Form MHD56062

OPERATION AND MAINTENANCE MANUAL

for

Roughneck™

LEVER CHAIN HOIST MODELS

R4H-150
3/4 TON (metric)

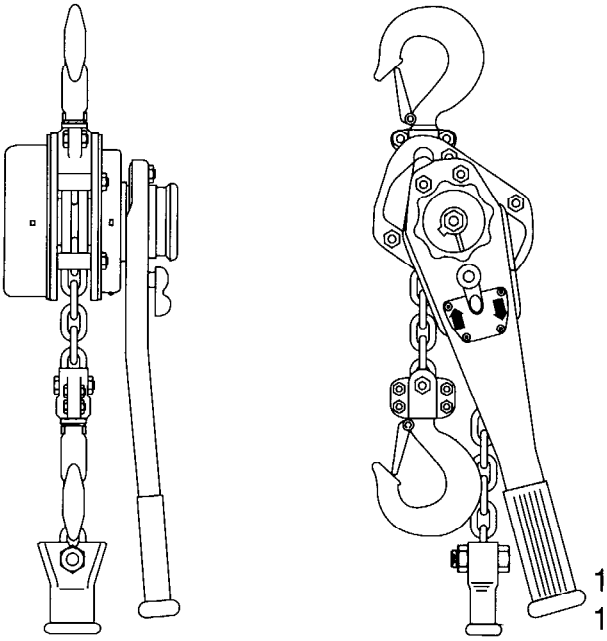
R4H-300
1-1/2 TON (metric)

R4H-600
3 TON (metric)

R4H-200
1 TON (US)

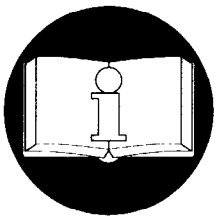
R4H-400
2 TON (US)

R4H-1200
6 TON (metric)



(Dwg. MHTPA0216)

1 U.S. ton = 2,000 lbs
1 metric ton = 2,200 lbs



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

⚠WARNING

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

Always operate, inspect and maintain this Hoist in accordance with American National Standards Institute Safety Code (ASME B30.21) and any other applicable safety codes and regulations.

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

Form MHD56062
Edition 1
October 1992
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INGERSOLL-RAND®
MATERIAL HANDLING

SAFETY INFORMATION

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

Danger, Warning, Caution and Notice

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

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

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

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

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

Safety Summary

⚠WARNING

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

• The supporting structures and load-attaching devices used in conjunction with this hoist must provide an adequate safety factor to handle the rated load, plus the weight of the hoist and attached equipment. This is the customer's responsibility. If in doubt, consult a qualified structural engineer.

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

To our interpretation, INGERSOLL-RAND Material Handling hoists are manufactured in accordance with the latest ASME B30.21 standards.

However, contrary to common belief, the Occupational Safety and Health Act of 1970, as we understand it, generally places the burden of compliance with the user, not the manufacturer. Many OSHA requirements are not concerned or connected with the manufactured product but are, rather, connected with the final installation: "It is the owner's responsibility and user's responsibility to determine the suitability of a product for any particular use. Check all applicable industry, trade association, federal, state and local regulations. Read all operating instructions and warnings before operation."

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

NOTICE

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

SAFE OPERATING INSTRUCTIONS

The following warnings and operating instructions have been adapted in part from American National (Safety) Standard ANSI B30.21 and are intended to avoid unsafe operating practices which might lead to personal injury or property damage.
These recommendations apply to hoists used for material handling of freely suspended unguided loads.

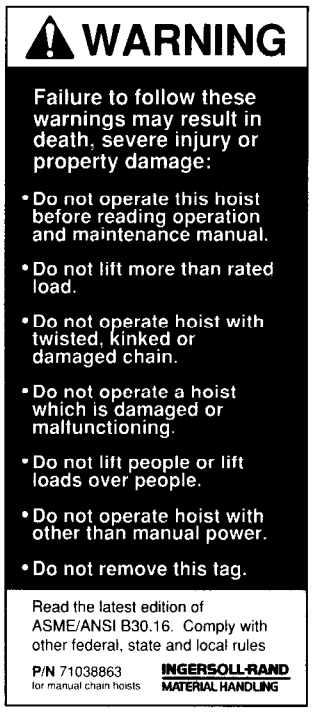
INGERSOLL-RAND recognizes that most companies who use hoists have a safety program in force in their plants. In the event that some conflict exists between a rule set forth in this publication and a similar rule already set by an individual company, the more stringent of the two should take precedence.

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

1. Only allow qualified people (trained in safety and operation) to operate the hoist.
2. Only operate a hoist if you are physically fit to do so.
3. When a "DO NOT OPERATE" sign is placed on the hoist, do not operate the hoist until the sign has been removed by designated personnel.
4. Before each shift, the operator should inspect the hoist for wear or damage.
5. Never use a hoist which inspection indicates is defective.
6. Periodically, inspect the hoist thoroughly and replace worn or damaged parts. (See "INSPECTION" Section)
7. Lubricate the hoist regularly. (See "LUBRICATION" Section)
8. Do not use hoist if hook latch on a hook has been sprung or broken.
9. Check that the hook latches are engaged before using.
10. Never splice a hoist chain by inserting a bolt between links.
11. Only lift loads less than or equal to the rated capacity of the hoist. See warning labels attached to the hoist.
12. Never use the hoist chain as a sling.
13. Never operate a hoist when the load chain is not centered under the hook. Do not "side pull" or "yard."
14. Never operate a hoist with twisted, kinked, "capsized" or damaged load chain.
15. Do not force a chain or hook into place by hammering.
16. Never insert the point of the hook into a chain link.
17. Be certain the load is properly seated in the saddle of the hook.
18. Do not support the load on the tip of the hook.
19. Never run the load chain over a sharp edge. Use a sheave.
20. When using two hoists to suspend one load, select two hoists both having rated capacities equal to or more than the load to be lifted. This provides adequate safety in the event of a sudden load shift or failure of one hoist.
21. Pay attention to the load at all times when operating the hoist.
22. Always ensure that you, and all other people, are clear of the path of the load. Do not lift a load over people.
23. Never use the hoist for lifting or lowering people, and never allow anyone to stand on a suspended load.
24. Ease the slack out of the chain and sling when starting a lift. Do not jerk the load.
25. Do not swing a suspended load.
26. Never suspend a load for an extended period of time.
27. Never leave a suspended load unattended.
28. Never weld or cut a load suspended by the hoist.
29. Never use the hoist chain as a welding electrode.
30. Do not operate hoist if chain jumping, excessive noise, jamming, overloading, or binding occurs.
31. Keep the load from hitting the load chain.
32. Do not use a cheater bar or extended handle.
33. After use, properly secure hoist and loads.

