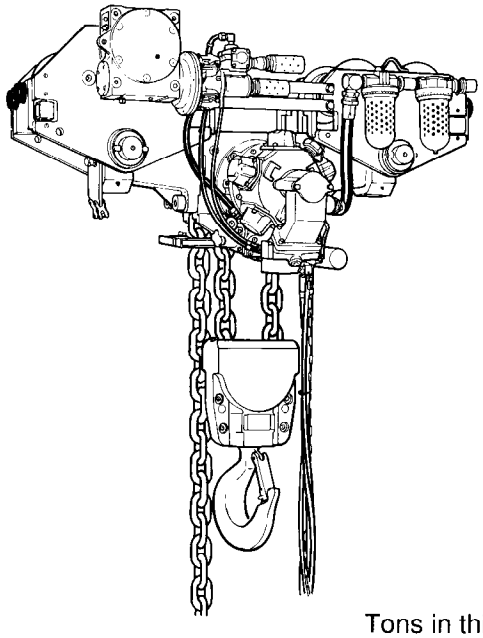
PARTS, OPERATION AND MAINTENANCE MANUAL for Hercu-Link™ AIR HOIST MODELS

HA2-012	HA2-025	HA2-037	HA2-050
12-1/2 ton	25 ton	37-1/2 ton	50 ton



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

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

⚠WARNING

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

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

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

Form MHD56055
Edition 1
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INGERSOLL-RAND®
MATERIAL HANDLING

TABLE OF CONTENTS

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

Danger, Warning, Caution and Notice

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

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

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

⚠ CAUTION Caution is used to indicate the presence of a hazard which ***will*** or ***can*** cause ***minor*** 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 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 the 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 the weight of the hoist and attached equipment. This is the customer's responsibility. If in doubt, consult a registered structural engineer.

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

INGERSOLL-RAND Material Handling 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 the owner/employer, not the manufacturer. Many OSHA requirements are not concerned or connected with the manufactured product but are, rather, connected with the final installation. It is the owner's responsibility 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. See ASME B30.9 for rigging information, American National Standards Institute, 1430 Broadway, New York, NY 10018.

NOTICE

• Using other than genuine INGERSOLL-RAND Material Handling parts will void the warranty.

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

SAFE OPERATING INSTRUCTIONS

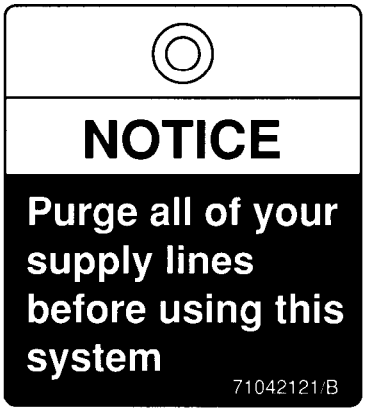
The following warnings and operating instructions have been adapted in part from American National (Safety) Standard ASME B30.16 and are intended to avoid unsafe operating practices which might lead to injury or property damage.

INGERSOLL-RAND recognizes that most companies who use hoists have a safety program in force at their facility. If you are aware 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.

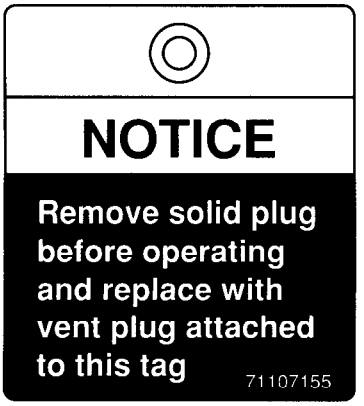
1. Only allow personnel trained in, safety and operation on this product to operate and maintain the hoist.
2. Only operate a hoist if you are physically fit to do so.
3. When a "DO NOT OPERATE" sign is placed on the hoist controls, do not operate the hoist until the sign has been removed by designated personnel.
4. Before each shift, the operator should check the hoist for wear or damage.
5. Never use a hoist which inspection indicates is warn or damaged.
6. Do not use hoist if hook latch on a hook has been sprung or broken.
7. Check that the hook latches are engaged before using.
8. Never splice a hoist chain by inserting a bolt between links.
9. Only lift loads less than or equal to the rated capacity of the hoist. See warning labels attached to the hoist.
10. When using two hoists to suspend one load, select two hoists each having a rated capacity equal to or more than the load. This provides adequate safety in the event of a sudden load shift.
11. Never place your hand inside the throat area of a hook.
12. Never use the hoist chain as a sling.
13. Only operate a hoist when the load chain is centered over the hook. Do not "side pull" or "yard".
14. Never operate a hoist with twisted, kinked, "capsized" or damaged load chain.
15. Do not force a chain or hook into place by hammering.
16. Never insert the point of the hook into a chain link.
17. Be certain the load is properly seated in the saddle of the hook.
18. Do not support the load on the tip of the hook.
19. Never run the load chain over a sharp edge. Use a sheave.
20. Pay attention to the load at all times when operating the hoist.
21. Make sure all people are clear of the load path. Do not lift a load over people.
22. Never use the hoist for lifting or lowering people, and never allow anyone to stand on a suspended load.
23. Ease the slack out of the chain and sling when starting a lift. Do not jerk the load.
24. Do not swing a suspended load.
25. Never suspend a load for an extended period of time.
26. Never leave a suspended load unattended.
27. Never weld or cut a load suspended by the hoist.
28. Never use the hoist chain as a welding electrode.
29. Do not operate hoist if chain jumping, excessive noise, jamming, overloading, or binding occurs.
30. Keep the load from hitting the load chain.
31. Do not use the up and down emergency stop limit protection as a normal means of stopping the hoist.
32. Avoid unnecessary jogging of hoist and/or trolley controls.
33. Always rig the hoist properly and carefully.
34. Shut off air supply before performing any maintenance.
35. Avoid collision or bumping of hoist.
36. After use, properly secure hoist and all loads.

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

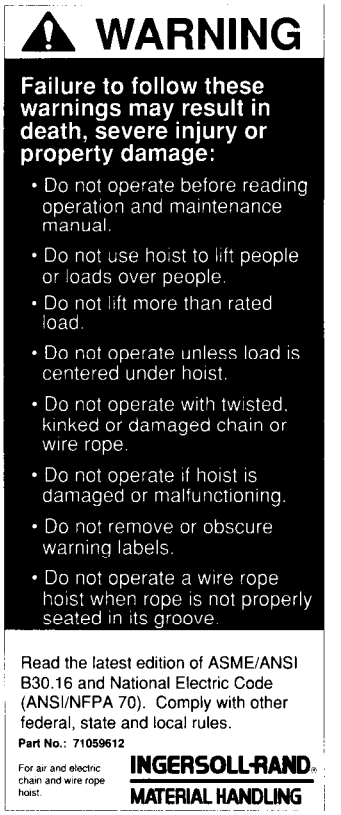


Tag part number 71042121/B is attached to the inlet air supply components.

Tag part number 71042147/A is attached to the lubricator in the inlet air supply line .



Tag part number 71107155 is attached to the power head reduction gear assembly fill plug.



Tag part number 71059612 is attached to the pendant assembly.

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

Label part number 71107130/A is attached to the inlet air supply components.

SPECIFICATIONS

Description of Hoist Operation

The HA2 air powered hoist primarily consists of a power head assembly which acts as the control for the lower hook block movement. The power head assembly is made up of three main sections. They are the gear reducer section, the brake/motor section and the sheave section.

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

The motor driven brake shaft is connected to the brake through a sprag clutch. In the hoist "UP" direction the clutch allows the shaft to rotate without releasing the brake. No air pressure is applied to the brake piston in the "UP" direction.

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

The brake piston is actuated by air from the main control valve. When the control pendant "DOWN" button is pushed it moves the main control valve spool. The spool is designed to send air to the brake in the "DOWN" direction only.

When the pendant "DOWN" button is released, quick exhaust valves allow the brake to set quickly and avoid downward load drift.

Table 1

Model No.	Capacity (metric tons)	Std. Lift		Speed				HP	CFM
		ft	m	Lift (fpm)	Lift (m/min)	Lower (fpm)	Lower (m/min)		
HA2-012	12-1/2	10	3	8	2.4	12	3.7	9.4	280
HA2-025	25	10	3	4	1.2	6	1.8	9.4	280
HA2-037	37-1/2	10	3	2-1/2	0.76	3-3/4	1.1	9.4	280
HA2-050	50	10	3	2	0.61	3	0.91	9.4	280

Table 2

Model No.	Capacity (metric tons)	Load Chain Size (mm)	Head Room		Unit Weight Hook Mount		Unit Weight with Trolley (Piston Motor)	
			in	mm	lbs	kg	lbs	kg
HA2-012	12-1/2	22	24-7/8	632	965	439	1415	643
HA2-025	25	22	41	1041	1235	561	1835	834
HA2-037	37-1/2	22	46	1168	2230	1014	3700	1681
HA2-050	50	22	52-3/8	1330	2995	1361	4665	2120

Model Code Explanation

Model Code Example **HA2 - 025M - A3 - 30 - 27FLM**

Series

HA = Hercu-link Air Powered Hoist

Frame Size

2 = 22 mm Load chain

Capacity

012 = 12-1/2 ton (27,500 lbs)
025 = 25 ton (55,000 lbs)
037 = 37-1/2 ton (82,500 lbs)
050 = 50 ton (110,000 lbs)

Suspension

H = Hook mount
C = Clevis mount*
D = Deck Mount*
P = Plain trolley*
G = Geared trolley*
V = Vane motor driven trolley
M = Piston motor driven trolley

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

1 = Pull rope
2 = 1 motor pendant (2 button)
3 = 2 motor pendant (4 button)
4 = 3 motor pendant (6 button)

Lift

XX = Length of lift. (XX = Specify hose length (ft). Max 60 ft. (18 m))

Control Drop

XX = Control Drop Pendant Hand chain length

Options

C = Corrosion resistant coating (SBCZ and Marine 812 top coat)
L = Upper and lower limit switch (std. on HA2 hoists)
N = Corrosion resistant load chain (zinc plated)
M = Marine protection package
T = Galvanized chain container (not available on 12-1/2 ton hook mounted models)
Y = Hull bumper (for hook mounted shipyard hoists only)
R = Copper plate S•COR•E package
S = Solid bronze S•COR•E package (12-1/2 ton models only)
Q = 60 psi application package*

Trolley

B = Trolley bumper
G = Trolley guide rollers

Control

F = Push button main air shutoff
A = Accu-Trol® pendant

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

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

⚠WARNING

• Before installing hoist read "SAFETY INFORMATION" section.

Hoists are supplied from the factory with the correct grade and quantity of lubricating oil. Before operation all oil levels must be checked and/or topped off with the proper type of oil recommended in the "LUBRICATION" section. 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 type of use of this product before installing or putting hoist to use.

Remove cover from the shipping crate. Carefully remove steel straps. On units equipped with a trolley, attach wire rope sling to the suspender lugs on the hoist trolley side plates and slowly lift into position. On hook mounted units lift into position by using top hook of the hoist.
Attach chain container to hoist with chain container pin and connect the container suspension hook as required.

Hook Mounted Hoist Installation

Place hook over mounting structure. Make sure hook latch is engaged.

Trolley and Hoist Installation

⚠WARNING

• A falling load can cause injury or death. Before installing trolley and hoist, read "SAFETY INFORMATION".
• Depending on the size of hoist selected it could weigh as much as 4665 lbs. (2116 kg). If parts of the trolley or hoist are dropped, they could cause injury or damage property. Adequately support the hoist and trolley when lifting them into place on the beam.

Installing Over the End of the Beam

Preadjust trolley width for the beam flange measurement. Refer to "Installing from Underneath the Beam." Remove the rail stop and slide trolley on end of the 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 the beam using the procedure which follows.

Installing from Underneath the Beam

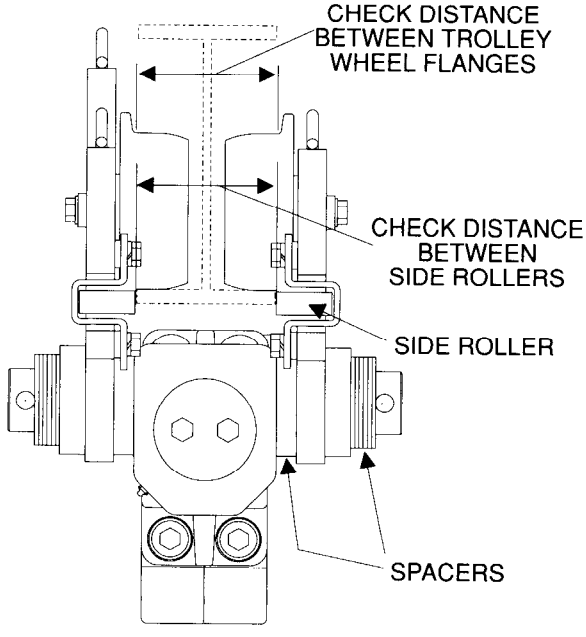
(Ref. Dwg. MHTPA0352)

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

⚠ CAUTION

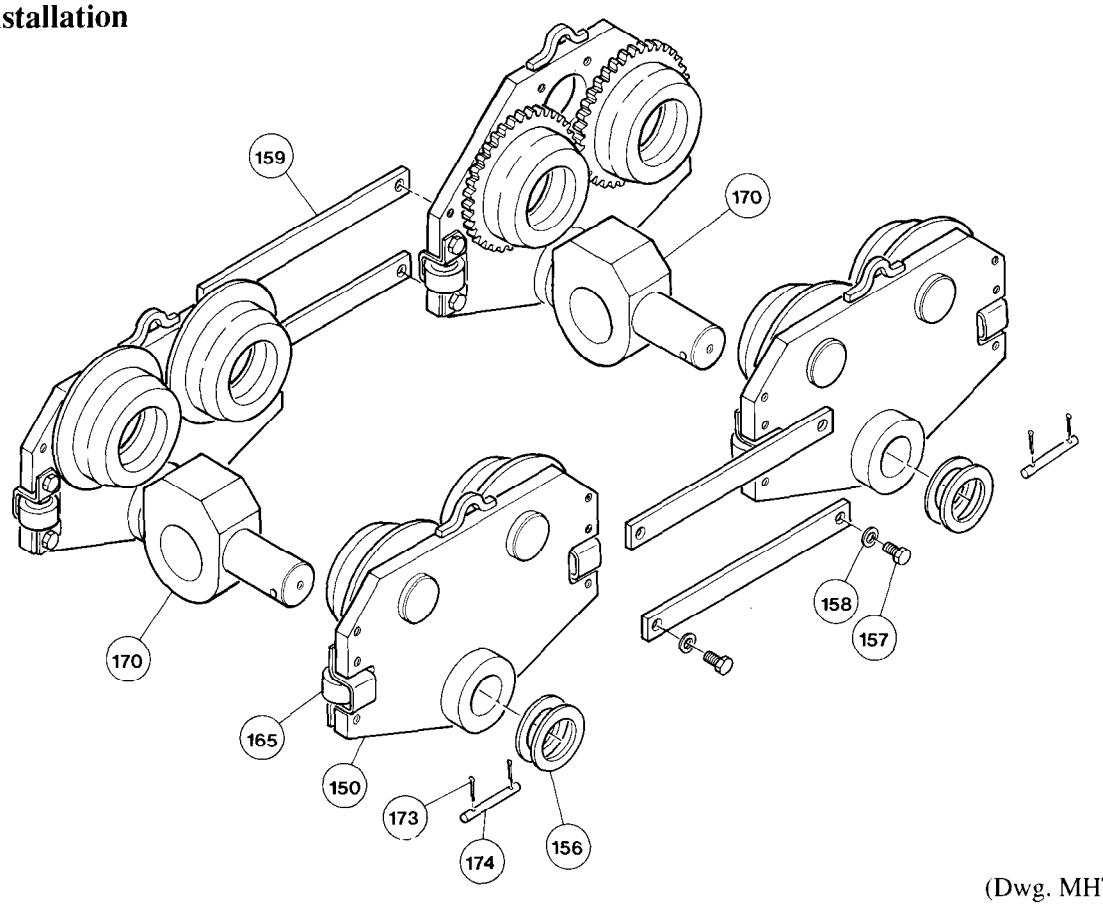
• To avoid an unbalanced load which may damage the trolley, the hoist must be centered under the trolley by the spacers (156).

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



(Dwg. MHTPA0340)

Trolley Installation



(Dwg. MHTPA0352)

NOTICE

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

6. The pin (174) and outside spacers (156) must hold the trolley to the adjustment in step 1. If the side plates can be spread farther apart, install more outside spacers (156) between side plate (150) and the pin (174).
7. 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.
8. Prior to using, test the trolley. Check that the trolley side plates are vertical. Raise a load equal to the rated capacity of the hoist a 6 to 7 ins. (130 to 180 mm) off the floor and operate the trolley along the entire length of the beam.

Chain Container

⚠ CAUTION

• Do not pile chain carelessly in the chain container. Piling the chain carelessly into the container by hand may lead to kinking or twisting that will jam the hoist.

1. Check the chain container size to make sure the length of load chain is within the capacity of the chain container. Replace with a larger chain container, if required.
2. Attach chain stopper (241) to the last link of the load chain free end.
3. Attach the chain container to the hoist.
4. Run bottom block to lowest point and run hoist in up direction to feed the chain back into the container.

NOTICE

• When feeding chain into the chain container begin with the chain stopper end of the chain so that it piles naturally.

Attaching Free End of Load Chain

1. Install chain stopper (241) on the end of the load chain.
2. Attach the free end of the load chain to the hoist or bottom hook assembly. See Chaining Drawings in the "MAINTENANCE" section.

After installing load chain, make sure it is not twisted or kinked. Fix before using hoist.

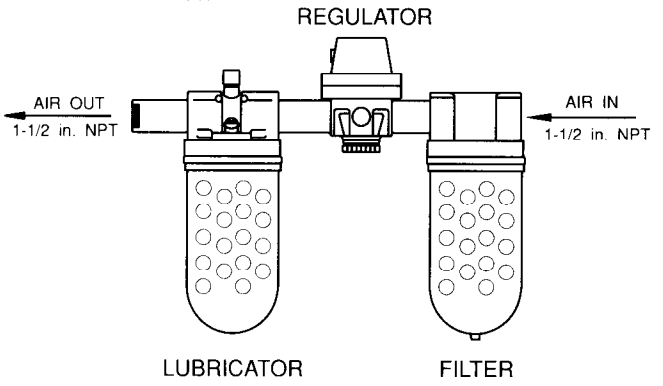
Air Supply

The air supply must be clean and free from moisture. Due to efficiency losses in the air lines and air line components, air pressures should be checked at the hoist motor. A minimum of 105 psi (7.2 bar/724 Kpa) at the 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 the air supply may be required to achieve the

required operating pressure. (Contact the Technical Support Department for operating requirements with optional 60 psi system)

Air Lines

The inside diameter of the hoist air supply lines must not be smaller than 1 in. (25 mm) based on a maximum of 50 ft. (15 m) between the air supply and the hoist. Contact the factory for recommended air line sizes for distances greater than 50 ft. (15 m). Before making final connections, all air supply lines should be purged before 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 the lines.



(Dwg. MHTPA0191)

Air Line Lubricator

(Ref. Dwg. MHTPA0191)

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

⚠ CAUTION

• Lubricator must be located no more than 10 ft. (3 m) from the motor.

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

Air Line Filter

(Ref. Dwg. MHTPA0191)

It is recommended that an air line strainer/filter be installed as close as practical to the motor air inlet port to prevent dirt from entering the motor. The strainer/filter should provide 20 micron filtration and include a moisture trap. Clean the strainer/filter periodically to maintain its operating efficiency.

Moisture in Air Lines

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

Brake and Reducer Assembly

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

⚠ WARNING

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

Hoist and Trolley Motors

For optimum performance and maximum durability of parts, provide an air supply to operate hoist and trolley motors with 105 psig at 280 scfm (7.2 bar/724 kpa at 8 cu.m/m). The air motor should be installed as near as possible to the compressor or air receiver. (Contact the Technical Support Department for operating requirements with optional 60 psi system)

Hoist Pendant

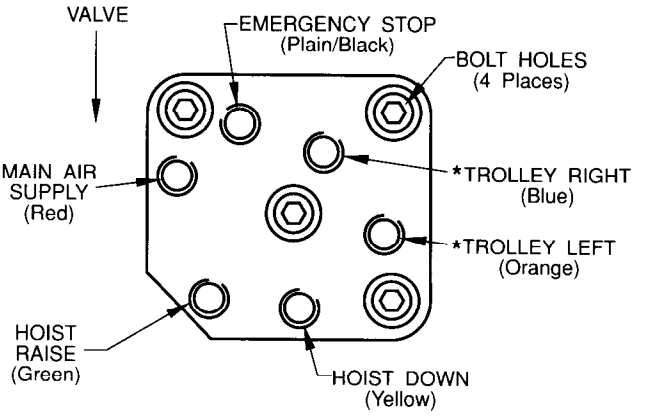
Pendant control is installed at the factory. Hose fittings are color coded to ensure correct assembly. Check all hose connections are tight and that hoses are not twisted or crimped. Refer to Dwgs. MHTPA0094 and MHTPA0095 for correct pendant hose connections.

⚠ WARNING

• Disconnect air supply before performing any maintenance.

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

MANIFOLD PENDANT BLOCK
(Looking at Bottom of Manifold)

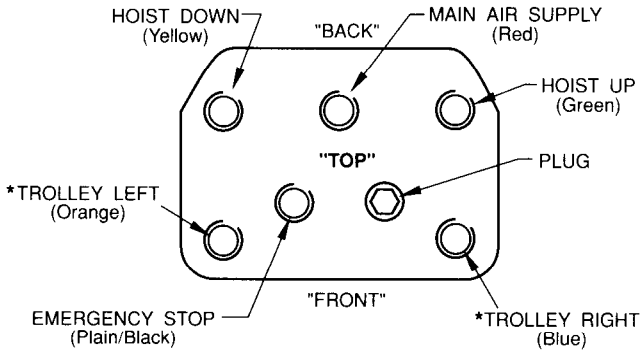


* PLUG FOR HOOK MOUNTED UNITS

(Dwg. MHTPA0094)

Check strain relief chain (188) is properly connected to the hoist and pendant body.

PENDANT CONTROL BLOCK
(Looking Down On Top of Block)



*PLUG FOR HOOK MOUNTED UNITS

(Dwg. MHTPA0095)

⚠ CAUTION

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

Emergency Air Shutoff

If supply air is wet and unfiltered, and/or the hoist is operated in a dirty environment, the hoist or trolley control valves may malfunction and become stuck "on". As a safeguard, an emergency main line shutoff valve is provided at the pendant. The emergency valve shuts off the air supply to the entire unit when the red pull/push button is depressed (pushed in).

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

Initial Operating Checks

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

1. After installation of trolley mounted hoists, check to ensure the hoist is centered below the trolley.
2. Check for air leaks in the supply hose and fittings to pendant, and from pendant to manifold.
3. When first running the hoist or trolley motors some light oil should be injected into the inlet connection to allow good lubrication.
4. When first operating the hoist and trolley it is recommended that the motors be driven slowly in both directions for a few minutes.
5. Operate the trolley along the entire length of the 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 the same direction as arrows or information on the pendant control.
8. Raise and lower a light load to check operation of the hoist brake.
9. Check hoist operation by raising and lowering a load equal to the rated capacity of the hoist a few inches (cm) off the floor.
10. Check operation of limit devices.
11. On trolley units check 'O' ring (360) on breather plug (362) in trolley drive piston motor has been removed.
12. Check that the solid plug (used for shipping) is removed from the power head reduction gear assembly and replaced with breather (421) attached to notice tag supplied with hoist.

Storing the Hoist

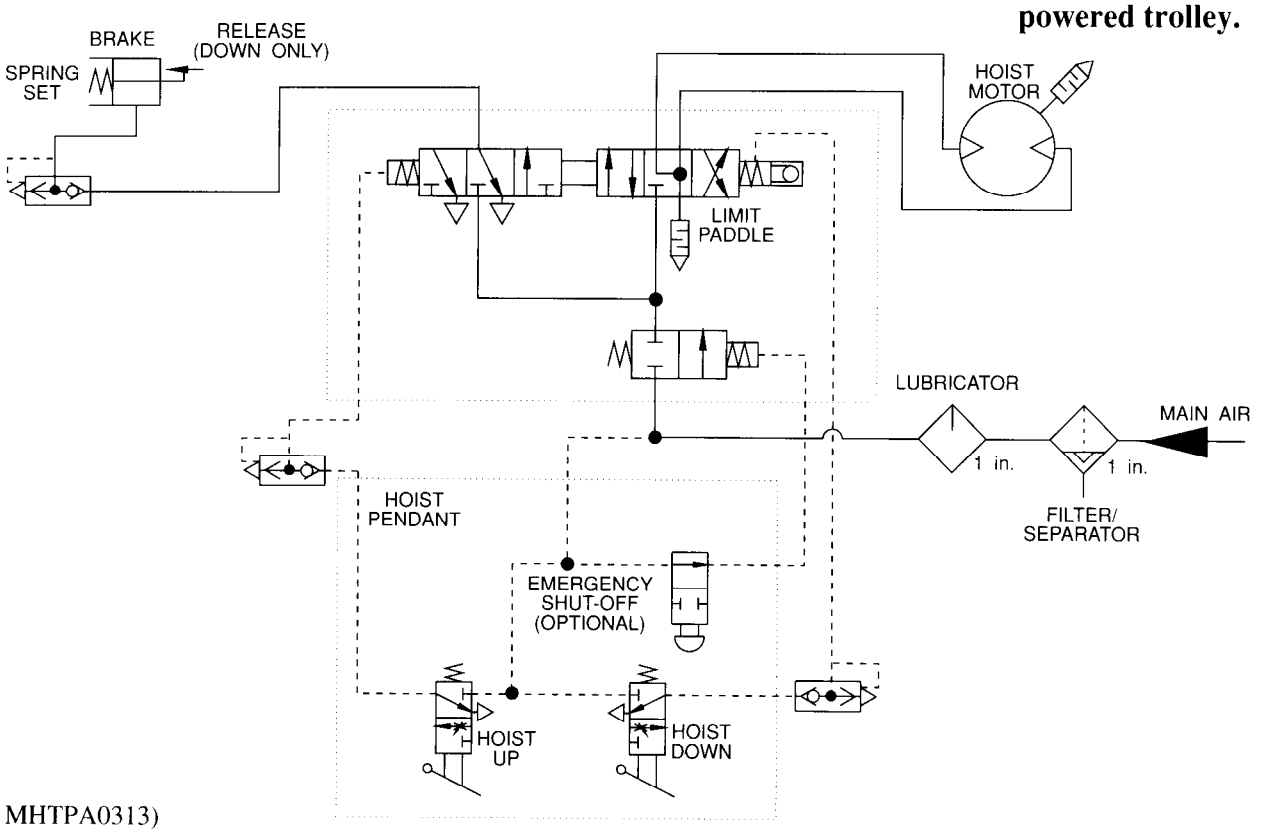
For hoists that have been in storage for a period of more than one month the following start-up procedure is required.

1. Give the hoist an inspection conforming to the requirements of "Hoists Not in Regular Use" in the "INSPECTION" section.
2. Pour a small amount of 10W oil in the motor inlet port.
3. Operate the motor for 10 seconds to flush out any impurities.
4. The hoist is now ready to work.

Trolley Drive Assembly Run In Period

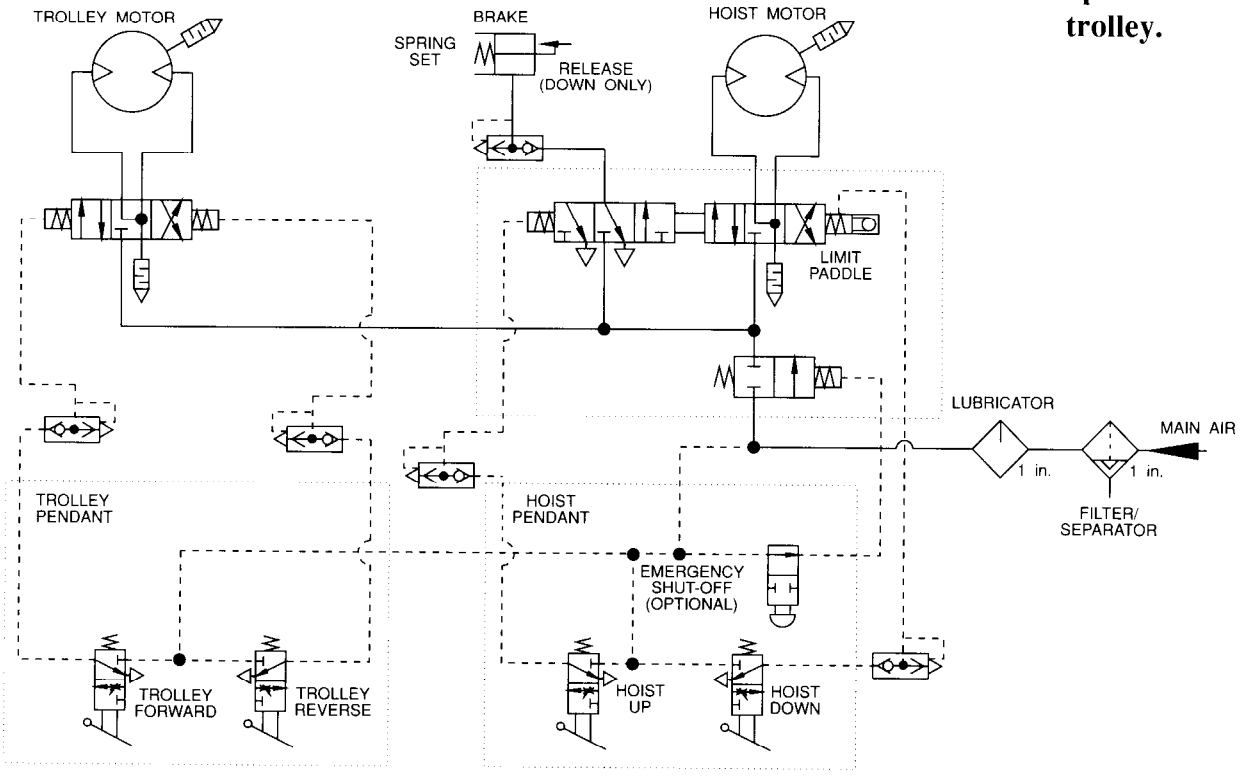
Maximum efficiency of the trolley drive worm gear is obtained after a "run-in" period. The length of time required will depend on the load applied and will be two to four hours at rated load and considerably longer at lighter loads. (Overloading will not decrease the "run-in" time and it may damage the worm gear.)
During "run-in" higher than normal temperature rise, and lower efficiency and output torque can be expected.

