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Yale®

OPERATING &
MAINTENANCE

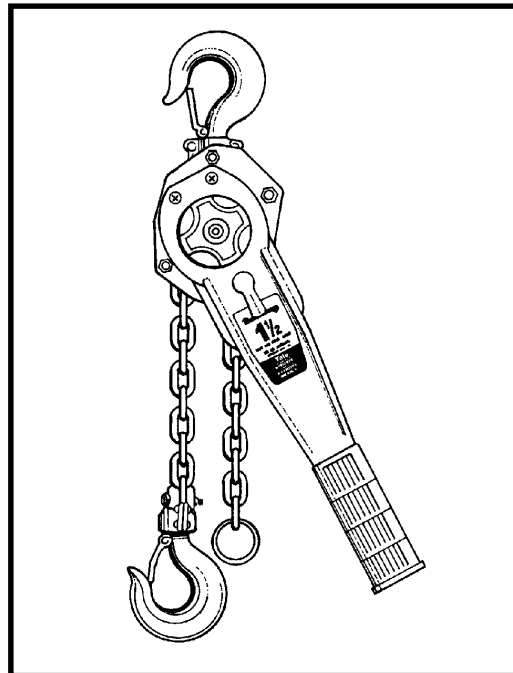
INSTRUCTIONS

WITH PARTS LIST

PUBLICATION PART NO. PSB-680

LEVER HOISTS

STEEL BODY LEVER HOIST/PULLER



MODEL PSB

IMPORTANT - CAUTION

This manual contains important information for the correct installation, operation and maintenance of the equipment described herein. All persons involved in such installation, operation and maintenance should be thoroughly familiar with the contents. To safeguard against the possibility of personal injury or property damage, follow the recommendations and instructions of this manual and keep it for further reference.

WARNING

The equipment shown in this manual is intended for industrial use only and should not to be used to lift, support, or otherwise transport people.

 **Duff-Norton**

PREFACE

YALE® LEVER HOISTS are made of the best selected materials, manufactured and processed through up-to-date streamlined production facilities by skilled engineers under strict quality control with a rigid final inspection before leaving our factory.

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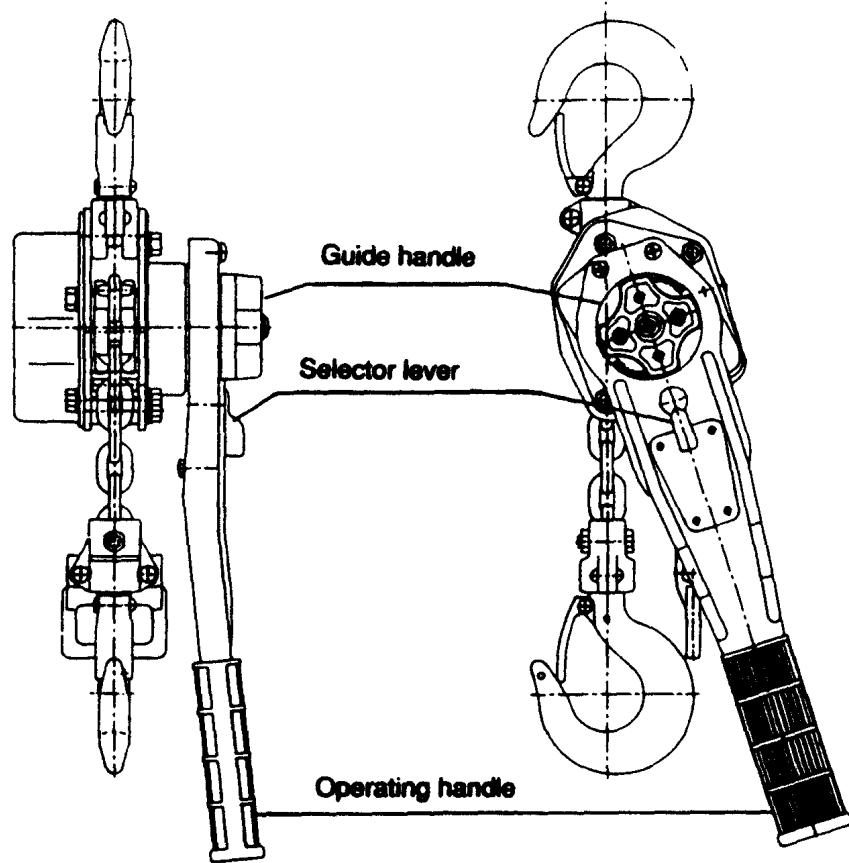
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WARNING

The following warnings and safety procedures are essential for avoiding the possibility of personal injury or property damage:

1. All persons involved must read this handbook and be completely familiar with all operating and maintenance procedures.
2. When operating the lever hoist, always maintain a firm footing and when necessary be secured. Operate the lever hoist from a location that will be clear of the load at all times. People must stay clear of the suspended load. Never use the lever hoist to lift, support, or transport people and never lift loads over or near people.
3. Before lifting a load, confirm that the lever hoist is in good condition and functioning properly.
4. Always keep the load chain well lubricated and protect it from weld spatter and other damaging contaminants. Never allow the load chain or hooks to be used as a ground for welding and never touch them with live welding electrodes. Never use the lever hoist with twisted, kinked, damaged, or worn load chains and never attempt to lengthen the load chain.
5. Always use proper slings and attachments in the correct manner and confirm that they are seated properly in the hook. Also confirm that the safety latch assembly has closed completely and not supporting any part of the load.
6. Never lift more than the rated load.
7. Slacked load chain must be taken up carefully. While checking the balance of the load, lift and lower the load about 4" to test the brake system before lifting further. Loads must be lifted slowly.
8. Never run the load chain out beyond the range of lift.
9. Never allow your attention to be diverted when operating the lever hoist and never leave a suspended load unattended.
10. Inspect the lever hoist regularly.
Never use a lever hoist when malfunction, unusual performance, damage, or extensive wear are found.
11. Never adjust or repair a lever hoist unless you are qualified to perform hoist maintenance.
12. Never modify the lever hoist. Our approval is required for all nonstandard applications.
13. Use only genuine parts when repairing the lever hoist.
14. Never remove or obscure the name-plate on the lever hoist.

Fig. 1



Standard Specifications

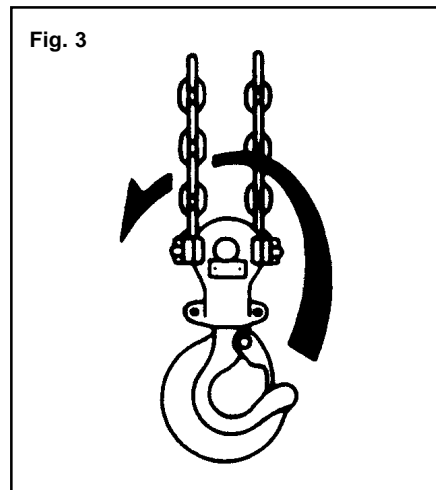
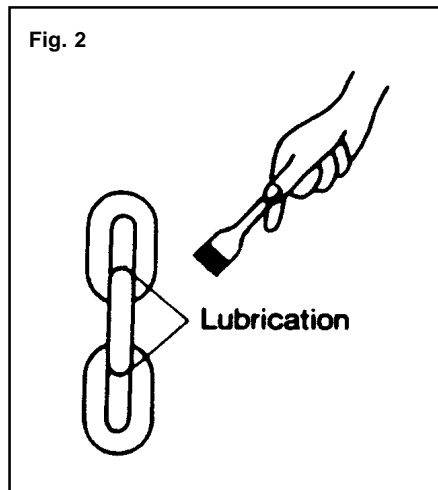
(Table 1)

| Rated Capacity (tons) | Standard Lift (ft) | Chain Dia. x Falls | Min. Distance Between Hooks (in) | Pull on lever to lift full load (lbs) | Length of operating handle (in) | Net Weight (lbs) | Test Load (tons) |
|-----------------------|--------------------|--------------------|----------------------------------|---------------------------------------|---------------------------------|------------------|------------------|
| 0.75 | 5 | ∅ 5.6mmx1 | 11 ⁵ / ₈ | 46 | 9 ¹ / ₄ | 13 | 1.125 |
| 1.5 | 5 | ∅ 7.1mmx1 | 14 ³¹ / ₃₂ | 55 | 13 ³ / ₄ | 21 | 2.25 |
| 3 | 5 | ∅ 9mmx1 | 16 ⁹ / ₁₆ | 77 | 13 ³ / ₄ | 33 | 4.5 |
| 6 | 5 | ∅ 9mmx2 | 22 ⁷ / ₁₆ | 84 | 13 ³ / ₄ | 63 | 9.0 |

The design, materials and specifications are subject to change for improvements without notice.

1 PREPARATION FOR USE

- A) Inspect carefully for any damage that may occur during shipping. Check for loose, missing, or damaged parts.
- B) Lubricate the load chain along the whole length with - machine oil - see Figure 2.
- C) Examine the load chain to ensure that there is no twist. When your lever hoist is a 6 ton that lifts on 2 falls of load chains, twists can arise from the bottom hook being accidentally turned over through the load chains - see Figure 3.
- D) Confirm that the supporting structure is strong enough to support the full rated capacity of the lever hoist with a generous factor of safety.



2 OPERATING INSTRUCTIONS

2-1 Hoisting (Pulling) and Lowering (Releasing)

- A) Hoisting (Pulling)
Set the selector lever to the "UP" position. Take up the slacked load chain by turning the guide handle clockwise. Next, manipulate the operating handle clockwise.
- B) Lowering (Releasing)
Set the selector lever to the "DOWN" position. Manipulate the operating handle counterclockwise. When there is no load on the lever hoist, the load chain can be slacked by turning the guide handle counterclockwise.

2-2

Free-Wheeling

This operation is for making quick large adjustments of the load chain length. Set the selector lever to the "N" position and pull the load chain out in the desired direction.