WARNING TAG

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



SPECIFICATIONS

General

The R4H Lever Chain Hoist can be mounted to the suspension shaft of a trolley or a permanent mounting structure. The hoist is designed to lift and lower loads with minimal lever effort.

To determine correct hoist configuration see serial and model number label. Refer to "PARTS ORDERING INFORMATION" section for location of serial and model number label.

Model No.	Capacity metric tons (*US tons)	Pull to lift rated load		Chain size (mm)	Wt. of chain per 1 ft (0.3 m) of lift		No. of chain falls	Net Weight 5 ft. (1.52 m) of lift	
		lb	kg		lb	kg		lb	kg
R4H-150	3/4	37	16	6.3	0.57	0.26	1	15	6.9
R4H-200	1*	50	20	6.3	0.57	0.26	1	16	7.2
R4H-300	1-1/2	59	18	7.1	0.74	0.34	1	21	9.7
R4H-400	2*	78	23	7.1	0.74	0.34	1	22	10
R4H-600	3	97	33	9.0	1.2	0.54	1	34	15.4
R4H-1200	6	100	35	9.0	1.2	0.54	2	62	28

Model Code R4H - 300 - 5V

Series R4H

Hoist Capacity
150, 200, **300**, 400, 600 and 1200

Lift
(Available lengths **5 std**, 10, 15 and 20 ft.)
F = Hoist without chain

Options
V = Slip Clutch
N = Nickel diffused chain

INSTALLATION AND OPERATION

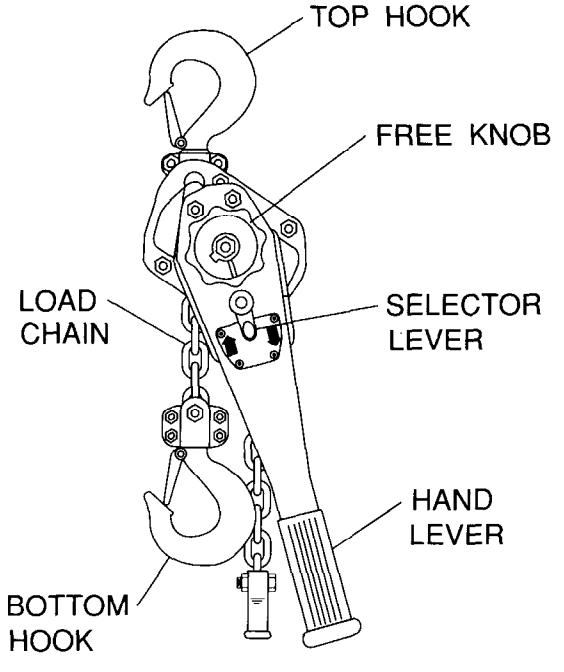
Installation

The R4H hoist can be used in any position provided it is rigged to pull in a straight line from hook to hook. The frame must be positioned so that it does not contact the load or support members when in use. When operating in limited areas suitable lifting attachments or slings must be used to prevent frame and lever from being obstructed.

Operation

Positioning Unloaded Hook (Free-Chain)

1. Set the selector lever to neutral (center position).
2. Rotate free knob approximately one turn counterclockwise to free brake.
3. Exert a firm pull on the load chain to move the hook to the desired location.



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NOTICE

• Jerking or pulling too fast on the hook fall of the load chain will cause the brake to reset and prevent free-chaining.

4. Rotate the free knob clockwise. Once slack is removed, this resets the brake and allows the hoist to be operated with the hand lever.

⚠WARNING

• Always lower the load into position until the load chain becomes slack. Otherwise, when free-chaining, it may be impossible to apply enough force with the free knob to release the brake. If the brake does become stuck, switch the selector lever to DOWN and ratchet the hand lever while pulling on the hook fall of the load chain.

Lifting or Lowering the Load

Select direction of movement and ratchet hand lever back and forth, see below:

Chain Movement:	Selector Lever:	Hand Lever Rotation:
Raise (Haul in)	UP	Clockwise
Lower (Pay out)	DOWN	Counterclockwise

NOTICE

• If hand lever movement does not produce lifting, pull down on the load chain while ratcheting until slack is removed and the hoist begins lifting the load.
• The brake is engaged whether lowering or raising the load.

Storing the Hoist

1. Always store the hoist in a no load condition.
2. Switch the selector lever to neutral (center position).
3. Wipe off all dirt and water.
4. Oil the chain, hook pins and hook latch pins.
5. Hang in a dry place.
6. Before returning hoist to service follow instructions for Hoists not in Regular Service in the "INSPECTION" section.

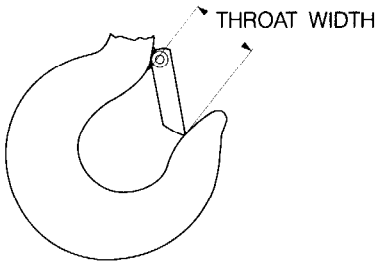
INSPECTION

There are two types of inspection, the frequent inspection performed by the operator and more thorough periodic inspections performed by qualified personnel.
Careful inspection on a regular basis will reveal potentially dangerous conditions while still in the early stages, allowing corrective action to be taken before the condition becomes dangerous.
Any deficiency revealed through inspection must be reported to an appointed person. A determination must be made as to whether a deficiency constitutes a safety hazard before resuming operation of the hoist.

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

Frequent Inspection
The lever chain hoist should be inspected at the beginning of each shift. Visual inspections should also be conducted during regular service for any damage or evidence of malfunction which appears between regular inspections.

