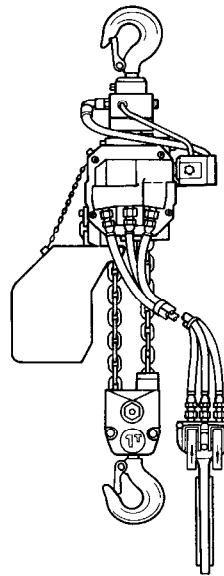
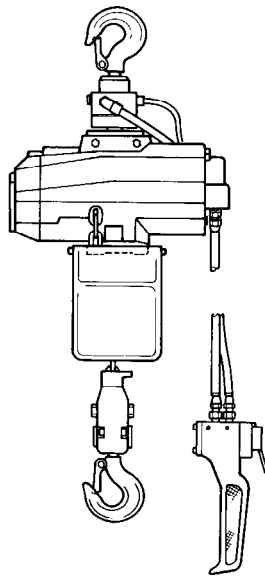


OPERATION AND MAINTENANCE MANUAL for **PALAIR PLUS** **AIR CHAIN HOIST MODELS**

PAL250K
(0.25 metric tons)

PAL500K
(0.5 metric tons)

PAL1000K
(1 metric ton)



(1 metric ton = 2200 lbs)

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

⚠ WARNING

Do not use this 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 (B30.16) and any other applicable safety codes and regulations.

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

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Edition 1
February 1992
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INGERSOLL-RAND®
MATERIAL HANDLING

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SAFETY INFORMATION

This manual provides important information for all personnel involved with the safe installation, operation and proper maintenance of this product. Even if you feel you are familiar with this or similar equipment, you must 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 hazard. The following signal words are used to identify the level of potential hazard.

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

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

Safety Summary

⚠ WARNING

- Do not use this hoist or attached equipment for lifting, supporting, or transporting people or lifting or supporting loads over people.
- The supporting structures and load-attaching devices used in conjunction with this hoist must provide an adequate safety factor to handle the rated load, plus the weight of the hoist and attached equipment. This is the customer's responsibility. If in doubt, consult a qualified 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 or pulling operations in such a manner that if there were an equipment failure, no personnel would be injured. This means keep out from under a raised load and keep out of the line of force of any load.

To the best of our knowledge, INGERSOLL-RAND Material Handling hoists are manufactured in accordance with the latest standards in effect at time of manufacture.

However, contrary to common belief, the Occupational Safety and Health Act of 1970, as we understand it, generally places the burden of compliance with the user, not the manufacturer. Many OSHA requirements are not concerned or connected with the manufactured product but are, rather, 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. Check all applicable industry, trade association, federal, state and local regulations. 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 ANSI/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 result in the void of warranty.

SAFE OPERATING INSTRUCTIONS

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

These recommendations apply to hoists used for material handling of freely suspended unguided loads.

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

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

1. Only allow qualified people (trained in safety and operation) to operate the hoist.
2. Only operate a hoist if you are physically fit to do so.
3. Only allow qualified people (trained in safety, maintenance and troubleshooting) to perform service on hoists.
4. 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.
5. Never use a hoist which inspection indicates is defective.
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 or failure of one hoist.
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, "cap-sized" 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.

WARNING TAG

Each hoist is supplied from the factory with the warning tag shown. If the tag is not attached to your unit, order a new tag and install it. See the parts list for the part number. Read and obey all warnings and other safety information attached to this hoist. Tag may not be shown actual size.

WARNING

Failure to follow these warnings may result in death, severe injury or property damage:

- Do not operate before reading operation and maintenance manual.
- Do not use hoist to lift people or loads over people.
- Do not lift more than rated load.
- Do not operate unless load is centered under hoist
- Do not operate with twisted, kinked or damaged chain or wire rope
- Do not operate if hoist is damaged or malfunctioning.
- Do not remove or obscure warning labels.
- Do not operate a wire rope hoist when rope is not properly seated in its groove.

Read the latest edition of ASME/ANSI B30.16 and National Electric Code (ANSI/NFPA 70). Comply with other federal, state and local rules.

Part No.: 71059612

For air and electric chain and wire rope hoist.

SPECIFICATIONS

General

The Palair Plus hoist is a lube-free* air powered hoist designed to lift and lower loads. The Palair Plus hoist hook mounts to the suspension shaft of a trolley or a permanent mounting structure. The air supply line can be strung to the hoist using either cable hangers or cable trolleys.

* Lube-free means that no lubrication to the supply air is required for these hoists, and therefore no oil mist is exhausted to the atmosphere.

Performance

Model No.	PAL250K	PAL500K	PAL1000K	PAL250KV	PAL500KV	PAL1000KV	
Load capacity: lbs (kg)	550 (250)	1100 (500)	2200 (1000)	High Precision Option "V" Specifications similar to standard model but with control progressivity spread over a lower range of speeds. This option is offered for applications where the hoist is essentially used for very precise load positioning with, usually, short lift heights.			
Falls of load chain	1	1	2				
Standard height of lift: ft (m)	10 (3)	10 (3)	10 (3)				
Standard length of pendant: ft (m)	6 (2)	6 (2)	6 (2)				
Total weight of chain and pendant: lbs (kg)	33 (15)	33 (15)	39.5 (18)				
Weight of chain - 1 ft of lift: lbs (kg)	.36 (.16)	.36 (.16)	.73 (.33)				
Performance with air pressure of 90 psig (6.3 bar)							
Working pressure: psig (bar)		70 - 100 (5 - 7)			70 - 100 (5 - 7)		
Max. speed* rated load	Hoisting: ft/min (m/min)	66 (20)	44 (13.5)	22 (6.75)	33 (10)	26 (8)	13 (4)
	Lowering: ft/min (m/min)	75 (23)	88 (27)	44 (13.5)	43 (13)	45 (13.6)	22 (6.8)
Max. speed* no load	Hoisting: ft/min (m/min)	98 (30)	98 (30)	49 (15)	46 (14)	46 (14)	23 (7)
	Lowering: ft/min (m/min)	52 (16)	52 (16)	26 (8)	39 (12)	39 (12)	20 (6)
Max. air consumption: scfm (m ³ /min)		78 (2.2)	78 (2.2)	78 (2.2)	53 (1.5)	53 (1.5)	53 (1.5)
Air consumption for 1 ft of lift: ft ³ (m ³)		3.9 (0.11)	5.3 (0.15)	10.6 (0.30)	5.3 (0.15)	6.4 (0.18)	13 (0.37)

* Variable speed according to pressure applied on PHS pendant.

Model Code Example: **PAL250K - 3HE18 - 10S**

Series	PAL
Hoist Capacity	250K = 550 lb (250 kg) 500K = 1100 lb (500 kg) 1000K = 2200 lb (1000 kg) V = High Precision Spotting
Control	2 = One Motor Pendant (PHS2) 3 = Two Motor Pendant (PHS4)
Suspension	A = Fixed Lug Mount C = Swivel Top Hook D = Plain Trolley, Rigid Mount F = Geared Trolley, Rigid Mount HN = Motorized Trolley (Std. width tapered flange) HE = Motorized Trolley (Std. width flat flange)
Length of Lift	18 = 18 ft. (6 m) XX = Specify Length
Pendant Drop	10 = 10 ft. (3 m) XX = Specify Length
Options	N = Zinc Plated Load Chain S = Stoplift

INSTALLATION

Prior to installing the hoist, carefully inspect it for possible shipping damage. Hoists are supplied fully lubricated from the factory. Lubrication of the load chain is recommended before initial hoist operation.

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.