Hoist without air powered trolley.



(Dwg. MHTPA0313)

Hoist with air powered vane or piston motor trolley.



(Dwg. MHTPA0312)

The four most important aspects of hoist operation are:

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

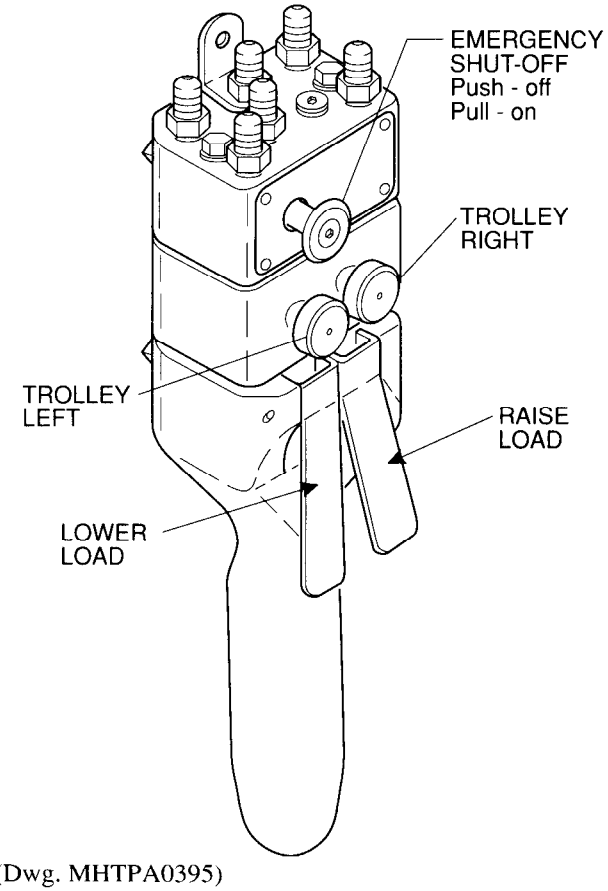
⚠WARNING

• Only allow personnel trained in safety and operation of this product to operate the hoist and trolley.
• The hoist is not designed or suitable for lifting, lowering or moving persons. Never lift loads over people.

Hoist Controls

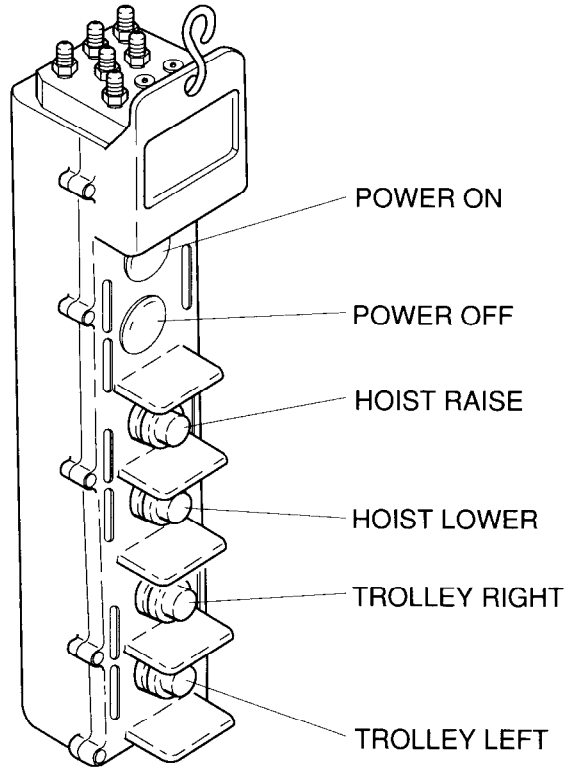
Refer to Dwgs. MHTPA0094 and MHTPA0095 in the "INSTALLATION" section for correct pendant hose connections.

Pilot Pendant Throttle with Emergency Stop
(Ref. Dwg. MHTPA0395)
The pendant control throttle is equipped with two separate levers for hoist operation. Pilot pressure from the pendant throttle activates the hoist control valve. Direction of hook travel is controlled by whichever lever is depressed.



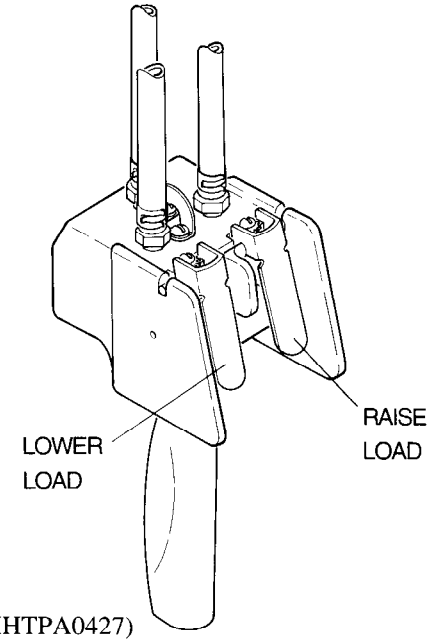
(Dwg. MHTPA0395)

Accu-Trol® Pendant (Push Button Type) Optional
The Accu-Trol® pendant is available with 2, 4 or 6 buttons. Refer to Accu-Trol® Pendant manual form number MHD56014 for additional information.



(Dwg. MHTPB0434)

MLK Two Lever Pendant
(Ref. Dwg. MHTPA0396)
The MLK pendant is standard on hook mounted hoists which do not require emergency stop.



(Dwg. MHTPA0427)

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

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

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

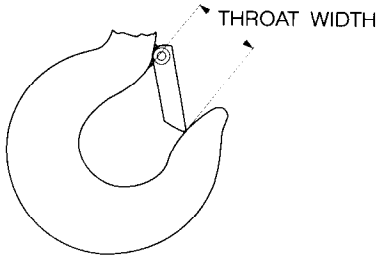
Records and Reports

Some form of inspection record should be maintained for each hoist, listing all points requiring periodic inspection. A written report should be made monthly on the condition of the critical parts of each hoist. These reports should be dated, signed by the person who performed the inspection, and kept on file where they are readily available to authorized personnel.

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 defect. Make sure all controls function properly and return to neutral when released. Check chain feed through the hoist and bottom block. If chain binds, jumps, is excessively noisy or "clicks", clean and lubricate the chain. If problem persists, replace the chain. Do not operate the hoist until all defects have been corrected.
2. HOOKS. Check for wear or damage, increased throat width, bent shank or twisting of hook. Replace hooks which exceed the throat opening discard width specified in table 3 (see Dwg. MHTPA0040) or exceed a 10° twist (see Dwg. MHTPA0111). If the hook latch snaps past the tip of the hook, the hook is sprung and must be replaced. Refer to the (Dwg. MHTPA0111) latest edition of ASME B30.10 "HOOKS" for additional information.

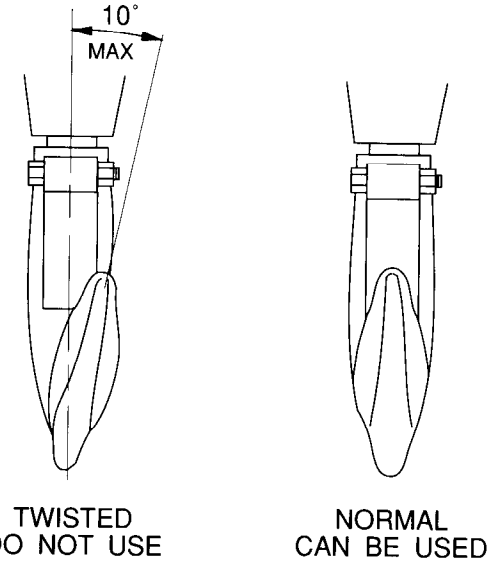


(Dwg. MHTPA0040)

Table 3

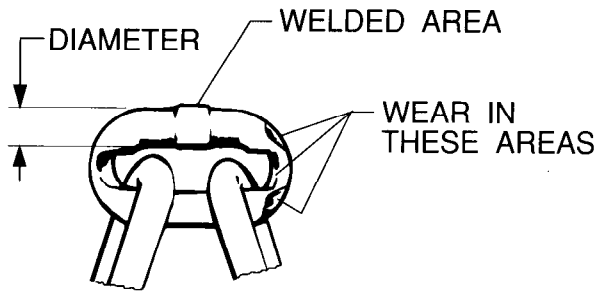
Model No.	Throat Width in.	(mm)	Discard Width in.	(mm)
HA2-012	2.50	63.5	2.87	73
HA2-025	4.00	101.6	4.60	116.8
HA2-037	4.75	120.6	5.46	138.7
HA2-050	6.50	165.1	7.47	189.8

3. UPPER AND LOWER LIMIT DEVICE. Test operation with no load. Upward travel must stop when the bottom block or stop buffer on chain hits hoist limit arm.
4. AIR SYSTEM. Visually inspect all connections, fittings, hoses and components for indication of air leaks. Repair any leaks found.
5. CONTROLS. During operation of hoist, verify response to pendant is quick and smooth. If hoist responds slowly or movement is unsatisfactory, do not operate hoist until all defects have been corrected.



(Dwg. MHTPA0111)

6. HOOK LATCH. Make sure the hook latch is present and operating. Replace if necessary.
7. CHAIN. Examine each of the 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 bearing surfaces between chain links (see Dwg. MHTPA0102). Replace a chain that fails any of the inspections. Check chain lubrication and lubricate if necessary. Refer to "Load Chain" in "LUBRICATION" section.



(Dwg. MHTPA0102)

NOTICE

• Excessive wear or stretching may not be apparent from visual observation. Also, inspect chain by measuring five links in accordance with instructions under "Periodic Inspection". A worn load chain may cause the load sheave to wear rapidly. Inspect the load sheave and replace if damaged or worn.

8. 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.

Periodic Inspection

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

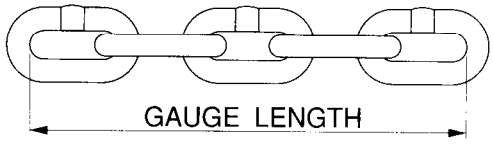
NORMAL	HEAVY	SEVERE
yearly	semi-annually	quarterly

Disassembly may be required for HEAVY or SEVERE usage. Keep accumulative written records of periodic inspections to provide a basis for continuing evaluation.

Inspect all the items in "Frequent Inspection". Also inspect the following:

1. FASTENERS. Check all rivets, split pins, capscrews and nuts. Replace if missing or tighten if loose.
2. 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.
3. HOOKS. Inspect hooks carefully for cracks using magnetic particle or other suitable non-destructive method. Inspect hook retaining parts. Tighten or repair, if necessary.
4. CHAIN SHEAVES. Check for damage or excessive wear. Replace if necessary.
5. MOTOR. If performance is poor, disassemble the 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 the rated capacity of the hoist a few inches off the floor and check ability of hoist to hold the load without excessive drift. If excessive drift occurs, disassemble. Check brake disc lining thickness as noted in the "MAINTENANCE" section.
7. SUPPORTING STRUCTURE. Check for distortion, wear and continued ability to support load.
8. TROLLEY. Check that the trolley wheels track the beam properly and clearance between side rollers and beam is correct, 1/16 to 3/16 in. (1.6 to 4.7 mm). Check side plates for spreading due to bending.
9. LABELS AND TAGS. Check for presence and legibility. Replace if necessary.
10. LOAD CHAIN END ANCHORS. Ensure both ends of load chain are securely attached. Secure if loose, repair if damaged, replace if missing. Check chain stopper is correctly installed and functional.
11. LOAD CHAIN. Measure the chain for stretching by measuring across five link sections all along the chain paying particular attention to the most frequently reeved links. When any five links in the working length reaches or exceeds the discard length, replace the entire chain (see Dwg. MHTPA0041). Always use a genuine INGERSOLL-RAND Material Handling replacement chain for regular and nickel-diffused load chains.

Size	Normal Length		Discard Length	
(mm)	in.	(mm)	in.	(mm)
22.0	13.05	331	13.22	336



(Dwg. MHTPA0041)

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

Hoists Not in Regular Use

A hoist which has been idle for a period of one month or more, but less than six months, shall be given an inspection conforming with the requirements of "Frequent Inspection" before being placed into service.

A hoist which has been idle for a period of over six months shall be given a complete inspection conforming with the requirements of "Periodic Inspection". Standby hoists shall be inspected at least semi-annually in accordance with the requirements of "Frequent Inspection". If abnormal operating conditions apply hoists may require a more frequent inspection.

LUBRICATION

To ensure continued satisfactory operation of the hoist, all points requiring lubrication must be serviced with the 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 the hoist eight hours each day, five days per week. If the hoist is operated almost continuously or more than the eight hours each day, more frequent lubrication will be required. Also, the 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 the performance of the hoist. Approval for the 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 the 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 minutes required at maximum motor speed). Check oil levels in the hoist and trolley piston motors.
Monthly	Lubricate all grease fittings. Clean air line filter. Check oil level in the brake and reduction gear assembly.
6 Monthly	Drain and replace oil in trolley and hoist piston drive motors.
Yearly	Drain and refill oil in the hoist brake and reduction gear assem bly.

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. For temperatures -20° to 50° F (-29° to 10° C) use a multipurpose lithium-based EP 1 grease. For temperatures 30° to 120° F (-1° to 49° C) use a multipurpose lithium-based EP 2 grease.

Hoist Motor
The motor is splash lubricated by the oil in the motor housing and has no other means of lubrication. It is therefore important to use only high quality, non-detergent hydraulic oil to insure maximum performance and minimum down time for repairs. Allow oil to settle prior to topping off. Oil capacity for the HA2 hoist motor is 0.35 pints (200 ml).

Below 32° F (0° C)	SAE 10W Hydraulic Oil
32° to 80° F (0° to 27° C)	SAE 20W Hydraulic Oil*
Above 80° F (27° C)	SAE 30W Hydraulic Oil

* Hoists are shipped from the factory with this oil

Trolley Drive Motor (piston)
The motor is splash lubricated by the oil in the motor housing and has no other means of lubrication. It is therefore important to use only high quality, non-detergent hydraulic oil to insure maximum performance and minimum down time for repairs. Allow oil to settle prior to topping off. Oil capacity for the HA2 trolley drive motor is 0.1 pints (65 ml).

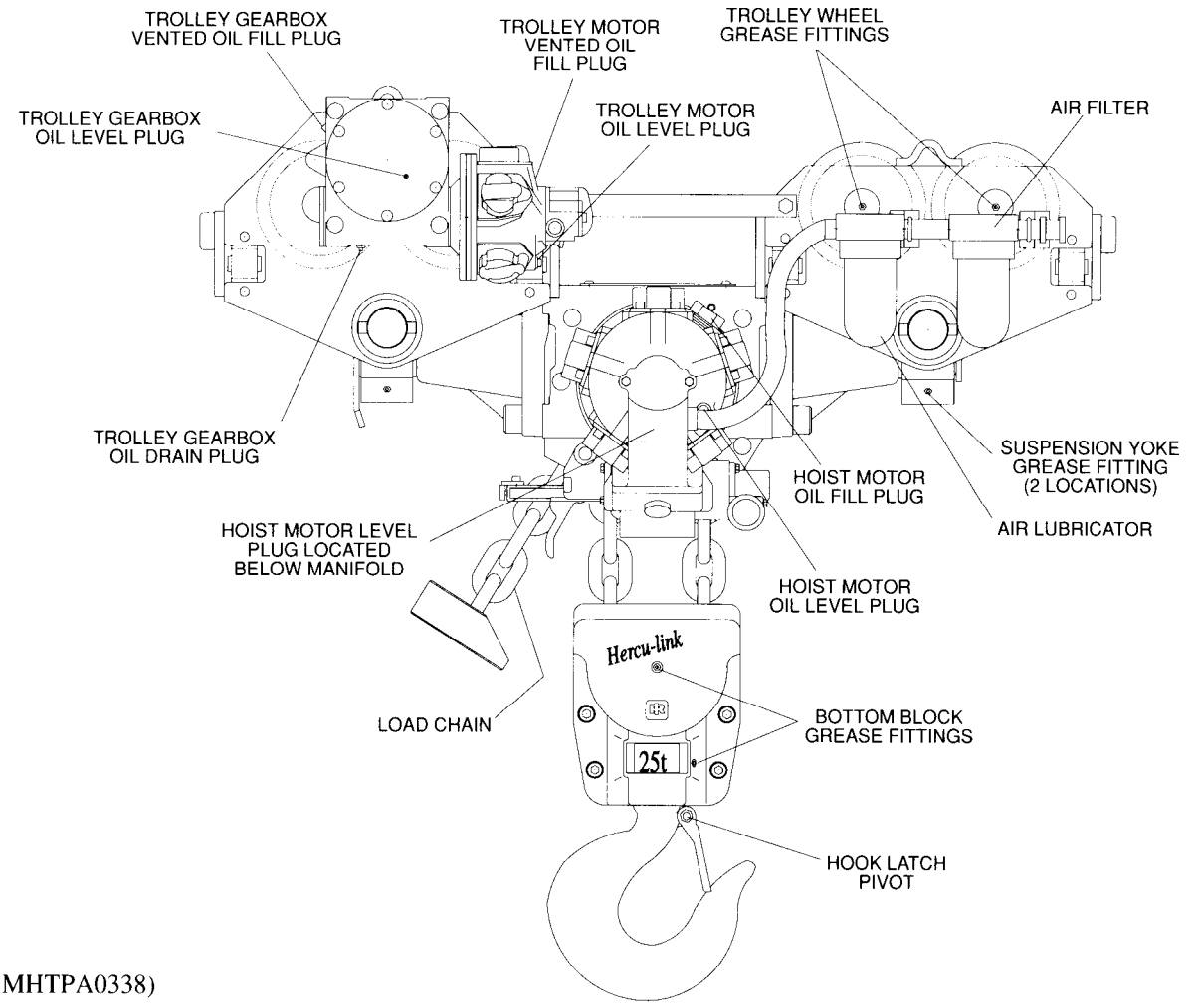
Below 32° F (0° C)	SAE 20W Hydraulic Oil
32° to 80° F (0° to 27° C)	SAE 30W Hydraulic Oil*
Above 80° F (27° C)	SAE 40W Hydraulic Oil

* Hoists are shipped from the factory with this oil

Bottom Hook Block Assembly
To prevent moisture entering the bottom block assemblies they should periodically be disassembled and repacked with grease. For temperatures -20° to 50° F (-29° to 10° C) use a multipurpose lithium-based EP 1 grease. For temperatures 30° to 120° F (-1° to 49° C) use a multipurpose lithium-based EP 2 grease. Apply grease to grease fitting until grease escapes through breather (421).

Hoist Capacity	Grease Required to Pack Hook Assembly	
	ozs.	grams
HA2-012 (12-1/2 ton)	1.1	31
HA2-025 (25 ton)	7.2	204
HA2-037 (37-1/2 ton)	16.5	468
HA2-050 (50 ton)	30.8	873

Hoist Lubrication Points



(Dwg. MHTPA0338)

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 the 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 the chain.
6. Use Ingersoll-Rand Lubri-Link® or a SAE 50 to 90 EP oil.

Trolley Drive Assembly

The gear housing is filled at the factory and shipped with the proper amount of oil, a non-toxic, rust inhibiting worm gear oil AGMA #7 compound that is suitable for an ambient temperature of 50° F to 125° F (10° C to 52° C). Before placing the hoist in operation, make certain that the vented pipe plug (210) has been installed in the gear housing (212).

Lubricant Chart

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

Fill gear housing (212) through vented fill plug (210) hole to the height of level plug (201) hole located in the cover (202). The gear housing oil capacity is approximately 1 qt. (0.95 lts.)

After the first 10 hours of operation, the 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 (213) located underneath the gear housing (212). The oil should be replaced using one of the recommended lubricants or its equivalent.

Reduction Gear Assembly

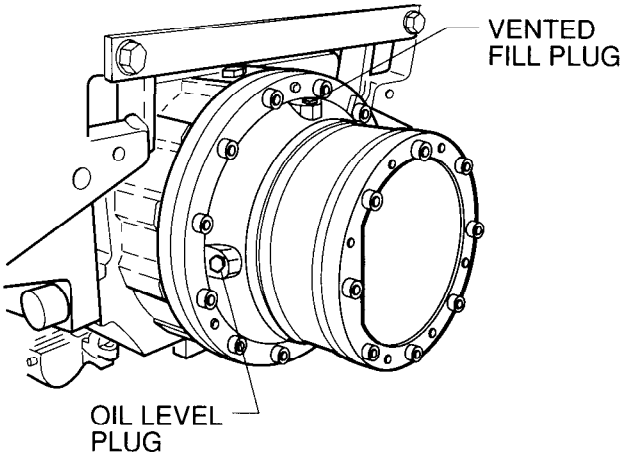
The reduction gear assembly is filled and shipped with oil from the factory. Check oil level before initial hoist operation. If the hoist is used at a normal frequency replace the oil in the reduction housing once every year.
To ensure correct performance, highest efficiency and long life, it is essential that the lubricating oil be maintained at the correct level. Oil capacity for the reduction gear assembly is 1-1/2 qts (1.4 lts).

⚠ CAUTION

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

Use only high quality lubricants in the reduction gear assembly such as SAE 90 EP motor oil or high grade EP4 gear oil.

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



(Dwg. MHTPA0343)

Disc Brake

The disc brake housing is filled and shipped with oil from the factory. Check oil level before initial hoist operation. If the hoist is used at a normal frequency replace the oil in the disc brake housing once every year.
To ensure correct performance, highest efficiency and long life, it is essential that the lubricating oil be maintained at the correct level. Oil capacity for the disc brake housing is 1/2 qts (0.48 lts).

⚠ CAUTION

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

Use only high quality lubricants in the disc brake housing assembly such as SAE 90 EP motor oil or high grade EP4 type gear oil.

The recommended grade of oil must be used at all times since the use of unsuitable oil may result in excessive temperature rise, loss of efficiency and possible damage to the brake discs and sprag clutch.
Fill brake housing (27) to height of level plug (28).

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 temperatures -20° to 50° F (-30° to 10° C) use a multipurpose lithium-based EP 1 grease.
For temperatures 30° to 120° F (-1° to 49° C) use a multipurpose lithium-based EP 2 grease.

TROUBLE SHOOTING

This section provides the information necessary for troubleshooting this hoist. The troubleshooting guide provides a general outline of problems which could be experienced with normal use of this hoist. It lists the symptom, the possible cause, and the possible remedy for the trouble being experienced.

SYMPTOM	CAUSE	REMEDY
Hoist will not operate.	No air supply to hoist, or too little CFM or PSI.	Check PSI (bar) at valve inlet. Refer to "SPECIFICATIONS" section for correct CFM (cu.m/min) and PSI (bar).
	Valve or limit arm sticking.	Check limit arm for free movement.
	Emergency valve "OFF".	Turn air "ON".
	Pendant malfunction.	Check PSI (bar) at pendant. Minimum operating pressure in pendant line is 55 PSI (3.8 bar).
	Hoist is overloaded.	Reduce load to within rated capacity.
	Motor is damaged.	Repair or replace. See "MAINTENANCE" section. 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 the brake inlet. (55 PSI (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 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 dump valves.
	Brake is slipping.	Check brake springs and brake disc linings. See "MAINTENANCE" section.
	Brake release screws incorrectly set.	Check brake release screws in brake housing and back-off as required.
	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 valve inlet. Refer to "SPECIFICATIONS" section for correct CFM (cu.m/min) and PSI (bar).
	Main air valve travel is restricted.	Check limit arm and linkage for free movement.
	Exhaust restricted.	Inspect vents and replace mufflers.
	Motor is damaged.	Check for worn motor bearings.

SYMPTOM	CAUSE	REMEDY
Hoist will not lift rated capacity (cont'd).	Motor or gearbox out of oil.	Check oil levels in motor and gearbox and fill to required level. Check oil level in lubricator.
Hook lowers, but will not raise.	No air supply to hoist, or too little CFM (cu.m/min). Hoist is overloaded. Pendant malfunction.	Check power supply and connections, in power supply line. Reduce load to within rated capacity. Check PSI (bar) at green coloured fitting connection on pendant.
Hook can be raised but not lowered.	Brake is not releasing. Brake piston seals leaking. (old style) Low air pressure. Pendant malfunction.	No breather in the 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 (3.8 bar) minimum) Check brake and pendant dump valves. Install upgrade kit. See parts section. Check PSI (bar) at valve inlet. Raise pressure to rated capacity. Check PSI (bar) at yellow coloured fitting connection on pendant.
Load chain jumps on sheave or is making a snapping sound.	No oil on load chain. Worn or rusted chain. Worn load sheave. Hoist not in-line with load. Incorrectly reeved load chain.	Lubricate load chain. See "LUBRICATION" section. See "INSPECTION" to determine wear limit. Replace if necessary. Replace worn parts. Align hoist with load. Do not "yard" or side pull. Check load chain is correctly reeved.
Trolley Trolley won't stop or trolley wheels slip.	Damaged beam. Too much oil, grease or paint on track of beam. Trolley not spaced for beam clearance.	Repair or replace beam. Clean off oil, grease or paint. Check trolley spacing. Refer to "INSTALLATION" section.
Trolley won't run.	Pendant lever sticking. Emergency valve "OFF". No air supply to trolley, or too little CFM (cu.m/min) or PSI (bar). Control valve is sticking.	Check lever and restore free movement. Turn air "ON". Check PSI (bar) at trolley valve. See "MAINTENANCE" section.

SYMPTOM	CAUSE	REMEDY
Trolley won't run (cont'd).	No oil in trolley motor or gearbox.	Check oil levels in trolley motor and gearbox and fill to required level.
	Wheels may be obstructed.	Remove obstruction.
	Motor is damaged.	Repair or replace. See "MAINTENANCE" section.

⚠WARNING

- **Never perform maintenance on the hoist while it is supporting a load.**
- **Before performing maintenance, tag controls:**

DANGER - DO NOT OPERATE - EQUIPMENT BEING REPAIRED.

- **Only allow personnel trained in service and repair on this hoist to perform maintenance.**
- **After performing any maintenance on the hoist, dynamically test hoist to 100% of its rated capacity, in accordance with ASME B30.16 standards, before returning hoist to service.**
- **Turn off air system and depressurize air lines before performing any maintenance.**

INTERVAL	MAINTENANCE CHECKS
Start of each shift	Make a thorough visual inspection of the hoist for damage. Do not operate the hoist if damage is found. Check the operation of the pendant control and brake.
6 Months	Inspect the disc brake friction linings and sprag clutch assembly. Clean or replace parts as required.
Annually	Inspect the gearing, shafts, and bearings for damage or wear. Check all of the supporting members, including the trolley if used.

Disc Brake

Adjustment

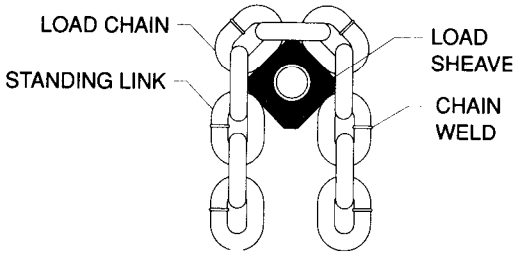
No brake adjustment is required.

NOTICE

- **When any part of the 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

It is suggested that a short length of 22 mm load chain be available when replacing the hoist load chain. Feeding a short length of load chain through the bottom block assembly or power head assembly prior to installing the new load chain may simplify installation.



(Dwg. MHTPA0042)

Weld on perpendicular load chain must always face away from sheaves. See Dwg. MHTPA0042.

