

PARTS, OPERATION AND MAINTENANCE MANUAL for AIR CHAIN HOIST MODELS*

HL1000K
1000 kg (1 ton)

HL1000KR
1000 kg (1 ton)
Spark Resistant

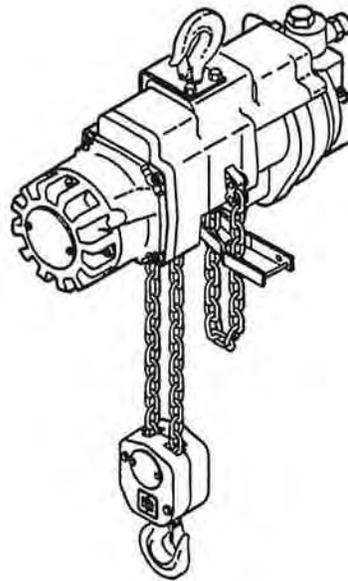
HL1500K
1500 kg (1-1/2 ton)

HL2000K
2000 kg (2 ton)

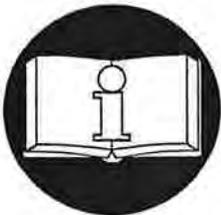
HL3000K
3000 kg (3 ton)

HL4500K
4500 kg (4-1/2 ton)

HL6000K
6000 kg (6 ton)



* Capacities of hoists are in metric tons (1 metric ton = 2,200 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 (ASME B30.16) and any other applicable safety codes and regulations.

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

Form P6587

Edition 6

May 1997

03531837

© 1997 Ingersoll-Rand Company

INGERSOLL-RAND
MATERIAL HANDLING

TABLE OF CONTENTS

Safety Information	
Danger, Warning, Caution and Notice	3
Safety Summary	3
Safe Operating Procedures	4
Warning Tags and Labels	4
Specifications	
Model Code Explanation	6
Installation	
Hoist Checks	7
Hoist Mounting	7
Chain Container	8
Air System	8
Pendant Control Adjustments	9
Storing the Hoist	9
Operation	
Initial Operating Checks	10
Hoist Controls	10
Pendant Controls	10
Pull Chain Control	11
Inspection	
Records and Reports	12
Load Chain Reports	12
Frequent Inspection	12
Periodic Inspection	13
Hoists Not in Regular Use	14
Inspection and Maintenance Report	15
Troubleshooting	16
Lubrication	
General Lubrication	17
Maintenance	
Load Chain Care	18
Initial Chain Installation	19
Chain Replacement	22
Servicing the Filter and Strainer	23
Disassembly	23
Cleaning, Inspection and Repair	25
Assembly	25
Load Test	31
Assembly Drawings and Parts Lists	33 - 61
Assembly Drawing and Parts List Table of Contents	32
Parts Ordering Information	
Return Goods Policy	62
Disposal	62
Warranty Information	63
Offices and Addresses	64

SAFETY INFORMATION

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

Danger, Warning, Caution and Notice

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

DANGER

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

WARNING

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

CAUTION

Caution is used to indicate the presence of a hazard which *will* or *can* cause *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 or attached equipment for lifting, supporting, or transporting people or lifting or supporting loads over people.
- Powered hoists are designed to provide a 5 to 1 safety factor. 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.

NOTICE

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

The National Safety Council, Accident Prevention Manual for Industrial Operations, Eighth Edition and other recognized safety sources make a common point: Employees who work near 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 intended path 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 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 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.

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

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

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

Ingersoll-Rand cannot know of, or provide all the procedures by which product operations or repairs may be conducted and the hazards and/or results of each method. If operation or maintenance procedures not specifically recommended by the manufacturer are conducted, it must be ensured that product safety is not endangered by the actions taken. If unsure of an operation or maintenance procedure or step, personnel should place the product in a safe condition and contact supervisors and/or the factory for technical assistance.

SAFE OPERATING PROCEDURES

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 in their plants. In the event 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 instructed 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. Read the manufacturer's operating instructions before operating the hoist.
5. Never lift a load greater than the rated capacity of the hoist (unless for test purposes).
6. Never use the load chain as a sling.
7. Never operate the hoist with twisted, kinked, "capsized" or damaged chain.
8. Be certain the load is properly seated in the saddle of the hook.
9. Do not use load chain as a ground for welding. Do not attach a welding electrode to a hoist or sling chain.
10. Do not use the up and down stops as a means of stopping a hoist. The up and down stops are emergency devices only.
11. Do not leave a load suspended for extended periods.
12. Always stand clear of the load path.
13. Never use the hoist for lifting or lowering people, and never stand on a suspended load.
14. Never carry loads over people.
15. Before each shift, check the hoist for wear or damage. Check brakes, limit stops, etc.
16. Periodically, inspect the hoist thoroughly and replace worn or damaged parts.
17. Follow the lubrication instructions.
18. Do not attempt to repair load chain or hooks. Replace them when they become worn or damaged.
19. Never operate a hoist when the load chain is not centered under the hook. Do not "side pull" or "yard".
20. Always rig the hoist properly and carefully.
21. Ease the slack out of the load chain when starting a lift. Do not jerk the hoist load.
22. Keep the load chain clean and well lubricated. Do not drag the load chain or hook on the floor.
23. Be certain there are no objects in the way of a moving load.
24. Be certain the air supply is shut off before performing maintenance on the hoist.
25. Do not swing a suspended load.
26. Keep the load block overhead when not in use.
27. After use, or when in a non-operational mode, the winch should be secured against unauthorized and unwarranted use.
28. Avoid collision or bumping of hoists.
29. Pay attention to the load at all times when operating a hoist.
30. Never splice a hoist chain by inserting a bolt between links or by any other means.
31. Do not force a chain or hook into place by hammering, and never insert the point of the hook into a chain link.
32. Do not allow the chain to be exposed to extremely cold weather. Do not apply loads to a cold chain.

WARNING TAGS AND LABELS

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. See parts list in parts section. Read and obey all warnings and other safety information attached to this hoist. Tags and labels are not shown actual size.



WARNING

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

- Do not operate this hoist before reading operation and maintenance manual. 
- Do not 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 a damaged or malfunctioning hoist.
- 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.

P/N 71059812/B
for air and electric chain
and wire rope hoists

INGERSOLL-RAND
MATERIAL HANDLING

SPECIFICATIONS

Table 1

Hoist Model No.	Rated Capacity (kg)	No. Chain Falls	Speed with Rated Load				Speed with Half Load				Speed with No Load				Hoist Weight*	
			fpm		m/m		fpm		m/m		fpm		m/m		lb	kgs
			up	down	up	down	up	down	up	down	up	down	up	down		
HL1000K	1000	1	26	37	7.9	11.3	31	30	9.4	9.1	40	26	12.2	7.9	84	38.1
HL1000KR			16	26	4.9	7.9	22	22	6.7	6.7	28	16	8.5	4.9		
HL1500K	1500	2	13	18	4.0	5.5	15	15	4.6	4.6	20	13	6.1	4.0	125	56.6
HL2000K	2000		8	13	2.4	4.0	11	11	3.4	3.4	14	8	4.3	2.4		
HL3000K	3000	3	4.6	10	1.4	3.0	7.5	8.4	2.3	2.6	10.5	6.6	3.2	2.0	193	87.5
HL4500K	4500	4	3.5	7.6	1.0	2.3	5.8	6.2	1.8	1.9	8.4	4.8	2.6	1.5	248	112.5
HL6000K	6000															

Notes:

- * Based on hook mounted hoist with standard 10 ft (3 m) lift and one motor pendant control.
- ** Performance figures based on 70 SCFM (1.96 cu m/min) at 90 psig (6.3 bar/630 kPa) air supply at hoist inlet. Pendant control models use approximately 4 SCFM (0.11 cu m/min) more air.

Model Code Explanation

Example: HL1000K-2C10-C6S H L 1000K - 2 C 10 - C 6 S

Series: = H

Chain Type: L = Link

Base Model: 1000K = 1000 kg 1 metric ton (2,200 lbs)

1000KR = 1000 kg 1 metric ton (2,200 lbs) Spark Resistant

1500K = 1500 kg 1-1/2 metric tons (3,300 lbs)

2000K = 2000 kg 2 metric tons (4,400 lbs)

3000K = 3000 kg 3 metric tons (6,600 lbs)

4500K = 4500 kg 4-1/2 metric tons (10,000 lbs)

6000K = 6000 kg 6 metric tons (13,200 lbs)

Control: 0 = No control provided

1 = Pull Chain

2 = **Single Motor Pendant**

3 = Two Motor Pendant

4 = Three Motor Pendant

Suspension (1): A = Fixed Lug

B = Bullard Hook (self closing)

C = **Swivel Steel Snap Hook**

R = Bronze Snap Hook

DA = Plain Rigid Trolley (universal wheels "A" flange)

DD = Plain Rigid Trolley (universal wheels "D" flange)

FXXA (2) = Hand Geared Trolley (universal wheels "A" flange)

FXXD (2) = Hand Geared Trolley (universal wheels "D" flange)

HA = Vane Motor Powered Trolley (universal wheels "A" flange)

HD = Vane Motor Powered Trolley (universal wheels "D" flange)

Length of Lift: 10 = 10 feet (3 metres) Standard

XX = Specify Length

Lower Hook: B = Bullard Hook (self closing)

C = **Steel Snap Hook**

R = Bronze Snap Hook

Length of Pull Chain or Pendant Control Hose Drop: * 6 = 6 feet (1.8 metres) Standard

XX = Specify Length (in feet)

Options: E = Epoxy Paint

M = Manual Release Brake Kit

P = Piped Away Exhaust

S = **Steel Chain Container**

U = Fabric Chain Container

CE = Compliance with European Machinery Directive: CE adds Pendant Emergency Stop, Main Air Shut Off Valve and Overload Protection Device

- Notes: (1) Refer to page 58 for Flange Adjustment.
 (2) XX = Specify length of hand chain required. Example: "08" = 8 feet, standard.
 (3) Order hose lengths in feet. Metric sizes listed for reference only.

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".

• 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.

Hoist Checks

Make certain your hoist is properly installed. A little extra time and effort in so doing can contribute toward preventing accidents and helping you get the best service possible. Always make certain the supporting member from which the hoist is suspended is strong enough to support the weight of the hoist plus the weight of a maximum rated load plus a liberal safety factor.

⚠ CAUTION

• Before placing this hoist in service, remove square headed pipe plug from oil fill hole and replace with hex headed breather plug attached to caution tag CA210-121.

1. Remove the solid shipping plug located on top of the hoist and install the attached breather plug prior to using the hoist.
2. With the hoist placed in its normal level position check that the gear case oil level is at the check plug on the side of the gear box.

Hoist Mounting

Hook Mounted Hoist Installation

Place hook over mounting structure. Ensure hook is large enough to properly fit on structure. Make sure hook latch is engaged.

Ensure the supporting member rests completely within the saddle of the hook and is centered directly above the hook shank. Hoist must freely hang from hook without restriction.

⚠ CAUTION

• The supporting member must position on the saddle of the hook. Ensure hoist does not tilt to one side or the other.

Trolley Mounted Hoist Installation

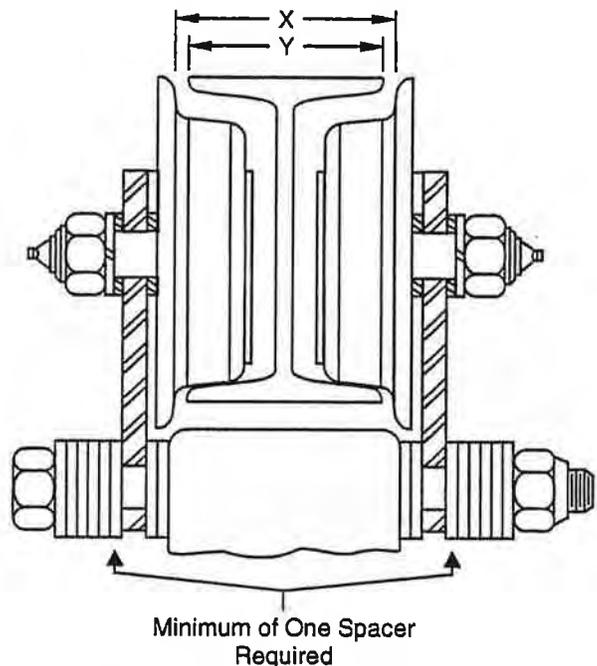
Refer to Dwg. MHP0866

When installing a trolley on a beam, measure the beam flange and temporarily install the trolley on the hoist to determine the exact distribution and arrangement of the spacers. The total distance between the wheel flanges should be $3/16$ to $1/4$ inch (5 to 6 mm) greater than the width of the beam flange. The number of spacers between the trolley side plate and the mounting lug on the hoist must be the same in all four locations in order to keep the hoist centered under the I-beam. The remaining spacers must be equally distributed on the outside of the trolley side plates.

NOTICE

• For specific information relating to trolley installation refer to the manufacturers' manual supplied with the trolley.

HLK Hoist Plain Rigid Trolley



Note: Ensure $X - Y = 3/16$ to $1/4$ inch (5 to 6 mm)

(Dwg. MHP0866)

⚠ WARNING

• A minimum of one adjusting spacer must be placed on the outside of the trolley side plates. Ensure correct installation as described in the parts, operation and maintenance manual provided with the trolley.

Trolley bolt nuts (207) and (220) torque requirements:

On HL1000K, HL1500K, HL2000K and HL3000K hoists torque to 150 ft lbs (203 Nm).

On HL4500K and HL6000K hoists torque to 250 ft lbs (339 Nm).

When installing the hoist and trolley on the beam, make certain the side plates are parallel and vertical. After installation, operate the trolley over the entire length of the beam with rated load suspended 4 to 6 inches (100 to 150 mm) off the floor.

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.

Ensure beam stops are installed prior to operating hoist and trolley.

