ensure oil drain and level plugs (712) are installed.

### Top Hook Assembly

Refer to Dwg. MHP2345 on page 38.

1. Install hook (352) and bearing (354) in hook plate (400).
2. Install nut (353) on threaded hook end until snug. Back nut (353) off until first dowel pin hole is lined up. Install pins (355). Do not attempt to drive pins (355) into nut until holes are aligned or threads on hook (352) will be damaged.
3. Install hook plate assembly on power head with capscrews (403). Torque to approximately 1288 ft lbs (1840 Nm).
4. Install hoist on mounting structure.

## CAUTION

• Do not use swivel ring hook (401) for lifting load, use for installation only.

### Bottom Block Assembly

#### HA3-100

Refer to Dwg. MHP2344 on page 39.

1. Pack bearing (354) in hook center block (350) cavity.
2. Install threaded hook end into hook center block (350) and through bearing (354).



3. Install nut (353) being careful that threads are not crossed. Tighten nut (353) until snug then back nut (353) off until first dowel pin hole is lined up. Install pins (355) until flush with nut (353) diameter. Do not attempt to drive pins (355) into nut until holes are aligned or threads on hook (352) will be damaged.
4. Lubricate and install 'O' rings (163) and (164) on sheaves (156) in grooves provided. Using a press against the inner race of bearing (157) press the bearings (157) onto both sides of sheaves (156).
5. Install the assembled sheaves in the hook center block (350). Pack cavities in hook center block (350) and hook blocks (351) with grease.
6. Tap dowel pins (165) into position. Install hook blocks (351) over bearings (157) and sheaves (156) making sure dowel holes are lined up. Secure hook blocks (351) with capscrews (356) using Loctite® 242. Torque to 681-772 ft lbs (973-1103 Nm).
7. Install grease fittings (360) and (363) and fill block with grease. Refer to "LUBRICATION" section on page 20.

## 2 Lever Pendant Assembly

Refer to Dwg. MHP1977 on page 28.

1. Assemble protectors (261) and 'O' rings (253) and (259) on valves (262).
2. Insert valve (262) assemblies into pendant handle (264).
3. Install screws (260) into pendant handle.
4. Install balls (256), springs (255) and plugs (254) into pendant handle.
5. Install plug (270) into pendant handle.
6. Install fittings (265) and lifting eye (250) into top of pendant handle.
7. Facing pendant handle operation side, place levers (263) such that lever direction indicators show 'UP' on left hand side and 'DOWN' on right hand side. Install pin (257) ensuring pin inserts through levers and locates on opposite side of pendant handle.
8. Install exhaust washer (267) and secure with retainer ring (268).
9. Attach hoses to fittings located on top of pendant handle. Locate hoses to fittings as shown in the "INSTALLATION" section on page 16.

### NOTICE

- Screws (258) are installed in pendant levers allowing adjustment of pendant levers.

## 4 Lever Pendant Assembly

Refer to Dwg. MHP1980 on page 42.

1. Assemble protectors (261) and 'O' rings (253) and (259) on valves (262).
2. Insert valve (262) assemblies into pendant handle (264) and attachments (right) (287) and (left) (286).
3. Install screws (260) in pendant handle and attachments (right) and (left).

4. Install balls (256), springs (255) and plugs (254) into pendant handle and attachments (right) and (left).
5. Install plug (270) into pendant handle.
6. Install fittings (265) into top of pendant handle and attachments (right) and (left). Install lifting eye (250) into top of pendant handle.
7. Facing pendant handle operation side, place levers (263) such that lever direction indicates 'UP' on left hand side and 'DOWN' on right hand side. Install pin (257) ensuring pin inserts through levers and locates on opposite side of pendant handle.
8. Lubricate and install 'O' rings (282) in recesses on sides of pendant handle (264).
9. Install attachment (right) (287) and (left) (286) to pendant handle (264) and secure with washers (281) and capscrews (280) and (283). Install shorter screws in back, longer screws in front.
10. Facing pendant handle operation side, place levers (285) such that lever direction indicates 'LEFT' on left hand side and 'RIGHT' on right hand side. Install pins (284) ensuring pins insert through levers and locate on side of pendant handle.
11. Install exhaust washer (267) in pendant handle and secure with retaining ring (268).
12. Attach hoses to fittings located on top of pendant handle. Locate hoses to fittings as shown in the "INSTALLATION" section.

### Load Test

Prior to initial use, all new, extensively repaired, or altered hoists shall be load tested by or under the direction of personnel instructed in safety, maintenance and operation of this hoist. A written report must be maintained on record confirming the rating of the hoist.

1. Operate the hoist fully in both directions without a load. Hoist must operate smoothly, without evidence of binding. Response to operating controls must be quick and accurate.
2. Place a 10% load on hoist and operate hoist fully in both directions. Hoist must operate smoothly, without evidence of binding. Response to operating controls must be quick and accurate.
3. Dynamically load test hoist to **100%** of its rated capacity in accordance with ASME B30.16 standards. Hoist must operate smoothly, without evidence of binding. Response to operating controls must be quick and accurate.

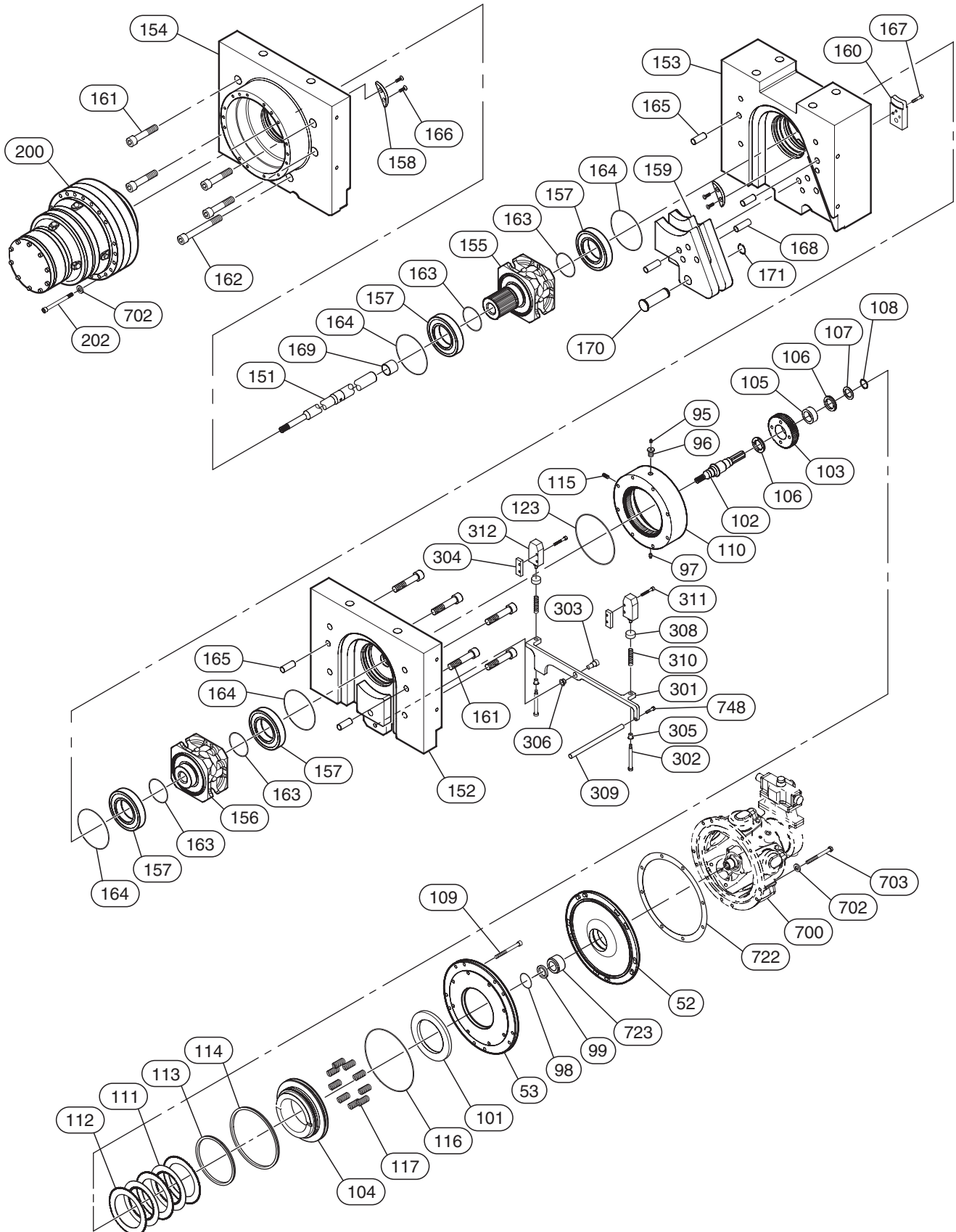
### NOTICE

- Testing to more than 100% may be necessary to comply with standards and regulations set forth in areas outside of the USA.