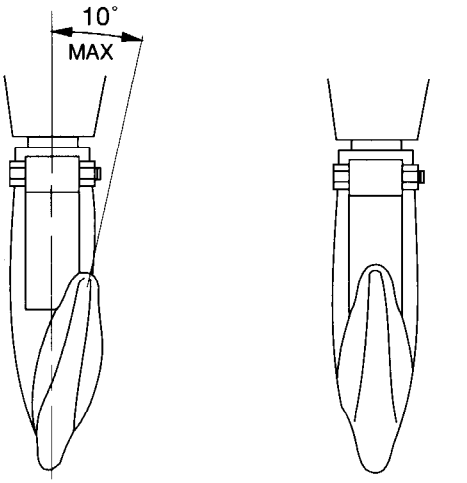
1. OPERATION. Check for visual signs or abnormal noises which could indicate a defect. Make sure all controls function properly. Check chain feed through hoist and hook idler sheaves. If chain binds, jumps, or is excessively noisy or "clicks," clean and lubricate the chain. If problem persists, the chain and load sheave may have to be replaced. Do not operate the hoist until all defects have been determined and corrected.
2. HOOKS. Check for wear or damage, increased throat width, bent shank or twisting of hook. Replace hooks with 15% increase in throat opening (ref. Dwg. MHTPA0040) or 10° twist (ref. Dwg. MHTPA0111). If the hook latch snaps past the tip of the hook, the hook is sprung and must be replaced.



(Dwg. MHTPA0040)

3. HOOK LATCHES. Check the operation of the hook latch. Replace if broken or missing.

Model No.	Throat Width in.	(mm)	Discard Width in.	(mm)
R4H-150	1.22	31.0	1.40	35.5
R4H-200	1.22	31.0	1.40	35.5
R4H-300	1.50	38.0	1.72	43.7
R4H-400	1.50	38.0	1.72	43.7
R4H-600	1.85	47.0	2.12	53.8
R4H-1200	2.01	51.0	2.31	58.6



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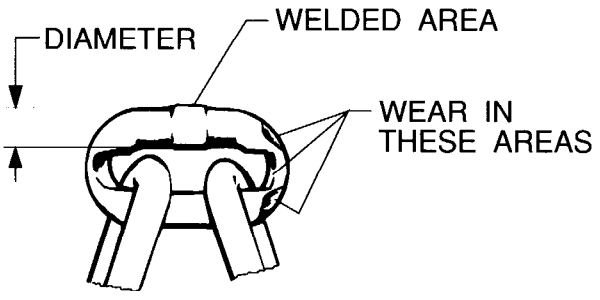
4. CHAIN. Examine each of the links for bending, cracks in weld areas or shoulders, transverse nicks and gouges, weld splatter, corrosion pits, striation — minute parallel lines and chain wear, including bearing surfaces between chain links. Replace a chain that fails any of the inspections. Check lubrication and lubricate if necessary. See "Load Chain" under "LUBRICATION."



(Dwg. MHTPA0102)

NOTICE

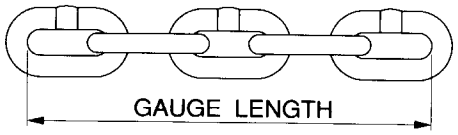
• Excessive wear or stretching may not be apparent from visual observation. Also inspect chain by measuring five links in accordance with instructions in "Periodic Inspection."
• A worn load chain may cause damage to the load sheave. Inspect the load sheave and replace if damaged or worn.

5. LOAD CHAIN REEVING. Make sure welds on standing links are away from load sheave. Re-install chain if necessary. Make sure chain is not capsized, twisted or kinked. Check that the chain stopper or anchor is in the end of the load chain. Adjust as required.
6. HAND LEVER. Check for cracks, bending and other damage. Replace if necessary.

Periodic Inspection

According to ANSI/ASME B30.21, frequency of periodic inspection depends on the severity of usage: NORMAL, yearly; HEAVY, semiannually; SEVERE, quarterly. Disassembly may be required for HEAVY or SEVERE usage. Keep accumulative records of periodic inspections to provide a basis for continuing evaluation. Inspect all items in frequent inspection plus the following:

1. FASTENERS. Check rivets, capscrews, nuts, cotter pins and other fasteners on hooks and hoist body. Replace if missing and tighten or secure if loose.
2. ALL COMPONENTS. Inspect for wear, damage, distortion, deformation and cleanliness. If external evidence indicates the need, disassemble. Check gears, shafts, bearings, sheaves, chain guides, springs and covers. Replace worn or damaged parts. Clean, lubricate and reassemble.
3. HOOKS. Inspect hook retaining parts. Use magnetic particle or dye penetrant to check for cracks. Replace damaged parts.
4. SHEAVES. Check for excessive wear or damage. Replace if necessary.
5. BRAKES. Ensure proper operation. Brake should not slip with test load (10% of capacity). If external inspection indicates the need, disassemble. Brake discs must be unglazed and uniform in thickness. Check all other brake surfaces for wear, deformation or foreign deposits. Inspect for damaged gear teeth, pawl and pawl spring. Check that pawl brake stops counterclockwise rotation of ratchet gear. Clean and replace damaged components as necessary.
6. SUPPORTING STRUCTURE. If a permanent structure is used, inspect for continued ability to support load.
7. LABELS AND TAGS. Check for presence and legibility. Replace if necessary.
8. LOAD CHAIN. Measure the chain for stretching by measuring across five link sections all along the chain.



(Dwg. MHTPA0041)

Model No.	Part No.	Size (mm)	Normal Length in.	Normal Length (mm)	Discard Length in.	Discard Length (mm)
R4H-150	LCCF010	6.3	3.76	95.5	3.85	97.9
R4H-200	LCCF010	6.3	3.76	95.5	3.85	97.9
R4H-300	LCCF015	7.1	4.17	106.0	4.28	108.7
R4H-400	LCCF015	7.1	4.17	106.0	4.28	108.7
R4H-600	LCCF025	9.0	5.35	136.0	5.49	139.4
R4H-1200	LCCF025	9.0	5.35	136.0	5.49	139.4

Note: Zinc plated chain for the R4H is designated by "ZP" at the end of the part number.

When any five links in the working length reaches or exceeds the discard length, replace the entire chain. Always use a genuine INGERSOLL-RAND Material Handling Products replacement chain.