Chain Container

Refer to Dwgs. TPC451-3 and MHP1029 and the "MAINTENANCE" section for detailed assembly and disassembly information.

NOTICE

- Make certain to adjust the container support such that the chain container does not contact the load chain or hook.
- Operate the hoist to naturally pile chain into the chain container. Piling the chain carelessly into the container by hand may lead to kinking or twisting that may cause chain to 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 the chain container to the hoist.
3. Run bottom block to lowest point and run hoist in up direction to feed the chain back into the container.

WARNING

- Disconnect the hoist from the air supply before installing a chain container kit.

Air System

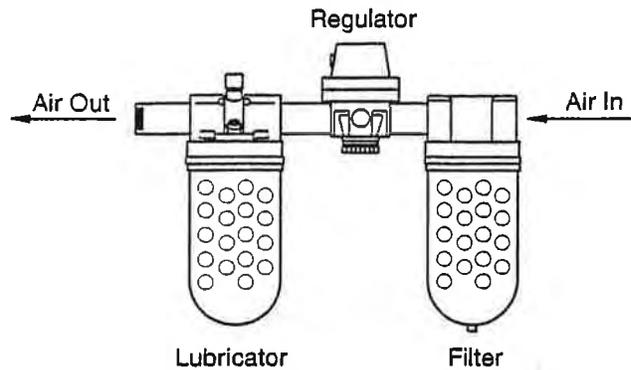
The supply air must be clean, lubricated and free from water or moisture. A minimum air supply of 70 scfm (1.96 cu. m/m) at 90 psig (6.3 bar/630 kPa) at the hoist motor inlet is required, during operation to provide rated hoist performance.

Air Lines

The inside diameter of the hoist air supply lines must not be smaller than 1/2 in (13 mm) for up to 12 ft (4 m) lengths and 3/4 in (19 mm) for up to 50 ft (15 m) lengths 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 with clean, moisture free air 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. Fittings used at the inlet of the hoist must have at least a 3/8 in (10 mm) air passage. Use of smaller fittings will reduce performance.

NOTICE

- Always use an air line filter and lubricator with an HLK hoist.



(Dwg. MHP0191)

Air Line Lubricator

Refer to Dwg. MHP0191.

Always use an air line lubricator with these hoists. Use a lubricator having an inlet and outlet at least as large as the inlet on the hoist motor. Install the air line lubricator as close to the air inlet on the hoist motor as possible. Refer to "ACCESSORIES" in the parts section for the recommended Filter-Lubricator-Regulator.

CAUTION

- Lubricator must be located no more than 10 ft (3 metres) from the hoist motor.
- Shut off air supply before filling air line lubricator.

The air line lubricator should be replenished daily and set to provide lubrication at a minimum rate of 1 to 3 drops per minute adjusted at maximum hoist speed, of SAE 10W oil or a good grade of hydraulic oil.

CAUTION

- Do not use automotive type detergent oil. Detergents will delaminate the motor vanes and cause premature failure.

Air Line Filter

Refer to Dwg. MHP0191

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 10 micron filtration and include a moisture trap. Clean the strainer/filter monthly to maintain its operating efficiency. Refer to "ACCESSORIES" in the parts section for the recommended Filter-Lubricator-Regulator.

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. 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.

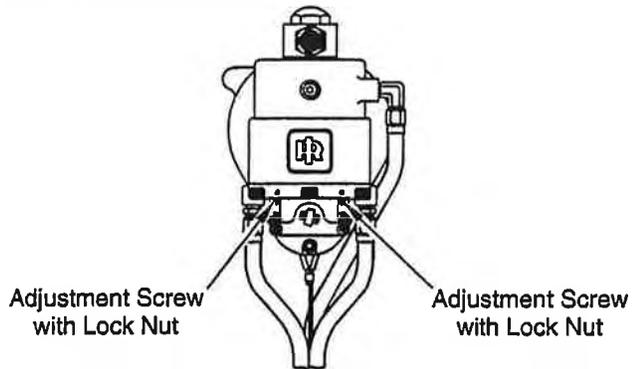
The swivel inlet assembly (includes items 23 through 24C) must be installed on the hoist. Failure to do so may result in a hoist malfunction.

Pendant Control Adjustments

The bleed adjustment screws (19) or (336 [old style]) used on hoists with a pendant control are factory adjusted to provide optimum control at 90 psig (6.3 bar/630 kPa) air pressure. If the hoist is used with other air supply pressures, the bleed adjustment screws may require readjustment.

Adjustment Bleed Screw Location

(New Style valve chest shown.)



(Dwg. MHP1225)

For maximum performance and control, adjust the bleed screws (19) or (336 [old style]) as follows:

1. Loosen the adjustment screw locknut (21) or (337 [old style]).
2. Turn the adjustment screw (19) or (336 [old style]) counterclockwise approximately one third (1/3) of a turn.
3. Fully depress the pendant throttle lever (165) and hold in depressed position. Turn the adjustment screw clockwise until the piston rod fully retracts. This adjustment will provide a good balance of spotting control and maximum hoist speed. If better spotting control is desired, slowly back out the adjustment screw a little at a time until the spotting control is suitable.
4. When adjustment is complete, hold the adjustment screw in position and tighten the adjustment screw locknut (21) or (337 [old style]).
5. Repeat steps 1 through 4 for opposite pendant throttle lever.

Storing the Hoist

1. Always store the hoist in a no load condition.
2. Wipe off all dirt and water.
3. Oil the load 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 people instructed in safety and operation on this product to operate hoist.
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

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



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

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 a small amount of 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 4 to 6 inches (100 to 150 mm) off the floor.
10. Check operation of limit devices.
11. Check to see that the hoist is directly over the load. Do not lift the load at an angle (side pull or "yard").
12. Check to see that the hoist is securely connected to the overhead crane, monorail, trolley or supporting member.
13. Check to see that the load is securely inserted in the hook, and that the hook latch is engaged.

WARNING

• The hook latch is intended to retain loose slings or devices under slack conditions. Hook latches are not intended to be an antifouling device, so caution must be used to prevent the latch from supporting any of the load.

Hoist Controls

Pendant Controls

The HLK hoist can be supplied with an optional manual pull chain control or a one, two or three function pendant depending on application. For detailed information on these products refer to Ingersoll-Rand Manual Form Number P6778 or contact your nearest distributor or the factory.

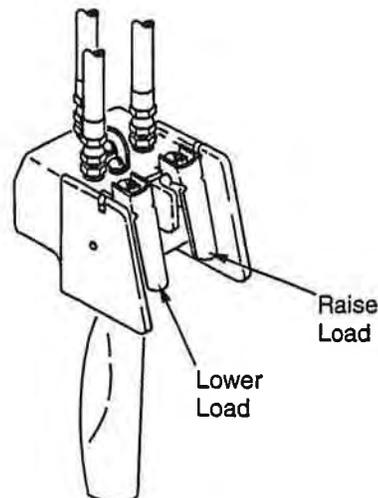
Operation of the hoist is the same for all pendants listed in this section:

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

Single Function, Two Lever Pendant

Refer to Dwg. MHP0427.

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

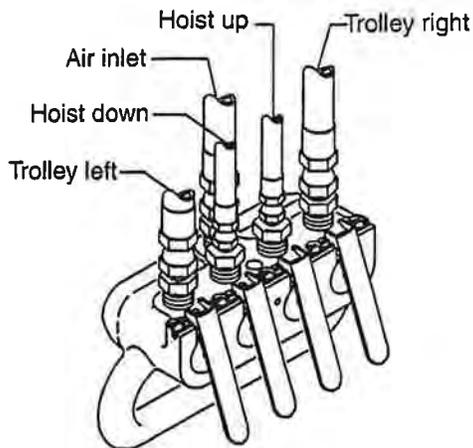


(Dwg. MHP0427)

Two Function, Four Lever Pendant

The four lever pendant is designed to provide a single station for control of hoist and trolley operations.

Refer to Dwg. MHP1008 for pendant lever function and hose to component connections.

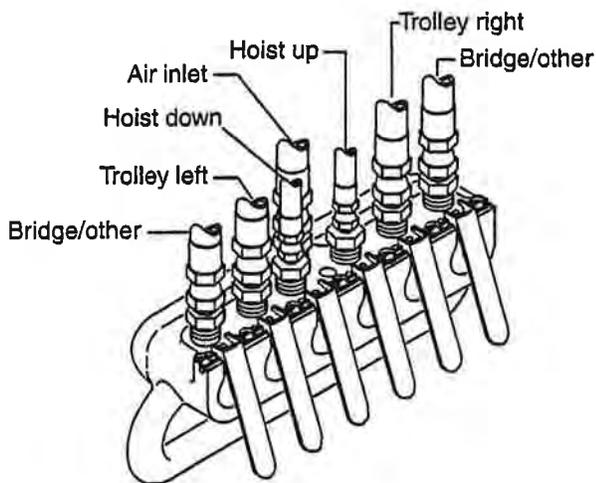


(Dwg. MHP1008)

Three Function, Six Lever Pendant

The six lever pendant is designed to provide a single station for control of the hoist, the trolley and a third related component (bridge/runway) operation.

Refer to Dwg. MHP1009 for pendant lever function and hose to component connections.



(Dwg. MHP1009)

Pull Chain Control

The pull chain provides the operator with a local hoist operating station. The following operating directions are as viewed from the motor end of hoist, facing the pull chains.

1. To lift a load pull down on the right pull chain.
2. To lower a load pull down on the left pull chain.
3. To throttle lift or lowering speed regulate the distance the pull chain travels. Pull chain to full travel for maximum speed; pull chain partially for slower speeds.
4. To stop lift or lowering of load, release the pull chain. Hoist motor will stop.

⚠ WARNING

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

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

The inspection intervals recommended in this manual are based on intermittent operation of the hoist eight hours each day, five days per week, in an environment relatively free of dust, moisture and corrosive fumes. If the hoist is operated almost continuously or more than eight hours each day, more frequent inspections will be required.

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

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

Records and Reports

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

Load Chain Reports

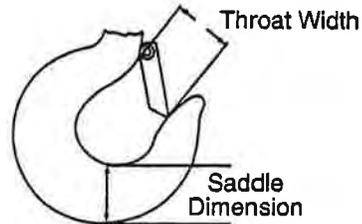
Records should be maintained documenting the condition of load chain removed from service as part of a long-range load chain inspection program. Accurate records will establish a relationship between visual observations noted during frequent inspections and the actual condition of the load chain as determined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

Frequent Inspection

On hoists in continuous service, frequent inspection should be made by operators at the beginning of each shift. In addition, visual inspections should be conducted during regular operation for any damage or evidence of malfunction (such as abnormal noises).

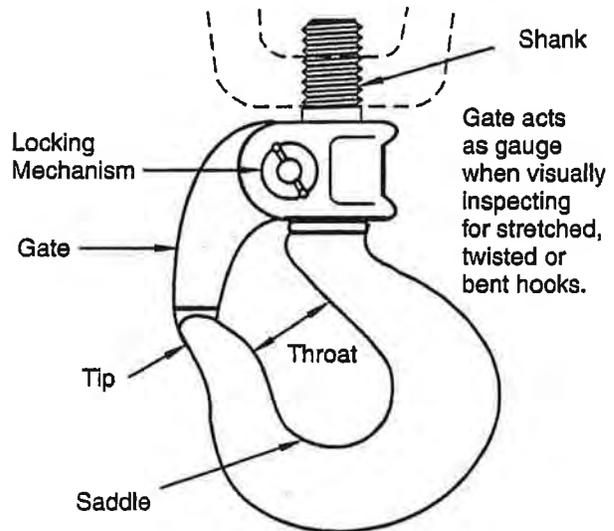
1. OPERATION. Check for visual signs or abnormal noises (grinding etc.) which could indicate a potential problem. Make sure controls function properly and return to neutral when released. Check load chain feed through the hoist and bottom block. If chain binds, jumps, is excessively noisy or "clicks", clean and lubricate the chain. If problem persists, replace the chain. Do not operate the hoist until all problems 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 and/or saddle dimension discard widths specified in Table 2 (refer to Dwg. MHP0040) or exceed a 10° twist (refer to Dwg. MHP0111). If the hook latch snaps past the tip of the hook, the hook is sprung and must be replaced. Replace Bullard Burnham hooks if the gate no longer contacts the hook tip. Refer to Dwg. MHP0662. Refer to the latest edition of ASME B30.10 "HOOKS" for additional information. Check hook support bearings for lubrication or damage. Ensure they swivel easily and smoothly.

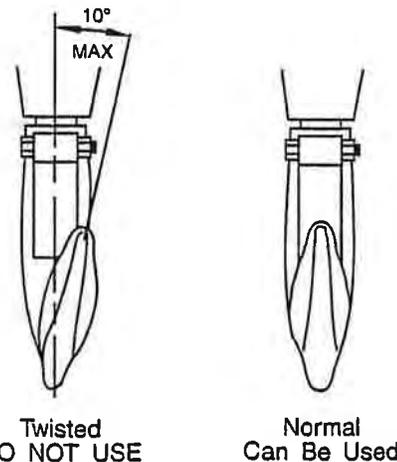


(Dwg. MHP0040)

Bullard Burnham Hook



(Dwg. MHP0662)



(Dwg. MHP0111)

3. UPPER AND LOWER LIMIT DEVICE. Test operation with no load slowly to both extremes of travel. Upward travel must stop when the bottom block or stop ring on chain hits hoist limit arm. Downward travel must stop when the loop at the unloaded end of the chain decreases and activates the limit arm.
4. AIR SYSTEM. Visually inspect all connections, fittings, hoses and components for indication of air leaks. Repair any leaks found. Check and clean the filter in the inlet stud (24) and the inlet strainer (24C) if equipped.
5. CONTROLS. During operation of hoist, verify response to pendant, or pull chain, is quick and smooth. Ensure that the controls return to neutral and hoist operation stops when released. If hoist responds slowly or movement is unsatisfactory, do not operate hoist until all problems have been corrected.
6. HOOK LATCH. Make sure the hook latch or gate is present and operating. Replace if necessary.