WARNING

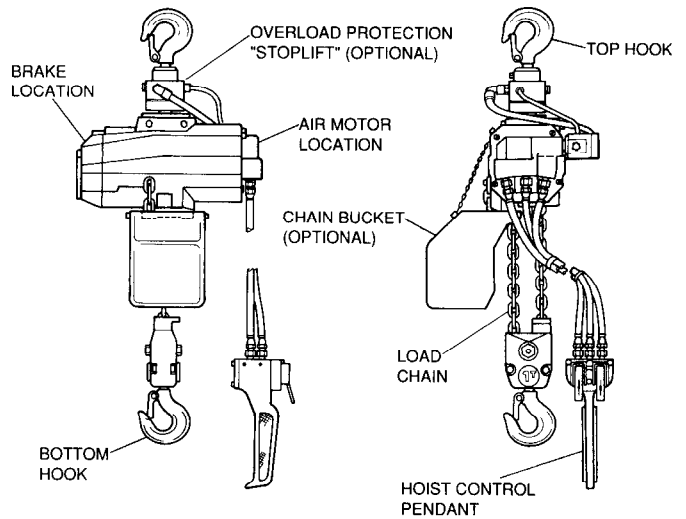
- A falling load can cause injury or death. Before installing, read "SAFETY INFORMATION".

Hook Mounted Hoist Installation

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

Trolley Mounted Hoist Installation

Preadjust trolley width for the beam flange measurement. Remove the rail stop and slide trolley onto the end of the beam. If trolley cannot be installed onto the end of the beam due to insufficient space or fixed limit stops, the trolley may need to be partially disassembled and installed from underneath the beam.



(Dwg. MHTPA0239)

CAUTION

- To avoid an unbalanced load which may damage the trolley, the hoist must be centered under the trolley.

NOTICE

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

When a trolley is used, check that the trolley side plates are parallel and vertical. Raise a load equal to the rated capacity of the hoist a few inches off the floor and operate the trolley along the entire length of the beam.

Air Supply

The air supply must be clean and free from moisture.

Air Lines

The inside diameter of the hoist air supply lines must not be smaller than 1/2 in. (13 mm) and 7/16 in. (11 mm) for hose fittings. Before making final connections, all air supply lines should be purged before connecting to system inlet. Supply lines should be as short and straight as installation conditions will permit. Long transmission lines and excessive use of fittings, elbows, tees, globe valves, etc. cause a reduction in pressure due to restrictions and surface friction in the lines.

Air Line Lubricator (optional)

The use of an air line lubricator is not required for the Palair Plus lube-free hoists. If lubricated supply air is used on the Palair Plus lube-free models it will cause no harm to the hoist.



- Shut off air supply before filling air line lubricator.

Air Line Filter

When a hoist is to be used in corrosive or moist atmospheres it is recommended that an air line strainer/filter be installed within 3 feet (1 meter) of the motor to prevent dirt from entering the motor. The strainer/filter should provide 20 micron filtration and include a moisture trap. Clean strainer/filter periodically to maintain its operating efficiency.

Moisture in Air Lines

Moisture that reaches the 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.

Motor

For optimum performance and maximum durability of parts, operate air motor within the operating specifications provided in the "SPECIFICATIONS" section. The air motor should be installed as near as possible to the compressor or air receiver.

Chain Container



- 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.

To attach the chain container: run lower block to lowest point, attach chain container to hoist and run hoist in up direction to feed the chain back into the container.

1. Check the chain bucket label to make sure the length of load chain is within the capacity of the chain bucket. Replace with a larger chain bucket, if required.
2. Attach stop buffer 2 to 6 in. (5 to 15 cm) from the end of the chain.
3. Attach the chain bucket to the hoist.

NOTICE

- When putting chain into the chain container by hand begin with the stop buffer end of the chain so that it piles naturally.

Attaching Free End of Load Chain

1. Install stop buffer on the end of the load chain.
2. Attach stop buffer to the ninth link from the end of the load chain.
3. Attach the free end of the load chain to the hoist.

Hoist Pendant

Check all hose connections are tight and that hoses are not twisted or crimped.



- Disconnect air supply before performing any maintenance.

Check strain relief wire (172) is firmly secured in the hoist motor cover (5) and pendant body with screw (2).



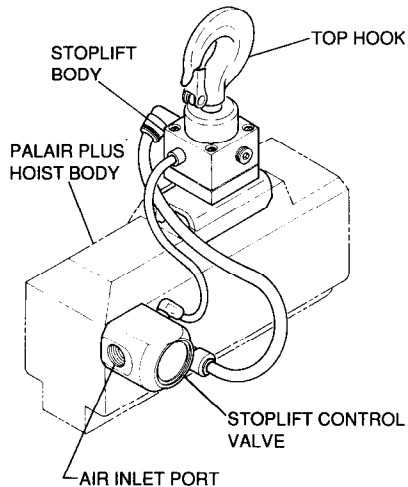
- To avoid damaging the pendant hose, make sure the strain relief cable, not the pendant hose, is supporting the weight of the pendant.

Overload Protection "Stoplift" (Optional)

The Stoplift is positioned between the hoist and the top hook. Automatic power cut-off occurs if more than 102 to 120% of the rated load is attempted. Check hose connections are as shown. (ref. Dwg. MHTPA0232). If a cut-off occurs the load must be lowered and an alternate method used to accomplish the task. Stoplifts are supplied pre-adjusted from the factory.

⚠ WARNING

• Use of the Stoplift does not preclude the operator from observing the basic hoist operating "Safety Precautions".



(Dwg. MHTPA0232)

Initial Operating Checks

1. After installation, make sure the chain is not twisted or kinked. Fix before using. On the Palair Plus, for a capsized bottom hook, pass the hook between the two chain falls until the chain is untwisted.
2. If a trolley is used, check that the hoist is centered below the trolley. Raise a load equal to the rated capacity of the hoist a few inches off the floor and operate the trolley along the entire length of the beam.
3. Run hoist slowly in both directions with no load with a good supply of lubricating oil.

Storing the Hoist

1. Always store the hoist in a no load condition.
2. Wipe off all dirt and water.
3. Oil the chain, hook pins and hook latch.
4. Place in a dry location.
5. Plug hoist air inlet port.
6. Before returning hoist to service follow instructions for Hoists not in Regular Service in the "INSPECTION" section

OPERATION

The four most important aspects of hoist operation are:

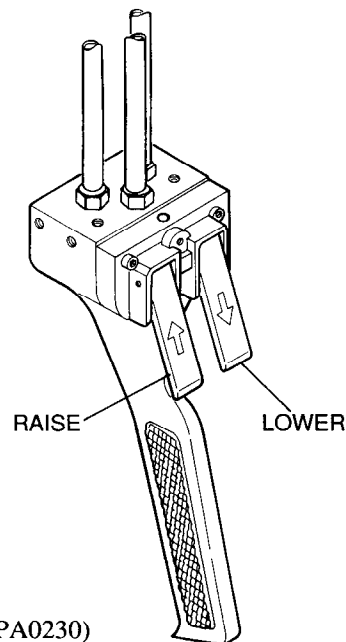
1. Follow all safety instructions when operating hoist.
2. Allow only qualified people to operate a hoist.
3. Subject each hoist to a regular inspection and maintenance.
4. Be aware of the hoist capacity and weight of load at all times.

⚠ CAUTION

• Only allow qualified personnel (trained in safety and operation) to operate a hoist.

Hoist Movement

Lifting and lowering a load is controlled by the pendant control levers. Careful movement of the pendant levers will allow infinitely variable up and down speeds. Hoists supported by a power trolley will require a four lever pendant control.



(Dwg. MHTPA0230)

INSPECTION

There are two types of inspection, the frequent inspection performed by the operator and periodic inspections performed by qualified personnel.

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.

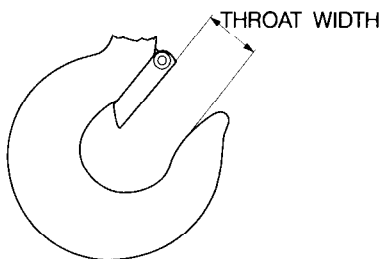
Records and Reports

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. **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 stop button.
3. **HOOKS.** Check for wear or damage, increased throat width, bent shank or twisting of hook. Replace hooks with 15% increase in throat width (see Dwg. MHTPA0040) or 10° twist (see Dwg. MHTPA0111).

