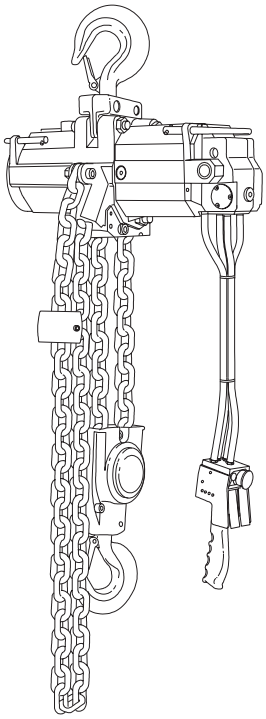
Form MHD56140

PARTS, OPERATION AND MAINTENANCE MANUAL
for
LIFTCHAIN INDUSTRIAL AIR HOIST MODELS

LCA015
(1.5 metric tons)

LCA030
(3 metric tons)



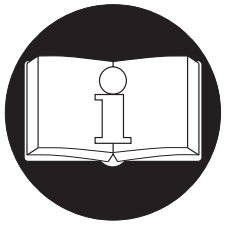
LCA060
(6 metric tons)

LCA120
(12 metric tons)

LCA180
(18 metric tons)

LCA250
(25 metric tons)

(1 metric ton = 2200 lbs)



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

⚠WARNING

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

Always operate, inspect and maintain this hoist in accordance with American National Standards Institute Safety Code (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 MHD56140
Edition 1
December 1997
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INGERSOLL-RAND
MATERIAL HANDLING

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SAFETY INFORMATION

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

Danger, Warning, Caution and Notice

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

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

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

⚠ CAUTION — Caution is used to indicate the presence of a hazard which ***will*** or ***can*** cause injury or property damage if the warning is ignored.

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

Safety Summary

⚠WARNING

• Do not use this hoist or attached equipment for lifting, supporting, or transporting people or lifting or supporting loads over people.
• The supporting structures and load-attaching devices used in conjunction with this hoist must provide an adequate safety factor to handle the rated load, plus the weight of the trolley and attached equipment. This is the customer's responsibility. If in doubt, consult a registered structural engineer.

NOTICE

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

The National Safety Council, Accident Prevention Manual for Industrial Operations, Eighth Edition and other recognized safety sources make a common point: Employees who work near suspended loads or assist in hooking on or arranging a load should be instructed to keep out from under the load. From a safety standpoint, one factor is paramount: conduct all lifting or pulling operations in such a manner that if there were an equipment failure, no personnel would be injured. This means keep out from under a raised load and keep out of the 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, associated with the final installation. It is the owner's and user's responsibility to determine the suitability of a product for any particular use. It is recommended that all applicable industry, trade association, federal, state and local regulations be checked. Read all operating instructions and warnings before operation.

Rigging: It is the responsibility of the operator to exercise caution, use common sense and be familiar with proper rigging techniques. 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 mechanics common hand tools as well as special **Ingersoll-Rand** or recommended tools.
2. Safety procedures, precautions and work habits established by accepted industry standards.

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

SAFE OPERATING INSTRUCTIONS

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

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

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

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

WARNING TAG AND LABEL

Each hoist is supplied from the factory with the warning tag and label shown. If the tag or label is not attached to your unit, order a new tag or label and install it. Read and obey all warnings and other safety information attached to this hoist. Tag and label are shown smaller than actual size.

Part Number:
04306445

Part Number:
71059612

SPECIFICATIONS

Model Code Explanation

Example: LCA030D I P 3 RU 3M 2 A - E

Liftchain Air Hoist Capacity and Chain Falls

LCA015S	=	1500 kg (3300 lbs), single fall
LCA030S	=	3000 kg (6600 lbs), single fall
LCA030D	**=**	**3000 kg (6600 lbs), double fall**
LCA060S	=	6000 kg (13200 lbs), single fall
LCA060D	=	6000 kg (13200 lbs), double fall
LCA120D	=	12000 kg (26400 lbs), double fall
LCA180T	=	18000 kg (39600 lbs), triple fall
LCA250Q	=	25000 kg (55100 lbs), quadruple fall

Application

I	**=**	**Industrial**
M	=	Mining

Body Control Type

P	**=**	**Pendant Type**
C	=	Rope Control Type

Control Type

1	=	Rope Control
2	=	1 motor
3	**=**	**2 motors**

Suspension

A	=	Fixed lug
C	=	Swivel top hook
PU	=	Plain rigid universal trolley (flat or tapered beam) 1500 to 6000 kg
PE	=	Plain rigid trolley (flat beam) 12000 to 25000 kg
PN	=	Plain rigid trolley (tapered beam) 12000 to 25000 kg
GU	=	Geared rigid universal trolley (flat or tapered beam) 1500 to 6000 kg
GE	=	Geared rigid trolley (flat beam) 12000 to 25000 kg
GN	=	Geared rigid trolley (tapered beam) 12000 to 25000 kg
RU	**=**	**Motorized rigid universal trolley (flat or tapered beam) 1500 to 6000 kg**
RE	=	Motorized rigid trolley (flat beam) 12000 to 25000 kg
RN	=	Motorized rigid trolley (tapered beam) 12000 to 25000 kg
RUA	=	Motorized articulated universal trolley (flat or tapered beam) 1500 to 6000 kg
REA	=	Motorized articulated trolley (flat beam) 12000 to 25000 kg
RNA	=	Motorized articulated trolley (tapered beam) 12000 to 25000 kg

Load Chain Lift

3M	**=**	**3 metres (standard) 10 ft**
X	=	Specify length

Pendant Control

2	**=**	**2 metres (standard) 6 ft**
XX	=	Specify length (maximum 66 ft (20 m))

Options

A	**=**	**Standard chain bucket**
B	=	Large chain bucket
C	=	Extra large chain bucket
P	=	Marine Paint (150 µ DFT)
Q	=	Offshore Paint (290 µ DFT)
R	=	Zinc-plated (S•COR•E) Package
T	=	Bronze/copper-plated (S•COR•E) Package
Z	=	Sandblast and primer

Options for Non -E Models

U	=	Emergency stop (only with pendants, not available with rope control)
SU	=	Overload protection with emergency stop

European Package

-E	**=**	**Compliance with the European Machinery Directive and includes: Emergency Stop on Pendant, Main Air Shut-off Valve and Overload Protection Device**

Description

The Liftchain hoist is air powered and designed to suit industrial or mining applications. The Liftchain hoist can be hook-mounted to the suspension shaft of a trolley, permanent mounting structure or any mounting point capable of supporting both load and hoist. Retractable lifting handles are built into the hoist body.

The air supply line can be strung to the hoist using cable hangers, cable trolleys or any festooning system that will ensure the air line remains free of kinks or sharp bends and is protected from being pinched or crushed by other equipment.

Liftchain hoists are driven by a lube-free gear motor which is connected to a pinion shaft which in turn drives the planetary reduction gear. The output from the planetary reduction gear drives the load chain sprocket. The pinion shaft from the planetary reduction is also coupled to the brake discs. The brake is engaged at all times, until the hoist is powered in either the raise or lower direction. System pressure acts on the brake piston to release the spring-applied brake. The brake and gear components run in an oil bath. Top and bottom limit switches are completely integrated in the hoist body.

The optional overload protection kit is completely integrated into the motor body.

Specifications

Hoist Model	Rated Capacity metric tons	Load Chain Falls	Pressure		Air Flow		Chain Size mm	Wt. of Chain		Unit Net Wt. with standard 10 ft Lift	
			psi	bar	cu ft/ min	cu m/ min		per ft (lb)	per metre (kg)	lbs	kg
LCA015S	1.5	1	90	6.3	78	2.2	8 x 24	1.01	1.5	110	50
LCA030D	3	2								176	80
LCA030S		1			124	3.5	13 x 36	2.59	3.85	132	60
LCA060D	6	2								220	100
LCA060S		1					16 x 45	3.86	5.75	286	130
LCA120D	12	2								396	180
LCA180T	18	3								484	220
LCA250Q	25	4								506	230

Hoist Performance at 90 psi (6.3 bar) Air Pressure

Hoist Model	Rated Capacity metric tons	Max. Lifting Speed with Rated Load		Max. Lowering Speed with Rated Load		Max. Lifting Speed with No Load	
		ft/min	m/min	ft/min	m/min	ft/min	m/min
LCA150S	1.5	13.1	4	21.3	6.5	24.6	7.5
LCA030S	3	10.5	3.2	23	7	19.7	6
LCA030D		6.6	2	10.5	3.2	12	3.7
LCA060S	6	5.9	1.8	9.8	3	11.8	3.6
LCA060D		5.2	1.6	11.5	3.5	9.8	3
LCA120D	12	2.95	0.9	4.9	1.5	5.9	1.8
LCA180T	18	1.64	0.5	3.3	1	3.3	1
LCA250Q	25	1.31	0.4	2.5	0.75	2.62	0.8

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 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."

Mounting

Make certain your hoist is properly installed. A little extra time and effort in doing so can contribute a lot 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 the maximum rated load plus a generous factor of at least 500% of the combined weights.

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

☞ Hook Mounted Hoist

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

☞ Trolley Mounted Hoist

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 in. to 1/4 in. (4.76 mm to 6.35 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 side plates. (For additional information refer to the trolley manufacturer's literature.)

⚠WARNING

• At least one mounting spacer must be used between the head of each trolley bracket bolt and the trolley bracket and between each trolley bolt nut and the trolley bracket. Failure to do this could cause the hoist to fall when used improperly.

Ensure the trolley bolts or nuts are torqued in accordance with manufacturer's specifications. 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 a capacity load suspended 4 to 6 inches (10 to 15 cms) 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.

Air System

The supply air must be clean, lubricated and free from moisture. A minimum of 90 psi (6.3 bar/630 kPa) at the hoist motor is required to provide rated hoist capacity. Air inlet port size for LCA015S and LCA030D units is 1/2 in. BSP. On all other units the inlet port size is 3/4 in. BSP.

☞ Air Lines

The inside diameter of the hoist air supply lines must not be smaller than 3/4 in. (19 mm). Before making final connections, all air supply lines should be purged before connecting to system inlet. Supply lines should be as short and straight as installation conditions will permit. Long transmission lines and excessive use of fittings, elbows, tees, globe valves, etc. cause a reduction in pressure due to restrictions and surface friction in the lines.

☞ Lubricator

The air motor may be operated without lubrication. If an air line lubricator is used, it should be replenished daily with SAE 30W Grade ISO VG 100 oil (minimum viscosity 135 Cst at 104° F (40° C)).

⚠ CAUTION

• Shut off air supply before filling air line lubricator.

☞ Filter

It is recommended that an air line strainer/filter be installed within 3 ft (1 m) of the motor air inlet port to prevent dirt from entering the motor. The strainer/filter should provide 20 micron filtration and include a moisture trap. Clean the strainer/filter monthly to retain its operating efficiency.

☞ Moisture in Air Lines

Moisture that reaches the air motor through the supply lines is the chief factor in determining the length of time between service overhauls. Moisture traps can help 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.

Motor

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

☞ Overload Device

(Optional feature)
Overload protection is integrated into the motor body and is standard on -E versions. The overload system is based on detection of the difference in air pressure between the inlet and outlet ports. It consists of a valve which is normally closed. The valve senses pressure at the motor inlet and outlet and compares the difference between the two pressures to the index value established by spring adjustment. A difference in pressure greater than the index value causes the emergency stop to be activated. This then exhausts the air and hoist operation stops. Overload protection is adjusted at the factory to 120% of the safe working load (SWL). It is also able to operate on both sides for mining versions with two bottom hooks. Refer to the "MAINTENANCE" section for adjustment procedures.

☞ Main Air Shut-off Valve

The main air shut-off valve is completely integrated into the motor body and is standard on -E versions.

Chain Container

Refer to Dwgs. MHP1441 or MHP1442 in Parts Section.

1. Check the chain container size to make sure the length of the load chain is within the capacity of the chain container. Replace with a larger chain container if required.
2. When a chain bucket is used, always connect the free end of the chain to the hoist. Install a chain buffer on the ninth link from the end of the chain.
3. Attach the chain container to the hoist.
4. Run bottom block to the lowest point and run hoist in the "UP" direction to feed the chain back into the container.

NOTICE

• Make certain to adjust the balance chain so that the chain container does not contact the load chain.
• Allow chain to pile naturally in the chain container. Piling the chain carelessly into the container by hand may lead to kinking or twisting that will jam the hoist.

☞ Attaching Limit Stop

1. On hoists without a chain bucket, slide buffer and washer onto chain.
2. Install limit stop as described under "Load Chain Replacement" in the "MAINTENANCE" Section.
3. Run hoist slowly in the "DOWN" direction to verify limit stop activates cutout.

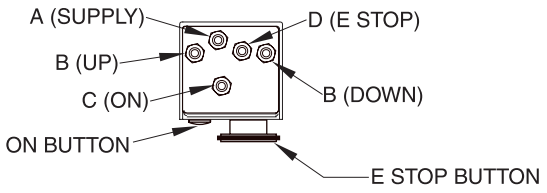
Pendant

Check that all hose connections are tight and that hoses are not twisted or crimped. Refer to Dwg. MHP1299 for hose connections. Pendant lengths up to 66 ft (20 m) are available. Contact the factory for pendant lengths greater than 66 ft (20 m).

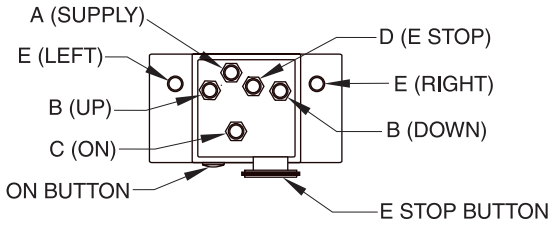
⚠ CAUTION

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

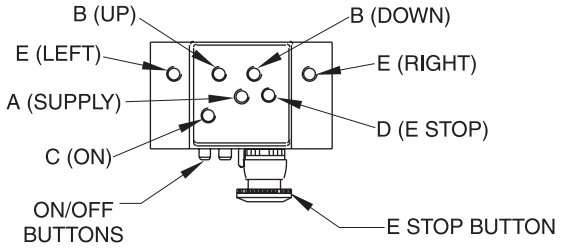
Single Motor Pendant PHS2D(-U) (Top View)



Two Motor Pendant PHS4D(-U) (Top View)
New Style (on hoists shipped after 31 Dec 1997)



Two Motor Pendant (Top View)
Old Style PHS4C(-U) (on hoists shipped before 31 Dec 1997)



(Dwg. MHP1299)

Storing the Hoist

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

OPERATION

The four most important aspects of hoist operation are:
1. Follow all safety instructions when operating the hoist.
2. Allow only people trained in safety and operation of this product to operate the hoist.
3. Subject each hoist to a regular inspection and maintenance program as outlined in ASME B30.16.
4. Be aware of the hoist capacity and weight of load at all times.

Operators must be physically competent. Operators must have no health condition which might affect their ability to act, and they must have good hearing, vision and depth perception. The hoist operator must be carefully instructed in his or her duties and must understand the operation of the hoist, including a study of the manufacturer's literature. The operator must thoroughly understand 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 in 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, as well as from pendant to manifold.
3. When first running the hoist or trolley motors, some light oil should be injected into the inlet connection to allow good lubrication.
4. When first operating the hoist and trolley it is recommended that the motors be driven slowly in both directions for a few minutes.
5. Operate the trolley along the entire length of the beam.
6. Inspect hoist and trolley performance when raising, moving and lowering test loads. Hoist and trolley must operate smoothly and at rated specifications prior to being placed in service.
7. Check that trolley and hook movement is in the same direction as arrows and pendant control labels.
8. Raise and lower a light load to check operation of the hoist brake.
9. Check hoist operation by raising and lowering a load equal to the rated capacity of the hoist a few inches (cm) off the floor.
10. Check operation of limit devices.
11. 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 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

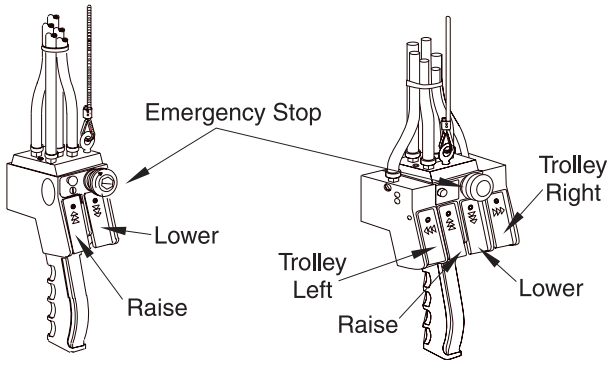
• Allow only personnel trained in safety and operation of this product to operate hoist and trolley.
• The hoist is not designed and not suitable for lifting, lowering or moving people. Never lift loads over people.

⚠WARNING

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

Pendant

The pendant is a remote control that allows the operator to control the positioning of a load. It will allow the operator to control hoist movements from a distance, thereby allowing exact positioning of a hook. The two lever pendant controls raising and lowering of the hook. Refer to Dwg. MHP1294. The four lever pendant controls both hook and trolley positions.



(Dwg. MHP1294)

Emergency Stop
The Emergency Stop button, when activated, will immediately stop all operations of the hoist and trolley.
The Emergency Stop button will remain depressed after activation.
To reset two lever pendant Emergency Stop button and new style four lever pendants shipped after 31 December, 1997, twist (rotate) Emergency Stop button clockwise until button releases and spring returns to its original position. Depress "ON" button.
For older style four lever pendants supplied on hoists shipped before 31 December, 1997, reset the Emergency Stop button by performing the following steps:
1. Locate the serrated ring directly behind the Emergency Stop button.
2. Rotate the serrated ring until the Emergency Stop button pops out.
3. Depress the Emergency Stop valve "ON" button on the left of the Emergency Stop button to resume air supply to the hoist.

Rope Control

(Optional feature)
The rope control provides the operator with a local hoist operating station. The following directions are as viewed from the motor end of the hoist, facing the rope control.
1. To lift a load, pull down on the right rope.
2. To lower a load, pull down on the left rope.
3. Pull rope to full travel for maximum speed. Pull rope partially for slower speeds.
4. To stop lifting or lowering, release rope. Hoist motor will stop.

INSPECTION

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

⚠WARNING

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

Frequent and periodic inspections should be performed on equipment in regular service. Frequent inspections are visual examinations performed by operators or personnel trained in safety and operation of this equipment and include observations made during routine hoist operation. Periodic inspections are thorough inspections conducted by personnel trained in 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 the 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 instructed in safety, operation and maintenance of this equipment. A determination as to whether a condition constitutes a safety hazard must be made, 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.

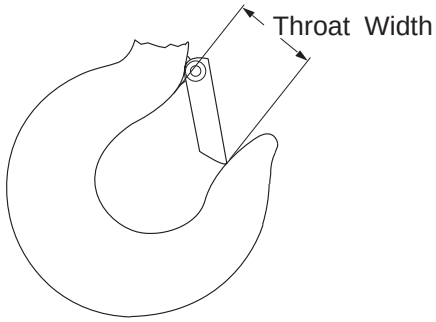
☞ Load Chain Reports

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 inspections should be made by operators at the beginning of each shift. In addition, visual inspections should be conducted during regular service for any damage or evidence of malfunction.

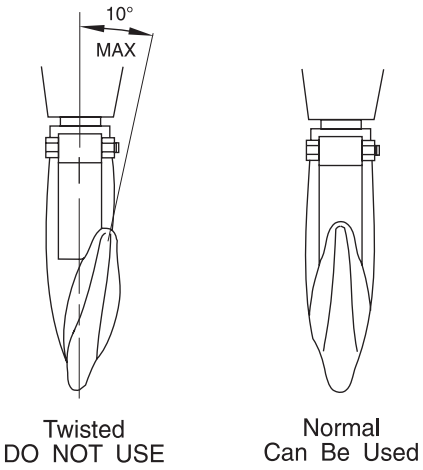
1. OPERATION. Check for visual signs or abnormal noises (grinding, etc.) which could indicate a potential problem. Make sure all controls function properly and return to neutral when released. Check chain feed through the hoist and bottom block. If chain binds, jumps, is excessively noisy or "clicks," clean and lubricate the chain. If the problem persists, replace the chain. Do not operate the hoist until all problems have been corrected.
2. UPPER AND LOWER LIMIT DEVICE. Test operation with no load slowly in both extremes of travel. Upward travel must stop when the stop buffer on the bottom block hits hoist limit switch. Downward travel must stop when the stop buffer attached to the end of the unloaded load chain decreases and activates the limit switch.
3. HOOKS. Check for wear or damage, increased throat width, bent shank or twisting of hook. Replace hooks which exceed the throat opening discard width specified in Table 4 (refer to Dwg. MHP0040) or which 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. Refer to the latest edition of ASME B30.10 "HOOKS" for additional information. Check hook support bearings for lubrication or damage. Ensure that they swivel easily and smoothly.



(Dwg. MHP0040)

Table 4

Hoist Model	Capacity metric tons	Throat Width		Discard Width	
		in.	mm	in.	mm
LCA015S	1.5	1.06	27	1.22	31
LCA030S	3	1.26	32	1.45	36.8
LCA030D					
LCA060S	6	1.61	40	1.81	46
LCA060D					
LCA120D	12	2.24	57	2.58	65.5
LCA180T	18	2.72	69	3.11	79
LCA250Q	25	3.19	81	3.66	93



(Dwg. MHP0111)

4. HOOK LATCH. Make sure hook latch is present and operating. Replace if necessary.

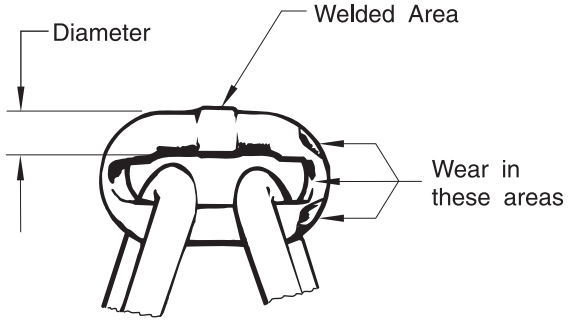
⚠ CAUTION

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

5. CONTROLS. During operation of the hoist, verify that response to pendant is quick and smooth. See that the controls return to neutral when released. If hoist responds slowly or movement is unsatisfactory, do not operate the hoist until all problems have been corrected.
6. AIR SYSTEM. Visually inspect all connections, fittings, hoses and components for indication of air leaks. Repair any air leaks found. Check and clean the filter.
7. LOAD CHAIN. Examine each of the links for bending, cracks in weld areas or shoulders, traverse nicks and gouges, weld splatter, corrosion pits, striation (minute parallel lines) and chain wear, including bearing surfaces between chain links. 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 the "LUBRICATION" section.