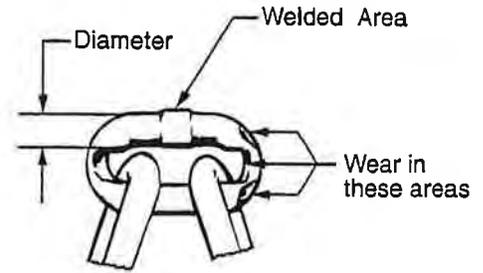
⚠ CAUTION

• Do not use hoist if hook latch or gate is missing or damaged.

7. LOAD CHAIN. Examine each link 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 (refer to Dwg. MHP0102). Replace a chain that fails any of the inspections. Check chain lubrication and lubricate if necessary. Refer to 'Load Chain' in "LUBRICATION" section.

⚠ CAUTION

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



(Dwg. MHP0102)

8. LOAD CHAIN REEVING. Ensure welds on standing links are away from the powered chain wheel. Reinstall chain if necessary. On hoists with multiple chain falls, make sure load chain is not capsized, twisted or kinked. Adjust as required.

Periodic Inspection

Frequency of periodic inspection depends on the severity of usage:

NORMAL	HEAVY	SEVERE
yearly	semiannually	quarterly

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

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

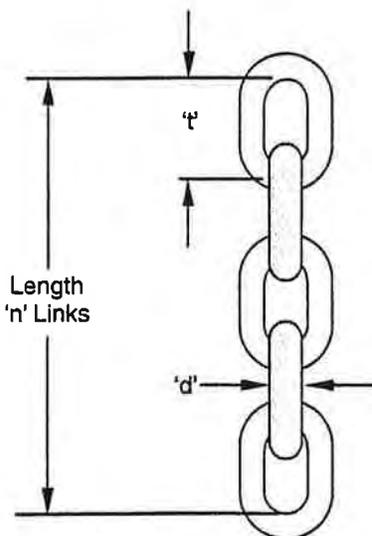
1. FASTENERS. Check all rivets, split pins, capscrews and nuts. Replace if missing or tighten if loose.
2. ALL COMPONENTS. Inspect for wear, damage, distortion, deformation and cleanliness. If external evidence indicates the need, disassemble. Check gears, shafts, bearings, sheaves, chain guides, springs and covers. Replace worn or damaged parts. Clean, lubricate and reassemble.

Table 2

Hoist Model	Throat Width (with Latch installed)											
	Standard				Bronze				Bullard Burnham			
	New Hook		Discard Hook		New Hook		Discard Hook		New Hook		Discard Hook	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
HL1000K and HL1500K	1.12	28.4	1.21	30.7	1.06	26.9	1.14	29.0	1.37	34.8	1.48	37.6
HL2000K	1.06	26.9	1.14	29.0	1.50	38.1	1.62	41.1	1.50	38.1	1.62	41.1
HL3000K	1.50	38.1	1.62	41.1					1.87	47.5	2.02	51.3
HL4500K					1.75	44.5	1.89	48.0	3.00	76.2	3.24	82.3
HL6000K	1.75	44.5	1.89	48.0	2.75	69.9	2.97	75.4				

Hoist Model	Saddle Dimension											
	Standard				Bronze				Bullard Burnham			
	New Hook		Discard Hook		New Hook		Discard Hook		New Hook		Discard Hook	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
HL1000K and HL1500K	1.12	28.4	1.21	30.7	1.44	36.6	1.56	39.6	1.34	34.0	1.45	36.8
HL2000K	1.44	36.6	1.56	39.6	1.81	46.0	1.95	49.5	1.50	38.1	1.62	41.1
HL3000K	1.81	46.0	1.95	49.5					1.87	47.5	2.02	51.3
HL4500K					2.25	57.2	2.43	61.7	2.75	69.9	2.97	75.4
HL6000K	2.25	57.2	2.43	61.7	2.97	75.4	3.21	81.5				

3. **HOOKS.** Inspect hooks carefully for cracks using magnetic particle or other suitable nondestructive method. Inspect hook retaining parts. Tighten or repair, if necessary.
4. **LOAD CHAIN WHEELS.** Check for damage or excessive wear. Replace if necessary. Observe the action of the load chain feeding through the hoist. Do not operate a hoist unless the load chain feeds through the hoist and hook block smoothly and without audible clicking or other evidence of binding or malfunctioning.
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 4 to 6 inches (100 to 150 mm) off the floor. Verify hoist holds the load without drift. If drift occurs, disassemble. Remove brake discs as described in the "MAINTENANCE" section. Check and clean the brake parts each time the hoist is disassembled. Replace the brake discs if the thickness is less than 0.090 inch (2.29 mm).
7. **SUPPORTING STRUCTURE.** Check for distortion, wear and continued ability to support load.
8. **TROLLEY (if equipped).** Check that the trolley wheels track the beam properly and clearance between each wheel flange and beam is correct, 3/32 to 1/8 in. (2 to 3 mm). Check that wheels and beam are not excessively worn. Inspect side plates for spreading due to bending. Do not operate the hoist until any problems have been determined and corrected.
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.
11. **LOAD CHAIN.** Measure the load chain for wear over a five link section as shown in Dwg. MHP1291. Pay particular attention to the most frequently reeved links. When any five links in the working length reaches or exceeds the discard length shown in Table 3, replace the entire chain. Always use a genuine **Ingersoll-Rand** Material Handling replacement chain.



(Dwg. MHP1291)

Table 3 Load Chain Length

Dimensions Of Link		Number Of Links (n)	Discard Length (n) Links
Nominal Wire Diameter (d)	Pitch (t)		
3/8	1.012 in	5	5.175 in
	25.7 mm		131.4 mm

Zinc plated load chain is standard on HLK hoists built after January 1996. Always use stainless steel load chain on HL1000KR Spark Resistant Hoists.

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 throttle lever moves freely. To limit hook downward travel the loop in the slack chain side must contact the throttle lever. To limit hook upward travel the bottom hook block, or stop ring, must contact the throttle lever.
To test "UP" and "DOWN" travel limits first run hoist slowly with no load to verify proper function. Repeat test at full speed with no load to verify proper function. On Hoist Models HL4500K and HL6000K the throttle lever (35) may require minor adjustment to provide adequate clearance with the upper suspension block.

Hoists Not in Regular Use

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

INSPECTION AND MAINTENANCE REPORT

Ingersoll-Rand HLK Air Chain Hoist

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

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

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

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

* Refer to the Parts, Operation, and Maintenance Manual 'Load Test' in the "MAINTENANCE" section to determine Maximum Test Load.
 This page may be photocopied and used by inspectors or maintenance personnel.

TROUBLESHOOTING

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

SYMPTOM	CAUSE	REMEDY
Hoist will not operate.	No air supply to hoist, or too little flow or pressure.	Check air supply line connections and hoses. Check supply air at hoist motor inlet. A minimum of 70 scfm (1.96 cu. m/m) air flow at 90 psig (6.3 bar/630 kPa) at hoist motor inlet is required to provide rated performance.
	Hoist is overloaded.	Reduce load to within rated capacity.
	Motor is damaged.	Disassemble, inspect and replace parts. Refer to "MAINTENANCE" section.
	Pendant malfunction.	Check pendant throttle lever for free movement. Check air pressure at pendant. Minimum operating pressure in pendant line must be 55 psig (3.8 bar/380 kPa). Check lubricator oil level. Fill if low.
	Brake not releasing.	Check brake release circuit and pressure. Minimum operating pressure at brake inlet must be 55 psig (3.8 bar/380 kPa).
Load continues to move when hoist is stopped (UP direction).	Valve or throttle lever sticking.	Check pendant throttle lever for free movement. Lubricate or repair as required.
	Dump valves not releasing.	Check pendant hose dump valves.
Load continues to move when hoist is stopped (DOWN direction).	Pendant lever sticking.	Check pendant throttle lever for free movement.
	Dump valves not releasing.	Check pendant hose dump valves.
	Hoist is overloaded.	Reduce load to within rated capacity.
	Valve or throttle lever sticking.	Check pendant throttle lever for free movement.
Hoist does not lift load.	Brake is slipping.	Check brake springs and brake disc linings for wear. Refer to "MAINTENANCE" section.
	No air supply to hoist, or too little flow or pressure.	Check air supply line connections and hoses. Check supply air at hoist motor inlet. A minimum of 70 scfm (1.96 cu. m/m) air flow at 90 psig (6.3 bar/630 kPa) at hoist motor inlet is required to provide rated performance.
	Hoist is overloaded.	Reduce load to within rated capacity.
	Main air travel is restricted.	Check throttle lever and linkage for free, unobstructed movement.
	Exhaust restricted.	Inspect vents and replace mufflers. Refer to "MAINTENANCE" section.
Reduced speed and/or capacity.	Motor is damaged.	Disassemble, inspect and replace parts. Refer to "MAINTENANCE" section.
	Inlet stud (24) screen plugged, restricting air flow.	Replace old style inlet stud with screen with new style (without screen), or remove screen.
	Lubricator oil level low.	Fill lubricator.
	No air supply to hoist, or too little flow or pressure.	Check air supply line connections and hoses. Check supply air at hoist motor inlet. A minimum of 70 scfm (1.96 cu. m/m) air flow at 90 psig (6.3 bar/630 kPa) at hoist motor inlet is required to provide rated performance. Check pendant control adjustment as described in the "INSTALLATION" section.
Hoist operates in LOWER direction but will not LIFT.	Bleed screws out of adjustment.	Adjust bleed screws as described in 'Bleed Screw Adjustment' procedure in "INSTALLATION" section.
	Hoist is overloaded.	Reduce load to within rated capacity.
Hoist operates in LIFT direction but will not LOWER.	Pendant malfunction.	Check pendant throttle lever for free movement. Check air pressure at pendant. Minimum operating pressure in pendant line must be 55 psig (3.8 bar/380 kPa).
	Brake piston seals leaking.	Install new seals. Refer to "MAINTENANCE" section.
Load chain jumps on sheave or makes a "snapping" sound.	No air supply to hoist, or too little flow or pressure.	Check air supply line connections and hoses. Check supply air at hoist motor inlet. A minimum of 70 scfm (1.96 cu. m/m) air flow at 90 psig (6.3 bar/630 kPa) at hoist motor inlet is required to provide rated performance.
	Dirty or lack of oil on load chain.	Clean and lubricate load chain. Refer to "LUBRICATION" section.
	Worn or rusted load chain.	Inspect load chain. Refer to "INSPECTION" section. Clean and lubricate load chain. Refer to "LUBRICATION" section.
	Worn load sheave or incorrectly reeved load chain.	Check load chain is correctly reeved. Disassemble, inspect and replace worn parts. Refer to "MAINTENANCE" section.
	Capsized hook.	Correct as described in "MAINTENANCE" section.
Hoist not in-line with load.	Align hoist with load. Do not side pull or "yard".	

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. 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 provide proper lubrication may result in damage to the hoist and/or its associated components.

INTERVAL	LUBRICATION CHECKS
Start of each shift (Operator)	Check flow and level of air line lubricator (1 to 3 drops per minute) when operating hoist at maximum motor speed.
Weekly (Maintenance personnel)	Clean and lubricate load chain.
	Lubricate hook latch and pivot points.
Monthly (Maintenance personnel)	Inspect and clean or replace air line filter.
Yearly (Maintenance personnel)	Drain and replace housing oil.

Note: Intervals are based on hoist operation in a normal environment as described in the "INSPECTION" section. In HEAVY or SEVERE operating conditions adjust lubrication intervals accordingly.

General Lubrication

Whenever a Series HLK Hoist is disassembled for overhaul or replacement of parts, lubricate as follows:

1. Coat all motor parts with a light film of **Ingersoll-Rand** Pneu-Lube® Medium Oil No. 50 or a good quality hydraulic oil before assembling.

⚠ CAUTION

• Do not use automotive type detergent oil. Detergents will delaminate the motor vanes and cause premature failure.

2. Apply a coating of **Ingersoll-Rand** No. 70 Grease or multipurpose grease to the throttle shaft bearings (2) before assembly.
3. Fill the gear case to the level plug on the side of the housing (1) with **Ingersoll-Rand** No. 62 oil, or Texaco Meropa No. 220. Replace oil level plug and vent plug after filling.

4. The top and bottom hooks are supported by thrust bearings. These bearings must be packed with **Ingersoll-Rand** No. 68 grease or a standard No. 2 multipurpose grease at regular intervals. Neglect of proper lubrication will lead to bearing failure.

In Line Lubricator

Lubricate the motor with **Ingersoll-Rand** Pneu-Lube® Medium Oil No. 10 (or SAE 10), or No. 50 (SAE 20 or 20W) non-detergent motor oil from an in-line lubricator. The use of detergent oil may cause premature failure.

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 each link of the load chain weekly. Apply new lubricant over existing layer.
2. In severe applications or corrosive environments, lubricate more frequently than normal.
3. Lubricate hook and hook latch pivot points with same lubricant used on the load chain.
4. If required, clean chain with acid free solvent to remove rust or abrasive dust buildup and lubricate the chain.
5. Use **Ingersoll-Rand** LUBRI-LINK-GREEN® or a SAE 50 to 90 EP oil.

Hook and Suspension Assemblies

1. Lubricate the hook and hook latch pivot points. Hook and latch should swivel/pivot freely.
2. Use **Ingersoll-Rand** LUBRI-LINK-GREEN® or a SAE 50 to 90 EP oil.
3. On HL4500K and HL6000K hoists lubricate the idler wheel bearings (107) in the upper suspension housing (101) and lower hook block (123) with **Ingersoll-Rand** No. 68 Grease or a good quality No. 2 multipurpose grease.
4. On HL4500K and HL6000K hoists after each 300 hours of operation or more frequently if hoist is operating in a contaminated atmosphere, inject 2 or 3 shots of grease from a grease gun into grease fittings (111) in the end of the idler wheel shafts (110).

