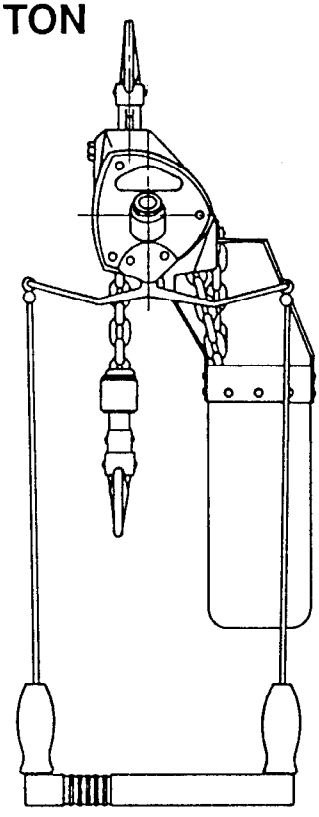
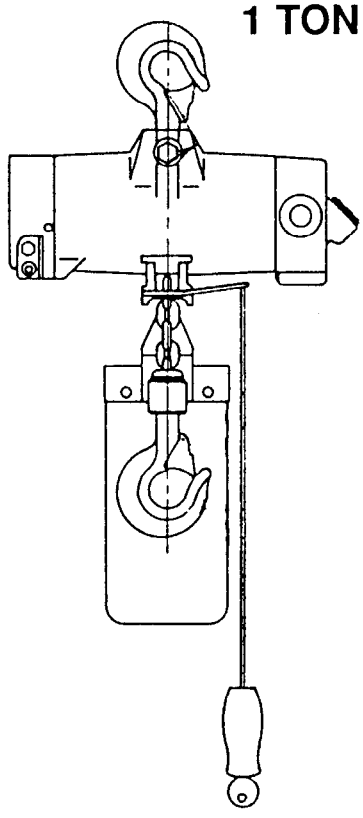
Form MHD56025
Edition 2
August 1990
71057392

# OPERATION AND MAINTENANCE MANUAL
## For
## AIR CHAIN HOIST

**MODEL ACH005**
**1/2 TON**



**MODEL ACH010**
**1 TON**



**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 (ANSI B30.16) and any other applicable safety codes and regulations.

Refer All Communications to the Nearest
Ingersoll-Rand Material Handling Products
Office or Distributor.



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 the best of our knowledge, INGERSOLL-RAND Material Handling hoists are manufactured in accordance with the latest standards in effect at time of manufacture.

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.

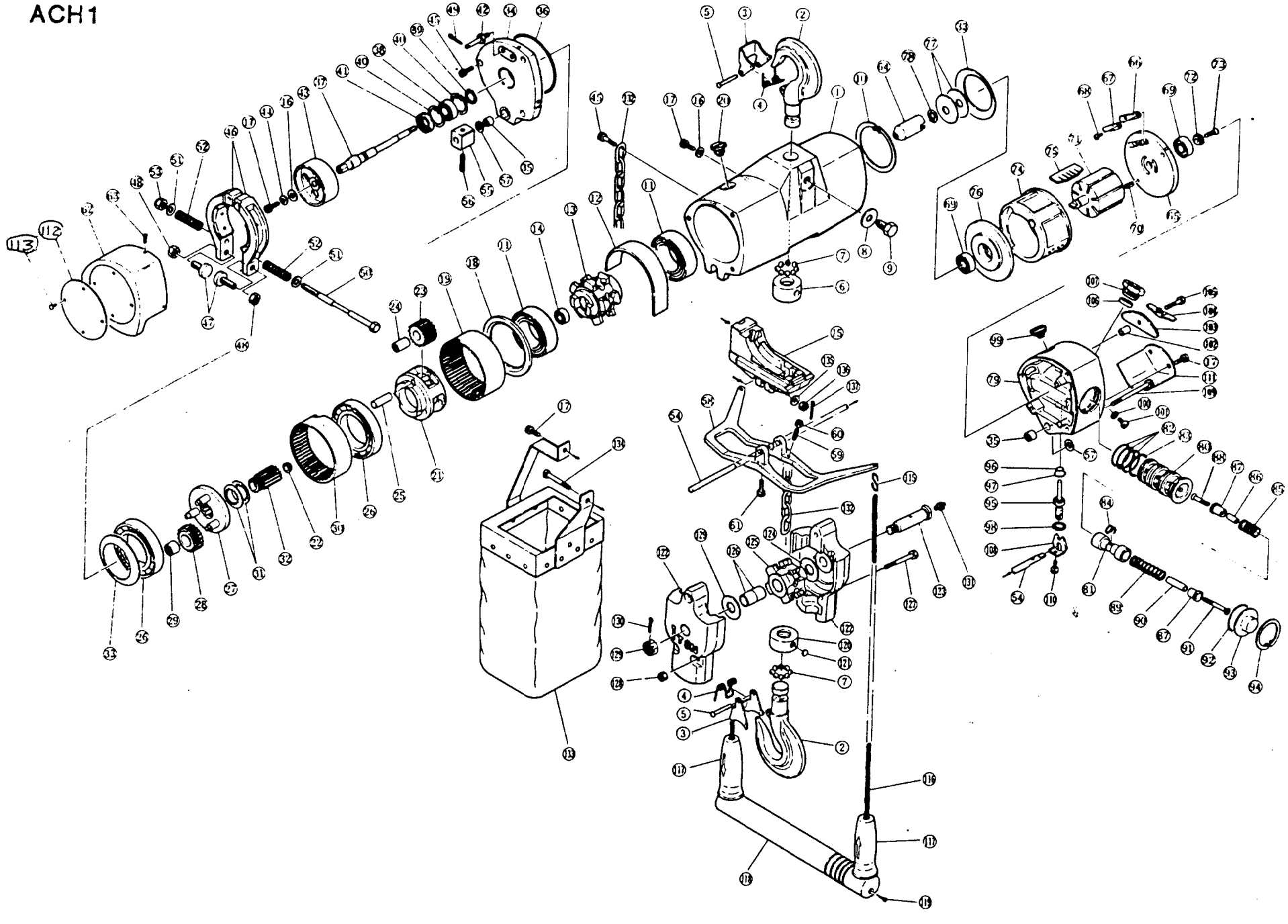
**NOTICE**

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

## SAFETY INSTRUCTIONS

1. Only allow qualified people (trained in safety and operation) to operate the hoist.
2. Only operate a hoist if you are physically fit.
3. When an "DO NOT OPERATE" sign is placed on the hoist controls, do not operate the hoist until the sign has been removed by designated personnel.
4. 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.
7. Lubricate the hoist regularly.
8. Do not use hoist if safety latch on a hook has been sprung or broken.
9. Check that the safety 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 of which have 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. After use, properly secure hoist and loads.