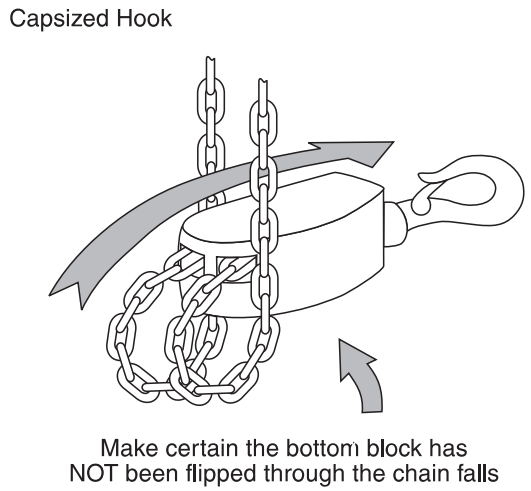
NOTICE

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



(Dwg. MHP0102)

8. LOAD CHAIN REEVING. Ensure welds on standing links are away from load sheave. Reinstall chain if necessary. Make sure chain is not capsized, twisted or kinked. Adjust as required. Refer to Dwg. MHP0043.



(Dwg. MHP0043)

Periodic Inspection

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

NORMAL	HEAVY	SEVERE
yearly	semiannually	quarterly

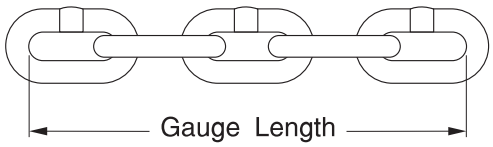
Disassembly may be required for HEAVY or SEVERE usage. Keep accumulative written records of periodic inspections to provide a basis for continuing evaluation. Inspect all the items in "Frequent Inspection." Also inspect the following:

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, deformations and cleanliness. If external evidence indicates the need, disassemble. Check gears, shafts, bearings, sheaves, chain guides, springs and covers. Replace worn or damaged parts. Clean, lubricate and reassemble.
3. HOOKS. Inspect hooks carefully for cracks using magnetic particle or other suitable non-destructive method. Inspect hook retaining parts. Tighten or repair if necessary.
4. LOAD CHAIN SPROCKET. 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 a few inches (cms) off the floor. Verify hoist holds the load without drift. If drift occurs, disassemble. Remove the 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 grooves are no longer visible.
7. SUPPORTING STRUCTURE. Check for distortion, wear and continued ability to support a load.

8. TROLLEY (if equipped). Check that the trolley wheels track the beam properly and trolley is correctly adjusted in accordance with manufacturer's literature. Check that wheels and beam are not excessively worn and inspect side plates for spreading due to bending. Do not operate the hoist until the problem has 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 the load chain are securely attached. Secure if loose, repair if damaged, replace if missing. Check chain stoppers are correctly installed and functional.
11. LOAD CHAIN. Measure the chain for stretching. Measure the load chain over the outside of five link sections all along the the chain, paying particular attention to the most frequently reeved links. Refer to Dwg. MHP0041. When any five links in the working length reaches or exceeds the discard length, replace the entire chain. Refer to Table 5. Always use genuine **Ingersoll-Rand** Material Handling replacement chain. Zinc plated load chain is standard on Liftchain hoists.

Table 5

Hoist Model	Chain Size	Normal Length		Discard Length	
	mm	in.	mm	in.	mm
LCA015S	8 x 24	4.72	120	4.8	122
LCA030D					
LCA030S	13 x 36	7.09	180	7.2	183
LCA060D					
LCA060S	16 x 45	8.85	225	8.99	228
LCA120D					
LCA180T					
LCA250Q					



(Dwg. MHP0041)

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 SWITCH. Check limit switches function correctly.

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 to the requirements of "Frequent Inspection" prior to being placed in service.
2. A hoist which has been idle for a period of more than one year should be given an inspection conforming to the requirements of "Periodic Inspection" prior to being placed in 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 Liftchain Air Hoist

Model Number:	**Date:**
Serial Number:	**Inspected By:**

Reason for Inspection: (Check Applicable Box)

	1. Scheduled Periodic Inspection: _____ Quarterly _____ Semiannually _____ Yearly	Operating Environment: _____ Normal _____ Heavy _____ Severe
	2. Discrepancy(ies) noted during Frequent Inspection	
	3. Discrepancy(ies) noted during Maintenance	
	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 4 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 4 for minimum/maximum acceptable widths.)				
	Hook Twist			---		(maximum 10%)
	Hook Crack Test Method Used: Dye Penetrant _____ Magnetic Particle _____ Other: _____				
Hook Latch			---		
Brake (100% Load Test)			---		
Brake (Visual Inspection)					
Tail Pin (End Anchor)					
Load Chain:			---		
Working length(s) maximum wear: _____ inches / _____ mm (Refer to Table 5)					
Supporting Structure					
Labels and Tags			---		
Other Components (List in NOTES section)					

Testing:	**Pass**	**Fail**	**NOTES**
Operational (No Load)			
Operational (100% Load)			
Operational (Maximum Test Load*)			

* Testing to more than 100% of rated capacity may be required to set overload device.

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

LUBRICATION

To ensure continued satisfactory operation of the hoist, all points requiring lubrication must be serviced with the correct lubricant at the proper time intervals indicated for each assembly. Correct lubrication is one of the most important factors in maintaining efficient operation.
The lubrication intervals recommended in Table 6 are based on intermittent operation of the hoist eight hours each day, five days per week. If the hoist is operated almost continuously, or for more than eight hours each day, or under severe conditions, more frequent lubrication will be required.

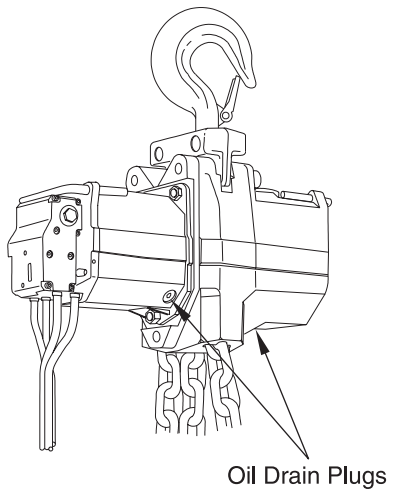
Table 6

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

Lubricant types and change intervals are based on operation in an environment relatively free of dust, moisture and corrosive fumes. Use only those lubricants recommended. Other lubricants may affect performance of the hoist. Approval for the use of other lubricants must be obtained from your **Ingersoll-Rand** Technical Support Department or distributor. Failure to observe this precaution may result in damage to the hoist and/or its associated components.
Whenever a hoist is disassembled for overhaul or replacement of parts, lubricate as follows:

Brake and Gear Assemblies

The gear and brake assemblies share a common oil bath. On larger capacity hoists, the output shaft from the motor is offset and utilizes a pinion gear to drive the sun gear. These gears operate in the motor casing oil bath. Refer to Table 7 for oil quantities. Refer to Dwg. MHP1338 for position of gear box oil drain plugs.



(Dwg. MHP1338)

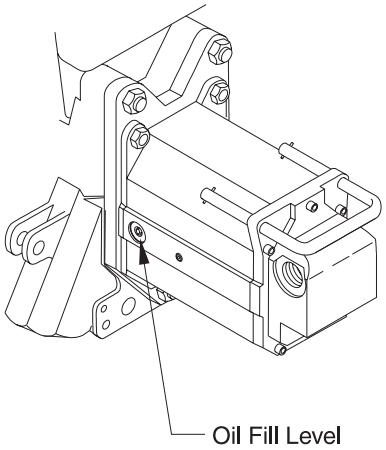
Table 7

Model	Gear Casing		Motor Casing	
	Pints	ml	Pints	ml
LCA015S and LCA030D	0.32	150	N/A	N/A
LCA030S and LCA060D	0.8	400	0.32	150
LCA060S, LCA120D, LCA180T and LCA250Q	1.6	750		

LCA015S and LCA030D Hoists Oil Fill Level Position
Fill to the level of the plug on the side of the gear housing.

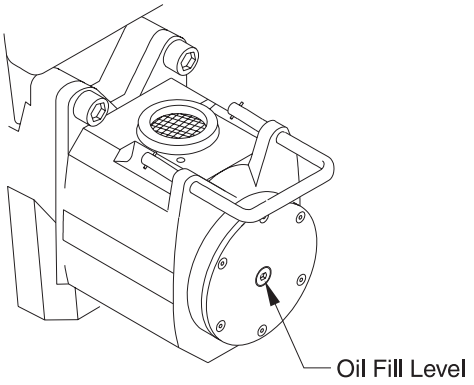
LCA030S and Larger Hoists Oil Fill Level Positions
Fill to the level of the plug on the side of the motor housing and on the gear end in the center of the brake end cover. Refer to Dwgs. MHP1439 and MHP1440.

Oil Fill Level Position on Motor Housing



(Dwg. MHP1439)

Oil Fill Level Position on Brake End Cover



(Dwg. MHP1440)

Replace the oil in the brake and gear housing in accordance with Table 6 recommendations. Refer to Table 8 for recommended oil type. If hoist use is at normal frequency, the oil in the reduction housing is suitable for one year's operation without changing. However, when hoist use is at greater frequency, or under severe conditions, the oil may need to be changed more often.

To ensure correct performance, highest efficiency and long life, it is essential that the lubricating oil be maintained at the correct level. The recommended grade of oil must be used at all times since the use of unsuitable oil may result in excessive temperature rise, loss of efficiency and possible damage to the gears.

Liftchain hoists are shipped from the factory with oil in the brake and reduction gear assembly.

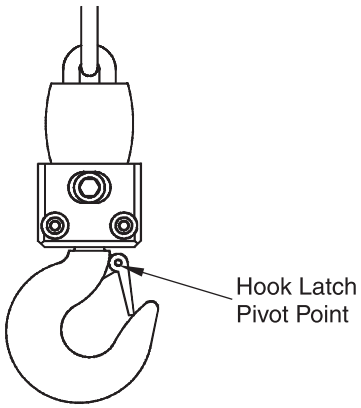
Table 8

Ambient Temperature	Recommended Oil Type
Below 32° F (0° C)	ISO VG 22 (50W)
30° to 80° F (0° to 26° C)	ISO VG 150 (90W)
Above 80° F (26° C)	ISO VG 460 (140W)

Hook Assemblies

Hoist 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 multi-purpose grease at regular intervals. Neglect of proper lubrication can lead to bearing failure.

1. Lubricate the hook and latch pivot points. Refer to Dwg. MHP1300. Hook and latch should swivel/pivot freely.
2. Use **Ingersoll-Rand** LUBRI-LINK-GREEN® or ISO VG 220 (50W) lubricant.
3. Lubricate hook bearings by applying several shots of grease from a grease gun to the grease fittings provided on the hook blocks.



(Dwg. MHP1300)

Air Line Lubricator

If an air line lubricator is used, it should be replenished daily with ISO VG 100 (30W) lubricant (minimum viscosity 135 Cst at 104° F (40° C)).

Trolley

(Optional feature)
Grease the wheel bearings and wheel drive gear with **Ingersoll-Rand** No. 68 Grease or a standard No. 2 multi-purpose grease periodically. Refer to the manufacturer's literature for additional lubrication information.

Load Chain

WARNING

• Failure to maintain a 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 ISO VG 220 (50W) oil.

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 and trolley symptoms, probable causes and remedies.

SYMPTOM	CAUSE	REMEDY
Hoist will not operate.	No air supply to hoist, or too little CFM or PSI.	Check PSI (bar) at hoist inlet. Refer to "SPECIFICATIONS" section for correct CFM (cu.m/min) and PSI (bar).
	Pendant lever sticking.	Check pendant lever and restore free movement.
	Pendant malfunction.	Check PSI (bar) at pendant. Minimum operating pressure in pendant line is 60 PSI (4 bar).
	Hoist is overloaded.	Reduce load to within rated capacity.
	Motor is damaged.	Repair or replace. Refer to "MAINTENANCE" section.
	Limit switch sticking.	Check limit switch button moves freely. Clean and lubricate if sticking.
	Brake is not releasing.	Check brake release circuit and PSI (bar) at brake inlet (60 PSI (4 bar) minimum).
Load continues to move when hoist is stopped. "UP" direction.	Pendant lever sticking.	Check lever and restore free movement.
Load continues to move when hoist is stopped. "DOWN" direction.	Pendant lever sticking.	Check lever and restore free movement.
	Hoist is overloaded.	Reduce load to within rated capacity.
	Brake is slipping.	Check brake springs and brake disc linings for wear. Refer to the "MAINTENANCE" section.
Hoist will not lift rated capacity.	Hoist is overloaded.	Reduce load to within rated capacity.
	No air supply to hoist or too little CFM or PSI.	Check PSI (bar) at hoist inlet. Refer to "SPECIFICATIONS" section for correct CFM (cu.m/min) and PSI (bar).
	Brake is not releasing.	Check brake release circuit and PSI (bar) at brake inlet (60 PSI (4 bar) minimum).
	Exhaust is restricted.	Inspect vents and clean or replace muffler.
	Motor is damaged.	Check for worn motor bearings.
Hook lowers but will not raise.	Hoist is overloaded.	Reduce load to within rated capacity.
	No air supply to hoist or too little CFM or PSI.	Check at hoist power supply connection with hoist under load. Raise pressure to rated capacity.
	Pendant malfunction.	Check PSI (bar) at air inlet connection on pendant.
Load chain jumps on sprocket or is making a snapping sound.	Worn or rusted chain.	Refer to "INSPECTION" section to determine wear limit. Replace if necessary.
	Incorrect chain.	Replace with correct chain.
	Worn sprocket or chain guide.	Replace worn parts.
	Capsized hook.	Correct as described in "MAINTENANCE" section.
	Hoist not in line with load.	Align hoist with load. Do not "yard" or side pull.
	Incorrectly reeved load chain.	Check load chain is correctly reeved.
	No oil on load chain.	Lubricate load chain.
Trolley (optional feature)	Damaged beam.	Repair or replace beam.
Trolley will not stop or trolley wheels slip.	Excessive oil, grease or paint on track of beam.	Clean off oil, grease or paint.
	Trolley not spaced for beam clearance.	Check trolley spacing. Refer to the manufacturer's literature.
Air-powered trolley does not operate.	Pendant lever sticking.	Check lever and restore free movement.
	No air supply to trolley or too little CFM or PSI.	Check PSI (bar) at trolley inlet. Refer to manufacturer's specifications.

⚠WARNING

• Never perform maintenance on the hoist while it is supporting a load.
• Before performing maintenance, tag controls:
DANGER - DO NOT OPERATE -
EQUIPMENT BEING REPAIRED.
• Only allow personnel trained in operation and service of this hoist to perform maintenance.
• After performing any maintenance on the hoist dynamically test the 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 is required to set overload device and may be required to comply with standards and regulations set forth in areas outside the USA.
• Shut off air system and depressurize air lines before performing any maintenance.

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

☞ Maintenance Intervals

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

INTERVAL	MAINTENANCE CHECK
Start of each shift	Make a thorough visual inspection of the hoist for damage. Do not operate the hoist if damage is found.
	Operate in both directions. Hoist must operate smoothly without sticking, binding or abnormal noises.
	Check the operation of the brake.
Quarterly	Remove, clean or replace muffler in top of gear housing.
Yearly	Inspect the hoist gearing, shafts and bearings for damage or wear. Repair or replace as necessary.
	Check all of the supporting members, including the trolley if used. Repair or replace as required.

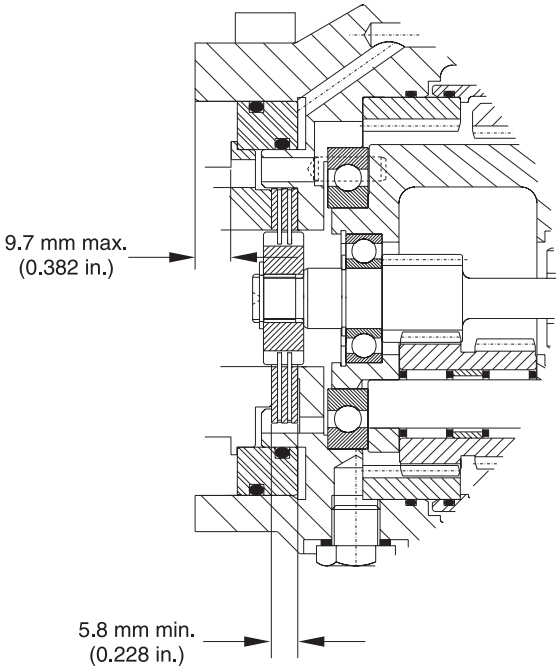
Adjustments

☞ Brake

No brake adjustment is required.

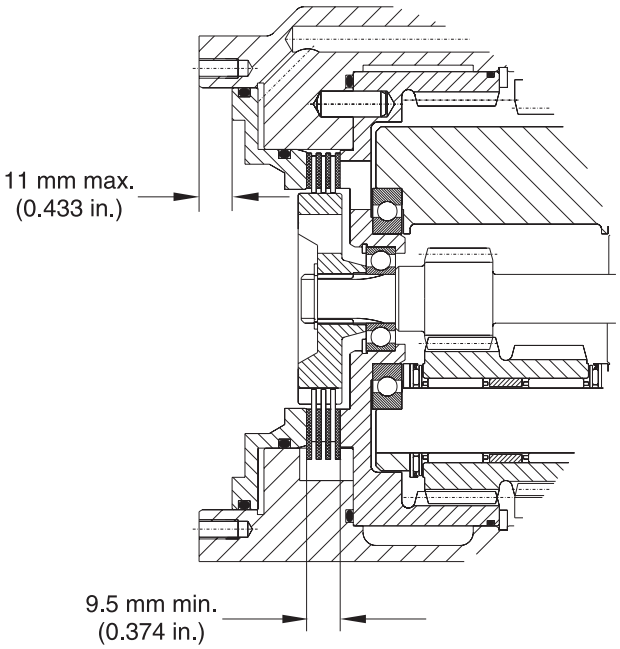
Annual Maintenance is limited to:
1. A general cleaning.
2. The friction discs have a 0.2 mm (0.079 in.) deep groove on each side. Replace the friction discs if the grooves are no longer visible. Refer to Dwg. MHP1415 or MHP1416.
3. Measure total brake and steel plate stack up. Check that measurement is not less than minimum shown.

LCA015S and LCA030D Hoists



(Dwg. MHP1415)

LCA030S, LCA060S, LCA060D, LCA120D, LCA180T and LCA250Q Hoists



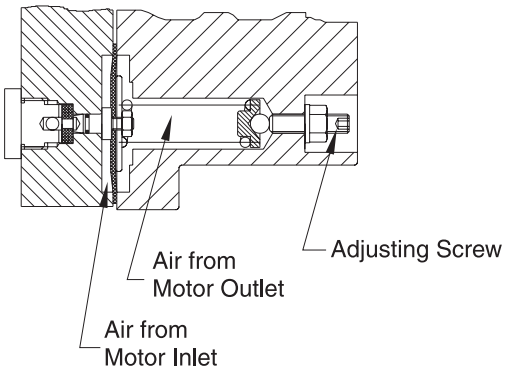
(Dwg. MHP1416)

☞ Overload Device

1. Connect the hoist to the air supply.
2. Release the locknut and turn the adjustment screw in order to increase or decrease the SWL (increase the SWL by tightening the adjustment screw). The adjustment must be made for an overload of 20% maximum of the SWL.
3. Tighten the locknut securing the adjustment screw.
4. Check hoist operation at rated load. If necessary repeat the adjustment.

NOTICE

• Do not change factory settings unless hoist is tested and recertified at an authorized repair facility.



(Dwg. MHP1302)

Disassembly

☞ General Instructions

WARNING

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

All maintenance work done on the Liftchain hoist should be performed on a bench in a clean dust free work area. In the process of disassembling the hoist, observe the following:

1. Never disassemble the hoist any further than is necessary to accomplish the needed repair. A good part can be damaged during the course of disassembly.
2. Never use excessive force when removing parts. Tapping gently around the perimeter of a cover or housing with a soft hammer, for example, is sufficient to break the seal.
3. Do not heat a part with a flame to free it for removal, unless the part being heated is already worn or damaged beyond repair and no additional damage will occur to other parts.

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

4. Keep the work area clean to prevent dirt and other foreign matter from getting into bearings and other moving parts.
5. All seals and 'O' rings should be discarded once they have been removed. New seals and 'O' rings should be used when assembling the hoist.
6. When grasping a part in a vise, always use leather- 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.
7. 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.
8. 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.
9. For assembly work above body height, suitable working platforms or ladders should be made available.
10. Do not attempt to wash sealed bearings.

If hoists are to be completely disassembled it is recommended that the motor assembly and brake/gear housing assembly be removed as complete assemblies from the chain guide housing. This can be accomplished by removing the capscrews, nuts and washers that clamp the housings together. Carefully separate assemblies and clean mating surfaces. Assemblies are Loctited together.

The muffler is located in the top of the gear housing. To clean muffler remove retainer ring in gear housing and with the aid of small pick remove the first muffler plate. Remove 'O' ring, second muffler plate and last 'O' ring.

☞ Load Chain Replacement

WARNING

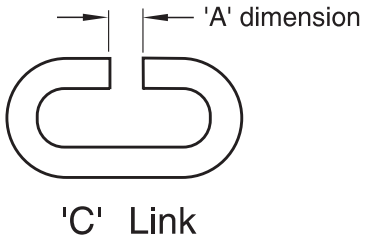
• NEVER splice a load chain except when installing a new load chain by the following method. Always discard the link used to connect the old chain with the new.

Excessive chain wear cannot be detected by casual observation. The chain is case hardened and once the case hardening is worn through, wear will progress rapidly and the strength of the chain will be considerably reduced. Further, the chain will no longer fit the chain sprocket properly, greatly increasing the chance of malfunction and chain breakage.
One chain sprocket will outlast several chains if the chain is replaced as recommended. The use of a worn chain will cause the chain sprocket to wear rapidly.
If the chain is visibly damaged, examine the chain sprocket and chain guide. Install a new chain sprocket if the old one is visibly worn. Install a new guide if the old one is broken or distorted.

NOTICE

• For ease of installation, do not remove the old chain from the hoist. Use the old chain to feed the new chain through the hoist.

1. The hoist must be hung and connected to the air supply. Reduce air pressure to 60 psi (4 bar).
2. Remove chain bucket, if used.
3. Remove free end of chain from hoist body, if attached. Remove chain buffer and limit stop.
4. Remove the load hook.
5. Run hoist slowly in the lifting direction until the chain free end is approximately 2 ft (60 cm) from the hoist.
6. Using an abrasive wheel, cut a section from the last link as shown in Dwg. MHP0817. Use a 'C' link which is the same size as the chain. Refer to Table 9.



(Dwg. MHP0817)

Table 9

Hoist Model	Chain Size	'A' Dimension	
	mm	in.	mm
LCA015S	8 x 24	0.4	10
LCA030D			
LCA030S	13 x 36	0.5	15
LCA060D			
LCA060S	16 x 45	0.7	18
LCA120D			
LCA180T			
LCA250Q			

⚠ CAUTION

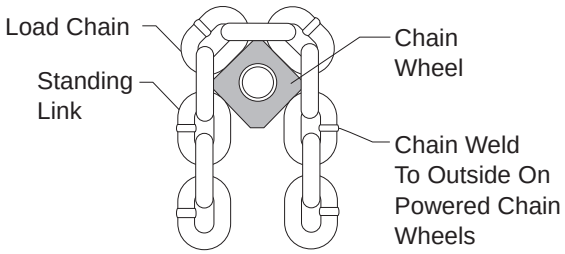
• Do not distort the link in any manner. It must be able to pass over the pocket and idler wheels without binding.