Housing

Remove the oil level plug from the side of the housing (1). If the oil level is below the tapped hole, remove the vent plug and add a sufficient amount of **Ingersoll-Rand** No. 62 oil (Texaco Meropa No. 3 or Texaco Meropa No. 220). Reinstall the oil level plug and vent plug.

Other System Components

Refer to the "LUBRICATION" section in the manufacturer's manual provided with the system component for lubrication requirements.

⚠ 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 instructed in service and repair of 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. Testing to more than 100% of rated capacity may be required to comply with standards and regulations set forth in areas outside of the USA.
- Shut off air system and depressurize air lines before performing any maintenance.

Maintenance Intervals

The maintenance interval chart is based on intermittent operation of the hoist eight hours each day, five days per week, in an environment relatively free of dust, moisture and corrosive fumes. If the hoist is operated almost continuously or more than eight hours each day, more frequent maintenance should be performed.

INTERVAL	MAINTENANCE CHECK
Start of each shift (Operator or Maintenance Personnel)	Make a thorough visual inspection of the hoist for damage. Do not operate the hoist if damaged.
	Operate the hoist in both directions. Hoist must operate smoothly without sticking, binding or abnormal noises. Check the operation of the brake.
Semiannually (Maintenance Personnel)	Inspect the brake. Clean or replace parts as required. Adjust brake as necessary.
Yearly (Maintenance Personnel)	Inspect the hoist gearing, shafts and bearings for wear and damage. Repair or replace as necessary.
	Check all the supporting members, including the suspension, fasteners, nuts, sheaves and rigging, etc. for indications of damage or wear. Repair or replace as required.

General Maintenance Instructions

All maintenance work performed on the hoist must be recorded with the date in the inspection report.

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

It is recommended that all maintenance work on the hoist be performed on a bench in a clean, dust free work area. During the process of disassembling the hoist, observe the following:

1. Turn off air system and depressurize air lines before performing any maintenance. Disconnect air line from hoist.

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 necessary.

5. Keep the work area clean to prevent dirt and other foreign matter from getting into bearings and other moving parts.
6. All seals, gaskets and 'O' rings should be discarded once they have been removed. New seals, gaskets 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, machined surfaces and housings.
8. Do not remove any part which is press fit in or on a subassembly unless the removal of the 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.
10. If repair work can only be conducted above body height, suitable working platforms or ladders should be made available.

Load Chain Care

Keep the chain well lubricated as instructed in the "LUBRICATION" section. Never operate a hoist when the load chain does not flow freely and smoothly into and out of the chain wheel(s), or when it makes noises indicative of binding or other malfunctions.

If the chain is visibly damaged replace the chain and examine the chain wheel and chain guard. Install a new chain wheel if the old one is visibly worn. Install a new guard if the old one is broken or distorted.

Refer to "INSPECTION" section for information on load chain inspection.

⚠ CAUTION

- The full extent of load chain wear cannot be determined by visual inspection. At any indication of load chain wear inspect chain and chain wheel. Refer to "INSPECTION" section.

The standard chain provided with this hoist is case hardened to a depth of 0.010 to 0.012 inch (0.25 to 0.35 mm). When the outer hardened case layer is worn through, additional wear will progress rapidly and the strength of the chain will be considerably reduced.

Additionally, the chain will no longer fit the pockets in the hoist chain wheel properly causing the chain wheel to wear rapidly. This will greatly increasing the chance of hoist malfunction and chain breakage.

The hoist chain wheel is designed to outlast several chain replacement cycles if the chain is replaced as recommended.

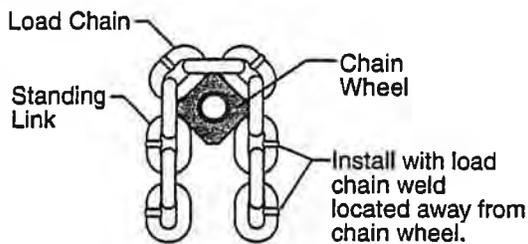
Initial Chain Installation

The following instructions apply to hoists that do not have load chain installed. For hoists with load chain installed, that must be replaced, refer to the 'Chain Replacement' section. When directed to remove or install hoist sections or subassemblies to assist in chain installation, refer to the applicable 'Disassembly' or 'Assembly' section for specific requirements.

HL1000K, HL1000KR and HL1500K

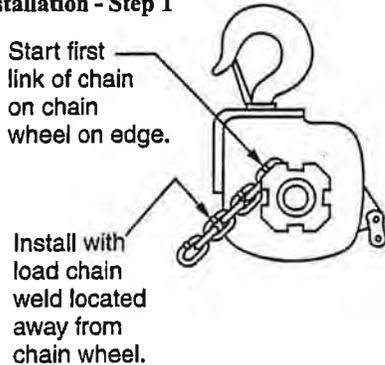
The following steps describe the initial installation of chain on *single fall* hoists that *do not have load chain installed*.

1. Remove the brake spring and piston housing, brake discs and brake plates to expose the brake driver.
2. From the side of the chain wheel opposite the chain anchor bolt, engage the first link of load chain in a pocket of the chain wheel *on edge*. Refer to Dwg. TPA706-4, 'Chain Installation - Step 1.' The weld on the load chain link must face away from the powered chain wheel. Refer to Dwg. MHP0472.
3. Rotate the brake driver by hand to feed the load chain through the hoist.



(Dwg. MHP0472)

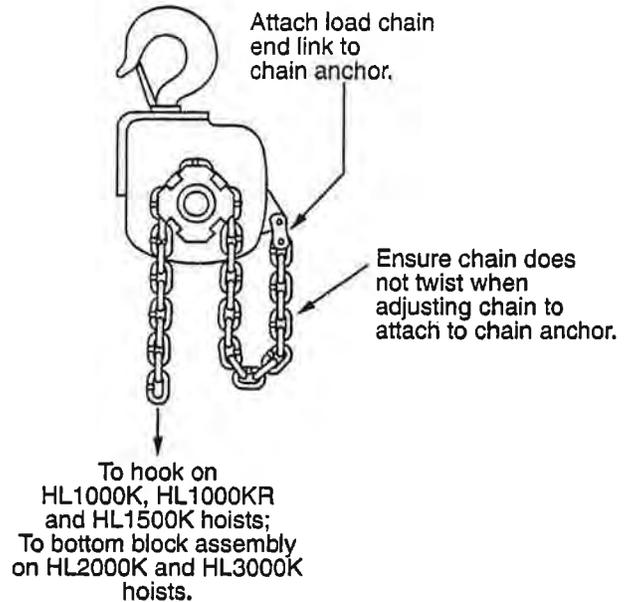
Chain Installation - Step 1



(Dwg. TPA706-4)

4. Keep the load chain straight and do not twist it. Attach the free end of the load chain to the connecting link. Refer to Dwg. TPA706-3, 'Chain Installation - Step 2.' Clean, inspect and install the brake spring, brake discs, brake plates and piston housing on hoist.

Chain Installation - Step 2



(Dwg. TPA706-3)

5. Attach free end of load chain to hook. Inspect chain while operating hoist slowly. Ensure chain feeds through chain wheel smoothly, without sticking or binding. Repeat operation in the opposite direction.

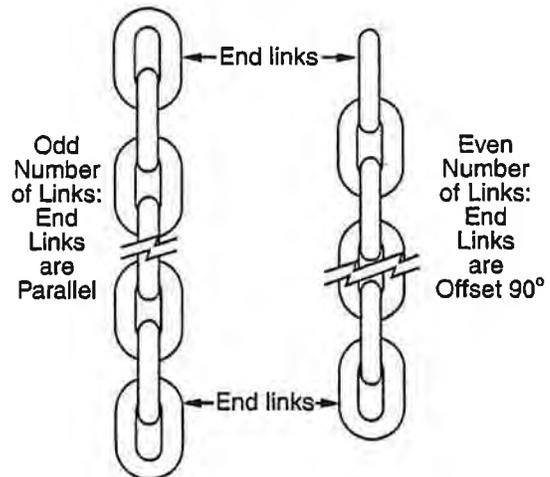
HL2000K and HL3000K

The following steps describe the initial installation of chain on *double fall* hoists that *do not have load chain installed*.

1. Complete steps 1 through 4 of "HL1000K, HL1000KR and HL1500K Chain Installation" section. Refer to MHP0472, TPA706-4, and TPA706-3.

WARNING

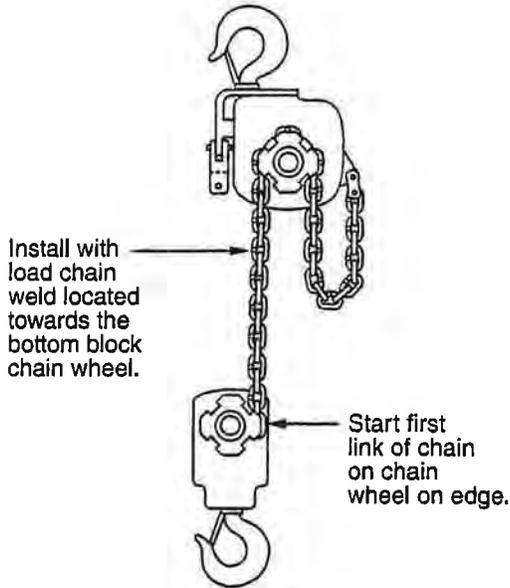
- Replacement chain for an HLK double fall hoist must have an ODD number of total links. Refer to Dwg. MHP0441.



(Dwg. MHP0441)

2. Ensure the chain is straight and feed the end through the bottom hook chain wheel with the first link *on edge with the weld to the inside of the idler chain wheel*. Refer to Dwg. TPA706-2, 'Chain Installation - Step 3.'

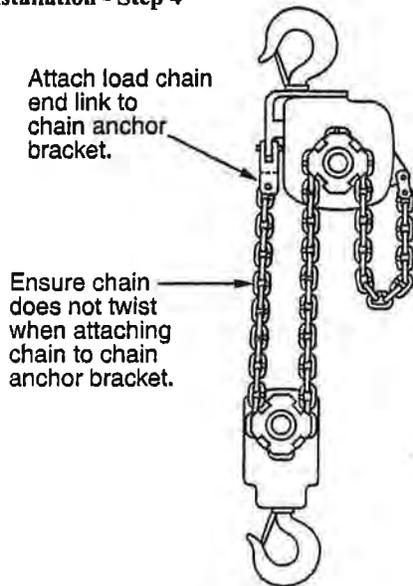
Chain Installation - Step 3



(Dwg. TPA706-2)

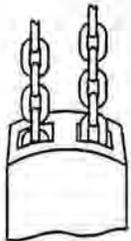
3. Ensure the chain is straight and attach the free end to the chain anchor bracket. Refer to Dwg. TPA706-1, 'Chain Installation - Step 4.'

Chain Installation - Step 4

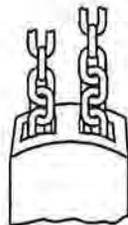


(Dwg. TPA706-1)

4. Inspect to ensure chain is not twisted, kinked or "capsized". Refer to Dwg. MHP0020 and MHP0043.



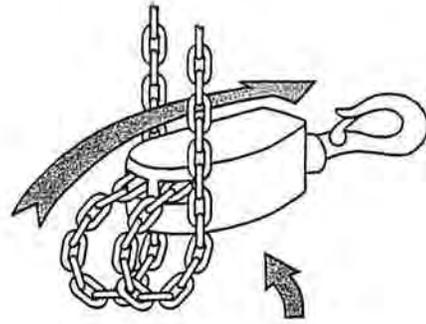
Appearance of chain that is Not Twisted



Appearance of chain that is Twisted

(Dwg. MHP0020)

Capsized Hook



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

(Dwg. MHP0043)

HL4500K and HL6000K

The following steps describe the initial installation of chain on *three or four fall* hoists that *do not have load chain installed*.

1. Remove the brake spring and piston housing, brake discs and brake plates to expose the brake driver.
2. Place the edge of the first link of load chain in a pocket of the hoist powered chain wheel. Refer to Dwg. MHP0472. The weld on the load chain link must face away from the powered chain wheel pocket.

⚠ CAUTION

• **Improper installation of the load chain will cause premature wear of the chain wheels resulting in damaged equipment, which can cause injury or property damage.**

3. Rotate the brake driver by hand to feed the load chain through the hoist in the direction of the dead end chain anchor (raise direction).
4. Keep the load chain straight, do not twist it. Attach the free end of the load chain to the connecting link. Refer to Dwg. TPA1056 for HL4500K and Dwg. TPA1057 for HL6000K. Clean and inspect the brake parts and assemble.
5. On HL6000K hoists, slide the limit stop tube onto the load chain.
6. Keeping the load chain straight, complete the load chain installation as described in either the HL4500K or HL6000K 'Hoist Load Chain Reeving' section.

HL4500K Hoist Load Chain Reeving

Refer to Dwg. TPA1056.

After the load chain has been correctly installed onto the hoist powered chain wheel it must be carefully routed through the lower block idler chain wheel, the upper suspension idler chain wheel and secured to the bottom block housing as described in this section.

⚠ WARNING

• **Twisted load chain can jam as it passes over the chain wheel causing damage to the hoist or breaking the load chain which can cause injury or property damage.**

1. Raise the bottom hook block to a position near the hoist where it can be properly supported and restrained from movement.
2. Ensure the load chain remains straight. Feed load chain through bottom block idler chain wheel.

NOTICE

• The load chain links that were standing links on the powered chain wheel are also standing links on the bottom block idler chain wheel.