Hoists not in Regular Service

A hoist that has been idle for a period of one month or more, but less than one year shall be given an inspection conforming with the requirements of "Frequent Inspection."

A hoist that has been idle for a period of one year shall be given an inspection conforming with the requirements of "Periodic Inspection."

LUBRICATION

Gears (11)

Unscrew nuts (13) on side of hoist opposite hand lever and remove gear cover (12). Remove old grease and replace with new. For temperatures -20° to 50° F (-29° to 10° C) use EP 1 grease or equivalent. For temperatures 30° to 120° F (-1° to 49° C) use EP 2 grease or equivalent.

Load Chain

NOTICE

• Failure to maintain clean and well-lubricated load chain may result in chain failure causing personnal injury, death or damage to equipment.

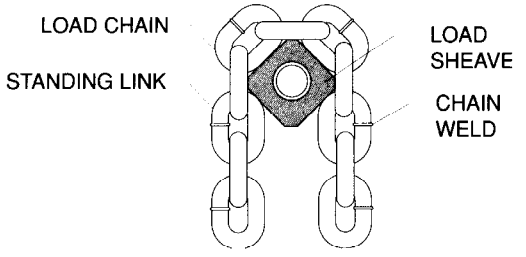
1. In a corrosive environment, lubricate more frequently than normal.
2. Lubricate each link of the chain and apply new lubricant over existing layer.
3. Lubricate hook and hook latch pivot points with SAE 50-90W EP oil.
4. Clean chain with an acid free solvent to remove rust or abrasive dust build-up. After cleaning, lubricate the chain.
5. Lubricate load chain weekly, or more frequently, depending on severity of service.
6. Use Ingersoll-Rand Lubri-Link® or a SAE50 to 90W EP oil.

⚠WARNING

• Never perform maintenance on the hoist while it is supporting a load.
• Before performing maintenance, tag hoist: DANGER - DO NOT OPERATE - EQUIPMENT BEING REPAIRED.
• Only allow qualified service personnel to perform maintenance.
• After performing any maintenance on the hoist, test to 125% of its rated capacity before returning to service. (Testing to 150% of rated capacity might be required to comply with standards and regulations set forth in areas outside of the USA.)

Installing a New Chain

1. Ensure welds of "standing" links on the new chain are facing away from the load sheave (2).
2. Ensure load chain (35) is reeved between load sheave (2) and chain guides (5).
3. Bottom hook assembly (36) must be on left fall of load chain (35) and right fall must have chain stopper (39) or anchor (41) attached to the end link.



(Dwg. MHTPA0042)

NOTICE

• Right and left are designated when viewed from the hand lever side of the hoist.

Brake Adjustment

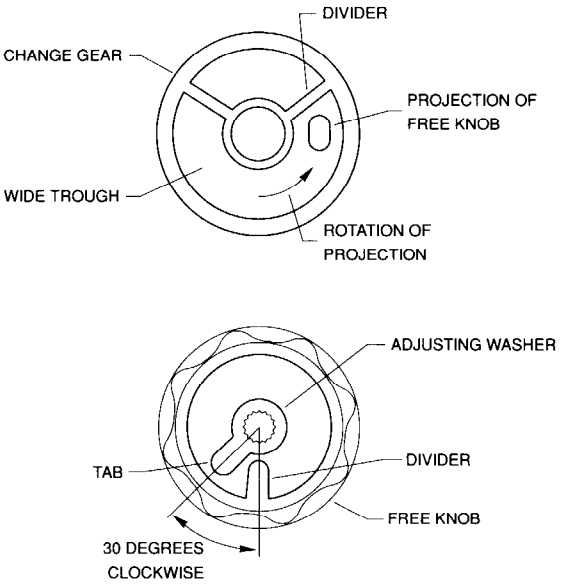
(Ref. Dwg. MHTPA0076)

1. Remove the pinion nut (34), adjusting washer (33), free knob (32) and check (50).
2 Suspend a load to the lower hook.
3. Adjust and remove the chain slack.
4. Switch selector lever to UP.
5. Rotate hand lever (33) clockwise until load is applied to the chain.

NOTICE

• Rotating pinion shaft (3) counterclockwise also tightens the brake.
• The hand lever must fit tight up against the brake cover (20).

6. Insert projection on the check (50) so it overlays the mark line located on the wider side of the two change gear (26) rims.
7. Insert the projection of the free knob into the narrow side.
8. Install the washer (33) and tighten it with pinion nut (34).



(Dwg. MHTPA0076)

NOTICE

• After installing pinion nut (34), the hand lever should be flush against the brake cover (20). If the pinion shaft (3) rotates while pinion nut (34) is being installed, reinstall the hand lever and repeat the brake adjustment procedure.

Slip Clutch Adjustment

Ref. Dwg. MHTPA0244

1. Suspend the R4H Hoist.
2. Remove the pinion nut (34), washer (33), free knob (32) and check (50).
3. Apply a load to the hoist. (See Chart)

Model No.	**Adjusting Load** (150% of rated load)	
	lbs.	**kgs.**
R4H-150	2475	1125
R4H-200	3000	1364
R4H-300	4950	2250
R4H-400	6000	2727
R4H-600	9900	4500
R4H-1200	19800	9000

4. Remove all slack from the chain by following the free chaining procedure.
5. Set the selector lever to the up position.

6. Operate the hoist to lift the load approximately 2 feet (0.5 m) off the floor.
7. Using special socket part number R3V-SOCKET adjust slip clutch to required setting.
   a. Tightening nut (55) will increase slip clutch overload limit.
   b. Loosen nut (55) to decrease slip clutch overload limit.

   Clutch should begin to slip with loads shown in above chart.
8. When the desired slip clutch overload limit has been achieved bend one of the outer tabs on washer (54) into a slot in nut (55). Install check (50), free knob (32), washer (33) and pinion nut (34).
9. Tighten pinion nut (34).

General Disassembly

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

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

It is recommended that all maintenance work on the hoist be performed on a bench.

In 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.