# ACH1

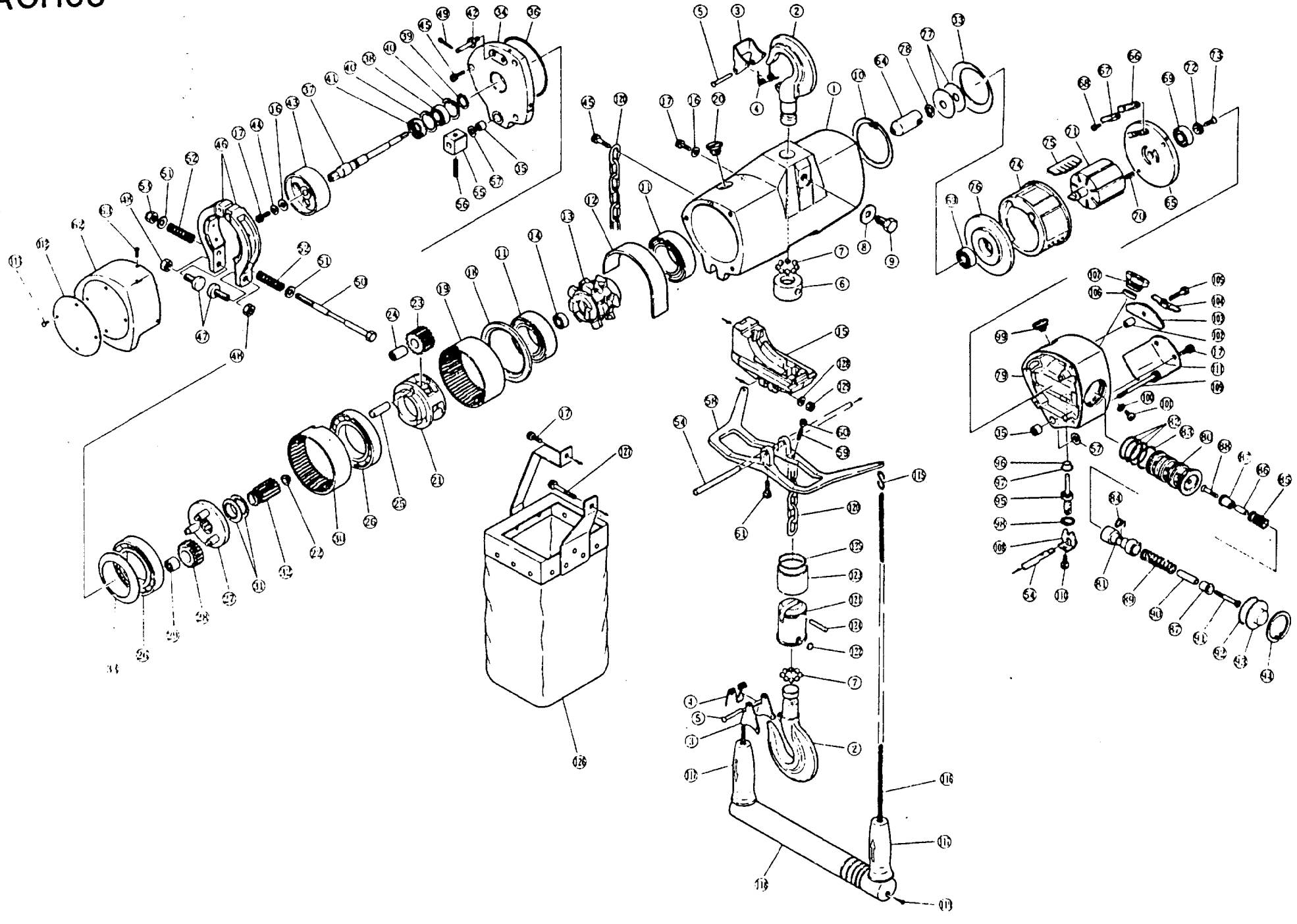


ACH1 AIR CHAIN HOIST PARTS LIST

| Item No. | Description of Part | Total Qty. | Part No. |
|---|---|---|---|
| 1 | Casing | 1 | 5372594 |
| 2 | Hook | 2 | 5372716 |
| 3 | Plate | 2 | |
| 4 | Spring | 2 | |
| 5 | Rivet | 2 | |
| 6 | Hook Holder | 1 | 5372717 |
| 7 | Steel Ball | 16 | 5372597 |
| 8 | Lock Washer | 1 | 5572598 |
| 9 | Capscrew | 1 | 5372599 |
| 10 | Retaining Ring | 1 | 5372600 |
| 11 | Bearing | 2 | 5372601 |
| 12 | Chain Guide | 1 | 5372602 |
| 13 | Chain Wheel | 1 | 5372603 |
| 14 | Bearing | 1 | 5372604 |
| 15 | Chain Guide | 1 | 5372605 |
| 16 | Washer | 2 | 5372606 |
| 17 | Capscrew | 5 | 5372607 |
| 18 | Washer | 1 | 5372608 |
| 19 | Internal Gear | 1 | 5372609 |
| 20 | Lock Screw | 1 | 5372610 |
| 21 | Planet Shaft | 1 | 5372611 |
| 22 | Bushing | 1 | 5372612 |
| 23 | Gear Wheel | 3 | 5372613 |
| 24 | Bearing | 3 | 5372614 |
| 25 | Shaft | 3 | 5372615 |
| 26 | Bearing | 2 | 5372616 |
| 27 | Planet Shaft Set | 1 | 5372617 |
| 28 | Gear Wheel | 3 | 5372618 |
| 29 | Bearing | 3 | 5372619 |
| 30 | Internal Gear | 1 | 5372620 |
| 31 | Coned Disc Spring | 2 | 5372621 |
| 32 | Gear Wheel | 1 | 5372622 |
| 33 | Coned Disc Spring | 2 | 5372623 |
| 34 | Cover | 1 | 5372624 |
| 35 | Bearing | 2 | 5372625 |
| 36 | 'O' Ring | 1 | 5372626 |
| 37 | Shaft | 1 | 5372627 |
| 38 | Bearing | 1 | 5372628 |
| 39 | Retaining Ring | 1 | 5372629 |
| 40 | Retaining Ring | 2 | 5372630 |
| 41 | Oil Seal | 1 | 5372631 |
| 42 | Brake Shoe Pin | 2 | 5372632 |
| 43 | Brake Wheel | 1 | 5372633 |
| 44 | Spring Washer | 1 | 5372634 |
| 45 | Capscrew | 4 | 5372635 |
| 46 | Brake Shoe Set | 2 | 5372636 |
| 47 | Brake Adjuster | 2 | 5372637 |
| 48 | Nut | 2 | 5372638 |
| 49 | Pin | 2 | 5372639 |
| 50 | Capscrew | 1 | 5372640 |
| 51 | Washer | 2 | 5372641 |
| 52 | Brake Spring | 2 | 5372642 |
| 53 | Nut | 1 | 5372643 |
| 54 | Shaft | 1 | 5372644 |
| 55 | Brake Cam | 1 | 5372645 |
| 56 | Pin | 1 | 5372646 |
| 57 | Washer | 2 | 5372647 |
| 58 | Valve Lever | 1 | 5372648 |
| 59 | Setscrew | 2 | 5372649 |
| 60 | Nut | 2 | 5372650 |
| 61 | Capscrew | 1 | 5372651 |
| 62 | Rear Cover | 1 | 5372652 |
| 63 | Screw | 3 | 5372653 |
| 64 | Coupling | 1 | 5372654 |
| 65 | End Plate | 1 | 5372655 |
| 66 | Valve Plate | 1 | 5372656 |
| 67 | Support | 1 | 5372657 |