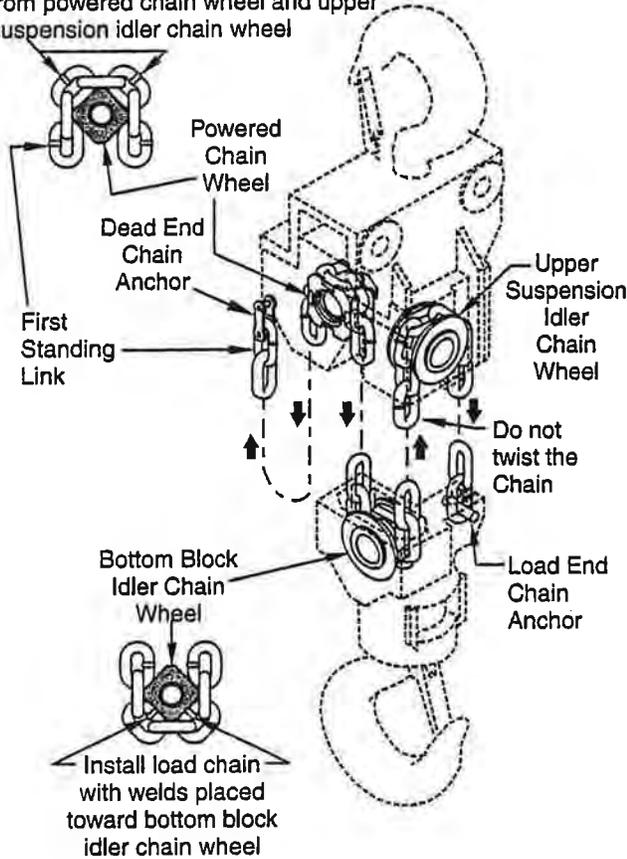
3. Ensure the load chain remains straight. Feed the chain through the upper suspension idler chain wheel.

NOTICE

• The load chain links that were standing links on the powered chain wheel and bottom block chain wheel are flat links on the upper suspension idler chain wheel.

HK4500K Hoist Chain Reeving

Install load chain with welds placed away from powered chain wheel and upper suspension idler chain wheel



(Dwg. TPA1056)

4. Ensure the load chain remains straight. Feed the load chain through the upper suspension idler chain wheel and insert end link into bottom block load end chain anchor. Do not twist the load chain when attaching it to the load end chain anchor. If necessary cut the last link from the load chain (refer to Dwg. MHP0441) and remove it to prevent twisting. Secure in place using anchor pin.

NOTICE

• The bottom block assembly may require adjustment to ensure it is level with an equal number of load chain links along the length of each load bearing fall. To level out the bottom block assembly feed the load chain through the bottom block and upper suspension idler chain wheels as necessary to 'balance' the bottom block assembly. Ensure the powered chain wheel does not turn during adjustment.

5. Lubricate the load chain as described in the "LUBRICATION" section. Operate the hoist fully in both directions without a load attached. Hoist must operate smoothly without sticking, binding or chain 'jumping'. Test hoist completely as described in the 'Testing' section before returning to general service.

HL6000K Hoist Load Chain Reeving

Refer to Dwg. TPA1057.

After the load chain has been correctly installed onto the hoist powered chain wheel it must be carefully routed through the lower block idler chain wheel, the upper suspension idler chain wheel and secured to the housing as described in this section.

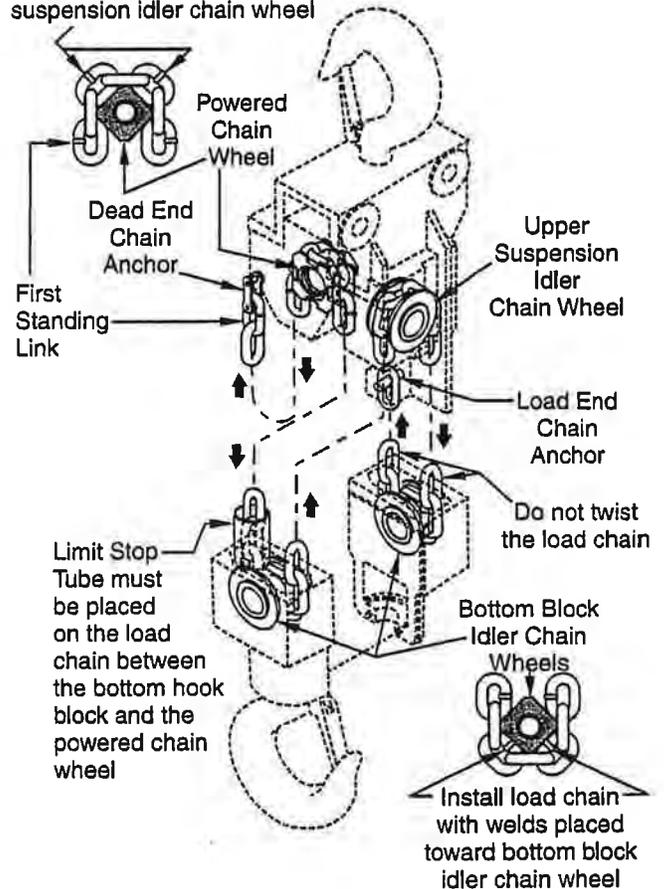
⚠ WARNING

• Twisted load chain can jam as it passes over the chain wheel causing damage to the hoist or breaking the load chain which can cause injury or property damage.

1. Raise the bottom hook block to a position near the hoist where it can be properly supported and restrained from movement.

HL6000K Hoist Chain Reeving

Install load chain with welds placed away from powered chain wheel and upper suspension idler chain wheel



(Dwg. TPA1057)

2. Ensure the load chain remains straight. Place the limit stop tube on the load chain and feed chain through bottom block idler chain wheel.

NOTICE

• The load chain links that are standing links on the powered chain wheel must also be standing links on the bottom block idler chain wheel.

3. Ensure the load chain remains straight. Feed the chain through the upper suspension idler chain wheel.

NOTICE

• The load chain links that are standing links on the powered chain wheel and bottom block chain wheel must be flat links on the upper suspension chain wheel.

4. Ensure the load chain remains straight. Feed the load chain through the second bottom block idler chain wheel. Insert end link into upper suspension load end chain anchor. Do not twist the load chain when attaching it to the load end chain anchor. If necessary cut the last link from the load chain (refer to Dwg. MHP0441) and remove it to prevent twisting. Secure in place using anchor pin.

NOTICE

• The bottom block assembly may require adjustment to ensure it is level with an equal number of load chain links along the length of each load bearing fall. To level out the bottom block assembly feed the load chain through the bottom block and upper suspension idler chain wheels as necessary to 'balance' the bottom block assembly. Ensure the powered chain wheel does not turn during adjustment.

5. Lubricate the load chain as described in the "LUBRICATION" section. Operate the hoist fully in both directions without a load attached. Hoist must operate smoothly without sticking, binding or chain 'jumping'. Test hoist completely as described in the 'Testing' section before returning to general service.

Chain Replacement

The following instructions describe the replacement of load chain on hoists with chain installed. If the load chain has been removed, it must be reinstalled or replaced as described in the 'Initial Chain Installation' section. When directed to remove or install hoist sections or subassemblies to assist in chain installation, refer to the applicable 'Disassembly' or 'Assembly' section for specific requirements.

CAUTION

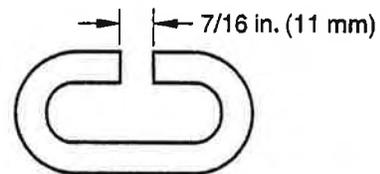
- Damaged load chain may cause chain wheel wear or damage and result in hoist failure, injury or property damage. Worn or damaged load chain must be removed, the hoist and bottom block assemblies disassembled and the powered and idler chain wheels inspected before continuing hoist operations.
- Do not attempt to replace load chain with hoist supporting a load. Remove all loads.
- The following procedures use powered hoist operations. Extreme care must be taken to ensure safe operating conditions exist to prevent injury and hoist or property damage when operating hoist.

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

1. Raise the hoist hook (HL1000K, HL1000KR, HL1500K) or hook block (HL2000K, HL3000K, HL4500K, HL6000K) to a position near the hoist where it can be properly supported and restrained from movement.
2. Disconnect the load chain load end link from either the hook (HL1000K, HL1000KR, HL1500K) or the load end chain anchor (HL2000K, HL3000K, HL4500K, HL6000K). On the HL2000K and HL3000K, remove the load chain from the bottom block.
3. Using an abrasive wheel, cut a section from the end link to form a 'C' link, as shown in Dwg. MHP0502.

CAUTION

• Do not distort the link in any manner. It must be able to pass over the chain wheel(s) without binding.



"C" Link

(Dwg. MHP0502)

4. Connect the new chain to the old chain by inserting the end of the new chain onto the 'C' link. Make certain the welds and links on the new chain match the positioning of the welds and links on the chain being replaced.
5. The following hoist specific instructions describe the steps that must be taken to complete the load chain replacement on your hoist.

HL1000K, HL1000KR and HL1500K Chain Replacement
Complete the initial steps described in 'Chain Replacement'. Conduct the following additional steps on *single fall* hoists to complete load chain replacement installation.

1. Slowly operate the hoist in the raise direction to run off the old chain and reeve the new chain over the chain wheel. Refer to Dwg. TPA706-4.

NOTICE

• The first link of new chain over the powered chain wheel must be a standing link.

2. After the new chain has been reeved over the powered chain wheel, remove the old chain and the 'C' link. Secure the dead end of the load chain to the dead end chain anchor located on the hoist. Refer to Dwg. TPA706-3. Make certain the load chain is not twisted between the chain wheel and dead end chain anchor.
3. Lubricate the load chain. Refer to "LUBRICATION" section.
4. Rotate the last link in the load chain such that it is perpendicular to the next link with the weld facing down, towards the hook. Refer to parts Dwg. MHP1105. Attach the hook to the load end of the load chain. Operate the hoist slowly in both directions. Hoist must operate smoothly, without sticking or binding.

HL2000K and HL3000K Chain Replacement

Complete the initial steps described in 'Chain Replacement'. Conduct the following additional steps on *double fall* hoists to complete load chain replacement installation.

1. Slowly operate the hoist in the raise direction to run off the old chain and reeve the new chain over the chain wheel. Refer to Dwg. TPA706-4.

NOTICE

• On double chain fall hoists the total number of load chain links must be an ODD number. Ensure the new load chain has an odd number of total chain lengths. Refer to Dwg. MHP0441.

• The first link of new chain over the powered chain wheel must be a standing link.

2. After the new chain has been reeved over the powered chain wheel, remove the old chain and the 'C' link. Secure the dead end of the load chain to the dead end chain anchor located on the hoist. Refer to Dwg. TPA706-3. Make certain the load chain is not twisted between the chain wheel and dead end chain anchor.
3. Reeve the load end of the load chain around the bottom block idler chain wheel. Ensure the chain is not twisted between the hoist chain wheel and the bottom block chain wheel. Refer to Dwg. TPA706-2.
4. Ensure the load chain remains straight and attach the load end of the load chain to the chain anchor bracket located on the hoist. Refer to Dwg. TPA706-1.
5. Lubricate the load chain. Refer to "LUBRICATION" section.
6. Operate the hoist slowly in both directions. Hoist must operate smoothly, without sticking or binding.

HL4500K and HL6000K Chain Replacement

Complete the initial steps described in 'Chain Replacement'. Conduct the following additional steps on *three and four fall* hoists to complete load chain replacement installation. Refer to Dwg. TPA1056 for HL4500K hoists and TPA1057 for HL6000K hoists.

1. Keeping the new load chain straight, slowly operate the hoist in the raise direction to run off the old load chain and reeve the new load chain over the powered and idler chain wheels.

NOTICE

• Make certain the welds and links on the new chain match the positioning of the welds and links on the chain being replaced. The new chain must be installed such that as it is reeved through the hoist *the first link of new load chain over the powered chain wheel will be a standing link with the weld facing away from the powered chain wheel.*

2. After the new load chain is reeved over the powered chain wheel, remove the old chain from the dead end chain anchor at the side of the hoist and attach the end of the new chain. Ensure the load chain is not twisted between the powered chain wheel and the dead end chain anchor.

WARNING

• Twisted load chain can jam as it passes over the chain wheels, damaging to the hoist and possibly breaking the chain resulting in injury and property damage.

3. Keep the load end of the load chain straight, attach the load end link to the load end chain anchor located in the bottom block (HL4500K) or in the upper suspension housing (HL6000K). Do not twist the chain when attaching it to the load end chain anchor. If necessary cut the last link from the load chain and remove it to prevent twisting. Refer to Dwg. MHP0441.
4. Lubricate the load chain. Refer to the "LUBRICATION" section.

5. Run the hook up and down several times under power with no load to ensure the load chain is running smoothly over the chain wheels. There must be no apparent binding or evidence of malfunctioning.

Servicing the Filter and Strainer

1. Disconnect the air supply from the hoist.
2. Unscrew the air hose from the inlet strainer (24C).
3. Unscrew the inlet strainer from the inlet body (23).
4. Clean the screen inside the inlet strainer by washing with a quality, non-toxic, nonflammable commercial solvent in a well ventilated area. If the screen is damaged or cannot be cleaned, replace the inlet strainer.
5. Unscrew the inlet stud (24) from the valve chest (6) and remove the inlet stud and inlet body from the valve chest.
6. Push the inlet stud out of the inlet body.
7. Remove the two swivel inlet seals (24A) from the inlet stud.
8. If the swivel inlet gasket (24B) is damaged, replace it.
9. If hoist is equipped with a filter inside the inlet stud, clean by washing with a quality, non-toxic, nonflammable commercial solvent in a well ventilated area. If the filter cannot be cleaned, replace the inlet stud. (New style inlet studs do not have filters).
10. Moisten the new swivel inlet seals with 'O' ring lubricant and install them in the grooves around the body of the inlet stud.
11. Push the inlet stud into the inlet body until the 'hex' of the stud is flush against the face of the inlet body.
12. Keep the threaded hole of the inlet body facing away from the hoist and screw the inlet stud into the valve chest.
13. Screw the inlet strainer into the inlet body.
14. Screw the air hose into the inlet strainer.
15. Reconnect the air supply to the hoist.