7. Connect the new chain to the old chain by hooking 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.

⚠ CAUTION

• Ensure that chain does NOT become twisted during reeving. All chain welds must align while chain is hanging free.

8. Slowly run the hoist in the raise direction, running off the old chain and reeving the new chain over the chain wheel. ***The first link of new chain over the chain wheel must be a standing link.*** Refer to Dwg. MHP0472.



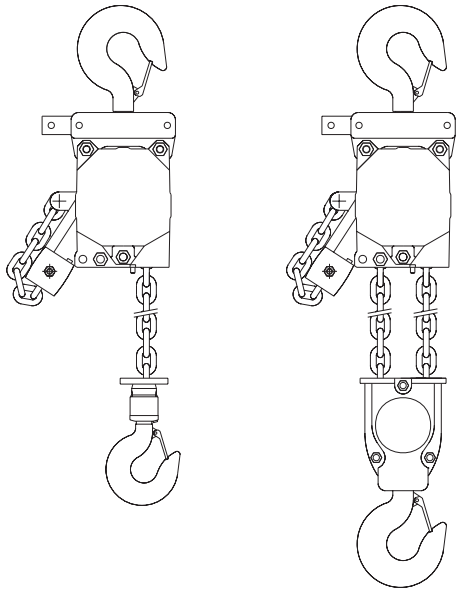
(Dwg. MHP0472)

9. Reinstall the load hook, chain buffer and limit stop. Connect free end of chain to hoist body.

⚠ WARNING

• A twisted chain can jam as it passes over the pocket wheel, possibly resulting in damage to the hoist or even breaking the chain and causing injury.

Chain Reeving



(Dwg. MHP1469)

☞ Accessing the Brake

LCA015S and LCA030D Hoists

Refer to Dwg. MHP1412.

1. It is recommended that carry handle (25) on the brake end be removed prior to brake disassembly.
2. Carefully remove the four brake cover screws (27) one half turn at a time each, until spring compression is relaxed. Remove brake cover (34), brake support plate (64) and three brake springs (33).
3. Check brake plate wear tolerance.
4. Remove brake disc (28), friction discs (35) and steel discs (36).
5. Remove retainer ring (30) from pinion (21) and pull out brake sleeve (29).
6. Using low pressure air in the brake port carefully remove brake piston (37) from gear housing (23).
7. Remove 'O' rings (24) and (38) from brake support plate (64) and brake piston (37).

LCA030S and LCA060D Hoists

Refer to Dwg. MHP1413.

1. It is recommended that carry handle (37) on the brake end be removed prior to brake disassembly.
2. Carefully remove the six brake cover screws (32) one half turn at a time each, until spring compression is relaxed. Remove brake cover (35) and eight brake springs (34).
3. Using low pressure air in the brake port, carefully remove brake piston (29) from gear housing (31).
4. Remove 'O' rings (30) and (33) from brake piston (29) and brake cover (35).
5. Check brake plate wear tolerance.

LCA060S, LCA120D, LCA180T and LCA250Q Hoists
Refer to Dwgs. MHP1414 and MHP1418.
1. It is recommended that carry handle (28) on the brake end be removed prior to brake disassembly.
2. Carefully remove the six brake cover screws (31) one half turn at a time each, until spring compression is relaxed. Remove brake cover (37) and eight brake springs (38).
3. Remove brake piston (33).
4. Remove retainer ring (36) from sun gear (41) and pull out brake sleeve (39).
5. Remove 'O' rings (8) and (32) from brake cover (37) and brake piston (33).
6. Check brake plate wear tolerance.

☞ Motor Disassembly

2 HP without Emergency Stop or Overload
Refer to Dwg. MHP1419.
1. Remove four capscrews (21) and pull motor assembly from motor housing.
2. Remove capscrews (8) from motor flange (9) and pull motor flange assembly from motor housing (1).
3. Separate motor housing (1) from motor cover (22).
4. Remove rear stops (10), springs (11) and slide valves (25) from gear housing.
5. Immobilize the idle gear (4) and drive gear (7) with a rod between the teeth and remove locknuts (3).
6. Remove idle gear (4) and drive gear (7) from motor flange (9).
7. Remove capscrew (6) and washer (5). Tap bearings (2) from motor flange.

2 HP with Emergency Stop and Overload
Refer to Dwg. MHP1420.
Follow steps 1 through 7 immediately above for initial motor disassembly.
1. Remove the three capscrews (36) from cover (27).
2. Pry cover (27) from housing and remove spring (28) and 'O' ring (46).
3. Remove plug (50) and seal washer (49) from motor cover.
4. Remove eight capscrews (39) and lift off cover.
5. Remove diaphragm (34). Remove capscrew (30) and separate valve cones (31) and (35), seal washer (33), washer (32) and spacer (37).
6. Remove diaphragm assembly (46) from housing. Unscrew valve cone (47) and nut (44). Remove washer (45) and 'O' ring (48) from valve cone.
7. Remove spring (43), spring receiver (42) and ball (52) from cover housing. Unscrew screw (40) with self locking nut (41) and seal ring (51) from same cover.
8. Check dowel pins (12) are not damaged.

4 HP Motors
Refer to 2 HP motor disassembly instructions and Dwgs. MHP1422, MHP1423 or MHP1424 in Parts Section.

☞ Reduction Housing

LCA015S and LCA030D Hoists
Refer to Dwg. MHP1412.
1. Remove the four nuts (53), lockwashers (54) and capscrews (52) which secure the motor assembly and gear housing assembly to the chain guide housing (9).
2. Carefully pry gear housing assembly (23) from chain guide housing (9).
3. Disassemble brake parts as described in "Accessing the Brake."
4. Remove retainer ring (32) in planetary support.
5. Carefully tap on the motor end of the pinion shaft (21) until it can be removed from the brake end of the gear housing.
6. Remove pinion (11) and gear cover (48).
7. Remove ring gear (18) and planetary support assembly.
8. Remove bearings (17) and (40) from planetary support (19).
9. Slide out satellite axles (47), bearings (46), spacers (45) and planetary gears (44).
10. Remove ring gear (20).

LCA030S and LCA060D Hoists
Refer to Dwg. MHP1413.
1. Remove the four nuts (13), lockwashers (12) and capscrews (11) which secure the motor assembly and gear housing assembly to the chain guide housing (52).
2. Carefully pry gear housing assembly (31) from chain guide housing (52).
3. Using the two puller screw holes (M6 mm) provided in the gear cover (55) remove the gear cover.
4. Tap drive pinion (17) from the gear side to separate parts. Remove bearing (44), spring washer (19), ring gear (18) and gear cover (55) from drive pinion (17).
5. Remove oil seal (57) and 'O' rings (54) and (56) from gear cover (55).
6. Remove 'O' ring (16) from drive pinion (17).
7. Remove planetary assembly.
8. Refer to "Accessing the Brake" to remove brake cover.
9. Remove retainer ring (36) from sun gear (20) and pull out brake sleeve (39).
10. Pull sun gear (20) from the motor side of the housing.
11. Remove retainer ring (48) from gear housing bore. Tap on ring gear (45) hub from the brake side to remove.
12. Remove retainer ring (41) from ring gear (45) and tap out bearing (43). Remove and discard 'O' ring (47). Always replace 'O' ring (47) as it is normally damaged during disassembly.
13. Remove friction discs (27) and steel discs (28) from gear housing.
14. Slide planet axles (23) from planetary support and remove bearings (21), thrust bearings (25), spacers (22), thrust rings (26) and planetary gears (24).
15. Remove remaining bearing (44) from planetary support (46).

LCA060S and LCA120D Hoists
Refer to Dwg. MHP1414.
1. Remove the four nuts (52), lockwashers (51) and capscrews (50) and (69) which secure the motor assembly and gear housing assembly to the chain guide housing (12).
2. Carefully pry gear housing assembly (30) from chain guide housing (12).
3. Remove brake assembly as described in "Accessing the Brake."
4. Using the two puller screw holes (M6 mm) provided in the gear cover (13) remove the gear cover. Remove oil seal (53) and 'O' rings (9) and (14) from gear cover (13).
5. Remove ring gear support (54).
6. Remove ring gear (16) from gear housing (30). Remove retainer ring (15) from ring gear.
7. Pull planetary support assembly from gear housing.
8. To disassemble planetary assembly drive pins (25) completely through to the inside of the planetary support (48). Push planet axles (49) out of planetary support. Remove bearings (21) and (24), spacers (20), thrust rings (26) and planetary gears (22) from planetary support (48).
9. Remove capscrews (27) from ring gear support (45). Remove ring gear (47) and ring gear support from gear housing (30).
10. Remove friction discs (43) and steel discs (44).

11. Remove retainer ring (40) and bearing (5) from ring gear support (45).
12. Remove 'O' rings (46) from gear housing (30).

☞ Chain Guide Housing

LCA015S and LCA030D Hoists
Refer to Dwg. MHP1412.
1. Remove the gear housing assembly and motor assembly as previously described.
2. Tap on the sprocket (2), on the brake side, until bearing (12) and sprocket (2) are clear of the chain guide housing (9).
3. Remove chain guide (50) and remaining bearing (12).
4. If replacement is required remove retainer ring (56) and oil seal (55) from bore of sprocket.
5. If replacement is required, remove limit switch body (61) and limit switch (62). Remove spring (63).

LCA030S and LCA060D Hoists
Refer to Dwg. MHP1413.
1. Remove gear housing assembly and motor assembly as previously described.
2. Tap on the sprocket (9), on the brake side, until bearing (10) and sprocket (9) are clear of the chain guide housing (52).
3. Remove chain guide (14) and remaining bearing (10).
4. If replacement is required remove bearing (63) and oil seal (62) from bore of sprocket.
5. If replacement is required, remove limit switch body (64) and limit switch (65). Remove spring (66).

LCA060S and LCA120D Hoists
Refer to Dwgs. MHP1414.
1. Remove gear housing assembly and motor assembly as previously described.
2. Tap on the sprocket (59), on the brake side, until bearing (55) and sprocket (59) are clear of the chain guide housing (12).
3. Remove chain guide (56) and remaining bearing (55).
4. If replacement is required remove bearing (5) and oil seal (6) from bore of sprocket.
5. If replacement is required, remove limit switch body (66) and limit switch (67). Remove spring (68).

LCA180T and LCA250Q Hoists
Refer to Dwgs. MHP1418.
1. Remove gear housing assembly and motor assembly.
2. Remove capscrews (78), nuts (80) and lockwashers (79) from top hook assembly.
3. Remove motor flange (11).
4. Separate chain guide housing (12), flange (86) and second chain guide housing (68).
5. Tap on the brake side of sprocket (57) until bearing (53) and sprocket (77) are clear of the chain guide housing (68). Remove chain guide (76).
6. Remove bearing (74) and eccentric ring (72).
7. Tap on the motor side of sprocket until bearing (53) and sprocket are clear of the chain guide housing (12). Remove chain guide (54) and bearing (74).
8. If replacement is required remove bearing (5) and oil seal (6) from bore of sprocket (77).
9. If replacement is required remove limit switch body (64) and limit switch (65). Remove spring (66).

Cleaning, Inspection and Repair

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

☞ Cleaning

⚠ CAUTION

• Bushings that rotate in the frame or are loose or worn must be replaced. Failure to observe this precaution will result in additional component damage.

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

☞ Inspection

All disassembled parts should be inspected to determine their fitness for continued use. Pay particular attention to the following:
1. Inspect all gears for worn, cracked or broken teeth.
2. Inspect all bushings for wear, scoring or galling.
3. Inspect shafts for ridges caused by wear. If ridges caused by wear are apparent on shafts, replace the shaft.
4. Inspect all threaded items and replace those having damaged threads.
5. Measure the thickness of the friction disc. Replace the friction discs if the grooves are no longer visible.

☞ Repair

Actual repairs are limited to the removal of small burrs and other minor surface imperfections from gears and shafts. Use a fine stone or emery cloth for this work.
1. Worn or damaged parts must be replaced. Refer to the applicable Parts Listing for specific replacement parts information.
2. Inspect all remaining parts for evidence of damage. Replace or repair any part which is in questionable condition. The cost of the part is often minor in comparison with the cost of redoing the job.
3. Smooth out all nicks, burrs or galled spots on shafts, bores, pins or bushings.
4. Examine all gear teeth carefully and remove nicks or burrs.
5. Polish the edges of all shaft shoulders to remove small nicks which may have been caused during handling.
6. Remove all nicks and burrs caused by lockwashers.

Assembly

☞ Brake

LCA015S and LCA030D Hoists
Refer to Dwg. MHP1412.
1. Lubricate 'O' rings (24) and (38) and install on brake support plate (64) and brake piston (37).
2. Install brake sleeve (29) on pinion (21) and secure in position with retainer ring (30).
3. Install brake piston (37) in gear housing (23). Internal 'O' ring groove must be positioned nearest the gear compartment.

4. Install friction and steel discs, beginning with a friction disc (35) and alternating with a steel disc (36), until the discs are used.
5. Install brake disc (28).
6. Position springs in the brake disc spring holes and install brake support plate (64) and brake cover (34) on gear housing (23). Install and tighten four cover screws (27), one half turn at a time each, until cover is secure. Keep brake cover square to gear housing during installation to avoid damaging 'O' ring.
7. Reinstall handle (25) if previously removed.

LCA030S and LCA060D Hoists

Refer to Dwg. MHP1413.

1. Lubricate and install 'O' rings (30) and (33) on brake piston (29) and brake cover (35).
2. Install brake piston (29) with 'O' rings in gear housing (31).
3. Using a small amount of grease on each spring (34) position springs in the brake cover spring holes and install brake cover (35) on gear housing (31). Install and tighten six cover screws (32), one half turn at a time each, until cover is secure. Keep brake cover square to gear housing during installation to avoid damaging 'O' ring (33).
4. Install plug (7) and copper washer (8) in brake cover (35).
5. Reinstall handle (37) if previously removed.

LCA060S, LCA120D, LCA180T and LCA250Q Hoists

Refer to Dwgs. MHP1414 and MHP1418.

1. Lubricate 'O' rings (8) and (32) and install on brake cover (37) and brake piston (33).
2. Install brake sleeve (39) on sun gear (41) and secure in position with retainer ring (36).
3. Install brake piston (33).
4. Using a smal amount of grease on each spring (38), position springs in the brake cover spring holes and install brake cover (37) on gear housing (30). Install and tighten six cover screws (31), one half turn at a time each, until cover is secure. Keep brake cover square to gear housing during installation to avoid damaging 'O' ring.
5. Install plug (34) and seal washer (35) in cover (37).
6. Reinstall handle (28) if previously removed.

☞ Motor

2HP without Emergency Stop or Overload

Refer to Dwg. MHP1419.

1. Lubricate bearings (2) with grade 2 grease then install bearings in motor flange (9). Ensure markings on bearing cage are still visible after installation.
2. Install washer (5) and capscrew (6) to retain bearings. Lightly coat capscrew threads with Loctite® 234.
3. Install idle gear (4) and drive gear (7) through bearings in motor flange (9).
4. Immobilize the idle gear (4) and drive gear (7) with a rod between the teeth and install locknuts (3). Lightly coat locknut threads with Loctite® 234.
5. Install motor housing (1) on motor flange.
6. Lubricate and install quad rings (23) on slide valves (25). Lubricate and install quad ring (24) in bore of gear housing (1).
7. Install rear stops (10), springs (11) and slide valves (25) in gear housing.
8. Position stop (18) in recess in motor cover (22). Install needle bearings (14) in motor cover (22).
9. Lubricate and install 'O' rings (19) in gear housing. Carefully install motor cover assembly on gear housing until fully seated. Ensure pins (12) are aligned and fully engaged.
10. Lightly coat capscrew threads with Loctite® 234 then install and torque capscrews (8) to 7.5 ft-lbs (5.5 Nm). After assembly of the motor, check to ensure motor driving gear rotates freely in both directions.
11. Install motor assembly in motor housing (60). Secure in position with four capscrews (21). Torque capscrews to 7.5 ft-lbs (5.5 Nm).

2HP with Emergency Stop and Overload

Refer to Dwg. MHP1420.

Follow steps 1 through 11 immediately above, for initial motor assembly.

Assembly of Emergency Stop and Overload options:

1. Ensure dowels (12) are installed in motor cover (22).
2. Lubricate and position 'O' rings (13) on motor cover.
3. Assemble items (31), (32), (33) and (37) on screw (30). Install screw with parts into motor cover. Screw (32), (33) and (35) on opposite end and tighten. Use Loctite® 243 on threads.
4. Install spring (28) and 'O' ring (29) in cover (27) and assemble on motor cover. Secure with three capscrews (36). Apply Loctite® 243 to threads.
5. Install diaphragm (34) on opposite side.
6. Grease and install ball (52), spring receiver (42) and spring (43) in motor cover.
7. Assemble items (47), (44) and (45) to diaphragm (46). Ensure parts are assembled from the correct side. There is one extra hole in addition to the four capscrew holes. The extra hole must align with the port hole in the motor cover and cover (38).
8. Install cover (38) with capscrews (39) and (54) using Loctite® 243 on the threads. Torque capscrews to 7.5 ft-lbs (5.5 Nm).
9. Install seal washer (49) in cover (38) with plug (50).
10. Thread nut (41) onto screw (40) and install with seal ring (51).
11. Refer to Overload Device Adjustments in the "MAINTENANCE" section to reestablish settings.

4HP without Emergency Stop or Overload

Refer to Dwg. MHP1422.

1. Lubricate bearings (10) and (2) with grade 2 grease then install bearings in motor housing (14). Ensure markings on bearing cage are still visible after installation.
2. Install washer (5) and screw (6) to retain bearings. Lightly coat screw threads with Loctite® 234.
3. Install 'O' ring (12) on shuttle valve stop (11). Install ball (13) and screw shuttle valve stop into motor housing (14).
4. Install idle gear (15) and drive gear (4) through bearings in motor housing (14).
5. Immobilize the idle gear (15) and drive gear (4) with a rod between the teeth and install locknuts (3) and (9). Lightly coat locknut threads with Loctite® 234.
6. Lubricate and install quad rings (29) on slide valves (16). Lubricate and install quad ring (1) in bore of motor housing (14).
7. Install rear stops (7), springs (8) and slide valves (16) in motor housing.
8. Install bearing (23) on smaller stepped diameter of idle gear (15). Secure in position with retainer ring (24).
9. Position rear stops (28) in recess in motor cover (21). Install needle bearing (30) in motor cover (21).
10. Lubricate and install 'O' rings (26) and (27) in motor cover. Carefully install motor cover assembly on motor housing until fully seated. Ensure pins (19) are aligned and fully engaged.

11. Lightly coat capscrew threads with Loctite® 234 then install and torque capscrews (17) to 16.3 ft-lbs (12 Nm). After assembly of the motor, check to ensure motor driving gear rotates freely in both directions.
12. Install motor assembly in motor housing (60). Secure in position with six capscrews (20) and (32). Verify capscrew lengths for correct positioning.

4HP with Emergency Stop and Overload

Refer to Dwg. MHP1423.

Follow steps 1 through 12 immediately above, for initial motor assembly.

Assembly of Emergency Stop and Overload options:

1. Ensure dowels (19) are installed in motor cover (21).
2. Lube and position 'O' rings (26) and (27) on motor cover.
3. Assemble items (37), (38), (39) and (44) on screw (43). Install screw with parts into motor cover. Screw (35), (37) and (38) on opposite end and tighten. Use Loctite® 243 on threads.
4. Install spring (42) and 'O' ring (46) in cover (45) and assemble on motor cover. Secure with three capscrews (41). Apply Loctite® 243 to threads.
5. Install diaphragm (36) on opposite side.
6. Grease and install ball (50), spring receiver (51) and spring (52) in motor cover.
7. Assemble items (53), (54) and (55) to diaphragm (59). Ensure parts are assembled from the correct side. There is one extra hole in addition to the four capscrew holes. The extra hole must align with the port hole in the motor cover and cover (34).
8. Install cover (34) with capscrews (20) using Loctite® 243 on the threads. Torque capscrews to 7.5 ft-lbs (5.5 Nm).
9. Install seal washer (57) in cover (34) with plug (58).
10. Thread nut (48) onto screw (47) and install with seal ring (49).
11. Refer to Overload Device Adjustments in the "MAINTENANCE" section to reestablish settings.

☞ Reduction Housing

LCA015S and LCA030D Hoists

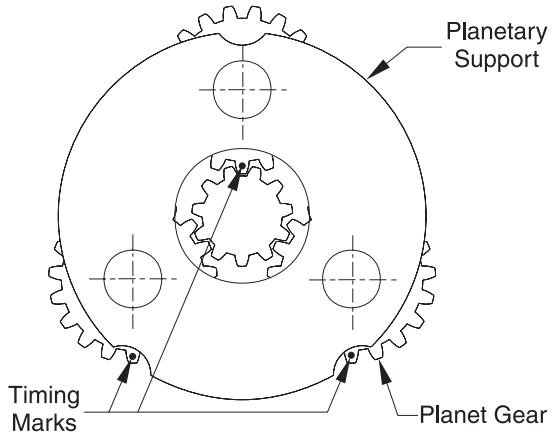
Refer to Dwg. MHP1412.

1. Install 'O' ring (43) in gear housing (23). Ensure two dowel pins (22) are in place in the gear housing and are undamaged.
2. Carefully install ring gear (20) in gear housing making sure dowel pins are aligned with the holes in the ring gear. Tap down until seated.
3. Install bearing (40) on planetary support (19).
4. Install two bearings (46) with a spacer (45) between, in each planetary gear (44).
5. Install planetary gears with bearings into planetary support (19) and locate with satellite axles (47). Ensure planet gears (44) are installed with the smaller gear head diameter nearest the side of the planetary support (19) with the timing notches.
6. Rotate satellite axles to allow installation of bearing (17).
7. Install bearing (39) and secure with retainer ring (32).
8. Time planetary gears as shown in drawing MHP1406. Use of a separate ring gear tool to maintain gear position during installation of planetary assembly is helpful. Install planetary assembly and tap down until planetary assembly is fully seated.
9. Install pinion (21). Tap into position until seated against bearing (39).
10. Install ring gear (18).
11. Lubricate and install 'O' ring (43) in gear cover (48). Install oil seal (13) with lip toward planetary support.
12. Install gear cover (48). Attempt to locate the puller holes at the top and bottom just off vertical. This may aid disassembly at some later date. Install pinion (11).
13. Install spring (63), limit switch (62) and limit switch body (61) in chain guide housing (9).
14. Refer to "Accessing the Brake" for information on assembling the remaining brake parts.

LCA030S and LCA060D Hoists

Refer to Dwg. MHP1413.