Free-chaining will not be possible during the following conditions—

- a. When the lever hoist is under a load.
- b. When the guide handle is in contact with something and not rotating freely.
- c. When the brake has locked from a large or abrupt load Turn the guide handle 45 degrees counterclockwise to unlock the brake.
- d. When the brake is locked
The brake can be unlocked by setting the selector lever to the "DOWN" position and manipulating the operating handle counterclockwise.

2-3

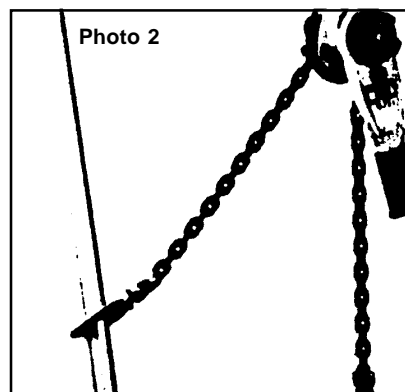
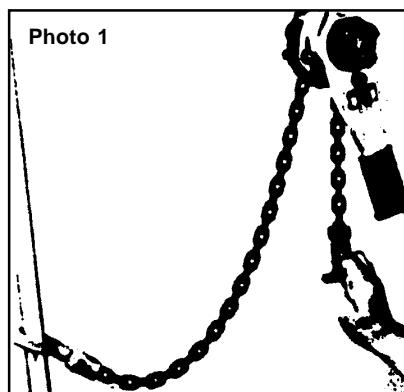
Resetting

The lever hoist will automatically change from the free-chaining condition to the brake locked condition when a load is applied.

Apply the load with one of the following two methods

- a. Turn the guide handle clockwise till the brake locks from the force of the load.
- b. Pull firmly on the stop grip till the brake locks from the force of the load - see photos 1 & 2.

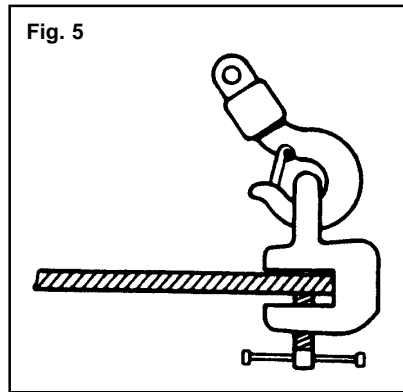
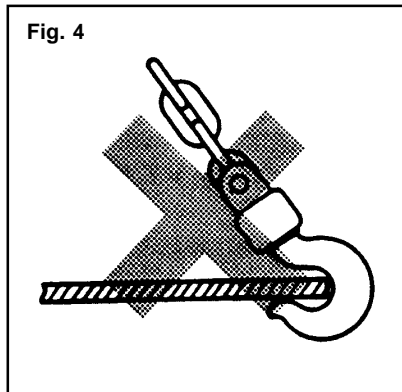
Next, turn the selector lever to the "UP" position and hoist or pull by manipulating the operating handle.