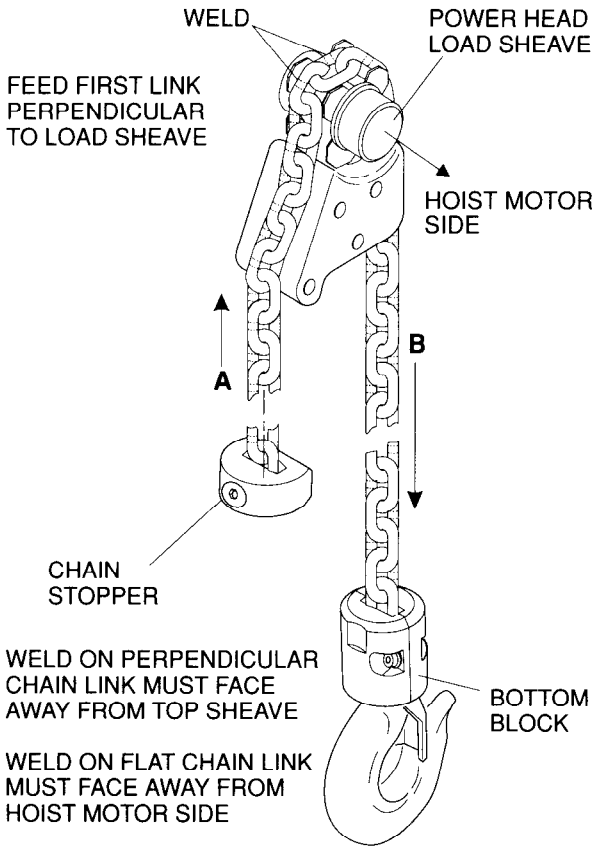
HA2-012 Hoist (Ref. Dwg. MHTPA0428)

1. The hoist should be hung and connected to the air supply. Reduce hoist air pressure to 60 psi (4 bar).
2. Remove chain bucket, if used.
3. Remove load chain stopper (241).
4. Remove bottom block assembly (70).
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).
6. Run hoist slowly in the lifting direction until the load chain free end is approximately 2 ft (60 cm) from the hoist.
7. Using a "C" link which is the same size as the load chain join the new load chain to the old taking care that the weld on the perpendicular "standing" links on the new load chain are facing away from the hoist load sheave.

"C" Link

(Dwg. MHTPA0016)

8. Run the hoist slowly until the new load chain has passed 2 to 3 feet (60 to 90 cm) through the hoist. Remove the "C" link and old chain.
9. Install chain stopper (241) in last link of the load chain free end.
10. Install bottom block assembly (70).
11. Lubricate entire length of load chain before operating hoist. Refer to "LUBRICATION" section.



(Dwg. MHTPA0428)

Chain Replacement

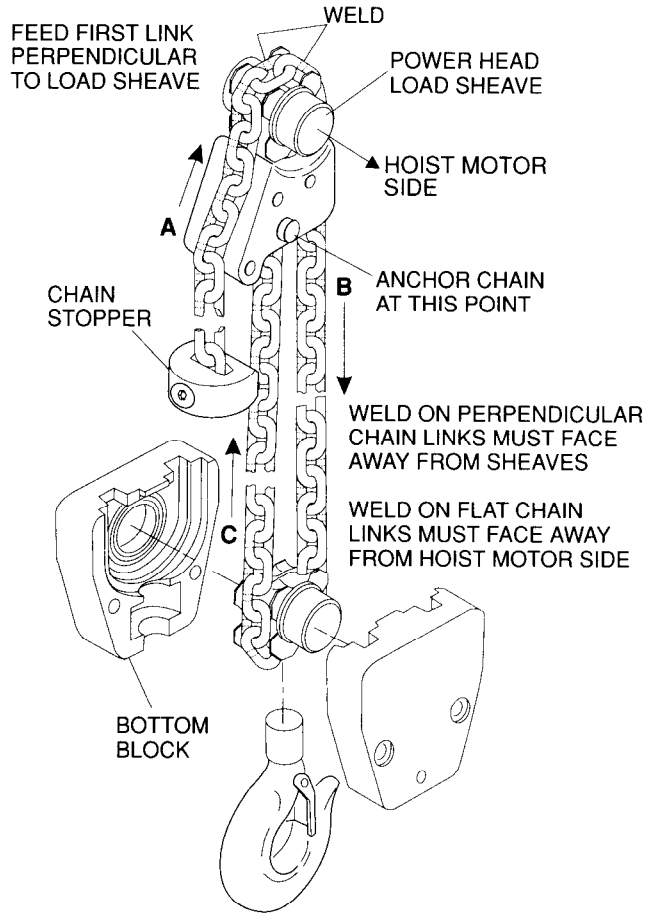
HA2-025 Hoist (Ref. Dwg. MHTPA0337)

1. The hoist should be hung and connected to the air supply. Reduce hoist air pressure to 60 psi (4 bar).
2. Remove chain bucket, if used.
3. Remove load chain stopper (241).
4. Run hoist slowly in the lifting direction until the bottom block assembly (70) is approximately 3 ft (1 m) from the hoist power head. Firmly support and secure the bottom block assembly (70) in this position.

⚠WARNING

• Do not begin chain replacement until bottom block assembly is fully secured and supported. If the 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).
6. Remove pin (46) and pin (47) which anchor the load chain to the power head assembly.
7. Using a "C" link which is the same size as the load chain join the new load chain to the free end on the old chain taking care that the weld on the perpendicular "standing" links on the new chain are facing away from the hoist load sheave.
7. Run the hoist slowly until the new load chain has passed through the hoist. Continue running hoist and pull chain by hand through bottom block assembly (70). Begin feeding chain at position 'A' and work alphabetically. Remove the "C" link and old chain.
8. Anchor the end of the load chain to the power head assembly. Install chain stopper (241) in last link of load chain free end.
9. Lubricate entire length of load chain before operating hoist. Refer to "LUBRICATION" section.



(Dwg. MHTPA0337)

Chain Replacement

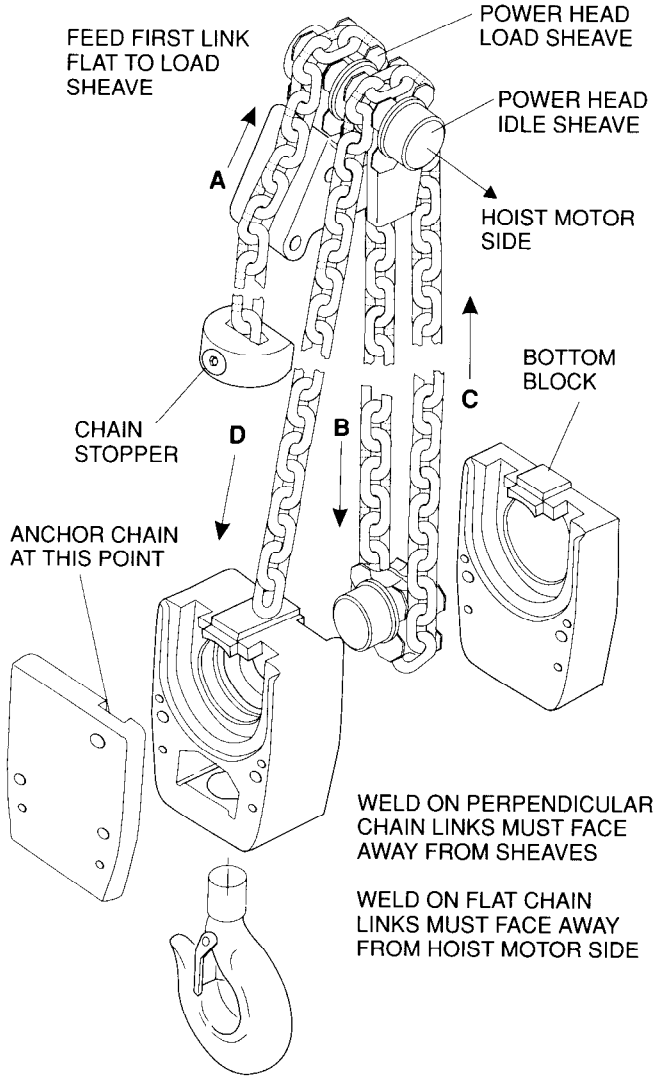
HA2-037 Hoist (Ref. Dwg. MHTPA0332)

1. The hoist must be hung and connected to the air supply. Reduce hoist air pressure to 60 psi (4 bar).
2. Remove chain bucket, if used.
3. Remove chain stopper (241).
4. Run hoist slowly in the lifting direction until the bottom block assembly (70) is approximately 3 ft (1 m) from the hoist power head. Firmly support and secure the bottom block assembly (70) in this position.

⚠WARNING

• Do not begin chain replacement until bottom block assembly is fully secured and supported. If the 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 the same plane/parallel to each other).
6. Remove screw (416) and pin (414) which anchor load chain to bottom block assembly.
7. Using a "C" link which is the same size as the load chain join the new load chain to the free end on the old chain taking care that the weld on the perpendicular "standing" links on the new chain are facing away from the hoist load sheave.
8. Run the hoist slowly until the new load chain has passed through the hoist. Continue running hoist and pull chain by hand through the bottom block assembly (70). Begin feeding chain at position 'A' and work alphabetically. Remove the "C" link and old chain.
9. Attach the end of the load chain to the bottom block assembly. Install chain stopper (241) in last link of load chain free end.
10. Lubricate entire length of load chain before operating hoist. Refer to "LUBRICATION" section.



(Dwg. MHTPA0332)

Chain Replacement

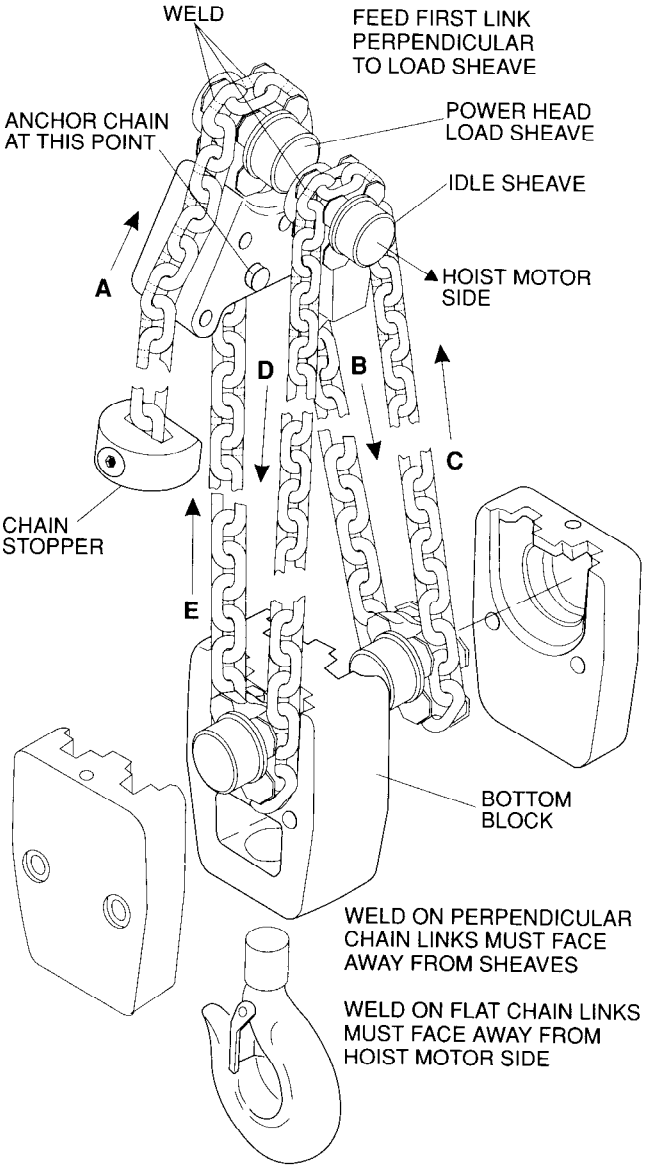
HA2-050 Hoist (Ref. Dwg. MHTPA0331)

1. The hoist must be hung and connected to the air supply. Reduce hoist air pressure to 60 psi (4 bar).
2. Remove chain bucket, if used.
3. Remove chain stopper (241).
4. Run hoist slowly in the lifting direction until the bottom block assembly (70) is approximately 3 ft (1 m) from the hoist power head. Firmly support and secure the bottom block assembly (70) in this position.

⚠WARNING

• Do not begin chain replacement until bottom block assembly is fully secured and supported. If the 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).



(Dwg. MHTPA0331)

6. Remove pin (46) and pin (47) which anchor load chain to power head assembly.
7. Using a "C" link which is the same size as the load chain join the new load chain to the free end on the old load chain taking care that the weld on the perpendicular "standing" links on the new load chain are facing away from the hoist load sheave.
8. Run the hoist slowly until the new load chain has passed through the hoist. Continue running hoist and pull chain through the bottom block assembly (70). Begin feeding chain at position 'A' and work alphabetically. Remove the "C" link and old chain.
9. Anchor the end of the load chain to the power head assembly. Install chain stopper (241) in last link of load chain free end.
10. Lubricate entire length of load chain before operating hoist. Refer to "LUBRICATION" section.

General Disassembly

The following instructions provide the necessary information to disassemble, inspect, repair, and assemble the hoist. Parts drawings of the hoist assembly are provided in the Parts Section.

If a 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 the hoist be performed on a bench in a clean dust free work area. In the process of disassembling the 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 the 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.

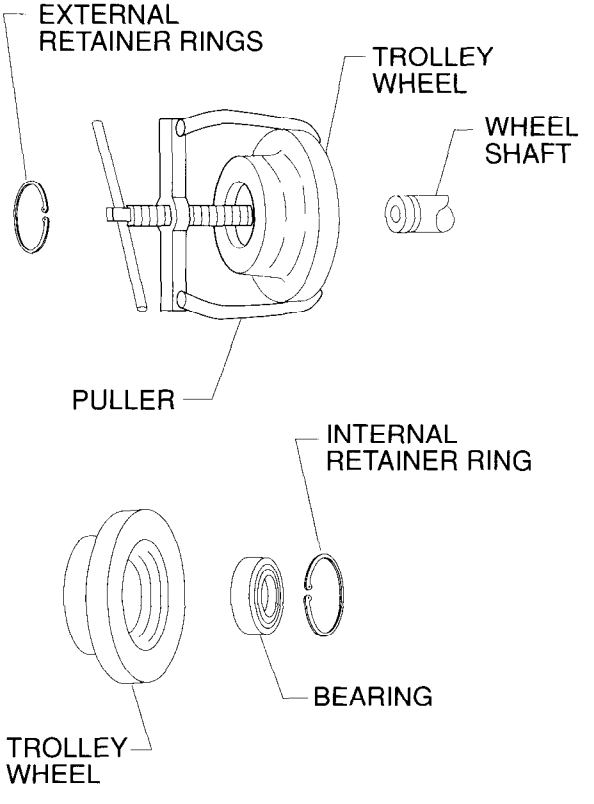
In general, the hoist is designed to permit easy disassembly and assembly. The use of heat or excessive force should not be required.

5. Keep the work area clean to prevent dirt and other foreign matter from getting into bearings and other moving parts.
6. 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.
7. When grasping a part in a vise, always use leather or copper covered vise jaws to protect the surface of the part and help prevent distortion. This is particularly true of threaded members and housings.
8. 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.
9. To avoid damaging bearings during hoist assembly or disassembly always tap or press on the bearing inner race for shaft fit bearings or the outer race for bore fit bearings.

Trolley Disassembly (Geared)

(Ref. Dwg. MHTPB0282)

1. Remove capscrews (236) and separate trolley drive assembly from side plate (184).
2. Remove capscrews (178) and remove power head assembly.
3. Remove capscrews (157), lockwashers (158), cap (169) and bracket (175) from brackets (177).
4. Remove cotter pins (173) and tap pins (174) out of suspension yokes (170). Note position of spacers (156) for later reassembly.
5. Separate side plates (150) and remove suspension yokes (170).
6. Remove retainer ring (155) and pull wheels (151) or (179) from side plates.



(Dwg. MHTPA0414)

7. Remove oil seal (152) and retainer ring (153) from wheels (151) or (179). Press bearing (154) out of wheels (151) or (179). Refer to Dwg. MHTPA0414.

Power Head Disassembly
(Ref. Dwg. MHTPD0353)

1. Disconnect all hoses from hoist motor. On trolley mounted hoists remove power head assembly from trolley. Drain oil from reducer, brake and motor assemblies. Position power head assembly vertically so brake end is up. Remove valve and manifold assembly.
2. Remove capscrews (468) and pry motor assembly (450) from adapter (2). Set motor assembly to one side for later disassembly.
3. Remove capscrews (48), washers (49) and limit paddle (52).
4. On trolley mounted hoists remove screws (81) and plate (80). On hook mounted hoists remove top hook assembly (149).
5. Carefully loosen capscrews (1) 4 - 5 turns each progressively round the adapter (2) until the brake spring compression is relaxed. Do not allow adapter to become cocked during removal.
6. When brake spring compression is relaxed remove capscrews (1), adapter (2) and brake springs (5).
7. Remove cylinder (14) and brake piston (7) as an assembly from brake housing (27).
8. Tap brake piston (7) out of cylinder (14) and remove seals (6) and (8).

NOTICE

• Hoists prior to serial number HL0510992 used 'O' rings on brake piston (7). Parts are not interchangeable. If brake piston requires replacement refer to parts section for upgrade kit.

9. Remove brake hub assembly, brake discs (23) and friction discs (22).
10. Remove capscrews (25) and pry brake housing (27) from frame (36).
11. If brake hub must be disassembled for inspection or repair remove retainer ring (9) and washer (10) from shaft (12) and pull bushing (18) and sprag clutch (19) from brake hub (20).

NOTICE

• If the sprag clutch (19) is removed from the brake hub (20) exercise extreme care as individual sprags will fall out and may be lost.

Reposition power head assembly vertically so brake end is down.

12. Remove capscrews (66) and pry complete assembled housings from frame (45). Separate housings and ring gears only if 'O' rings are being replaced or gear teeth in ring gears are damaged.
13. Remove thrust washer (74), planetary assembly (73) and sun gear (72).
14. Remove remaining planetary assemblies (64), (60) and sun gear (63).
15. Remove capscrews (35) and separate frames (36), (45) and (82). Frame (82) is used in 37-1/2 and 50 ton units only.
16. Remove sheaves (40). Remove capscrews (42) and lift strippers (43) from frames.
17. Remove screws (39) and inserts (38) from frames.
18. Pull bearings (32) from sheaves (40) if bearing or seal replacement is required.

Top Hook Disassembly
Hook Mount Hoist
(Ref. Dwgs. MHTPB0344, MHTPB0345, MHTPB0346 and MHTPB0347)

1. Remove hoist from mounting structure.
2. To remove hook and plate assembly (hook cannot be removed before hook plate is removed from hoist) remove capscrews (283) and separate hook plate assembly from power head. On HA2-012 hoists capscrews (268) must also be removed.
3. To remove hook (408) from hook plate (280) drive out roll pin (282) or (406) and remove nut (405) from threaded hook end.
4. Remove hook (408) and bearing (407) from hook block (280).

Bottom Block Disassembly
HA2-012 Hoist
(Ref. Dwg. MHTPB0314)

1. Always make sure load chain is removed before disassembly.
2. Remove capscrews (402) and nuts (403) securing side blocks (400). Pry side blocks (400) apart.
3. Drive out pin (406) and remove nut (405) on threaded hook section. Remove bearing (407).
4. Remove pin (414).

HA2-025 Hoist
(Ref. Dwg. MHTPB0315)

1. Always make sure load chain is removed before disassembly.
2. Remove capscrews (402) and nuts (403) securing side blocks (400). Partially drive out dowel pins (412) and pry side blocks (400) apart.
3. Drive out pin (406) and unscrew nut (405) from threaded hook section. Remove bearing (407).
4. Remove bearings (32), sheave (40) and quad seals (34) from side blocks (400).

HA2-037 Hoist
(Ref. Dwg. MHTPB0316)

1. Always make sure load chain is removed before disassembly.
2. Remove capscrews (402) securing side block (400) to hook center block (413) and pry side block (400) from hook center block (413). (Engagement of dowel pins (412) may make removal difficult).

3. If hook (408) is being removed it will be necessary to remove side plate (415). Remove capscrews (402) and pry off side plate (415). (Engagement of dowel pins (412) may make removal difficult).
4. Drive out pin (406) and unscrew nut (405) from threaded hook section. Pull hook (408) from hook center block (413) and remove bearing (407).
5. Remove bearings (32), sheave (40) and 'O' rings (410) from side block (400) and hook center block (413).

HA2-050 Hoist

(Ref. Dwg. MHTPB0317)

1. Always make sure load chain is removed before disassembly.
2. Remove capscrews (402) securing side blocks (400) to hook center block (413) and pry side blocks (400) from both sides of hook center block (413). (Engagement of dowel pins (412) may make removal difficult).
3. Drive out pin (406) and unscrew nut (405) from threaded hook section. Pull hook (408) from hook center block (413) and remove bearing (407).
4. Remove bearings (32), sheaves (40) and quad seals (34) from side blocks (400) and hook center block (413).

Piston Motor Disassembly (Power Head)

(Ref. Dwg. MHTPA0359)

1. Remove plug (464) and drain oil into a suitable container.
2. Remove capscrews (500), lockwashers (482) and valve cap (502) from manifold (504). Pull out rotary valve (467), rotary valve bushing (466). Remove valve and manifold assembly
3. Remove capscrews (468) and lockwashers (482). Support the weight of the motor assembly (450) and pull from power head assembly.
4. Remove the capscrews (55), copper washers (452) and cylinders (453) from the motor housing (463).
5. Rotate the crankshaft assembly (473) to bring each wrist pin (457) above the motor housing (463), then push out the wrist pin (457) and remove piston (455). Plugs (456) pressed into ends of wrist pins (457) should not be removed. To avoid breakage use extreme care when removing compression rings (454).
6. Pull the crankshaft assembly (473) with attached connecting rods (459) out of the motor housing (463) by shifting the connecting rods (459) to clear the cylinder holes. The connecting rods (459) are joined through a common journal on the crankshaft and are held in place by connecting rod rings (474) on each side of the main rib.
7. To remove the connecting rods (459) from the crankshaft (473), loosen setscrew (478) and drive out the taper pin (479) securing the counterbalance section to the crankshaft section.
8. Loosen the capscrew (166), remove counterbalance section, then pull off connecting rod rings (474), connecting rods (459), bushing (476) and sleeve (475).

Trolley Drive Disassembly

(Ref. Dwg. MHTPC0306)

1. Remove capscrews (236) and lockwashers (235) then pull trolley drive assembly from trolley side plate (184).
2. Remove retainer ring (180) and drive gear (182) from shaft (208).
3. Remove capscrews (234) and lockwashers (233) from reducer adapter (232). Carefully pry reducer adapter (232) from housing (212).
4. Remove spacer (230) and sleeve (229) from shaft (208). Remove oil seal (228) from reducer adapter (232). Pull shaft (208) with worm gear (226) and bearing (cones) (205) from housing (212).
5. Remove motor adapter (220) from housing (212) with bearing cup (218).
6. Remove four screws (200), cover (225) and cover shims.
7. Pull worm (214) from housing (212).
8. Carefully pull bearing cones (217) from worm (214).
9. Remove oil seal (219) from motor adapter (220).
10. Pull bearing cup (218) out of cover (225).
11. Remove screws (200), cover (202) and gaskets (203) from housing (212).
12. Remove worm gear (226) from shaft (208).
13. Remove bearing cone (205) and spacer (206).

Piston Motor Disassembly (Trolley Drive)

(Ref. Dwg. MHTPC0381)

Remove the motor assembly (329) from the trolley drive assembly and move to a clean work surface.

Drain the oil from the motor housing (369) into a suitable container by removing the pipe plug (379).

Disassembly and re-assembly will be simplified if the crankshaft (354) is held vertically in a soft-jawed vice or supported vertically on suitable packing, to raise the shaft clear of the work surface.

1. Remove capscrews (334) and valve assembly (625).
2. Remove capscrews (340) and cover (339).
3. Remove capscrews (334) and rotary valve housing (332).
4. Support the rotary valve housing evenly on the flange face. Tap rotary valve (337) out of rotary valve housing (332) from inside outwards. The normal clearance between the rotary valve (337) and rotary valve housing (332) is 0.002 - 0.003 in. (0.05 - 0.075 mm). Replace parts if wear is excessive.
5. Remove the retaining ring (335) and bearing (336) from rotary valve housing (332).
6. Remove setscrew (346) and balance weight (345). Remove spacer washers (347) and note the thickness for subsequent re-assembly.
7. Remove the ring (351) now exposed.

8. Remove capscrews (334) and cylinders (375) from motor housing (369). Slide connecting rod (349) along the bearing (352) towards the open end of the motor housing (369), until the connecting rod slipper end is clear of the ring (351). Push out the complete piston assembly, from inside the motor housing (369).
9. When all four piston assemblies (373) have been removed, remove the bearing (352), ring (351) and spacer (353).
10. Remove the retainer ring (366) and spacer (367) and shims (365).
11. Press out crankshaft (354), aligning oil thrower with opening in motor housing (369).
12. Clean off jointing compound from rotary valve housing bore (332) and the outside of the valve bush (136) with "Hermetite" 1325B solvent or similar.

Vane Motor Disassembly (Trolley Drive) Optional
(Ref. Dwg. MHTPB0379)

1. Remove capscrews (262) from cover (260) and pull vane motor assembly from trolley drive assembly.
2. Remove capscrews (273) and (274). Pull pilot control valve (270) from valve manifold (267).

Pilot control valve (270) repair should be limited to the removal of the end caps, bushings and plunger to replace the 'O' rings. See Dwg. MHTPB0407.

3. Remove capscrews (268) and valve manifold (267) from cylinder (256).
4. Remove capscrews (265) and pry cover (260) from cylinder (256).
5. Remove cover (253) from cylinder (256).
6. Slide shaft and rotor (259) from cylinder (256). Be careful not to drop or damage vanes (258) during this operation.
7. Remove capscrews (264) and cap (263) from cover (260).
8. Tap bearings (251) from motor adapter (220) and cover (260).

Cleaning, Inspection and Repair

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

Cleaning

⚠ CAUTION

• Bearings that are loose, worn or rotate in the housing must be replaced. Failure to observe this precaution will result in additional component damage.
• Do not use trichloroethylene to clean parts.
• If trolley suspension yoke bushings (176) are loose or worn they must be replaced. Failure to observe this precaution will result in additional component damage.

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.

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 (22). 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 (22).
6. Check mufflers (107), (266) and (566) for damage or excessive dirt.
7. Inspect yoke bushings (176) for wear, scoring, or galling. If wear exceeds discard dimensions in table 4 replace bushings.

Table 4

Hoist Model	Item No.	Bushing Part No.	Original Bore Size		Discard Bore Size	
			in.	mm	in.	mm
HA2-02	176	16187	3.437	87.3	3.500	89
IIA2-03		16190	4.500	114.3	4.562	116
HA2-05						

8. Check bearings for freeness 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 (20) and on brake shaft (12) for ridges or gaulling. If either condition exists replace parts.

NOTICE

• If brake hub (20), sprag clutch (19) or brake shaft (12) 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

Trolley Assembly

(Ref. Dwg. MHTPB0282)

1. Press bearings (154) into wheels (151) or (179). Install retainer rings (153) and oil seals (152) in wheels (151) or (179).
2. Install wheels (151) or (179) on side plates. Install retainer rings (155).
3. Coat suspension yoke ends with grease then install side plates (160) on suspension yokes (170). Install spacers (156) in same location as noted during disassembly.
4. Install pins (174). Secure pins (174) with cotter pins (173) and bend ends apart.
5. Install brackets (177) in suspension yokes (170). Install cap (169) and bracket (175) with capscrews (157) and lockwashers (158).
6. Install power head assembly between brackets (177). Install capscrews (178), with a small amount of Loctite® 242 on the threads and torque to 525 lb. ft. (712 N.m)
7. Install trolley drive assembly on side plate (184).

Power Head Assembly

(Ref. Dwg. MHTPD0353)

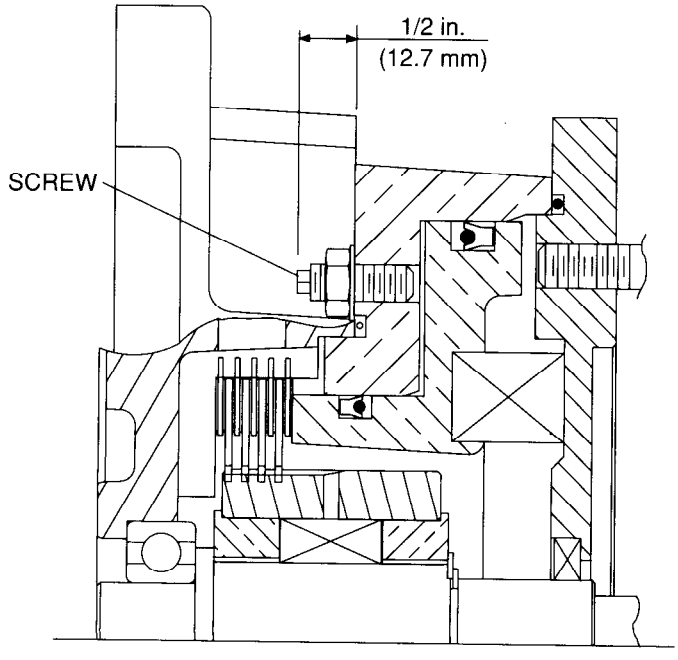
1. Install insert (38) with screws (39) using Loctite® 242 in frame (36) (motor side). Lubricate and install 'O' rings (33) in large bore of frames (36) and (45).
2. Install seals (34) in groove on both sides of sheave (40). Press a bearing (32) onto both sides of load sheave(s) (40).
3. Install assembled load sheave (40) into frame (45) so splined end enters first. Be careful not to damage 'O' ring (33) in bore of frame (45).
4. Install chain stripper (43) on frame (45) and secure with capscrews (42). Apply a small amount of Loctite® 242 on the threads and torque to 110 lb. ft. (149 N.m).
5. Tap dowel pins (37) into frame (45). Install a short length of 22 mm starter chain.
6. Install insert (38) in frame (45) with screws (39) using Loctite® 242.
7. Install frame (36) to frame (45) so it positions over the sheave (40) and bearing (32). Clamp frames (36) and (45) together with capscrews (35). Use Loctite® 242. Torque capscrews to 400 lb.ft. (542 N.m). On 37-1/2 and 50 ton units also install frame (82).
8. Install spacer (44) over sheave spline.