| 68 | Screw | 1 | 5372658 |
| 69 | Bearing | 2 | 5372659 |

| Item No. | Description of Part | Total Qty. | Part No. |
|---|---|---|---|
| 70 | Pin | 1 | 5372660 |
| 71 | Rotor | 1 | 5372661 |
| 72 | Washer | 1 | 5372662 |
| 73 | Screw | 1 | 5372663 |
| 74 | Cylinder | 1 | 5372664 |
| 75 | Vane | 7 | 5372665 |
| 76 | End Plate | 1 | 5372666 |
| 77 | Coned Disc Spring | 2 | 5372667 |
| 78 | Retaining Ring | 1 | 5372668 |
| 79 | Valve Housing | 1 | 5372669 |
| 80 | Liner (incls. Item 81) | 1 | 5372670 |
| 81 | Valve Cone | 1 | |
| 82 | 'O' Ring | 3 | 5372671 |
| 83 | 'O' Ring | 1 | 5372672 |
| 84 | Spring | 1 | 5372673 |
| 85 | Spring | 1 | 5372674 |
| 86 | Spacer | 1 | 5372675 |
| 87 | Sleeve | 2 | 5372676 |
| 88 | Screw | 1 | 5372677 |
| 89 | Spring | 1 | 5372678 |
| 90 | Spacer | 1 | 5372679 |
| 91 | Screw | 1 | 5372680 |
| 92 | 'O' Ring | 1 | 5372681 |
| 93 | Cover | 1 | 5372682 |
| 94 | Retaining Ring | 1 | 5372683 |
| 95 | Lever Set | 1 | 5372684 |
| 96 | 'O' Ring | 1 | 5372706 |
| 97 | 'O' Ring | 1 | 5372685 |
| 98 | Retaining Ring | 1 | 5372686 |
| 99 | Plug | 1 | |
| 100 | Seal | 1 | 5373084 |
| 101 | Screw | 1 | 5372688 |
| 102 | Spacer | 1 | 5372689 |
| 103 | Silencer | 1 | 5372690 |
| 104 | Support | 1 | 5372691 |
| 105 | Capscrew | 1 | 5372692 |
| 106 | Strainer | 1 | 5372693 |
| 107 | Adapter | 1 | 5372694 |
| 108 | Angle Piece | 1 | 5372695 |
| 109 | Capscrew | 3 | 5372696 |
| 110 | Capscrew | 1 | 5372697 |
| 111 | Cover | 1 | 5372698 |
| 112 | Name Plate | 1 | 5372699 |
| 113 | Drive Screw | 4 | 5372700 |
| 115 | S-Hook | 2 | 5372701 |
| 116 | Chain | 2 | 5372702 |
| 117 | Handle | 1 | 5372703 |
| 118 | Handle Bar | 1 | 5372704 |
| 119 | Screw | 2 | 5372705 |
| 120 | Hook Holder | 1 | 5372718 |
| 121 | Washer | 1 | 5372707 |
| 122 | Hook Case | 1 | 5372719 |
| 123 | Shaft | 1 | 5372720 |
| 124 | Washer | 2 | 5372721 |
| 125 | Idle Chain Wheel | 1 | 5372722 |
| 126 | Bearing | 2 | 5372723 |
| 127 | Capscrew | 3 | 5372724 |
| 128 | Nut | 3 | 5372725 |
| 129 | Nut | 1 | 5372726 |
| 130 | Pin | 1 | 5372727 |
| 131 | Grease Nipple | 1 | 5372728 |
| 132 | Chain | 1 | LCES005 |
| 133 | Chain Bucket (10 ft) | 1 | 5372712 |
| 133A | Chain Bucket (20 ft) | 1 | 5372729 |
| 134 | Pin | 1 | 5372730 |
| 135 | Washer | 1 | 5372731 |
| 136 | Nut | 1 | 5372732 |
| 137 | Pin | 1 | 5372733 |
| | | | |

