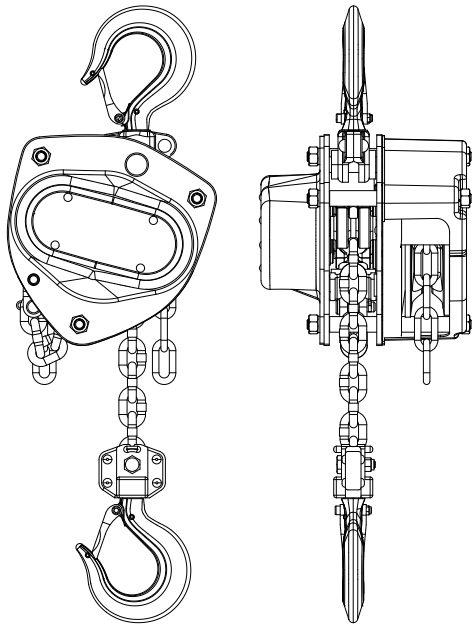
Product Maintenance Information

Manual Chain Hoist

KM Series



(Dwg. MHP3261)

Save These Instructions

Ingersoll Rand®

Form 48496350
Edition 2
November 2016

Only allow **Ingersoll Rand** trained technicians to perform maintenance on this product. For additional information contact **Ingersoll Rand** factory or nearest Distributor.

For additional supporting documentation refer to Table 1 'Product Information Manuals' on page 2.
Manuals can be downloaded from ingersollrandproducts.com

The use of other than genuine **Ingersoll Rand** replacement parts may result in safety hazards, decreased performance and increased maintenance and will invalidate all warranties.

Original instructions are in English. Other languages are a translation of the original instructions.

Refer all communications to the nearest **Ingersoll Rand** Office or Distributor.

Table 1: Product Information Manuals

Publication	Part/Doc Number	Publication	Part/Doc Number
Product Safety Information Manual	48489231	Product Parts Information Manual	48489249
	47589199001		47589065001
Product Information Manual	48489223		

INSPECTION

Frequent inspections should be performed on equipment in regular service. Refer to Product Information Manual.

■ Periodic Inspection

Refer to Table 2 'Inspection Classifications' on page 2 for suggested inspection classifications for Periodic Inspection Intervals. Select conditions most appropriate to application.

Table 2: Inspection Classifications

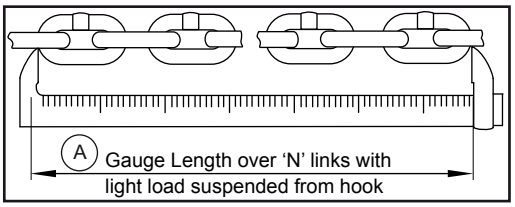
Conditions	Usage	Load Characterization
Normal	<=25% duty cycle	Regular
Heavy	>25% duty cycle	Usually medium loads, frequent maximum loads
Severe	Loads normally less than 50% of rated load with running time up to continuous; or, Loads normally above 50% of rated load with running time up to 50% of work period.	

Maintain written records of periodic inspections to provide an accumulative basis for continuing evaluation. Inspect all items listed in 'Frequent Inspection' in the Product Information Manual. Also inspect the following at the suggested intervals recommended in Table 5 'Periodic Maintenance/Inspection Interval' on page 3.

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 hooks for cracks. Use magnetic particle or dye penetrant to check for cracks. Inspect hook retaining parts. Tighten, repair or replace if necessary. Refer to the latest edition of ASME B30.10 (Hooks) for additional hook inspection information
4. **Load Chain Sprocket.** Check for damage or excessive wear. Replace if necessary. Observe the action of load chain feeding through hoist. Do not operate a hoist unless load chain feeds through hoist and hook block smoothly and without audible clicking or other evidence of binding or malfunctioning
5. **Brake.** Ensure proper operation. Brake must hold hoist rated capacity. If load test indicates the need, disassemble. Brake discs must be free of oil, any grease, unglazed and uniform in thickness. Refer to "MAINTENANCE" section for allowable brake disc wear. Check all other brake surfaces for wear, deformation or foreign deposits. Inspect gear teeth, pawl and pawl spring for damage. Check that brake pawl stops counterclockwise rotation of ratchet gear. Clean and replace damaged components as necessary.
6. **Supporting Structure.** Check for distortion, wear and continued ability to support hoist and rated load.
7. **Labels and Tags.** Check for presence and legibility. Replace if necessary.
8. **End Anchor.** Ensure both ends of load chain are securely attached. Secure if loose, repair if damaged, replace if missing. Check chain stoppers are correctly installed and functional.
9. **Trolley (if equipped).** Check that the trolley wheels track 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 hoist until problem has been determined and corrected.
10. **Load Chain.** Check the chain for stretching. Measure the load chain over five link sections all along chain, paying particular attention to the most frequently reeved links. Refer to Dwg. MHP0455 on page 2, **A.** Gauge Length over 'N' links with light load suspended from hook. When any five links in the working length reaches or exceeds the discard length, replace entire chain. Refer to Table 3 'Load Chain Normal and Discard Length' on page 2. Always use genuine **Ingersoll Rand** replacement chain. Zinc plated load chain is standard on Liftchain hoists.