To assist parts assembly it is recommended that the power head be positioned in a vertical position with the gear end up.

9. Pre-assemble gear reducer outer housings. Install two capscrews 180° apart in cover (178) and place cover on work bench. Lubricate and install 'O' rings (68) on both sides of ring gear (77) then place on cover (78) so capscrews holes are aligned.
10. Tap dowels (76) partially into spacer (75) then install spacer (75) on ring gear (77). Lubricate and install 'O' rings (68) on both sides of ring gear (69). Install ring gear on spacer (75).
11. Install input housing (65) and remaining capscrews (79). Apply a small amount of Loctite® 242 on capscrews (79) and torque to 32 lb. ft (44 N.m). Avoid damaging 'O' rings during assembly. Tap dowel pins (83) into cover (78) until flush.
12. Install large planetary assembly (60) on spline of sheave (40). Apply a small amount of grease to thrust washer (62) and press into sun gear (63). Install sun gear (63).
13. Install planetary assembly (64) so it engages with sun gear (63). Apply a small amount of grease to thrust washer (62) and press into sun gear (72) and install sun gear (72).
14. Install planetary assembly (73) so it engages with sun gear (72).
15. Install shaft (30) through center of planetary assemblies so gear end meshes with planet gears in planetary assembly (73).
16. Lubricate and install 'O' rings (57) on ring gear (58).
17. Install ring gear on frame (45). Place thrust washer (74) on the end of shaft (30).
18. Install pre-assembled outer housings over planetary assemblies so fitting (71) and breather (421) are at the top. (The breather hole can be determined as being the hole which will be directly in line with a dowel pin when capscrew holes are aligned.)
19. Drive dowel pins (59) through flange into ring gear (58) and frame (45).
20. Install capscrews (66) with Loctite® 242 to secure reducer housing to frame (45). Torque capscrews (66) to 85 lb. ft (115 N.m).

To assist parts assembly it is recommended that the power head be re-positioned in a vertical position with the motor end up.

21. Lubricate and install 'O' ring (4) in shoulder recess of brake housing (27). Install brake housing (27) on frame (36). Secure with capscrews (25) and torque to 85 lb. ft. (115 N.m). Position brake housing (27) so the two valve mounting pads are located at the bottom.
22. Install pipe plugs (26) and (28) in brake housing (27).
23. Press one bushing (18) into brake hub (20). Install shaft (12) into assembly. Slide sprag clutch (19) onto shaft (12) and into brake hub (20). Press in second bushing (18). Ensure sprags are assembled all in the same direction and garter springs are not twisted or out of location. Sprag clutch must be installed so that the end with the stamped arrow is nearest the motor adapter. Check that shaft rotates freely counter clockwise when looking at the non splined end of brake hub (20) and locks up instantly in the clockwise direction. Check rotation of shaft in free sprag clutch direction is smooth. If tightness or rough rotation exists disassemble and inspect.
24. Install washer (10) and retainer ring (9) on shaft (12). Press bearing (24) onto shaft (12).
25. Starting with a friction disc (22) and alternating with brake discs (23), install friction discs (22) and brake discs (23) in brake housing (27).
26. Install motor coupling (29) on the end of the shaft (12) and install assembled shaft and brake hub assembly through brake. Remove pipe plug (26) in brake housing (27) to check that brake hub is properly engaged with each friction disc (22). Use of artificial light will aid inspection. Line up plates and tap gently on shaft if bearing (24) is tight in brake housing (27).
27. Install screws (13), seal washers (16) and nuts (17) in two locations in the brake cylinder (14). Check that screws (13) are slightly below the cylinder surface on the brake piston (7) side. Screws should extend 1/2 in. (12.7 mm) from the face of the brake cylinder (14). Adjust both screws evenly. See Dwg. MHTPA0397.

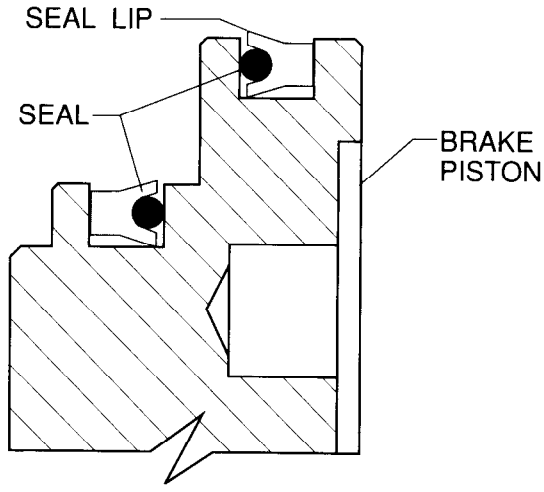


(Dwg. MHTPA0397)

28. Lubricate and install seals (6) and (8) on brake piston (7). Seal lips must face each other. See Dwg. MHTPA0139. Install 'O' ring (151) in recessed groove in brake cylinder (14).

NOTICE

• Hoists prior to serial number HL0510992 used 'O' rings on brake piston (7). Parts are not interchangeable. If brake piston requires replacement refer to parts section for upgrade kit.



(Dwg. MHTPA0139)

29. Apply a thin film of grease to bore of brake cylinder (14) and install brake piston (7).
30. Install assembled brake piston (7) on brake housing (27) so brake port hole is positioned on the right hand side and machined pad is at the bottom.
31. Set brake springs (5) into holes provided in the brake piston (7).
32. Install oil seal (3) in motor adapter (2) so lip of seal (3) is toward the brake. Lubricate and install 'O' ring (4) in recessed groove in motor adapter (2).
33. Install motor adapter (2) on brake cylinder (14) so the threaded hole, which is located dead center between the counterbored mounting bolt holes, is located at the bottom (6:00 o'clock position.)
34. Secure motor adapter (2) with capscrews (1) and torque to 33 lb. ft. (45 N.m). Pull motor adapter down evenly to compress the brake springs (5). Tighten capscrews 4 - 5 turns each progressively round the adapter (2). Do not allow motor adapter (2) to become cocked.
35. Install gasket (470) on motor adapter (2). Install motor assembly (450) so spline on shaft (12) engages motor. Position motor so drain plug (464) is located at the bottom. Secure with capscrews (468), lockwashers (482). Torque capscrews (468) to 36 lb. ft. (49 N.m).
36. On trolley mounted hoists a cover plate is used instead of the top hook assembly. Install plate (80) with gasket sealant Loctite® 515 and screws (81).

37. Install bushings (50) for limit paddle (52) in frames (36) and (45). Tap bushings (50) in until flush.
38. Install limit paddle (52) with capscrews (48), washers (49) and nuts (56).

Valve Assembly

39. Pre-assemble valve and manifold assembly and install on the underside of brake housing (27) with capscrews (505) and washers (309). Capscrews must be finger tight only.
40. Ensure rotary bushing (466) is installed in manifold (504) and slides freely in the bore. Install valve cap (502) in manifold (504).
41. Install capscrews (500) and washers (482) which attach manifold (504) to motor assembly (450).

Torque manifold capscrews before finally tightening valve to brake capscrews.

Piston Motor Assembly (Power Head)

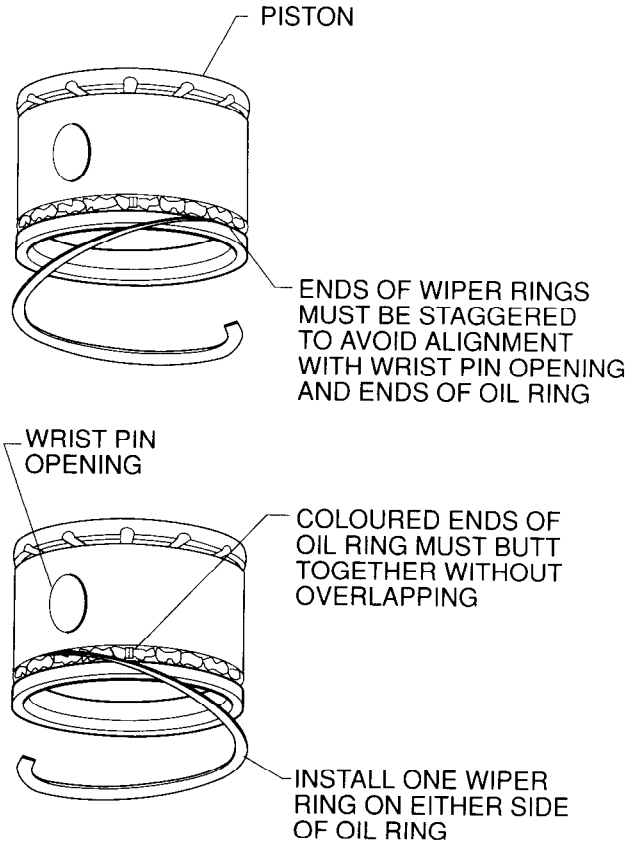
(Ref. Dwg. MHTPA0359)

1. Press bearing (465) onto crankshaft counterbalance. Place the connecting rods (459) on the bushing (476) and hold them in place with the two connecting rod rings (474). Install connecting rod rings (474) so the chamfered side is next to the connecting rod (459).
2. Place the sleeve (475) on the crankshaft (473), then install the connecting rod (459) assembly on the crankshaft (473).
3. Secure the crankshaft counterbalance to the crankshaft with taper pin (479) and tighten capscrew (166).
4. Align bearing (465) in the bore of the motor housing (463) and tap crankshaft assembly in place until each connecting rod (459) end will project through a cylinder hole.
5. Check the fit of each compression (454) and oil ring (458) by placing one ring at a time in the cylinder (453), making sure that it is not canted or tilted in relation to the cylinder wall. With a feeler gauge, measure the ring gap. Ring gap should be 0.003 to 0.004 in. (0.75 to 0.1 mm).
6. Make sure that compression rings (454), oil rings (458), and pistons (455) are perfectly clean. Carefully place oil rings (458) and compression rings (454) in their respective grooves on the pistons (455). The plain compression ring (454) must be placed nearest the head of the piston (455). The oil ring (458) with several oil channels must be placed nearest the skirt of the piston (455).

⚠ CAUTION

• Do not interchange the compression and oil rings.

7. Compression and oil ring joints (gaps) should be staggered and positioned so that joints (gaps) do not coincide with wrist pin (457) openings. (Ref. Dwg. MHTPA0224).



(Dwg. MHTPA0224)

8. Rotate the crankshaft so each connecting rod (459) in succession will project enough beyond the motor housing (463) to permit inserting the wrist pin (457) through the piston (455) and connecting rod (459).
9. After each piston (455) is assembled to its connecting rod (459), install a gasket (460) and cylinder (453).
10. Slide each cylinder (453) over the piston (455), guiding it carefully over the compression and oil rings. Note that the cylinder has four tapered ears around the skirt of the piston which serve as ring compressors to aid in installation. The cylinder should fit into place by tapping lightly. If force is required, there may be an alignment problem which must be corrected before continuing.
11. Secure cylinders (453) to the motor housing (463) with capscrews (55) and lockwashers (452) and tighten uniformly.

Trolley Drive Assembly

(Ref. Dwg. MHTPC0306)

1. Press or tap bearing cup (218) into housing (212) on cover (225) side.
2. Place gaskets (222, 223 and 224) on shoulder of cover (225).
3. Install cover (225) and gaskets on housing (212). Secure with four screws (200).
4. Press bearing cones (217) onto worm (214). Ensure bearings are fully seated against worm shoulder. Install worm and bearings in housing (212). Tap or press second bearing cup (218) into housing bore.

5. Tap or press bearing cup (204) into cover (202). Place gaskets (203) on shoulder of cover (202).
6. Install cover (202) and gaskets on housing (212). Secure with six screws (200).

NOTICE

• Rotate cover (202) so oil level hole is in the 3 o'clock position.

7. Install keys (207) in shaft (208) and press worm gear (226) onto shaft making sure it aligns with and fits over the keys (207).
8. Install spacers (206) and (227) on shaft. Press bearing cones (205) on shaft (208) until they contact the spacers.
9. Install shaft and worm gear assembly in gear housing (212) so worm gear teeth mesh with worm.
10. Tap or press bearing cup (204) into reducer adapter (232).
11. Install reducer adapter (232) and gaskets (203) on housing (212). Secure with capscrews (234) and lockwashers (233). Check to see if shaft (208) turns freely without binding or moving from side to side.

NOTICE

• Adjust gaskets (203) to provide zero side to side motion of the worm gear assembly.

12. Install oil seal (219) in motor adapter (220) so oil seal lip faces into the housing.
13. Install oil seal (228) in reducer adapter (232) so lip faces into the housing.
14. Install motor adapter (220) on housing (212) and secure with screws (200) (piston motor) or screws (234) (vane motor).
15. Install spacer (230) on shaft (208). Take care not to damage the lip of oil seal (228).
16. Install key (183) in shaft (208). Slide drive gear (182) onto shaft (208) so it aligns with and fits over key (183). Install retainer ring (180).

NOTICE

• The first bearing cup (218) must be flush against cover (225) for accurate backlash reading.

17. Rotate worm to check for tight spots and to see if backlash is between 0.004 - 0.008 in. (0.10 - 0.20 mm). Adjust shims (222, 223 or 224) until correct backlash is achieved.

Piston Motor Assembly (Trolley Drive)
(Ref. Dwg. MHTPC0381)

1. Install oil seal (358) and bearings (356) on crankshaft (354). Lip of oil seal (358) must face into motor housing (369). Tap assembled parts into position in flange plate (363).
2. Install shims (365), spacer (367) and retainer ring (366) on the end of crankshaft (354).
3. Lubricate and install 'O' ring (368) on flange plate (363). Align oil-thrower on crankshaft (354) with opening in motor housing (369) and assemble flange plate to motor housing (369) with screws (364).
4. Clamp the crankshaft vertically in a soft-jawed vice. (shaft down)
5. Install spacer (353) so radius on inside bore of spacer is toward the crank pin shoulder.
6. Install ring (351) and bearing (352). Radius on inside bore of ring (351) must face outward.
7. Assemble the connecting rods (349) to the pistons (373). Ensure retainer rings (378) are fully seated in the grooves on wrist pins (377). Install the oil rings (370) and compression rings (372) on the pistons (373). Check gap on rings is 0.003 to 0.004 ins. (0.076 to 0.1 mm). Note: The upper compression ring (372) is plain and the lower oil ring (370) acts as an oil control.
8. Carefully install the cylinders (375) on pistons. Do not use force during this procedure and avoid damaging oil rings (370) and compression rings (372).
9. Install a gaskets (374) on each cylinder. Insert the piston assemblies into the motor housing (369) bores, with the connecting rod (349) positioned correctly to seat on the needle bearing (352). When the slipper end is seated on the bearing (352), slide the connecting rod (349) inward to enter the ring (351). Install capscrews (334) so they are finger tight. When all cylinders have been installed tighten capscrews (334) evenly.
10. Install second ring (351) with the radius of the bore innermost. Install spacer (347). Rotate crankshaft 360° to ensure parts are correctly fitted.
11. Install rotary valve (337) in rotary valve housing (332). Press bearings (336) and (338) into rotary valve housing (332). Install retainer ring (335).
12. Install balance weight (345). Secure balance weight with setscrew (346).
13. Rotate the crankshaft (354) until the balance weight is at the bottom dead center position, rotate the rotary valve (337) until the balance weight is at the bottom position.
14. Install gasket (331) on rotary valve housing then assembly to motor housing and secure with capscrews (334). Rotate the output shaft in both directions and viewing the rotary valve (337) through the exhaust cover (339) opening ensure that the valve is correctly following the output shaft direction. This checks that both crank and valve slot are correctly engaged.
15. Install cover (339) and secure with capscrews (340).

Vane Motor Assembly (Trolley)

(Ref. Dwg. MHTPB0379)

1. Install seal (252) in cover (253) so seal (252) is flush with cover face. Seal lip must face towards motor.
2. Install seal (254) in cover (253) so seal lip faces towards the motor.
3. Install bearings (251) in covers (253) and (260) using a small amount of Loctite® 609 on the outside bearing diameter. Pack grease between seal (252) and bearing (251) in cover (253) filling the cavity.
4. Install cap (263) on cover (260) with capscrews (264).
5. Apply gasket sealant to the motor cylinder (256) surface for cover (253). Use a minimal amount but enough to create a total seal. Install cover (253) to motor cylinder (256).
6. Install dowels (255) to align cover (253) with motor cylinder (256).

NOTICE

• Replacement rotors and cylinders must be supplied as matched sets in order to maintain the proper end running clearance of 0.002 to 0.004 in. (0.05 - 0.1 mm).

7. Apply a film of 10W oil to the cylinder wall. Install shaft and rotor (259) in cylinder (256). Place one vane (258) in each rotor slot so that the long straight vane edge is towards the cylinder wall.
8. Apply gasket sealant to the motor cylinder (256) surface for cover (260). Use a minimal amount but enough to create a total seal. Install motor cover (260) to motor cylinder (256). Align cover with dowel pin (255) holes and carefully tap cover (260) into position until flush with the cylinder (256).
9. Install dowel pins (255) in cover (260) and cylinder (256). The relationship of the motor end covers (253) and (260) with motor cylinder (256) is very critical. In order to provide proper running clearance for the rotor, the rotor has to run exactly parallel with the cylinder (256) and perpendicular to the covers. Dowel pins (255) are used to locate these parts within 0.007 in. (0.18 mm) of correct alignment.
10. Install capscrews (256). The correct alignment is established by snugging down the capscrews (265) which retain the covers to the cylinder and checking the motor for free turning. If any drag is noted, tap around the edges of the motor covers until the shaft turns freely. Tighten capscrews to 30 in. lbs. (3.3 N.m).
11. Tap shaft key (257) into the keyway on shaft and motor (259).
12. Install valve manifold (267) on cylinder (256) with capscrews (268).
13. Lubricate and install 'O' rings (269) in recesses in pilot control valve (270). Install pilot control valve (270) on valve manifold (267) secure with capscrews (273) and (274).

Top Hook Assembly

Hook Mounted Hoists

(Ref. Dwgs. MHTPB0344, MHTPB0345, MHTPB0346 and MHTPB0347)

1. Install hook (408) and bearing (407) in hook block (280).
2. Install nut (405) on threaded hook end. Back nut (405) off until first dowel pin (406) hole is lined up. Install pin (406). Do not attempt to drive dowel pin (406) into nut until holes are aligned or threads on hook (408) will be damaged.
3. Install hook plate assembly on power head with capscrews (283). On HA2-012 hoists also install capscrew (286).
4. Install hoist on mounting structure.

Bottom Block Assembly

HA2-012 Hoist (Ref. Dwg. MHTPB0314)

1. Pack bearing (407) with grease and install bearing (407) on hook (408). Screw nut (405) onto threaded shank of hook (408).
2. Place hook with bearing and nut in one half of side block (400) and tighten nut until parts clamp side block. Back nut off until first dowel pin (406) hole is lined up. Install pin (406). Do not attempt to drive dowel pin (406) into nut until holes are aligned or threads on hook (408) will be damaged.
3. Install pin (414).
4. Pack cavities in side blocks (400) with grease and place side blocks (400) together. Apply a small amount of Loctite ® 242 to capscrews threads and install capscrews (402) and nuts (403) to clamp parts. Torque capscrews to 205 lb. ft (278 N.m). Check that hook swivels freely.
5. Install grease fitting (172) and fill block with grease. Refer to "LUBRICATION" section.

On 25, 37-1/2 and 50 ton hoists it is suggested that a short length of 22 mm chain be available when assembling the bottom block assembly. The chain should be installed around the sheave prior to final assembly of the block sections. If this procedure is followed it will simplify the installation of the load chain later.

HA2-025 Hoist

(Ref. Dwg. MHTPB0315)

1. Pack bearing (407) with grease and install bearing (407) on hook (408). Screw nut (405) onto threaded shank of hook (408).
2. Place hook with bearing and nut in one half of side block (400) and tighten nut until parts clamp side block. Back nut off until first dowel pin (406) hole is lined up. Install pin (406). Do not attempt to drive dowel pin (406) into nut until holes are aligned or threads on hook (408) will be damaged.
3. Lubricate and install quad seals (34) on sheave (40) in grooves provided. Using a press against the inner race of bearing (32) press the bearing (32) onto the sheave (40). Repeat the process for the opposite side.

4. Install the assembled sheave in the bottom block. Pack cavities in side blocks (400) with grease and place side blocks (400) together.
6. Check dowel holes are lined up. Tap dowels (412) into position. Secure side blocks (400) with capscrews (402) using Loctite® 242. Torque capscrews (402) to 310 lb. ft. (420 N.m).
6. Install grease fitting (172) and fill block with grease. Refer to "LUBRICATION" section.

HA2-037 Hoist

(Ref. Dwg. MHTPB0316)

1. Pack bearing (407) with grease and position bearing (407) in hook center block (413) cavity.
2. Install threaded hook end into hook center block (413) and through bearing (407).
3. Install nut (405) being careful that threads are not crossed. Tighten nut (405) until snug then back nut (405) off until first dowel pin (406) hole is lined up. Install dowel (406) until flush with nut (405) diameter. Do not attempt to drive dowel pin (406) into nut until holes are aligned or threads on hook (408) will be damaged
4. Lubricate and install 'O' rings (407) on sheave (40) in grooves provided. Using a press against the inner race of bearing (32) press the bearing (32) onto the sheave (40). Repeat the process for the opposite side.
5. Install the assembled sheave in the hook center block (413). Pack cavities in hook center block (413) and side block (400) with grease.
6. Install cover (400) over bearing (32) and sheave (40) making sure dowel holes are lined up. Tap dowels (412) into position. Secure cover (400) with capscrews (402) using Loctite® 242. Torque capscrews (402) to 310 lb. ft. (420 N.m).
7. Install grease fitting (172) and fill block with grease. Refer to "LUBRICATION" section.

HA2-050 Hoist

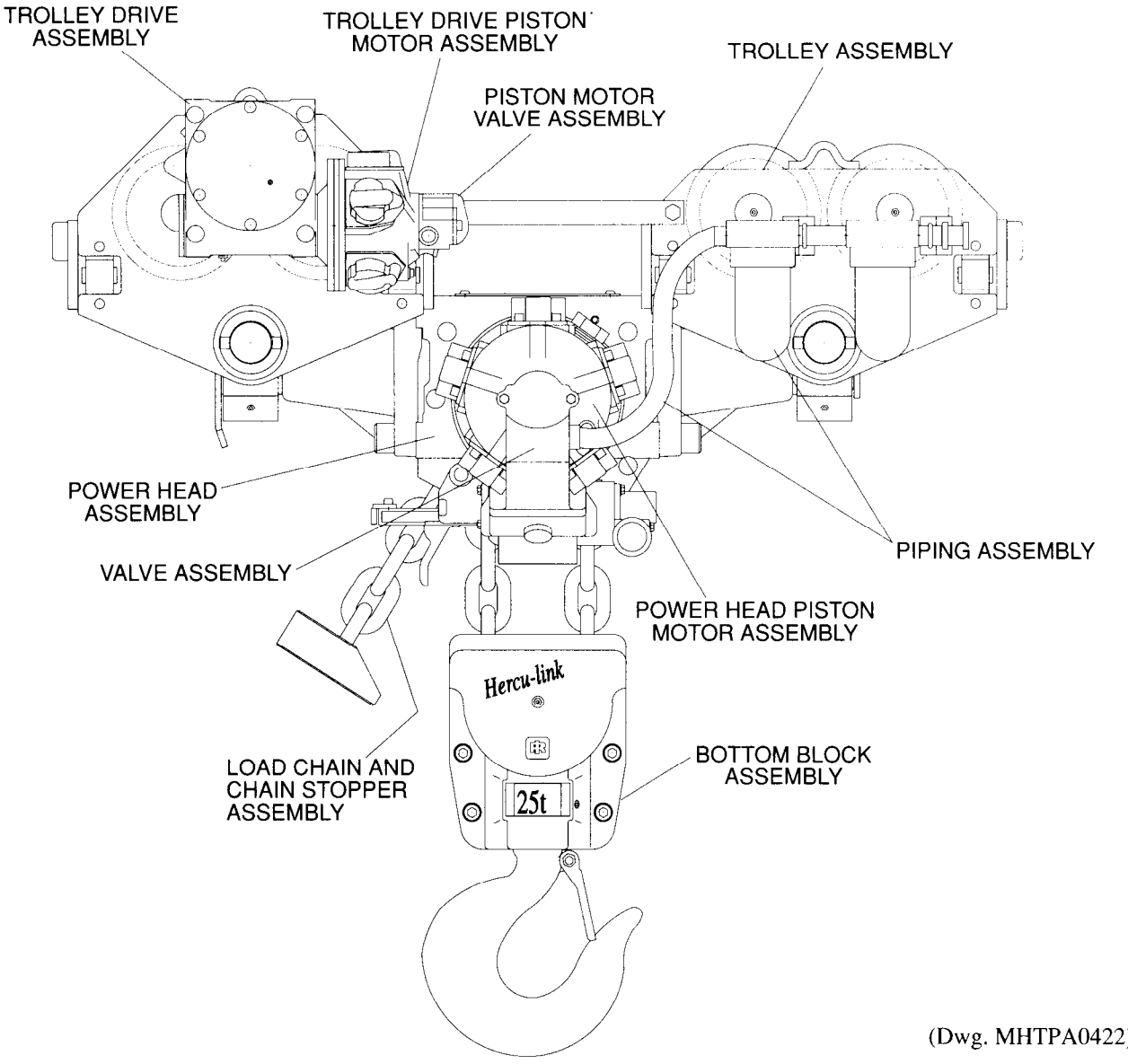
(Ref. Dwg. MHTPB0317)

1. Pack bearing (407) with grease and position bearing (407) in hook center block (413) cavity.
2. Install threaded hook end into hook center block (413) and through bearing (407).
3. Install nut (405) being careful that threads are not crossed. Tighten nut (405) until snug then back nut (405) off until first dowel pin (406) hole is lined up. Install dowel (406) until flush with nut (405) diameter. Do not attempt to drive dowel pin (406) into nut until holes are aligned or threads on hook (408) will be damaged
4. Lubricate and install quad seals (34) on sheaves (40) in grooves provided. Using a press against the inner race of bearing (32) press the bearings (32) onto both sides of sheaves (40).
5. Install the assembled sheaves in the hook center block (413). Pack cavities in hook center block (413) and side block (400) with grease.
6. Install cover (400) over bearing (32) and sheave (40) making sure dowel holes are lined up. Tap dowels (412) into position. Secure cover (400) with capscrews (402) using Loctite® 242. Torque capscrews (402) to 310 lb. ft. (420 N.m).
7. Install grease fitting (172) and fill block with grease. Refer to "LUBRICATION" section.