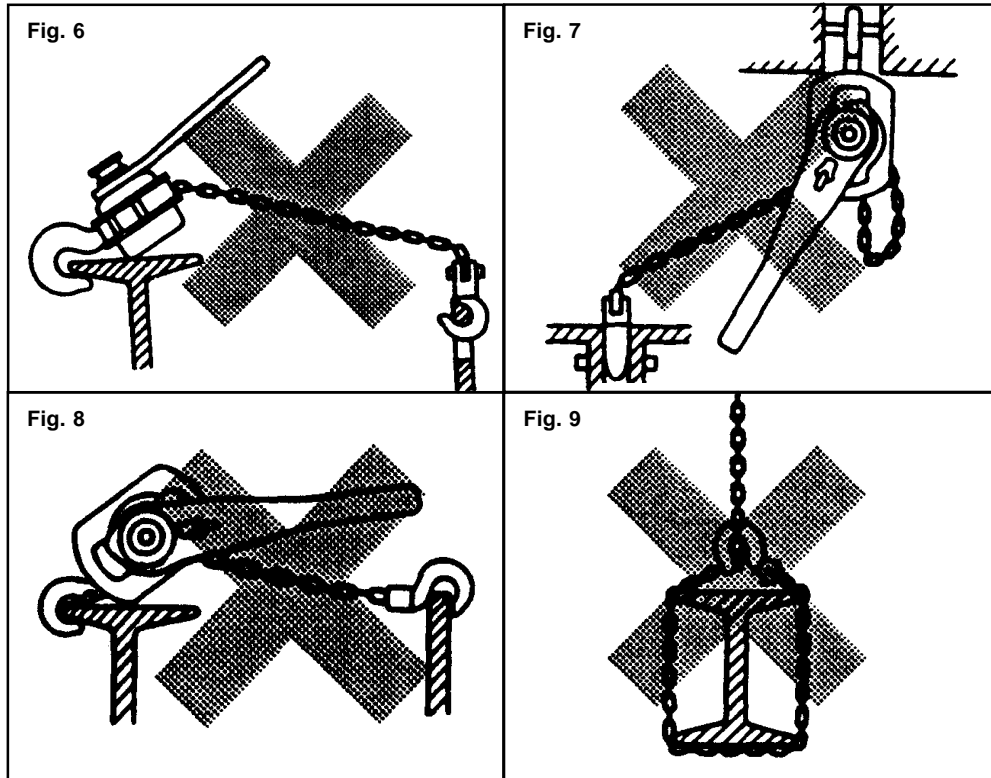
3 OPERATING PRECAUTIONS

- A) Keep the load within the rated capacity marked on the lever hoist. An excess load may lead to an accident. The lever hoist is overloaded when the pulling effort indicated in the standard specifications is exceeded - see Table 1.
- B) Before operating, lift and lower the load about 4" and test the brake system. Ineffective braking may lead to an accident.
- C) Loads must be lifted slowly as possible. Load swinging and abrupt shocks will impose on the lever hoist excessive burdens double or more the weight of the load.
- D) Extreme temperatures will affect the durability of the lever hoist. In subzero temperatures loads must be lifted and lowered very slowly and carefully.
- E) Hooking
The load must be applied squarely to the center of the hook and the hook must not come loose during operation. **Never use the hook directly on a load as shown in Figure 4.**

Use the correct attachments as shown in Figure 5.



Figures 6 through 9 show improper hooking methods, which, may cause the hook to elongate or bend. These hooking methods may also obstruct the load chain flow to the load sheave and prevent the lever hoist from operating properly. **In applications similar to Figures 6 through 9, be sure to use the correct slings and attachments to ensure safe operation and long life of the lever hoist.**



- F) Never run the chain out too far. When the lever hoist is run out beyond the range of lift, a dangerous excessive load will be imposed on the load chain, stop grip and gearings.
- G) The selector lever must be set to the "UP" position when the lever hoist is under a load during hoisting or pulling.
- H) Lifting a load with two lever hoists is not recommended.
If the job is unavoidable, keep the load well within the total rated capacity of the two lever hoists; lift with exceptional care while maintaining proper balance, angle and lifting speed.
- I) Do not throw or drop the lever hoist from high places; do not drag the lever hoist in transportation. Doing so may cause damage that may lead to an accident.

4 CARE AFTER USE

- A) Never leave or store the lever hoist with the brake system locked. Loosen the brake system by operating the lever hoist as if lowering a load.
- B) Always service and repair the lever hoist after use. Thoroughly clean the dust or if used in the rain, wipe off the dirt and moisture and lubricate the lever hoist to prevent rust. **IMPORTANT:** Do not forget to lubricate the load chain, rotation section of the bottom hook and the chain guides.
- C) Inspect the hooks and load chain for bends and any other types of defects. Also check to see if the hooks rotate. If any defect is found, replace the defective component before using the lever hoist again.

5 INSPECTION AND MAINTENANCE

The lever hoist is designed and made to withstand heavy-duty materials handling operations, but wear and damage are unavoidable after a long period of use and depending on the place and method of use. This is why we suggest that your company or workshop adopt a periodical inspection program for the lever hoist.

- A) Never leave the lever hoist in a damp environment or damp weather such as rain. Always store the lever hoist in a dry airy area.
- B) Proper lubrication will help lengthen the life of the lever hoist. Before storing check to see if the lever hoist is well lubricated. Be especially sure that the moving parts such as gears and bearings are well lubricated.

C) **Load chain and hooks**

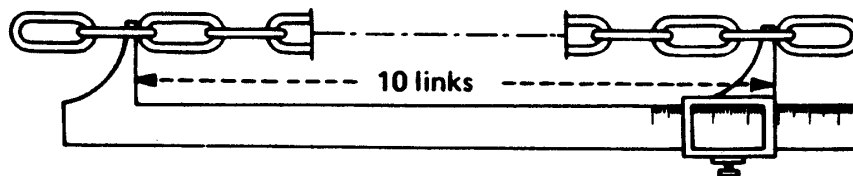
Note: The load chains and hooks are precisely heat-treated.

Never weld or heat-treat them again!

A. Load chain

Load chains worn-out or elongated beyond the permissible dimensions must be replaced at once. Replace the entire load chain immediately if even one link of the load chain is extensively worn-out, elongated or damaged.

Fig. 10



Load Chains Dimensions

| Capacity (tons) | Diameter (Ø mm) | Standard (in) | Limit (in) |
|-----------------|-----------------|---------------|------------|
| 0.75 | 5.6 | 6.732 | 6.866 |
| 1.5 | 7.1 | 8.346 | 8.511 |
| 3 & 6 | 9 | 10.748 | 10.964 |

(10 links dimensions)

B. Hooks

If the hook opening is elongated beyond the permissible dimension, the hook is dangerously deformed and must be replaced at once. No deformation of the hook will arise when the lever hoist is used and maintained properly.