# ACH05



ACH05 AIR CHAIN HOIST PARTS LIST

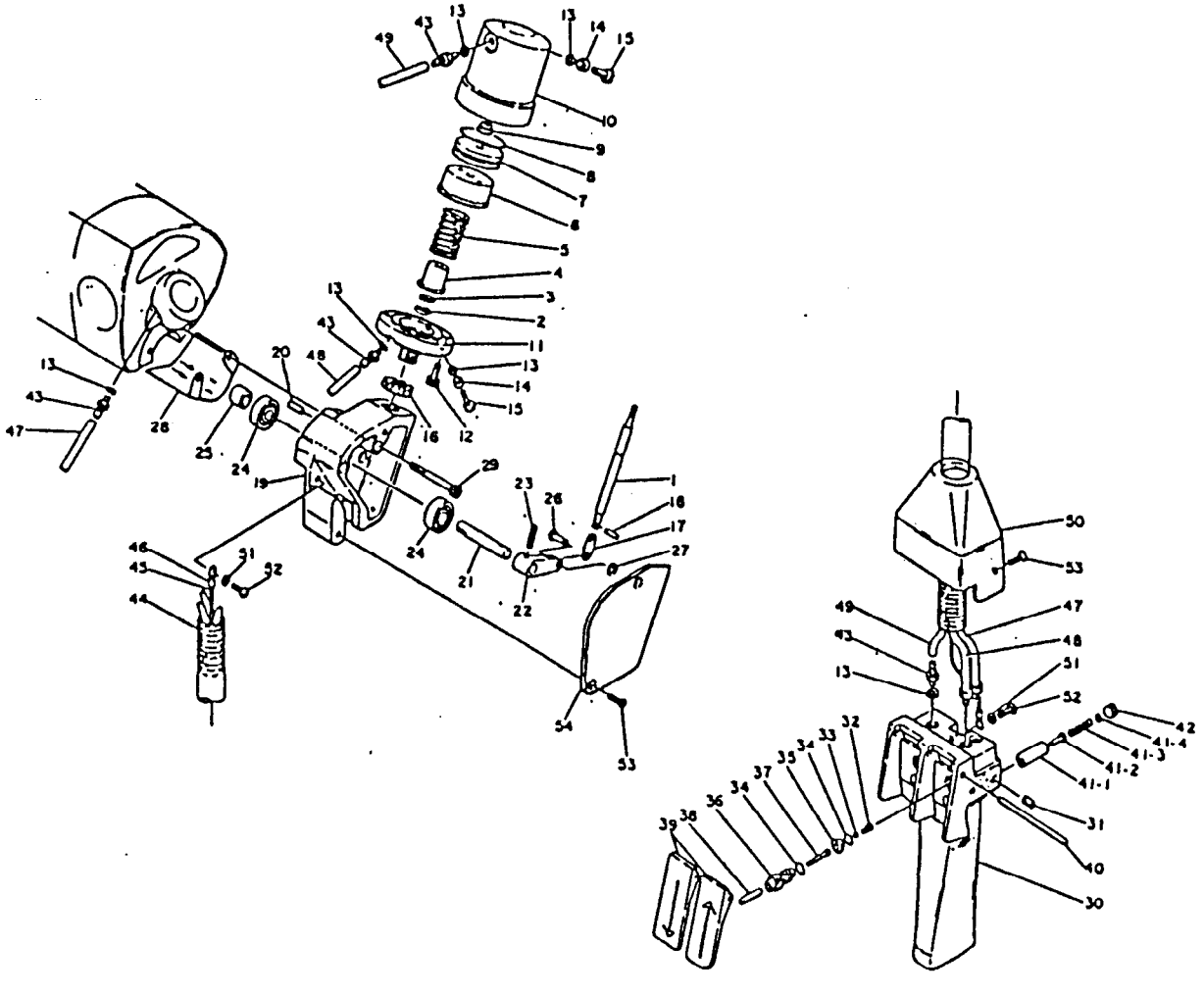
| Item No. | Description of Part | Total Qty. | Part No. |
|---|---|---|---|
| 1 | Casing | 1 | 5372594 |
| 2 | Hook | 2 | 5372595 |
| 3 | Plate | 2 | |
| 4 | Spring | 2 | |
| 5 | Rivet | 2 | |
| 6 | Hook Holder | 1 | 5372596 |
| 7 | Steel Ball | 16 | 5372597 |
| 8 | Lock Washer | 1 | 5572598 |
| 9 | Capscrew | 1 | 5372599 |
| 10 | Retaining Ring | 1 | 5372600 |
| 11 | Bearing | 2 | 5372601 |
| 12 | Chain Guide | 1 | 5372602 |
| 13 | Chain Wheel | 1 | 5372603 |
| 14 | Bearing | 1 | 5372604 |
| 15 | Chain Guide | 1 | 5372605 |
| 16 | Washer | 2 | 5372606 |
| 17 | Capscrew | 5 | 5372607 |
| 18 | Washer | 1 | 5372608 |
| 19 | Internal Gear | 1 | 5372609 |
| 20 | Lock Screw | 1 | 5372610 |
| 21 | Planet Shaft | 1 | 5372611 |
| 22 | Bushing | 1 | 5372612 |
| 23 | Gear Wheel | 3 | 5372613 |
| 24 | Bearing | 3 | 5372614 |
| 25 | Shaft | 3 | 5372615 |
| 26 | Bearing | 2 | 5372616 |
| 27 | Planet Shaft Set | 1 | 5372617 |
| 28 | Gear Wheel | 3 | 5372618 |
| 29 | Bearing | 3 | 5372619 |
| 30 | Internal Gear | 1 | 5372620 |
| 31 | Coned Disc Spring | 2 | 5372621 |
| 32 | Gear Wheel | 1 | 5372622 |
| 33 | Coned Disc Spring | 2 | 5372623 |
| 34 | Cover | 1 | 5372624 |
| 35 | Bearing | 2 | 5372625 |
| 36 | 'O' Ring | 1 | 5372626 |
| 37 | Shaft | 1 | 5372627 |
| 38 | Bearing | 1 | 5372628 |
| 39 | Retaining Ring | 1 | 5372629 |
| 40 | Retaining Ring | 2 | 5372630 |
| 41 | Oil Seal | 1 | 5372631 |
| 42 | Brake Shoe Pin | 2 | 5372632 |
| 43 | Brake Wheel | 1 | 5372633 |
| 44 | Spring Washer | 1 | 5372634 |
| 45 | Capscrew | 4 | 5372635 |
| 46 | Brake Shoe Set | 2 | 5372636 |
| 47 | Brake Adjuster | 2 | 5372637 |
| 48 | Nut | 2 | 5372638 |
| 49 | Pin | 2 | 5372639 |
| 50 | Capscrew | 1 | 5372640 |
| 51 | Washer | 2 | 5372641 |
| 52 | Brake Spring | 2 | 5372642 |
| 53 | Nut | 1 | 5372643 |
| 54 | Shaft | 1 | 5372644 |
| 55 | Brake Cam | 1 | 5372645 |
| 56 | Pin | 1 | 5372646 |
| 57 | Washer | 2 | 5372647 |
| 58 | Valve Lever | 1 | 5372648 |
| 59 | Setscrew | 2 | 5372649 |
| 60 | Nut | 2 | 5372650 |
| 61 | Capscrew | 1 | 5372651 |
| 62 | Rear Cover | 1 | 5372652 |
| 63 | Screw | 3 | 5372653 |
| 64 | Coupling | 1 | 5372654 |
| 65 | End Plate | 1 | 5372655 |