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

4. Keep the work area as clean as practical, to prevent dirt and other foreign matter from getting into bearings or other moving parts.
5. When grasping a part in a vise, always use leather-covered or copper-covered vise jaws to protect the surface of the part and help prevent distortion. This is particularly true of threaded members and housings.
6. Do not remove any part which is press fit in or on a sub-assembly unless the removal of that part is necessary for repairs or replacement.

Hoist Disassembly

Ref. Dwg. MHTPA0243

To remove brake discs (18), disassemble the hoist with the following procedure:

1. Remove the pinion nut (34), adjusting washer (33), free knob (32) and check (50). (On hoists with slip clutch remove washer (56) instead of check (50)).
2. Remove bolts (31) and "U" nuts (30) and separate hand lever (23) from brake cover assembly (20).
3. Remove change gear (26).

For hoists with slip clutch

4. Grip the outside diameter of change gear (26) and unscrew complete slip clutch assembly.

NOTICE

• Do not loosen nut (55) or attempt to remove slip clutch assembly by holding or turning nut (55). Independant movement of nut (55) may change slip clutch setting.

5. Remove U-Nuts (13) and separate brake cover (20) from side plate (1).
6. Remove brake discs (18), brake ring (21), ratchet gear (19) and spring (22).

Slip Clutch Disassembly

Ref. Dwg. MHTPA0244

1. Refer to previous instructions for removal of slip clutch assembly.
2. Use a small punch to bend tab on washer (54) out of slot in nut (55).
3. Firmly grip the outside of the slip clutch assembly then use tool R3V-SOCKET to remove nut (55) from supporter (51).
4. Separate the remaining parts of the slip clutch assembly.

Cleaning and Inspection

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

Cleaning

Clean all hoist component parts in solvent (except for the brake disc). The use of a stiff bristle brush will facilitate the removal of accumulated dirt and sediments on the gears and frames. Dry each part using low pressure, filtered compressed air. If the R4H brake discs are oil soaked, they must be replaced.

Inspection

All disassembled parts should be inspected to determine their fitness for continued use. Pay particular attention to the following:

1. Inspect all gears for worn, cracked, or broken teeth.
2. Inspect shafts for ridges caused by wear. If ridges caused by wear are apparent on shafts, replace the shaft.

3. Inspect all threaded items and replace those having damaged threads.
4. Inspect the R4H brake discs for oil. If the brake discs are oil-soaked, replace the brake discs.
5. Measure the thickness of the brake discs. Refer to Brake Disc Chart for discard thickness.

Brake Disc Chart

Model No.	New Disc Thickness (in.)	Discard Thickness (in.)	Color
R4H	0.076 (3 mm)	0.64 (2.5 mm)	Dark Grey

Hoist Assembly

Ref. Dwg. MHTPA0243

⚠ CAUTION

• The R4H brake will not operate properly if there is oil or grease on the brake discs (18).

1. R4H brake discs must remain dry and free from oil and grease.
2. Install new brake disc (18), ratchet gear (19) and brake ring (21) on hub (14). Check brake pawls (16) are spring loaded to engage ratchet gear (19) and ratchet gear turns freely.
3. Install brake cover assembly (20) on side plate (1) and secure with "U" nuts (13). Install spring (22) and second brake disc (18).

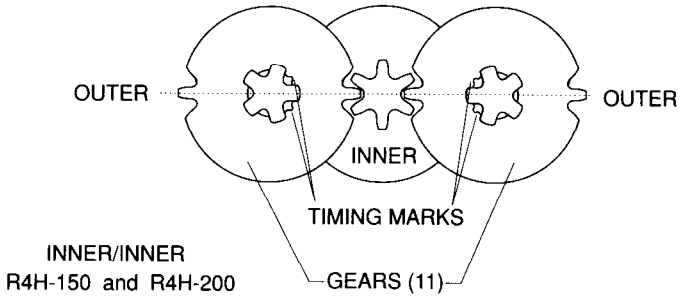
⚠ CAUTION

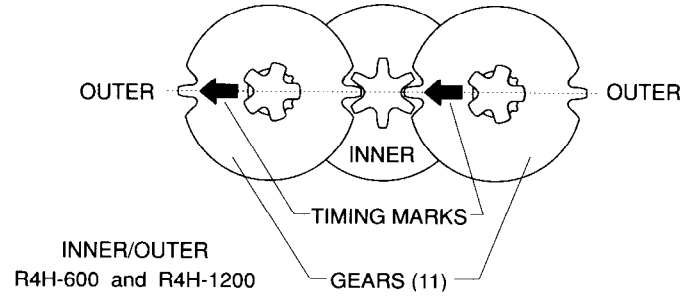
• The brake cover (20) can be installed improperly. The outer edges of the brake cover (20) and side plate 1 (1) must match.

4. Install change gear (26). Carefully rotate change gear (26) until brake ring (21) locates with change gear (26). For hoists with slip clutch screw slip clutch assembly onto the pinion shaft (3) until assembly contacts hub (14). Install hand lever (23) with bolts (31) and "U" nuts (30).
5. Move change gear to "up" position. Insert a screw-driver blade or short rod through one of the chain links near the side plate (1) and (7) or suspend a light load from the hook.
6. Install check (50) or washer (56) on spline of pinion shaft (3) so tab locates in the wider area of the change gear (26). Position tab 40° from right side rim.
8. Install tab of free knob (32) in narrow area of change gear (26). For slip clutch hoists locate free knob tab between tabs in the cone wheel (52).
9. Install adjusting washer (33) and pinion nut (34).

Gear Timing

For proper operation, timing marks on both gears (11) must be in the correct positions. For R4H-150 and R4H-200, the timing marks are two enlarged cutouts near the center of gear (11). See Dwg. MHTPA0080A





(Dwg. MHTPA0080/A)

NOTICE

• Models R4H-300 and R4H-400 have no timing marks and require no timing.