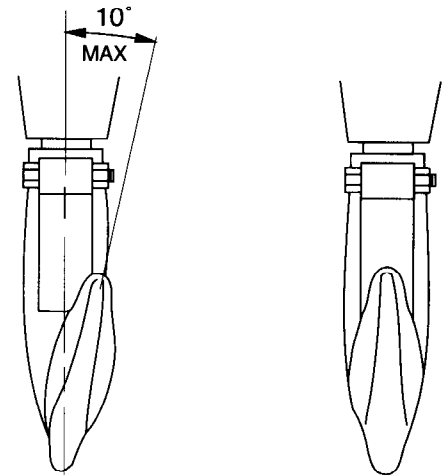


(Dwg. MHTPA0270)

Model	Throat Width *		Discard Width	
	in.	mm	in.	mm
PAL250K	1.18	27	1.36	34.5
PAL500K	1.18	27	1.36	34.5
PAL1000K	1.18	27	1.36	34.5

*Dimensions are based on the throat width opening with a hook latch in place.

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/ANSI B30.10 "HOOKS" for additional information.

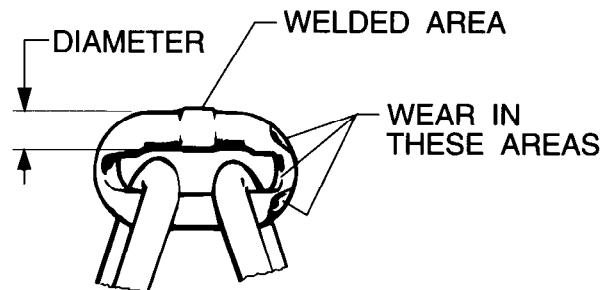


**TWISTED
DO NOT USE**

**NORMAL
CAN BE USED**

(Dwg. MHTPA0111)

4. **HOOK LATCH.** Make sure the hook latch is present and operating. Replace if necessary.
5. **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. Replace a chain that fails any of the inspections. Check chain lubrication and lubricate if necessary. See "Load Chain" under "LUBRICATION".



(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.**

6. **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 ANSI/ASME B30.16, frequency of periodic inspection depends on the severity of usage: **NORMAL**, yearly; **HEAVY**, semi-annually; **SEVERE**, 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 rivets, split pins, capscrews and nuts on hook, chain bucket and hoist body. 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 worn gearing, bearings and shafts. The parts should be cleaned, lubricated and reassembled. Replace worn or damaged parts.

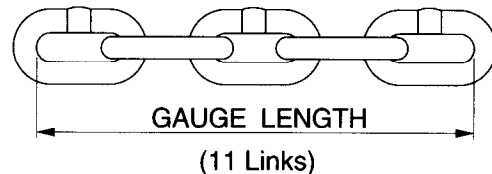
⚠ WARNING

• **A falling load can cause injury or death. To keep the brake from slipping, do not get lubricant on the brake lining.**

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 per "Hoist Brake Lining Measurement" under "MAINTENANCE".
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 wheels and beam is correct, 3/32 to 5/32 in. (2 to 4 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 stop buffers are correctly installed and functional.
11. **LOAD CHAIN.** Measure the chain for stretching by measuring across eleven 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.

Model No.	Size (mm)	Normal Length		Discard Length	
		in.	(mm)	in.	(mm)
PAL250K	5.0	6.50	165	4.80	6.57
PAL500K	5.0	6.50	165	7.24	6.57
PAL1000K	5.0	6.50	165	9.02	6.57



(Dwg. MHTPA0041)

12. **CHAIN CONTAINER.** Check for excessive wear and that chain container is securely attached to the hoist. Replace if necessary.
13. **STOPLIFT.** Stoplift must be disassembled, inspected, cleaned and lubricated yearly by an authorized Ingersoll-Rand Service Center or repair facility.

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

Lubrication Schedule

The time intervals listed below are for service in a normal environment. Units operating in a harsh environment (excessively hot or cold, marine, hazardous gases or abrasive dust) may require more frequent lubrication.

Usage:

Heavy	Continual daily usage.
Normal	Subject to daily use, but not continually.
Occasional	Average use of once a week or less.

Component:	Lubrication Frequency by Usage Level		
	Heavy	Normal	Occasional
Geared Trolley Wheels	Monthly	Quarterly	Yearly
Load Chain	Daily	Weekly	At Usage
Hook and Hook Latch	Daily	Weekly	At Usage
Gear Case	Yearly	Every 3 Years	Unnecessary

Load Chain



• **Failure to maintain clean and well lubricated load chain will affect the life of the chain resulting in premature wear and can result in chain failure.**

1. Lubricate each link of the chain and apply new lubricant over existing layer. Ensure that all links in the top and bottom chain sheaves are moved to allow lubrication of those links.
2. Coat entire link surfaces, including bearing surfaces between links.
3. Clean chain to remove rust or abrasive dust build-up. After cleaning, lubricate the chain using SAE 50 to 90W EP oil.

Gear Case

The gear case is packed with grease on assembly. Whenever hoist is serviced remove old grease and replace with new. Use a good quality EP2 grease with a dropping point of 302° F (250° C). Viscosity 1100 SUS at 100 ° F (38° C)



• **Amount of grease in gear case must not exceed 2 ounces (60 g)**

Air Line Lubricator (if used)

To adjust. Remove plug then rotate screw to limit oil flow. Replace plug when adjustment is complete. The air line lubricator should be replenished daily with SAE 30W oil (minimum viscosity 135 Cst at 104° F (40°C)).

Hook and Hook Latch

Lubricate the hook and hook latch pivot points. Hook should swivel freely. Hook latch should pivot freely. Use SAE 30 oil or SAE 50 to 90W EP oil.

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. Hoist is overloaded. Motor is damaged. Brake is not releasing.	Check power supply and connections, in power supply line. Reduce load to within rated capacity. Repair or replace. See "MAINTENANCE" section. Remove end cover and inspect brake. Check brake release circuit.
Load continues to move when hoist is stopped.	Brake is slipping. Hoist is overloaded.	Check brake spring and brake disc lining. See "MAINTENANCE" section. Reduce load to within rated capacity.
Hoist will not lift rated capacity.	Hoist is overloaded. Motor is damaged. Brake is not releasing. No air supply to hoist, or too little CFM.	Reduce load to within rated capacity. Check for worn motor bearings. Remove end cover and inspect brake. Check brake release circuit. Check power supply and connections, in power supply line.
Hook lowers, but will not raise.	Hoist is overloaded. Low air pressure.	Reduce load to within rated capacity. Check at hoist power supply connection with hoist under load. Raise pressure to rated capacity.
Load chain jumps on sheave or is making a snapping sound.	Worn or rusted chain. Incorrect chain. Worn sheave or chain guide. No oil on load chain.	See "INSPECTION" to determine wear limit. Replace if necessary. Replace with correct chain. Replace worn parts. Lubricate load chain.
Trolley Trolley won't stop or trolley wheels slip.	Damaged beam. Too much oil or grease on track of beam.	Repair or replace beam. Clean off oil or grease.
Stoplift Load jumps when being lifted.	Stoplift may require adjustment.	Adjust Stoplift. See Stoplift adjustment in "MAINTENANCE" section. If adjustment does not correct problem and additional service is required, contact your nearest Ingersoll-Rand office, distributor or service center for repair information.

⚠ 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 qualified service personnel to perform maintenance.
- After performing any maintenance on the hoist, test hoist to 125% of its rated capacity before returning 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 brake.
6 Months	Inspect the disc brake friction linings. Clean or replace parts as required. Lubricate brake spring washers.
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 brake disc thickness measures .098 in. (2.5 mm) or less, brake disc must be replaced.

Brake Disc Replacement

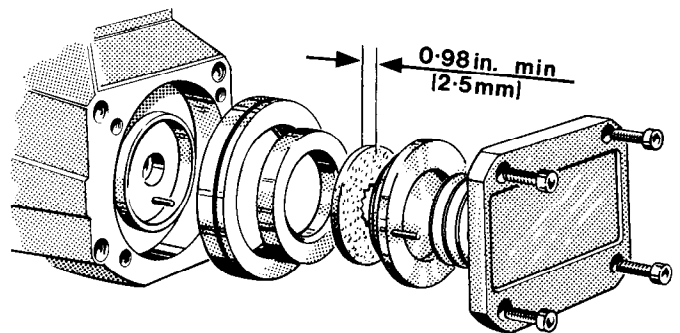
To check or replace the brake disc (88) use the following procedure.