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# POWERHEAD ASSEMBLY DRAWING



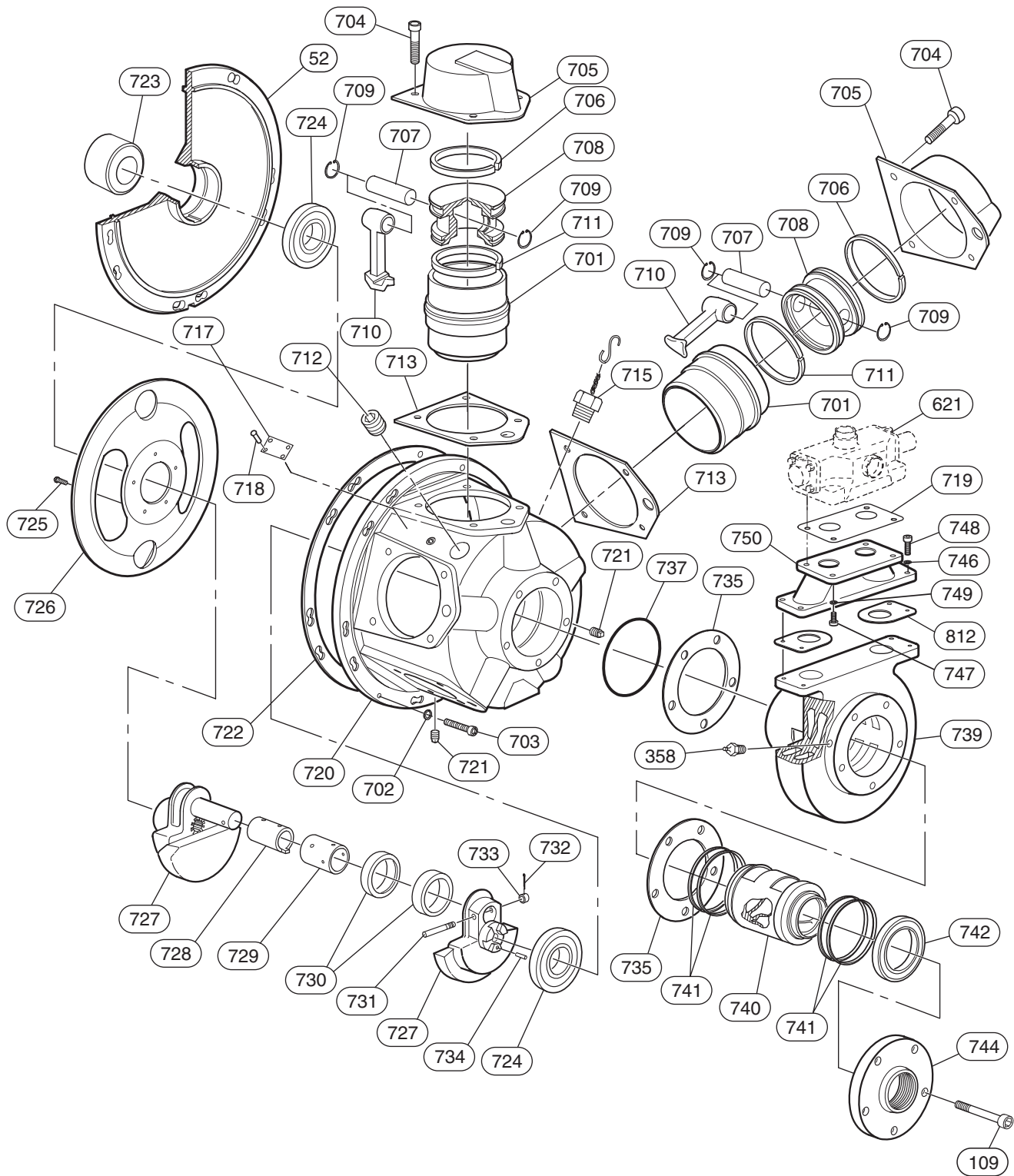
(Dwg. MHP2343)

## POWERHEAD ASSEMBLY PARTS LIST

Item No.	Description of Part	Total Qty	Part Number	Item No.	Description of Part	Total Qty	Part Number
52	Mounting Flange	1	K5B-502A	159	Stripper, Lead	1	28713
53	Motor Adapter	1	14227	160	Stripper, Vertical	1	28715
• 95	Breather	1	51857	161	Capscrew	9	71395198
96	Fitting, Reducer Bushing	1	51803	162	Capscrew	1	71395271
97	Pipe Plug	1	50801	• 163	'O' Ring	4	71395206
• 98	'O' Ring	1	52537	• 164	'O' Ring	4	71395214
99	Seal Adapter	1	11711	165	Dowel Pin	8	71393995
101	Reaction Ring	1	10597	166	Capscrew	4	50964
102	Brake Shaft	1	28727	167	Capscrew	3	50910
103	Hub	1	28731	168	Dowel Pin	6	71396196
104	Piston	1	28767	169	Bearing	1	71395420
105	Sprag Clutch	1	71394423	170	Chain Anchor Pin	1	28817
106	Bushing	2	28732	171	Retainer Ring	1	71396162
107	Thrust Washer	1	71394415	200	Reduction Gear Assembly	1	71394274
108	Retainer Ring	1	51898	202	Capscrew	8	71394464
109	Capscrew	8	51471	301	Limit Paddle	1	28807
110	Brake Housing	1	11593	302	Shoulder Screw	2	71395644
111	Drive Disc	2	50773	303	Shoulder Screw	1	71395677
112	Friction Disc	3	50772	304	Spacer	2	28829
113	Seal	1	51462	305	Bushing	2	71395651
114	Seal	1	51461	306	Bushing	1	71395685
115	Fitting, Nipple	1	50859	308	Trigger Plate	2	28809
• 116	'O' Ring	1	51458	309	Limit Arm	1	28808
117	Spring	9	50751	310	Spring	2	71395669
• 123	'O' Ring	1	51460	311	Capscrew	4	71396451
151	Drive shaft	1	28751	312	Valve	2	53040
152	Frame, Motor End	1	28707	700	Motor	1	K5B-546L
153	Frame, Center	1	28708	702	Lockwasher	18	71268213
154	Frame, Reduction Gear End	1	28709	703	Capscrews	10	71268205
155	Drive Sheave	1	28695-1	• 722	Gasket	1	K5B-582
156	Idler Sheave	1	28695-2	• 723	Oil Seal	1	51873
157	Bearing	4	71394001	748	Capscrew	1	51780
158	Wear Pad	2	28710				

• Recommended spares for one hoist, 2 years of normal service.