1. Install 'O' ring (42) in gear housing (31). Ensure three dowel pins (40) are in place in the gear housing (31) and are undamaged.
2. Install new 'O' ring (47) on ring gear (45).
3. Install friction and steel discs. Begin with a friction disc (27) and then alternate with a steel disc (28) until discs are used. Locate friction disc tabs in slots provided in gear housing.
4. Install bearing (43) in ring gear and secure with retainer ring (41).
5. Carefully install ring gear in gear housing making sure dowel pins are aligned with the holes in the ring gear. Tap down until retainer ring groove in gear housing bore, is visible. Use a clamp to further pull ring gear into position compressing 'O' ring (42). Install retainer ring (48). Ensure retainer ring is fully seated, then release clamp.
6. Install sun gear (20) and tap into position through bearing (43) until seated.
7. Turn gear housing over and support to avoid damaging the sun gear. Align tabs on steel discs (28) and install brake sleeve (39) on sun gear spline. Secure in position with retainer ring (36).
8. Install two bearings (21) with a spacer (22) between, in each planetary gear (24).
9. Install planet gears with bearings into planetary support (46) and locate with planet axles (23). Place one bearing (25) and one thrust ring (26) on each side of the planetary gears. Bearings (25) must contact inside face of planetary support and thrust rings (26) must contact planet gears. Ensure planet gears (24) are installed with the smaller gear head diameter nearest the side of the planetary support (46) with the timing notches.
10. Rotate planet axles to allow installation of bearing (44) on the brake side. Pin punch around bearing to hold in place during assembly into gear housing (31).
11. Time gears as shown in drawing MHP1406. Using a separate ring gear tool to maintain gear position during installation of planetary assembly is helpful. Tap down until planetary assembly is fully seated.



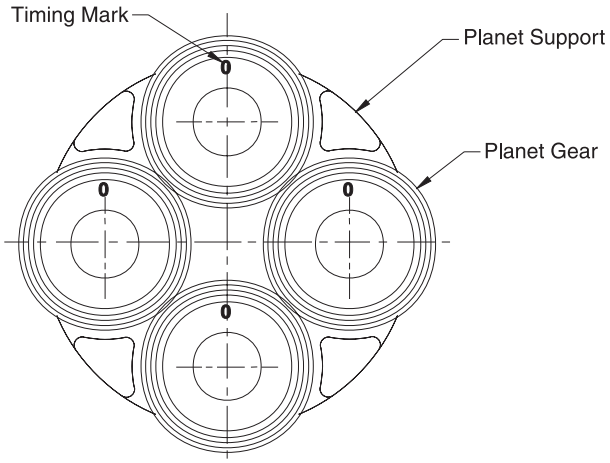
(Dwg. MHP1406)

12. Install oil seal (57) and 'O' rings (54) and (56) on gear cover (55). Seal lip must be toward gear side.
13. Set drive pinion (17) on bench with the splined end up. Install gear cover on drive pinion with the threaded jacking holes toward the bench.
14. Install ring gear (18) on spline. Install spring washer (19) with concave side toward ring gear. Install bearing (44) and tap into place.
15. Install assembled parts in gear housing aligning the gear teeth with the ring gear. Position the puller holes at the top and bottom just off vertical. This may aid disassembly on another occasion.
16. Lubricate 'O' rings (30) and (33) and install on brake cover (35) and brake piston (29).
17. Install brake piston (29). Refer to "Accessing the Brake" for information on assembling remaining brake parts.

LCA060S and LCA120D Hoists

Refer to Dwg. MHP1414.

1. Install 'O' rings (46) in gear housing (30). Ensure three dowel pins (42) are in place in the gear housing (30) and are undamaged.
2. Install friction and steel discs. Beginning with a friction disc (43) and then alternate with a steel disc (44) until discs are used. Locate friction disc tabs in slots provided in gear housing.
3. Install bearing (5) in ring gear support (45) and secure with retainer ring (40).
4. Carefully install ring gear support in gear housing making sure dowel pins are aligned with the holes in the ring gear support. Tap down and secure with three capscrews (27). Use Loctite® 243 on capscrew threads.
5. Install retainer ring (26) in ring gear (47) then install ring gear in gear housing.
6. Install two bearings (21) with a spacer (20) between, in each planet gear (22).
7. Install planet gears with bearings into planetary support (48) and locate with planet axle (49). Place one bearing (24) and one thrust ring (23) on each side of the planet gears. Bearings (24) must contact inside face of planetary support and thrust rings (23) must contact planet gears. Ensure planet gears (22) are installed with the smaller gear head diameter nearest the side of the planetary support (48) with the puller holes.
8. Align pin hole in planet axle with pin hole in planetary support. Install pins (25). Tap down until flush with planetary support.
9. Time gears as shown in drawing MHP1417. Using a separate ring gear tool to maintain gear position during installation of planetary assembly is helpful. Tap down until planetary assembly is fully seated.



(Dwg. MHP1417)

10. Install retainer ring (15) in ring gear (16). Install ring gear in gear housing (30).
11. Install sun gear (41) and tap into position through bearing (5) until seated.
12. Turn gear housing over and support to avoid damaging the sun gear. Align tabs on steel discs (44) and install brake sleeve (39) on sun gear spline. Secure in position with retainer ring (36).
13. Install remaining brake parts as described in "Accessing the Brake."
14. Install oil seal (53) and 'O' rings (9) and (14) on gear cover (13). Seal lip must be toward gear side.
15. Install ring gear support (54).
16. Install gear cover (13) in gear housing (30).

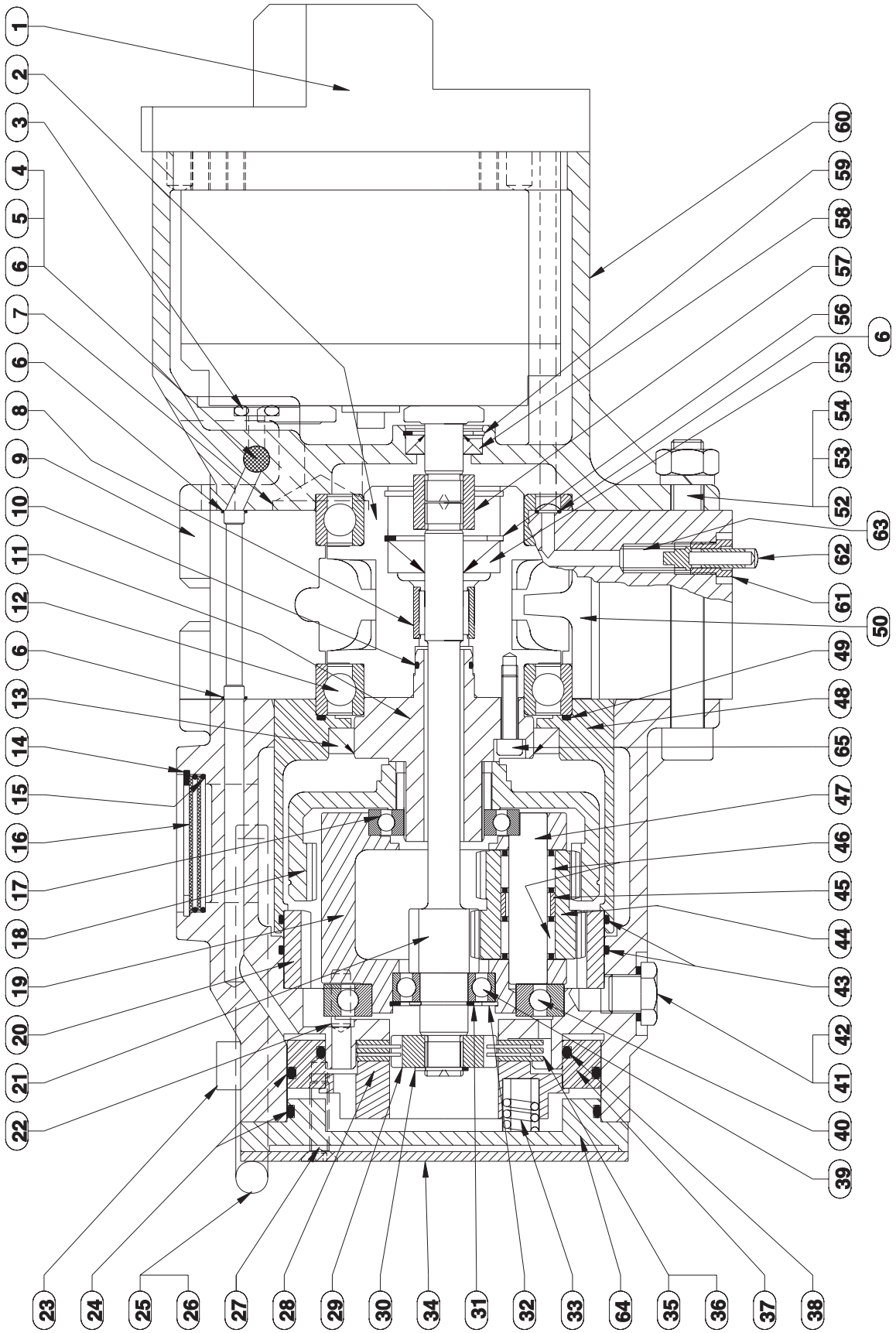
☞ Load Test

Prior to initial use, all new, extensively repaired or altered hoists shall be load tested by or under the direction of a person trained in safety and operation of this hoist. Dynamically load test hoist to 100% of its rated capacity in accordance with ASME B30.16 standards. Testing to more than 100% is required to set overload device and may be necessary to comply with standards and regulations set forth in areas outside the USA.

INDEX TO DRAWINGS AND PARTS LISTS

LCA015S AND LCA030D HOIST PARTS DRAWING

1.5 and 3 ton Hoist Capacities



(Dwg. MHP1412)

LCA015S AND LCA030D HOIST PARTS LIST

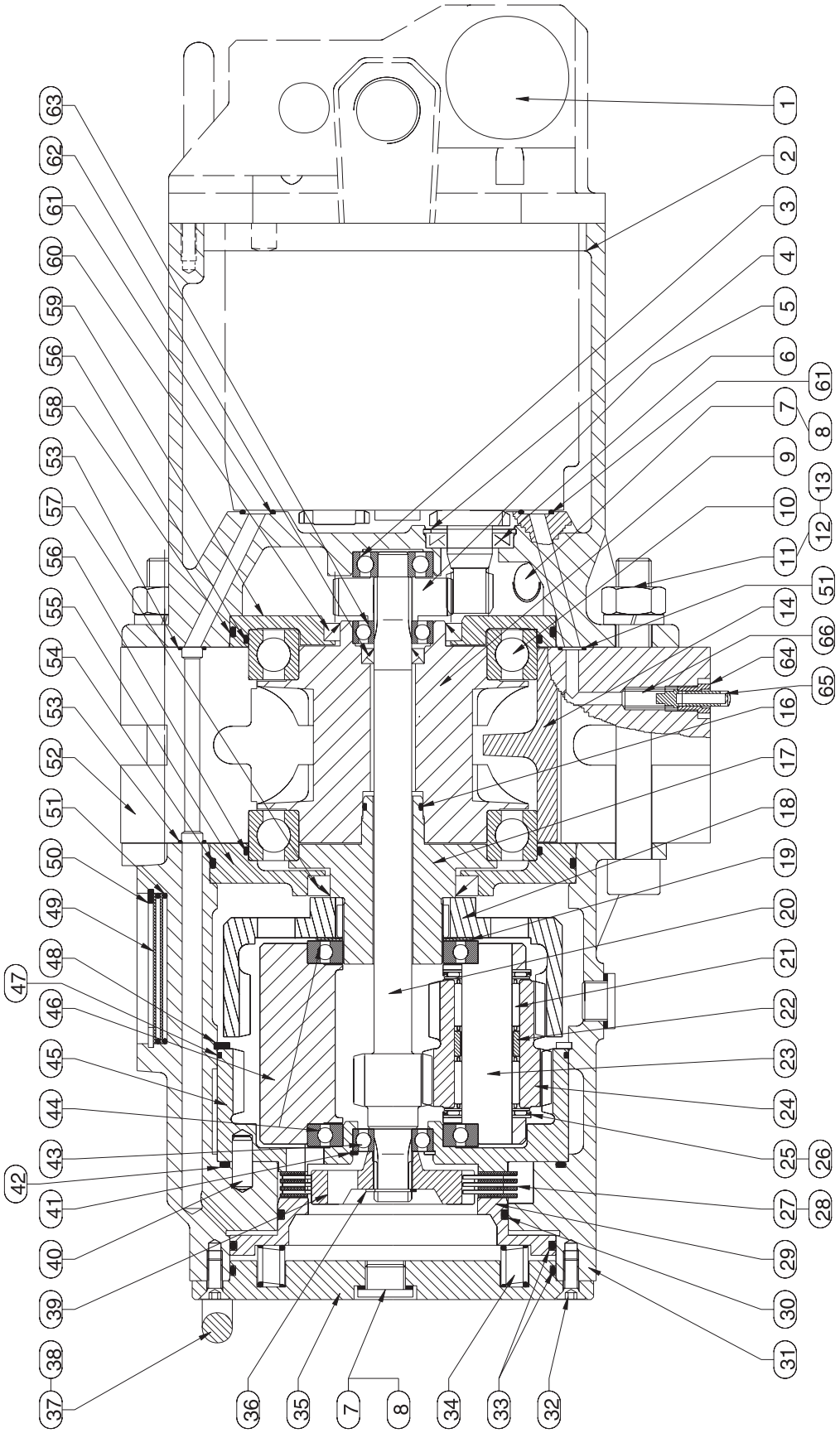
ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER	ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
1	Motor	1	Refer to Motor Section	34	Brake Cover	1	94240327
2	Sprocket	1	94240015	35	Friction Disc	3	63028241
• 3	'O' Ring	2	58224929	36	Steel Disc	2	63028341
4	Shuttle Valve Stop	1	96090223	37	Brake Piston	1	96180126
5	Ball	1	69401625	• 38	'O' Ring	2	58235829
• 6	'O' Ring	5	58212229	39	Bearing	1	50000002
7	Muffler	2	67600303	40	Bearing	1	50800009
8	Needle Bearing	1	56471916	41	Plug	2	65159732
9	Chain Guide Housing	1	94240299	42	Seal Washer	2	58406031
• 10	'O' Ring	1	58211729	• 43	'O' Ring	2	58235829
11	Pinion	1	94240314	44	Planetary Gear	2	96180009
12	Bearing	2	50050010	45	Spacer	3	96090026
• 13	Oil Seal	1	58006330	46	Bearing	6	56501713
14	Retainer Ring	1	47703043	47	Satellite Axle	3	96090039
• 15	'O' Ring	2	58236129	48	Gear Cover	1	94240313
16	Muffler	2	94240328	• 49	'O' Ring	1	58235529
17	Bearing	1	50800006	50	Chain Guide	1	94240306
18	Ring Gear	1	96180008	52	Capscrew	4	41326506
19	Planetary Support	1	96180041	53	Nut	4	43006911
20	Ring Gear	1	96090038	54	Lockwasher	4	45201010
21	Pinion	1	94240315	• 55	Oil Seal	1	58021430
22	Pin	2	46001716	56	Retainer Ring	1	47703035
23	Gear Housing	1	94240308	57	Coupling	1	96090034
• 24	'O' Ring	2	58235229	• 58	Oil Seal	1	58021530
25	Handle	1	94240055	59	Retainer Ring	1	47703024
26	Pin	2	46402918	60	Motor Housing	1	94240310
27	Screw	4	41104206	61	Limit Switch Body	2	96090050
28	Brake Disc	1	94240326	62	Limit Switch	2	96090051
29	Brake Sleeve	1	94240316	63	Spring	2	69160332
30	Retainer Ring	1	47700012	64	Brake Support Plate	1	94240309
31	Retainer Ring	1	47700015	65	Screw	4	41307206
32	Retainer Ring	1	47703032	*	Load Chain (Bulk)	Specify Length (metres)	LC824-G8ZP
33	Spring	3	69165532				

• Recommended Spare

* Not Illustrated

LCA030S AND LCA060D HOIST PARTS DRAWING

3 and 6 ton Hoist Capacities



(Dwg. MHP1413)

LCA030S AND LCA060D HOIST PARTS LIST

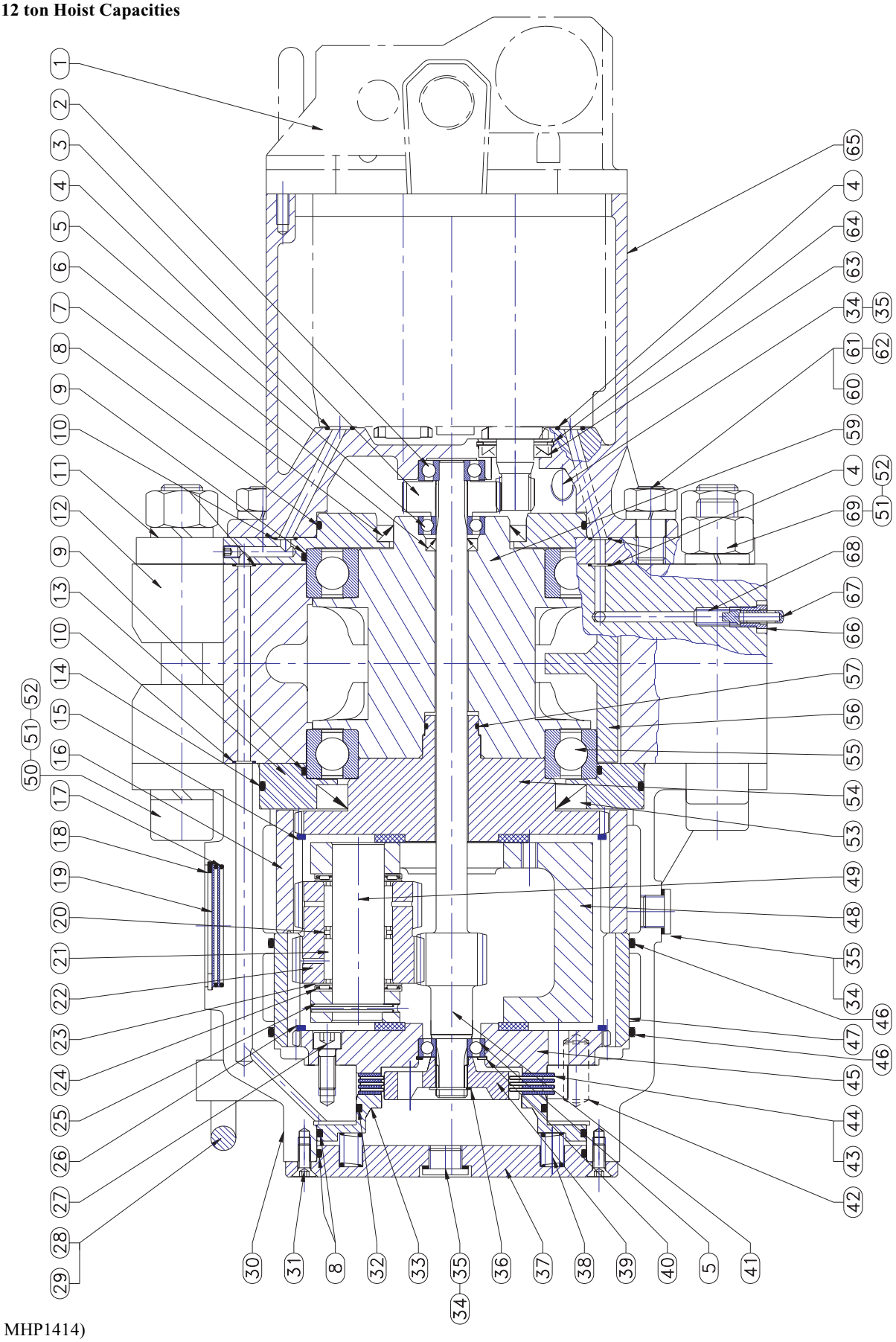
ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER	ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
1	Motor	1	Refer to Motor Section	35	Brake Cover	1	94120406
2	Motor Housing	1	94120405	36	Retainer Ring	1	47700015
3	Bearing	1	50100001	37	Handle	1	94120080
4	Retainer Ring	1	47703035	38	Pin	2	46503420
5	Gear Wheel	1	94120410	39	Brake Sleeve	1	96310120
• 6	Oil Seal	1	58020030	40	Pin	3	46000416
• 7	Plug	4	65119732	41	Retainer Ring	1	47703032
• 8	Copper Washer	4	58403431	• 42	'O' Ring	1	58221829
9	Sprocket	1	94120412	43	Bearing	1	50000002
10	Bearing	2	50050015	44	Bearing	1	50800008
11	Capscrew	4	41324006	45	Ring Gear	1	96310096
12	Lockwasher	4	45201014	46	Planetary Support	1	96200010
13	Nut	4	43005811	• 47	'O' Ring	1	58231129
14	Chain Guide	1	94120420	48	Retainer Ring	1	47847832
• 16	'O' Ring	1	58215829	49	Muffler	2	94120426
17	Drive Pinion	1	94120408	50	Retainer Ring	1	47703060
18	Ring Gear	1	96200031	• 51	'O' Ring	2	58235729
19	Spring Washer	1	69172132	52	Chain Guide Housing	1	94120416
20	Sun Gear	1	94120411	• 53	'O' Ring	2	58212529
21	Bearing	6	56502620	• 54	'O' Ring	1	58234929
22	Spacer	3	96190024	55	Gear Cover	1	94120407
23	Planet Axle	3	96200060	• 56	'O' Ring	2	58234829
24	Planet Gear	3	96200075	• 57	Oil Seal	1	58012230
25	Bearing	6	56053520	• 58	'O' Ring	1	58212829
26	Thrust Ring	6	57319832	59	Motor Cover	1	94120409
27	Friction Disc	4	63059932	• 60	Oil Seal	1	58007230
28	Steel Disc	3	63060032	• 61	'O' Ring	3	58224929
29	Brake Piston	1	96310093	• 62	Oil Seal	1	58021330
• 30	'O' Ring	1	58230929	63	Bearing	1	50000002
31	Gear Housing	1	94120399	64	Limit Switch Body	2	96090050
32	Screw	6	41104503	65	Limit Switch	2	96090051
• 33	'O' Ring	2	58212829	66	Spring	2	69160332
34	Spring	8	69165532	*	Load Chain (Bulk)	Specify Length (metres)	LC1336-G8ZP

• Recommended Spare

* Not Illustrated

LCA060S AND LCA120D HOIST PARTS DRAWING

6 and 12 ton Hoist Capacities



(Dwg. MHP1414)