| Item No. | Description of Part | Total Qty. | Part No. |
|---|---|---|---|
| 66 | Valve Plate | 1 | 5372656 |
| 67 | Support | 1 | 5372657 |
| 68 | Screw | 1 | 5372658 |
| 69 | Bearing | 2 | 5372659 |
| 70 | Pin | 1 | 5372660 |
| 71 | Rotor | 1 | 5372661 |
| 72 | Washer | 1 | 5372662 |
| 73 | Screw | 1 | 5372663 |
| 74 | Cylinder | 1 | 5372664 |
| 75 | Vane | 7 | 5372665 |
| 76 | End Plate | 1 | 5372666 |
| 77 | Coned Disc Spring | 2 | 5372667 |
| 78 | Retaining Ring | 1 | 5372668 |
| 79 | Valve Housing | 1 | 5372669 |
| 80 | Liner (incls. Item 81) | 1 | 5372670 |
| 81 | Valve Cone | 1 | |
| 82 | 'O' Ring | 3 | 5372671 |
| 83 | 'O' Ring | 1 | 5372672 |
| 84 | Spring | 1 | 5372673 |
| 85 | Spring | 1 | 5372674 |
| 86 | Spacer | 1 | 5372675 |
| 87 | Sleeve | 2 | 5372676 |
| 88 | Screw | 1 | 5372677 |
| 89 | Spring | 1 | 5372678 |
| 90 | Spacer | 1 | 5372679 |
| 91 | Screw | 1 | 5372680 |
| 92 | 'O' Ring | 1 | 5372681 |
| 93 | Cover | 1 | 5372682 |
| 94 | Retaining Ring | 1 | 5372683 |
| 95 | Lever Set | 1 | 5372684 |
| 96 | 'O' Ring | 1 | 5372706 |
| 97 | 'O' Ring | 1 | 5372685 |
| 98 | Retaining Ring | 1 | 5372686 |
| 99 | Plug | 1 | 5372687 |
| 100 | Seal | 1 | 5373084 |
| 101 | Screw | 1 | 5372688 |
| 102 | Spacer | 1 | 5372689 |
| 103 | Silencer | 1 | 5372690 |
| 104 | Support | 1 | 5372691 |
| 105 | Capscrew | 1 | 5372692 |
| 106 | Strainer | 1 | 5372693 |
| 107 | Adapter | 1 | 5372694 |
| 108 | Angle Piece | 1 | 5372695 |
| 109 | Capscrew | 3 | 5372696 |
| 110 | Capscrew | 1 | 5372697 |
| 111 | Cover | 1 | 5372698 |
| 112 | Name Plate | 1 | 5372699 |
| 113 | Drive Screw | 4 | 5372700 |
| 115 | S-Hook | 2 | 5372701 |
| 116 | Chain | 2 | 5372702 |
| 117 | Handle | 1 | 5372703 |
| 118 | Handle Bar | 1 | 5372704 |
| 119 | Screw | 2 | 5372705 |
| 120 | Chain | 1 | LCES005 |
| 121 | Hook Holder | 1 | 5372707 |
| 122 | Washer | 1 | 5372708 |
| 123 | Sleeve | 1 | 5372709 |
| 124 | Pin | 1 | 5372710 |
| 125 | Locking Ring | 1 | 5372711 |
| 126 | Chain Bucket (10 ft) | 1 | 5372712 |
| 126A | Chain Bucket (40 ft) | 1 | 5372729 |
| 127 | Capscrew | 1 | 5372713 |
| 128 | Lock Washer | 1 | 5372714 |
| 129 | Nut | 1 | 5372715 |
| | | | |