# MOTOR ASSEMBLY DRAWING



(Dwg. MHP2348)

## MOTOR ASSEMBLY PARTS LIST

Item No.	Description of Part	Total Qty	Part Number	Item No.	Description of Part	Total Qty	Part Number
700	Motor Assembly *	1	K5B-546L	723	Oil Seal	1	51873
52	Mounting Flange	1	K5B-502A	724	Crank Bearing	2	51066
109	Capscrew	5	51471	725	Buttonhead Screw	5	K5B-541
358	Grease Fitting	1	53095	726	Oil Slinger	1	K5B-540
621	Control Valve Assembly	1	28883	727	Crank Assembly (2 pieces)	1	K5B-A516
701	Cylinder Liner	5	K5B-L505-47	728	Sleeve	1	K5B-519
702	Lockwasher	10	71268213	729	Bushing	1	K5B-511
703	Capscrew	10	71268205	730	Connecting Rod Ring	2	K5B-510
704	Capscrew	20	52317	731	Lock Pin	1	HU-520
705	Cylinder	5	K5B-H505	732	Cotter Pin	1	53456
706	Compression Ring	1 Set	K5B546-KRING	733	Pin Nut	1	D02-394
707	Wrist Pin	5	HU-514A	734	Pin	1	54257
708	Piston Assembly **	5	K5B-A513-47	735	Gasket	2	K5B-928
709	Retainer Ring	10	902A45-632	737	'O' Ring	1	20A11CM248
710	Connecting Rod	5	K5B-509	739	Rotary Valve Housing	1	K5B-545
711	Oil Ring	1 Set	K5B546-KRING	740	Rotary Valve	1	K5B-526EQ-RS
712	Plug	1	71363297	741	Seal Ring	1 Set	K5B-607A
713	Head Gasket	1 Set	K5B-507-5	742	Bearing	1	50138
715	Vent Cap Assembly	1	26604	744	Exhaust Flange	1	KK5B-276M
717	Nameplate	1	K5B-301-R	746	Lockwasher	4	50200
718	Drive Screw	4	R4K-302-12	747	Capscrew	4	54681
719	Gasket	1	71376321	748	Capscrew	4	51780
720	Motor Housing	1	K5B-501A	749	Lockwasher	4	50893
721	Pipe Plug	2	54912	750	Manifold	1	13881
722	Gasket	1	K5B-592	812	Gasket	1 Set	27115

• Recommended spares for one hoist, 2 years of normal service.

\* Motor Assembly (includes items 52, 701-744)

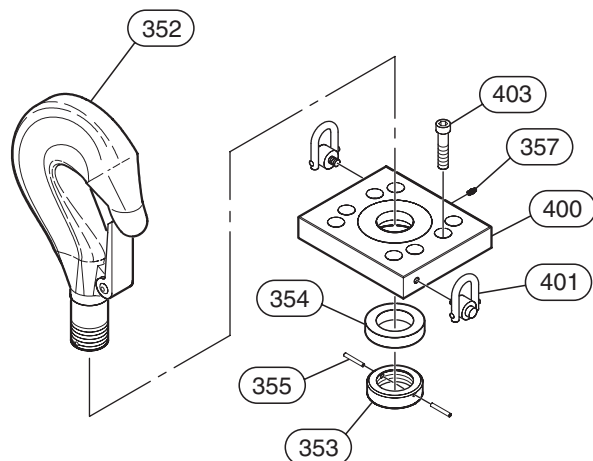
\*\* Piston Assembly (includes items 706 and 711), refer to kits listed below.

### Motor Assembly Kit List

Item No.	Description of Part	Total Qty	Part Number
708	Piston Ring Kit (includes items 706, 707, 709 and 711)	1	K5B-A513-47
727	Crank Assembly (includes items 710 and 724 - 734)	1	K5B-A516
• ---	Motor Service Repair Kit (includes items 701 - 704, 706, 722, 735, 737 and 741)	1	71390181

## TOP HOOK ASSEMBLY DRAWING AND PARTS LIST

100 ton Hoist



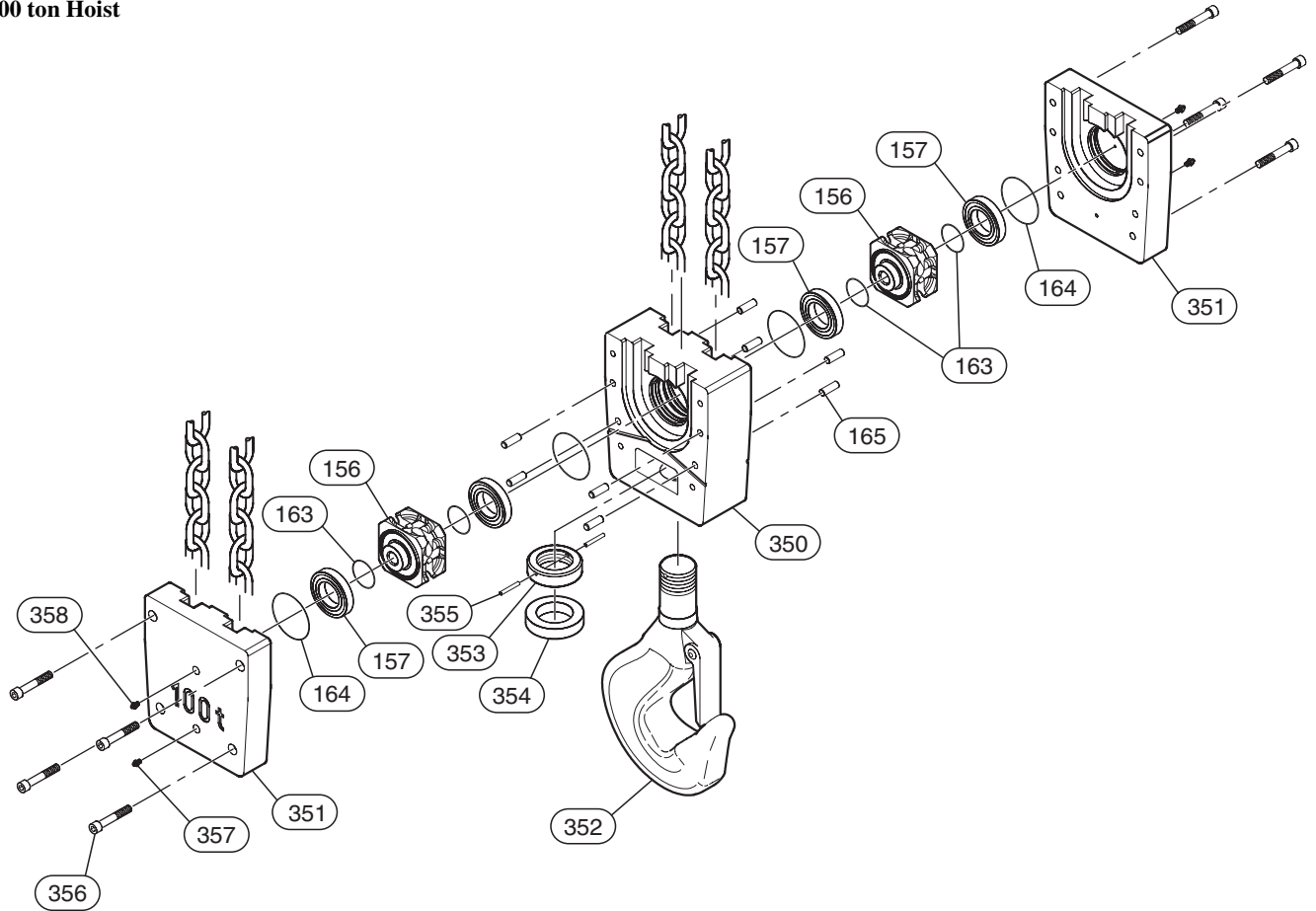
**CAUTION:** Do not use Item 401 for lifting load.

(Dwg. MHP2345)

Item No.	Description of Part	Total Qty	Part Number
352	Hook	1	28700
353	Nut	1	28703
354	Bearing	1	71393631
355	Pin	2	71395032
357	Fitting, Grease	1	71395321
400	Hook Plate	1	28711
401	Swivel Ring Hook	2	71394878
403	Capscrew	8	71396436