LCA060S AND LCA120D HOIST PARTS LIST

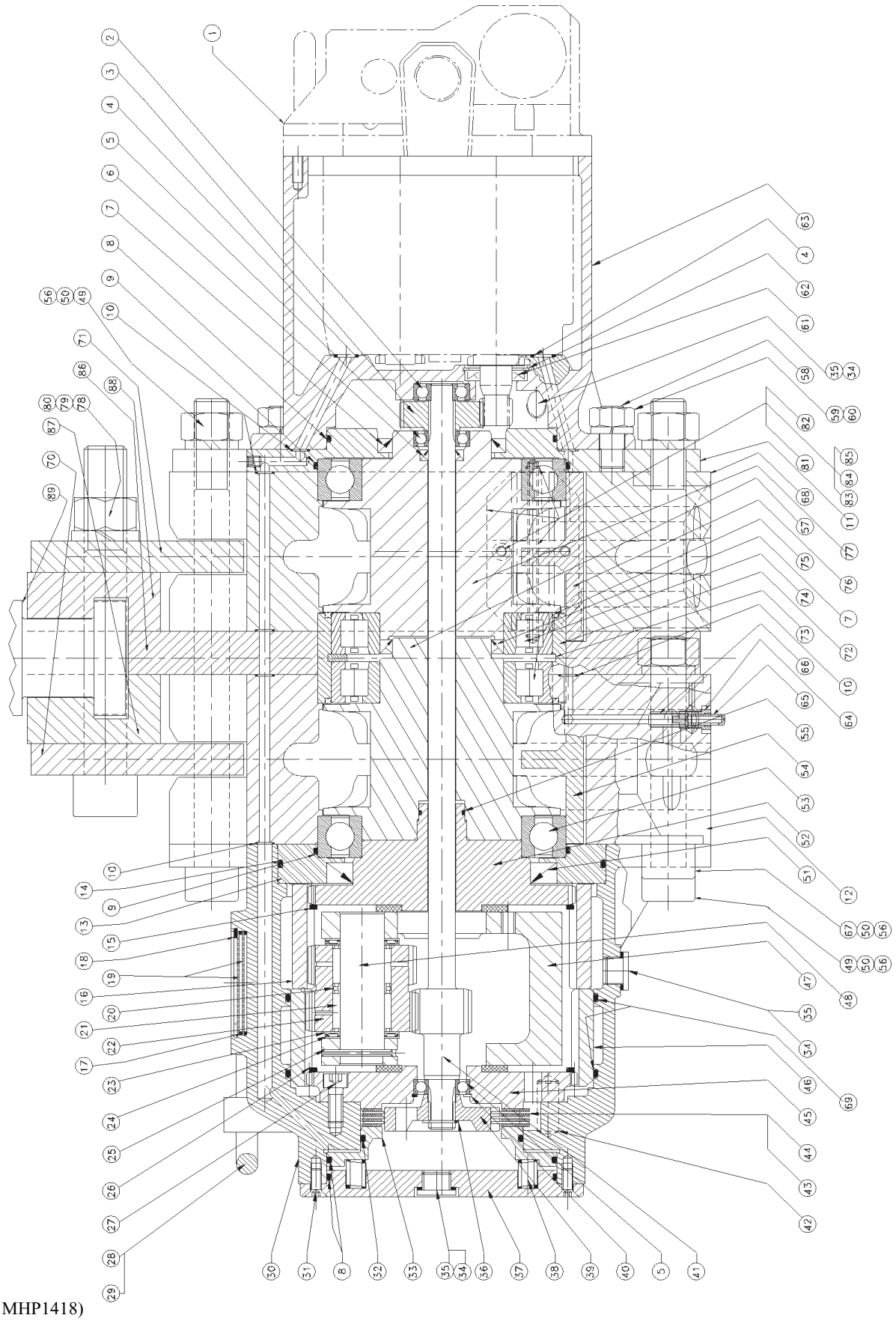
ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
1	Motor	1	Refer to Motor Section
2	Bearing	1	50100001
3	Gear Wheel	1	94120410
• 4	'O' Ring	3	58224929
5	Bearing	2	50000002
• 6	Oil Seal	1	58021330
• 7	Oil Seal	1	58006330
• 8	'O' Ring	3	58212829
• 9	'O' Ring	2	58234929
• 10	'O' Ring	3	58212529
11	Motor Flange	1	95260147
12	Chain Guide Housing	1	95260145
13	Gear Cover	1	95260148
• 14	'O' Ring	1	58235029
15	Retainer Ring	1	47834832
16	Ring Gear	1	95260151
• 17	'O' Ring	2	58235729
18	Retainer Ring	1	47703060
19	Muffler	2	94120426
20	Spacer	4	95730021
21	Bearing	8	56503324
22	Planet Gear	4	95260150
23	Thrust Ring	8	57312632
24	Bearing	8	56054225
25	Pin	4	46504220
26	Retainer Ring	1	47836832
27	Capscrew	3	41301406
28	Handle	1	94120080
29	Pin	2	46503420
30	Gear Housing	1	95260146
31	Screw	6	41104503
• 32	'O' Ring	1	58230929
33	Brake Piston	1	96310093
• 34	Plug	4	65119732
• 35	Seal Washer	4	58403431
36	Retainer Ring	1	47700015
37	Brake Cover	1	94120406
38	Spring	8	69165532
39	Brake Sleeve	1	96310120
40	Retainer Ring	1	47703032
41	Sun Gear	1	95260153
42	Pin	3	46002216
43	Friction Disc	4	63059932
44	Steel Disc	3	63060032
45	Ring Gear Support	1	95260149
• 46	'O' Ring	2	58235929
47	Ring Gear	1	95730055
48	Planetary Support	1	96150023
49	Planet Axle	4	95730019
50	Capscrew	3	41321606
51	Lockwasher	4	45201020
52	Nut	4	43004011
• 53	Oil Seal	1	58008630
54	Ring Gear Support	1	95260152
55	Bearing	2	50060018
56	Chain Guide	1	95260156
• 57	'O' Ring	1	58220129
59	Sprocket	1	95260154
60	Screw	3	95260105
61	Nut	3	43005811
62	Lockwasher	3	45201014
• 63	Oil Seal	1	58020030
64	Retainer Ring	1	47703035
65	Motor Housing	1	94120405
66	Limit Switch Body	2	96090050
67	Limit Switch	2	96090051
68	Spring	2	69160332
69	Screw	1	41323906
*	Load Chain (Bulk)	Specify Length (metres)	LC1645-G8ZP

• Recommended Spare

* Not Illustrated

LCA180T AND LCA250Q HOIST PARTS DRAWING

18 and 25 ton Hoist Capacities



(Dwg. MHP1418)

LCA180T AND LCA250Q HOIST PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER	ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
1	Motor	1	Refer to Motor Section	41	Sun Gear	1	95900055
2	Bearing	1	50100001	42	Pin	3	46002216
3	Gear Wheel	1	94120410	43	Friction Disc	4	63059932
• 4	'O' Ring	3	58224929	44	Steel Disc	3	63060032
5	Bearing	2	50000002	45	Ring Gear Support	1	95260149
• 6	Oil Seal	1	58021330	46	Ring Gear	1	95730055
• 7	Oil Seal	2	58021630	47	Planetary Support	1	96150023
• 8	'O' Ring	3	58212829	48	Planet Axle	4	95730019
• 9	'O' Ring	2	58234929	49	Capscrew	3	41331006
• 10	'O' Ring	9	58212529	50	Lockwasher	4(3)	45201020
11	Motor Flange	1	95900052	• 51	Oil Seal	1	58008630
12	Chain Guide Housing	1	95260145	52	Ring Gear Support	1	95260152
13	Gear Cover	1	95260148	53	Bearing	2	50060018
• 14	'O' Ring	1	58235029	54	Chain Guide	1	95260156
15	Retainer Ring	1	47834832	• 55	'O' Ring	1	58220129
16	Ring Gear	1	95260151	56	Nut	4(3)	43004011
• 17	'O' Ring	2	58235729	57	Sprocket	1	95900053
18	Retainer Ring	1	47703060	58	Screw	3	95260105
19	Silencer	2	94120426	59	Nut	3	43005811
20	Spacer	4	95730021	60	Lockwasher	3	45201014
21	Bearing	8	56503324	• 61	Oil Seal	1	58020030
22	Planet Gear	4	95260150	62	Retainer Ring	1	47703035
23	Thrust Ring	8	57312632	63	Motor Housing	1	94120405
24	Bearing	8	56054225	64	Limit Switch Body	2	96090050
25	Pin	4	46504220	65	Limit Switch	2	96090051
26	Retainer Ring	1	47836832	66	Spring	2	69160332
27	Capscrew	3	41301406	67	Screw*	1	41330906
28	Handle	1	94120080	68	Chain Guide Housing	1	95900048
29	Pin	2	46503420	• 69	'O' Ring	2	58235929
30	Gear Housing	1	95260146	72	Eccentric Ring	1	95900067
31	Screw	6	41104503	73	Retainer Ring	1	47703125
• 32	'O' Ring	1	58230929	74	Bearing	2	51200014
33	Brake Piston	1	96310093	• 75	Quad Ring	2	58236029
• 34	Plug	4	65119732	76	Chain Guide	1	95260007
• 35	Seal Washer	4	58403431	77	Sprocket	1	95900054
36	Retainer Ring	1	47700015	81	Tube	2	95900049
37	Brake Cover	1	94120406	82	Cover	2	95900050
38	Spring	8	69165532	• 83	'O' Ring	4	58212229
39	Brake Sleeve	1	96310120	84	Screw	4	41321406
40	Retainer Ring	1	47703032	85	Lockwasher	4	45201006

• Recommended Spare

( ) Quantity Required for LCA180T Hoist

* Required for LCA250Q Hoist Only

LCA180T AND LCA250Q HOIST PARTS LIST (CONT'D)

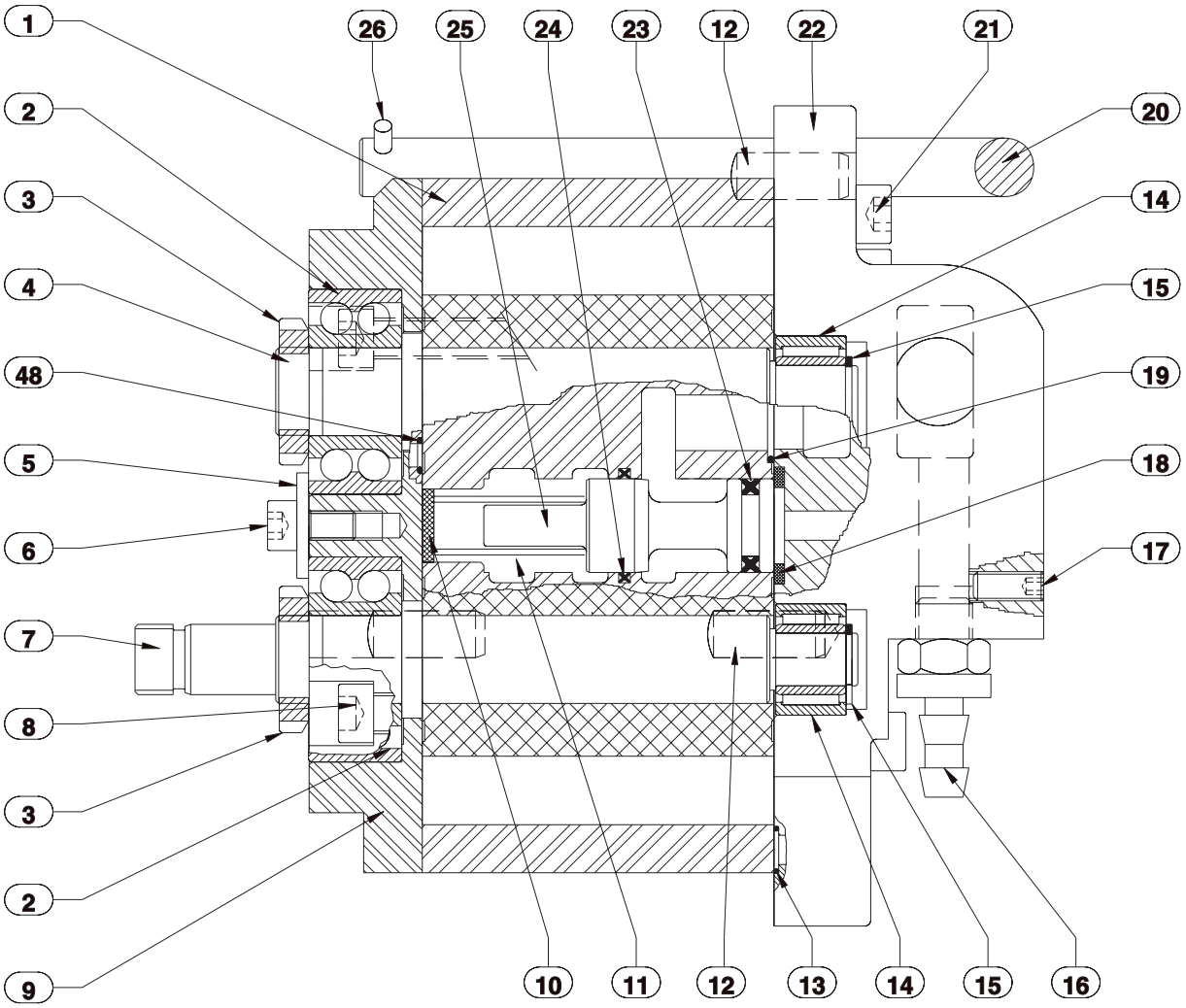
Top Hook

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER	
			LCA180T	LCA250Q
70	Hook Support	1	95900059	
71	Hook Support	1	95900060	
78	Capscrew	2	41330806	
79	Lockwasher	2	45201024	
80	Nut	2	43006111	
86	Flange	1	95900056	95900051
87	Hook Support	1	95900061	95900057
88	Hook Support	1	95900062	95900058
89	Hook, standard	1	95960048	96230015
	Hook, Option "R"		95960062	96230169
*	Load Chain (Bulk)	Specify Length (in metres)	LC1645-G8ZP	

* Not Illustrated

2HP MOTOR ASSEMBLY DRAWING AND PARTS LIST

2HP Motor (without Overload or Emergency Stop) for use with Hoist Models LCA015S and LCA030D



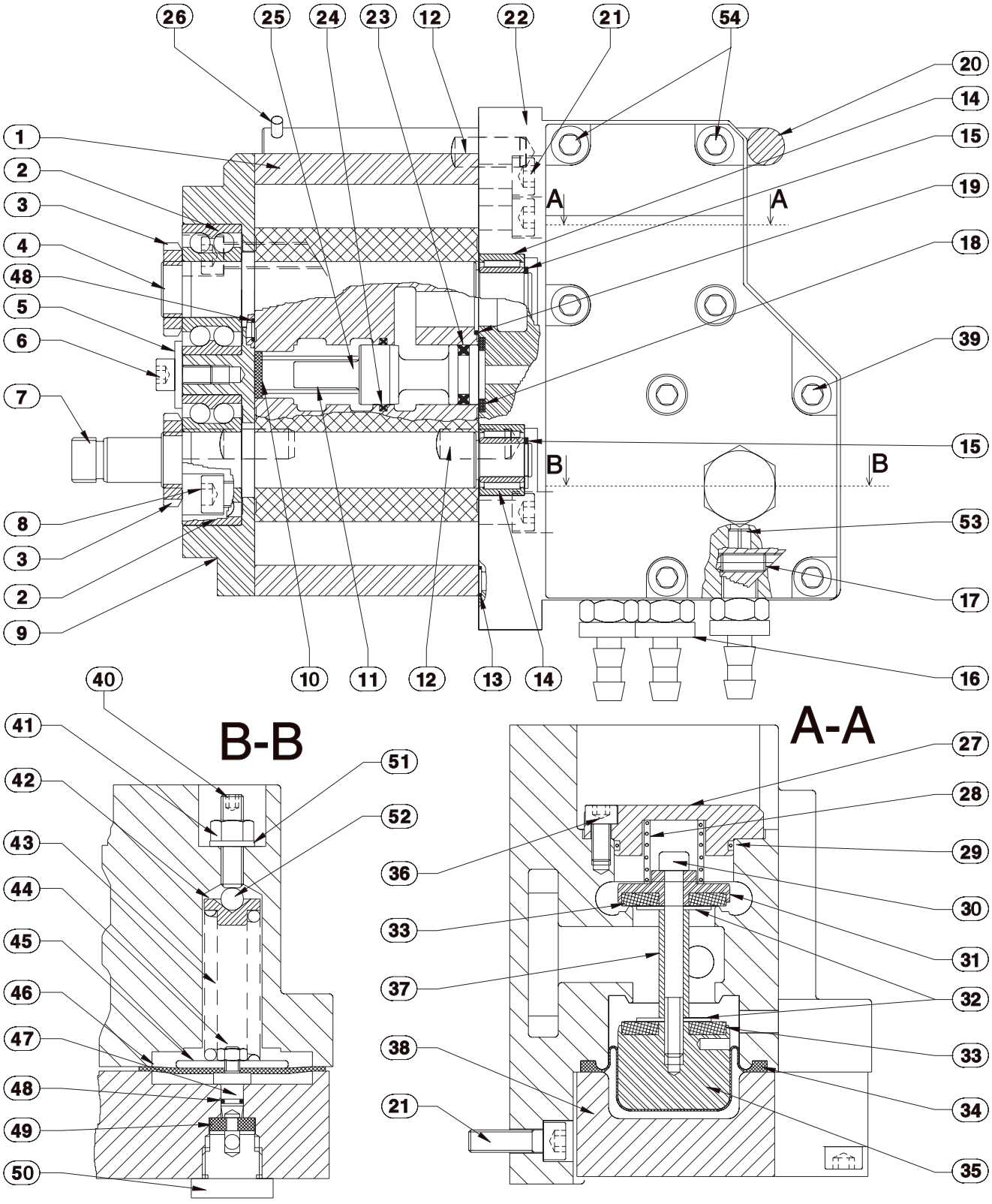
(Dwg. MHP1419)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER	ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
1	Motor Housing	1	96090007	15	Retainer Ring	2	47801339
2	Bearing	2	50600002	16	Fitting	3	61652632
3	Locknut	2	57000002	17	Screw	1	42007307
4	Idle Gear	1	96090030	18	Stop	2	96090042
5	Washer	1	96090032	• 19	'O' Ring	2	58205029
6	Capscrew	1	41306706	20	Handle	1	94240055
7	Drive Gear	1	94240319	21	Capscrew	4	41312206
8	Capscrew	4	41300806	22	Motor Cover	1	94240318
9	Motor Flange	1	96090008	• 23	Quad Ring	2	58228929
10	Rear Stop	2	94120030	• 24	Quad Ring	2	58231229
11	Spring	2	94240224	25	Slide Valve	2	94240212
12	Pin	6	46000416	26	Pin	2	46402918
• 13	'O' Ring	2	58212229	48	'O' Ring	2	58222329
14	Needle Bearing	2	56461912				

• Recommended Spare

2 HP SU MOTOR ASSEMBLY PARTS DRAWING

2HP Motor (with Overload and Emergency Stop) for use with Hoist Models LCA015S and LCA030D



(Dwg. MHP1420)

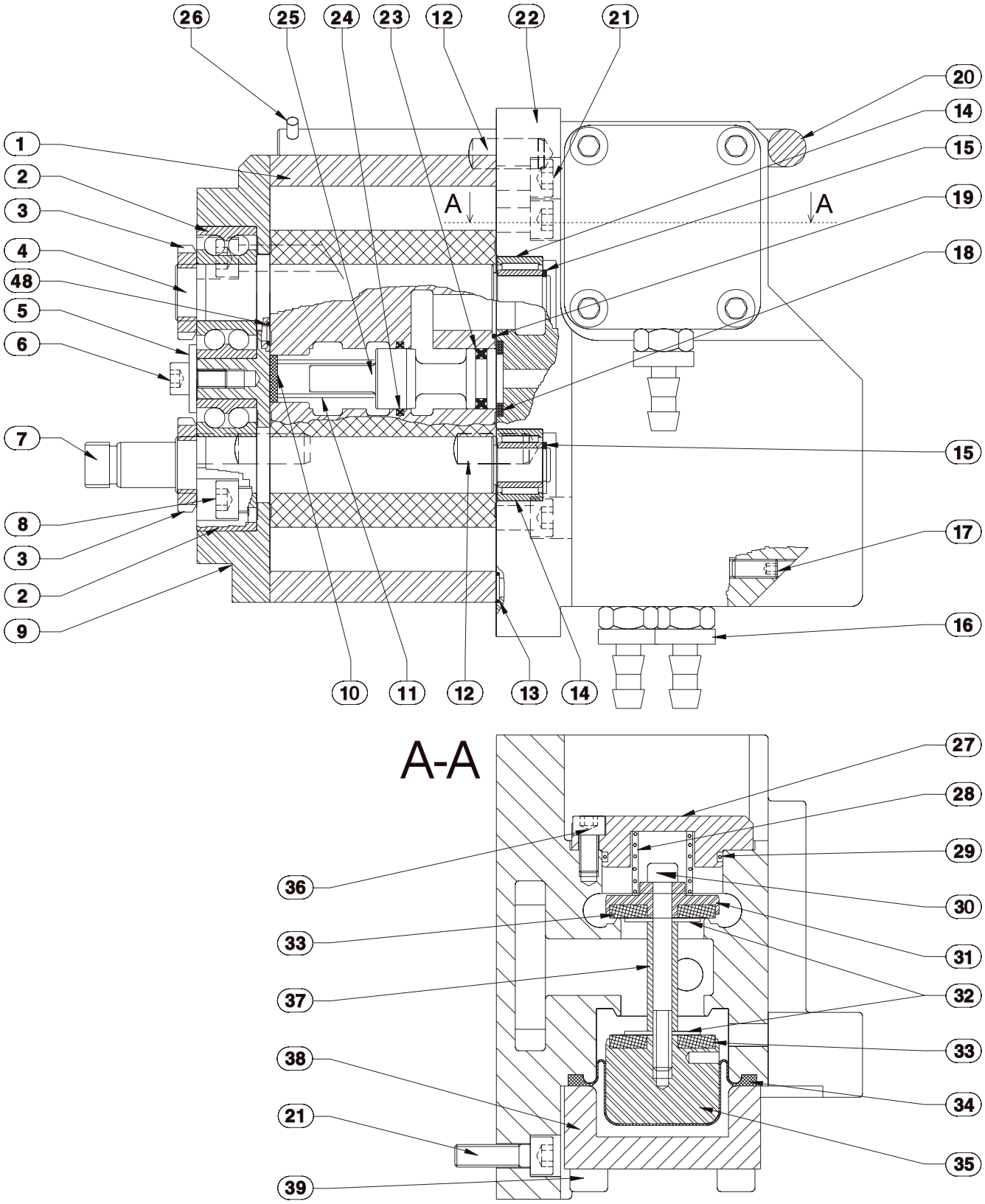
2 HP SU MOTOR ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER	ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
1	Motor Housing	1	96090007	28	Spring	1	96158732
2	Bearing	2	50600002	• 29	'O' Ring	1	58214829
3	Locknut	2	57000002	30	Capscrew	1	41308206
4	Idle Gear	1	96090030	31	Valve Cone	1	96170053
5	Washer	1	96090032	32	Washer	2	45700005
6	Capscrew	1	41306706	33	Seal Washer	2	96170056
7	Drive Gear	1	94240319	• 34	Diaphragm	1	67716341
8	Capscrew	4	41300806	35	Valve Cone	1	96170054
9	Motor Flange	1	96090008	36	Capscrew	3	41326306
10	Rear Stop	2	94120030	37	Spacer	1	96170055
11	Spring	2	94240224	38	Cover	1	94240312
12	Pin	6	46000416	39	Capscrew	6	41322306
• 13	'O' Ring	2	58212229	40	Screw	1	42007107
14	Needle Bearing	2	56461912	41	Locknut	1	43707611
15	Retainer Ring	2	47801339	42	Spring Receiver	1	96360023
16	Fitting	5	61652632	43	Spring	1	69159432
17	Screw	1	42007307	44	Nut	1	43001111
18	Stop	2	96090042	45	Washer	1	96360019
• 19	'O' Ring	2	58205029	• 46	Diaphragm	1	96360020
20	Handle	1	94240317	47	Valve Cone	1	96360017
21	Capscrew	4	41322206	• 48	'O' Ring	3	58222329
22	Motor Cover	1	94240320	49	Seal Washer	1	96360021
• 23	Quad Ring	2	58228929	50	Plug	1	96090269
• 24	Quad Ring	2	58231229	51	Seal Ring	1	58404531
25	Slide Valve	2	94240212	52	Ball	1	69400125
26	Pin	2	46402918	53	Nozzle	1	96170071
27	Cover	1	96170081	54	Capscrew	2	41324306