1. Loosen capscrews (36) one turn at a time progressively round the cover (97) until brake spring load is relaxed. Remove capscrews (36) holding cover to the brake housing (90).
2. Remove cover (97), spring washers (96) and brake disc (95).
3. Pull brake friction disc (88) from pinion (75).
4. Replace brake friction disc (88) so spline locates on pinion (75).

5. Install brake disc (95). Place spring washers (96) on brake disc starting with a dished surface toward the brake disc. Alternate springs (96) (dished up/dished down). Install cover (97).
6. Align pin (89) in brake disc (95) with hole in cover (97) then install cover (97) and pull down evenly with capscrews (36).

⚠ CAUTION

- The brake will not operate properly if there is oil or grease on the brake disc.

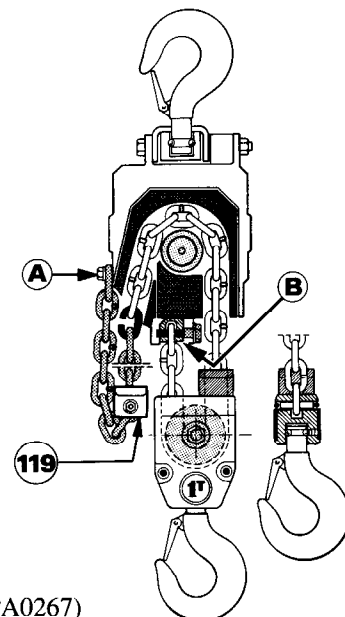


(Dwg. MHTPA0231)

Chain Replacement

(Ref. Dwg. MHTPA0237)

1. The hoist must be hung and connected to the air supply. Reduce air pressure to 60 psi (4 bar).
2. Remove chain bucket, if used.
3. Remove free end of chain from hoist body "A", if attached. Remove chain stop buffer (119).
4. Run hoist slowly in the lifting direction until the chain free end is approximately 2 ft (60 cm) from the hoist.



(Dwg. MHTPA0267)

5. Using a 'C' link which is the same size as the chain join the new chain to the old taking care that the weld on the "standing" links on the new chain are facing away from the hoist load sheave.
6. Run the hoist slowly until the new chain has passed 24 to 36 in. (60 to 90 cm) through the hoist.

For 0.25 and 0.5 metric ton hoists

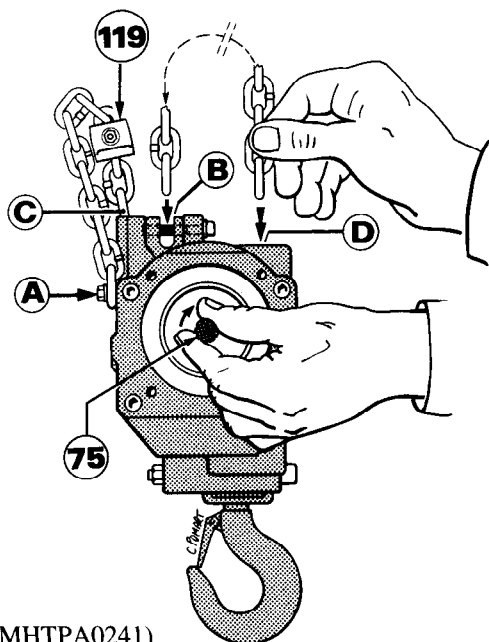
7. Install buffer (119) on the hook fall of the load chain. The offset shoulder of the buffer (119) must be toward the hose connection end of the hoist. The buffer actuates the top limit switch.
8. Remove retainer wire (115), hook ring (125) and hook anchor pin (120). Position the last link of the chain in the hook slot. Replace hook anchor pin (120), hook ring (125) and retainer wire (115).
9. Install buffer (119) on opposite chain end so offset shoulder of buffer is facing the bottom of the hoist motor. Place buffer 6 in. (15 cm) from the chain end. This buffer activates the bottom limit switch.
10. Secure buffer (119) in position with capscrew (123) and nut (124).
11. Attach the last chain link to the hoist with capscrew (36) and washer (45).

CAUTION

- Check that the chain is not twisted.

For 1.0 metric ton hoists

12. Install buffer (119) on the hook fall of the load chain. The offset shoulder of the buffer (119) must be toward the hose connection end of the hoist. The buffer actuates the top limit switch.
13. Feed the chain end with a nylon string into the hook block (117). Take care that the "standing" links on the new chain are facing away from the hook block sheave (127).
14. Secure the last link on the chain to the hoist body with capscrew (59).



(Dwg. MHTPA0241)

15. Secure the opposite end of the chain as previously described for the 0.25 and 0.5 ton hoists.

In the event that the chain has been completely removed from the hoist it will be necessary to remove the hoist brake. Refer to the instructions for "Brake Disc Replacement" (Ref. Dwg. MHTPA0241).

Insert the first link in "D" so link is parallel to pinion (75). Ensure welded side of second chain link faces away from sprocket (63).

Rotate pinion (75) by hand to install chain until it appears at "C".

CAUTION

- Do not attempt to install the chain by powering the hoist.

Attach the chain at "A" after installing buffer (119). Reinstall the brake and complete chain installation as previously described.

Stoplift

For Stoplift checks and adjustments, it is imperative that certified loads in actual hoist conditions are used. Any other means of testing is not permitted.

NOTICE

- Do not attach hook to a fixed point for testing Stoplift. Damage to the Stoplift spring rings may result.

Safety regulations in most countries require an annual inspection and test be conducted. In addition to the required annual inspection the Stoplift must be periodically checked to ensure correct adjustment.

Check the rated air pressure for the hoist. Refer to the "SPECIFICATIONS" section for this information.

Determine the required overload from the Overload Value Chart and attach overload to the down side of the load chain.

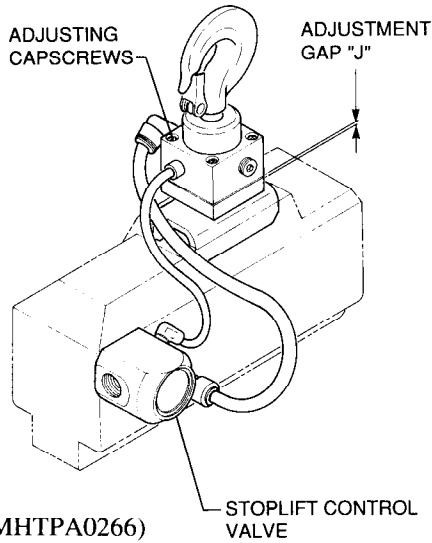
Operate the hoist to lift the overload. After the chain has tensioned the hoist must stop, within the required response time, approximately 0 to 2 in. (0 to 5 cm) of lift. After hoist has stopped due to the overload, do not continue to operate the control lever in the hoist direction. Lower the load and make adjustments if required. Remove Stoplift before attempting any dynamic or static hoist tests with loads over 125%.

Adjustment

Check the rated air pressure for the hoist. Refer to the "SPECIFICATIONS" section for this information.

Operate the hoist by lifting and lowering the maximum rated load about 3 ft. (1 m) from the ground without stopping. If erratic or jerky operation is noticed tighten the four adjusting capscrews in the top surface of

the Stoplift body 1/8 turn each until erratic movement stops (see Dwg. MHTPA0266). Capscrews must be adjusted equally.



Add the test load to the down side of the load chain as determined in the Test Load Value Chart. After the load chain has tensioned the hoist must stop when lifting (with the test load) within the required response time 0 to 2 in. (1 to 5 cm) of lift.

Test Load Value Chart

Model	Test Load		Test Load % at 90 psig (6.3 bar)
	lbs	kgs	
PAL250K	660	299	120
PAL500K	1276	579	116
PAL1000K	2464	1118	112

The pre-set dimension (see Adjustment Chart) provides a basis for checking. If measurement does not meet "J" pre-set dimension the Stoplift may not function correctly. Follow adjustment procedure to verify proper operation. If adjustment dimension "J" cannot be met then Stoplift assembly should be returned to nearest distributor or service center for repair.