Slip Clutch Assembly

Ref. Dwg. MHTPA0244

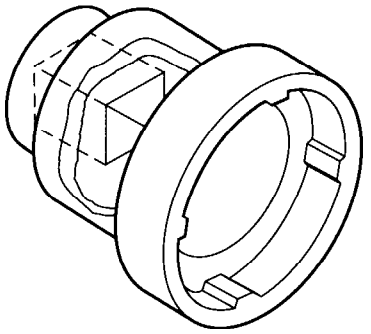
1. Position change gear (26) on supporter (51). Set cone wheel (52) in supporter (51) so notches engage with change gear (26).
2. Install cone spring (53) with dished surface towards the change gear (26).
3. Install washer (54) on hub of change gear (26) so tab locates in change gear slot. Outer tabs on washer (54) must face upward away from cone spring (53).
4. Install nut (55) on change gear (26) until finger tight.
5. Install slip clutch assembly in hoist and adjust.

Load Test

Prior to initial use, all new, extensively repaired, or altered hoists shall be load tested by or under the direction of a qualified person, and a written report furnished confirming the rating of the hoist. Test loads shall not be more than 125% of the rated hoist capacity. Testing to more than 125% may be necessary to comply with standards and regulations set forth in areas outside of the USA.

Special Tools

Clutch Overload Adjusting Socket
Part number R3V-SOCKET.



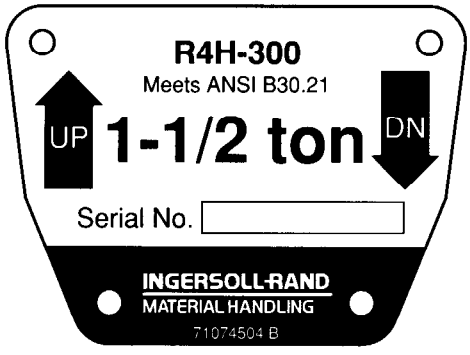
(Dwg. MHTPA0225)

PARTS ORDERING INFORMATION

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

1. Complete model number and serial number, if available, as it appears on the nameplate: R4H plus capacity.
2. Part number and part description as shown in this manual.
3. Quantity required.

The model and serial number label is located on the hand lever under the selector lever.



Model and serial number nameplate for R4H Hoists.

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

Hoist Model Number.....

Hoist Serial Number.....

Date Purchased.....

Return Goods Policy

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

NOTICE

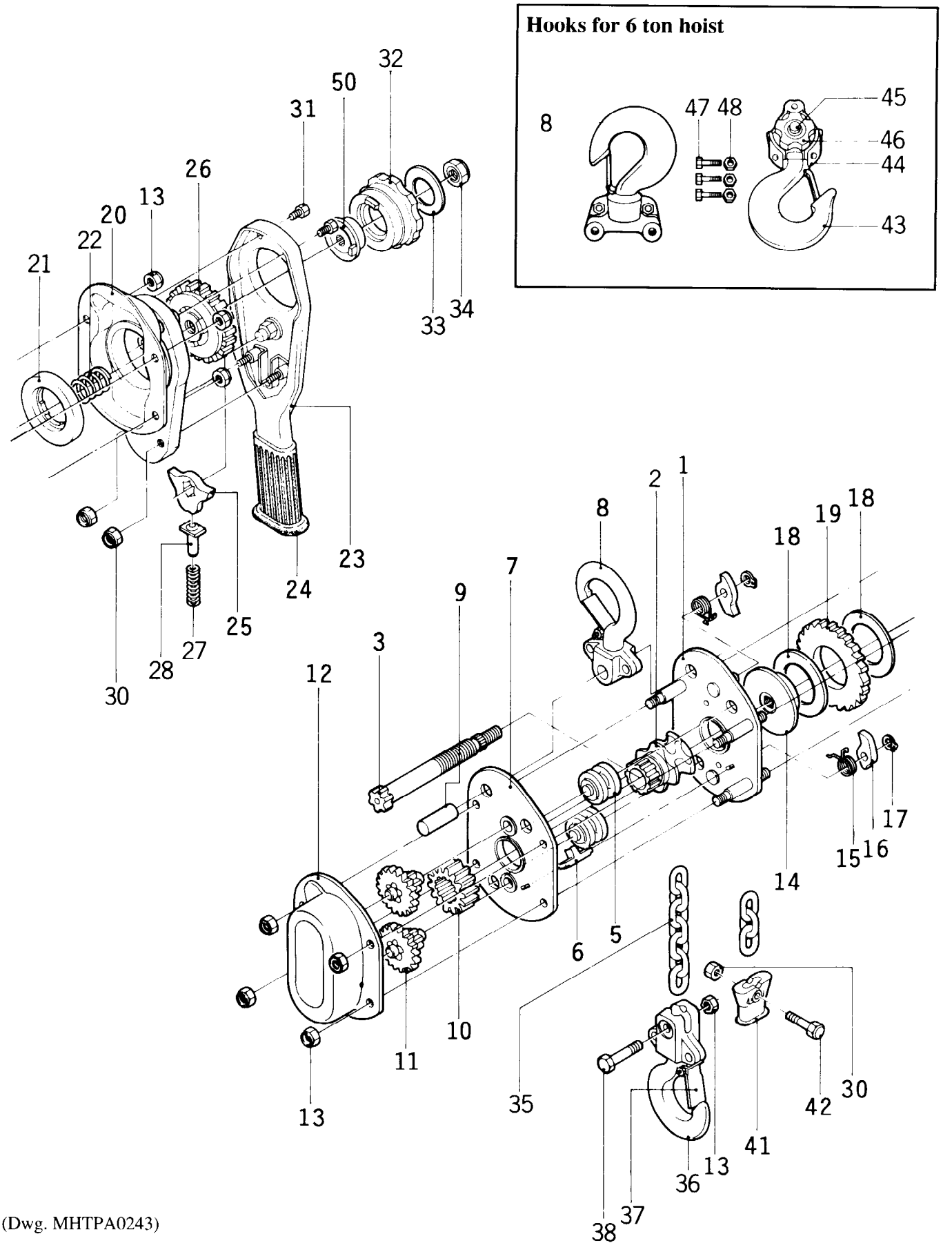
• Continuing improvement and advancement of design may cause changes to this hoist which are not included in this manual. Manuals are periodically revised to incorporate changes. Always check the manual edition number on the front cover for the latest issue.