• Recommended Spare

2 HP U MOTOR ASSEMBLY PARTS DRAWING

2 HP Motor (with Emergency Stop only) for use with Hoist Models LCA015S and LCA030D



(Dwg. MHP1421)

2 HP U MOTOR ASSEMBLY PARTS LIST

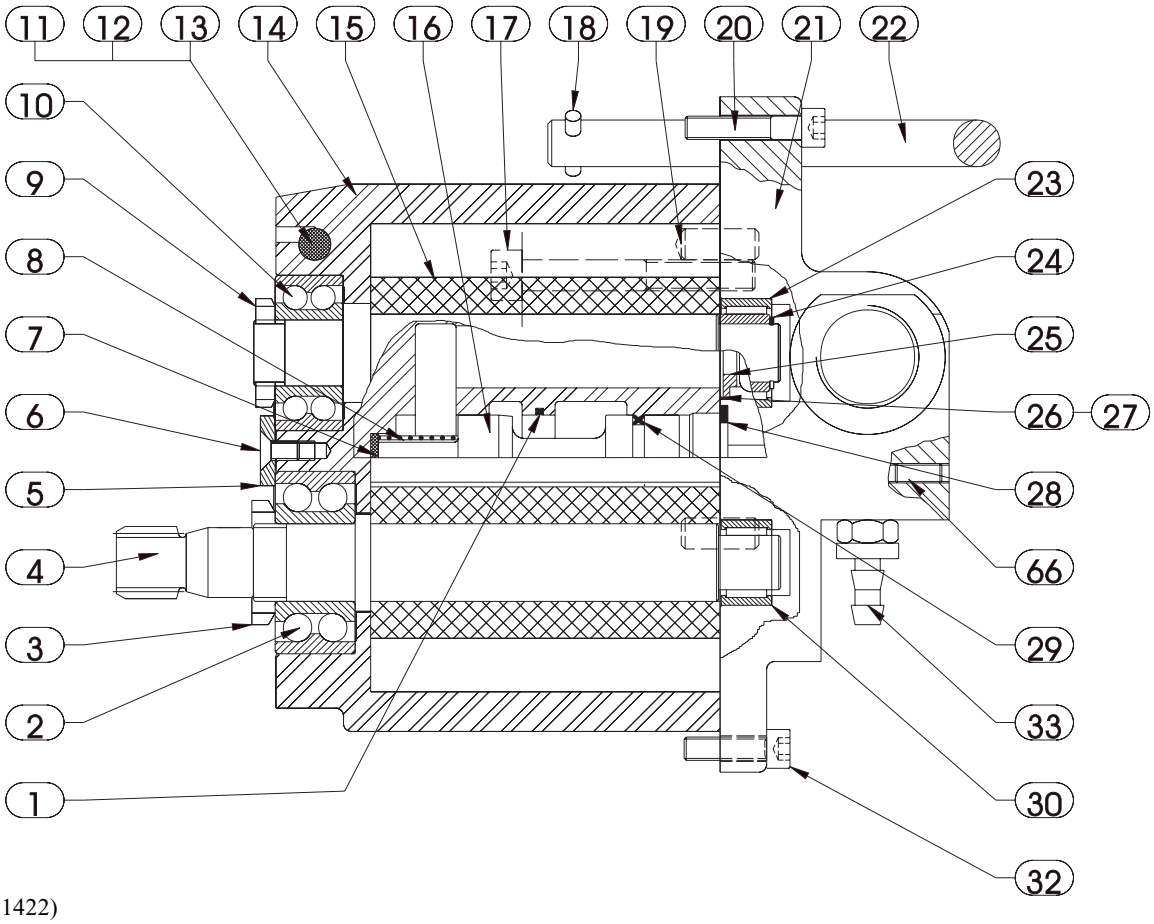
ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER	ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
1	Motor Housing	1	96090007	21	Capscrew	4	41322206
2	Bearing	2	50600002	22	Motor Cover	1	94240321
3	Locknut	2	57000002	• 23	Quad Ring	2	58228929
4	Idle Gear	1	96090030	• 24	Quad Ring	2	58231229
5	Washer	1	96090032	25	Slide Valve	2	94240212
6	Screw	1	41306706	26	Pin	2	46402918
7	Drive Gear	1	94240319	27	Cover	1	96170081
8	Capscrew	4	41300806	28	Spring	1	69158732
9	Motor Flange	1	96090008	• 29	'O' Ring	1	58214829
10	Rear Stop	2	94120030	30	Capscrew	1	41308206
11	Spring	2	94240224	31	Valve Cone	1	96170053
12	Pin	6	46000416	32	Washer	2	45700005
• 13	'O' Ring	2	58212229	33	Seal Washer	2	96170056
14	Needle Bearing	2	56461912	• 34	Diaphragm	1	67716341
15	Retainer Ring	2	47801339	35	Valve Cone	1	96170054
16	Fitting	5	61652632	36	Capscrew	3	41326306
17	Screw	1	42007307	37	Spacer	1	96170055
18	Stop	2	96090042	38	Cover	1	94120388
• 19	'O' Ring	2	58205029	39	capscrew	4	41322306
20	Handle	1	94240317	48	'O' Ring	2	58222329

• Recommended Spare

SERVICE NOTES

4HP MOTOR ASSEMBLY DRAWING AND PARTS LIST

4HP Motor (without Overload or E-Stop) for use with Hoist Models LCA030S, LCA060D, LCA060S, LCA120D, LCA180T and LCA250Q



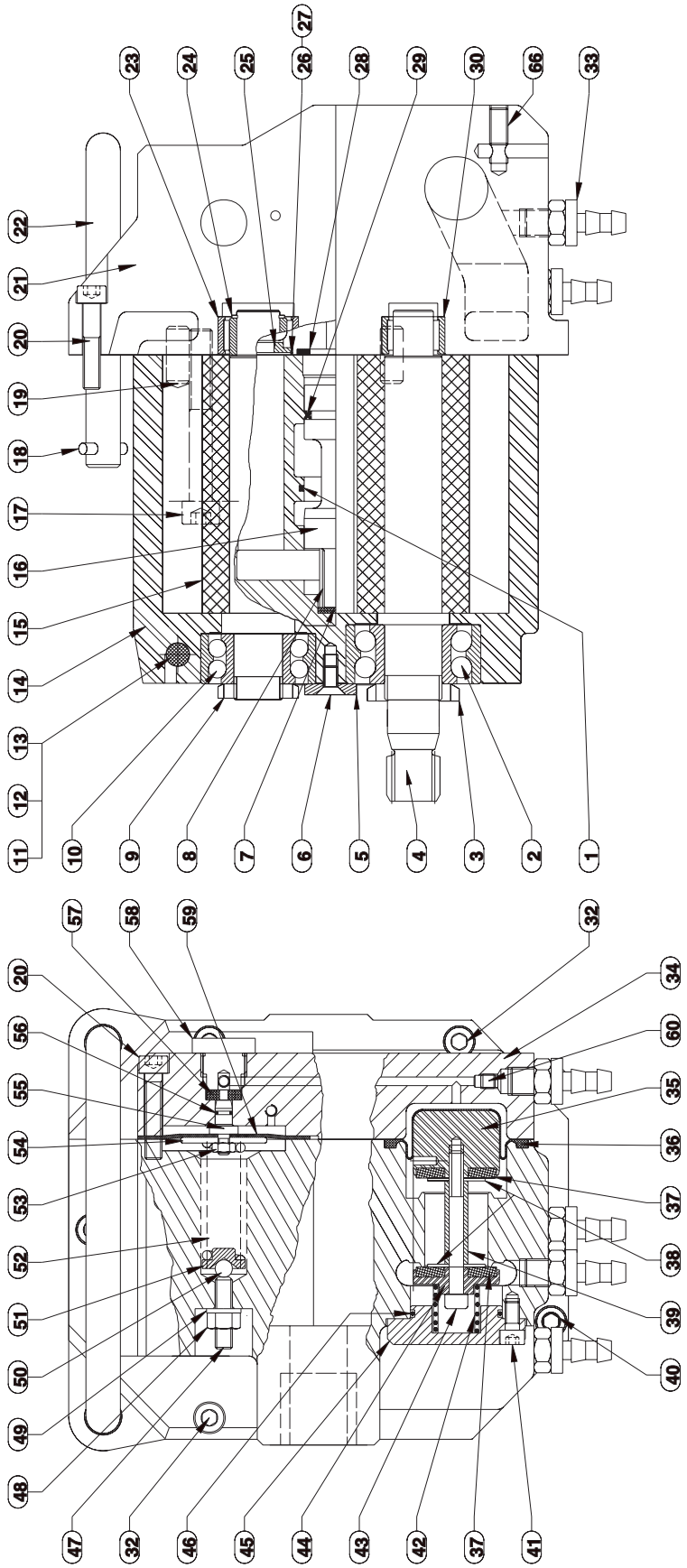
(Dwg. MHP1422)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER	ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
• 1	Quad Ring	2	58232429	18	Pin	2	46503420
2	Bearing	1	50600004	19	Pin	4	46000416
3	Locknut	1	57000004	20	Capscrew	1	41322306
4	Drive Gear	1	96200093	21	Motor Cover	1	94120379
5	Washer	1	96310054	22	Handle	1	94120080
6	Screw	1	41103403	23	Bearing	1	56462813
7	Rear Stop	2	94120030	24	Retainer Ring	1	47836732
8	Spring	2	94120289	25	Exhaust Washer	1	96200045
9	Locknut	1	57000003	• 26	'O' Ring	1	58226029
10	Bearing	1	50600003	• 27	'O' Ring	1	58225929
11	Shuttle Stop	1	96090223	28	Rear Stop	2	96200069
• 12	'O' Ring	1	58212229	• 29	Quad Ring	2	58229029
13	Ball	1	69401625	30	Bearing	1	56492213
14	Motor Housing	1	96200005	32	Capscrew	4	41322206
15	Idle Gear	1	96200026	33	Fitting	3	61652632
16	Slide Valve	2	96200006	66	Screw	1	42007307
17	Capscrew	4	41302206				

• Recommended Spare

4 HP SU MOTOR ASSEMBLY PARTS DRAWING

4HP SU Motor (with Overload and E-Stop) for use with Hoist Models LCA030S, LCA060D, LCA060S, LCA120D, LCA180T and LCA250Q



(Dwg. MHP1423)

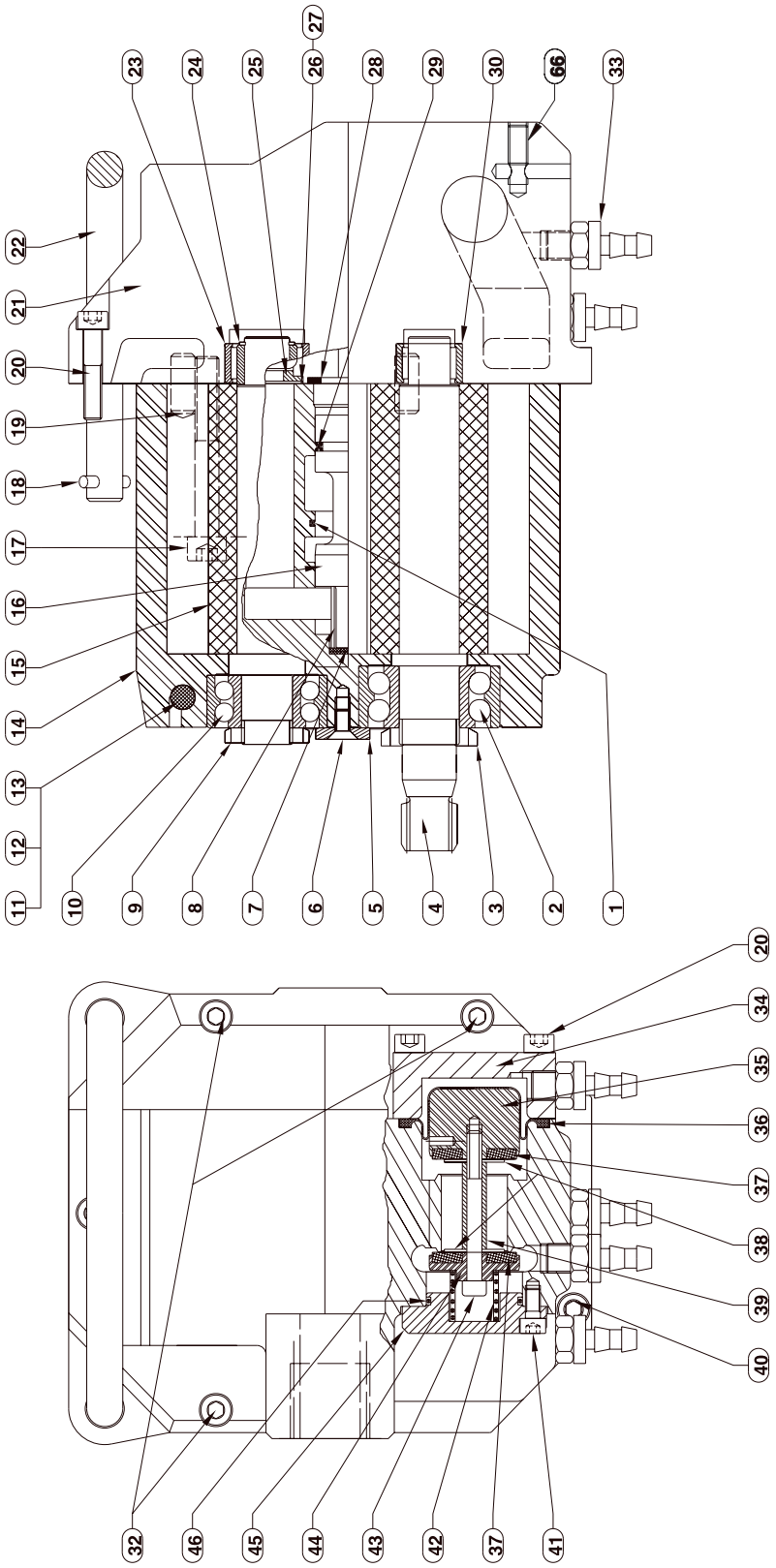
4 HP SU MOTOR ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER	ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
• 1	Quad Ring	2	58232429	32	Capscrew	3	41322206
2	Bearing	1	50600004	33	Fitting	5	61652632
3	Locknut	1	57000004	34	Cover	1	94120351
4	Drive Gear	1	96200093	35	Valve Cone	1	96170054
5	Washer	1	96310054	• 36	Diaphragm	1	67716341
6	Screw	1	41103403	• 37	Seal	2	96170056
7	Rear Stop	2	94120030	38	Washer	2	45700005
8	Spring	2	94120289	39	Spacer	1	96170055
9	Locknut	1	57000003	40	Capscrew	1	41322606
10	Bearing	1	50600003	41	Capscrew	3	41326306
11	Shuttle Stop	1	96090223	42	Spring	1	69158732
• 12	'O' Ring	1	58212229	43	Capscrew	1	41308206
13	Ball	1	69401625	44	Valve Cone	1	96170053
14	Motor Housing	1	96200005	45	Cover	1	96170081
15	Idle Gear	1	96200026	• 46	'O' Ring	1	58214829
16	Slide Valve	2	96200006	47	Screw	1	42007107
17	Capscrew	4	41302206	48	Locknut	1	43707611
18	Pin	2	46503420	49	Seal Ring	1	58404531
19	Pin	4	46000416	50	Ball	1	69400125
20	Capscrew	9	41322306	51	Spring Receiver	1	96360023
21	Motor Cover	1	94120350	52	Spring	1	69159432
22	Handle	1	94120080	53	Nut	3	43001111
23	Bearing	1	56462813	54	Washer	1	96360019
24	Retainer Ring	1	47836732	55	Valve Cone	1	96360017
25	Exhaust Washer	2	96200045	• 56	'O' Ring	1	58222329
• 26	'O' Ring	1	58226029	• 57	Seal	1	96360021
• 27	'O' Ring	2	58225929	58	Plug	1	96090269
28	Rear Stop	2	96200069	• 59	Diaphragm	1	96360020
• 29	Quad Ring	2	58229029	60	Nozzle	1	96170071
30	Bearing	1	56492213	66	Screw	1	42007307

• Recommended Spare

4 HP U MOTOR ASSEMBLY PARTS DRAWING

4HP Motor (with Emergency Stop only) for use with Hoist Models LCA030S, LCA060D, LCA060S, LCA120D, LCA180T and LCA250Q



(Dwg. MHP1424)

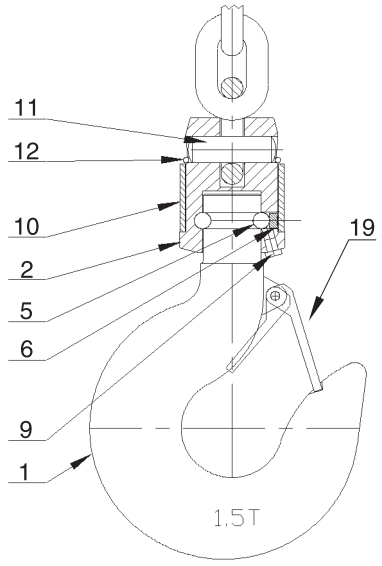
4 HP U MOTOR ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER	ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
• 1	Quad Ring	2	58232429	24	Retainer Ring	1	47836732
2	Bearing	1	50600004	25	Exhaust Washer	2	96200045
3	Locknut	1	57000004	• 26	'O' Ring	1	58226029
4	Drive Gear	1	96200093	• 27	'O' Ring	2	58225929
5	Washer	1	96310054	28	Rear Stop	2	96200069
6	Screw	1	41103403	• 29	Quad Ring	2	58229029
7	Rear Stop	2	94120030	30	Bearing	1	56492213
8	Spring	2	94120289	32	Capscrew	3	41322206
9	Locknut	1	57000003	33	Fitting	5	61652632
10	Bearing	1	50600003	34	Cover	1	94120388
11	Shuttle Stop	1	96090223	35	Valve Cone	1	96170054
• 12	'O' Ring	1	58212229	• 36	Diaphragm	1	67716341
13	Ball	1	69401625	• 37	Seal	2	96170056
14	Motor Housing	1	96200005	38	Washer	2	45700005
15	Idle Gear	1	96200026	39	Spacer	1	96170055
16	Slide Valve	2	96200006	40	Capscrew	1	41322606
17	Capscrew	4	41302206	41	Capscrew	3	41326306
18	Pin	2	46503420	42	Spring	1	69158732
19	Pin	4	46000416	43	Capscrew	1	41308206
20	Capscrew	9	41322306	44	Valve Cone	1	96170053
21	Motor Cover	1	94120387	45	Cover	1	96170081
22	Handle	1	94120080	• 46	'O' Ring	1	58214829
23	Bearing	1	56462813	66	Screw	1	42007307

• Recommended Spare

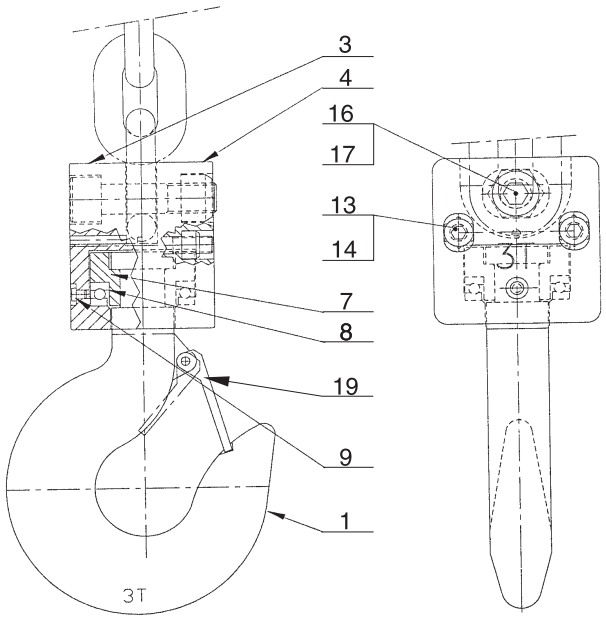
SINGLE AND DOUBLE FALL BOTTOM HOOK ASSEMBLY PARTS DRAWINGS

Single Fall 1.5 ton Hoist



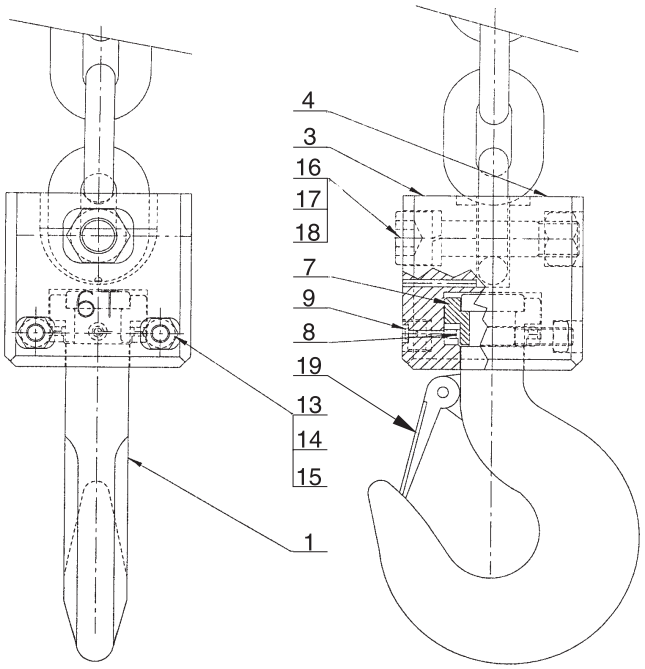
(Dwg. MHP1425)