Table 3: Load Chain Normal and Discard Length

Hoist Capacity ton	Chain Size	Normal Length		Discard Length	
	mm	inches	mm	inches	mm
0.25	4.0 X 12.0	2.35	60	2.42	61.5
0.5	5.0 X 15.0	2.95	75	3.03	76.9
1	6.3 X 19.0	3.75	95	3.83	97.4
1.5	7.1 X 21.0	4.15	105	4.24	107.6
2	8.0 X 24.0	4.70	120	4.84	123
3	10.0 X 28.0	5.5	140	5.65	143.5
5	9.0 X 27.0	5.3	135	5.45	138.4
7.5	9.0 X 27.0	5.3	135	5.45	138.4
10	9.0 X 27.0	5.3	135	5.45	138.4
20	9.0 X 27.0	5.3	135	5.45	138.4



(Dwg. MHP0455)

■ Maintenance Schedule

After considering the previous section, regarding loading, it is possible to determine the necessary maintenance intervals. Given that the load spectrum has been determined and the duration of use has been recorded, the following chart is intended to be used to determine service intervals for major overhauls and unit gear box lubrication. Accordingly, the following table is given:

Table 4: Service Intervals for Major Overhauls

Load Spectrum (LF)	Characterization	Time Before Overhaul (hours)	Check Oil Level (*) (hours)
L1 - Light 0 < LF < = 0.50	Hoist is usually subject to very small loads and in exceptional cases only to maximum loads.	6300	400
L2 - Medium (normal) 0.5 < LF < = 0.63	Hoist is usually subject to small loads but rather often to maximum loads.	3200	
L3 - Heavy 0.63 < LF < = 0.80	Hoist is usually subject to medium loads but frequently to maximum loads.	1600	
L4 - Heavy 0.80 < LF < = 1.00	Hoist is usually subject to maximum or almost maximum loads.	800	

(*) Operation specifics may warrant modification to this interval.

■ Periodic Maintenance

While the information in the preceding section is used for major service intervals, many items need to be checked at greater frequency depending on usage. The following information is provided for that purpose, but it is important to note that the information in the preceding section, regarding hours of service, is applicable in all conditions of use. Refer to Table 5 'Periodic Maintenance/Inspection Interval' on page 3.

Table 5: Periodic Maintenance/Inspection Interval

Item	Conditions		
	Normal	Heavy	Severe
Requirements of frequent inspection	Annually	Semi-annually	Quarterly
Evidence of loose bolts, nuts, rivets, snap rings	Annually	Semi-annually	Quarterly
Evidence of worn corroded, distorted, or cracked parts such as suspension housing, hand chain wheels, chain attachments, clevises, yokes, suspension bolts, shafts, gears, bearings, pins, rollers, and locking and clamping devices	Annually	Semi-annually	Quarterly
Evidence of damage to hook retaining nuts or collars or pins, and welds or rivets used to secure the retaining members	Annually	Semi-annually	Quarterly
Evidence of damage or excessive wear of load sprockets, idler sprocket, or hand chain wheel	Annually	Semi-annually	Quarterly
Evidence of worn, glazed, or oil-contaminated friction disc; worn pawl, cams or ratchet; corroded, stretched, or broken pawl springs in brake mechanism.	Annually	Semi-annually	Quarterly
Evidence of damage to supporting structure, and/or trolley, if used.	Annually	Semi-annually	Quarterly
Product and safety label for legibility	Annually	Semi-annually	Quarterly
End connections of load chain	Annually	Semi-annually	Quarterly

TROUBLESHOOTING

This section provides basic troubleshooting information. Determination of specific causes to problems are best identified by thorough inspections performed by **Ingersoll Rand** trained technicians. The chart below provides a brief guide to common hoist and trolley symptoms, probable causes and remedies.