ACH AIR CHAIN HOIST PENDANT ASSEMBLY PARTS LIST

| Item No. | Description of Part | Total Qty. | Part No. |
|---|---|---|---|
| 1 | Piston Rod | 1 | 5372734 |
| 2 | Retaining Ring | 1 | 5372735 |
| 3 | Ring | 1 | 5372736 |
| 4 | Spacer | 1 | 5372737 |
| 5 | Spring | 1 | 5372738 |
| 6 | Spacer | 1 | 5372739 |
| 7 | Piston | 1 | 5372740 |
| 8 | 'O' Ring | 1 | 5372741 |
| 9 | Locknut | 1 | 5372742 |
| 10 | Cylinder | 1 | 5372743 |
| 11 | Cylinder Cover | 1 | 5372744 |
| 12 | Capscrew | 4 | 5372745 |
| 13 | Seal | 8 | 5373084 |
| 14 | Silencer | 2 | 5372746 |
| 15 | Capscrew | 2 | 5372747 |
| 16 | Nut | 2 | 5372748 |
| 17 | Link | 5 | 5372749 |
| 18 | Pin | 1 | 5372750 |
| 19 | Cylinder Holder | 1 | 5372751 |
| 20 | Pin | 1 | 5372752 |
| 21 | Spindle | 1 | 5372753 |
| 22 | Arm | 1 | 5372754 |
| 23 | Pin | 1 | 5372755 |
| 24 | Bearing | 2 | 5372756 |
| 25 | Sleeve | 1 | 5372757 |
| 26 | Pin | 1 | 5372758 |
| 27 | Retaining Ring | 1 | 5372759 |
| 28 | Cover | 1 | 5372760 |

| Item No. | Description of Part | Total Qty. | Part No. |
|---|---|---|---|
| 29 | Capscrew | 2 | 5372761 |
| 30 | Valve Housing | 1 | 5372762 |
| 31 | Setscrew | 1 | 5372763 |
| 32 | Valve Spring | 2 | 5372764 |
| 33 | Steel Ball | 2 | 5372765 |
| 34 | 'O' Ring | 4 | 5372706 |
| 35 | Seat | 2 | 5372766 |
| 36 | Liner | 2 | 5372767 |
| 37 | Valve Pin | 2 | 5372768 |
| 38 | Valve Knob | 2 | 5372769 |
| 39 | Push Button | 1 | 5372770 |
| 40 | Pin | 1 | 5372771 |
| 41 | Bumping Spool | 2 | 5372772 |
| 42 | Setscrew | 2 | 5372773 |
| 43 | Nipple | 6 | 5372774 |
|  | Tube Assembly | 1 | 5372775 |
| 44 | Flexible Tube | 1 | 5373071 |
| 45 | Wire Rope | 1 | 5373072 |
| 46 | Wire Lock | 2 | 5373073 |
| 47 | Nylon Tube (Black) | 1 | 5373074 |
| 48 | Nylon Tube (Red) | 1 | 5373075 |
| 49 | Nylon Tube (Blue) | 1 | 5373076 |
| 50 | Valve Cover | 1 | 5372776 |
| 51 | Washer | 2 | 5372777 |
| 52 | Screw | 2 | 5372653 |
| 53 | Screw | 4 | 5372778 |
| 54 | Cover | 1 | 5372656 |
|  |  |  |  |



# I . SPECIFICATIONS

| Model | Chain Type | Capacity lbs | Air Pressure PSI | Lifting Speed (at rated load) FPM | Air Comsumption CFM | Lift ft | Air Inlet Thread | Weight (incl. chain) (about) lbs |
|---|---|---|---|---|---|---|---|---|
| ACH05 | Link | 1100 | 60<br>75<br>90 | 25<br>33<br>41 | 32<br>46<br>56 | 10 | PT1/2 | 37 |
| ACH1 | Link | 2200 | 60<br>75<br>90 | 11<br>15<br>19 | 32<br>46<br>56 | 10 | PT1/2 | 48 |

# II . CONSTRUCTION

## 1. Main Valve

Main valve comprises built-in spring-return type spool valve of direct drive, 3-positions, 5-ports. The main valve is operated by valve lever which is connected with spool (valve cone). This makes for easy and smooth start and excellent inching characteristics.

## 2. Vane Motor

The motor design is a concentrically positioned rotor in a cylinder which is not completely cylindrical. This means that the vanes are working between air inlet and outlet on a constant radius and are therefore exposed to constant force. The vanes are also forced against the cylinder by air pressure. This results is excellent starting and creeping characteristics. The rotor is located axially. There is no unnecessary friction which would result in uneven running and poor control characteristics. The exact and permanent centering of the rotor greatly increases the lift of the motor.

## 3. Gears

The hoists are fitted with twin planetary gears with a high ratio — this means good control characteristics and high torque. The gears are dimensioned to withstand continuous running at full load. All meshing components are hardened and all rotating components are supported by ball or needle bearings. The gears are permanently lubricated for long, service-free life.

## 4. Brake

The brake is only active when the hoist is lowering, thus no extra forces are required to release the brake for lifting. Conventional brakes usually have to be released on starting, and this may lead to the load dropping slightly before the motor is able to start hoisting. The brake holds the load reliably when the valve lever is released and locks the load automatically should a failure on the drive side or in the air supply occur. It is easy to detach the brake for inspection as it is installed at the tail end.

### 5. Chain & Stopper (Protective Devices for over-lifting and over-lowering)

Designed to move the valve lever to the neutral position (position of no operation) by chain when over-lifting and/or over-lowering, it prevents trouble caused by over-lowering and unnecessary loading due to over-lifting.

**⚠WARNING** FREQUENT ACTUATION OF THE OVER-LIFTING/LOWERING PROTECTIVE DEVICE IS TO BE AVOIDED.

### 6. Hooks

The suspension and load hooks are drop-forged and heat-treated. Both hooks are equipped with safety latches. It allows full 360° rotation.

### 7. Chain Bucket (for models ACH05 AND ACH1)

Chain Buckets are provided according to operational lifts. It is convenient for operation and movement of hoists.

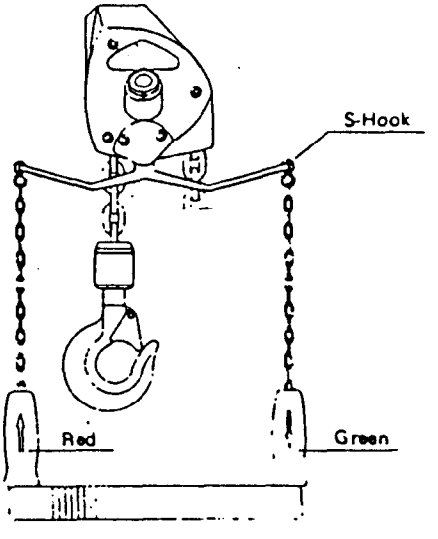
## III. OPERATING PROCEDURE

To ensure correct operating procedures on hoists please read the following instructions.