Single Fall 3 ton Hoists



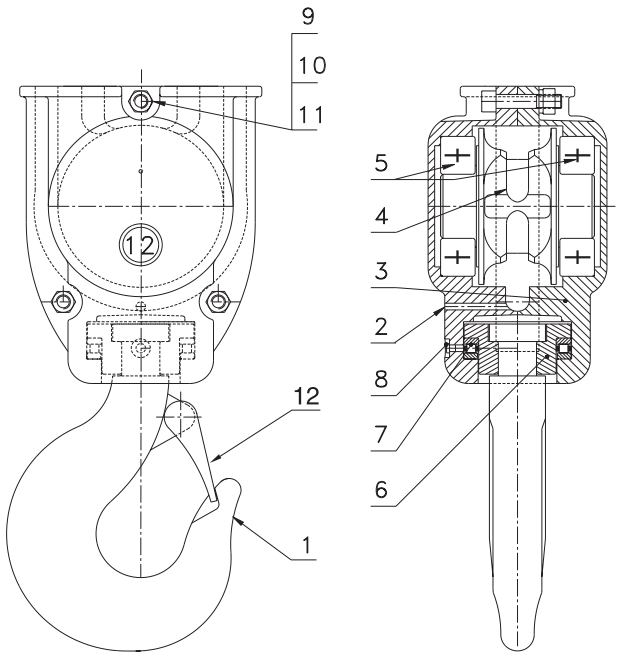
(Dwg. MHP1446)

Single Fall 6 ton Hoist



(Dwg. MHP1447)

Double Fall 3, 6 and 12 ton Hoists



(Dwg. MHP1428)

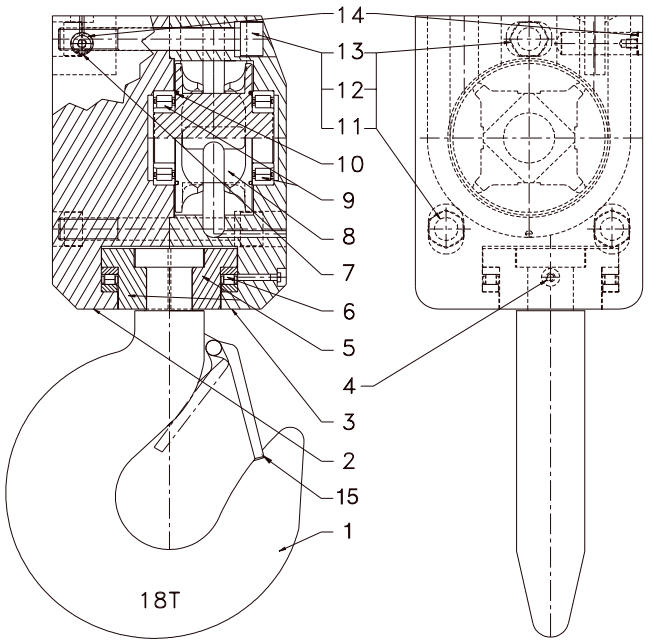
SINGLE AND DOUBLE FALL BOTTOM HOOK ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER					
			1.5 ton		3 ton		6 ton	
			Standard	Option 'R'	Standard	Option 'R'	Standard	Option 'R'
Single Fall Hoists								
1	Hook	1	94240292	94240294	94240290	94240296	94120395	94120402
2	Hook Block	1	94240293	94240295	---			
3	Bottom Block Flange	1	---		94120394	94120401	95260138	95260144
4	Bottom Block Flange	1	---		94120393	94120400	95260139	95260143
5	Ball	11	69401125		---			
6	Plug	1	96090060		---			
7	Ring, 2-piece	1	---		94240291		94120398	
8	Thrust Bearing	1	---		54000006		54700007	
9	Grease Fitting	1	67102627		67102627			
10	Ring	1	96090025	96090146	---			
11	Pin	1	46001916		---			
12	Retainer Wire	1	96090148		---			
13	Capscrew	2	---		41326206		41330006	
14	Nut	2	---		43706511		43006911	
15	Lockwasher	2	---				45201010	
16	Capscrew	1	---		41326606		95260037	
17	Nut	1	---		43707711		43004011	
18	Lockwasher	1	---				45201020	
19	Hook Latch	1	Contact Factory					

Double Fall Hoists			3 ton		6 ton		12 ton	
1	Hook	1	94240290	94240296	94120395	94120402	96230011	96230168
2	Half Hook Block	1	94240289	94240297	94120397	94120404	95260136	95260142
3	Half Hook Block	1	94240288	94240298	94120396	94120403	95260137	95260141
4	Sprocket Wheel	1	94240056	94240263	94120113	94120328	94260006	95260104
5	Bearing	2	50250005		50250006		50250011	
6	Ring, 2-piece	1	94240291		94120398		96230014	
7	Thrust Bearing	1	54000006		54700007		54700013	
8	Grease Fitting	1	67102627		67100827			
9	Lockwasher	3	45201008		45201012			
10	Capscrew	3	41326706		41324406		41323106	
11	Nut	3	43003511		43003611			
12	Hook Latch	1	Contact Factory					

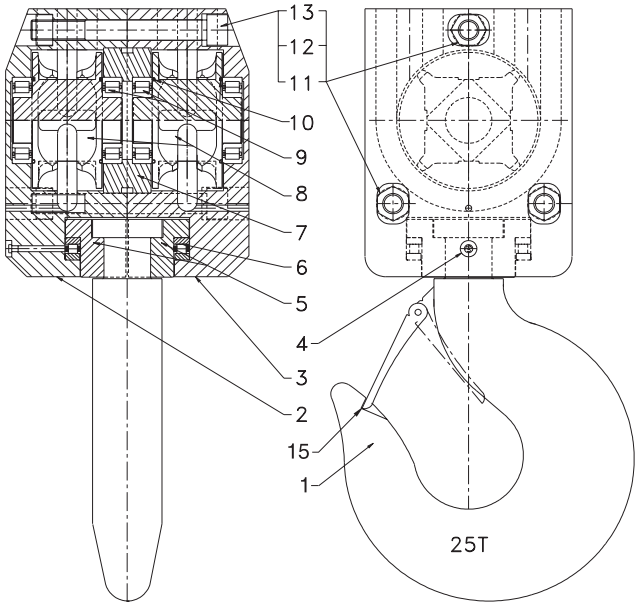
TRIPLE AND QUADRUPLE FALL BOTTOM HOOK DRAWINGS AND PARTS LIST

Triple Fall 18 ton Hoist



(Dwg. MHP1429)

Quadruple Fall 25 ton Hoist

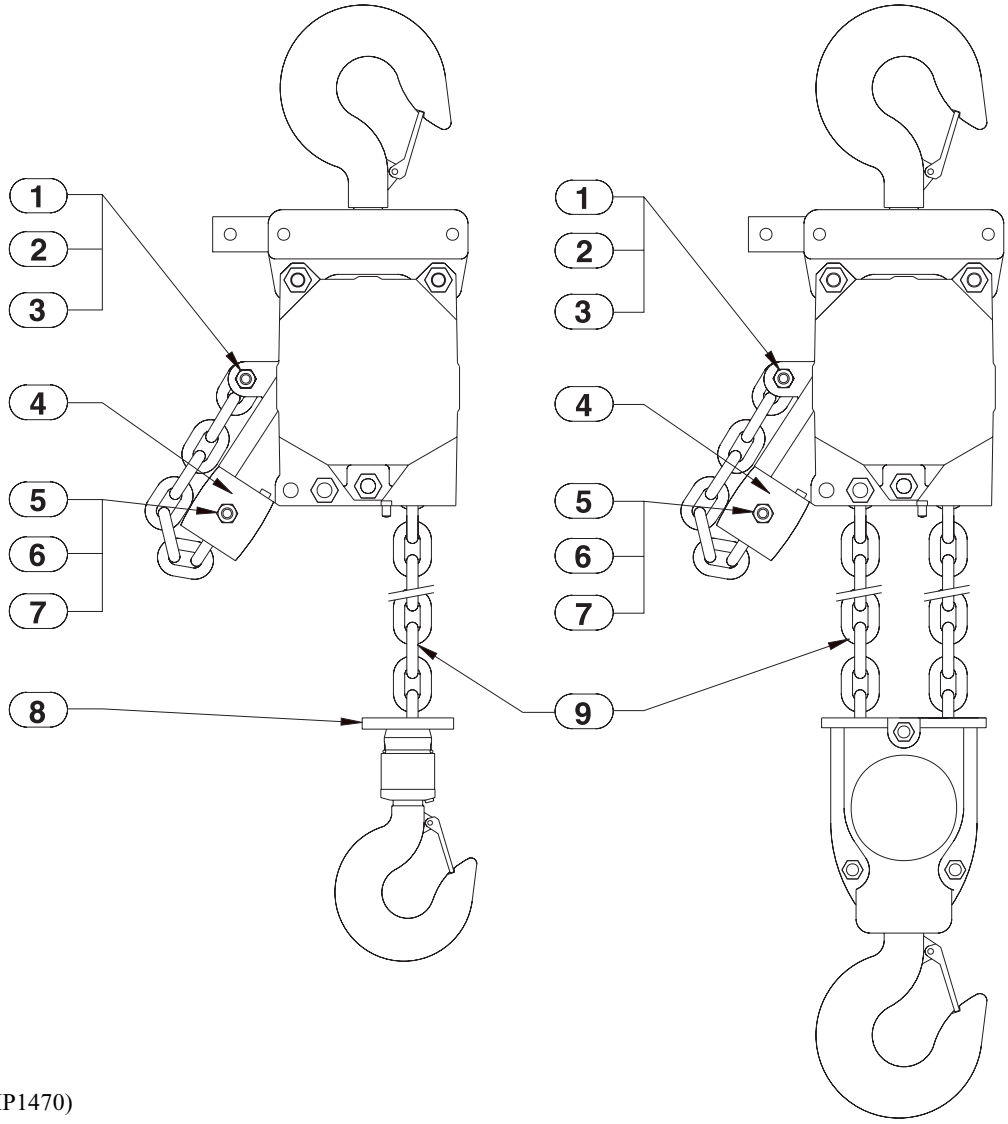


(Dwg. MHP1430)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER			
			18 ton		25 ton	
			Standard	Option "R"	Standard	Option "R"
1	Hook	1	95960048	95960062	96230015	96230169
2	Half Hook Block	1	95900073	95900079	95900071	95900076
3	Half Hook Block	1	95900072	95900078	95900070	95900075
4	Grease Fitting	1	67100827			
5	Ring, 2-piece	1	95960060		96230026	
6	Thrust Bearing	1	54700018			
7	Anchor Pin	1	95900074		---	
	Center Ring	1	---		95900068	
8	Sprocket Wheel	1(2)	95900069	95900077	95900069	95900077
9	Roller Bearing	2(4)	51200009			
• 10	'O' Ring	2(4)	58232329			
11	Lockwasher	3	45201020			
12	Nut	3	43004011			
13	Capscrew	3	41331206		41331106	
14	Retainer Ring	1	47713020		---	
15	Hook Latch	1	Contact Factory			

• Recommended Spare ( ) Quantities for 25 ton hoists

BOTTOM HOOK ACCESSORIES DRAWINGS AND PARTS LIST

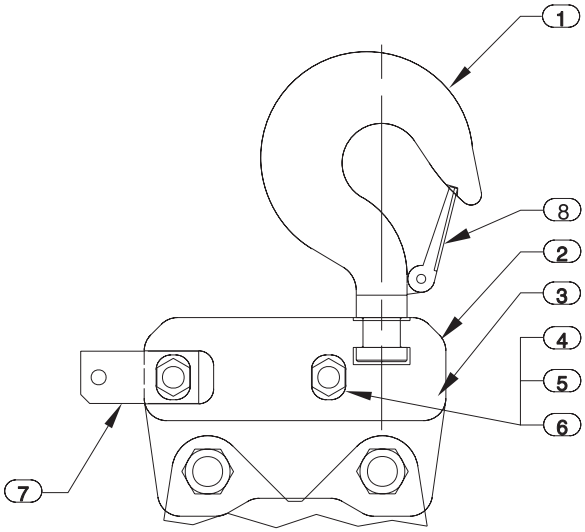


(Dwg. MHP1470)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER					
			LCA015S	LCA030D	LCA030S	LCA060D	LCA060S	LCA120D/ 180T/250Q
			1.5 ton	3 ton	3 ton	6 ton	6 ton	12/18/25 ton
1	Screw	1	41326706		41324206		41321906	
2	Washer	1	45001108		45001112		45001116	
3	Nut	1	43706511		43706311		43703711	
4	Buffer	1	94240069		94120119		95260040	
5	Screw	1	41321506		41324106		41322006	
6	Washer	1	45001108				45001112	
7	Nut	1	43706511				43706311	
8	Washer	1	94240177	---				
9	Load Chain (Bulk)	Specify Length (metres)	LC824-G8ZP		LC1336-G8ZP		LC1645-G8ZP	

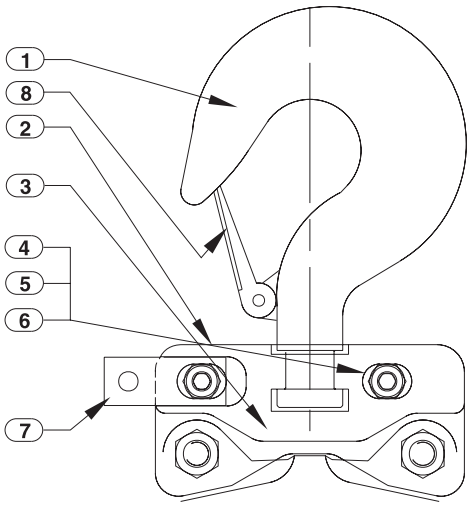
TOP HOOK ASSEMBLY DRAWINGS AND PARTS LIST

Single Fall Hoists



(Dwg. MHP1433)

Double Fall Hoists



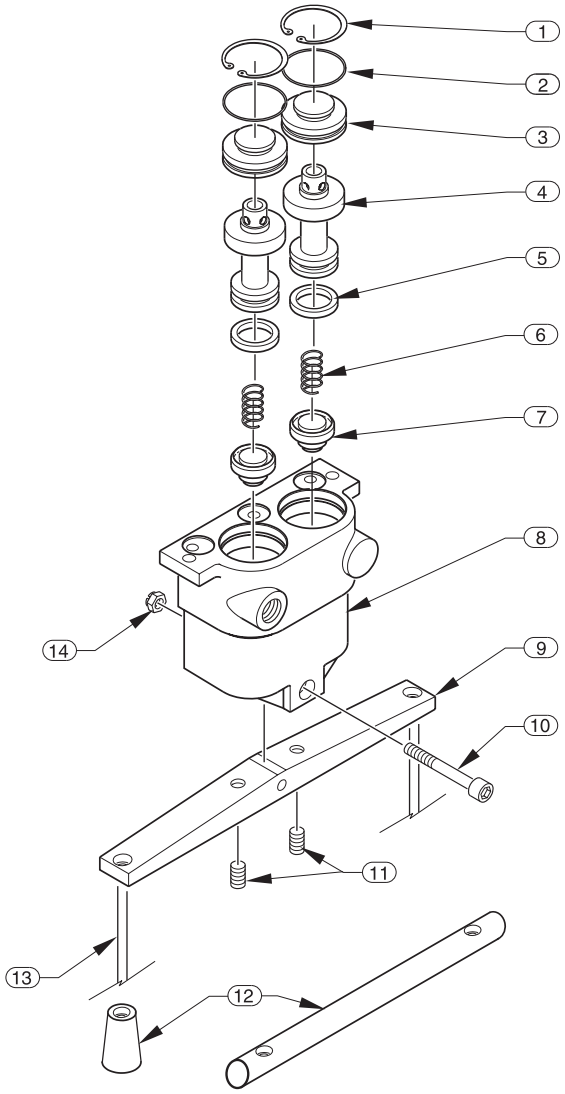
(Dwg. MHP1434)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER					
			1.5 ton		3 ton		6 ton	
			Standard	Option "R"	Standard	Option "R"	Standard	Option "R"
Single Fall Hoists								
1	Hook	1	94240300	94240307	94240290	94240296	94120395	94120402
2	Half Hook Support	1	94240304		94120421		95260157	
3	Half Hook Support	1	94240305		94120422		95260158	
4	Capscrew	2	41326206		41325306		41330106	
5	Nut	2	43003511		43006911		43005811	
6	Lockwasher	2	45201008		45201010		45201014	
7	Support	1	94240286				95260135	
8	Hook Latch	1	Contact Factory					

Double Fall Hoists			3 ton		6 ton		12 ton	
1	Hook	1	94240290	94240296	94120395	94120402	96230011	96230168
2	Half Hook Support	1	94240302		94120418		95260128	
3	Half Hook Support	1	94240303		94120419		95260129	
4	Capscrew	2	41326206		41325306		41330106	
5	Nut	2	43003511		43006911		43005811	
6	Lockwasher	2	45201008		45201010		45201014	
7	Support	1	94240286				95260135	
8	Hook Latch	1	Contact Factory					

Note: For 18 and 25 ton Top Hook Assemblies, refer to Hoist Assembly Dwg. MHP1418.

ROPE CONTROL ASSEMBLY DRAWING AND PARTS LIST



(Dwg. MHP1401)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
1	Retainer Ring	2	47703028
• 2	'O' Ring	2	58203729
3	Cover	2	95790037
4	Spool	2	95790035
• 5	Quad Ring	2	58230229
6	Spring	2	69199932
7	Valve Assembly	2	95790036
8	Motor Cover	1	95790080
9	Lever	1	95790081
10	Capscrew	1	41308106
11	Setscrew	2	42002407
12	Handle	2	95790084
	Bar	1	95790033
13	Cord	2	69703741
14	Nut	1	43705011

• Recommended Spare

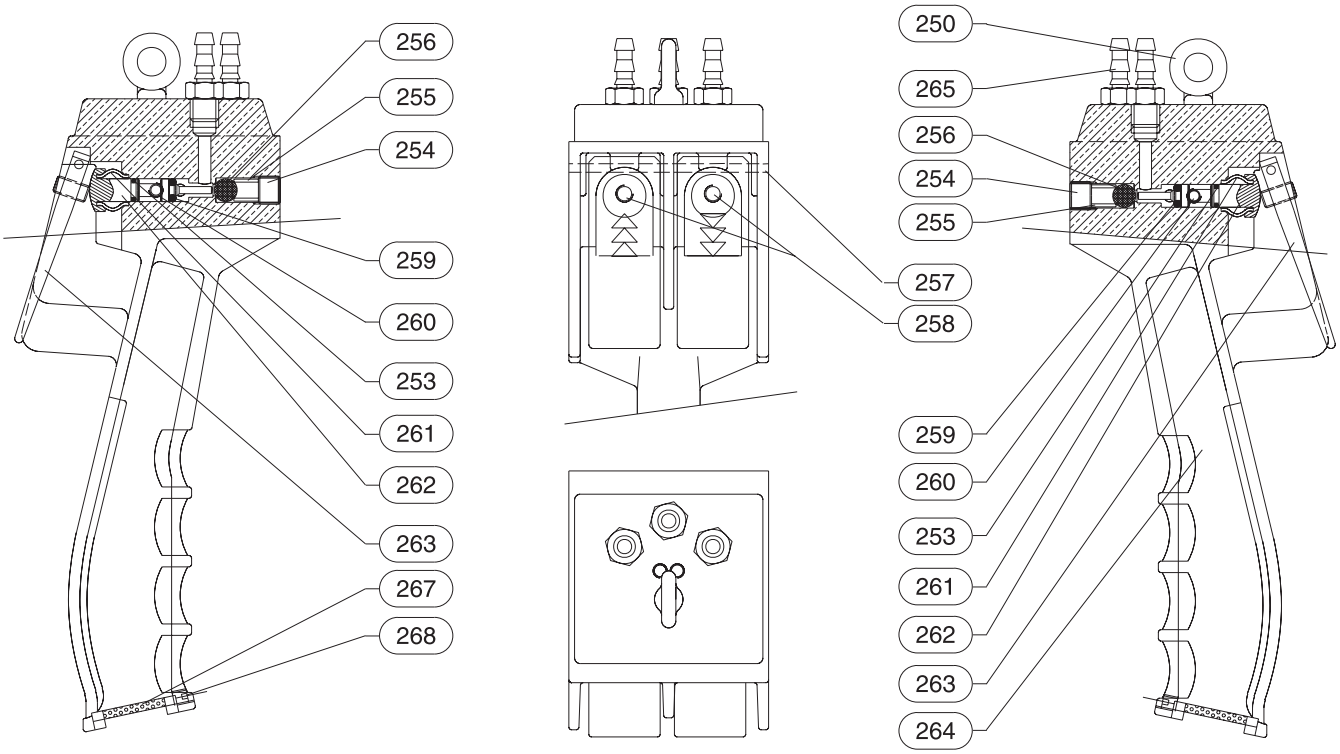
Note: Rope Control for use with Standard Motors only.