## BOTTOM BLOCK ASSEMBLY DRAWING AND PARTS LIST

**100 ton Hoist**

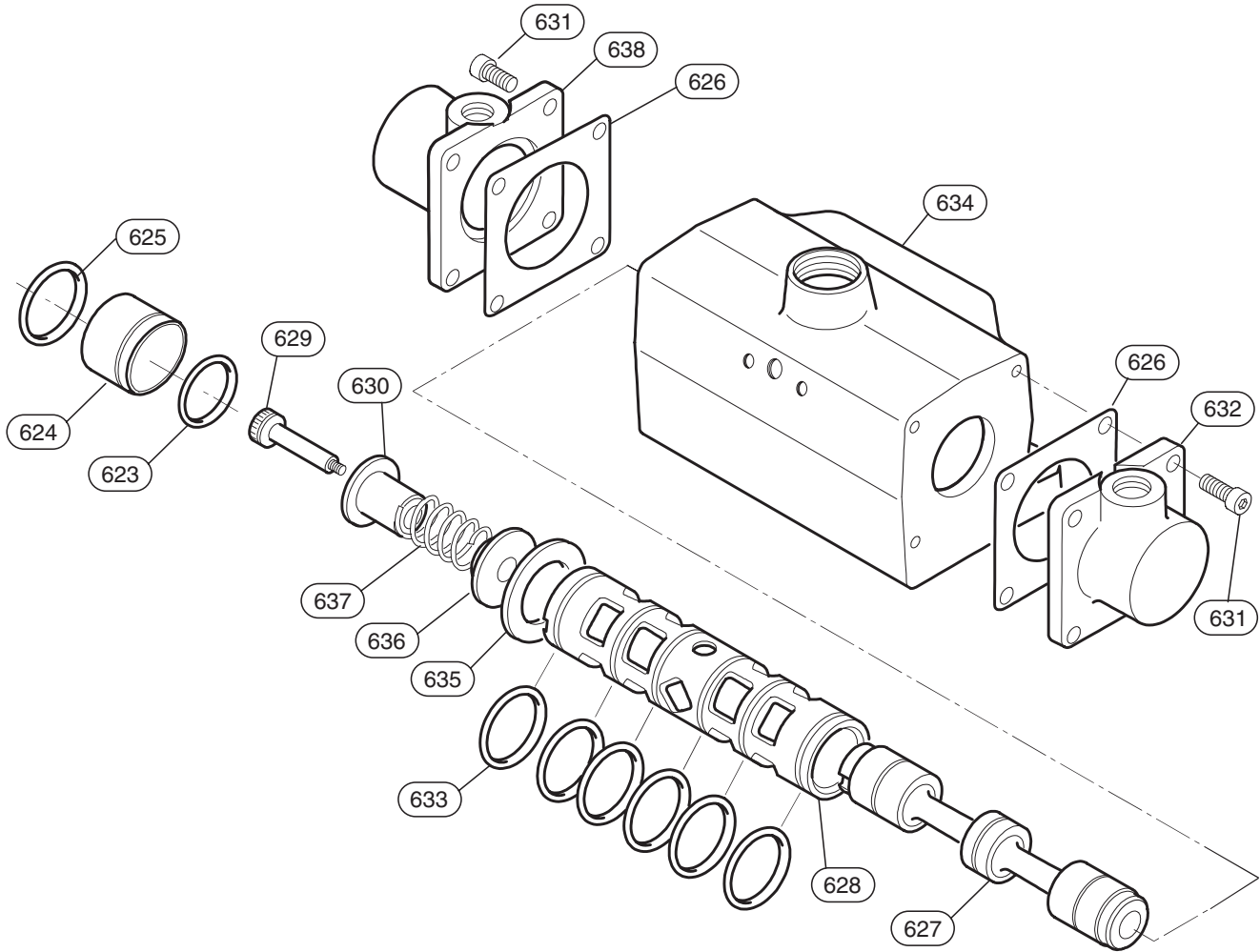


(Dwg. MHP2344)

Item No.	Description of Part	Total Qty	Part Number
156	Sheave, Idle	2	28695-2
157	Bearing	4	71394001
163	'O' Ring	4	71395206
164	'O' Ring	4	71395214
165	Dowel Pin	8	71393995
350	Hook Block, Center	1	28704
351	Hook Block, Outside	2	28705
352	Hook	1	28700
353	Nut	1	28703
354	Bearing	1	71393631
355	Pin	2	71395032
356	Capscrew	8	71329585
357	Fitting, Grease	2	71395321
358	Fitting, Grease	2	53095



# PILOT AIR CONTROL VALVE ASSEMBLY DRAWING



(Dwg. MHP2349)

## PILOT AIR CONTROL VALVE ASSEMBLY PARTS LIST

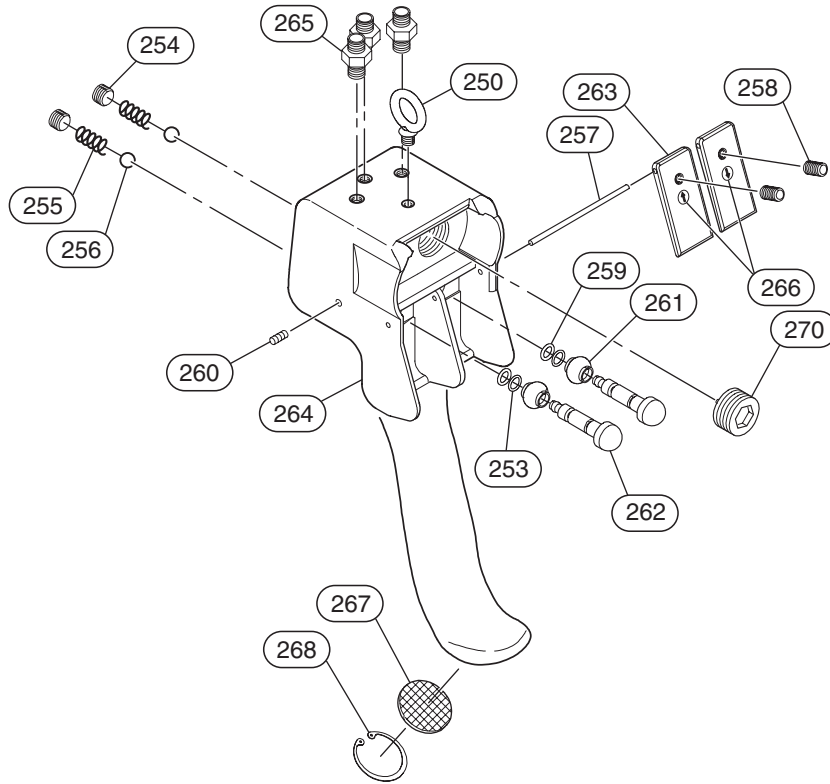
Item No.	Description of Part	Total Qty	Part Number
			510 Size
621	Valve Assembly (includes items 623 - 638)	1	28883
623	'O' Ring	1	71397533
624	Bushing	1	28822
625	'O' Ring	1	71397525
626	Gasket	2	71136733
627	Valve Spool	1	Not sold separately, order item 621
628	Valve Sleeve	1	
629	Shoulder Screw	1	54710
630	Guide	1	71136741
631	Capscrew	8	71030118
632	End Cap, Short	1	12291
633	'O' Ring	6	71136782
634	Valve Body	1	Not sold separately, order item 621
635	Spacer	1	71136766
636	Washer	1	71136774
637	Spring	1	71136758
638	End Cap, Long	1	71136725

Kit Description	Part Number
<ul style="list-style-type: none"> <li>• --- Pilot Air Control Valve Service Kit (includes items 623, 625, 626 and 633)</li> </ul>	71356406

- Recommended spare for one winch, 2 years of normal operation.

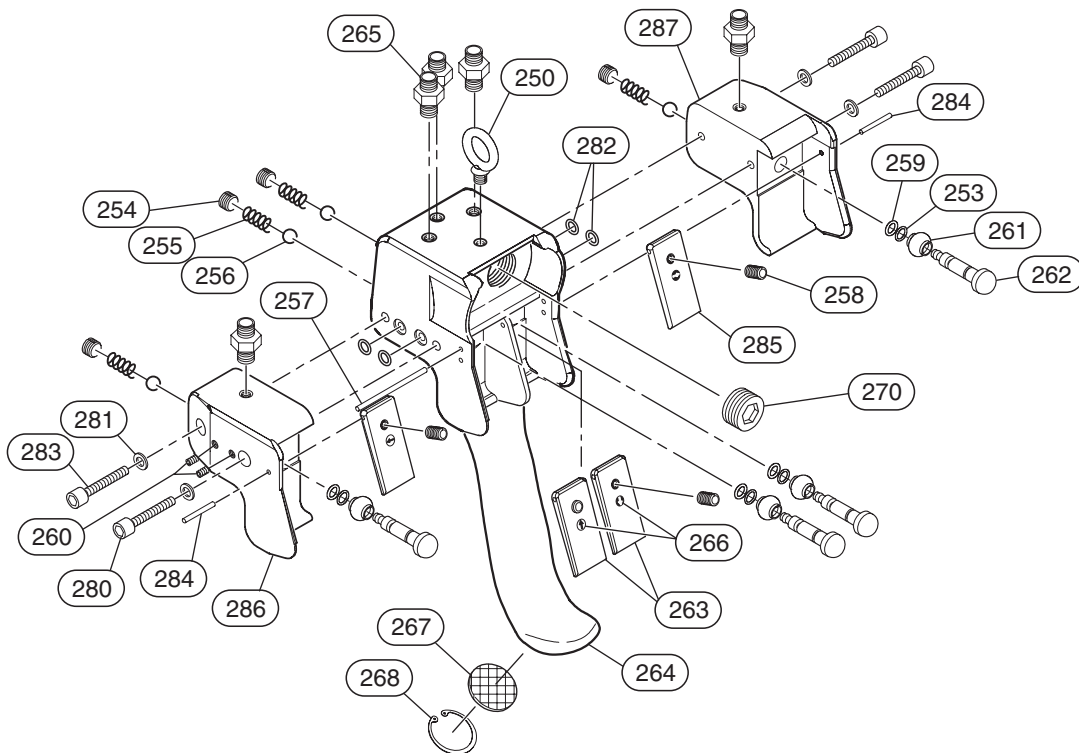
# TWO AND FOUR LEVER PENDANT ASSEMBLY PARTS DRAWINGS

## Two Lever Pendant



(Dwg. MHP1977)