### 1. Preparing the hoist for use

The air hoists are furnished with a chain bucket, hand operation chain or pendant control switch. Air supply tubes are detached. Install the hoist correctly as illustrated in the figure. (See separate operating manual for pendant control type).

To fix the hand operation chain to the valve lever, fasten S-hooks in the holes on the valve lever.




### 2. Installation

Install hoist to operate freely.

### 3. Piping

1). Presence of dirt, dust, water inside the piping system or failure to lubricate hoist may cause malfunction of the hoist. It is essential to install an air filter and lubricator in the air line prior to the air inlet of the hoist.

2). Air Hose to be used should be 1/2" (12.7 mm in the inside diameter). Hoses over 30 feet in length should be 3/4" (19 mm in the inside diameter).

Clean the air hoses or pipes by flushing them or blowing compressed air through prior to connecting to air hoists.

3). A drain should be provided at the lowermost position in the piping system.

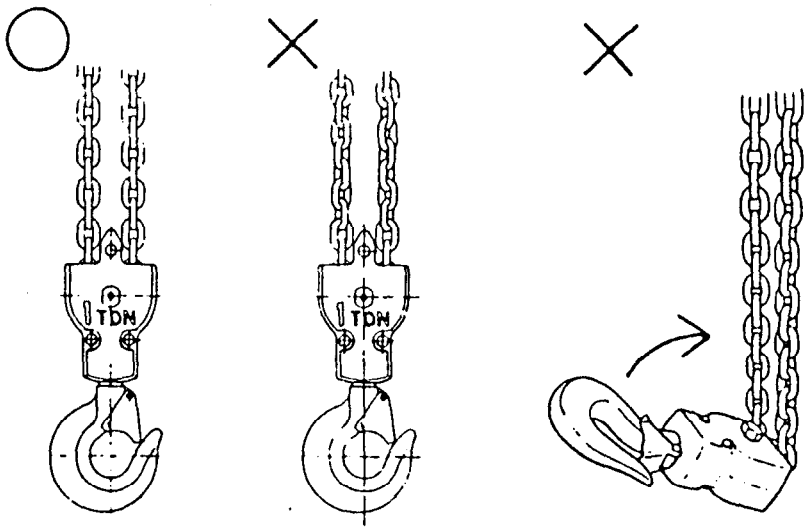
4). Upon initial operation of the hoist, inject about ten drops of lubricant into the intake port before connecting the hose. (Refer to list of recommended lubrication oils in Chapter IV-1-(4)-Lubrication).

### 4. Operating Air Pressure

The hoist is designed to be able to operate at an air pressure of 4 – 6 Bar at a point just behind the intake port. Use an air pressure reduction valve if necessary.

## 5. Checking the hoist before operation

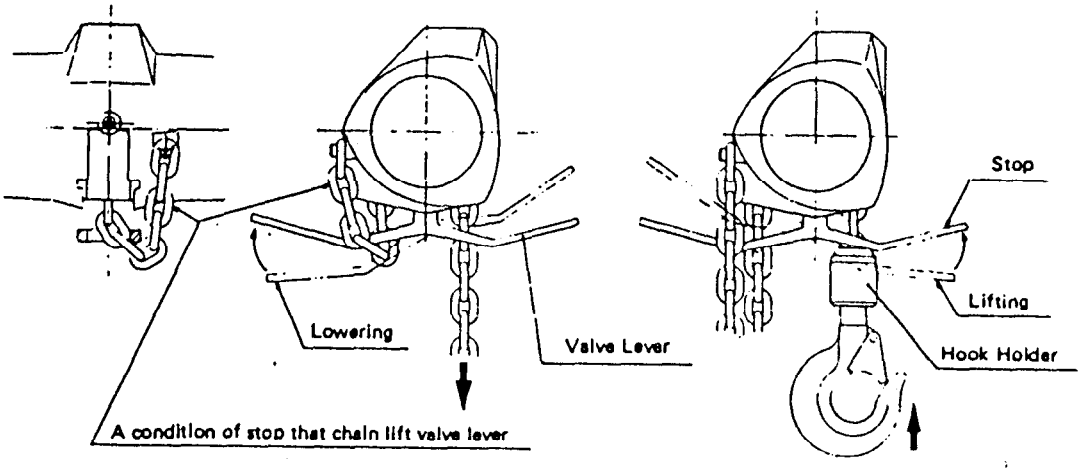
1). The load hook of model ACH1 type hoist may possibly be entangled in the twisted chain and even positioned upside down. Avoid operating the hoist with the reversed hook, or the hoist may be damaged. Prior to operation, be sure to check the chain and hook.




2). After the hoist has been installed in place, check for normal functioning. If no abnormality is found, then start the hoist. Before the hoist is operated at its full speed, a few times of lifting and lowering movements should be repeated at a low speed. The operating speed of the hoist may be varied depending upon the way you pull the hand operation chain for the pendant lever.

3). Inspection of over-lifting/lowering protective device. When the upper limit of the lift is reached, the chain stop will set the valve lever at the neutral position (refer to the undermentioned sketch).

When the lower limit of the lift is reached, the valve lever is placed at the neutral position by the portion of the chain passing thereunder as shown in the sketch.




4). Operate the hoist at rated capacity confirming lifting speed and condition of operation.

## 6. Operational Cares

Avoid abrupt starting or stopping of the hoist when under heavy load, resulting in excessive stresses to the hoist which may result in shorter life or damage.

After the hoist is turned off, it can continue to lift a considerably heavy load until it is brought to a complete stop. However, the hoist should not be subjected to a load over the nominal rating.

Do not operate when chain is damaged or malfunctioning.