ACCESSORIES

DESCRIPTION	PART NUMBER
Lubricant	LUBRI-LINK-GREEN®
Touch-up Paint (yellow)	FAP-237Y

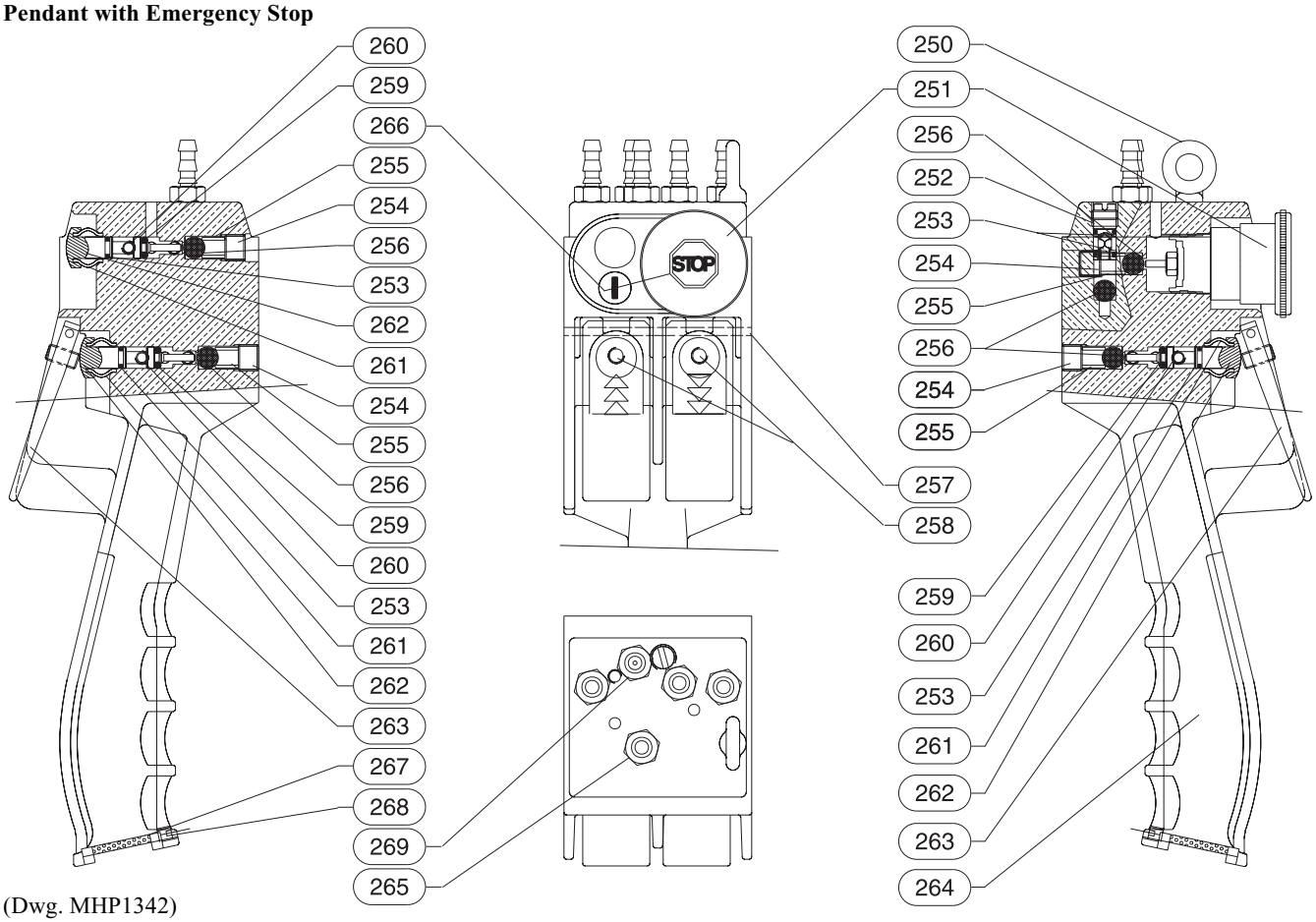
TWO LEVER PENDANT ASSEMBLY PARTS DRAWINGS

Pendant without Emergency Stop



(Dwg. MHP1343)

Pendant with Emergency Stop



(Dwg. MHP1342)

TWO LEVER PENDANT ASSEMBLY PARTS LIST

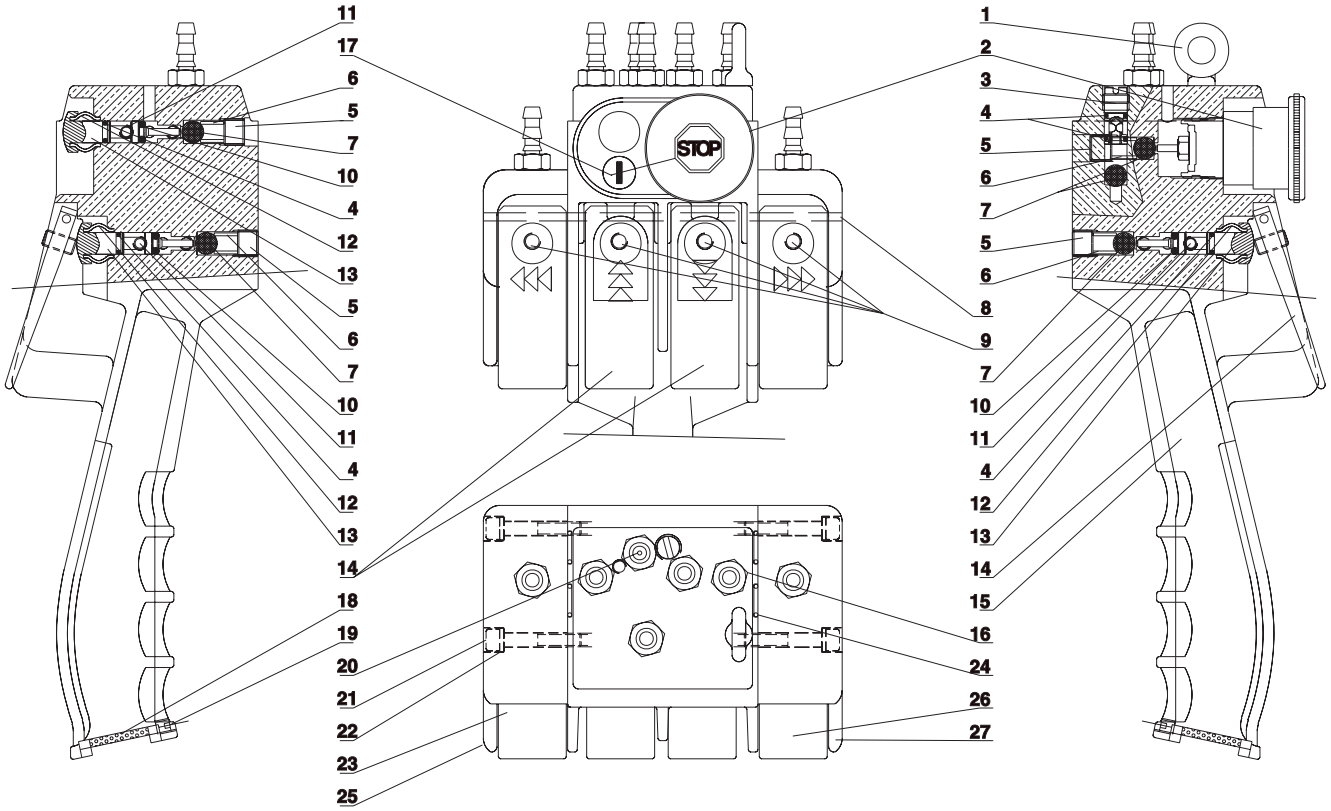
ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.	
			Without E-Stop	With E-Stop
---	Pendant Assembly	1	PHS2D	PHS2D-U
250	Lifting Eye	1	64222332	
251	Emergency Stop Valve	1	---	95790108
252	Plug	1	---	95790106
• 253	'O' Ring	2(4)	58209229	
254	Plug	2(4)	65107741	
255	Spring	2(4)	69128541	
256	Ball	2(5)	69401625	
257	Pin	1	95790040	
258	Screw	2	42006207	
• 259	'O' Ring	2(3)	58235329	
260	Screw	2(3)	42008207	
261	Protector	2(3)	95790107	
262	Valve	2(3)	95790104	
263	Lever	2	95790110	
264	Pendant Handle	1	95790112	95790113
265	Fitting	3(5)	61652632	
266	Label Kit	1	---	95790111
267	Exhaust Washer	1	95790114	
268	Screw	1	42008107	
269	Fitting	1	---	95790115
*	Label: "Read the Manual"	1	96180098	
*	Label: "Do Not Use for Lifting Personnel"	1	96180100	

• Recommended Spare

* Not Illustrated

( ) Quantity Required for Pendants with Emergency Stop

FOUR LEVER PENDANT AND EMERGENCY STOP DRAWING AND PARTS LIST



(Dwg. MHP1474)

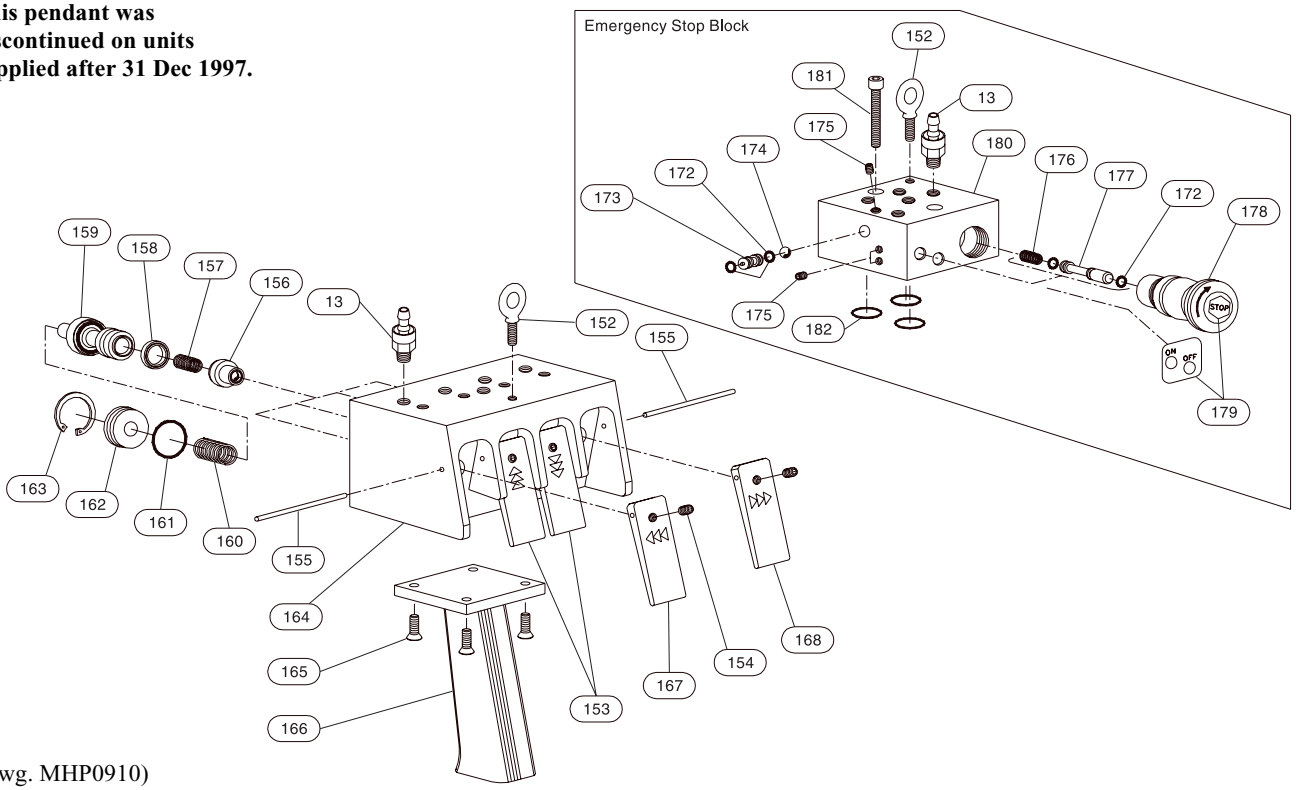
ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.		ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.	
			With E-Stop	No E-Stop				With E-Stop	No E-Stop
---	Pendant Assembly	1	PHS4D-U	PHS4D	14	Lever	2	95790110	
1	Lifting Eye	1	64222332		15	Pendant Handle	1	95790119	95790123
2	Emergency Stop Valve	1	95790108	---	16	Fitting	7	61652632	---
3	Plug	1	95790106	---	17	Label Kit	1	95790111	---
• 4	'O' Ring	7	58209229		18	Exhaust Washer	1	95790114	
5	Plug	6	65107741		19	Screw	1	42000407	
6	Spring	6	69128541		20	Fitting	1	95790115	
7	Ball	7	69401625		21	Capscrew	4	41322106	
8	Pin	1	95790118		22	Washer	4	45201005	
9	Screw	5	42008307		23	Lever (Left)	1	95790087	
• 10	'O' Ring	5	58235329		• 24	'O' Ring	4	58221329	
11	Screw	4	42008607		25	Attachment (Left)	1	95790121	
12	Protector	5	95790107		26	Lever (Right)	1	95790097	
13	Valve	5	95790104		27	Attachment (Right)	1	95790120	
*	Label: "Read the Manual"	1	96180098		*	Label: "Do Not Use for Lifting Personnel"	1	96180100	

• Recommended Spare

* Not Illustrated

OLD STYLE FOUR LEVER PENDANT AND E-STOP DRAWING AND PARTS LIST

This pendant was discontinued on units supplied after 31 Dec 1997.



(Dwg. MHP0910)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.	ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
169	Pendant Assembly (incl's items 13 and 152 through 168)	1	PHS4C	159	Spool (with 'O' Ring crimped)	4	9579-0035
				160	Spring	4	6915-8732
13	Fitting	5	6165-2632	• 161	'O' Ring	4	5820-3729
152	Lifting Eye	1	6422-2332	162	Rear Cover	4	9579-0037
153	Lever	2	9579-0038	163	Retainer Ring	4	4770-3028
154	Setscrew	4	4200-7407	164	Pendant Body	1	9579-0088
155	Pin	2	9579-0089	165	Screw	4	4110-1603
156	Valve Assembly (with 'O' Ring crimped)	4	9579-0036	166	Handle	1	9387-0007
157	Spring	4	6915-8632	167	Lever (Left)	1	9579-0087
• 158	Quad Ring	4	5823-0229	168	Lever (Right)	1	9579-0097

Pendant with Emergency Stop Assembly

Substitute or add the following parts for pendant with emergency stop

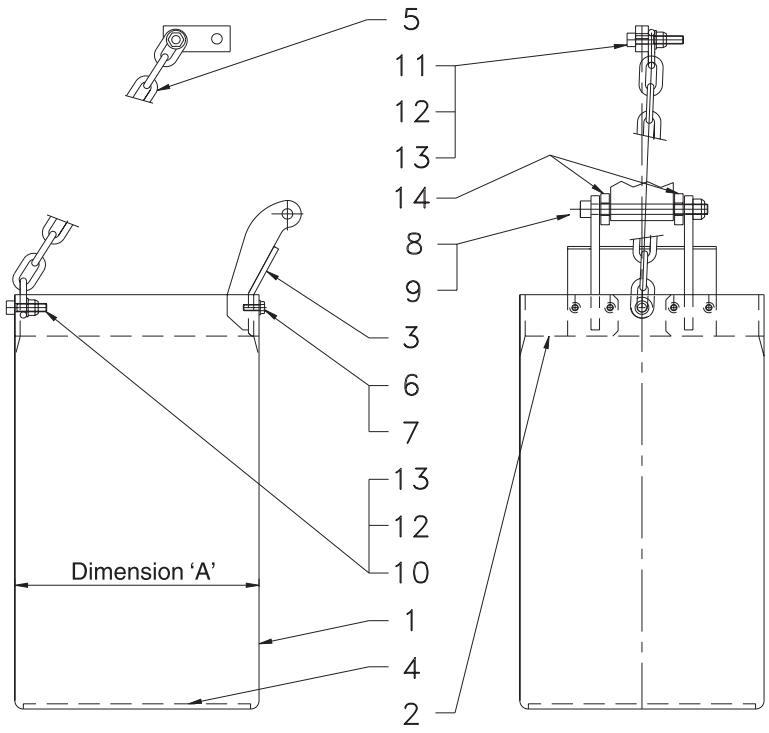
185	Pendant Assembly (incl's items 169 and 172 through 184)	1	PHS4C-U	177	Spool	3	9579-0085
				178	Emergency Stop Button	1	6859-8632
13	Fitting	2	6165-2632	179	Label Kit	1	9579-0099
• 172	'O' Ring	8	5820-9229	180	Emergency Stop Block	1	9579-0086
173	Shuttle Valve Stop	1	9579-0098	181	Screw	2	4131-4906
174	Ball	1	6940-1625	• 182	'O' Ring	3	5822-2829
175	Setscrew	3	4200-8207	183	Sticker*	1	9617-0098
176	Spring	3	6911-3941	184	Sticker*	1	9617-0100

• Recommended Spare.

* Not Illustrated.

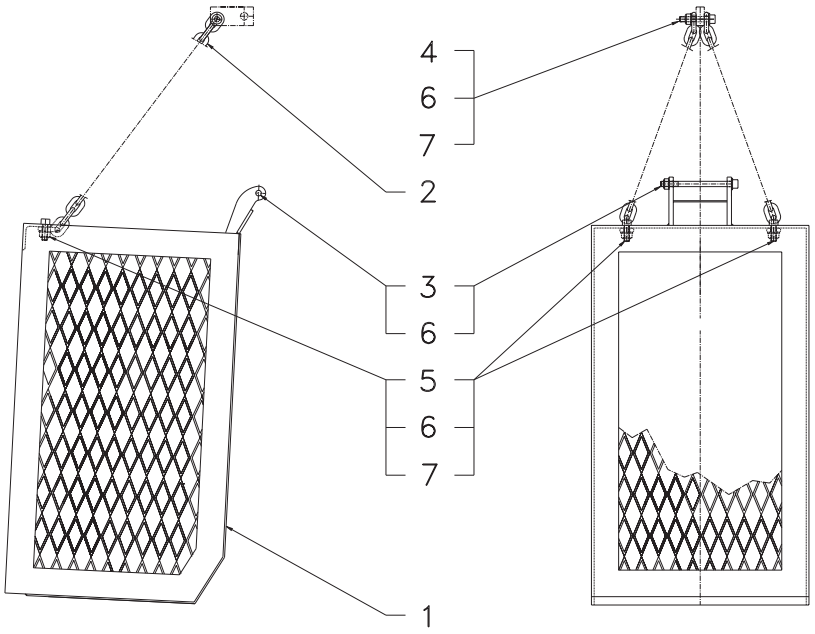
CHAIN CONTAINER ASSEMBLY PARTS DRAWINGS

Non-metallic Chain Container for up to 12 ton Hoists



(Dwg. MHP1442)

Metal Chain Container for LCA060S, LCA120D, LCA180T and LCA250Q Hoists



(Dwg. MHP1441)

CHAIN CONTAINER ASSEMBLY PARTS LIST

HOIST MODEL	CAPACITY*		DIMENSION 'A'		CONTAINER ASSEMBLY PART NUMBER	
	ft	m	ins	mm	Non-metallic	Metallic
LCA015S and LCA030D	39	12	7.1	180	CB030D-12M	---
	98	30	9.1	230	CB030D-30M	---
	197	60	12.2	310	CB030D-60M	---
LCA030S and LCA060D	39	12	9.1	230	CB060D-12M	---
	82	25	12.2	310	CB060D-25M	---
LCA060S and LCA120D	39	12	---	---	CB120D-12M	---
	85	26	---	---	---	CB120D-26M
LCA180T	39	12	---	---	CB120D-12M	---
	85	26	---	---	---	CB120D-26M
LCA250Q	39	12	---	---	CB120D-12M	---
	85	26	---	---	---	CB120D-26M

* Capacity is for single fall hoist. Divide capacity by number of chain falls when determining chain container size.

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER					
			LCA015S	LCA030D	LCA030S	LCA060D	LCA060S	LCA120D
Non-metallic Chain Containers								
1	Chain Container	1	94240137	94120177	95260056	94120177	95260056	
2	Frame	1	94240139	94120179	95260054	94120179	95260054	
3	Support Bracket	1	94240287					95260160
4	Plate	1	94240161	94120201	95260057	94120201	95260057	
5	Chain	1	69001332	96029232				
6	Screw	4	41321406					
7	Washer	4	45001106					
8	Screw	1	41330706					41330306
9	Nut	1	43706411					
10	Screw	2	---	41325006				
11	Screw	1	---	41326206				
12	Washer	2	---	45001108				
13	Nut	2	---	43706511				
14	Washer	2	94240168			---		
15	Loop for Chain Clasp*	2	90530031	---				

Metal Chain Containers			**LCA060S, LCA120D, LCA180T and LCA250Q**
1	Chain Container	1	95260162
2	Chain	2	69089432
3	Screw	1	41330306
4	Screw	1	41323306
5	Screw	2	41323506
6	Nut	4	43706411
7	Washer	4	45001110

* Not Illustrated

PARTS ORDERING INFORMATION

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

The use of replacement parts other than **Ingersoll-Rand** Material Handling may result in decreased hoist performance, and may, at the company's option invalidate the warranty. For prompt service and genuine **Ingersoll-Rand** Material Handling parts, provide your nearest Distributor with the following:

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

The nameplate is located on the brake cover.

Return Goods Policy

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

NOTICE

• Continuing improvement and advancement of design may produce changes to this hoist which are not included in this manual. Manuals are periodically revised to incorporate changes. Always check the manual edition number on the front cover for the latest issue.

☞ Disposal

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

NOTICE

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

For additional information contact:

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

or

Ingersoll-Rand Material Handling
Douai Operations
111, avenue Roger Salengro
59450 Sin Le Noble, France
Phone: (33) 3-27-93-08-08
Fax: (33) 3-27-93-08-00

LIMITED WARRANTY

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

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

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

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

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

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

IMPORTANT NOTICE

It is our policy to promote safe delivery of all orders.

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

VISIBLE LOSS OR DAMAGE

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

CONCEALED LOSS OR DAMAGE

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

DAMAGE CLAIMS

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

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

United States Office Locations

For Order Entry and Order Status

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

For Technical Support

Ingersoll-Rand
P.O. Box 24046
2724 Sixth Ave South
Seattle, WA 98124-0046
Phone: (206) 624-0466
Fax: (206) 624-6265
Web Site:
www.ingersoll-rand.com

Regional Sales Offices

Chicago, IL
888 Industrial Drive
Elmhurst, IL 60126
Phone: (630) 530-3800
Fax: (630) 530-3891

Detroit, MI
23192 Commerce Drive
Farmington Hills, MI 48335
Phone: (248) 476-6677
Fax: (248) 476-6670

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

Los Angeles, CA
11909 E. Telegraph Road
Santa Fe Springs,
CA 90670-0525
Phone: (562) 948-4189
Fax: (562) 948-1828

Philadelphia, PA
P.O. Box 425
900 E. 8th Ave., Suite 103
King of Prussia, PA 19406
Phone: (610) 337-5930
Fax: (610) 337-5912

International Office Locations

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

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

Canada
National Sales Office
Regional Warehouse
Toronto, Ontario
51 Worcester Road
Rexdale, Ontario
M9W 4K2
Phone: (416) 213-4500
Fax: (416) 213-4510
Order Desk
Fax: (416) 213-4506

Regional Sales Offices

Calgary, Alberta
44 Harley Road S.E.
Calgary, Alberta
T2V 3K3
Phone: (403) 252-4180
Fax: (403) 252-4462

Edmonton, Alberta
1430 Weber Center
5555 Calgary Trail N.W.
Edmonton, Alberta
T6H 5G8
Phone: (403) 438-5039
Fax: (403) 437-3145

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

British Columbia
201-6351 Westminster Hwy
Richmond, B. C.
V7C 5C7
Phone: (604) 278-0459
Fax: (604) 278-1254

Latin America Operations
Ingersoll-Rand
Production Equipment Group
730 N.W. 107 Avenue, Suite
300 Miami, FL 33172-3107
USA
Phone: (305) 559-0500
Fax: (305) 222-0864

Europe, Middle East and Africa
Ingersoll-Rand Company
111, avenue Roger Salengro
59450 Sin Le Noble, France
Phone: (33) 3-27-93-08-08
Fax: (33) 3-27-93-08-00

Asia Pacific Operations
Ingersoll-Rand (Japan) Ltd.
Shin-Yokohama Square Bldg.
(5th Floor)
2-3-12 Shin-Yokohama,
Kouhoku-Ku,
Yokohama-shi, Kanagawa
Pref. 222 Japan
Phone: 81-45-476-7800
Fax: 81-45-476-7806

Russia
Ingersoll-Rand Company
Kuznetsky Most, 21/5
Moscow, 103895
Russia.
Phone: 7-501-921-53-21
7-501-923-91-34
Fax: 7-501-924-46-25

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