Load Test

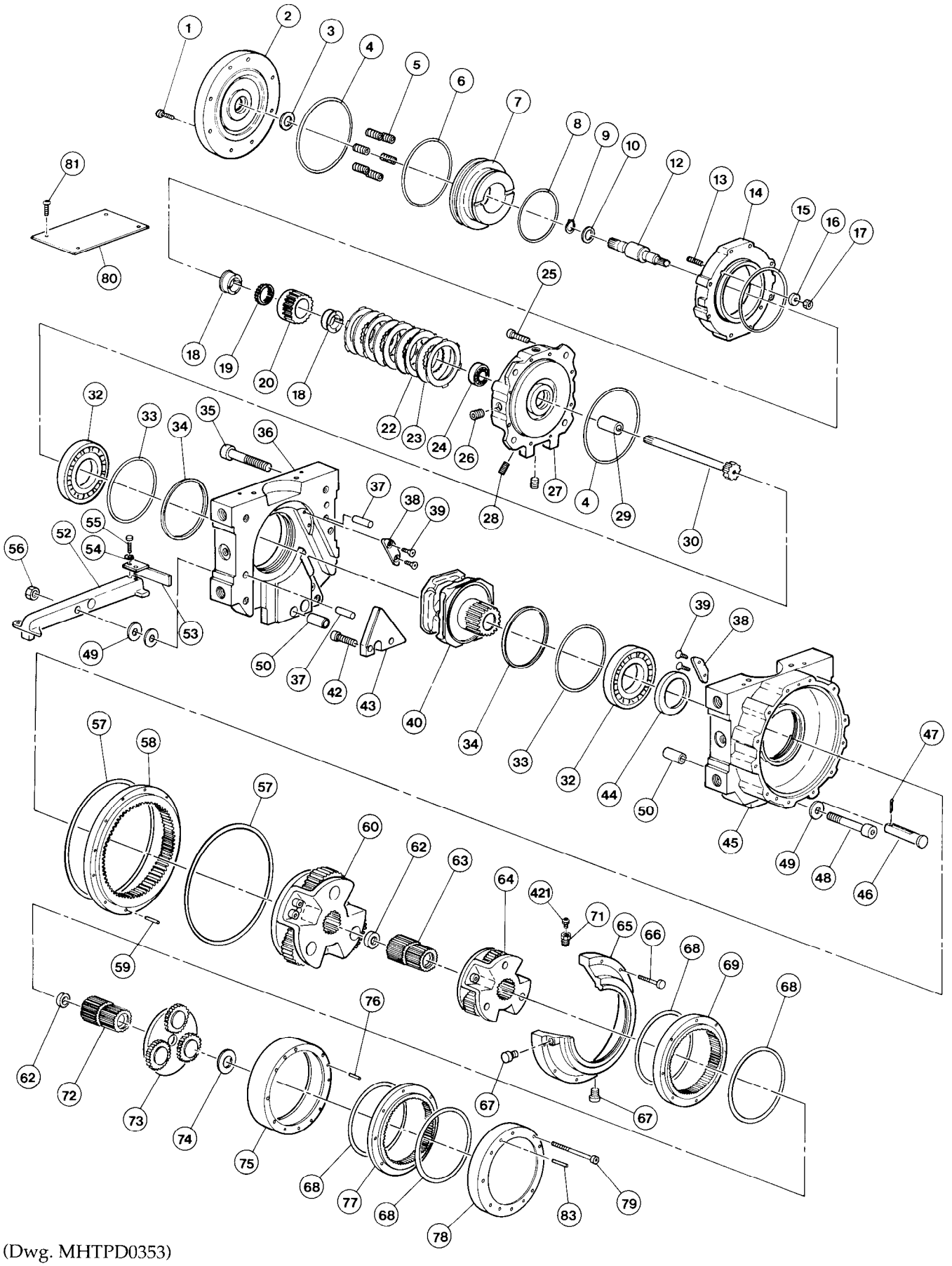
Prior to initial use, all new, extensively repaired, or altered hoists shall be load tested by or under the direction of a qualified person, and a written report furnished confirming the rating of the hoist. Dynamically load test hoist to 100% of its rated capacity in accordance with ASME B30.16 standards. Testing to more than 100% may be necessary to comply with standards and regulations set forth in areas outside of the USA.

Index Of Exploded View Parts Illustrations



(Dwg. MHTPA0422)

HOIST POWER HEAD ASSEMBLY PARTS DRAWING



(Dwg. MHTPD0353)

HOIST POWER HEAD ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
1	Capscrew	8	51711
2	Adapter	1	11954
• 3	Oil Seal	1	50541
• 4	'O' Ring	2	52670
5	Spring	6	50751
• 6	Seal	1	71107726
7	Brake Piston	1	22177
• 8	Seal	1	71107718
9	Retainer Ring	1	52669
10	Washer	1	50528
12	Shaft	1	12009
13	Screw	2	54859
14	Cylinder	1	11951
• 15	'O' Ring	1	52730
• 16	Seal	2	54655
17	Nut	2	54860
18	Bushing	2	12011
• 19	Sprag Clutch	1	52666
20	Brake Hub	1	12010
• 22	Friction Disc	5	12013
• 23	Brake Disc	4	12012
24	Bearing	1	52665
25	Capscrew	4	52317
26	Pipe Plug	3	54656
27	Brake Housing	1	11953
28	Pipe Plug	1	54658
29	Motor Coupling	1	11999
30	Drive Shaft	1	11998
• 32	Bearing	2*	54483
• 33	'O' Ring	2*	54341
• 34	Seal	2*	71007405
35	Capscrew (12-1/2, 25 t)	4	51751
	Capscrew (37-1/2, 50 t)	5	54209
36	Frame (12-1/2 & 25 t)	1	11844
	Frame (37-1/2 & 50 t)		11848
37	Pin	2*	53406
38	Insert	2	9147-1
39	Screw	4	50964
40	Sheave (All hoists)	1	11980
	Sheave (37-1/2 & 50 t)	1	11979
42	Capscrew	2*	52380
43	Stripper (All hoists)	1	12008
	Stripper (37-1/2 & 50 t)	1	13001

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
44	Spacer	1	12007
45	Frame (Reducer Side)	1	11846
46	Pin	1	16046
47	Pin	1	51021
48	Capscrew	1	54199
49	Washer	3	50165
50	Bushing	2	52675
52	Limit Paddle (12-1/2 & 25 t)	1	13002
	Limit Paddle (37-1/2 & 50 t)		17310
53	Extension (12-1/2 & 25 t)	1	13003
	Extension (37-1/2 & 50 t)		17185
54	Lockwasher	2	50200
55	Capscrew	2	50871
56	Nut	1	50914
• 57	'O' Ring	2	51459
58	Ring Gear	1	71068639
59	Pin	3	71106710
60	Planetary Assembly	1	71068621
62	Thrust Washer	2	71068647
63	Sun Gear	1	71068613
64	Planetary Assembly	1	71068555
65	Input Housing	1	71068589
66	Capscrew	12	54676
67	Plug	3	71068571
• 68	'O' Ring	4	52149
69	Ring Gear	1	71068548
71	Fitting, Bushing	1	54659
72	Sun Gear	1	71068530
73	Planetary Assembly	1	71107650
74	Thrust Washer	1	52950
75	Spacer	1	71068522
76	Pin	2	71068472
77	Ring Gear	1	71068514
78	Cover	1	71068654
79	Capscrew	8	71106736
80**	Plate (12-1/2 & 25 t)	1	12844
	Plate (37-1/2 & 50 t)		17098
81**	Screw	4	54654
82***	Frame (37-1/2 & 50 t)	1	11850
83	Pin	2	71068464
421	Breather	1	52024
490	Reducer Assembly (incls items 57 thru 79, 83 and 421)	---	52659

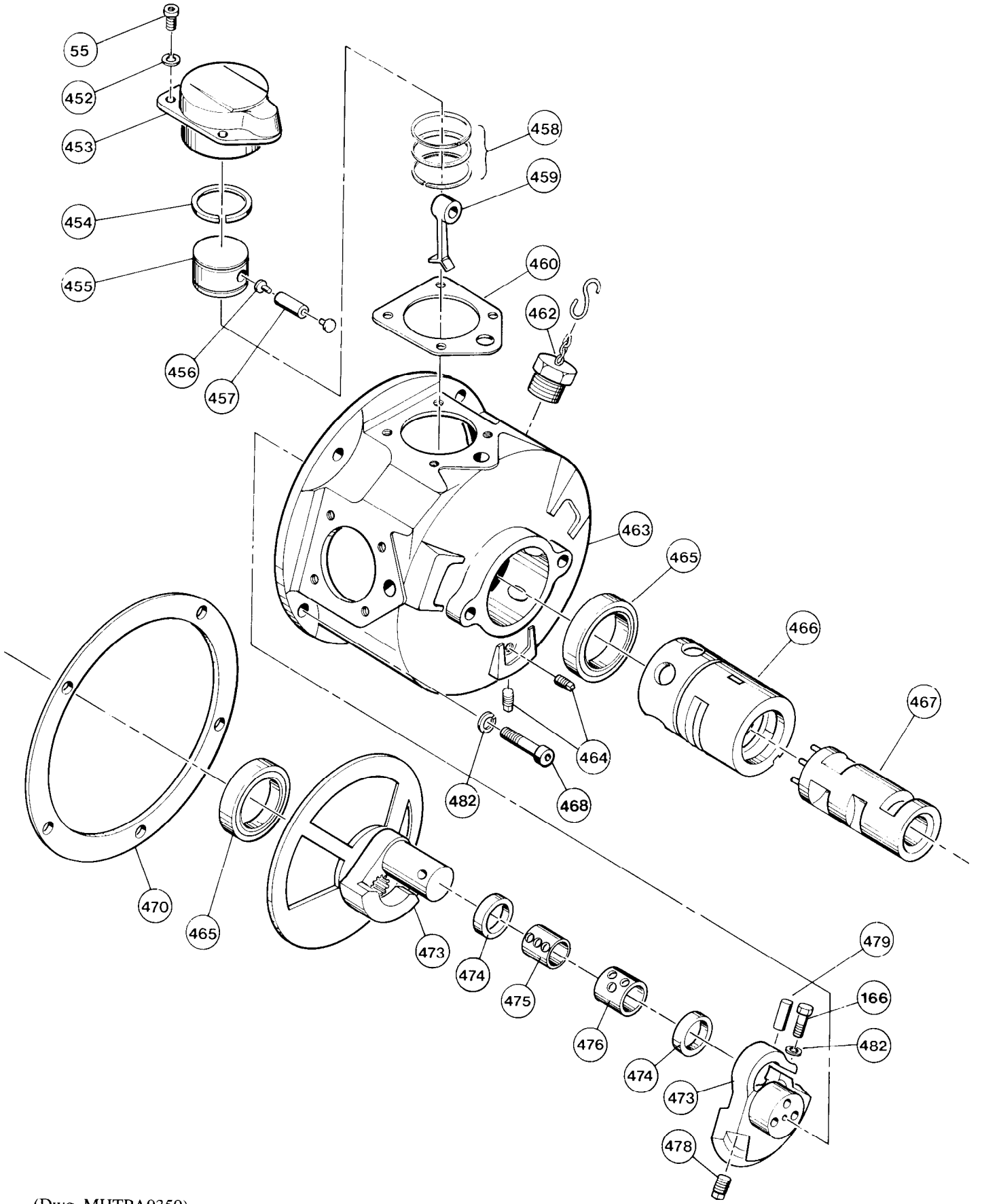
• Recommended Spare

** Required for trolley units only

* Quantity doubles for HA2-037 and HA2-050 Hoists

*** Not shown on parts drawing

POWER HEAD PISTON MOTOR ASSEMBLY PARTS DRAWING



(Dwg. MHTPA0359)

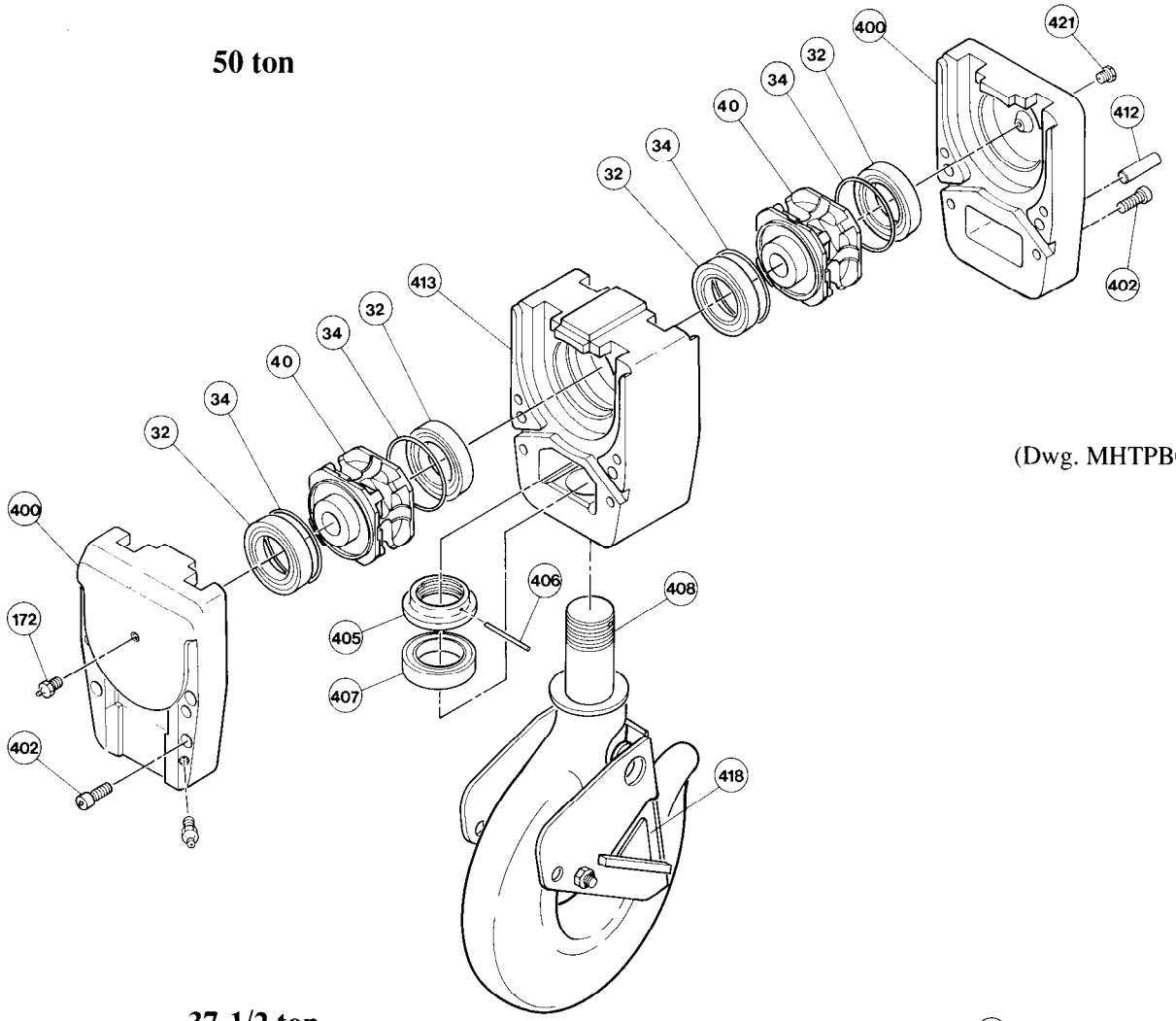
POWER HEAD PISTON MOTOR ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
450	Motor Assembly (Incl's items 55, 166 and 452 thru 482)	1	50259-2
55	Capscrew	20	50871
166	Capscrew	1	51712
• 452	**Copper Washer**	**20**	**94-027-20**
453	Cylinder	5	94-024
454	Compression Ring	5	Order Kit 94-RS
455	Piston Assembly (Incl's items 454, 457 and 458)	5	94-010A
456	Plug	10	Order 94-011-1A (item 457)
457	Wrist Pin Assembly (Incl's item 456)	5	94-011-1A
• 458	**Oil Ring**	**5**	**Order Kit 94-RS**
459	Connecting Rod	5	94-009
• 460	**Gasket**	**5**	**94-025-5**
462	Vent Cap Assembly	1	94-018
463	Motor Housing	1	Not Sold Separately
464	Pipe Plug	2	94-015
465	Bearing	2	50944
• 466	**Rotary Bushing**	**1**	**20-2**
• 467	**Rotary Valve**	**1**	**94-019**
468	Capscrew	5	51766
• 470	**Gasket**	**1**	**94-029**
473	Crank Shaft Assembly	1	94-001
474	Connecting Rod Ring	2	94-008
475	Sleeve	1	94-007
476	Bushing	1	94-006
478	Setscrew	1	94-005
479	Pin	1	94-004
482	Lockwasher	6	50200
	Repair Kit (incl's items 452, 454, 458, 460 and 470)	As Req'd	71032932

• Recommended Spare

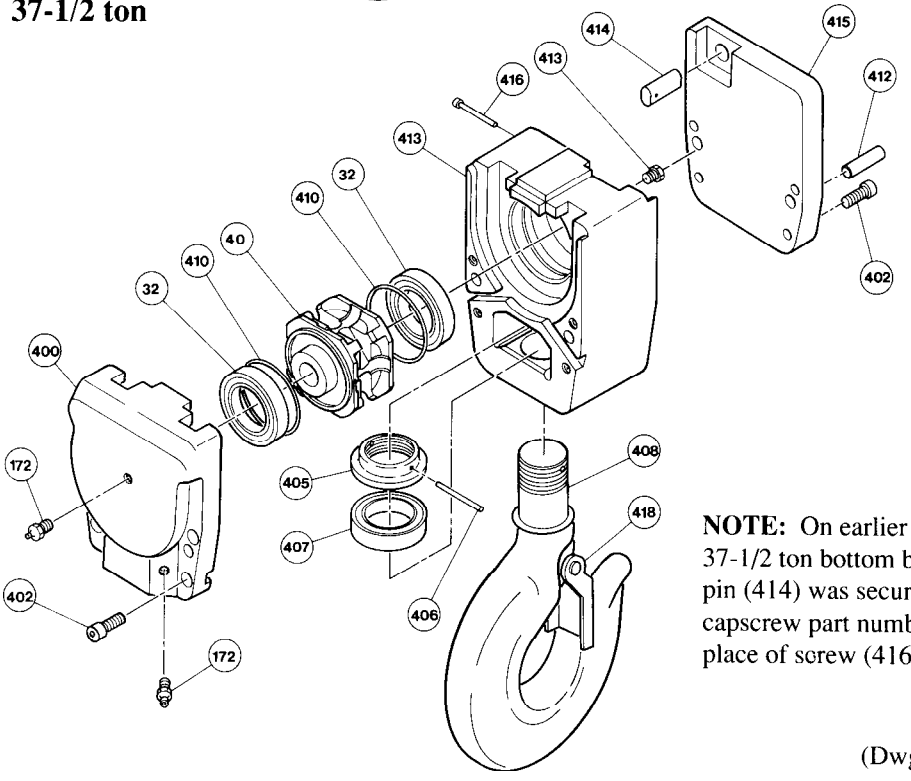
BOTTOM BLOCK ASSEMBLY PARTS DRAWINGS

50 ton



(Dwg. MHTPB0317)

37-1/2 ton



NOTE: On earlier designs of the 37-1/2 ton bottom block assembly, pin (414) was secured with a capscrew part number 51494 in place of screw (416).

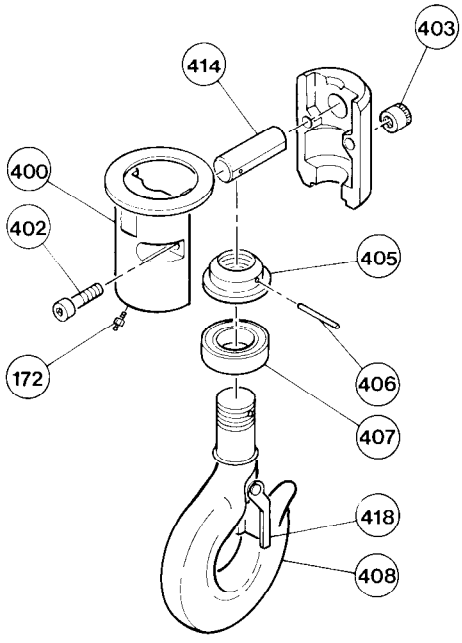
(Dwg. MHTPB0316)

BOTTOM BLOCK ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.			
			12.5 ton	25 ton	37.5 ton	50 ton
70	Bottom Block Assy	1	16998	12004	12928	14771
	Bottom Block Assy (Copper Plate)		Contact Factory	12004-2	Contact Factory	
• 32	Bearing	2	---	54483		
• 34	Quad Seal	See ( )	---	71007405 (2)	---	71007405 (8)
40	Sheave	See ( )	---	11979 (1)		11979 (2)
172	Grease Fitting	See ( )	53095 (1)	53095 (4)	53095 (2)	53095 (3)
400	Side Block	See ( )	19794	12014 (2)	12268 (1)	12267 (2)
402	Capscrew	See ( )	54660 (2)	71069524 (4)	71029524 (8)	
403	Nut	See ( )	54661 (2)	51752 (4)	---	---
405	Nut	1	8476	8316	8516	
406	Pin	1	50960	50958	50974	
• 407	Bearing	1	50144	50394	50331	
408	Hook (Incl's item 418)	1	8474-3	11030	8414-3	8515-2
	Hook Copper Plate (Incl's item 418)		Contact Factory	18479	Contact Factory	
• 410	'O' Ring	2	---		52674	---
412	Pin	See ( )	---	54205 (2)	54205 (4)	
413	Hook Center Block	1	---	---	13000	12264
414	Pin	1	13050	---	13050	---
415	Side Plate	1	---	---	12999	---
416	Screw	1	---	---	71070924	---
418	Hook Latch Kit	1	50597	52173	51237	50230
421	Breather	1	---	52024		

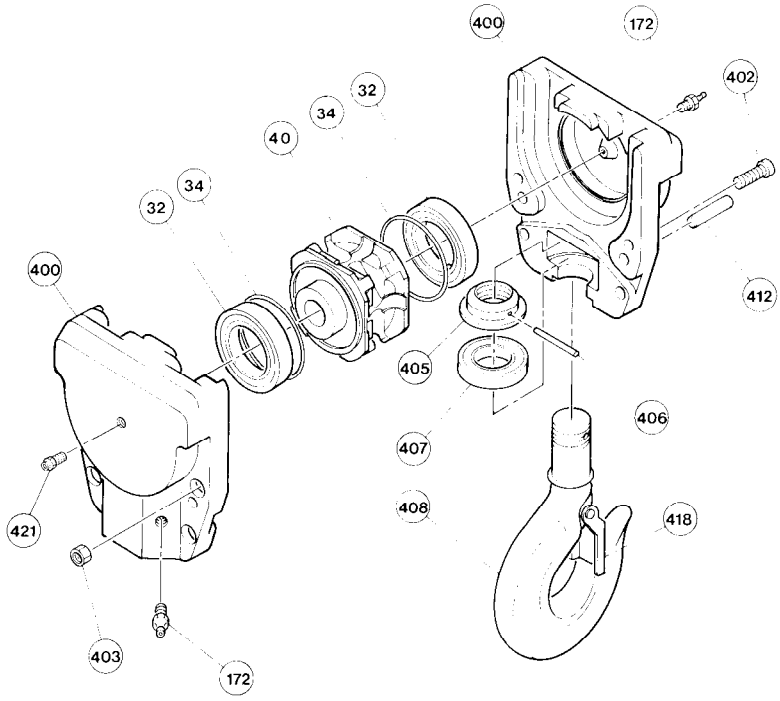
• Recommended Spare

12-1/2 ton



(Dwg. MHTPB0314)

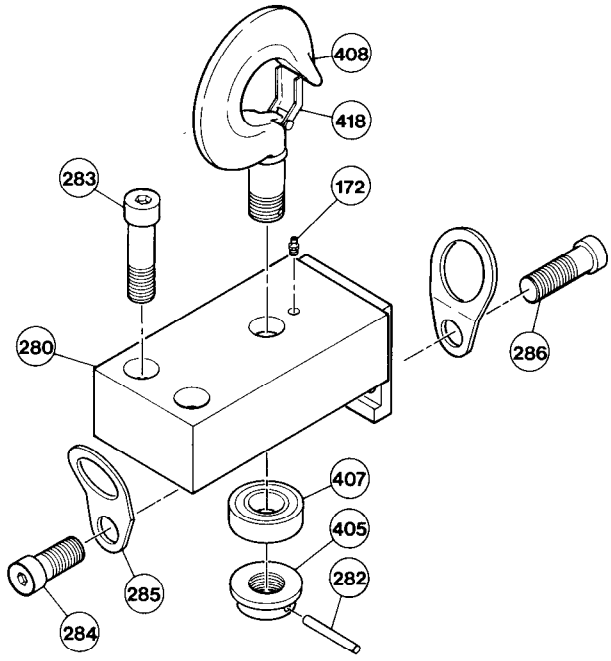
25 ton



(Dwg. MHTPB0315)

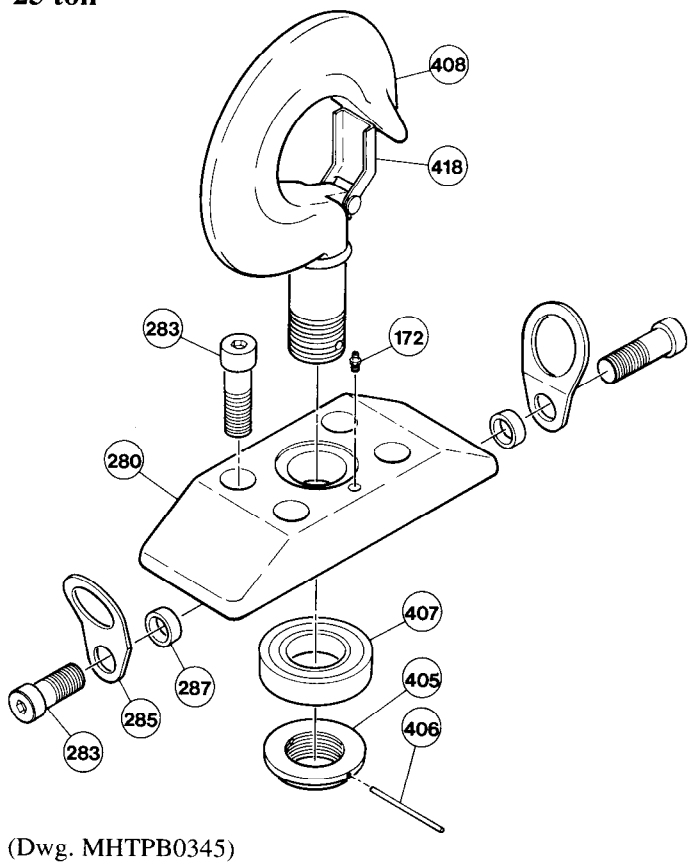
TOP HOOK ASSEMBLY PARTS DRAWINGS

12-1/2 ton



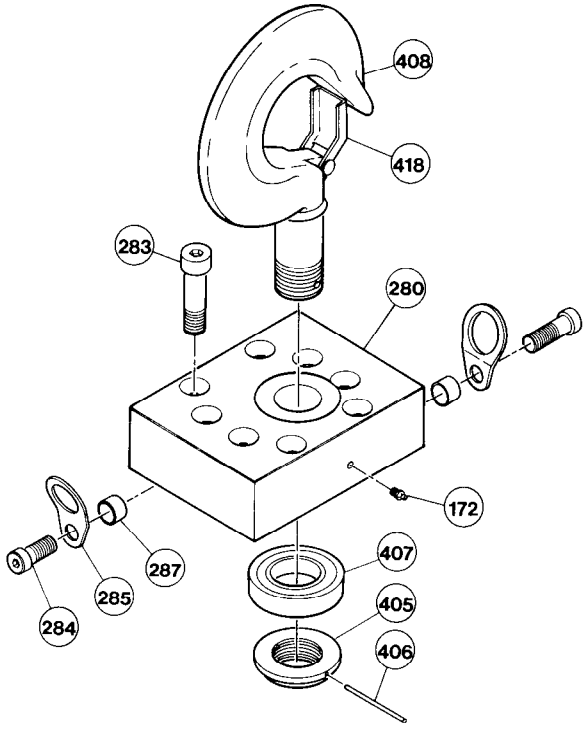
(Dwg. MHTPB0344)

25 ton



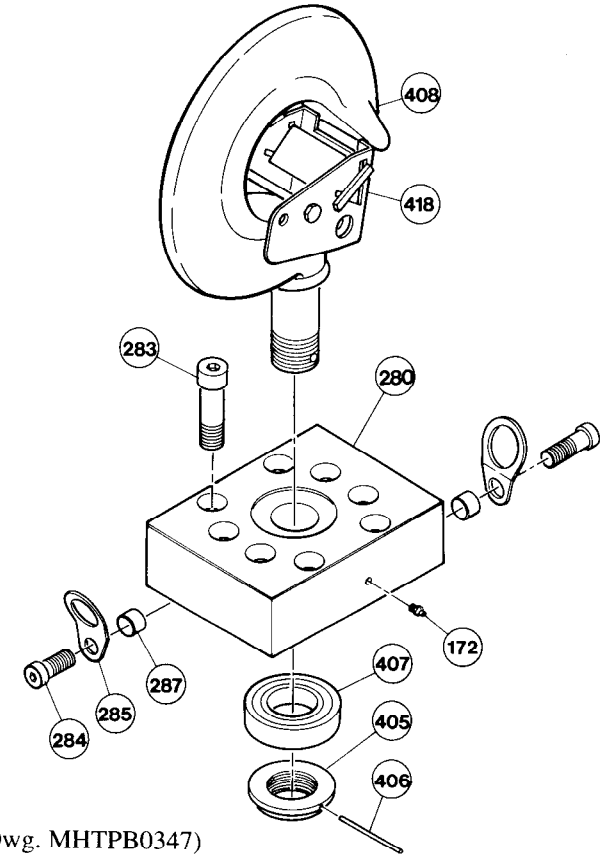
(Dwg. MHTPB0345)

37-1/2 ton



(Dwg. MHTPB0346)