Adjustment Chart

Load (metric tons)	Adjustment Dimension "J"					
	PAL250K		PAL500K		PAL1000K	
	in.	mm	in.	mm	in.	mm
0.25	0.126 0.150	3.2 3.8				
0.5			0.027 0.051	0.7 1.3		
1.0					0.102 0.126	2.6 3.2

If the HC expansion screw on the Stoplift control valve has been loosened during Stoplift adjustment it must be

retightened before operating the hoist. If the expansion screw is not tightened it may cause the hoist to lift very slowly.

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. 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.
2. Never use excessive force when removing parts. Tapping gently around the perimeter of a cover or housing with a soft hammer, for example, is sufficient to break the seal.
3. Do not heat a part with a torch 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.

4. Keep the work area as clean as practical, to prevent dirt and other foreign matter from getting into bearings or other moving parts.
5. 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.
6. When grasping a part in a vise, always use leather-covered 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.
7. 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.

Disassembly Instructions

1. Disconnect all hoses from hoist motor. Position hoist vertically so brake end is down. Remove capscrews (4) and pry motor assembly from gear casing (39). Set motor assembly to one side for later disassembly. Pull coupling (60) from pinion (75).
2. Remove capscrews (29), pull out tubes (32) and screen (33) from gear casing (39). Reposition hoist in a vertical position so motor end is down.
3. Progressively loosen capscrews (36) in cover (97) one turn at a time each, until the brake spring load is relaxed.

4. Remove spring washers (96). Lift off brake friction disc (88) and brake disc (88).
5. Remove capscrews (92) and pry brake cover (90) and gasket (77) from gear casing (39). Lift off spring washer (83).
6. Pull piston (86) with 'O' rings (87) and (93) from brake cover (90).
7. Pry bearing (78) from planet carrier (67).
8. Set hoist in a horizontal position and from the motor end of the gear casing (39) carefully tap on the end of pinion (75) to remove planet assembly.
9. Remove retainer ring (82) and tap out pinion (75).
10. If planet assembly requires disassembly slide out planet pins (73) and separate planet gears (69), spacers (72) and bearings (68).
11. Remove ring gear (76) from gear casing.

NOTICE

- **Check that load chain has been removed before attempting to remove sprocket (63).**

12. Remove retainer ring (40) from the motor side and tap on sprocket from the brake end of gear casing (39) to drive out sprocket (63) and bearing (43).
13. Lift out ring gear (65) and bearing (66).
14. Remove retainer ring (40) from gear casing (39) bore and tap out bearing (43) from brake side.
15. Loosen capscrews (52) in chain holder (54). Tap out pins (46) and remove chain holder (54) with chain guide stop (53).
16. Remove shafts (34) from gear casing (39) and slide out chain guide (50).

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 frame must be replaced. Failure to observe this precaution will result in additional component damage.**
- **Do not use trichloroethylene to clean parts.**

Clean all hoist component parts in solvent (except for the brake disc). 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 maybe necessary to carefully scrape old Loctite from the bearing bores. Dry each part using low pressure, filtered compressed air. If the brake disc is oil soaked, it must be replaced.

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. Inspect the brake disc for oil. If the brake disc is oil-soaked, replace the brake disc. If the brake disc is glazed, sand it lightly using fine emery cloth.
6. Measure the thickness of the brake disc. If the brake disc is less than .098 in. (2.5 mm) replace the brake disc (88).
7. Check screen (33) and silencer (37) for damage or excessive dirt.

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.

Assembly

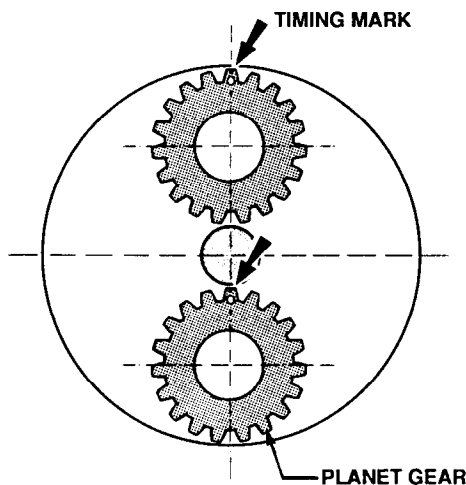
1. Install ring (42) in gear casing (39) so it is positioned just below the retainer ring groove on the brake side. Install retainer ring (40). Tap bearing (43) into ring (42) from the motor side of gear casing (39). Extreme care is required during this operation to ensure bearing (43) remains square and ring (42) is not damaged.
2. Install second ring (42) and bearing (43) on sprocket (63). Slide chain guide (50) into gear casing (39). Tap or press assembled sprocket (63) into gear casing (39) from the motor side.
3. Install retainer ring (40) at motor side.
4. Install shafts (34) in gear casing (39). Jiggle chain guide (50) to aid installation.

5. Position hoist vertically with the motor end down. Lubricate and install 'O' ring (64) in the groove on the outside of ring gear (65). Install ring gear (65) on spline of sprocket (63). Install bearing (66) on sprocket (63).
6. Install load chain. Refer to chain installation procedures in the "MAINTENANCE" section.
7. Assemble chain guide stop (53) to chain holder (54) with capscrews (58) and washers (56). Install assembled chain holder in the bottom of gear casing (39) with pins (46). Tighten capscrews (52) to secure pins (46).
8. Install pinion (75), bearing (80) and retainer rings (70) and (82) in planet carrier (67).

NOTICE

• **Maintenance of the planet gear assembly should be limited to general cleaning and greasing of the planet gears (69) and bearings (68). If the planet gear assembly was removed during hoist disassembly it will be necessary to line up the planet gears correctly.**

9. Assemble planet assembly so planet gears (69) mesh with pinion (75). Position planet gears (69) so the "0" marks engraved on the planet gears are in line. Ref. Dwg. MHTPA0242.
10. Install assembled planet assembly with pinion (75) in gear casing (39).
11. Install ring gear (76) with notches outward.



(Dwg. MHTPA0242)

12. Install bearing (78) on planet carrier (67).
13. Install gasket (77) on brake cover (90). Place spring washer (83) on bearing (78) so dished side is toward the bearing (78). Lubricate gear casing. See "LUBRICATION" section.

14. Lubricate 'O' rings (79) and 'U' cup seal (84) and install in brake cover (90). The lip of 'U' cup seal (84) must be toward the planet assembly. Add Loctite to gear casing surface and install brake cover (90) so pins (55) line up. Exercise caution during this operation to ensure 'O' rings (79) remain in position. Secure brake cover (90) in position with capscrews (92).
15. Lubricate and install 'O' rings (87) and (93) on piston (86). Install piston (86) in brake cover (90).
16. Install brake disc (94) and brake friction disc (88).
17. Place brake disc (95) on brake disc (88). Install springs (96) on brake disc (95) starting with a dished surface toward the brake disc. Alternate springs (96) (dished up/dished down).
18. Align pin (89) in brake disc (95) with hole in cover (97) then install cover (97) and pull down evenly with capscrews (36).
19. Position hoist vertically with the brake end down. Set screen (33) in motor side of gear casing (39) and loosely secure with capscrews (29). Install tubes (32) through screen (33) until they are fully seated. Tighten capscrews (29). Install coupling (60) on pinion (75).
20. Install motor assembly and secure with capscrews (4).
21. Install silencer (37) in gear casing (39) with capscrew (36).

Motor

If the motor assembly has been disassembled for inspection or repair it is recommended that it be reassembled using a good quality silicone seal between the housing sections. The silicone seal must be allowed to cure for 3 hours before attempting to pressurize the motor.

Hook Assemblies

If the hook assemblies have been disassembled for inspection or repair attention is required on reassembly to ensure that the correct number of balls (116) are installed and retained with washer (122).

SERVICE NOTES

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.

The model and serial number label is located on the brake end housing.