Hook Dimensions (Opening with Safety Latch)

| Capacity (tons) | Standard C Size (in) | Limit *C (in) |
|-----------------|----------------------|---------------|
| 0.75 | $15/16$ | $1 1/16$ |
| 1.5 | $1 1/4$ | $1 7/16$ |
| 3 | $1 3/8$ | $1 9/16$ |
| 6 | $1 3/4$ | $1 15/16$ |

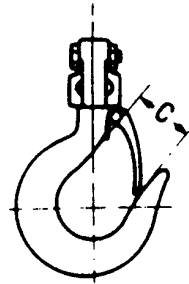


Fig. 11

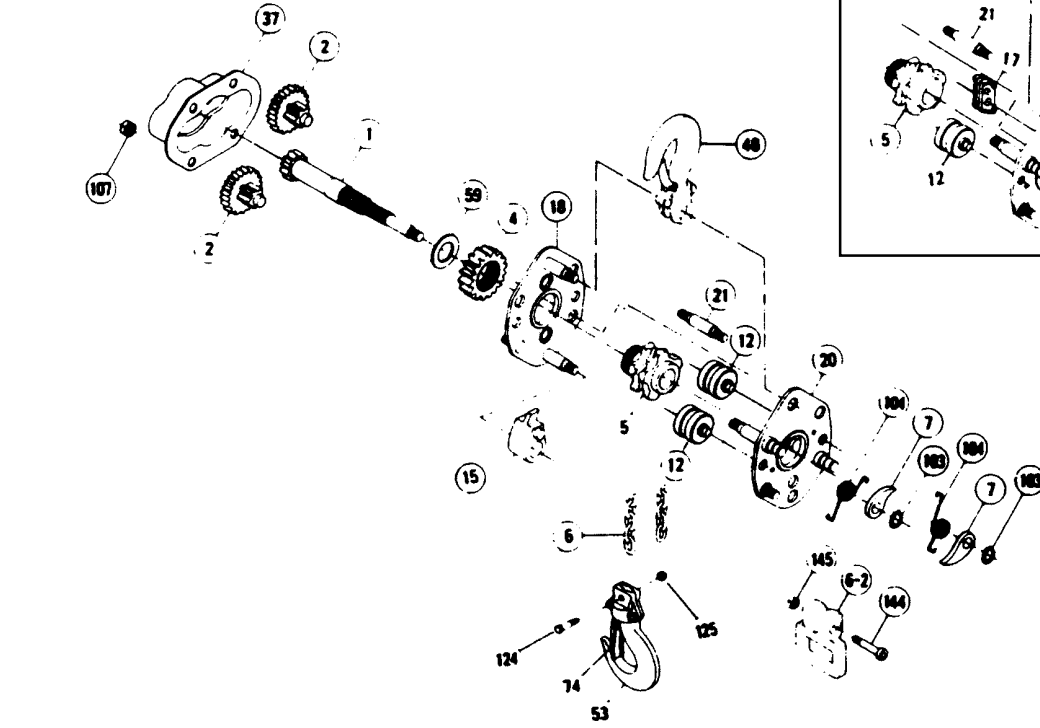
Note: Limit *C (in) are the maximum permissible dimensions of the hooks, which are about 10% wider than the standard hook openings.

TROUBLE-SHOOTING PROCEDURES

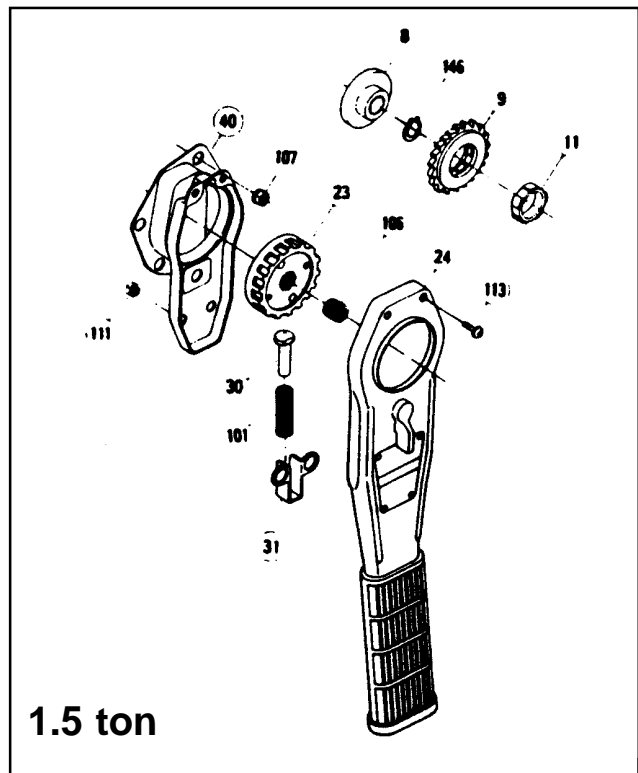
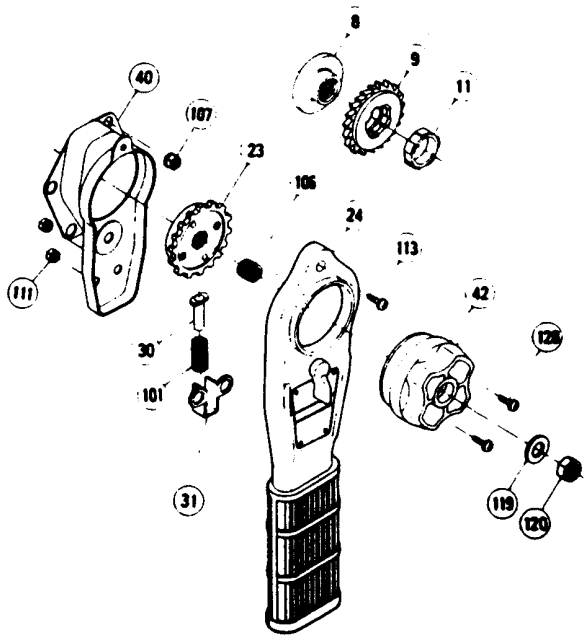
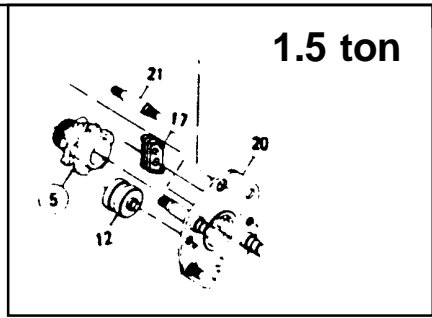
| Condition | Probable Cause | How to Repair |
|--|---|--|
| Slip caused by ineffective braking | <ol style="list-style-type: none"> 1. Worn-out friction discs 2. Excessive oil on the braking surface 3. Incorrect assembly of the brake system | <ol style="list-style-type: none"> 1. Replace with new ones 2. Disassemble and clean 3. Assemble orrectly |
| Load dropped while lowering | <ol style="list-style-type: none"> 1. Damaged friction discs 2. Foreign matters in the braking system | <ol style="list-style-type: none"> 1. Replace with new ones 2. Disassemble and clean |
| Jammed operating handle | <ol style="list-style-type: none"> 1. Over-tightening of the brake | <ol style="list-style-type: none"> 1. Operate the lever hoist as if lowering a load |
| Noises during hoisting and lowering operation | <ol style="list-style-type: none"> 1. Wear or deformation of the load chain and load sheave | <ol style="list-style-type: none"> 1. Replace with new parts |
| Operating handle becomes difficult to operate during lifting or lowering operation | <ol style="list-style-type: none"> 1. Over-hoisting or over-lowering 2. Twist in the load chain causing it to get caught between load sheave and load chain guide | <ol style="list-style-type: none"> 1. Operate the hoist in opposite direction. 2. Operate the hoist in the opposite direction and remove the twist from the load chain |