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

Ingersoll-Rand Material Handling
2724 Sixth Avenue South
Seattle, Wa 98124 USA
Phone: (206) 624-0466
Fax: (206) 624-6265
or
Ingersoll-Rand International Sales
Ingersoll-Rand Material Handling
Samiia, Douai Operations
111, avenue Roger Salengro
59450 SIN LE NOBLE
France
Phone: (33) 27-87-11-11
Fax: (33) 27-96-03-29

SERVICE NOTES

ASSEMBLY DRAWING FOR R4H HOIST



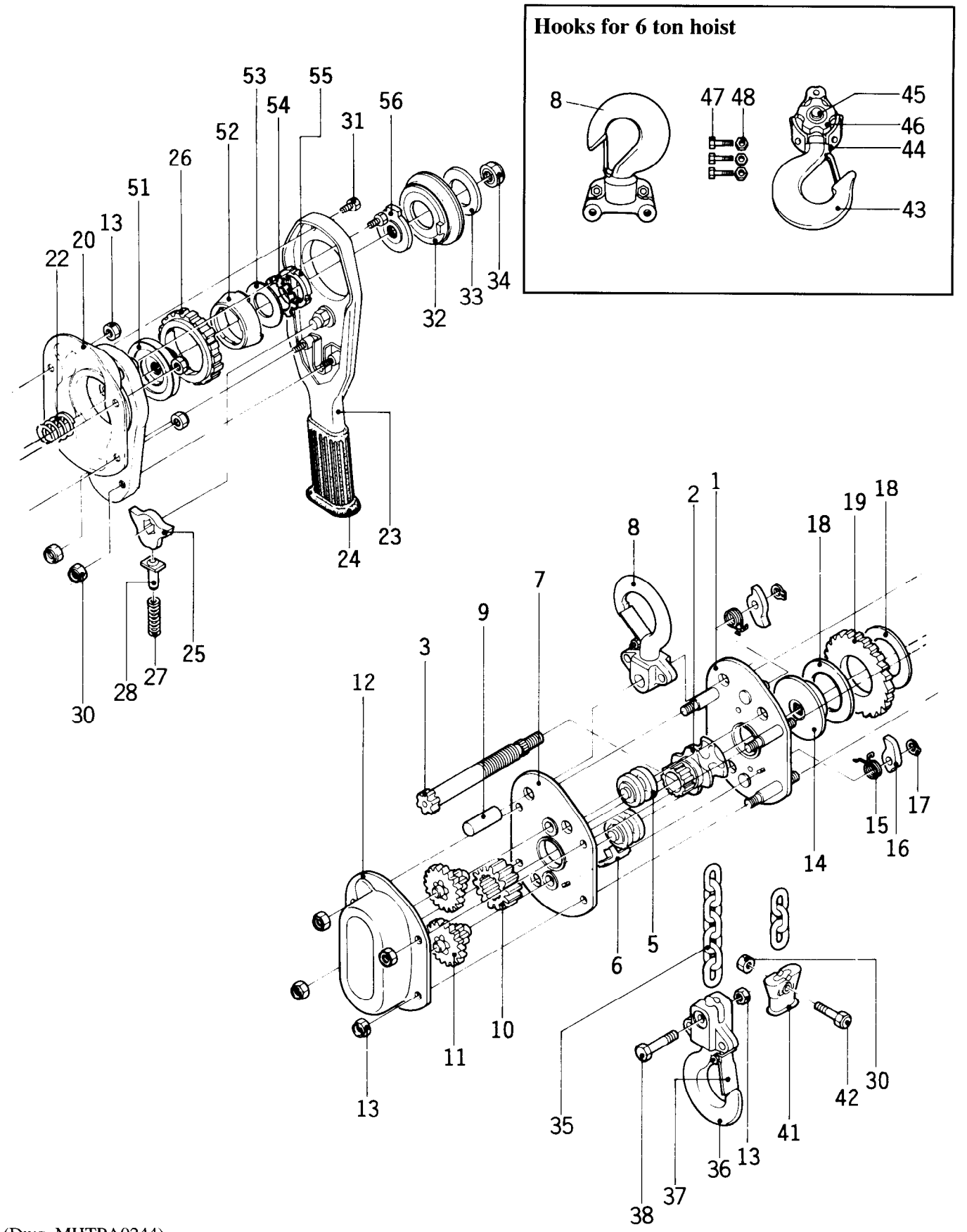
(Dwg. MHTPA0243)

PARTS LIST FOR R4H HOIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.					
			3/4 ton	1 ton	1-1/2 ton	2 ton	3 ton	6 ton
1	Side Plate 1	1	71076012		71076020		71076038	
2	Load Sheave	1	71076046		3573142		3573143	
3	Pinion Shaft	1	71076327		71076335		71076343	
5	Load Chain Guide	2	3372352		3372393		3372414	
6	Chain Stripper	1	3372353		3372394		3372415	
7	Side Plate 2	1	3573154		3573155		3573156	
8	Top Hook Assembly	1	3372354	71062723	3372395	71062749	3372416	3372439
9	Hook Pin	1	71076111		71076129		71076137	
10	1st Gear	1	3372356		3372397		3372418	
11	2nd & 3rd Gear	1 set	71079610		71079628		71079636	
12	Gear Cover	1	71076087		71076095		71076103	
13	U-Nut	9	Order Fastener Kit item 62					
14	Hub	1	71076160		71076178		71076186	
15	Brake Spring	2	Order Brake Pawl Kit item 61					
16	Brake Pawl	2	Order Brake Pawl Kit item 61					
17	Snap Ring	2	Order Brake Pawl Kit item 61					
18	Brake Disc	1 set	71079594				71079602	
19	Ratchet Gear	1	3372370				3372432	
20	Brake Cover Assembly	1	71076228		71076236		71076244	
21	Brake Ring	1	71076350				71076368	
22	Idle Spring	1	71076251					
23	Hand Lever	1	3372374		3372404			
24	Grip	1	3372441		3372442			
25	Change Pawl	1	Order Change Pawl Kit item 66					
26	Change Gear	1	71076376		71076384			
27	Push Spring	1	Order Change Pawl Kit item 66					
28	Push Pin	1	Order Change Pawl Kit item 66					
30	U-Nut	3	Order Fastener Kit item 62					
31	Bolt	2	Order Fastener Kit item 62					
32	Free Knob	1	71076400					
33	Adjusting Washer	1	71076418					
34	Pinion Nut	1	71076277					
35	Load Chain	1	LCCF010		LCCF015		LCCF025	
36	Bottom Hook Assy	1	3372385	71062731	3372409	71084156	3372436	3372440
37	Hook Latch	2	3372387		3372410		3372437	3372373
38	Bolt & Nut	1	3372388				3372438	
41	Anchor	1	Order Anchor Kit item 60					
42	Capscrew	1	71046940				71046957	
43	Bottom Hook	1	---					Order item 36
44	Bottom Frame	1	---					Order item 36
45	Axle	1	---					71076301
46	Idle Sheave	1	---					71076319
47	Yolk Bolt	3	---					Order item 65
48	U-Nut	3	---					Order item 65
49	Warning Tag	1	71038863					
50	Check	1	71076392					
57*	Capacity Label	1	71074421	71074439	71074447	71074454	71074462	71074470