50 ton

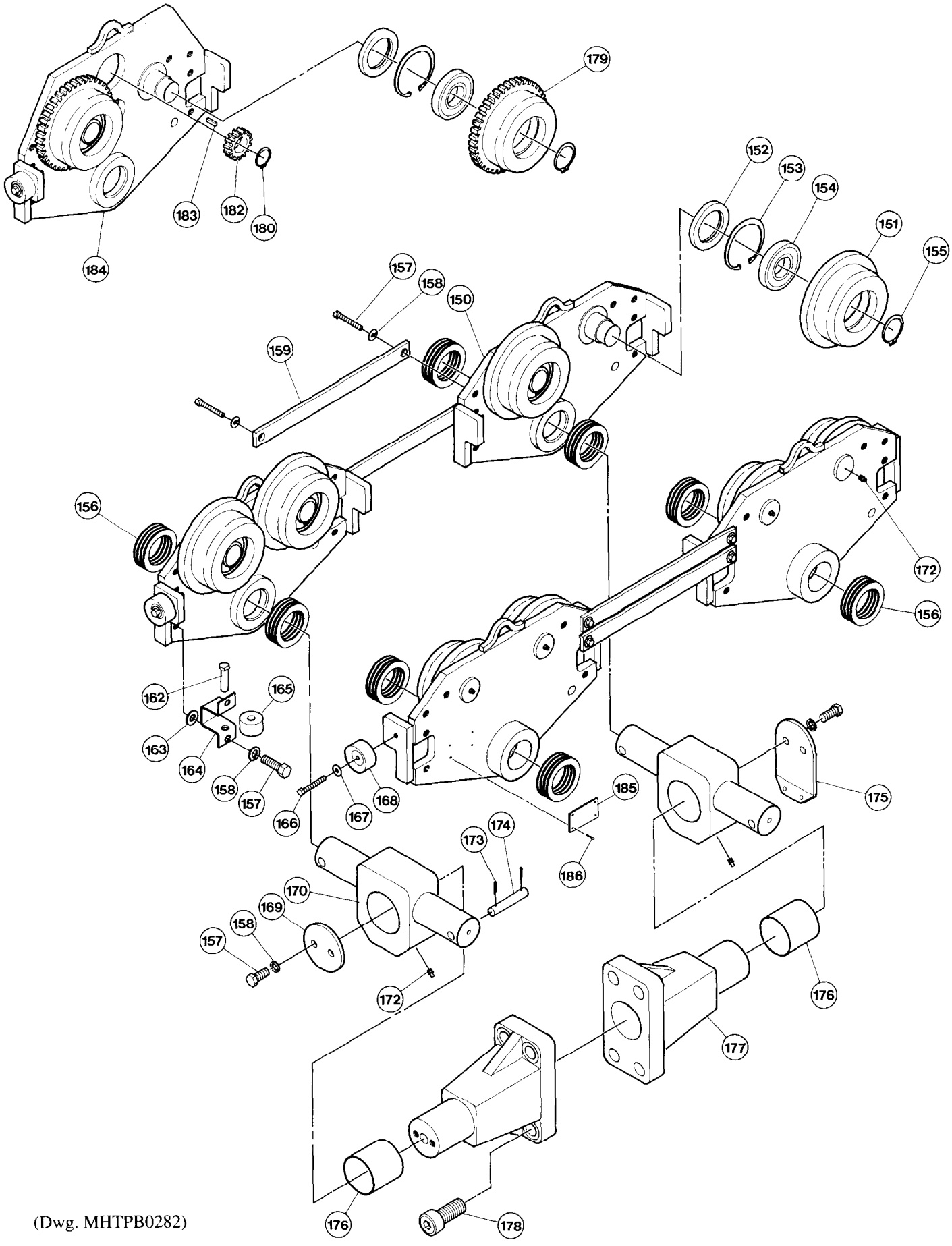


(Dwg. MHTPB0347)

TOP HOOK ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.			
			12.5 ton	25 ton	37.5 ton	50 ton
149	Top Hook Assembly	1	20789	16143	16146	16297
172	Grease Fitting	1	53095			
280	Hook Plate	1	17897	12058	14768	14773
282	Pin	1	50917	---		
283	Capscrew	See ( )	55006 (2)	52706 (6)	54322 (8)	
284	Capscrew	See ( )	54727 (1)	---	54546 (2)	
285	Lifting Eye	2	9575F			
286	Capscrew	2	55076	---		
287	Spacer	2	---	16755-4		
405	Nut	1	8476	8316	8516	
406	Pin	1	---	50958	50974	
407	Bearing	1	50144	50394	50331	
408	Hook (Incl's item 418)	1	8474-3	11030	8414-3	8515-2
	Hook Copper Plate (Incl's item 418)		Contact Factory	18479	Contact Factory	
418	Hook Latch Kit	1	50597	52173	51237	50230

TROLLEY ASSEMBLY PARTS DRAWING



(Dwg. MHTPB0282)

TROLLEY ASSEMBLY PARTS LIST

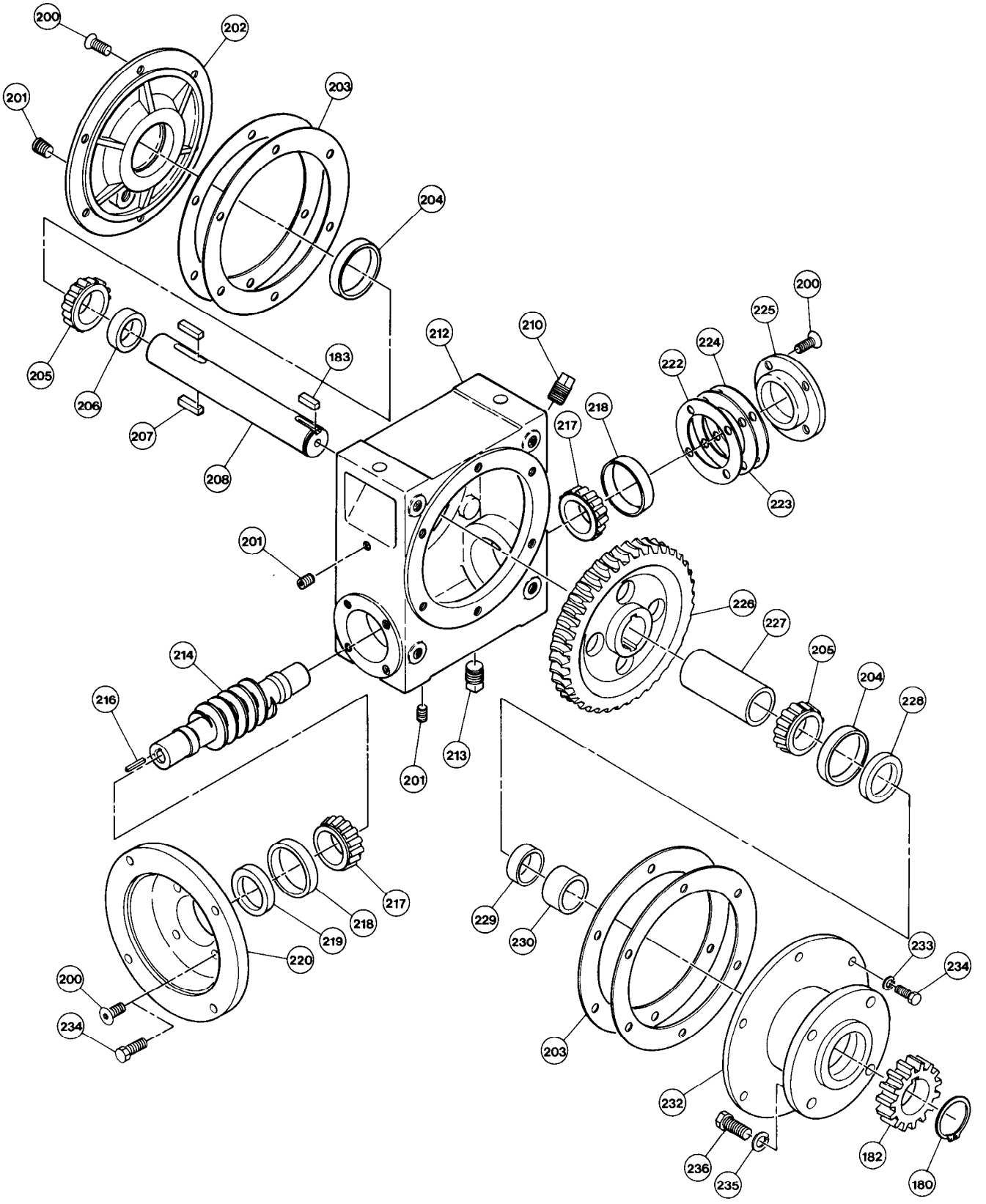
ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	Part No.		
			25 ton	37.5 ton	50 ton
150	Side Plate (Plain) Right Hand	See ( )	8326 (3)	17525 (2)	16760 (2)
	Side Plate (Plain) Left Hand		---	17527 (1)	16240 (1)
151	Wheel (Plain)	8*	8212	8402	
	Wheel (Copper Plate)		18485	Contact Factory	
	Wheel (Zinc Plate)		18486	Contact Factory	
• 152	Oil Seal	8	50539	50540	
153	Retainer Ring	8	51069	51045	
• 154	Bearing	8	51066	50455	
155	Retainer Ring	8	51070	51046	
156	Spacer	See ( )	8424-2 (32)	8424 (20)	
157	Capscrew	20	51067		50961
158	Lockwasher	20	50203		
159	Connecting Plate	See ( )	8329-12 (4)	16402-1 (2)	
162	Pin	4	Order Kit 70703	8218	70709
163	Spacer	See ( )	51068 (16)	8439 (8)	
164	Guide Roller Holder	4	Order Kit 70703	8217	8217-2
165	Guide Roller	4	Order Kit 70703	50438	70712
166	Capscrew	4	51712	52008	
167	Washer	4	50177	50182	
168	Bumper	4	51722	71756	
169	Cap	1	16185	16188	
170	Suspension Yoke (6-8 in. Std.)	2	16184	Contact Factory	
	Suspension Yoke (8-10 in.)		18815	18026	16166
	Suspension Yoke (11-12-1/2 in.)		Contact Factory	16639	
172	Grease Fitting	10	51058	53095	
173	Cotter Pin	8	51996	54447	
174	Pin	4	16291	16292	
175	Bracket	1	16186	17706	
• 176	Bushing	2	16187	16190	
177	Bracket	2	11852	17133	11854
178	Capscrew	See ( )	54319 (8)	54207 (16)	
179	Geared Wheel (Plain)	2	8234	8403	
	Geared Wheel (Copper Plate)		18483	Contact Factory	
	Geared Wheel (Zinc Plate)		18484	Contact Factory	
180	Retainer Ring (Piston Motor)	1	52645		
	Retainer Ring (Vane Motor)		51192		
182	Drive Gear	1	17690		
183	Key	1	19523-100		
184	Side Plate (Geared)	1	8327	17528	16650
185	Nameplate	1	71070098		
186	Drive Screw	4	50915		

• Recommended Spare

* Geared trolleys require quantity (6) plain wheels

12-1/2 ton trolley is not shown. Contact Ingersoll-Rand Technical Support Dept. for additional information.

TROLLEY DRIVE ASSEMBLY PARTS DRAWING



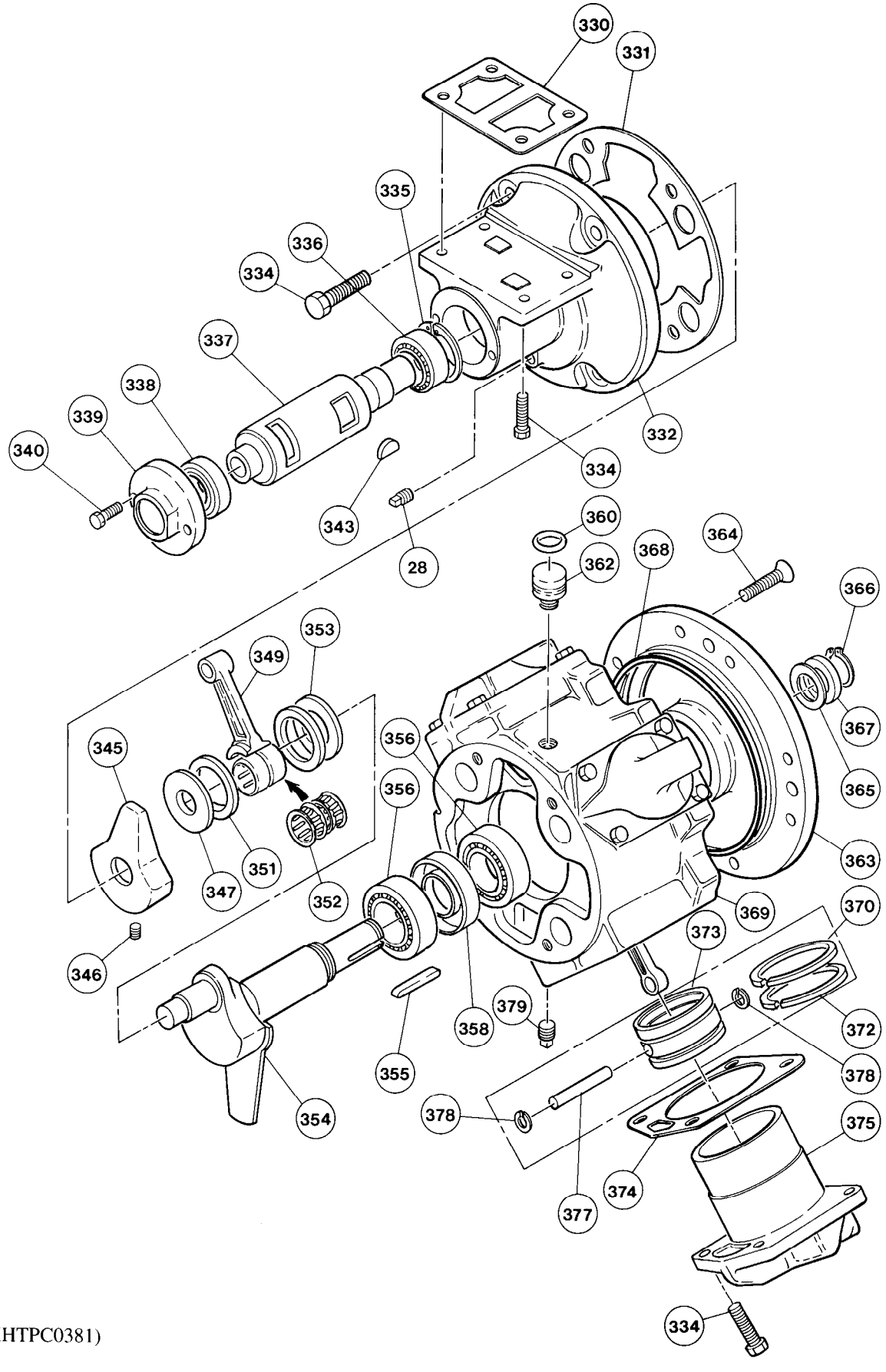
(Dwg. MHTPC0306)

TROLLEY DRIVE ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.	
			PISTON MOTOR	VANE MOTOR
180	Retainer Ring	1	52645	51192
182	Drive Gear	1	17690	
183	Key	1	19523-100	
200	Screw	14	51596	
201	Pipe Plug	3	51599	
202	Cover	1	3117	
• 203	**Gasket (set)**	2 (sets)	**3118**	
204	Bearing (Cup)	2	Order Bearing Assembly 71073407	
205	Bearing (Cone)			
206	Spacer	1	4147	
207	Key	2	3667	
208	Shaft	1	3112-2B	
210	Pipe Plug (vented)	1	51803	
212	Housing	1	B-5060	
213	Pipe Plug	1	51600	
214	Worm	1	11291	3829
216	Key	1	7285-41	
217	Bearing (Cone)	2	Order Bearing Assembly 71073415	
218	Bearing (Cup)			
• 219	**Oil Seal**	2	**51283**	
220	Motor Adapter	2	11252	6553
222	Shim 0.007 in. (0.178 mm)	3	Order Shim Kit 6550-50	
223	Shim 0.005 in. (0.127 mm)	3		
224	Shim 0.020 in. (0.508 mm)	1		
225	Cover	1	3115	
226	Worm Gear	1	3830	
227	Spacer	1	4147-1	
• 228	**Oil Seal**	1	**51578**	
229	Sleeve	1	3114	
230	Spacer	1	4147-10	
232	Reducer Adapter	1	8333-2	
233	Lockwasher	6	51486	
234	Capscrew	See ( )	51597 (6)	51597 (10)
235	Lockwasher	4	50201	
236	Capscrew	4	50827	

• Recommended spare

TROLLEY DRIVE PISTON MOTOR ASSEMBLY PARTS DRAWING



(Dwg. MHTPC0381)

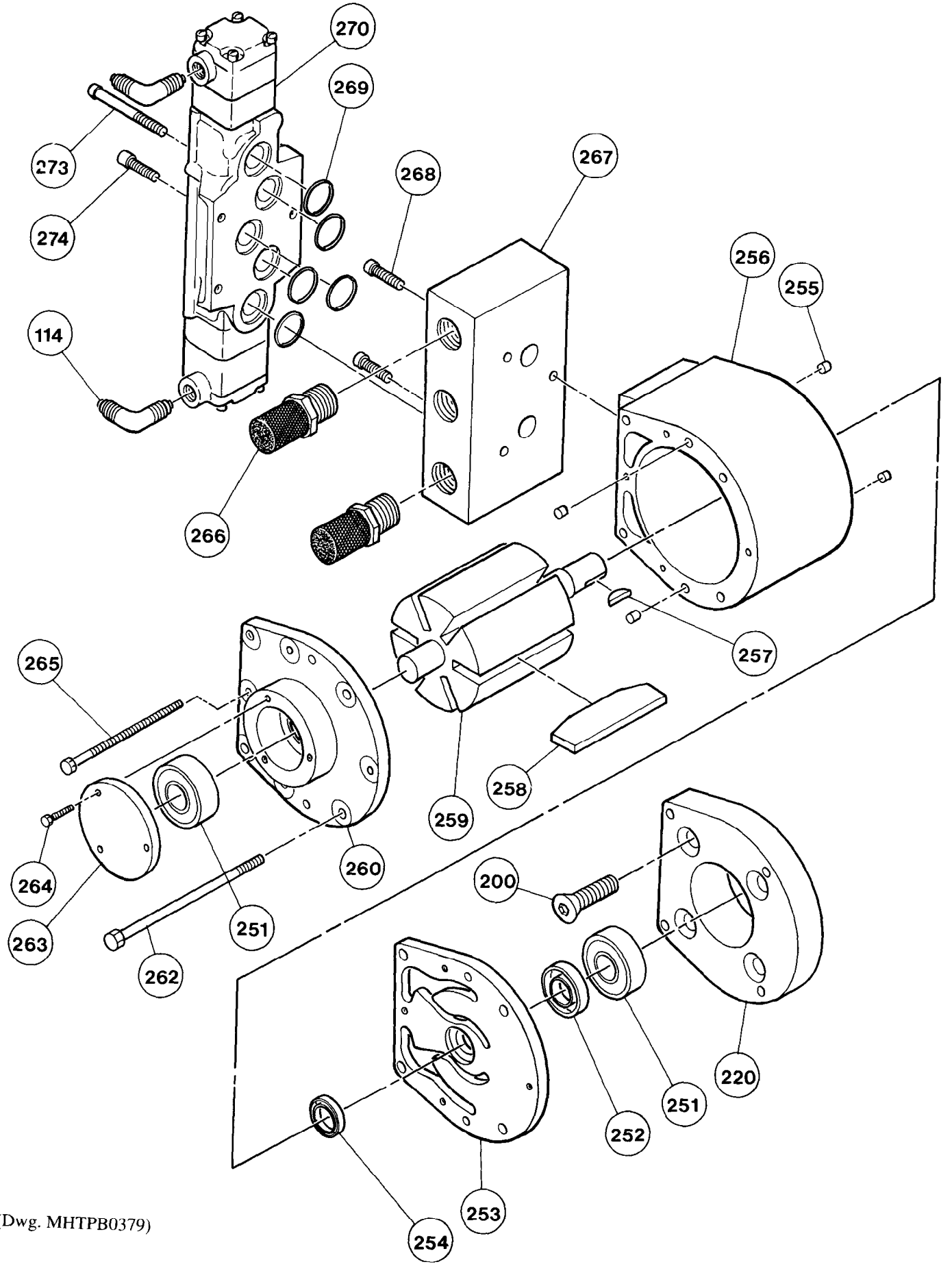
TROLLEY DRIVE PISTON MOTOR ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
329	Motor Assembly (Incl's items 330 thru 379)	1	52151
28	Pipe Plug (steel)	1	54658
	Pipe Plug (brass)		71112247
• 330	Gasket	1	71018386
• 331	Gasket	1	71018394
332	Rotary Valve Housing	1	71028252
334	Capscrew	24	71030084
335	Retainer Ring	1	71028328
• 336	Bearing	1	71028310
337	Rotary Valve	1	71028245
• 338	Bearing	1	71028237
339	Cover	1	71029854
340	Capscrew	2	71030134
343	Key	1	71030068
345	Balance Weight	1	71030043
346	Setscrew	1	71030209
347	Spacer 0.060 in. (1.5 mm)	1	71029979
	Spacer 0.010 in. (0.25 mm)	2	71029995
	Spacer 0.075 in. (1.9 mm)		71030001
	Spacer 0.105 in. (2.7 mm)		71030027
349	Connecting Rod	4	71029896
351	Ring	2	71029946
• 352	Bearing	1	71030183

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
353	Spacer	1	71029573
354	Crankshaft	1	71029664
355	Key	1	71030225
• 356	Bearing	2	71029904
• 358	Seal	1	71018444
360	'O' Ring (Shipping Only)	1	71030167
362	Breather Plug	1	71030175
363	Flange Plate	1	71029680
364	Screw	4	71029870
365	Shim	5	71029631
366	Retainer Ring	1	71029599
367	Spacer	1	71029615
• 368	'O' Ring	1	71029706
369	Motor Housing	1	Order item 329
• 370	Oil Ring	4	71018428
• 372	Compression Ring	4	71018410
373	Piston Assembly (Incl's items 370, 372, 377 and 378)	4	71029557
• 374	Gasket	4	71018402
375	Cylinder	4	71028336
377	Wrist Pin	4	Order item 373
378	Retainer Ring	8	Order item 373
379	Pipe Plug	1	
---	Repair Kit (incl's items 330, 331, 358, 368, 370, 372 and 374)	As Req'd	71028120

• Recommended Spare

TROLLEY DRIVE VANE MOTOR ASSEMBLY PARTS DRAWING



(Dwg. MHTPB0379)

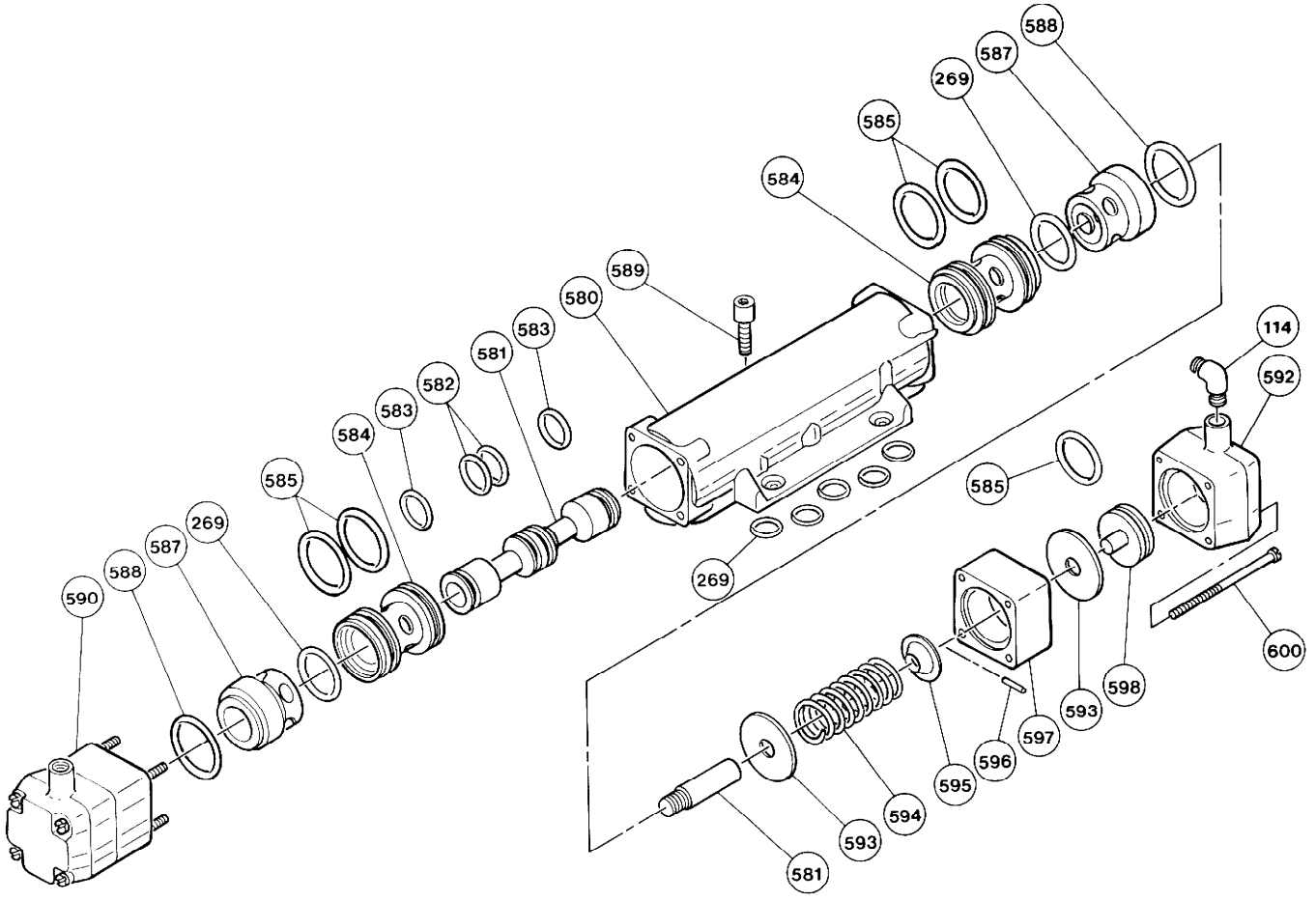
TROLLEY DRIVE VANE MOTOR ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
199	Motor Assembly (Incl's items 251 thru 265)	1	4864
114	Fitting	2	51281
200	Screw	2	51596
220	Motor Adapter	1	6553
• 251	Bearing	2	51074
• 252	Seal	1	50840
253	Cover	1	6554
• 254	Seal	1	51591
255	Dowel	4	51084
256	Cylinder	1	3131
257	Shaft Key	1	50273
• 258	Vane	6	4335-6
259	Shaft and Rotor	1	4333-A
260	Cover	1	3761
262	Capscrew	4	51080
263	Cap	1	4334
264	Capscrew	3	51081
265	Capscrew	4	51078
266	Muffler	2	50593
267	Valve Manifold	1	8466
268	Capscrew	2	51095
• 269	'O' Ring	5	P-1100-13
270	Pilot Control Valve	1	50431
273	Capscrew	1	51079
274	Capscrew	2	
---	Repair Kit (Incl's items 251, 252, 254, 258, 262, 264 and 265)	As Req'd	1000P60-VMK

• Recommended Spare

The vane motor is an optional component which can be used in place of the standard piston motor (329)

VANE MOTOR VALVE ASSEMBLY DRAWING AND PARTS LIST



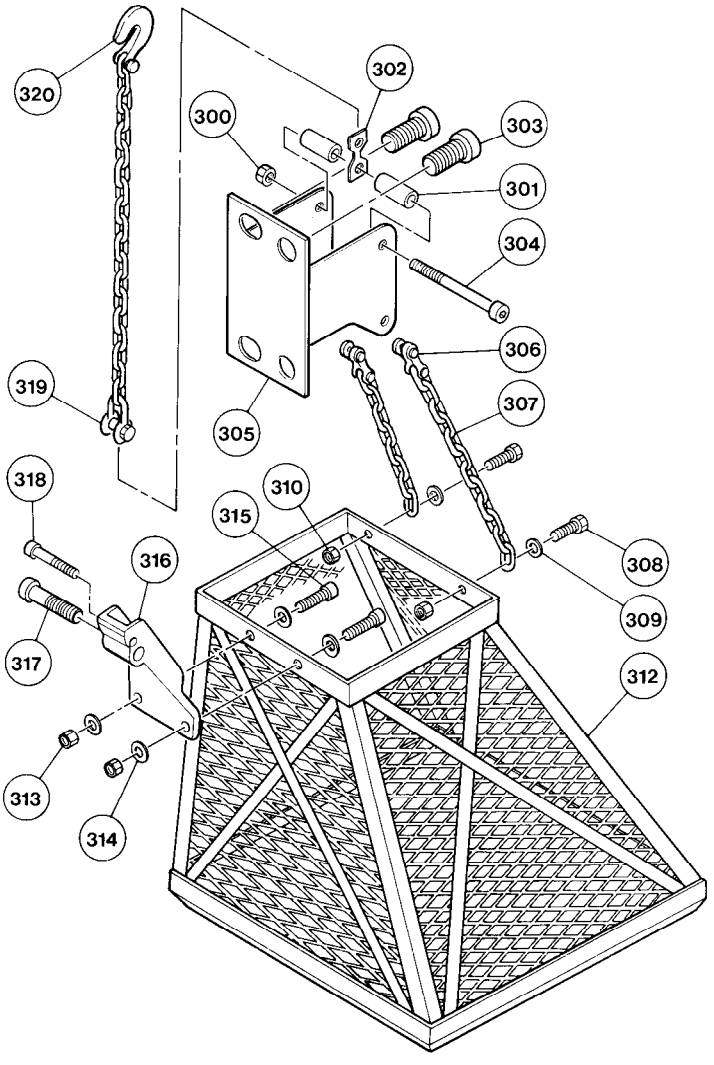
(Dwg. MHTPB0407)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
270	Pilot Control Valve (Incl's items 114, 269 and 580 thru 600)	1	50431
114	Fitting	2	51281
• 269	'O' Ring	7	P-1100-13
580	Body	1	Order item 270
581	Plunger	1	71060198
• 582	'O' Ring	2	P-1100-10
• 583	'O' Ring	2	P-1000-10
584	Bushing	2	4502-04
• 585	'O' Ring	6	P-1000-17
587	Retainer	2	4502-43
• 588	'O' Ring	2	P-1000-19
589	Capscrew	1	8325-93