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

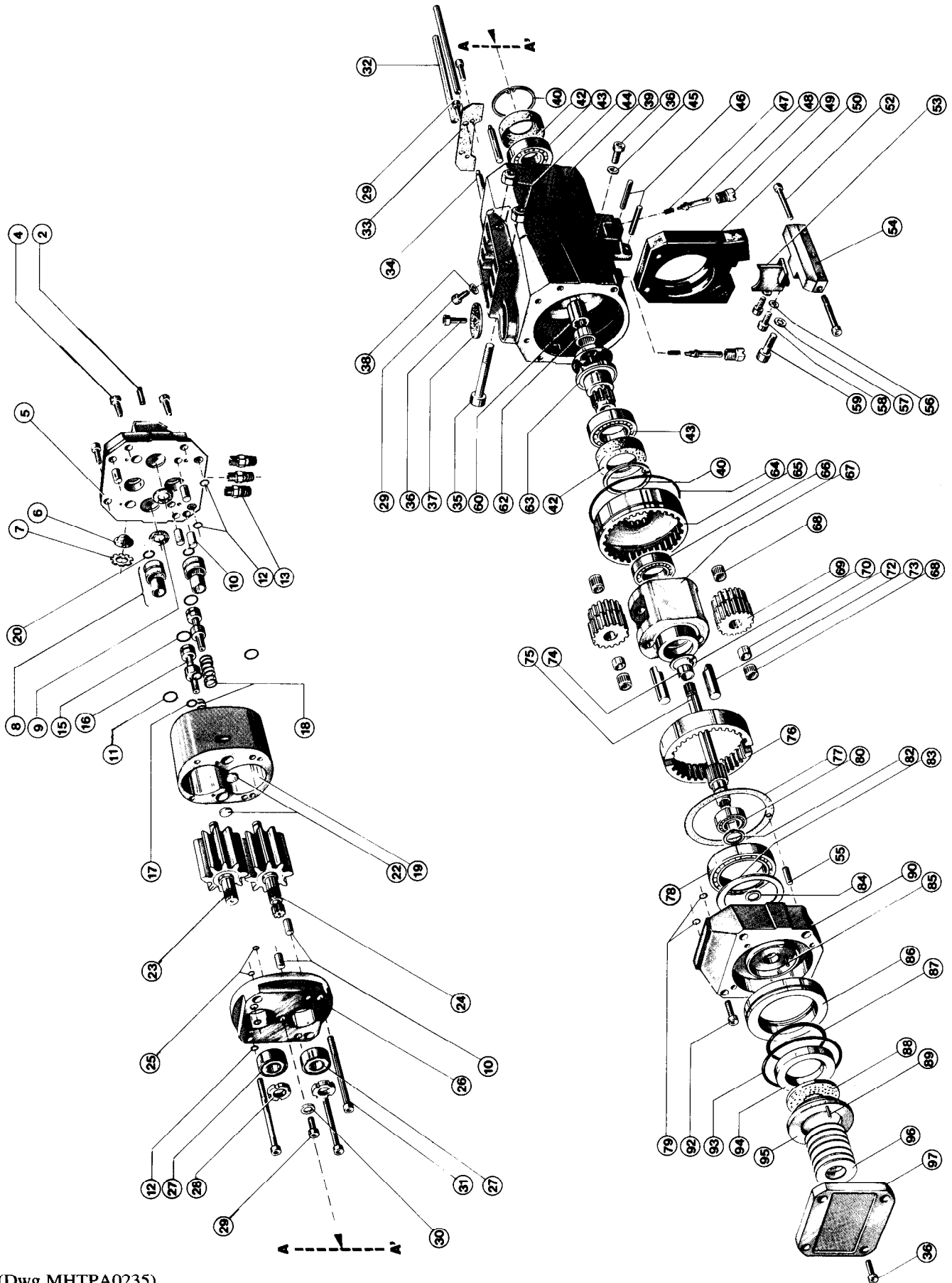
Ingersoll-Rand will not accept any returned goods for warranty or service work unless prior arrangements have been made and written authorization has been provided from the location where the goods were purchased.

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.**

HOIST ASSEMBLY DRAWING



(Dwg. MHTPA0235)

HOIST ASSEMBLY PARTS LIST

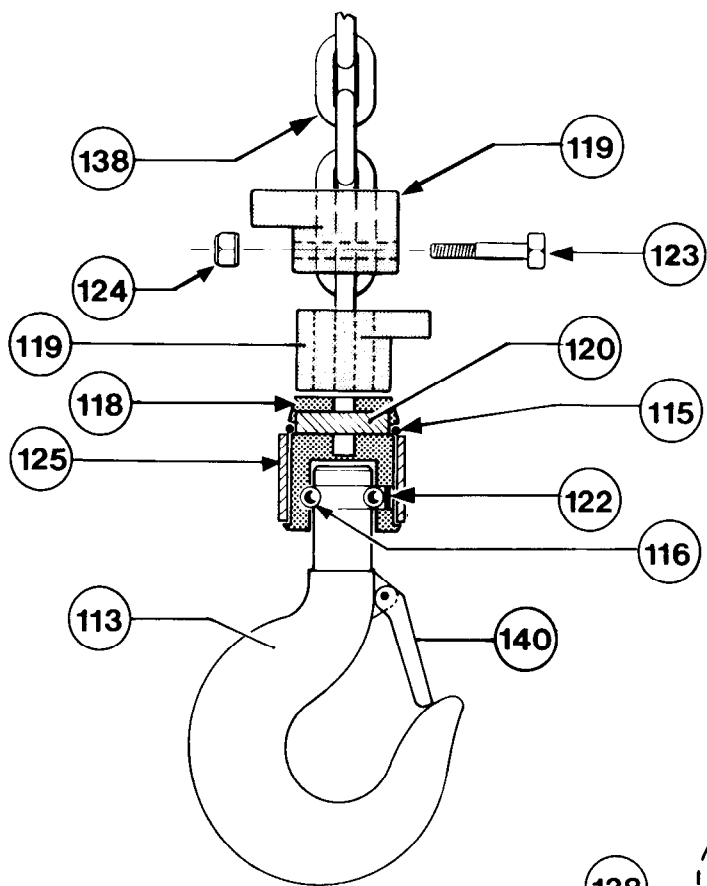
ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.
2	Screw	1	4200-5507
4	Capscrew	4	4130-1006
5	Motor Cover	1	9609-0079
6	Filter	1	6190-9028
7	Stop Ring	1	4770-3018
8	Bearing	2	5646-1912
9	Stop	2	9609-0042
10	Pin	6	4600-0416
• 11	O' Ring	2	5823-1229
• 12	O' Ring	6	5821-2229
13	Fitting	3	6165-2632
• 15	O' Ring	2	5822-8929
16	Slide Valve (Std)	2	9424-0212
	Slide Valve (High Precision)		9609-0084
• 17	O' Ring	2	5820-5029
18	Spring	2	9424-0224
19	Motor Housing	1	9609-0007
20	Retainer Ring	2	4780-1339
22	Slide Valve	2	9412-0030
23	Idle Gear	1 set	3609-0128
24	Driving Gear		
• 25	O' Ring	2	5822-2329
26	Motor Flange	1	9609-0008
27	Bearing	2	5060-0002
28	Nut	2	5700-0002
29	Capscrew	1	4130-6706
30	Washer	1	9609-0032
31	Capscrew	4	4130-0806
32	Tube	2	9609-0055
33	Screen	1	9609-0057
34	Shaft	2	9609-0040
35	Capscrew	2	4134-9606
36	Capscrew	6	4130-0106
37	Silencer	1	9609-0056
38	Washer	1	4500-0106
39	Gear Casing	1	9609-0002
40	Retainer Ring	2	4770-3067
42	Ring	2	9609-0076
43	Bearing	2	5005-0007
44	Nut	2	4370-2311
45	Washer	1	4500-0106
46	Pin	2	9609-0027
47	Spring	2	6916-0332
48	Limit Switch	2	9609-0051
49	Limit Switch Body	2	9609-0050
50	Chain Guide	1	9609-0019