Disassembly

WARNING

• Disconnect the air supply hose before performing any maintenance or repairs on this hoist.

Refer to 'General Maintenance Instructions' and also note:

1. The HLK hoist is constructed of various modules. During the process of disassembly it is not always necessary to disassemble a particular module just because it is removed from the hoist. For example, the valve chest assembly must be removed (as an assembly) to access and disassemble the motor. However, the valve chest need not be disassembled unless parts within the valve chest require replacement. Do not disassemble the hoist any further than necessary to replace or repair damaged parts.
2. Do not disassemble this hoist unless you have a complete set of new gaskets, 'O' rings and seals on hand for replacement. These are available in overhaul gasket kit No. HLK-K445. Idler wheel seals (108) and hook pins (130) are not included in the kit and must be ordered separately.
3. Do not attempt to wash sealed bearings.

New Style Valve Chest Disassembly

This procedure describes the disassembly of valve chests used on hoists with the second letter of the Serial Number other than A through G, or with second and third letters of the Serial Number other than HA, HB or HC. Replacement part numbers are listed in the parts section. Refer to Dwg. TPA958-1.

1. On hoists with pendant control, disconnect the three pendant hoses (171) from the fittings (181) and (182). Remove the valve chest plate screw (30) and disconnect the strain relief cable (175).
2. Remove the pendant links (183).

3. Unscrew the valve chest screws (26) and (27) and remove the valve chest (6) and valve chest gaskets (25).
4. Unscrew and remove the swivel inlet assembly. Push the inlet stud (24) out of the inlet body (23) to expose the swivel inlet seals (24A).
5. Unscrew the valve chest cover screws (22) and remove the valve chest cover (18) and valve chest cover gasket (16).
6. Remove the piston and piston shaft assemblies (14 and 15) and piston springs (13).
7. Remove the valve seat lock screws (11).
8. While exerting pressure against the valve seats (10), use retainer ring pliers to remove the valve seat retainers (12).
9. Using a hooked tool, pull the valve seats from the valve chest or rap the bottom of the valve chest on a block of wood.
10. Remove the valve assemblies (7) and (8) and valve springs (9) from the valve chest.
11. If the piston shaft seals (15A) require replacement, press the piston retaining pins (15B) from each piston and shaft and slide the pistons off the shafts.

Old Style Valve Chest Disassembly

This procedure describes the disassembly of valve chests used on hoists with second letter of the Serial Number A through G or with second and third letters of the Serial Number HA, HB, or HC. Refer to Dwg. TPA883-3.

NOTICE

• **Replacement parts for this valve chest are no longer available. Order kit No. MLK-K545B (03835519) to replace this style valve chest if it cannot be repaired.**

1. On a hoist with pendant control, disconnect the three pendant hoses (171) at the elbows (181) and (182). Remove the valve chest plate screw (30) and disconnect the strain relief cable (175).
2. Unscrew and remove the inlet strainer (24C).
3. Unscrew the valve chest screws (26) and (27) and remove the assembled valve chest and valve chest gaskets (25).
4. Unscrew and remove the swivel inlet assembly. Slide the inlet stud (24) out of inlet body (23) to expose the swivel inlet seal (24A).
5. Unscrew the valve chest cover capscrews (339), and withdraw the valve chest cover (334) along with the piston rods (328) and (329), pistons (330) and piston springs (333). Remove the valve chest cover gasket (338).
6. Withdraw the two valves (325) and the two valve springs (327).

NOTICE

• **Valves (325) and sleeves are manufactured as a matched set. Do not mix valves and sleeves. Ensure the valves are marked for sleeve location at disassembly.**

Brake Disassembly

Refer to Dwg. TPB704-3.

1. Unscrew the four shoulder bolts (89) and lockwashers (90) and separate the springs (81) and piston housing (80) as an assembly from the gear case cover (69).

NOTICE

• **When assemblies are separated into component parts the exposed 'O' rings and gaskets should be discarded and replaced with new during assembly.**

2. Remove the brake plates (78) and brake discs (79) from the gear case cover. Remove 'O' ring (air port) (77) and discard.
3. Disassemble the spring and piston housing as follows:
 - a. Remove the plate screws (88) and the plate (87).
 - b. Place the assembly, pressure plate (82) downward, on an arbor press, or; place the assembly vertically in a vise.
 - c. While holding the housing against the compression of the springs (81), hold the pressure plate screw (82A) with a wrench and unscrew the piston nut (82B).
 - d. Relax the tension of the compressed springs (81) by slowly and carefully easing up on the arbor press or vise.
 - e. Remove the pressure plate and push the piston (83) from the housing. Remove 'O' rings (84) and (85) and discard.
4. To remove the brake driver (73), remove retainer screw (76) and brake seal retainer (74). Slide brake driver off motor shaft (38). Remove brake seal (75) and discard.

Motor Disassembly

Refer to Dwgs. TPA958-1 and TPB703-3.

1. Remove the brake mechanism. Refer to 'Brake Disassembly' section.
2. Drain oil from the gear case.
3. Remove the valve chest (6) as an assembly. Refer to applicable (new or old style) valve chest disassembly section.
4. Remove the limit actuator retaining pin (34) and withdraw the limit actuator (33).
5. Unscrew the remaining valve chest plate screws (30) and remove the valve chest plate (28).
6. Grasp the rear end plate (41) and pull the motor from the hoist as an assembly. If the motor is a little "sticky", tap on the brake end of the motor shaft (38) with a soft drift to loosen.
7. Grasp the motor shaft vertically in copper-covered vise jaws.
8. Remove the motor shaft rear retaining ring (39).
9. Separate the rear end plate (41), rear end plate bearing (40), cylinder (44), cylinder dowel (45), vanes (43), rotor (42), front end plate (46) and front end plate bearing (47) into component parts.

Disassembly of the Gearing, Pocket Wheel, Chain Guide, Chain Guard, and Throttle Shaft

Refer to Dwgs. TPB705-2 and MHP1065.

NOTICE

• **When assemblies are separated into component parts the exposed 'O' rings and gaskets should be discarded and replaced with new during assembly.**

1. Remove the brake mechanism. Refer to 'Brake Disassembly' section.
2. Remove the motor. Refer to 'Motor Disassembly' section.
3. Remove the four gear case capscrews (70) and lockwashers (71). Remove the gear case cover (69). It may be necessary to use a slide hammer puller attached to a bar and fastened to two of the brake cover bolt holes.
4. Remove the gear case cover gasket (66) and discard.
5. If required, separate the fixed ring gear (67) from the gear case cover (69) by gently prying the ring gear from the cover, or by removing the ring gear pins (68). Discard the ring gear pins and replace with new.
6. Withdraw the planet frame (54) and gears as an assembly. The planet frame may then be disassembled.

7. Do not remove the needle roller bearings (63A) or (58) from the planet frame or planet gears unless required for repair. If removed they must be discarded and replaced with new sets.
8. Drive out the throttle lever retaining pin (36) from the throttle shaft (32).
9. From the motor end of the hoist, withdraw the throttle shaft (32) and remove the throttle lever (35), throttle lever thrust washers (36A) and throttle shaft spring (37).
10. Withdraw the ring gear (52), powered chain wheel (51A), ring gear bearing (50) and planet frame bearing (63C).
11. Remove the four chain guide capscrews (4A), lockwashers (4B) and the chain guide (4).
12. Remove the chain guard (5).

Chain Container

Fabric Chain Container Disassembly

Refer to Dwg. TPC451-3

1. Run bottom block to lowest point to remove chain from container. Disconnect hoist from air supply.



- **Disconnect the hoist from the air supply before removing chain container.**

1. Separate connecting link (91) and remove support chain (306).
2. Remove nuts (303), lockwashers (304) and bracket bolts (302) connecting mounting bracket (301) to hoist.
3. Remove container as an assembly from hoist.
4. If further disassembly is required, refer to Dwg. TPC451-3 to separate the assembly into its component parts.

Metal Chain Container HLK-K750 Disassembly

Refer to Dwg. MHP1029

1. Run bottom block to lowest point to remove chain from container. Disconnect hoist from air supply.



- **Disconnect the hoist from the air supply before removing chain container.**

2. Remove bracket (317) from chain container by removing bolts (322), lockwashers (316) and nuts (303).
3. Remove chain container from hoist by removing bolts (324), lockwashers (325) and nuts (326).
4. To separate the bracket (317) from end link of load chain, drive out pin (34).
5. To remove stop ring (319), remove setscrew (321) and pin (320) from stop ring. Slide stop ring off of chain.

Cleaning, Inspection and Repair

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

Cleaning



- **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.**

Clean all hoist component parts in solvent (except for the brake discs). Care must be taken to clean components thoroughly, but not damage components during cleaning. 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 remove old Loctite® from the bearing bores without damaging the mating surfaces. 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 brake discs (79). If the brake discs are less than 0.090 in. (2.23 mm) replace the brake discs (79) as a set.
6. Check mufflers (20) and (31) for damage or excessive dirt.
7. Check bearings for rotation and wear. Replace if bearings do not rotate smoothly, without sticking or binding, or if bearings are damaged or excessively worn.
8. Inspect brake driver bearing wear area on brake driver (73) and in planet gear frame (54) for ridges or galling. If either condition exists replace parts.

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 minor nicks, burrs, or galled spots on shafts, bores, pins, or bushings.
4. Examine all gear teeth carefully, and remove nicks or burrs.
5. Polish the edges of all 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.

NOTICE

- **When assemblies are separated into component parts discard all exposed 'O' rings and gaskets and replace with new during assembly.**

Assembly

The following assembly instructions are for a complete assembly of the hoist component modules. Conduct those assembly steps necessary to reassemble the hoist from the point of which your disassembly ended. For example: if the brake was removed as an assembly to access the hoist gears, it is not necessary to completely reassemble the brake to reinstall. Conduct only the steps necessary to reattach the brake assembly to the hoist.

General Instructions

Refer to 'General Maintenance Instructions' and also:

1. The HLK Hoist is constructed of various modules. The following instructions will first describe how to assemble the individual modules and finally, how to assemble a complete hoist from the assembled modules.

2. Always press against the stamped end of a needle-type bearing when installing the bearing in a bearing recess.
3. Always clean and wipe every part (except the brake parts) with a thin film of oil before installation.
4. Never clean sealed bearings using solvent or any other cleaner. Carefully remove dirt, externally applied lubricants and sediment with a rag or stiff bristle brush.

Chain Guard Assembly

Refer to Dwg. MHP1065.

1. Place the chain guard (5) in housing (1).
2. Install the chain guide (4) and loosely secure in place with the chain guide capscrews (4A) and lockwashers (4B).
3. When hoist is completely assembled tighten capscrews.

Planet Gear Frame Assembly

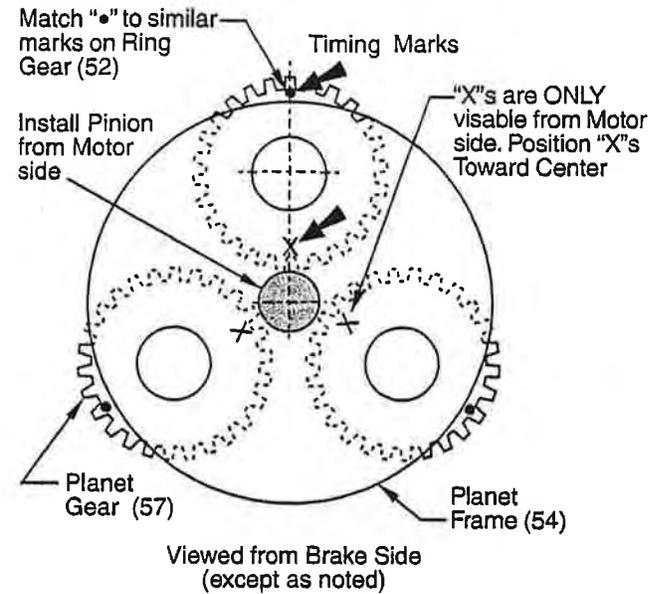
Refer to Dwg. TPB705-2.

1. Press a new planet gear bearing (58) into each end of the planet gears (57). Seat each bearing 1/64 in. (0.5 mm) below the face of the gear.
2. Work a liberal amount of **Ingersoll-Rand No. 11** grease into the bore of the planet gear bearings. Ensure each of the individual needles or rollers are thoroughly covered.
3. Stand the planet gear frame (54) on the table of an arbor press with its short hub upward.
4. Wipe a thin film of **Ingersoll-Rand No. 11** grease on both ends of the planet gears (57) and on the planet gear thrust races (60) and gear thrust bearings (59). Use enough lubricant to allow it to hold the parts in position. Place a planet gear thrust race (60), gear thrust bearing (59) and a second gear thrust race (60) against each face of the planet gear (57).
5. Slide the planet gear/thrust races/thrust bearing assembly, with the planet gear large diameter gear teeth located towards the short hub on the planet gear frame, into one side of the planet gear frame. Press in a planet shaft (61) to secure the gear assembly in the gear frame.
6. Repeat steps 4 and 5 for the second and third planet gear assemblies.
7. Work a liberal amount of **Ingersoll-Rand No. 11** grease into the bore of the brake driver bearing (63A), making certain that each individual needle or roller is covered. Press the brake driver bearing (63A) into the bore of the planet frame (54) hub. Seat bearing 3/16 in. (5 mm) below the face of the hub into the bore of the planet frame (54) hub.
8. Install a new brake driver seal (63B) with the lip facing the bearing (63A).
9. Place the planet frame retainer (62), planet frame seal (65) and oil slinger (63) on planet frame (54) hub. Install planet frame spacer (64) on hub.
10. Ensure the retainer ring is installed on planet frame bearing (63C). Press the bearing fully onto the planet frame (54) hub. Ensure the retainer ring is located with the shortest distance to the edge of the bearing towards the planet frame.
11. Position the planet gear frame (54) such that the pinion gear (72A) or (72B) may be installed from the motor side of the planet frame assembly with the brake side accessible for correct timing mark alignment checks.
12. Refer to Dwg. MHP0569. Rotate the three planet gears until the "X"s on the ends are all located towards the center of the planet frame (54). The timing marks ("•") on the planet gears (57) must locate on the centerline of the outside exposed gear splines.