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
590	Spring Center Cap Assembly	1	SA-4302-83
592	Pilot Cap	2	4302-11
593	Washer	4	4302-02
594	Spring	2	71060206
595	Spring Cap	2	4302-14
596	Pin	2	4302-22
597	Pilot Spacer	2	4302-32
598	Piston	2	4302-38
600	Screw	8	PFS-1032-36

• Recommended spare

CHAIN BUCKET ASSEMBLY DRAWING AND PARTS LIST



(Dwg. MHTPA0358)

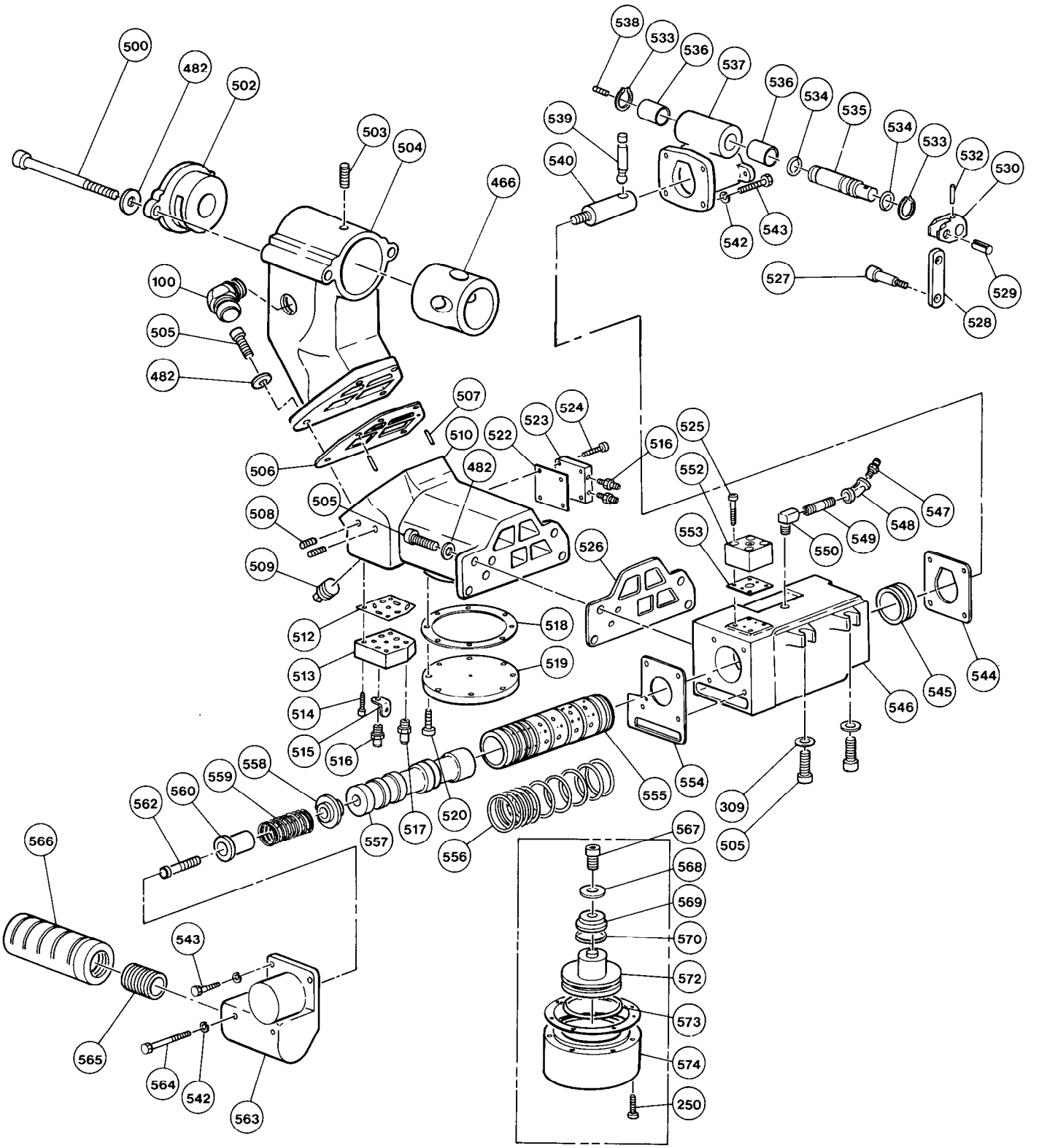
ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
300	Nut	1	51750
301	Spacer (12-1/2 t)	2	71020150
	Spacer (25 t)	3	
	Spacer (37-1/2 & 50 t)	4	
302	Tension Link	See Note	21620
303	Capscrew	2	54727
304	Capscrew	1	71098073
305	Bracket	1	21619
306	Clevis	2	54645
307	Chain	Specify Length	50962
308	Capscrew	2	50847

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
309	Washer	2	51833
310	Nut	2	50170
312	Chain Bucket	1	20512-*
313	Nut	2	71061584
314	Washer	4	54650
315	Capscrew	2	54240
316	Chain Guide	1	17575
317	Capscrew	1	54202
318	Capscrew	1	54866
319	Shackle	1	71098099
320	Hook	1	71098081

* Specify load chain length

Note: 12-1/2 t hoists require qty. 2, 25 t hoists require qty. 3, 37-1/2 and 50 t hoists require qty. 4

VALVE ASSEMBLY PARTS DRAWING



(Dwg. MHTPC0382)

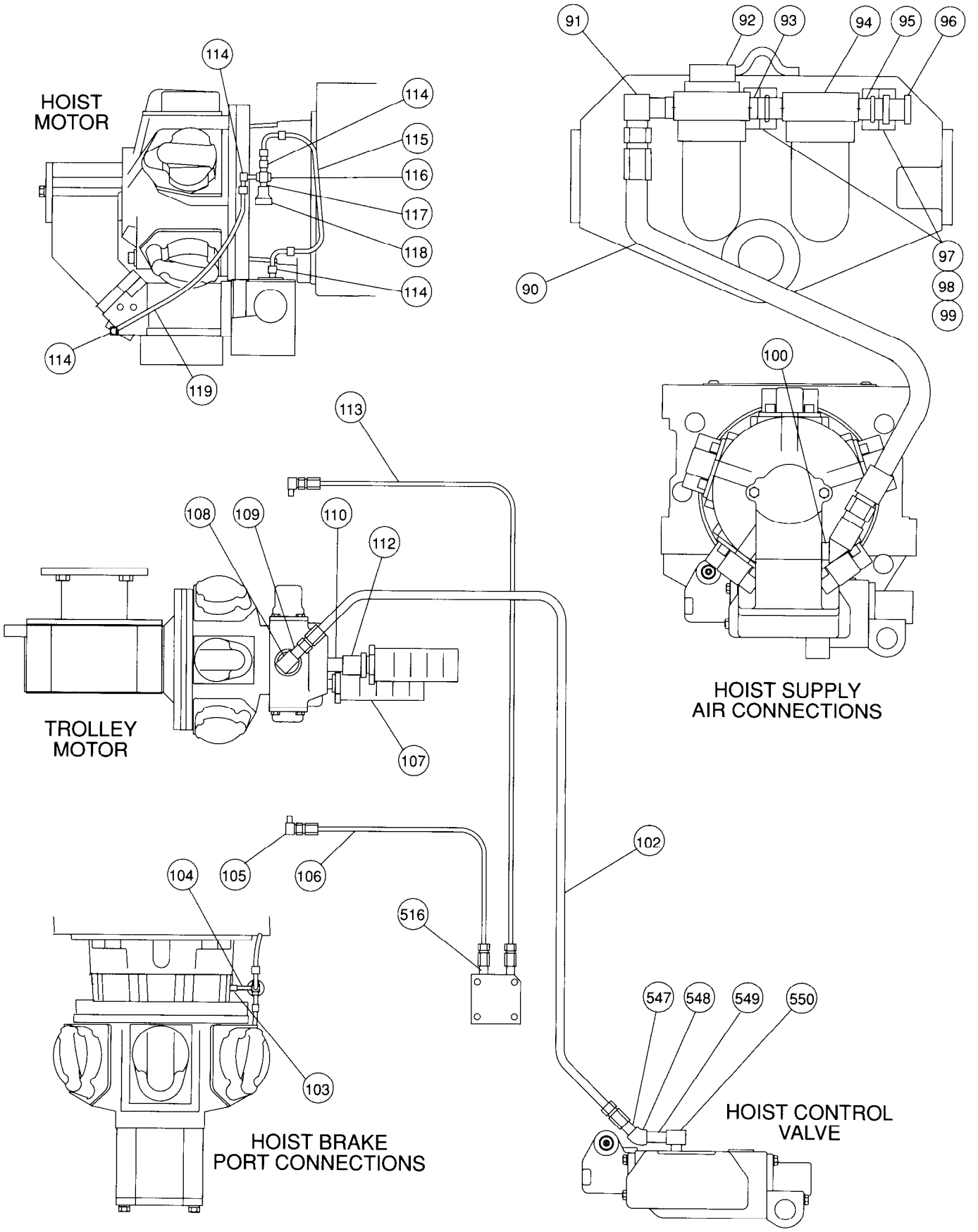
VALVE ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
100	Fitting, Elbow	1	53030
250	Capscrew	8	51095
309	Washer	2	51833
• 466	Rotary Bushing	1	20-2
482	Washer	1	50200
500	Capscrew	2	53840
502	Valve Cap	1	15031
503	Screw	1	51087
504	Manifold	1	Order B100-64
505	Capscrew	10	71030787
• 506	Gasket	1	15037B
507	Dowel	2	71053771
508	Pipe Plug	4	54247
509	Pipe Plug	1	52304
510	Manifold	1	Order B100-64
• 512	Gasket	1	9853
513	Block	1	9426
514	Capscrew	4	51939
515	Bracket	1	8909
516	Fitting	4	52092
517	Fitting	4	18647
• 518	Gasket	1	9857
519	Plate	1	20250
520	Capscrew	8	71069025
• 522	Gasket	1	9856
523	Manifold (Trolley)	1	9439
524	Capscrew	4	51976
525	Capscrew	4	50898
• 526	Gasket	1	9855
527	Shoulder Bolt	1	71085179
528	Link	1	21289
529	Pin	1	51974
530	Clevis	1	11220
532	Pin	1	53909
533	Retainer Ring	2	52663
• 534	'O' Ring	2	52662

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
535	Shaft	1	11769
• 536	Bushing	2	50498
537	Cap (Incl's item 536)	1	11763
538	Setscrew		53843
539	Link	1	11768
540	Push Rod	1	11767
542	Lockwasher	8	51023
543	Capscrew	6	52303
• 544	Gasket	1	12023
545	Spacer	1	12022
546	Housing	1	11962
547	Fitting	1	54623
548	Fitting	1	54624
549	Fitting	1	52809
550	Fitting	1	54611
552	Manifold (Brake)	1	13372
• 553	Gasket	1	13373
• 554	Gasket	1	12024
555	Sleeve	1	12016
• 556	'O' Ring	10	51553
557	Spool	1	12017
558	Stop	1	12019
• 559	Spring	1	71798
560	Spring Holder	1	12018
562	Capscrew	1	53845
563	End Cap	1	11981
564	Capscrew	2	53844
565	Pipe Nipple	1	51704
566	Muffler	1	52465
567	Capscrew	1	50156
568	Washer	1	9438-B
569	Piston Spacer	1	9438-A
• 570	'O' Ring	1	51554
572	Piston	1	9403
• 573	'O' Ring	1	51555
574	Housing	1	10063

• Recommended Spare

PIPING ASSEMBLY PARTS DRAWING



(Dwg. MHTPA0373)

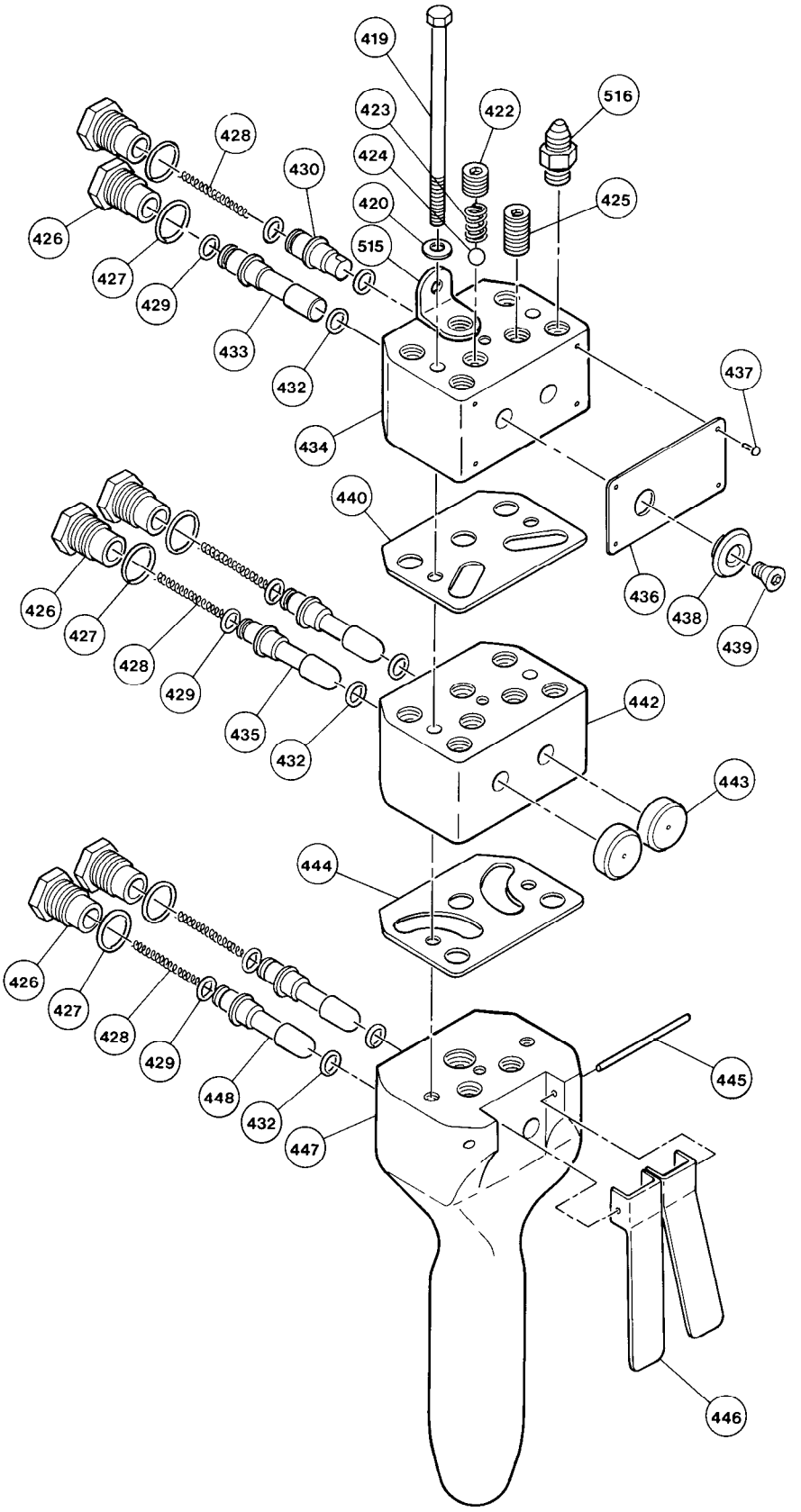
PIPING ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.	
			Hook Mount Hoist	Trolley Mount Hoist
90	Hose Assembly	1	---	17550-1
91	Fitting, Elbow	1	54244	54259
92	Lubricator (optional)	1	L30-08-000	
93	Fitting	1	53029	51018
94	Filter (optional)	1	F30-08-000	
95	Fitting, Nipple	See ( )	71077093 (2)	54267 (1)
96	Fitting, Coupling	1	52318	
97	U-Bolt	See ( )	51681 (1)	51681 (2)
98	Bracket	See ( )	14878 (1)	8551-5 (2)
99	Capscrew	See ( )	54243 (2)	50856 (1)
100	Fitting, Elbow	1	---	53030
102	Hose Assembly	1	---	17549-1
103	Fitting	1	54870	
104	Fitting, Nipple	1	54242	
105	Fitting, Elbow	2	---	52182
106	Hose Assembly	1	---	17073-3
107	Muffler	2	---	52104
108	Fitting, Elbow	1	---	53936
109	Fitting	1	---	54127
110	Fitting, Nipple	1	---	51057
112	Fittting, Reducer	1	---	54878
113	Hose Assembly	1	---	17073-4
114	Fitting, Elbow	4	51281	
115	Hose Assembly	1	17073-1	
• 116	Valve	2	51756	
117	Fitting, Nipple	1	52191	
• 118	Dump Valve	1	50275	
119	Hose Assembly	1	17073-2	
516	Fitting	2	---	52092
547	Fitting	1	---	54623
548	Fitting	1	---	54624
549	Fitting	1	---	52809
550	Fitting, Elbow	1	---	54611
*	Fitting	1	50933	---

* Not shown on drawing

• Recommended Spare

PENDANT ASSEMBLY PARTS DRAWING



(Dwg. MHTPA0396)

PENDANT ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.			
			2 Button	4 Button	2 Button w/emer off	4 Button w/emer off
417	Pendant Assembly (Standard)	1	---	51412	18952	18956
	Pendant Assembly Marine (Anodized)		21685	19755	15003-1	15002-1
419	Capscrew	2	---	51675		51679
420	Washer	2	---	51676		
422	Screw	1	---		51674	
• 423	Spring	1	---		51414	
424	Ball	1	---		51552	
425	Pipe Plug	1	51677			
426	Cap	See ( )	9486 (2)	9486 (4)		9486 (6)
• 427	'O' Ring	See ( )	51233 (2)	51233 (4)		51233 (6)
• 428	Spring	See ( )	51235 (2)	51235 (4)	51235 (3)	51235 (5)
• 429	'O' Ring	See ( )	50846 (2)	50846 (4)		50846 (6)
430	Spool (Emergency Off)	1	---		9071-4	
• 432	'O' Ring	See ( )	51234 (2)	51234 (4)		51234 (6)
433	Spool (Emergency Off)	1	---		9071-2	
434	Block (Emergency Off)	1	---		9984	
435	Spool (Trolley)	2	---	9071-3	---	9071-3
436	Nameplate	1	---		9436	
437	Drive Screw	4	---		51673	
438	Emergency Off Button	1	---		9414	
439	Capscrew	1	---		51672	
• 440	Gasket	1	---		9854	
442	Block (Trolley)	1	---	51678	---	51678
443	Button (Trolley)	2	---	9414-1	---	9414-1
• 444	Gasket	1	---	9852	---	9852
445	Pin	1	51671			
446	Lever	2	51413			
447	Pendant Handle	1	Order Pendant Assembly item 417		52481	
448	Spool (Hoist)	2	9071-1			
515	Bracket	1	8909			
516	Fitting	See ( )	52092 (4)	52092 (5)	52092 (4)	52092 (6)

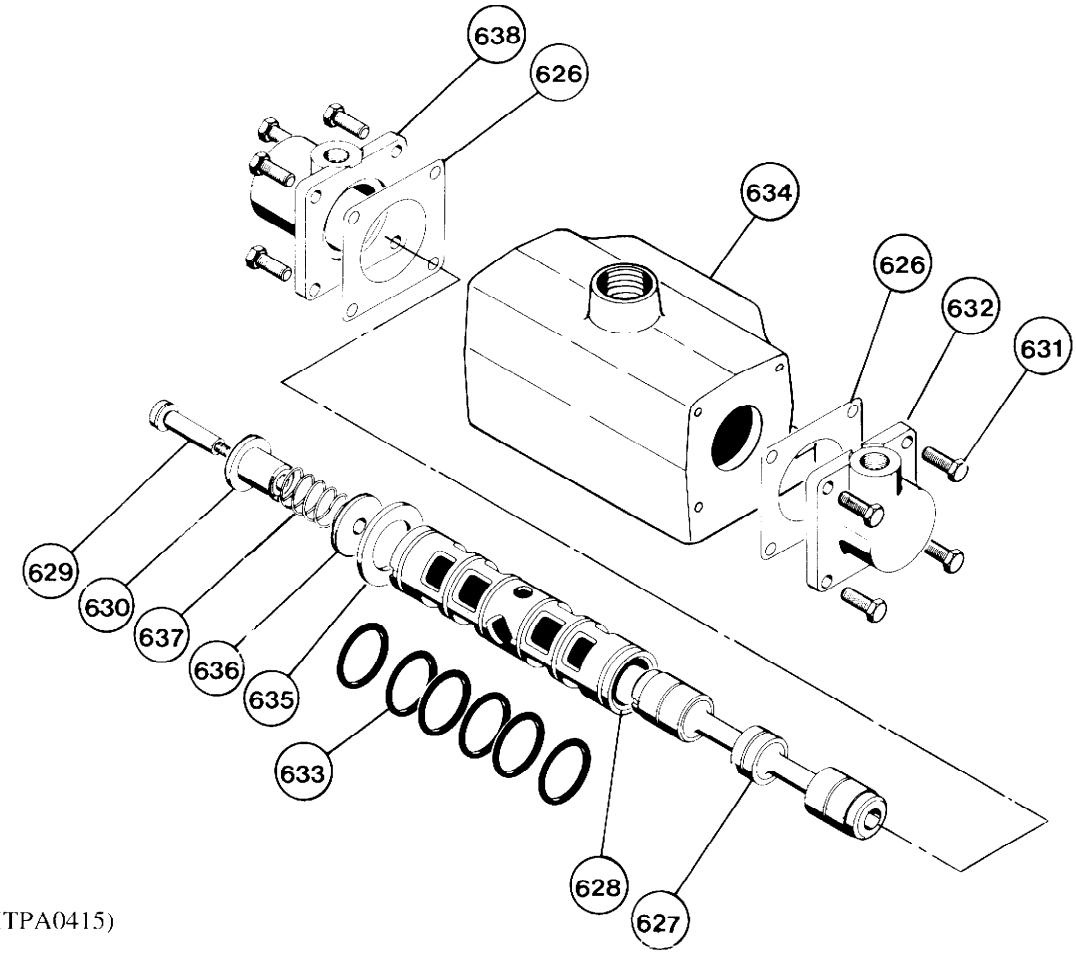
• Recommended Spare

2 Button Pendant provides hoist control only

4 Button Pendant provides hoist and trolley control only

Emergency Off feature can be used with the 2 button or 4 button pendant

TROLLEY PISTON MOTOR VALVE ASSEMBLY DRAWING AND PARTS LIST



(Dwg. MHTPA0415)

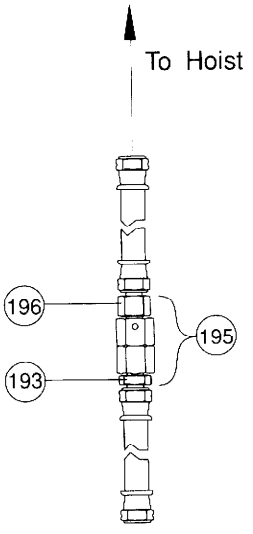
ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
625	Valve Assembly (Incl's items 626 thru 638)	1	51700
• 626	End Cap Gasket	2	51978
627	Valve Spool	1	Order Complete Valve Assembly item 625
628	Valve Sleeve	1	
629	Shoulder Screw	1	9640-4
630	Centering Shaft Guide	1	9640-5
631	Bolt	8	9640-6
632	End Cap	1	9640-7
• 633	'O' Ring	6	51632
634	Valve Body	1	Order Complete Valve Assembly item 625
635	Spacer	1	9640-10
636	Washer	1	9640-11
637	Spring	1	54925
638	End Cap	1	9640-13

• Recommended Spare

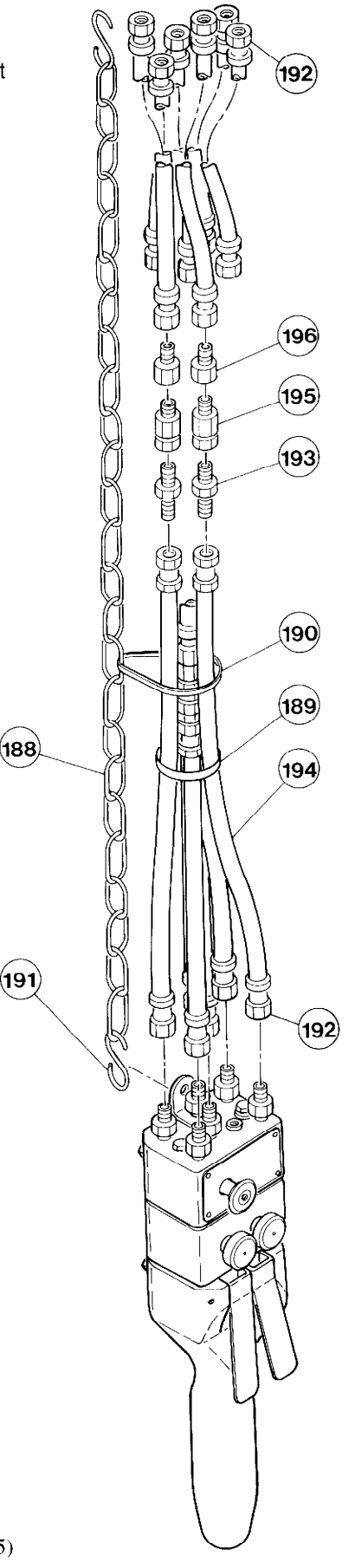
HOSE ASSEMBLY DRAWING AND PARTS LIST

ITEM NO.	DESCRIPTION OF PARTS	QTY TOTAL	PART NUMBER
*	Hose Assembly	*	See Hose Assembly Chart
188	Chain, Zinc Plated	As Req'd	50041
189	Tie Wrap	As Req'd	54235
190	Attachment Ring	As Req'd	50040
191	S-Hook	2	52120
192	Hose Fitting	As Req'd	51029
193	Adapter Fitting	As Req'd	71048268
194	Hose	As Req'd.	50923
• 195	Exhaust Valve Kit (Incl's items 193 and 196)	As Req'd	20417
196	Adapter Fitting	As Req'd	71048284

• Recommended Spare



Typical Exhaust Valve Assembly



(Dwg. MHTPA0425)

Hose Assembly Parts List Chart

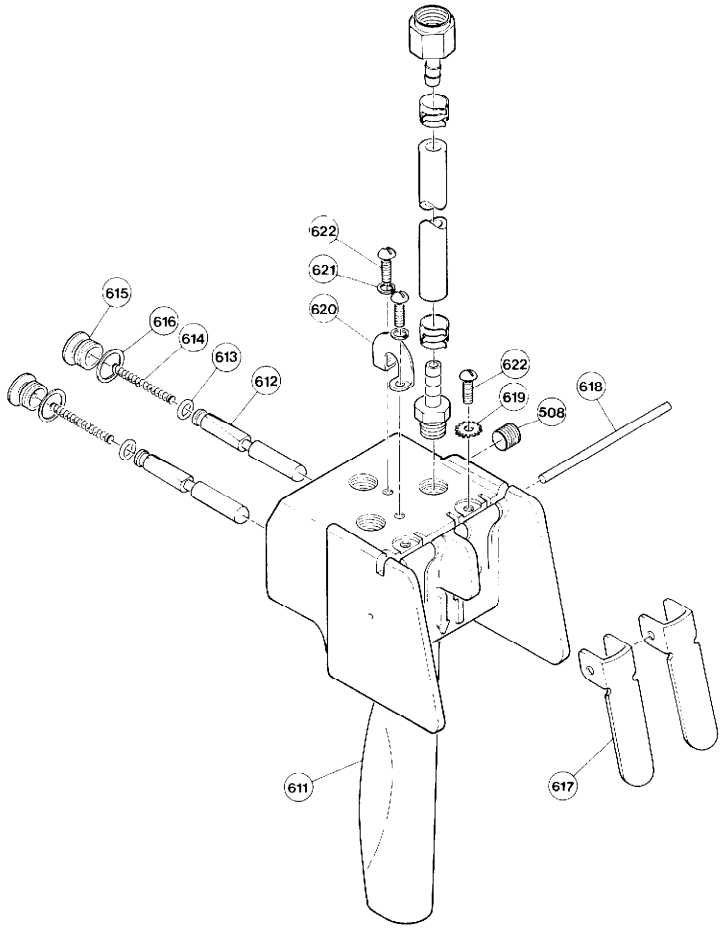
LENGTH		PART NUMBER (w/out EMERGENCY STOP)		
Feet	Meters	2 Button	4 Button	6 Button
10	3	21653-10	21654-10	21655-10
15	4.5	21653-15	21654-15	21655-15
20	6	21653-20	21654-20	21655-20
25	7.6	21653-25	21654-25	21655-25
30	9	21653-30	21654-30	21655-30
35	10.7	21653-35	21654-35	21655-35
40	12	21653-40	21654-40	21655-40
45	13.7	21653-45	21654-45	21655-45
50	15.25	21653-50	21654-50	21655-50

LENGTH		PART NUMBER (w/ EMERGENCY STOP)		
Feet	Meters	2 Button	4 Button	6 Button
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: 1. Dump valves included on lengths of 10 ft. (3 m) and longer to provide quick exhaust and improve control response.