## Four Lever Pendant



(Dwg. MHP1980)

## TWO AND FOUR LEVER PENDANT ASSEMBLY PARTS LIST

Item No.	Description of Part	Total Qty	Part Number	
			Two Lever	Four Lever
500	Pendant Assembly	1	PHS2E	PHS4E
250	Lifting Eye	1	64222332	
251	Emergency Stop Valve	1	---	95790108
252	Plug	1	---	95790106
• 253	'O' Ring	2(4)	58209229	
254	Plug	2(4)	54292	
255	Spring	2(4)	69128541	
• 256	Ball	2(4)	69401625	
257	Pin	1	95790040	
258	Screw	2(4)	42008607	
• 259	'O' Ring	2(4)	58235329	
260	Screw	1(2)	42008307	
261	Protector	2(4)	95790107	
262	Valve	2(4)	95790104	
263	Lever	2	95790122	
• 264	Pendant Handle*	1	Order item 500	
265	Fitting	3(5)	71078158	
266	Label Kit	1	95790111	
267	Exhaust Washer	1	95790114	67600303
268	Retainer Ring	1	47713030	
• 270	Plug	1	65129541	95790097
280	Capscrew	2	41322106	
281	Washer	4	45201005	
• 282	'O' Ring	4	58218229	
283	Screw	2	41330506	
284	Pin	2	95790127	
285	Lever	2	95790128	
286	Attachment (Left)	1	95790125	
287	Attachment (Right)	1	95790126	
**	Label: 'Read the Manual'	1	96180098	
**	Label: 'Do Not Use for Lifting Personnel'	1	96180100	

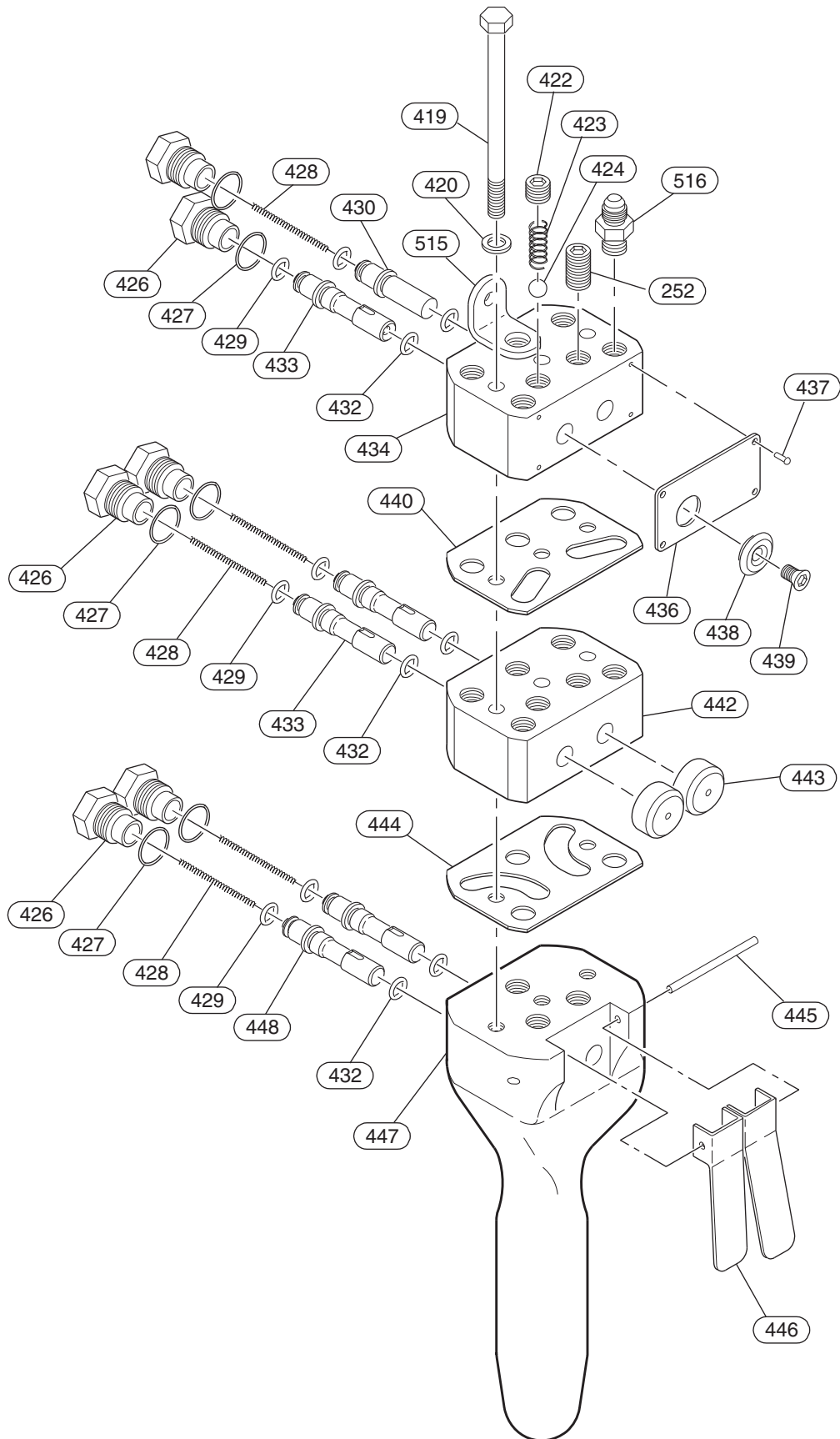
• Recommended spares for one hoist, 2 years of normal service.

\* Not sold separately. Order new Pendant.