• It is very important that the planet gears (57) and ring gear (52) are correctly aligned when the planet frame assembly is inserted into the ring gear.

Planet Gear Timing Mark Arrangement



(Dwg. MHP0569)

13. Install the pinion gear (72) with a tooth of the pinion entering each of "X" marked planet gear (57) spaces. The pinion gear internal spline must be located towards the end of the planet frame with the hub (brake end).
14. Ensure the retainer ring is installed on planet frame bearing (56). Place the planet frame spacer (55) on planet frame bearing (56). Install the spacer on the side of the bearing with the most clearance between the retainer ring and the end of the bearing. Press the bearing assembly into the planet frame (54), spacer (55) first, until spacer and retainer ring are flush with the frame.
15. Lubricate and press seal (53) into end of ring gear (52).
16. Lubricate the gear splines and teeth on the planet gears and ring gear (52) with **Ingersoll-Rand No 11** grease. Align the "•" matchmarks on the planet gears (57) to similar "•" matchmarks on ring gear (52) and place the planet frame assembly into the ring gear (52).
17. To install in hoist, refer to 'Hoist Assembly' section.

Motor Assembly

Refer to Dwg. TPB703-3.

1. Grasp the motor shaft (38) vertically in copper-covered vise jaws so that the short-splined end is upward.
2. Press the front end plate bearing (47) into the front end plate (46), and the rear end plate bearing (40) into the rear end plate (41). Apply grease to both bearings.
3. Slide the front end plate and bearing, bearing side first, down over the motor shaft until it seats against the motor shaft shoulder.
4. Slide the rotor (42), counterbored end first, down over the motor shaft until it contacts the front end plate.
5. Moisten each vane (43) with SAE 10 or SAE 20 non-detergent oil, and place a vane in each slot in the rotor (42).
6. Set the cylinder (44) on the rotor, aligning the dowel hole in the cylinder with the dowel hole in the front end plate (46).
7. Slide the rear end plate (41) and bearing (40) assembly, plate flat side first, onto the hub of the motor shaft until it contacts the cylinder. Align the dowel hole in the rear end plate with the dowel hole in the cylinder.
8. Install the motor rear retainer ring (39) in the annular groove on the end of the motor shaft (38).
9. Insert a 1/8 in. (3 mm) steel guide rod about 12 in. (305 mm) long through the dowel holes in the end plates and cylinder to maintain alignment of parts, and remove the assembly from the vise.

10. To install in hoist, refer to 'Hoist Assembly' section.

Brake Assembly

Refer to Dwg. TPB704-3.

1. Lightly coat the piston seals (84) and (85) with 'O' ring lubricant, and install them in their respective grooves on the brake piston (83).
2. Taking care not to cut the seals, slide the piston into the brake spring and piston housing (80).
3. Place the spring and piston housing on the workbench with the three spring cavities facing upward.
4. Place a spring (81) in each cavity.
5. **For New Style Pressure Plates (82):** install the pressure plate screw (82A) such that the screw head mates with the counterbore in the pressure plate face. Place the pressure plate (82) and screw over the springs so that the screw enters the hole in the brake piston.
For Old Style Pressure Plates with and Integral Stud: install the pressure plate, stud side first, over the springs so that the stud enters the hole in the brake piston.

NOTICE

• For improved brake control it is recommended that the old style pressure plate be replaced with the new style pressure plate (82) and screw (82A). The old style pressure plate is not available as a replacement part. To replace order Brake Kit No. MLK-ABK1.

6. Carefully place the assembly in a vise and compress the pressure plate against the brake springs and piston housing until the screw protrudes through the piston. Thread the piston nut (82B) onto the screw at least two full thread lengths, but not enough to fully engage the nut.
7. Slowly release the assembly from the vise.
8. **For New Style Pressure Plates:** tighten the pressure plate screw (82A) and piston nut (82B) until a 0.006 to 0.012 in. (0.15 to 0.30 mm) gap exists between the pressure plate and piston. Refer to Dwg. MHP0488.

NOTICE

• When adjusted, the piston (83) assembly should free float between piston nut (82B) and pressure plate (82). Ensure piston moves freely between nut and pressure plate.

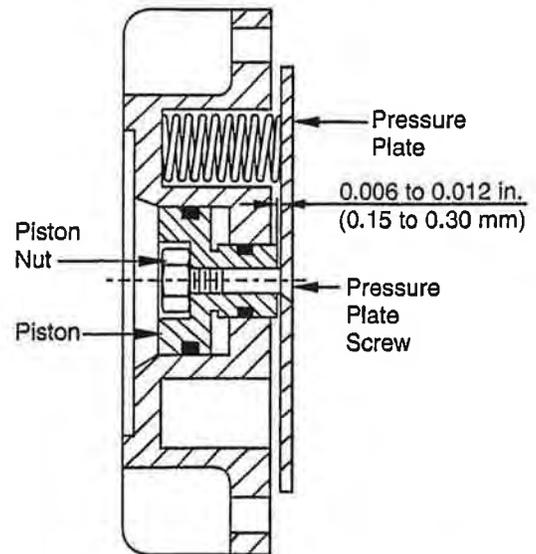
For Old Style Pressure Plates: torque the piston nut to 50 to 70 inch-lb (6 to 8 Nm).

NOTICE

• Ensure the piston extends completely through the spring and piston housing and contacts the pressure plate.

9. Install the plate (87) in the recess of the spring and piston housing (80) and secure using two plate screws (88).
10. To complete brake installation in hoist, refer to 'Hoist Assembly' section.

Brake Spring and Piston Housing Assembly



(Dwg. MHP0488)

Valve Chest Assembly (New Style)

This procedure describes the assembly of valve chests used on hoists with the second letter of the Serial Number other than A through G, or with second and third letters of the Serial Number other than HA, HB or HC, or hoist valve chests that have been updated with Valve Chest Kit No. MLK-K545B. Replacement part numbers are listed in the Parts section. Refer to Dwg. TPA958-1.

1. If the valve chest cover pins (17) were removed, install them in the bottom of the valve chest (6).
2. Apply a thin film of 'O' ring lubricant to the valve seals (7A) and (8A) and install them on the valves (7) and (8).

CAUTION

• Do not substitute any other 'O' rings for the valve seals.

3. Install a valve spring (9) on the non-tapered end of each valve and insert the valves, valve spring first, into the openings at the bottom of the valve chest. Make certain the valve marked UP is inserted into the opening marked UP VALVE and the valve marked DOWN is inserted in the opening marked DOWN VALVE.

NOTICE

• Some valves (7) and (8) were not marked UP and DOWN. To determine correct placement, inspect these valves. A valve with a shallow annular groove around the spring end hub is the DOWN valve. A valve without an annular groove around the spring end hub is the UP valve.

4. Apply a thin film of 'O' ring lubricant to the valve seat shaft seals (10B). Install a seal in each valve seat (10).
5. Apply a thin film of 'O' ring lubricant to the valve seat seals (10A) and install two seals on each valve seat.
6. Align the smaller diameter crosshole of the valve seat with the threaded hole in the side of the valve chest for the valve seat lock screw (11). With the hub end trailing, install the valve seats in the valve chest.
7. Screw the valve seat lock screws into the valve chest. Make certain they enter the valve seats. Torque the screws to 24 in lb (3 Nm).

8. Using retainer ring pliers and applying pressure to the hub of the valve seat, install the valve seat retainers (12). Make certain the retainers seat in the grooves of the valve chest.
9. If the pistons (14) were separated from the piston shafts (15), apply a thin film of 'O' ring lubricant to each piston shaft seal (15A) and install them in the grooves of the piston shafts.
10. Slide the pistons onto the piston shafts with the small hub of the piston toward the smallest diameter of the shaft. Align the crosshole in each piston with the crosshole in each shaft and install the piston retaining pins (15B).
11. Apply a thin film of 'O' ring lubricant to the piston seals (14A) and install one on each piston.
12. Apply a thin coat of 'O' ring lubricant on the piston cylinder walls and insert the piston springs (13) into the valve chest against the valve seat retainers.
13. Install the assembled pistons and shafts in the valve chest.
14. Apply a thin coat of 'O' ring lubricant to the valve chest cover seals (18A) and install them in the valve chest cover (18).
15. Align the valve chest cover gasket (16) with the valve chest cover pins and place the gasket against the valve chest.
16. Align the valve chest cover with the valve chest cover pins and piston shafts and place the cover against the valve chest.
17. Install the six valve chest cover screws (22). Tighten screws evenly and torque to 72 in lb (8 Nm).
18. Thread the adjustment screw locknuts (21) onto the bleed adjustment screws (19) and install the screws in the valve chest cover.

NOTICE

• Use these screws to adjust hoists with pendant control. Refer to 'Pendant Control Adjustments' in the "INSTALLATION" section.

19. Manually work the piston shaft assemblies up and down when installed in the valve chest. The piston shafts must shift smoothly with no indication of binding of parts.

Valve Chest Assembly (Old Style)

This procedure describes the assembly of valve chests used on hoists with second letter of the Serial Number A through G or with second and third letters of the Serial Number HA, HB, or HC. Refer to Dwg. TPA883-3.

NOTICE

• Replacement parts for this valve chest are no longer available. Order kit No. MLK-K545B (03835519) to replace this style valve chest if it cannot be repaired. The following assembly instructions are provided for reference only.

1. Moisten the valve sleeve seals (326) with 'O' ring lubricant and install them on the valve sleeves (325).

⚠ CAUTION

• When installing the valve and valve sleeve assemblies (325), make certain the valves do not get mixed. These are assembled as matched sets.

NOTICE

• Each valve sleeve has a notch in one end and a 7/16 inch (11 mm) diameter port in the wall of the sleeve. Inside the valve chest there is a 7/16 inch (11 mm) diameter cross-port that connects the two valve chambers.

2. Insert the valve sleeves, notched end first, into the valve chest so that the 7/16 in. (11 mm) diameter port in each sleeve is aligned with the cross-port in the valve chest, and so that the notches in the sleeves face each other.
3. Stand the valve chest up on the inlet port and insert a valve spring (327) and a valve (325) into each valve sleeve. Make certain each valve goes into its proper sleeve. These are matched sets.
4. Moisten each piston seal (331) with 'O' ring lubricant and install a seal in the groove on each piston (330).
5. Insert each piston rod (328 and 329), small end first, through its respective hole in the piston.
6. Install a piston nut (332) on each piston rod. Tighten the nut to a snug fit.
7. Moisten the valve chest cover seals (335) with 'O' ring lubricant, and install them in the valve chest cover (334).
8. Position the valve chest cover so that the bleed holes and adjustment screws (336) are facing you. Moisten the large diameter of the piston rods with 'O' ring lubricant. Insert the longer piston rod (328) through the hole on the left from the gasket side of the valve chest cover. Insert the shorter piston rod (329) through the hole on the right from the gasket side.
9. Place a piston spring (333) in each valve cavity in the valve chest, and position the valve chest cover gasket (338) on the bottom of the valve chest.
10. Taking care not to pinch the piston seals, install the assembled valve chest cover to the bottom of the valve chest. Check to make sure the long stem piston rod (328) is installed in "UP VALVE" side as marked on gasket face of valve chest. Tighten the valve chest cover screws (339) evenly a little at a time until all are tight.

Assembly of Hoist

1. If removed, install new throttle shaft bearings (2) in the housing and apply a light coating of grease.
2. Install the 'O' ring seal (51) in the housing.
3. Install the chain guard (5) in the housing.
4. Install a new oil seal (53) in the output ring gear (52) with the lip facing inward. Coat the lip with a film of oil or grease.
5. Ensure the retainer ring is located on the shaft bearing (50). Install the bearing on the ring gear (52) with the retainer ring end located towards the ring gear.
6. Lubricate the gear splines on the ring gear (52) shaft and the chain wheel (51A) with **Ingersoll-Rand** No. 11 grease. Install the chain wheel on ring gear shaft.
7. Install shaft bearing (49) onto the ring gear (52).
8. Install ring gear (52) assembly in housing.
9. Install the chain guide (4), four chain guide capscrews (4A) and lockwashers (4B).
10. Insert the motor retainer washer (48) in the housing. The raised outer diameter should be toward the open/motor end of the housing.
11. Install the motor assembly in the housing by aligning the motor guide rod with the dowel hole in the bottom of the housing and sliding the motor into the housing.
12. Remove the guide rod and replace it with a cylinder dowel (45). Tapered end of dowel pin must enter first. Dowel should be positioned approximately 1/8 in. (3 mm) below the rear end plate (41) surface.