SYMPTOM	CAUSE	REMEDY
Load is not lifted	Overload	Reduce the load to nominal load
	Slip clutch not adjusted	Adjust slip clutch
	Load got stuck	Set the load free again
	Brake disc are worn	Do maintenance and exchange the brake disc
	Load chain is twisted	Align the load chain
	Defect of chain, gear or chain wheels	Do maintenance and replace defective parts by original spare parts
	Pawl does not engage properly	Check the pawl and replace it if necessary
	Pawl spring is missing	Check the pawl and replace it if necessary
It is difficult to lift the load	Overload	Reduce the load to rated load
	Dirty chains, gear or chain wheels	Do maintenance, lubricate chains, gear and chain wheels
	Defect of chain, gear or chain wheels	Do maintenance and replace defective parts by original spare parts
Load is lifted with interruptions	Pawl spring is missing or defective	Do maintenance and replace defective parts by original spare parts
Hoist does not lift without load	Brake spring is missing	Do maintenance and replace defective parts by original spare parts
Hoist does not lift the whole distance long	Hook stuck, chain is twisted	Place hooks and chains in correct position
The brake remains closed (stuck)	the hoist was unloaded without lowering the load	Suspend the load again, lower the load, unload the hoist
	The load hook was pulled against the housing and got stuck there	Release the hook, suspend the load again, lower the load, unload the hoist.
Hoist does not lower the load	Brake too tight	Pull down hard (possibly with 2 people) on the hand chain to loosen brake
	Brake without function due to rust	Effect periodic inspection and replace rusty parts.
Load slips down partially during lowering	Brake discs are missing, installed incorrectly or worn	Replace the brake discs. Or install it correctly
Hand chain binds	Damaged hand chain, hand chain wheel, pinion shaft, gears, load chain, sheaves	Disassemble hoist, inspect and repair or replace damaged components.
	Hand chain not installed properly (twisted or kinked)	Remove hand chain and reinstall.
Load hook latch does not work	Latch broken	Replace hook latch.
	Load hook bent or twisted.	Inspect load hook as described in "INSPECTION" section. Replace if necessary.

INSPECTION REPORT

Ingersoll Rand Manual Chain 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(s) noted during Frequent Inspection	
	3. Discrepancy(s) noted during maintenance	
	4. Other: _____	

Refer to the Product Information and Parts Information Manual and "INSPECTION" section for the general inspection criteria. Also, 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 Wheel					
Hook Block/Double-Reeved Pocket Wheel					
Chain Guides					
Springs			---		
Covers, Housings					
Hooks			---		
Top	Actual Hook Throat Width: _____ inches / _____ mm (Refer to Table 3 'Load Chain Normal and Discard Length' on page 2 for minimum/maximum acceptable widths.)				
	Hook Twist		---		(maximum 10%)
	Hook Crack Test Method Used: Dye Penetrant _____ Magnetic Particle _____ Other: _____				
Bottom	Actual Hook Throat Width: _____ inches / _____ mm (Refer to Table 3 'Load Chain Normal and Discard Length' on page 2 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 3 'Load Chain Normal and Discard Length' on page 2.)					
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*)			

* Maximum test load should never exceed 125% of rated capacity.
This form may be photocopied and used as an inspection record.

- **Never perform maintenance on the hoist while it is supporting a load.**

  Before performing maintenance, tag controls:

  WARNING - DO NOT OPERATE EQUIPMENT BEING REPAIRED.
- **Only allow personnel instructed in service and repair of this hoist to perform maintenance.**
- **After performing any maintenance on the hoist, dynamically test hoist to 100% of its rated capacity, in accordance with ASME B30.16 standards, before returning hoist to service. Testing to more than 100% of rated capacity may be required to comply with standards and regulations set forth in areas outside of the USA.**
- **Use of other than genuine Ingersoll Rand replacement parts may result in safety hazards, decreased performance and increased maintenance and may invalidate all warranties.**

■ General

Correct disassembly (to prevent loss or damage of good parts), repair, assembly, testing and adjusting are critical to proper product operation. Maintenance procedures are technical in nature and require training and experience to accomplish correctly. In addition, repair and testing require specialized equipment that is not typically found at the hoist-mounting site. Proper use, inspections and maintenance increase the life and usefulness of your Ingersoll Rand equipment. During assembly, lubricate gears, nuts, capscrews and all machined threads with applicable lubricants. Use of antiseize compound and/or thread lubricant on capscrew and nut threaded areas prevents corrosion and allows for easy disassembly of components. It is extremely important that anyone involved with maintaining the hoist be familiar with the servicing procedures of these products, and be physically capable of conducting the procedures. These personnel shall have skills that include:

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.