\*\* Not Illustrated

( ) Quantity Required for Pendants with Emergency Stop

# FOUR LEVER PENDANT ASSEMBLY PARTS DRAWING



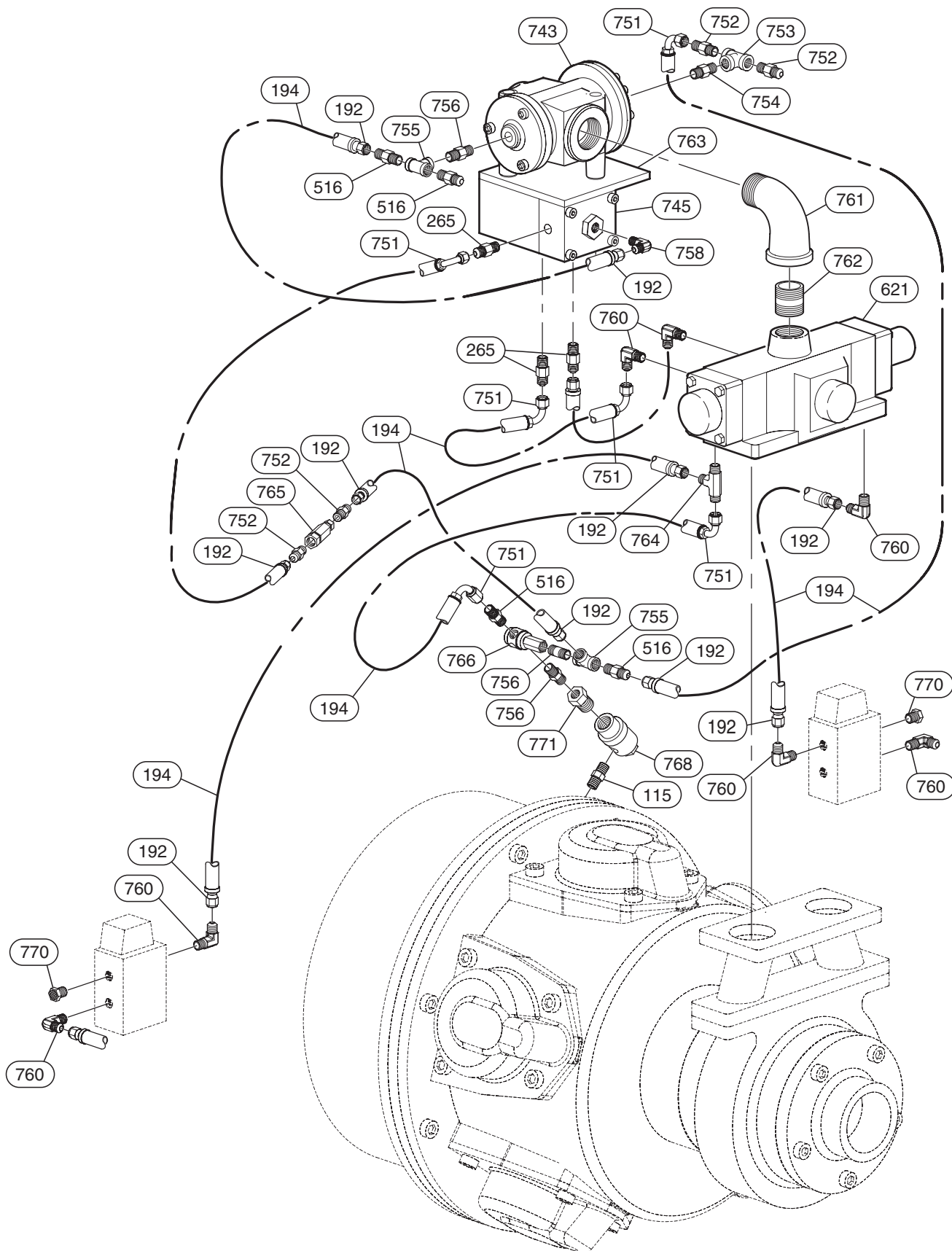
(Dwg. MHP2381)

## FOUR LEVER PENDANT ASSEMBLY PARTS LIST

Item No.	Description of Part	Total Qty	Part Number	
			Without E-Stop	With E-Stop
252	Plug	3	54292	
417	Pendant Assembly (Standard)	1	51412	18956
	Pendant Assembly Marine (Anodized)		19755	15002-1
419	Capscrew	2	71262711	51679
420	Washer	2	71271985	
422	Plug	1	---	51674
423	Spring	1		51414
424	Ball	1		51552
426	Cap	See ( )	51233 (4)	9486 (6)
427	'O' Ring	See ( )		51233 (6)
428	Spring	See ( )	51235 (4)	51235 (5)
429	'O' Ring	See ( )	50846 (4)	50846 (6)
430	Spool (Emergency Stop)	1	---	9071-4
432	'O' Ring	See ( )	51234 (4)	51234 (6)
433	Spool (Emergency Stop)	1	---	9071-2
434	Block (Emergency Stop)	1		9424
435	Spool (Trolley)	2	9071-3	
436	Nameplate	1	---	9436
437	Drive Screw	4		51673
438	Emergency Stop Button	1		9414
439	Capscrew	1		53869
440	Gasket	1	9854	
442	Block (Trolley)	1	51678	
443	Button (Trolley)	2	9414-1	
444	Gasket	1	9852	
445	Pin	1(2)	51671	
446	Lever	See ( )	51413 (4)	
447	Pendant Handle (Standard)	1	Order item 417	
	Pendant Handle Marine (Anodized)			
448	Spool (Hoist)	2	9071-1	
515	Bracket	1	8909	
516	Fitting	See ( )	52092 (5)	52092 (6)
•803	Pendant Service Kit (includes items 423, 424, 427-429, 432, 440 and 444)	1	9750-4	

•   Recommended spare for one hoist, 2 years of normal service.

# MAIN HOSE CONNECTION ASSEMBLY DRAWING



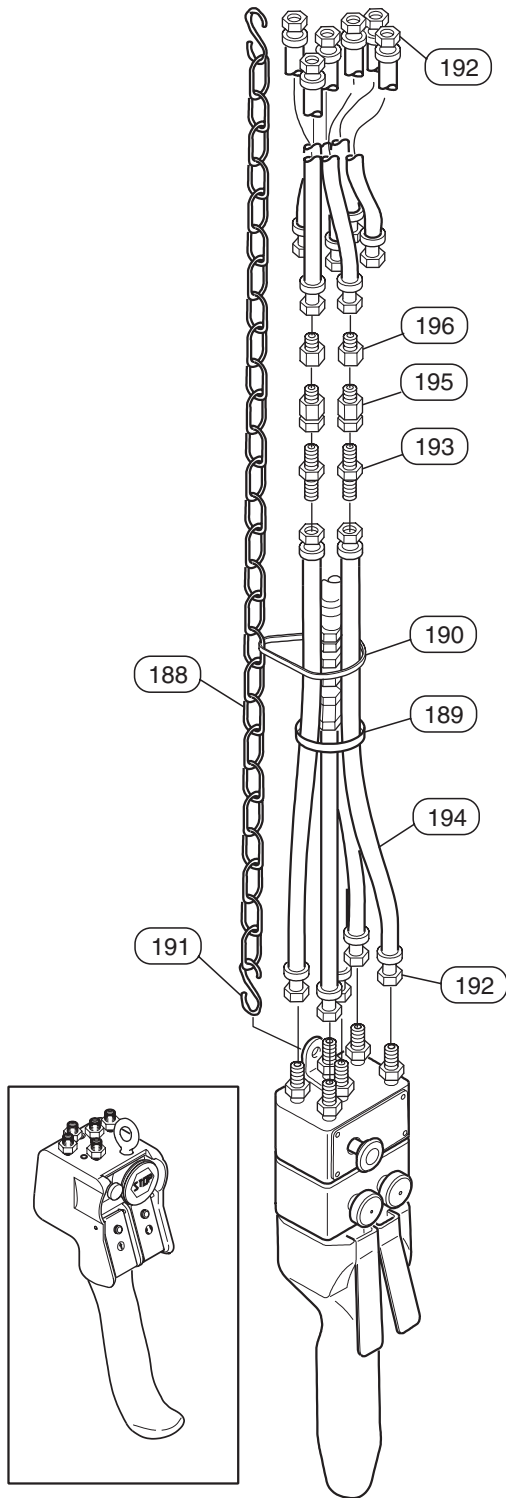
(Dwg. MHP2350)

## MAIN HOSE CONNECTION ASSEMBLY PARTS LIST

Item No.	Description of Part	Total Qty	Part Number
115	Fitting	1	50859
192	Fitting, Hose	12	51029
194	Hose, 1/4 in. (6.35 mm)	As Req'd	50923
265	Fitting, Nipple	3	71078158
516	Fitting	4	52092
621	Pilot Control Valve	1	28883
743	Shutoff Valve	1	28911
745	Delta P Valve	1	28446
751	Fitting, Hose	4	52179
752	Fitting, Nipple	4	51814
753	Fitting, Tee	1	51812
754	Fitting, Nipple	1	51034
755	Fitting, Pipe	2	71375372
756	Fitting, Nipple	3	52191
758	Fitting, Elbow	1	71387021
760	Fitting	7	54869
761	Fitting, Elbow	1	71330112
762	Fitting, Nipple	1	71057483
763	Plate	1	28928
764	Fitting, Tee	1	52181
765	Check Valve	1	71144380
766	Valve	1	51756
768	Dump Valve	1	50276
770	Breather	2	50595
771	Reducer	1	54688



# HOSE ASSEMBLY DRAWING AND PARTS LIST



(Dwg. MHP0425)

Item No.	Description of Part	Total Qty	Part Number
188	Chain, Zinc Plated	As req'd	50041
189	Tie Wrap		54235
190	Tie Wrap		71308746
191	'S' Hook	2	D02-421
192	Hose Fitting	As req'd	51029
193	Fitting, Nipple		71048268
194	Hose (bulk)		50923
195	Exhaust Valve (see note)	As req'd	71372890
•	Exhaust Valve Kit (incl's items 192, 193 and 196)	As req'd	20417
196	Fitting	As req'd	71048284
•	Recommended spare for one hoist, 2 years of normal service.		