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.
52	Capscrew	2	4130-0406
53	Chain Guide Stop	1	9609-0020
54	Chain Holder	1	9609-0013
55	Pin	2	4600-1716
56	Washer	2	4520-0004
57	Washer	1	4520-0008
58	Capscrew	2	4131-3606
59	Capscrew	1	9609-0098
60	Coupling	1	9609-0034
62	Bearing	1	5632-2115
63	Sprocket	1	9609-0009
• 64	O' Ring	1	5821-6129
65	Ring Gear (Std)	1	9609-0094
	Ring Gear (High Precision)		9609-0037
66	Bearing	1	5080-0005
67	Planet Carrier	1	9609-0014
68	Bearing (Std)	4	5650-1513
	Bearing (High Precision)		5650-1613
69	Planet Gear (Std)	1 set	3609-0129
	Planet Gear (High Precision)		3609-0130
70	Retainer Ring	1	4770-3032
72	Spacer (Std)	2	9609-0095
	Spacer (High Precision)		9609-0026
73	Planet Pin	2	9609-0039
74	Bearing	1	5636-2432
75	Pinion	1	9609-0035
76	Ring Gear	1	9609-0038
77	Gasket	1	9609-0041
78	Bearing	1	5080-0009
• 79	O' Ring	2	5821-2229
80	Bearing	1	5000-0002
82	Retainer Ring	1	4770-0015
83	Spring Washer	1	6916-0432
84	'U' Cup Seal	1	5801-7430
85	Pin	1	4640-4618
86	Piston	1	9609-0113
• 87	O' Ring	1	5823-2229
• 88	Brake Friction Disc	1	9609-0049
89	Pin	1	4640-6118
90	Brake Cover	1	9609-0004
92	Capscrew	4	4131-4906
• 93	O' Ring	1	5823-2329
• 94	Brake Disc	1	9609-0047
• 95	Brake Disc	1	9609-0046
96	Spring Washer	7	6916-0532
97	Cover	1	9609-0005
99*	Nameplate	1	71070031

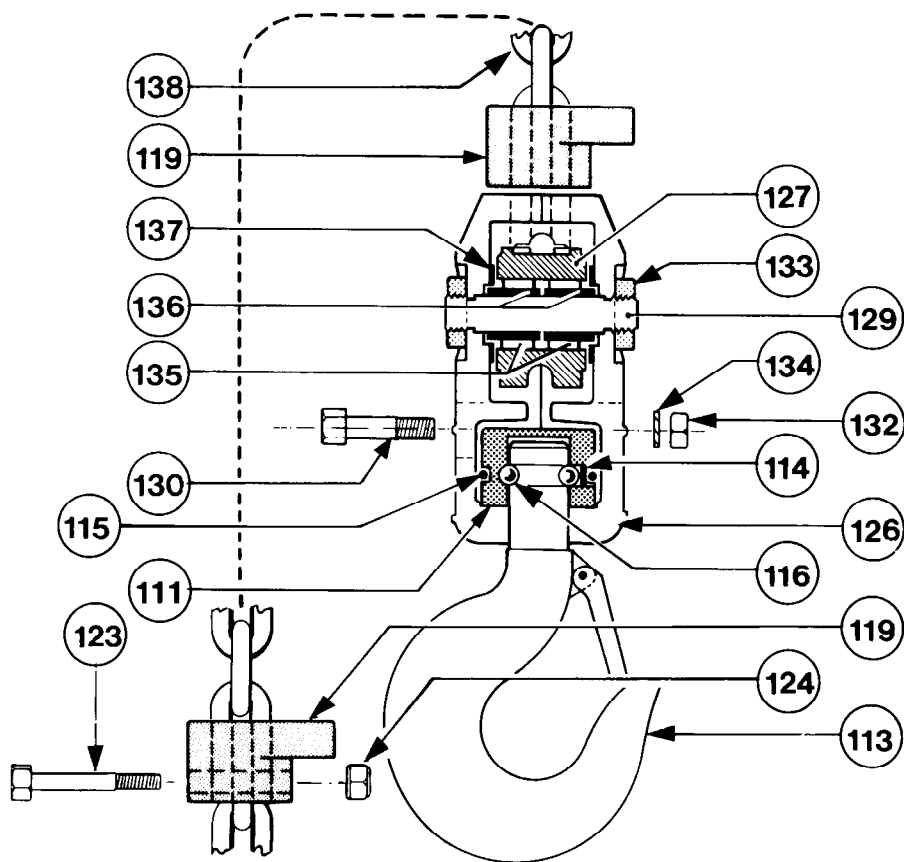
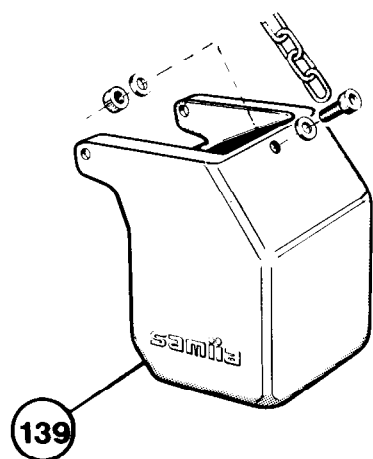
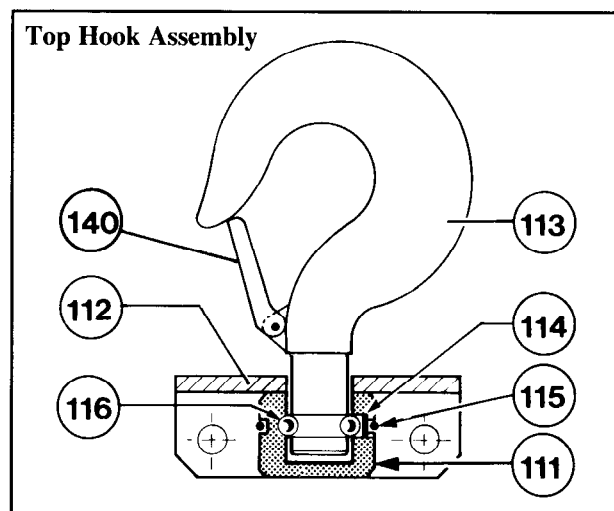
• Recommended Spare