■ *Maintenance Intervals*

Refer to Table 5 'Periodic Maintenance/Inspection Interval' on page 3 for recommended maintenance schedule.

■ *Load Chain Replacement*

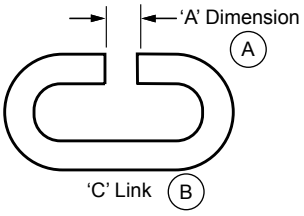
⚠ WARNING

- **To prevent a falling load, which can cause death, injury or property damage, the hook must be on left fall of load chain and right fall must be attached to hoist body with anchor pin and anchor hanger. Right and left designations are as viewed from the hand chain side of the hoist.**

NOTICE

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

1. Disconnect chain end from hoist body if attached.
2. Remove load pin and nut (23), if equipped.
3. Remove load hook.
4. Using an abrasive wheel, cut a section from the last link as shown in Dwg. MHP0817 on page 5, **A.** 'A' dimension; **B.** 'C' Link. Use a 'C' link which is the same size as the chain. Refer to Table 6 ''C' Link Dimension' on page 5.



(Dwg. MHP0817)

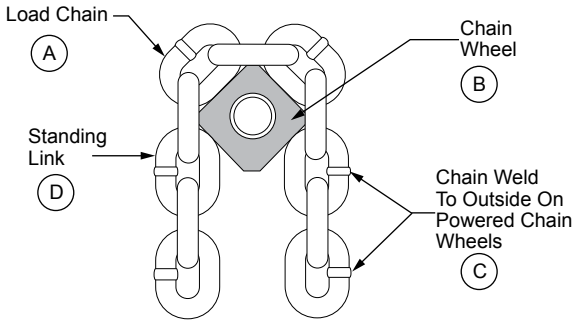
Table 6: 'C' Link Dimension

Capacity ton	Chain Size	'A' Dimension	
	mm	in.	mm
0.25	4.0 X 12.0	0.236	6
0.5	5.0 X 15.0	0.276	7
1	6.3 X 19.0	0.354	9
1.5	7.1 X 21.0	0.394	10
2	8.0 X 24.0	0.433	11
3	10.0 X 28.0	0.551	14
5	9.0 X 27.0	0.512	13
7.5	9.0 X 27.0	0.512	13
10	9.0 X 27.0	0.512	13
20	9.0 X 27.0	0.512	13

⚠ CAUTION

- **Do not distort link in any manner. Link must be able to pass over the chain sprocket and idler wheels without binding.**

5. Connect new chain to old chain by hooking end of new chain onto 'C' link. The last link of the chain must be in the same direction as the first, if not, cut off the last link. The end link must be a standing link (perpendicular to the axle of hoist sprockets). Make certain welds and links on new chain match positioning of welds and links on chain being replaced
6. Slowly run hoist in lower direction, running off old chain and reeving 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 on page 5.



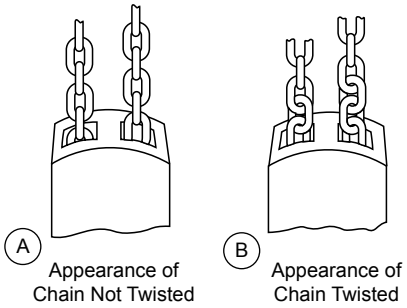
(Dwg. MHP0472)

Illustrations may not be a true representation of actual pocket wheel. Use for instructions only.

7. Reinstall load hook to load side of chain. Connect free end of chain to hoist body.

■ *Determining Twisted, Kinked or 'Capsized' Load Chain*

Ensure chain is not twisted, kinked or 'capsized' during installation. Refer to Dwg. MHP0020 on page 5, **A.** Appearance of Chain Not Twisted; **B.** Appearance of Chain Twisted.