6 PARTS LIST

0.75 ton

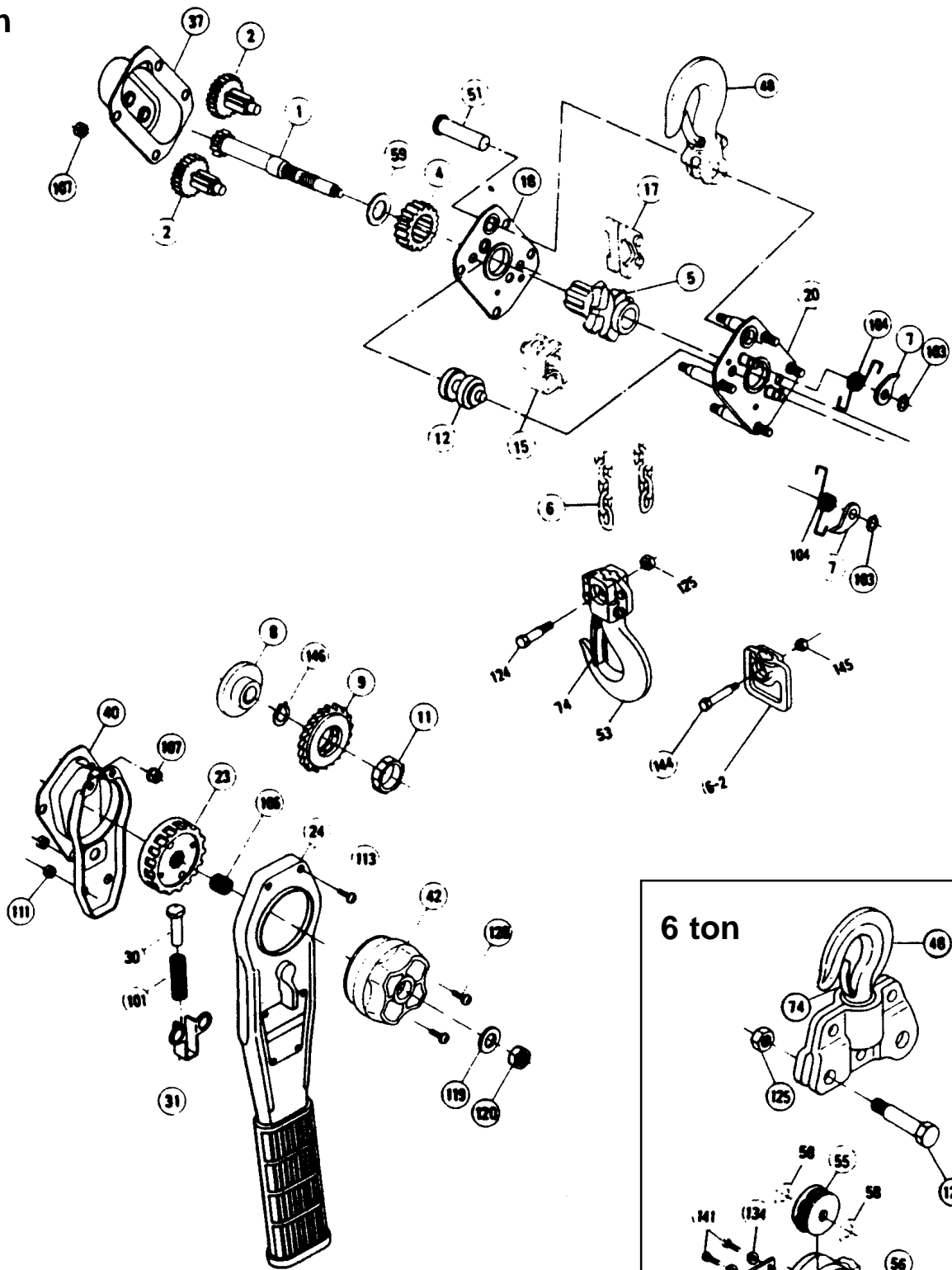


1.5 ton

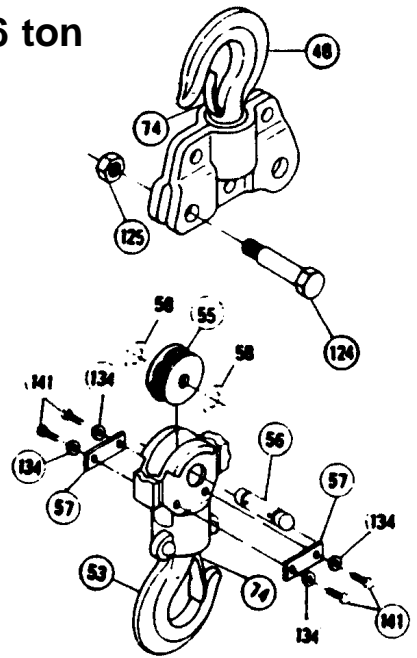


1.5 ton

3 ton



6 ton



| Index No. | Part Name | Qty | 0.75 ton Part No. | 1.5 ton Part No. | 3 ton Part No. | 6 ton Part No. |
|-----------|-------------------------|-------|-------------------|------------------|----------------|----------------|
| 1 | Pinion shaft | 1 | IRB4001 | KRB4001 | NRB4001 | |
| 2 | Pinion with pinion gear | 2 | IRB4002T | KRB4002T | NRB4002T | |
| 4 | Load gear | 1 | IRB4004 | KRB4004 | NRB4004 | |
| 5 | Load sheave | 1 | IRB4005 | KRB4005 | NRB4005 | |
| 6 | Load chain | 1 | T56 | V71 | V9 | |
| 6-2 | Stop grip | 1 | IRB40062 | KRB40062 | NRB40062 | |
| 7 | Pawl | 2 | IRB4007 | | NRB4007 | |
| 8 | Disc hub | 1 | IRB4008 | KRB4008 | | |
| 9 | Ratchet wheel | 1 set | IRB4009 | KRB4009 | | |
| 11 | Interlocking ring | 1 | IRB4011 | KRB4011 | | |
| 12 | Chain guide | () | IRB4012A(2) | KRB4012A(1) | NRB4012A(1) | |
| 15 | Stripper | 1 | IRB4015A | KRB4015A | NRB4015 | |
| 17 | Chain guide | 1 | _____ | KRB4017 | NRB4017 | |
| 18 | Gear-side plate | 1 | IRB4018A | KRB4018A | NRB4018 | |
| 20 | Handle-side plate | 1 | IRB4020A | KRB4020A | NRB4020 | |
| 21 | Stay bolt (D) | 1 | IRB4021 | KRB4021 | _____ | |
| 23 | Disc nut | 1 | IRB4023 | KRB4023 | | |
| 24 | Operating handle | 1 | IRB4024 | NRB4024 | | |
| 30 | Spring shaft | 1 | IRB4030 | IRB3030 | | |
| 31 | Shaft base | 1 | IRB4031 | IRB3031 | | |
| 37 | Gear cover | 1 | IRB4037 | KRB4037 | NRB4037 | |