2. For hose bundle lengths over 50 feet (15.25 meters) contact Technical Sales for control acceptability.

PENDANT ASSEMBLY DRAWING AND PARTS LIST

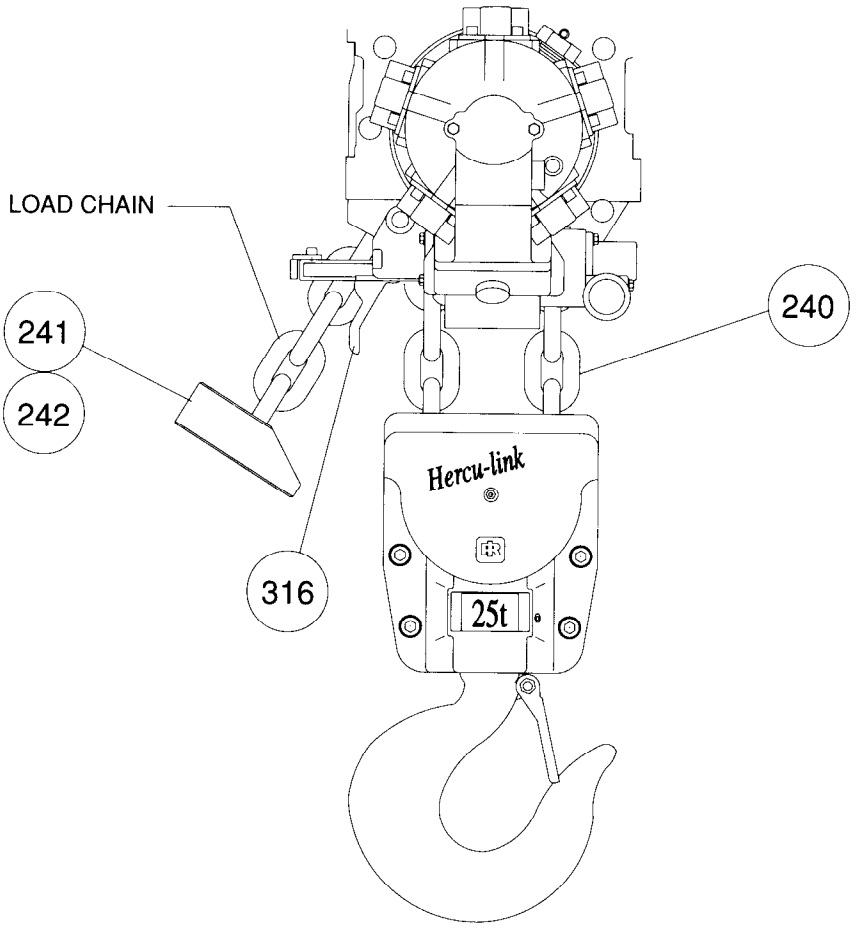


(Dwg. MHTPA0416)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
610	Pendant Assembly (Incl's items 611 thru 622)	1	MLK-A269A
508	Pipe Plug	1	54247
611	Pendant Handle	1	Order complete pendant assembly item 610
612	Throttle Valve	2	MLK-K264A
613	Throttle Valve face	2	R000BR1C-283
• 614	**Throttle Valve Spring**	2	**MLK-51A**
615	Throttle Valve Cap	2	MLK-266A
• 616	**Valve Cap Gasket**	2	**MLK-504**
617	Throttle Valve Lever	2	MLK-273
618	Throttle Lever Pin	1	DLC-120A
619	Pin Lock Washer	2	D02-138
620	Strain Relief Support	1	MKL-450
621	Lockwasher	2	H54U 352
622	Handle Screw	4	HRE20A-68

• Recommended Spare

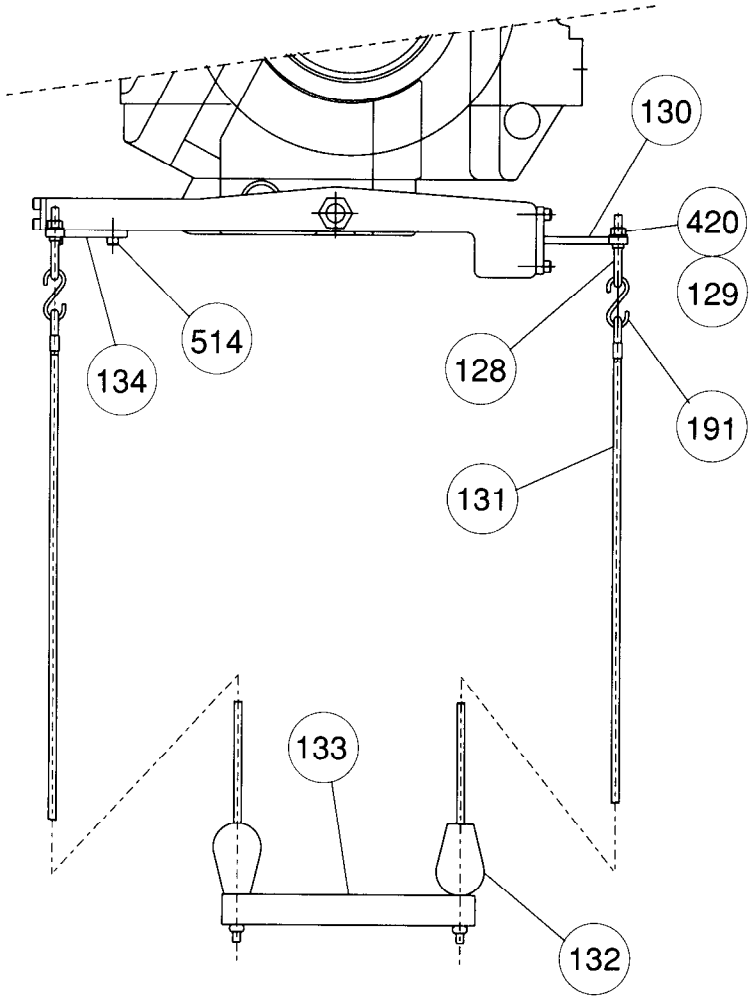
LOAD CHAIN AND CHAIN STOPPER PARTS LIST



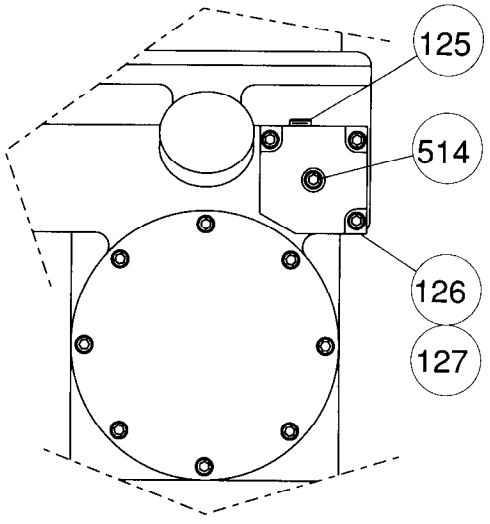
(Dwg. MHTPA0399)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
240	Load Chain	1	50399
	Load Chain (Zinc Plated)		16756
241	Chain Stopper	1	16246
242	Capscrew	1	50956
316	Chain Guide	1	17575

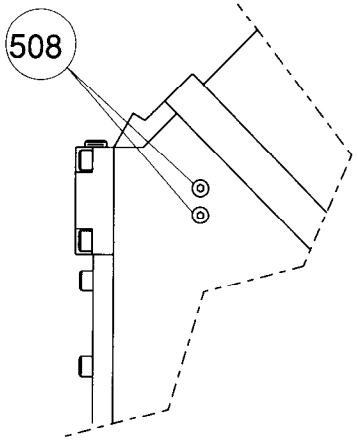
ROPE CONTROL ASSEMBLY



(Dwg. MHTPA0423)



MANIFOLD - BOTTOM VIEW

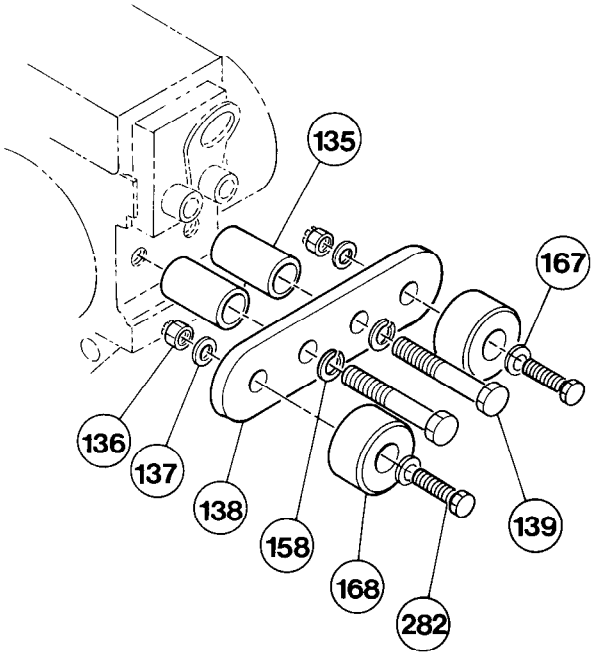


MANIFOLD - SIDE VIEW

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
124	Rope Control Assembly (Incl's items 125 thru 134, 191, 420, 508 and 514)	1	14874
125	Vent Plug	1	14895
126	Cover Plate	1	14879
127	Gasket	1	21555
128	Eyebolt	2	54753
129	Nut	2	50852
130	Rope Control Arm	1	21198
131	Nylon Cord	As Req'd	51777
132	Knob	2	4868
133	Control Handle	1	8273
134	Rope Control Arm	1	21199
191	S-Hook	2	52120
420	Washer	2	51676
508	Pipe Plug	3	54247
514	Capscrew	4	51939

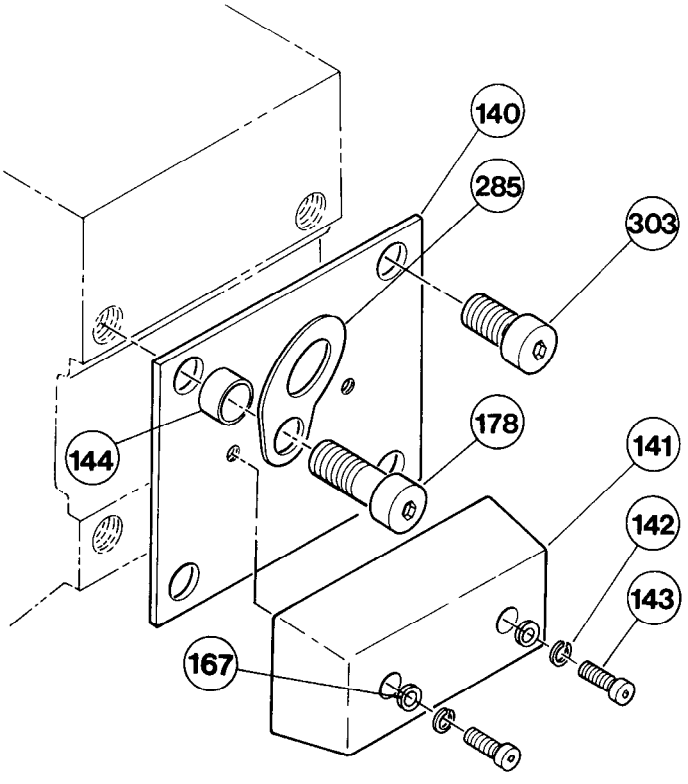
HULL BUMPER ASSEMBLY

12-1/2 and 25 ton Hoists



(Dwg. MHTPA0431)

37-1/2 and 50 ton Hoists



(Dwg. MHTPA0433)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.			
			12.5 ton	25 ton	37.5 ton	50 ton
120	Bumper Assembly	1	16178		16180	
135	Spacer	2	16640-10		---	
136	Nut	2	52919		---	
137	Washer	2	52914		---	
138	Bracket	1	9596-1		---	
139	Capscrew	2	53997		---	
140	Mounting Plate	1	---		19406	
141	Bumper	1	---		54739	
142	Lockwasher	2	---		50181	
143	Capscrew	2	---		54662	
144	Spacer	1	---		16755-3	
158	Lockwasher	2	50203		---	
167	Washer	2	50182			
168	Bumper	2	71756		---	
178	Capscrew	1	---		54207	
282	Capscrew	2	50197		---	
285	Lifting Eye	1	---		9575F	
303	Capscrew	3	---		54727	

LABEL AND TAG PARTS LIST

LABEL/TAG DESCRIPTION OR WORDING	WHERE SHOWN	QTY TOTAL		PART NO.
		HOOK MOUNT	TROLLEY MOUNT	
Label Kit Hook Mount Hoist	Not Shown	As Req'd	---	18916
Label Kit Trolley Mount Hoist	Not Shown	---	As Req'd	18917
Tag, Supply Line Notice	See "Warning Labels And Tags" Page 5	1		71042121
Label, Hercu-Link Logo	Not Shown	2	3	71046387
Tag, Oil Fill Notice	See "Warning Labels And Tags" Page 5	1		71042147
Nameplate	See "Parts Ordering Information" Page 70	1		71070098
Label, "DRAIN"	Not Shown	2		71043632
Label, "AIR SUPPLY"	Not Shown	1		71046395
Tag, Oil Level Caution	See "Warning Labels And Tags" Page 5	1	3	71107148
Label, "OIL LEVEL"	Not Shown	3	5	71043616
Label, "OIL FILL"	Not Shown	3	5	71042204
Label, "EXHAUST"	Not Shown	1	3	71042196
Label, "OIL DRAIN"	Not Shown	2	4	71042188
Label, "LUBE"	Not Shown	5	14	71042170
Label, Ingersoll-Rand Name And Logo	Not Shown	2	0	71106231
Label, Ingersoll-Rand Name And Logo	Not Shown	0	3	71106256
Tag, Operating Warning	See "Warning Labels And Tags" Page 5	1		71059612
Label, May Be Removed After Installation	Not Shown	0	4	71042154
Tag, Vent Plug Notice	See "Warning Labels And Tags" Page 5	2	3	71107155
Label, Operating Warning	See "Warning Labels And Tags" Page 5	1	2	71107130

Note: When ordering label kit or nameplate hoist model and serial number must be supplied.

ACCESSORIES AND REPAIR KITS

DESCRIPTION OF PART	QTY TOTAL	PART NO.
Control Valve Seal Kit	1	71034573
Manifold Seal Kit	1	71034599
Pendant Assembly Kit	1	9750-4
Pendant Line Exhaust Valves (Incl's items 193 and 196)	As Req'd	20417
Hoist Piston Motor Compression Ring Kit	1	94-RS
Hoist Piston Motor Seal Kit (Incl's items 452, 454, 458, 460 and 470)	1	71032932
Brake Rebuild Kit	1	71034581
Brake Exhaust Valve Kit	1	9750-10
Trolley Control Valve Seal Kit	1	9750-13
Trolley Piston Motor Seal Kit (Incl's items 330, 331, 358, 368, 370, 372 and 374)	1	71028120
Trolley Wheel Seal Kit	1	71061121
Trolley Gearbox Seal Kit	1	9750-17
Brake Retofit Kit (Incl's items 4, 6, 7, 8, 15, 470 and 526)	1	22181
Trolley Drive Vane Motor Kit (Incl's items 251, 252, 254, 258, 262, 264 and 265)	1	1000P60-VMK
Label Kit Hook Mount Hoist	1	18916
Label Kit Trolley Mount Hoist	1	18917
Touch-Up Paint (Orange)	As Req'd	MHD-OR
Chain Lubricant	As Req'd	LUBRI-Link

HOIST UPGRADES

The brake piston and seal design on all HA2 hoists were revised as part of Ingersoll-Rand's continuing product improvement program. See table 5 for description of change.

Table 5

Old Parts		**New Parts**	
Description	Part No.	Description	Part No.
'O' Ring	52672	Seal	71107726
'O' Ring	52671	Seal	71107718
Brake Piston	11949	Brake Piston	22177

When replacing brake piston on hoists with serial numbers prior to HL0510992 (approximate manufacture date Sept. '92) order retrofit kit part number 22181.

NOTICE

• Parts are not interchangeable. 'O' Rings cannot be used with new brake piston and seals cannot be used with old brake piston.

NUMERICAL LISTING OF PART NUMBERS

PART No.	ITEM No.	PART No.	ITEM No.	PART No.	ITEM No.	PART No.	ITEM No.	PART No.	ITEM No.	PART No.	ITEM No.
3114	229	11846	45	16146	149	22177	7	51023	542	51704	565
3115	225	11848	36	16166	170	50040	190	51029	192	51711	1
3117	202	11850	82	16178	120	50041	188	51045	153	51712	166
3118	203	11852	177	16180	120	50144	407	51046	155	51722	168
3131	256	11854	177	16184	170	50156	567	51057	110	51750	300
3667	207	11951	14	16185	169	50165	49	51058	172	51751	35
3761	260	11953	27	16186	175	50165	54	51066	154	51752	403
3829	214	11954	2	16187	176	50170	310	51067	157	51756	116
3830	226	11962	546	16188	169	50177	167	51068	163	51766	468
4147	206	11979	40	16190	176	50181	142	51069	153	51777	131
4334	263	11980	40	16240	150	50182	167	51070	155	51803	210
4864	199	11981	563	16246	241	50197	282	51074	251	51833	309
4868	132	11998	30	16291	174	50200	482	51078	265	51939	514
6553	220	11999	29	16292	174	50201	235	51079	273	51974	529
6554	253	12004	70	16297	149	50203	158	51080	262	51976	524
8212	151	12007	44	16639	170	50230	418	51081	264	51978	626
8217	164	12008	43	16650	184	50273	257	51084	255	51996	173
8218	162	12009	12	16756	240	50275	118	51087	503	52008	166
8234	179	12010	20	16760	150	50331	407	51095	250	52024	421
8273	133	12011	18	16998	70	50394	407	51095	268	52092	516
8316	405	12012	23	17098	80	50399	240	51192	180	52104	107
8326	150	12013	22	17133	177	50431	270	51233	427	52120	191
8327	184	12014	400	17185	53	50438	165	51234	432	52149	68
8402	151	12016	555	17310	52	50455	154	51235	428	52151	329
8403	179	12017	557	17525	150	50498	536	51237	418	52173	418
8424	156	12018	560	17527	150	50528	10	51281	114	52182	105
8439	163	12019	558	17528	184	50539	152	51283	219	52191	117
8466	267	12022	545	17575	316	50540	152	51412	417	52303	543
8476	405	12023	544	17690	182	50541	3	51413	446	52304	509
8516	405	12024	554	17706	175	50593	266	51414	423	52317	25
8909	515	12058	280	17897	280	50597	418	51459	57	52318	96
9403	572	12264	413	18026	170	50751	5	51486	233	52380	42
9414	438	12267	400	18479	408	50827	236	51552	424	52465	566
9426	513	12268	400	18483	179	50840	252	51553	556	52481	447
9436	436	12844	80	18484	179	50846	429	51554	570	52645	180
9439	523	12928	70	18485	151	50847	308	51555	573	52659	490
9486	426	12999	415	18486	151	50852	129	51578	228	52662	534
9852	444	13000	413	18647	517	50856	99	51591	254	52663	533
9853	512	13001	43	18815	170	50871	55	51596	200	52665	24
9854	440	13002	52	18952	417	50898	525	51597	234	52666	19
9855	526	13003	53	18956	417	50914	56	51599	201	52669	9
9856	522	13050	414	19406	140	50915	186	51600	213	52670	4
9857	518	13372	552	19755	417	50917	282	51632	633	52674	410
9984	434	13373	553	19794	400	50923	194	51671	445	52675	50
10063	574	14768	280	20250	519	50944	465	51672	439	52706	283
11030	408	14771	70	20417	195	50956	242	51673	437	52730	15
11220	530	14773	280	20789	149	50958	406	51674	422	52809	549
11252	220	14874	124	21198	130	50960	406	51675	419	52914	137
11291	214	14878	98	21199	134	50961	157	51676	420	52919	136
11763	537	14879	126	21289	528	50962	307	51677	425	52950	74
11767	540	14895	125	21555	127	50964	39	51678	442	53030	100
11768	539	15031	502	21619	305	50974	406	51679	419	53095	172
11769	535	16046	46	21620	302	51018	93	51681	97	53406	37
11844	36	16143	149	21685	417	51021	47	51700	625	53840	500

NUMERICAL LISTING OF PART NUMBERS

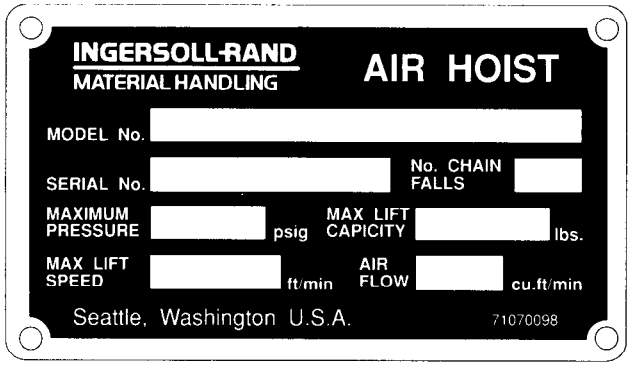
PART No.	ITEM No.	PART No.	ITEM No.	PART No.	ITEM No.	PART No.	ITEM No.	PART No.	ITEM No.
53843	538	71798	559	71068555	64	50259-2	450	MLK-266A	615
53844	564	71007405	34	71068571	67	6550-50	222	MLK-273	617
53845	562	71018386	330	71068589	65	7285-41	216	MLK-504	616
53909	532	71018394	331	71068613	63	8217-2	164	MLK-51A	614
53936	108	71018402	374	71068621	60	8325-93	589	MLK-A269A	610
53997	139	71018410	372	71068639	58	8329-12	159	MLK-K264A	612
54127	109	71018428	370	71068647	62	8333-2	232	P-1000-10	583
54199	48	71018444	358	71068654	78	8414-3	408	P-1000-17	585
54202	317	71020150	301	71069025	520	8424-2	156	P-1000-19	588
54205	412	71028237	338	71069524	402	8474-3	408	P-1100-10	582
54207	178	71028245	337	71070098	185	8515-2	408	P-1100-13	269
54209	35	71028252	332	71070924	416	8551-5	98	PFS-1032-36	600
54235	189	71028310	336	71073407	204/205	9071-1	448	R000BR1C-283	613
54240	315	71028328	335	71073415	217/218	9071-2	433	SA-4302-83	590
54242	104	71028336	375	71085179	527	9071-3	435		
54247	508	71029557	373	71098073	304	9071-4	430		
54259	91	71029573	353	71098081	320	9147-1	38		
54267	95	71029599	366	71098099	319	94-001	473		
54319	178	71029615	367	71106710	59	94-004	479		
54322	283	71029631	365	71106736	79	94-005	478		
54341	33	71029664	354	71107650	73	94-006	476		
54447	173	71029680	363	71107718	8	94-007	475		
54483	32	71029706	368	71107726	6	94-008	474		
54546	284	71029854	339	71112247	28	94-009	459		
54611	550	71029870	364	12004-2	70	94-010A	455		
54623	547	71029896	349	15002-1	417	94-011-1A	457		
54624	548	71029904	356	15003-1	417	94-015	464		
54645	306	71029946	351	15037B	506	94-018	462		
54650	314	71029979	347	16402-1	159	94-019	467		
54654	81	71029995	347	16640-10	135	94-024	453		
54655	16	71030001	347	16755-3	144	94-025-5	460		
54656	26	71030027	347	16755-4	287	94-027-20	452		
54658	28	71030043	345	17073-1	115	94-029	470		
54659	71	71030068	343	17073-2	119	9414-1	443		
54660	402	71030084	334	17073-3	106	9438-A	569		
54661	403	71030134	340	17073-4	113	9438-B	568		
54662	143	71030167	360	17549-1	102	9575F	285		
54676	66	71030175	362	17550-1	90	9596-1	138		
54727	284	71030183	352	19523-100	183	9640-10	635		
54727	303	71030209	346	20-2	466	9640-11	636		
54739	141	71030225	355	20512-*	312	9640-13	638		
54753	128	71030787	505	3112-2B	208	9640-4	629		
54859	13	71048268	193	4147-1	227	9640-5	630		
54860	17	71048284	196	4147-10	230	9640-6	631		
54866	318	71053771	507	4302-02	593	9640-7	632		
54870	103	71060198	581	4302-11	592	B100-64	504/510		
54878	112	71060206	594	4302-14	595	B-5060	212		
54925	637	71061584	313	4302-22	596	D02-138	619		
55006	283	71068464	83	4302-32	597	DLC-120A	618		
55076	286	71068472	76	4302-38	598	F30-08-000	94		
70703	165	71068514	77	4333-A	259	H54U-352	621		
70709	162	71068522	75	4335-6	258	HRE20A-68	622		
70712	165	71068530	72	4502-04	584	L30-08-000	92		
71756	168	71068548	69	4502-43	587	MKL-450	620		

PARTS ORDERING INFORMATION

The use of replacement parts other than INGERSOLL-RAND Material Handling will invalidate the Company's warranty. For prompt service and genuine INGERSOLL-RAND Material Handling parts, provide your nearest Distributor with the following:

1. Complete hoist model number and serial number as it appears on the nameplate.
2. Part number 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.



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

Hoist Model Number.....

Hoist Serial Number.....

Date Purchased.....

Return Goods Policy

Ingersoll-Rand will not accept any returned goods for warranty or service work unless prior arrangements have been made and written authorization has been provided from the location where the goods were purchased. Hoists returned with opened, bent or twisted hooks, or without chain and hooks, will not be repaired or replaced under warranty.

NOTICE

• Continuing improvement and advancement of design may cause 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.

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. For additional information contact:

Ingersoll-Rand Material Handling
2724 Sixth Avenue South
Seattle, Wa 98124 USA
Phone: (206) 624-0466
Fax: (206) 624-6265
or
Ingersoll-Rand Material Handling
Samiia, Douai Operations
111, avenue Roger Salengro
59450 Douai, France
Phone: (33) 27-93-08-08
Fax: (33) 27-93-08-00

NOTICE

• Mineral based oils are recyclable, however, some oils such as glycols may be extremely toxic and must be identified and disposed of at an approved waste or disposal site in accordance with all local, state and federal laws and regulations.

HOIST AND WINCH LIMITED WARRANTY

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

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

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

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

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

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

IMPORTANT NOTICE

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

VISIBLE LOSS OR DAMAGE

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

CONCEALED LOSS OR DAMAGE

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

DAMAGE CLAIMS

You must file claims for damage with the carrier. It is the transportation company's responsibility to reimburse you for repair or replacement of goods damaged in shipment. Claims for loss or damage in shipment must not be deducted from the Ingersoll-Rand invoice, nor should payment of Ingersoll-Rand invoice be withheld awaiting adjustment of such claims as the carrier guarantees safe delivery. You may return products damaged in shipment to us for repair, which services will be for your account and form your basis for claim against the carrier.

United States Office Locations

For Order Entry and Order Status:

Ingersoll-Rand Distribution Center
510 Hester Drive
P.O. Box 618
White House, TN 37188
Phone: (615) 672-0321
Telex: 786573
Fax: (615) 672-0801

For Technical Support:

Ingersoll-Rand Material Handling
2724 Sixth Avenue South
P.O. Box 24046
Seattle, WA 98124-0046
Phone: (206) 624-0466
Telex: 328795
Fax: (206) 624-6265

Regional Sales Offices

Atlanta, GA
111 Ingersoll-Rand Drive
Chamblee, GA 30341
Phone: (404) 936-6230

Detroit, MI
23192 Commerce Drive
Farmington Hills, MI 48335
Phone: (313) 476-6677
Fax: (313) 476-6670

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

Los Angeles, CA
5533 East Olympic Blvd.
Los Angeles, CA 90022
Phone: (213) 725-2826

Milwaukee, WI
12311 W. Silver Spring Dr.
Milwaukee, WI 53225
Phone: (414) 461-0973

Philadelphia, PA
900 E. 8th Ave., Suite 103
P.O. Box 425
King of Prussia, PA 19406
Phone: (215) 337-5930

International

Offices and distributors in principal cities throughout the world. Contact the nearest Ingersoll-Rand office for the name and address of the distributor in your country or write/fax to:
Ingersoll-Rand Material Handling
P.O. Box 24046 Seattle, WA 98124-0046 USA
Phone: (206) 624-0466
Telex: 328795
Fax: (206) 624-6265

Canada
National Sales Office
Regional Warehouse
Toronto, Ontario
51 Worcester Road
Rexdale, Ontario
M9W 4K2
Phone: (416) 675-5611
Fax: (416) 675-6920

Regional Sales Offices

Calgary, Alberta
333 11th Avenue S.W.
Calgary, Alberta
T2R 0C7
Phone: (403) 261-8652

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

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

British Columbia
Regional Warehouse
Technical Support
123 Bowser Avenue
North Vancouver, British Columbia V7P 3H1
Phone: (604) 985-4470
Fax: (604) 985-0160

Latin America Operations
Ingersoll-Rand
Production Equipment Group
730 N.W. 107 Avenue
Suite 300, Miami, FL
33172-3107
Phone: (305) 559-0500
Telex: 441617TLS UI
Fax: (305) 559-7505

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

Asia - Pacific
Ingersoll-Rand (Japan) Ltd.
Kowa Bldg. No. 17
2-7 Nishi-Azabu 1-chome
Minato-ku, Tokyo 106,
Japan
Phone: (03) 3403-0641/7
Fax: 81 3 3401-2049

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