(Dwg. MHP0020)

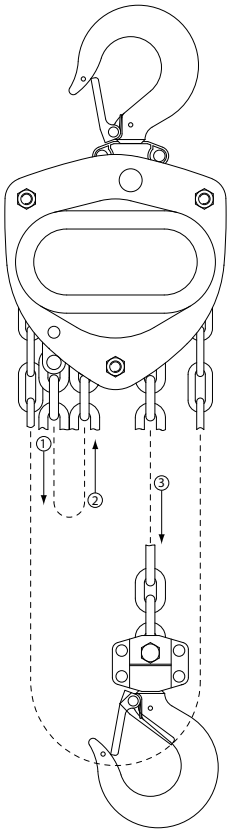
■ *Chain Reeving*

⚠ WARNING

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

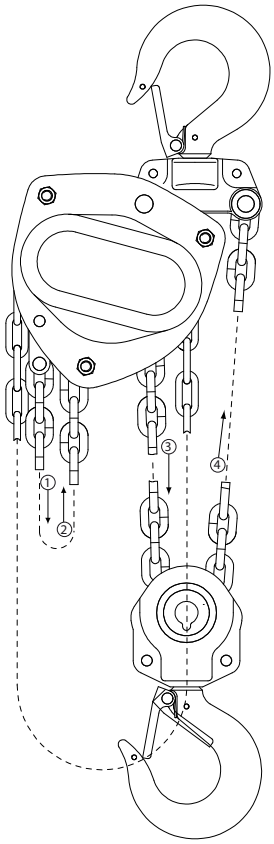
Refer to Dwg. MHP3273 on page 6 for single reeve, MHP3266 on page 6 for double reeve, MHP3274 on page 6 for triple reeve, MHP3267 on page 6 for quadruple reeve, and MHP3268 on page 7 for octuplet reeve.

Single Reeve (0.25 to 3 Ton Hoists)



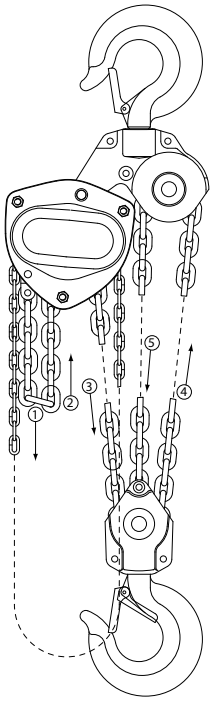
(Dwg. MHP3273)

Double Reeve (5 Ton Hoists)



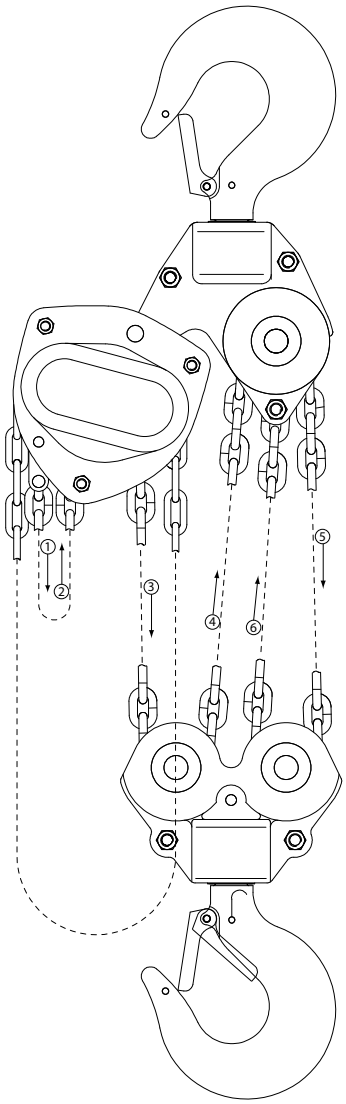
(Dwg. MHP3266)

Triple Reeve (7.5 Ton Hoists)



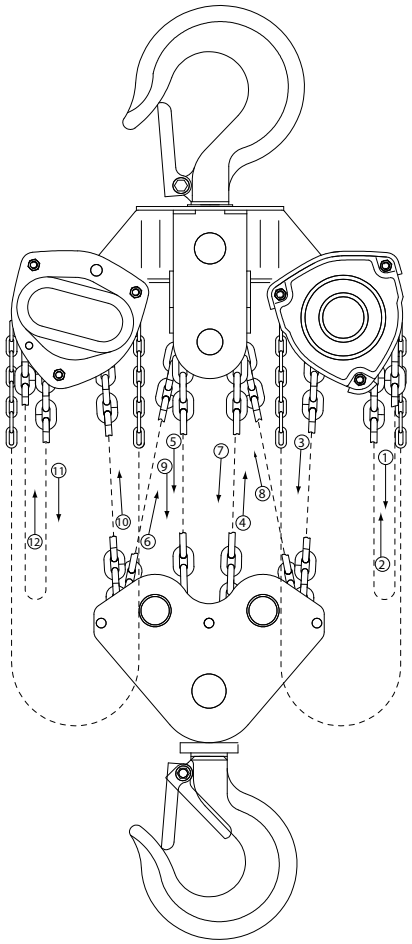
(Dwg. MHP3274)

Quadruple Reeve (10 Ton Hoists)



(Dwg. MHP3267)

Octuplet Reeve (20 Ton Hoists)



(Dwg. MHP3268)

Copper Plated Hook

Inspect the copper plated hook before performing the operation. Do not use the copper plated hook if the metallic part is exposed. To prevent spark when in contact with other metallic components, the bottom hook is copper plated.