* Not Shown

HOOK ASSEMBLY DRAWING



1/4 - 1/2 Ton Bottom Hook Assembly



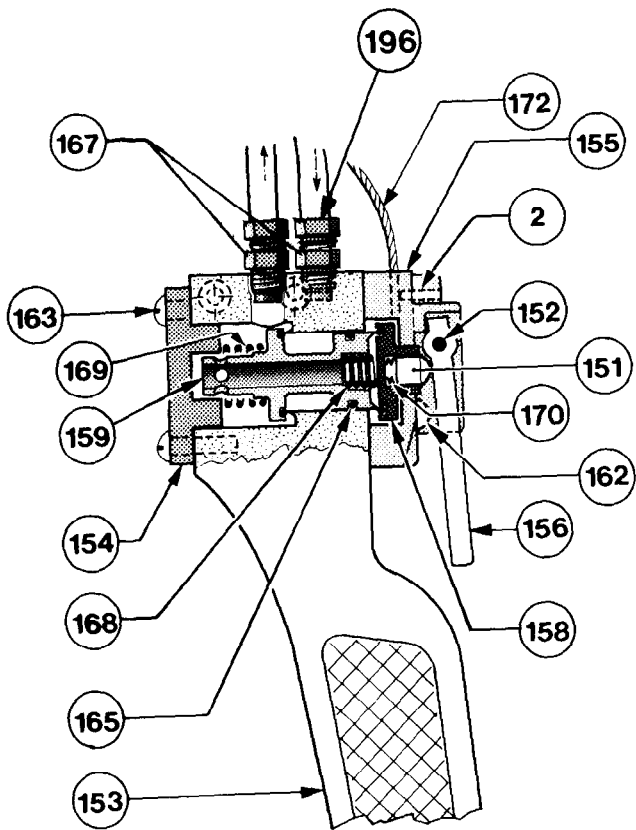
1 Ton Bottom Hook Assembly

HOOK ASSEMBLY PARTS LIST

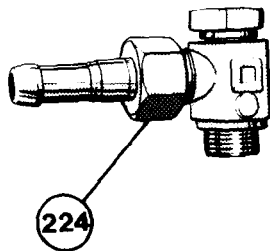
ITEM NO	DESCRIPTION OF PART	QTY TOTAL	PART NO.		
			0.25 ton	0.5 ton	1 ton
110	Top Hook Assembly (Incl's items 111 through 116 and 140)	1	3609-0106		
111	Hook Ring	1	9609-0012		
112	Support Plate	1	Order Item 110		
113	Hook	1	Order Item 110		
114	Washer	1	9609-0024		
115	Retainer Wire	1	4790-1239		
116	Ball	10	6940-1125		
117	Bottom Hook Assembly *	1	3609-0111	3609-0112	3609-0113
118	Hook Support	1	Order Item 117		
119	Buffer	2	9609-0018		
120	Pin	1	4600-1616		
122	Washer	1	9609-0060		
123	Screw	1	4130-0806		
124	Nut	1	4370-5011		
125	Hook Ring	1	9609-0069	9609-0068	---
126	Block Flange	2	---	---	Order Item 117
127	Block Wheel	1	---	---	9609-0010
129	Pin	1	---	---	9609-0052
130	Screw	2	---	---	4130-0406
132	Nut	2	---	---	4300-0711
133	Nut	2	---	---	4320-0112
134	Washer	2	---	---	4520-0006
135	Bearing	2	---	---	5632-2115
136	Bearing Ring	2	---	---	5636-2432
137	Spacer	2	---	---	5730-8632
138	Chain	1	LC515-G8		
	Chain Zinc Plate		LC515-G8-AC		
139	Chain Bucket Assembly max. 20 ft. (6 m)	1	CB1000-6M		
	Chain Bucket Assembly max. 40 ft. (12 m)		CB1000-12M		
140	Latch Assembly (Incl's spring, latch and rivet)	1	9609-0086		

* Bottom Hook Assembly for 0.25 and 0.5 ton hoists (Incl's items 113, 115, 116, 118 through 125 and 140)
 Bottom Hook Assembly for 1 ton hoists (Incl's items 111, 113 through 116, 119, 123, 124, 126 through 137 and 140)

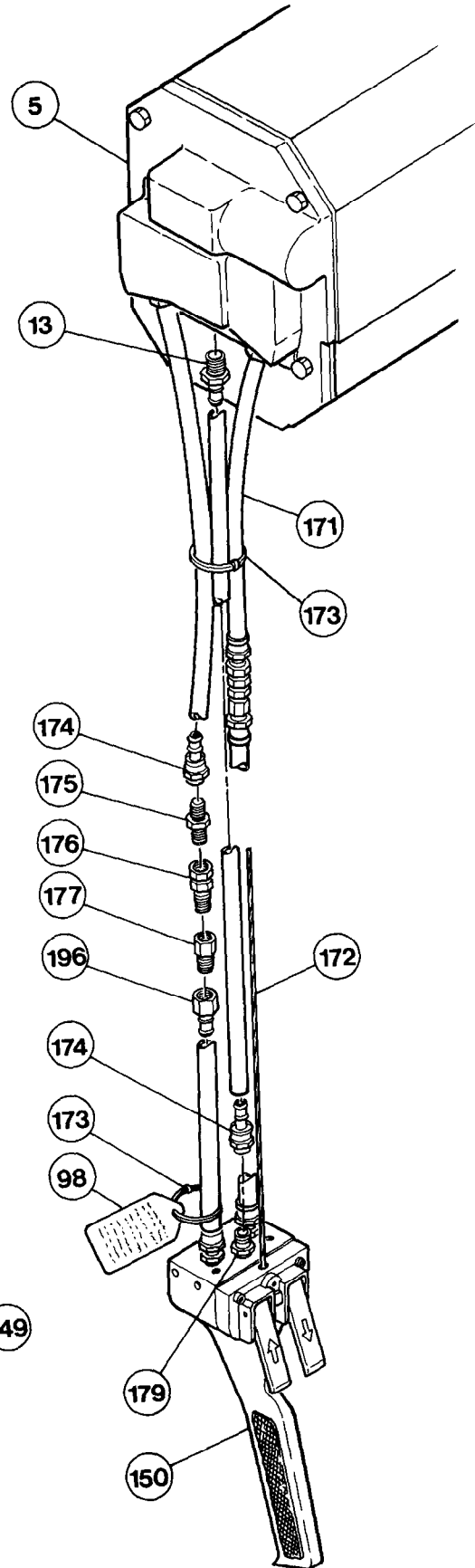
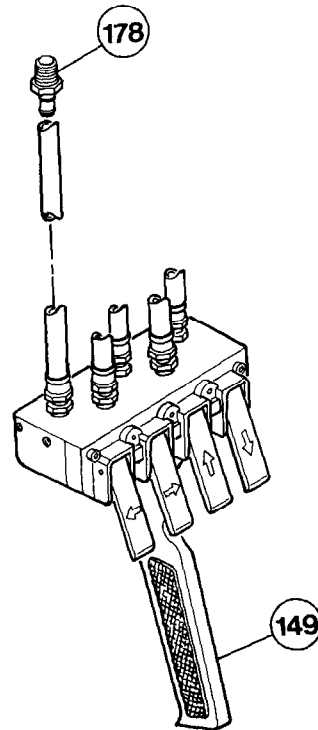
PENDANT ASSEMBLY DRAWING



(Dwg. MHTPA0234)



Note: 4 function Pendant Control Handle (149) supplied with hoist may be different from Pendant Control Handle shown.



(Dwg. MHTPB0254)

PENDANT ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.
2	Screw	1	4200-5507
13	Fitting	3	6165-2632
98	Warning Tag	1	71059612
149	Control Assy (2 motor)	1	PHS4
150	Control Assy (1 motor)	1	PHS2
151	Push Button	2	9579-0011
152	Axle	1	9579-0017
153	Body	1	9579-0020
154	Cover	2	9579-0021
155	Cover	1	9579-0022
156	Lever	2	9579-0023
158	Valve Cone	2	9579-0025
159	Slide Valve	2	9579-0026
162	Screw	3	4130-8806
163	Screw	4	4130-8706

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.
165	Seal	2	5822-5629
167	Nipple	3	6165-2632
168	Spring	2	6915-8632
169	Spring	2	6915-8732
170	Spring Washer	10	6915-9332
171	Hose	As Req'd	50923
172	Wire	1	71073506
173	Tie Wrap	3	54235
174	Fitting	6 (12)	51029
175	Fitting	2 (4)	71048268
176	Exhaust Valve	2 (4)	**
177	Fitting	2 (4)	71048284
178	Fitting	2	54361
179	Fitting	3 (5)	71078158
180*	Remote Control	1	7387-4542

■ Recommended Spare

* Not Shown

Quantities shown in parenthesis () are required for two motor installations.

** Exhaust Valves (item 176) must be installed at 20 ft (6 m) intervals. Exhaust Valves are not sold separately, order Exhaust Valve Kit item 225.

Accessories and Options

ITEM NO.	DESCRIPTION OF PART	PART NO.
220	Lubricator 1/2 in.	L20-04-000
221	Filter 1/2 in.	F20-04-000
222	Regulator 1/2 in.	R20-06-G00
223	Liquidator	8826-W2-000
224	Air Inlet Swivel	71079339
225	Exhaust Valve Kit (Incl's items 175, 176 and 177)	20417
226	Stoplift Assembly PAL250K	ST250H
	Stoplift Assembly PAL500K	ST500H
	Stoplift Assembly PAL1000K	ST1000H
227	Hose Kit (One motor)*	PHB2PP-XX
228	Hose Kit (Two motor)*	PHB4PP-XX

* = Specify Hose Length

SERVICE NOTES

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
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Telex: 786573
Fax: (615) 672-0801

For Technical Support:

INGERSOLL-RAND Material Handling

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Telex: 328795
Fax: (206) 623-0464

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Los Angeles, CA 90022
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