### Hose Assembly

#### Pendant without Emergency Stop

Length		Part Number		
Feet	Meters	2 Lever	4 Lever	6 Lever
10	3	21653-10	21654-10	21655-10
15	4.5	21653-15	21654-15	21655-15
20	6	21653-20	21654-20	21655-20
25	7.6	21653-25	21654-25	21655-25
30	9	21653-30	21654-30	21655-30
35	10.7	21653-35	21654-35	21655-35
40	12	21653-40	21654-40	21655-40
45	13.7	21653-45	21654-45	21655-45
50	15.25	21653-50	21654-50	21655-50

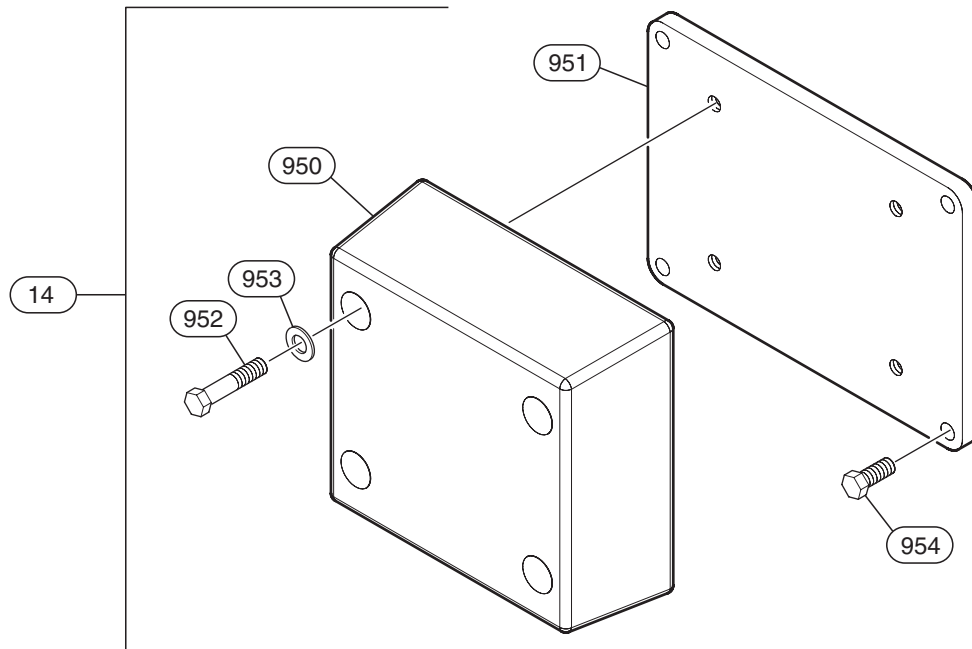
#### Pendant with Emergency Stop

10	3	21656-10	21657-10	21658-10
15	4.5	21656-15	21657-15	21658-15
20	6	21656-20	21657-20	21658-20
25	7.6	21656-25	21657-25	21658-25
30	9	21656-30	21657-30	21658-30
35	10.7	21656-35	21657-35	21658-35
40	12	21656-40	21657-40	21658-40
45	13.7	21656-45	21657-45	21658-45
50	15.25	21656-50	21657-50	21658-50

### Notes:

- For hose bundles longer than 50 ft. (15.25 m) contact Technical Sales for control acceptability.
- Exhaust valve assembly not required when using PHS2E and PHS2E-U pendants.

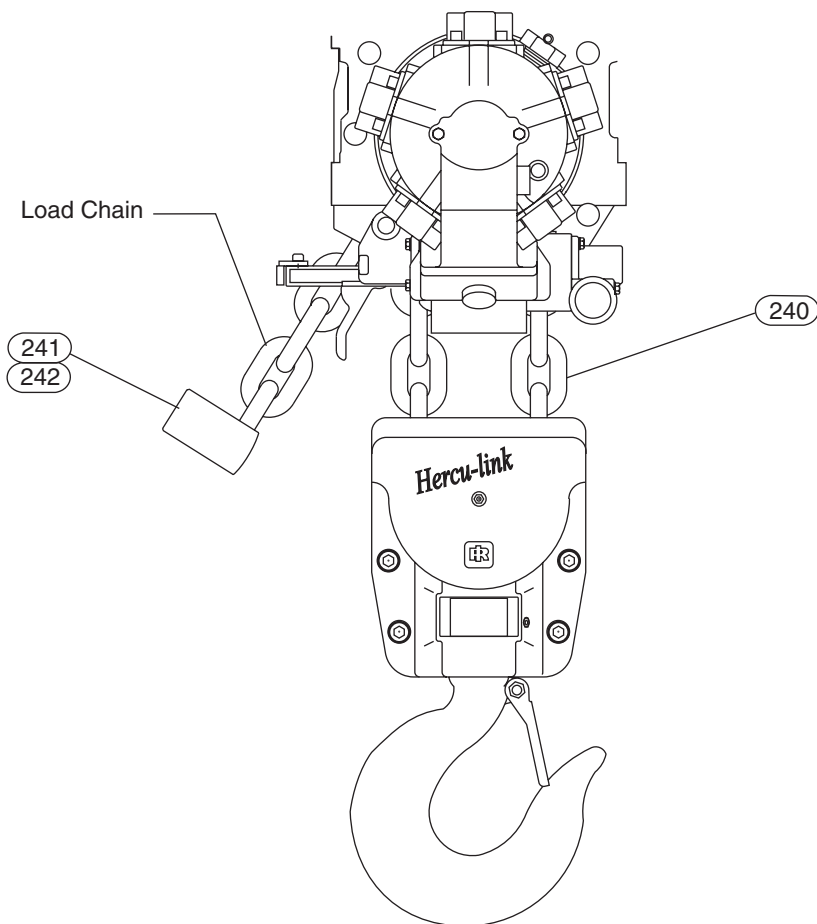
## HULL BUMPER ASSEMBLY DRAWING AND PARTS LIST



(Dwg. MHP2347)

Item No.	Description of Part	Total Qty	Part Number
950	Bumper	2	71395230
951	Mounting Plate	2	28784
952	Capscrew	8	71128193
953	Washer	8	50203
954	Capscrew	8	51007

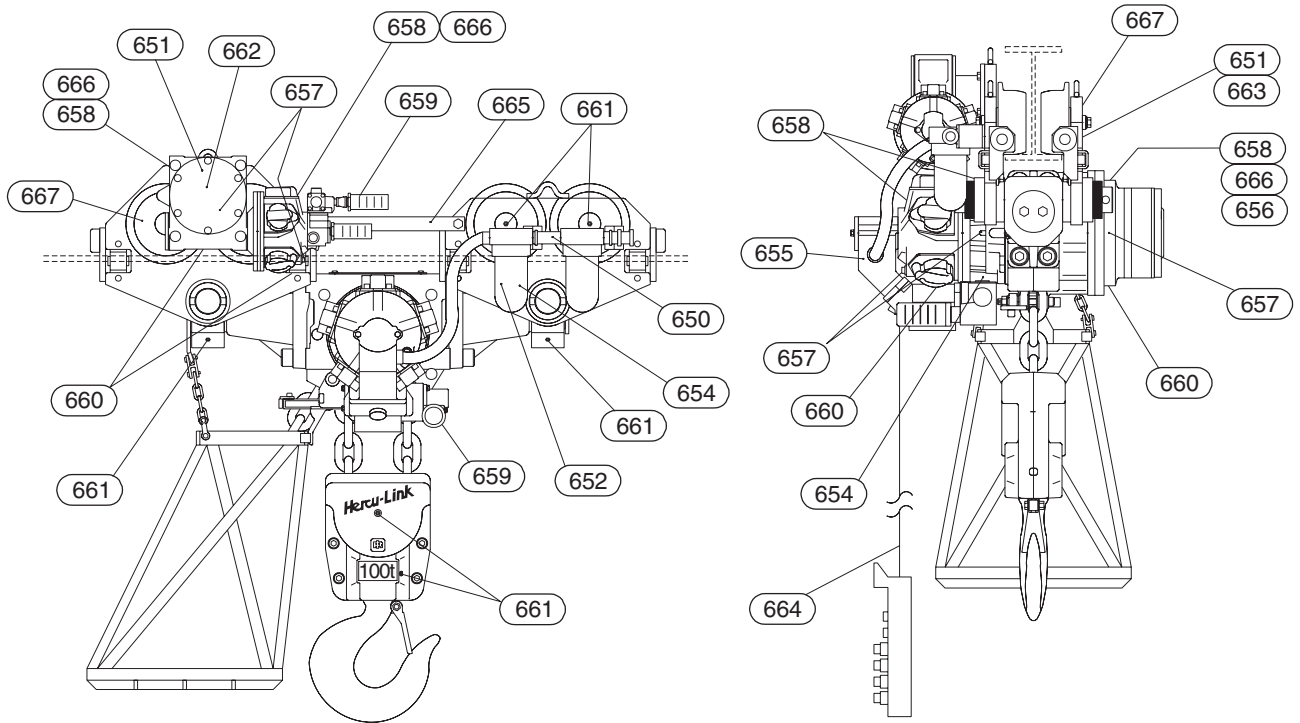
## LOAD CHAIN AND CHAIN STOPPER DRAWING AND PARTS LIST