13. Place a housing gasket (3) on the motor end of the hoist and install the valve chest plate (28) and screws (30). Check that motor shaft (38) turns freely by hand without sticking or binding.
14. Note the matchmarks '•' on the ring gear (52) and on the three planet gears (57). The planet frame assembly must be inserted into the hoist such that the pinion gear (72) internal splines align with the motor shaft (38) splines. Also, the matchmarks '•' on the planet gears must align with the matchmarks '•' on the ring gear.
15. Place the gear case gasket (66) on the end of the housing with the gasket hole aligned with the air port.
16. If removed, install the fixed ring gear (67) and ring gear pins (68) in the gear case cover.
17. Install the gear case assembly with gasket on the hoist aligning the ring gear roll pins and brake port. Install the four bolts and lockwashers.
18. Install the brake driver (73), brake seal (75), brake seal retainer (74), and brake driver retainer screw (76). Apply a small amount of silicone sealant to 'O' ring. The brake driver retainer screw is a self-locking type screw that should be replaced anytime the hoist is disassembled. Torque the screw to 50 in lb (5.65 Nm).
19. Check that the brake driver turns freely by hand. If the brake driver does not turn without restriction in both directions the hoist must be inspected to determine the cause of sticking or binding before further assembly.
20. If removed, assemble the upper suspension. On hook units, inspect the hook and hook latch as described in the "INSPECTION" section. Assemble the latch to the hook. Lubricate the thrust bearing (106).

For HL1000K to HL3000K Hoists:

Assemble the hook (102), thrust bearing (106), thrust washers (107), hook nut (104) and top yoke (101). **Be sure** to install the roll pin (105) to lock the hook nut on the hook. Mount the top yoke assembly or the lug mount kit to the hoist using **lubricated capscrews** and locking tabs under the capscrews. Torque the capscrews to 75 - 125 ft lb (100 - 170 Nm). Bend the locking tabs over the capscrews flats to secure.

For HL4500K and HL6000K Hoists:

Lubricate the thrust bearing (131). Assemble the hook (127), thrust bearing, hook nut (129) and upper suspension housing (101). **Be sure** to install the hook pin (130) to lock the hook nut on the hook. Mount the top yoke assembly or the lug mount kit to the hoist using **lubricated capscrews** and locking tabs under the capscrews. Torque the capscrews to 75 - 125 ft lb (100 - 170 Nm). Bend the locking tabs over the capscrew flats to secure.

21. Place the throttle shaft spring (37) over the hub of the throttle lever (35) with the bent leg of the spring on the outer side of the throttle lever.
22. Hold the throttle lever in the housing recess beneath the pocket wheel with the bent ends of the lever toward the valve chest end of the hoist and the legs of the throttle shaft spring engaging a rib on the bottom of the chain guide. Insert the throttle shaft (32), round end first, through the valve chest plate, housing and throttle lever. Install a thrust washer (36A) against the hub of the throttle lever. Install a thrust washer (36A) against the throttle shaft spring. Install the throttle lever retaining pin (36).

NOTICE

- On hoist models HL4500K and HL6000K the throttle lever (35) may require adjustment to provide adequate clearance with the upper suspension block. Minor modifications to the throttle lever are acceptable to establish throttle lever clearance.

23. Stand the hoist upright on the brake end. Place the valve chest gasket (25) on the valve chest plate, making certain that the small flapper is properly positioned in the recess between the two ports.

⚠ WARNING

- If the valve chest gasket (25) is installed incorrectly, the small flapper will not be in the recess between the two ports. The brake will not release and may cause damage to the hoist.
24. Center the two round rubber discs in corresponding recesses in the valve chest plate.
 25. Place the assembled valve chest (6) on the valve chest gasket. Secure using the valve chest screws (26) and (27).
 26. Install hoist load chain as described in the 'Initial Chain Installation' section.
 27. Reposition hoist with brake end up. Place a brake plate (78) followed by a brake disc (79), brake plate (78), brake disc (79), and two brake plates (78) over the brake driver (73), aligning the notches in the brake plates with the bolt holes in the gear case cover (69).
 28. Reposition hoist with brake end up. Install the assembled brake spring and piston housing (80), making sure the 'O' ring (77) is installed at the air port. Install the four shoulder bolts (89) and lockwashers (90).
 29. Place the limit actuator (33) on the square end of the throttle shaft, and install the limit actuator retaining pin (34).
 30. **For new style hoists with second letter of the serial number other than A through G or with second and third letters of the serial number other than HA, HB or HC,** install the two pendant links (183) between the limit actuator and the valve shafts.
For old style hoists with pendant control with second letter of the serial number A through G or with second and third letters of the serial number HA, HB or HC, install a pendant link (183) between the limit actuator and the long piston rod.
For old style hoists with pull chain control with second letter of the serial number A through G or with second and third letters of the serial number HA, HB or HC, no pendant links are required.
 31. Apply a thin film of 'O' ring lubricant to the swivel inlet seals (24A). Install seals on inlet stud (24) grooves.
 32. Carefully push the inlet stud into the inlet body (23). Take care to prevent cutting seals.
 33. Apply a thin film of 'O' ring lubricant to the swivel inlet gasket (24B). Install the gasket on the inlet stud.
 34. Thread the inlet assembly into the top of the valve chest and tighten.

Pendant Installation

Refer to Dwg. TPA0882-3.

⚠ CAUTION

- Disconnect the hoist from the air supply before performing maintenance on this hoist.

When installing a pendant assembly on HLK Hoists, a crimping tool (Part No. ML50K-930AT or a Nicopress® Tool with Groove Size G) must be used to install the clamping sleeve (176) on the ends of the strain relief cable (175).

The strain relief cable (175) must be long enough to allow the pendant hose to hang nearly straight yet short enough to absorb the pendant weight and forces.

⚠ CAUTION

• Ensure the strain relief cable supports the pendant. Do not allow the pendant hoses support the weight of the pendant. Hose failure can cause injury and loss of hoist control.

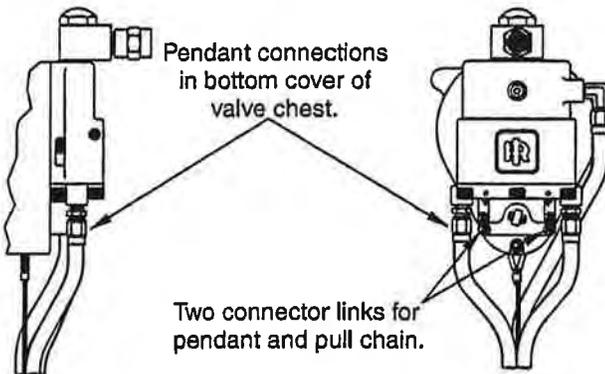
NOTICE

• When the control hoses are cut to length, the hose at the back of the pendant (air in) should extend 6 in. (150 mm) beyond the top clamping thimble.

Depending upon which valve chest is used on the hoist, the length of the two hoses at the front of the handle will vary.

1. On the new style MLK-A545A valve chest, the hoses should extend 2 in (51 mm) beyond the top clamping thimble (177). Refer to Dwg. TPB767.

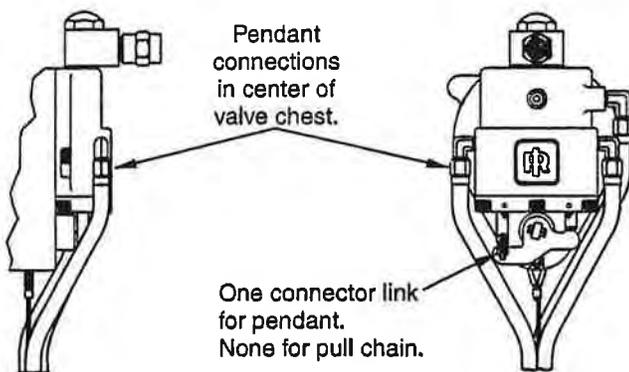
New Style Valve Chest Connections



(Dwg. TPB767)

2. On the old style MLK-A545 valve chest, the hoses should extend 4 in (100 mm) beyond the top clamping thimble (177). Refer to Dwg. TPB766.

Old Style Valve Chest Connections



(Dwg. TPB766)

3. Install one hose tie (218) above the pendant handle (160) and one hose tie below the clamping thimble (177). Install the remaining hose ties every 2-1/2 feet (0.76 m) between the hose ties at the handle and thimble.
4. Install the warning tag such that the tag can be read by the operator from the lever side of the pendant handle.

Chain Container

To Install Fabric Container

1. Position the mounting bracket (301) between the bosses at the bottom of the hoist in the area of the chain opening.
2. Insert two bracket bolts (302) from the inside of the chain container, through the mounting bracket and bosses. The bracket bolt heads should contact the mounting bracket.
3. Place a washer (304) and bracket nut (303) on each bracket bolt.

NOTICE

• If the container is to be allowed to swing outward, tighten the bracket nuts (303) to within one turn of being fully tight. This will allow the container to swing away from a load.

4. Because of space limitations, it may be necessary to depress the throttle lever (35) to install the bracket bolts (302) on hoists equipped with a hand chain throttle. Hoists equipped with a pendant throttle may require removal of the pendant links (183) to install the bracket bolts. Reinstall the pendant links after the mounting bracket is attached to the hoist.
5. Fasten the support bracket (305) to the outside of the chain container with the bracket nut and washer located to the outside of the chain container.
6. Fasten the chain container to the mounting bracket in the same manner.
7. Carefully disassemble the chain anchor (91) and attach one end of the support chain (306) onto the chain anchor with the load chain (92).

⚠ CAUTION

• Make certain the load chain does not become twisted when attaching the support chain to the chain anchor.

8. Fasten the free end of the support chain to the support bracket with the support bracket bolt (307), support bracket washer (309) and the support bracket nut (308).

NOTICE

• Adjust the support chain at the support bracket to prevent the load chain from rubbing against the container when operating the hoist.

To Install Metal Chain Container HLK-K750

Refer to Dwg. MHP1029

The following instructions are for adding the HLK-K750 metal chain container kit to a standard hoist. If installing an existing chain container, ignore Step 2 and the first part of Step 3 (connecting link) describing replacement of the limit actuator.

1. Run bottom block to lowest point to provide access to the installation area on the hoist. Disconnect hoist from air supply.

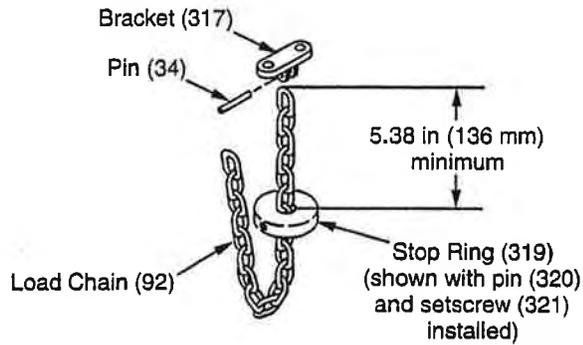
⚠ WARNING

• Disconnect the hoist from the air supply before installing chain container.

2. If installing the container for the first time (kit installation), remove links (183) from limit actuator (33). Drive out limit actuator retaining pin (34). Remove limit actuator from throttle shaft (32). Replace with limit actuator (315). Reinstall limit actuator retaining pin and links.

3. Disconnect the last link of load chain from hoist by separating connecting link (91). Slide stop ring approximately 16 links (minimum of 5.38 in (136 mm)) from dead end of load chain. Refer to Dwg. MHP1226. Secure in place by installing pin (320) and setscrew (321).

HLK-K750-80 Stop Ring Placement



(Dwg. MHP1226)

4. Ensure chain is straight. Place bracket (317) on last link of load chain such that the bracket angle will be downward when attached to the chain container (318).
5. Position the chain container (318) between the bosses at the bottom of the hoist in the area of the chain opening. Insert two bracket bolts (324) from the inside of the chain container, through the mounting bracket and bosses. The bracket bolt heads should contact the mounting bracket. Install lockwashers (325) and nuts (326) loosely on screws.
6. Attach bracket (317) to chain container with the bracket angle downward. Secure to chain container using screws (322), lockwashers (316) and nuts (303).

NOTICE

• Operate the hoist to naturally pile chain into the chain container. Piling the chain carelessly into the container by hand may lead to kinking or twisting that may cause chain to jam the hoist.

7. Tighten all screws. Provide supply air to hoist, and run chain into container.

Load Test

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

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

NOTICE

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

HOIST ASSEMBLY DRAWING AND PARTS LIST TABLE OF CONTENTS

Hoist Parts Section Guide (Dwg. TPA884-3)	33
Hoist Housing Assembly Parts Drawing (Dwg. MHP1065)	34
Hoist Housing Assembly Parts List	35
Hoist Valve Chest Assembly Parts Drawing (Dwg. TPA958-1)	36
Hoist Valve Chest Assembly Parts List	37
Hoist Gearing Assembly Parts Drawing (Dwg. TPB705-2)	38
Hoist Gearing Assembly Parts List	39
Hoist Brake Assembly Parts Drawing (Dwg. TPB704-3)	40
Hoist Brake Assembly Parts List	41
Motor Assembly Parts Drawing (Dwg. TPB703-3) and Parts List	42
Top Lug Assembly Drawing (Dwg. TPC449-3) and Parts List	43
HL1000K, HL1000KR and HL1500K Hook Assembly Parts Drawing (Dwg. MHP1105)	44
HL1000K, HL1000KR and HL1500K Hook Assembly and Parts List	45
HL2000K and HL3000K Hook Assembly Parts Drawing (Dwg. MHP1106)	46
HL2000K and HL3000K Hook Assembly Parts List	47
HL4500K Hook Assembly Parts Drawing (Dwg. TPA1041)	48
HL4500K Hook Assembly Parts List	49
HL6000K Hook Assembly Parts Drawing (Dwg. TPA1040)	50
HL6000K Hook Assembly Parts List	51
Pendant Assembly Parts Drawing (Dwg. TPA0882-3)	52
Pendant Assembly Parts List	53
Fabric Chain Container Assembly Parts Drawing (Dwg. TPC451-3)	54
Fabric Chain Container Assembly Parts List	55
Metal Chain Container Assembly Parts Drawing (Dwg. MHP1029)	56
Metal Chain Container Assembly Parts List	57
Trolley Assembly Information	58
Repair and Conversion Kits	59
Accessories	60
Old Style Valve Chest Assembly Drawing (Dwg. TPA883-3) and Parts List	61