Load Chain

Inspect the load chain at frequent intervals to make sure that no rust accumulates. Rust on the surface of load chain may result in spark if the chain comes in contact with other metallic components.

Hand Chain

Inspect the hand chain at frequent intervals to make sure that no rust accumulates. Rust on the surface of hand chain may result in spark if the chain comes in contact with other metallic components.

Grounding

The entire hoist system, from the trolley or load hook to the bottom hook, the hand chain and the payload must be earth grounded at all times to prevent ignition hazards due to electro-static discharge. Resistance to earth of less than 10000 Ohms is required. Do not disconnect or insulate any grounding or strain relief cables. When using a non-conductive sling or harness or a non-conductive link or barrier an independent grounding must be applied.

Disassembly

General Disassembly Instructions

The following instructions provide necessary information to disassemble, inspect, repair, and reassemble product. Parts drawings are provided in Product Parts Information Manual unless otherwise noted.

If product is being completely disassembled for any reason, follow the order of topics as they are presented. It is recommended that all maintenance work on the product be performed in a clean dust free work area.

In the process of disassembling the product, observe the following:

1. Never disassemble product any further than is necessary to accomplish needed repair. A good part can be damaged during the course of disassembly.
2. Never use excessive force when removing parts. Tapping gently around 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 part being heated is already worn or damaged beyond repair and no additional damage will occur to other parts. In general, product is designed to permit easy disassembly and reassembly. The use of heat or excessive force should not be required.
4. Keep 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, machined surfaces and housings.
6. Do not remove any part that is a press fit in or on a subassembly unless removal of that part is necessary for repairs or replacement.

Gear End Disassembly

1. Remove the three locknuts & washers (36) from gear cover assembly (35).
2. Remove gear cover assembly (35).
3. Remove disc gears (32).
4. Remove retainer ring III (33) from load sheave and pry off load gear (31).

Brake End Disassembly

1. Remove the three lock nuts and spring washers (1) from handwheel cover (2).
2. Remove handwheel cover (2).
3. Remove wheel stopper & washer (3) from pinion shaft (19).
4. Secure load sheave to prevent rotation and unscrew handwheel (5) from pinion shaft (19). Handwheel is left hand (counterclockwise) threaded.
5. Remove support plate (6).
6. Remove brake discs (7) and ratchet disc (8).
7. Secure load sheave to prevent rotation and unscrew brake hub (12) from pinion shaft (19).
8. Remove retainer rings I (9), pawls (10) and pawl springs (11) from side plate A assembly (13).

NOTICE

- **If ratchet pawls or springs are damaged or not functioning then remove retainer ring and replace damaged parts.**

Load Sheave Disassembly

Follow steps 1 through 4 in 'Gear End Disassembly' and steps 1 through 8 in 'Brake End Disassembly', then steps below.

1. Remove split pin & hook pin (29) and top hook assembly (17).
2. Remove side plate B assembly (30), and remove caged bearing (27) from the side plate B assembly (30).
3. Remove two- guide rollers (28), chain stripper (26), and anchor hanger (20).
4. Lift load sheave (25) with pinion shaft (19) from side plate A assembly (13), and remove caged bearing (14) from side plate A assembly (13).
5. Remove retainer ring II (15) from load sheave (25).
6. Remove pinion shaft (19) and caged needle bearings (16) from inside of load sheave (25).

Hooks Disassembly (5, 7.5, 10 and 20 ton)

1. Remove capscrews, locknuts and washers.
2. Separate plates and remove hook.
3. Lift out sheave assembly. Carefully slide idler sheave shaft from idler sheave and remove rollers.

Cleaning, Inspection and Repair

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

Cleaning

⚠ CAUTION

- **Bearings that are loose, worn or rotate in the housing must be replaced. Failure to observe this precaution will result in additional component damage.**

Clean all hoist component parts in an acid free 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.

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. Measure the thickness of the brake discs. If brake discs do not have uniform thickness or are less than the discard dimension shown in Table 7 'Brake Disc Chart' on page 8, replace brake discs.