| 40 | Ratchet cover | 1 | IRB4040T | KRB4040T | NRB4040T | |
| 42 | Guide handle | 1 | IRB4042 | | | |
| 48 | Top hook assembly | 1 | IRB4048U | KRB4048U | NRB4048U | QRB4048U |
| 51 | Yoke pin | 1 | _____ | NRB4051 | | |
| 53 | Bottom hook assembly | 1 | IRB4053U | KRB4053U | NRB4053U | QRB4053U |
| 55 | Chain wheel | 1 | _____ | QRB4055 | | |
| 56 | Wheel pin | 1 | _____ | QRB3056 | | |
| 57 | Key plate | 2 | _____ | QRB3079 | | |
| 58 | Wheel washer | 2 | _____ | HH4100083 | | |
| 59 | Pinion shaft washer | 1 | IRB4059 | | NRB4059 | |
| 74 | Safety latch assembly | 2 | JHH5074T | KHH5074T | | HH4060074T |
| 101 | Change-over spring | 1 | IRB4101 | IRB3116 | | |
| 103 | Snap ring | 2 | SRC51010 | | SRC51012 | |
| 104 | Pawl spring | 2 | IRB4104 | KRB4104 | KHH5010 | |
| 106 | Free-wheeling spring | 1 | IRB4106 | KRB4106 | NRB4106 | |
| 107 | Spring nut | 8 | HSNM8 | | HSNM10 | |
| 111 | Spring nut | 2 | HSNM6 | HSNM8 | | |
| 113 | Screw & spring washer | () | CMSM6 x 10S2 (1) | CMSM6 x 10S2 (2) | | |
| 119 | Flat washer | 1 | IRB4136 | | | |
| 120 | Lock nut | 1 | HNNM8 | | | |
| 124 | Chain fastening bolt | 1 | IRB4124 | KHH5048 | NRB4124 | QRB4124 |
| 125 | Lock nut | 1 | HUN1M6 | HUN1M8 | HUN1M10 | HNNM10 |
| 128 | Screw & spring washer | 2 | CMSM6 x 25S2 | | | |
| 134 | Spring washer for 141 | 4 | _____ | SWM8 | | |
| 141 | Hexagon bolt | 4 | _____ | HBMB x 16B | | |
| 144 | Socket bolt | 1 | CBM6 x 35 | CBM8 x 50 | LHH5048 | |
| 145 | Lock nut | 1 | HNNM6 | HNNM8 | HNNM8 | |
| 146 | Snap ring | 1 | _____ | SRC51014 | | |