* Not shown on drawing

ASSEMBLY DRAWING FOR R4H HOIST WITH SLIP CLUTCH



(Dwg. MHTPA0244)

PARTS LIST FOR R4H HOIST WITH SLIP CLUTCH

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.					
			3/4 ton	1 ton	1-1/2 ton	2 ton	3 ton	6 ton
1	Side Plate 1	1	71076012		71076020		71076038	
2	Load Sheave	1	71076046		3573142		3573143	
3	Pinion Shaft	1	71076327		71076426		71076434	
5	Load Chain Guide	2	3372352		3372393		3372414	
6	Chain Stripper	1	3372353		3372394		3372415	
7	Side Plate 2	1	3573154		3573155		3573156	
8	Top Hook Assembly	1	3372354	71062723	3372395	71062749	3372416	3372439
9	Hook Pin	1	71076111		71076129		71076137	
10	1st Gear	1	3372356		3372397		3372418	
11	2nd & 3rd Gear	1 set	71079610		71079628		71079636	
12	Gear Cover	1	71076087		71076095		71076103	
13	U-Nut	9	Order Fastener Kit item 62					
14	Hub	1	71076160		71076178		71076186	
15	Brake Spring	2	Order Brake Pawl Kit item 61					
16	Brake Pawl	2	Order Brake Pawl Kit item 61					
17	Snap Ring	2	Order Brake Pawl Kit item 61					
18	Brake Disc	1 set	71079594				71079602	
19	Ratchet Gear	1	3372370				3372432	
20	Brake Cover Assembly	1	71076228		71076236		71076244	
22	Idle Spring	1	71076251					
23	Hand Lever	1	3372374		3372404			
24	Grip	1	3372441		3372442			
25	Change Pawl	1	Order Change Pawl Kit item 66					
26	Change Gear	1	71076467					
27	Push Spring	1	Order Change Pawl Kit item 66					
28	Push Pin	1	Order Change Pawl Kit item 66					
30	U-Nut	3	Order Fastener Kit item 62					
31	Bolt	2	Order Fastener Kit item 62					
32	Free Knob	1	71076525					
33	Adjusting Washer	1	71076418					
34	Pinion Nut	1	71076277					
35	Load Chain	1	LCCF010		LCCF015		LCCF025	
36	Bottom Hook Assy	1	3372385	71062731	3372409	71084156	3372436	3372440
37	Hook Latch	2	3372387		3372410		3372437	3372373
38	Bolt & Nut	1	3372388				3372438	
41	Anchor	1	Order Anchor Kit item 60					
42	Capscrew	1	71046940				71046957	
43	Bottom Hook	1	---					Order item 36
44	Bottom Frame	1	---					Order item 36
45	Axle	1	---					71076301
46	Idle Sheave	1	---					71076319
47	Yolk Bolt	3	---					Order item 65
48	U-Nut	3	---					Order item 65
49	Warning Tag	1	71038863					
51	Supporter	1	71076442				71076459	

Parts List continued on page 18 .

Parts List continued from page 17 for R4H Hoist with slip clutch.

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.					
			3/4 ton	1 ton	1-1/2 ton	2 ton	3 ton	6 ton
52	Cone Wheel	1	71076475					
53	Cone Spring	1	71076483				71086318	
54	Washer	1	71076491					
55	Nut	1	71076509					
56	Washer	1	71076269					
57*	Capacity Label	1	71074421	71074439	71074447	71074454	71074462	71074470

* Not shown on drawing

LOAD CHAIN

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.					
			3/4 ton	1 ton	1-1/2 ton	2 ton	3 ton	6 ton
35	Load Chain (Zinc Plated)	1	LCCF010ZP		LCCF015ZP		LCCF025ZP	
	Load Chain (Nickel Diffused)		LCCF010ND		LCCF015ND		LCCF025ND	

ASSEMBLIES AND KITS

ITEM NO.	DESCRIPTION OF PART	PART NO.					
		3/4 ton	1 ton	1-1/2 ton	2 ton	3 ton	6 ton
60	Anchor Assembly (Incl's items 30, 41 and 42)	71046965				71046973	
61	Brake Pawl Kit (Incl's items 15, 16 and 17)	71079529				71079537	
62	Fastener Kit (Incl's items 13 and 31)	71079313					
65	Yoke Bolt and Nut Kit (Incl's items 47 and 48)	---				71079255	
66	Change Pawl Kit (Incl's items 25, 27 and 28)	71079545					

ACCESSORIES

Description	Part No.
Orange Touch-Up Paint	MHD-OR
Chain Lubricant	LUBRI-Link

HOIST AND WINCH LIMITED WARRANTY

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

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

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

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

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

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

IMPORTANT NOTICE

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

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

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

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

United States Office Locations

For Order Entry and Order Status:

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

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

Regional Sales Offices

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

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

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

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

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

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

International

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

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

Regional Sales Offices

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

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

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

British Columbia
Regional Warehouse
Technical Support
123 Bowser Avenue
North Vancouver, British
Columbia V7P 3H1
Phone: (604) 985-4470
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Ingersoll-Rand
Poduction Equipment Group
730 N.W. 107 Avenue
Suite 300, Miami, FL
33172-3107
Phone: (305) 559-0500
Telex: 441617TLS UI
Fax: (305) 559-7505

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111, avenue Roger Salengro
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