Table 7: Brake Disc Chart

Capacity ton	Normal		Discardh	
	inches	mm	inches	mm
0.25	0.08	2	0.06	1.5
0.5	0.12	3	0.09	2.3
1	0.12	3	0.09	2.3
1.5	0.12	3	0.09	2.3
2	0.12	3	0.09	2.3
3	0.12	3	0.09	2.3
5	0.12	3	0.09	2.3
7.5	0.12	3	0.09	2.3
10	0.12	3	0.09	2.3
20	0.12	3	0.09	2.3

5. Inspect ratchet pawls and springs on side plate assembly. Replace parts if pawls and or springs are damaged or fail to operate.

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. Do not use steel wool.

1. Worn or damaged parts must be replaced. Refer to the applicable Parts List Manual 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, and bushings.
4. Examine all gear teeth carefully, and remove nicks and 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

Load Sheave Assembly

1. Apply grease to bearings (16, 14 and 27) and pinion shaft (19).
2. Install caged bearing (14) into side plate A assembly (13), and install caged bearing (27) into side plate B assembly (30).
3. Install pinion shaft (19), caged needle bearings (16) and retainer ring II (15) into load sheave (25).
4. Install load sheave assembly in side plate A assembly (13).
5. Install two-guide rollers (28), chain stripper (26), anchor hanger (20) onto side plate A assembly (13), and cover with the side plate B assembly (30).

Gear End Assembly

Follow steps 1 through 5 described in 'Load Sheave Assembly'.

1. Install load gear (31) on load sheave (25). Ensure recessed side of gear face is outward. Install retainer ring III (33) on load sheave (25) to secure load gear (31)
2. Install disc gears (32) so gear teeth are correctly timed and end shafts are located in bearing sleeves in side plate. Refer to 'Gear Timing' on page 8
3. Apply a thick coat of grease as recommended in the "LUBRICATION" section in Product Information Manual to all gear teeth. Install gear cover assembly (35) over gears to engage gear end shafts.
4. Secure gear cover assembly (35) with locknuts and washers (36).
5. Install the top hook assembly (17), insert hook pin (29) and lock with split pin (29).

Brake End Assembly

Follow steps 1 through 5 described in 'Load Sheave Assembly' and steps 1 through 5 described in 'Gear End Assembly', then below steps.

⚠ CAUTION

- **The brake will not operate properly if there is oil on the brake discs.**

1. Install pawl springs (11), pawls (10) onto side plate A assembly (13), and secured with retainer rings I (9).
2. Thread brake hub (12) onto pinion shaft (19) until snug. Stepped side of brake hub (12) must face out.
3. Install first brake disc (7) followed by ratchet disc (8) and second brake disc (7). Ratchet disc teeth must engage the two pawls mounted on support plate assembly. Counterclockwise rotation of the ratchet disc must be possible.
4. Install the support plate (6)
5. Secure load sheave (25) to prevent rotation and thread handwheel (5) onto pinion shaft (19), and secure with washer and wheel stopper (3).
6. Wrap hand chain (4) around handwheel and feed ends through slots provided in hand chain wheel cover.
7. Install the handwheel cover (2). Secure with spring washers and locknuts (1).

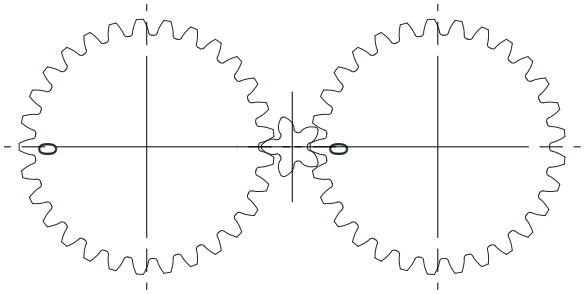
Bottom Hook Assembly (5, 7.5, 10 and 20 ton)

1. Grease and install the rollers in the groove provided in the bore of the idler sheave.
2. Install idler sheave shaft through the idler sheave bore. Ensure rollers remain in position.
3. Carefully place the assembled parts between the plates.
4. Install hook between plates and clamp plate halves together with capscrews, lockwashers and nuts.