DO'S AND DO NOT'S

Manually Lever Operated Chain Hoists

The following warnings and operating practices are intended to avoid unsafe hoisting practices which might lead to personal injury or property damage.

These recommendations apply to all manually lever operated Chain hoists used for lifting, pulling, and tensioning type applications.

WARNING: TO AVOID INJURY

1. **DO** read the Hoist Manufacturer's Operating and Maintenance Instructions.
2. **DO** be familiar with hoist operating controls, procedures, and warnings.
3. **DO** make sure that the unit is securely attached to a suitable support before applying load.
4. **DO** maintain firm footing or be otherwise secured when operating unit.
5. **DO** make sure that load slings or other approved sling attachments are properly sized and seated in the hook saddle.
6. **DO** make sure the hook latches, if used, are closed and not supporting any part of the load.
7. **DO** make sure that load is free to move and will clear all obstructions.
8. **DO** take up slack carefully, check load balance, move the load a few inches, and check load holding action before continuing.
9. **DO** make sure all persons stay clear of the supported load.
10. **DO** avoid swinging of load or load hook.
11. **DO** protect load chain from weld spatter or other damaging contaminants.
12. **DO** avoid lever "fly-back" by keeping a firm grip on the lever until operating stroke is completed and the lever is at rest.
13. **DO** promptly report any malfunction, unusual performance, or damage of the unit.
14. **DO** inspect unit regularly. replace damaged or worn parts, and keep appropriate records of maintenance.
15. **DO** use the Hoist Manufacturer's recommended parts when repairing unit.
16. **DO** use hook latches wherever possible.
17. **DO** apply lubricant to load chain as recommended by the Hoist Manufacturer.
18. **DO NOT** lift or pull more than rated load.
19. **DO NOT** use the hoist load limiting device to measure the load.
20. **DO NOT** use damaged unit or unit that is not working correctly.
21. **DO NOT** use unit with twisted, kinked, damaged or worn chain.
22. **DO NOT** apply a load unless chain is properly seated in chain wheel(s) or sprocket(s).
23. **DO NOT** use load chain as a sling or wrap chain around a load.
24. **DO NOT** apply a load if any binding prevents equal loading on all load supporting chains.
25. **DO NOT** apply the load to the tip of the hook.
26. **DO NOT** operate unit when it is restricted from adjusting itself to form a straight line with the direction of loading.
27. **DO NOT** operate except with hand power.
28. **DO NOT** permit more than one operator to pull on lever at the same time.
29. **DO NOT** operate with any lever extension (cheater bar).
30. **DO NOT** allow your attention to be diverted from operating the unit.
31. **DO NOT** operate unit beyond limits of load chain travel.
32. **DO NOT** attempt to "free chain" unit with any load applied.
33. **DO NOT** use hoist to lift, support or transport people.
34. **DO NOT** lift loads over people.
35. **DO NOT** leave a load supported by the unit unattended unless specific precautions have been taken.
36. **DO NOT** allow unit to be subjected to sharp contact with other units, structures or objects through misuse.
37. **DO NOT** allow the chain or hook to be used as a ground for welding.
38. **DO NOT** allow the chain or hook to be touched by a live welding electrode.
39. **DO NOT** remove or obscure the warnings on the unit.
40. **DO NOT** adjust or repair a unit unless qualified to perform such maintenance.
41. **DO NOT** attempt to lengthen the load chain or repair damaged load chain.

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