(Dwg. MHP2379)

Item No.	Description of Part	Total Qty	Part Number
---	Chain Stopper Assembly	1	28830
240	Chain (Zinc Plated)	1	71394282
241	Chain Stop	1	28828
242	Capscrew (supplied with chain stopper)	1	71340251
316	Pin	1	28827

## LABEL AND TAG PARTS LIST

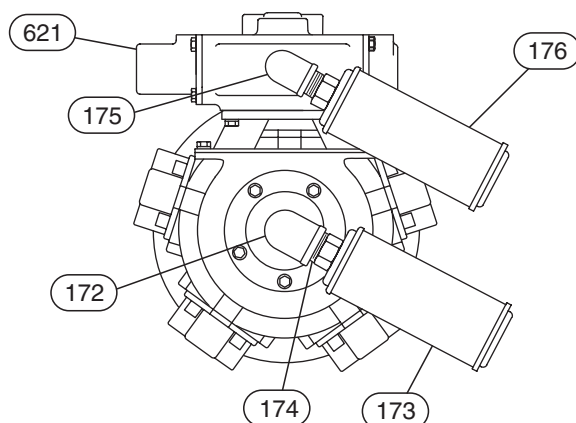


Note: Exact location of Tags and Labels may vary, depending on unit configuration, options and accessories.

(Dwg. MHP2380)

Item No.	Description of Part	Qty Total		Part Number
		Hook Mount	Trolley Mount	
---	Label Kit (Hook Mounted Hoist)	As Req'd	---	18916-R
---	Label Kit (Trolley Mounted Hoist)	---	As Req'd	18917-R
650	Tag, Supply Line Notice		1	71042121
651	Label, Hercu-Link Logo	2	3	71046387
652	Tag, Oil Fill Notice		1	71042147
653	Nameplate		1	71070098-R
654	Label, "Drain"		2	71043632
655	Label, "Air Supply"		1	71046395
656	Tag, Oil Level Caution	1	3	71107148
657	Label, "Oil Level"	4	6	71043616
658	Label, "Oil Fill"	3	5	71042204
659	Label, "Exhaust"	1	3	71042196
660	Label, "Oil Drain"	3	5	71042188
661	Label, "Lube"	5	13	71042170
662	Label, <b>Ingersoll-Rand</b> Name and Logo	2	1	71106231
663	Label, <b>Ingersoll-Rand</b> Name and Logo	---	2	71106256
664	Tag, Operating Warning		1	71059612
665	Label, May be Removed after Installation		As Req'd	71042154
666	Tag, Vent Plug Notice	2	---	71107155
667	Label, Operating Warning	1	2	71107130

## MUFFLER ASSEMBLY DRAWING AND PARTS LIST



(Dwg. MHP2351)

Item No.	Description of Part	Total Qty	Part Number
172	Pipe Elbow	1	71057434
173	Muffler	1	50594
174	Pipe Nipple	1	51704
175	Pipe Elbow	1	71127484
176	Muffler	1	52465
621	Pilot Air Control Valve Assembly	1	28883

## ACCESSORIES AND REPAIR KITS

Description of Part	Total Qty	Part Number
Air Supply Hose (Bulk) 1-1/2 in.	Specify Length	Contact Factory
Chain Lubricant	As req'd	LUBRI-LINK-GREEN®
Filter (1-1/2 in. FNPT)	1	F35-0B-C28
Label Kit (Hook Mount Hoist)	1	Contact Factory
Label Kit (Trolley Mount Hoist)	1	Contact Factory
Lubricator (1-1/2 in. FNPT)	1	L40-0B-000
Pendant Assembly Kit	1	9750-4
Regulator (1-1/2 in. FNPT)	1	R40-0B-600
Regulator Gauge	1	GRP-95-229

## SERVICE NOTES

## PARTS ORDERING INFORMATION

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

The use of replacement parts other than **Ingersoll-Rand** may result in decreased hoist performance, and may, at the company's option invalidate the warranty.

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

**Model Number** \_\_\_\_\_

**Serial Number** \_\_\_\_\_

**Date Purchased** \_\_\_\_\_

When ordering replacement parts, please specify the following:

1. Complete hoist model number as it appears on the nameplate.
2. Part number(s) and part description as shown in this manual.
3. Quantity required.

On hook-mounted hoists, the model and serial number plate is located on the top hook block.

On trolley-mounted hoists, the model and serial number plate is located on the trolley side plate.

### NOTICE

• **Continuing improvement and advancement of design may produce changes to this hoist 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.**

### Return Goods Policy

If it becomes necessary to return the complete hoist or certain parts to the factory, contact the Distributor from whom you purchased the hoist, or the nearest **Ingersoll-Rand** Distributor in your locality. **Ingersoll-Rand** will not accept any returned goods for warranty or service work unless prior arrangements have been made and written authorization has been provided from the location where the goods were purchased.

### Disposal

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

### NOTICE

• **Mineral-based oils can be recycled, however, some oils such as glycols may be extremely toxic and must be identified and disposed of in accordance with local, state and national regulations.**

**For additional information contact:**

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

or

**Ingersoll-Rand**  
**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 en route is not due to any action or conduct of the manufacturer.

### Visible Loss or Damage

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

### Concealed Loss or Damage

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

### Damage Claims

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

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



## United States Office Locations

### For Order Entry, Order Status and Technical Support

#### **Ingersoll-Rand**

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

#### **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.irco.com](http://www.irco.com)

### Regional Sales Offices

#### **Annandale, NJ**

P.O. Box 970  
1467 Route 31 South  
Annandale, NJ 08801  
Phone: (908) 238-7000  
Fax: (908) 238-7048

#### **Detroit, MI**

1872 Enterprise Drive  
Rochester, MI 48309  
Phone: (248) 293-5700  
Fax: (248) 293-5800

#### **Houston, TX**

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

#### **Los Angeles, CA**

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

## International Office Locations

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

### Canada

#### **National Sales Office**

#### **Regional Warehouse**

#### **Toronto, Ontario**

51 Worcester Road  
Rexdale, Ontario  
M9W 4K2  
Phone: (416) 213-4500  
Fax: (416) 213-4510  
**Order Desk**  
Fax: (416) 213-4506

### Regional Sales Offices

#### **Edmonton, Alberta**

5608-94 A Street  
Edmonton, Alberta  
T6E 3E4  
Phone: (780) 438-5039  
Fax: (780) 430-4500

#### **Montreal, Quebec**

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

#### **British Columbia**

1200 Cliveden Avenue  
Delta, B. C.  
V3M 6G4  
Phone: (604) 523-0803  
Fax: (604) 523-0801

### Latin America Operations

#### **Ingersoll-Rand**

#### **Production Equipment Group**

730 N.W. 107 Avenue  
Suite 300, Miami, FL  
33172-3107 USA  
Phone: (305) 559-0500  
Fax: (305) 222-0864

### Europe, Middle East and Africa

#### **Ingersoll-Rand**

#### **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

### Asia Pacific Operations

#### **Ingersoll-Rand**

42 Benoi Road  
Jurong, Singapore  
629903  
Phone: 65-861-1555  
Fax: 65-861-0317

### Russia

#### **Ingersoll-Rand**

Kuznetsky Most 21/5  
Entrance 3  
Moscow 103895 Russia  
Phone: 7-501-923-91-34  
Fax: 7-501-924-46-25

### Australia

#### **Ingersoll-Rand**

1 Hartnett Drive  
Seaford, Vic 3198  
Australia  
Phone: 613 95541642  
Fax: 613 95541607