Gear Timing

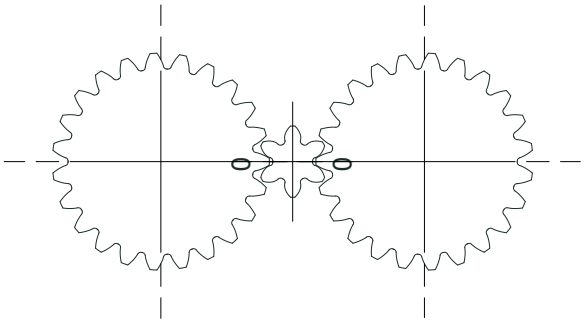
For proper operation, timing marks on the gears must be in the correct positions. The timing marks are circular impressions on the faces of gears.

All capacities except for 0.5 ton refer to Dwg. MHP3270 on page 8.



(Dwg. MHP3270)

0.5 ton refer to Dwg. MHP3269 on page 8.



(Dwg. MHP3269)

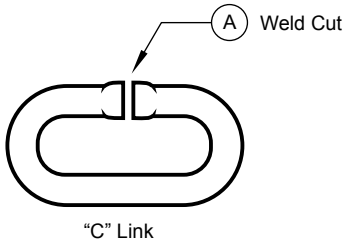
Hand Chain Adjustment or Replacement

⚠ CAUTION

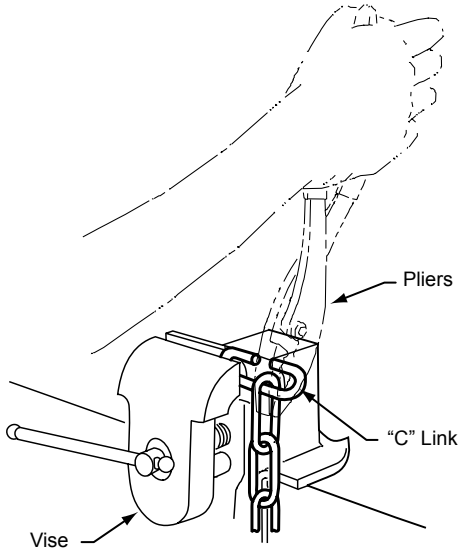
- **When cutting weld side of a hand chain link, do not cut or nick opposite side. A damaged link must be replaced to prevent premature failure. A falling hand chain could cause injury.**

1. To create a "C" link, cut welded side of link with a hack saw. Clamp one side of "C" link in a vise and bend it open by using pliers to grip the exposed part of link. Refer to Dwg. MHP0014 on page 9, and Dwg. MHP0016 on page 8.
2. If you are replacing the hand chain, disconnect it at "C" link and carefully remove hand chain.
3. If replacing the hand chain, cut a length 2 times the required hand chain drop plus about one foot (305 mm). If adjusting the hand chain length, remove or add a length of chain 2 times the difference in the required hand chain height.

   To prevent hand chain from twisting, maintain an even number of links, by removing or adding an even number of links.

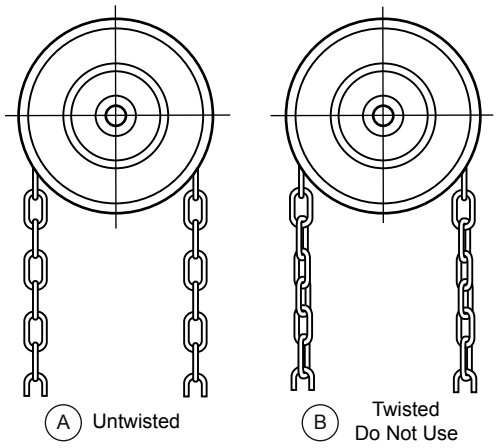


(Dwg. MHP0016)



(Dwg. MHP0014)

4. To keep your safe, please adjust the bottom of the hand chain 600 mm from the ground. You need cut the hand chain length to be X= (L-600)X2; X= chain length, L= lift. Then follow the steps 5 through 7 below to install hand chain.
5. To replace hand chain, run new chain through the left hand chain guide, around the hand wheel. Make sure hand chain is seated in the hand wheel pockets. Run hand chain back through the right hand chain guide.
6. Connect hand chain ends with "C" link. The total number of links must be even. Bend "C" link shut.
7. Make sure hand chain is not twisted. If twisted, untwist or open a "C" link and remove one hand chain link.



(Dwg. MHP0015)

■ 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 the operation and maintenance of this hoist, and a written report furnished confirming the rating of the hoist. Test hoist to 125% of the rated hoist capacity. Testing to more than 125% will be required to set overload clutch and may be necessary to comply with standards and regulations set forth in areas outside of the USA.

SERVICE NOTES

SERVICE NOTES

ingersollrandproducts.com