Avoid frequent actuation of the over-lifting/lowering protective device.

## 7. Adjustment

1). Adjustment of Brake

Although the brake is factory-adjusted before shipment, the performance may be reduced as the lining wears during operation. It is therefore necessary to inspect and adjust the brake. For adjustment, refer to the following description.

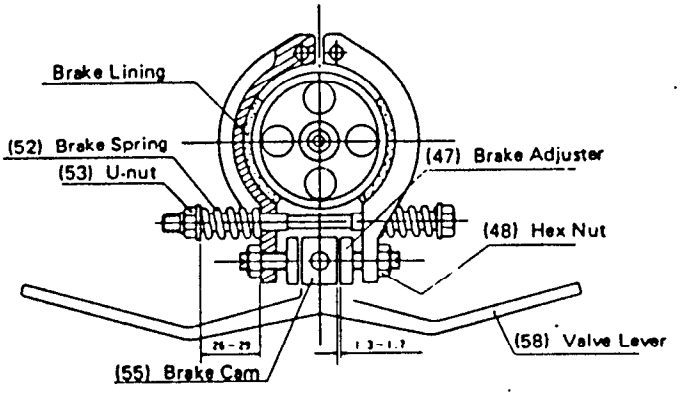
(1). Take rear cover (#62) off.

(2). Loosen hex nut (3M8 P=1) (#48), and adjust to make the clearance between the brake cam (#55) and brake adjuster (#47) in the length of about 1.3 – 1.7 mm, and fasten hex nut.

(3). Adjust brake spring (#52) to make the length of 29 mm by turning of U-nut (M8) (#53). If a slip of the brake is found in this condition, give additional tightening to the U-nut. However, the brake spring should be kept within 26 – 29 mm in length.

**⚠ WARNING** **It is required not to adhere any oil on lining and brake wheel. In the event that there is any oil on these parts, rinse out immediately.**

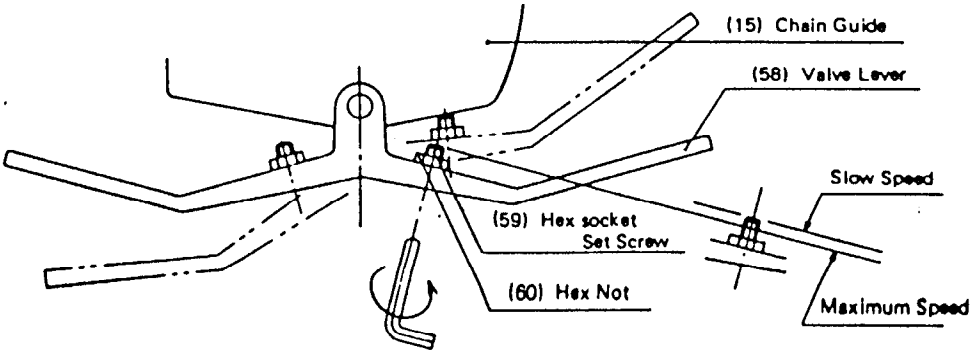
**Should the hoist lower (go down) slightly when starting the hoist slowly at heavy load, adjust further the clearance within 1.7 mm.**




2). Adjustment of Maximum Operating Speed

The maximum operating speed of the hoist is pre-adjusted to nominal rating before shipment from the factory. Re-adjustment of the maximum speed, if so desired, may be made by using the hex socket set screw (M4 x 12) (#59) and hex nut (M4) (#60) in the valve lever.

To decrease the speed, turn the hex socket set screw clockwise.



# Ⅳ. MAINTENANCE AND INSPECTION

## 1. Lubrication

1). Air Motor section

The air motor is lubricated by an oiler provided in the piping system. 10 to 15 drops of lubricaton oil per minute is considered as an optimum amount to be supplied.

Also, on periodic inspection, grease the ball bearing of air motor.

2). Reduction Gear section

The reduction gear section is lubricated with grease. When the reduction gear is overhauled for servicing, apply a quality grease recommended in the table or equivalent. (The amount of grease required is approx. 150 ml (150 $cm^3$). However, add 1/2 of the whole amount into the space between internal gear and case.

3). Chain

The chain should be preferably coated with oil on a periodic basis to allow for prolonged service of the chain and chain wheel.

- It recommend to coat with heavy gear oil such as Shell Macoma Oil 85 onto link chain.

**⚠ CAUTION** **Ensure chain is coated with oil only when hoist is under no load. oil after elimination of any dirt or dust. DO NOT USE GREASE.**

4). Table of recommended oil for lubrication

Use any one of the recommended brands of oil which are listed below, or equivalent.

| | Air Motor section (Line Oiler) | Reduction Gear Section (incl. bearing of reduction section) | Other Bearing Section |
|---|---|---|---|
| ESSO | AROX 22<br>TERESSO 32 | LIDOX EPO<br>LADEX O<br>LITHTAN EPO | BEACON EP 2 |
| MOBIL | ALMO OIL NO. 1 | MOBILUX EPO | MOBIL PLEX 48 |
| SHELL | ROCKDRILL OIL 32<br>TORCURA OIL 32 | ALVANIA GREASE EPRO | ALVANIA GREASE EP 2 |

## 2. Inspection

For inspection and servicing, overhaul the equipment on a yearly basis or every 1,000 hours of operation. If a day's operation exceeds five hours, however, the inspection and servicing should be carried out every six months or at a shorter interval.

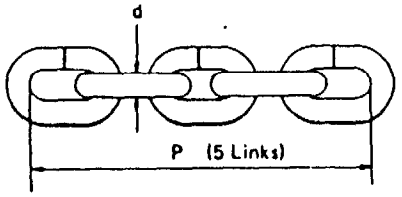
## 3. Periodic Inspection

In order to protect from unexpected accident, it is recommended to check the respective parts of hoists at least once a month, particularly working conditions of over-lifting/lowering protective devices, damage of motor housing, wear and tear of chain, wear and tear of suspension and load hooks, fastening of bolts, wear and tear of brake lining etc.

1). Link Chain

The dimension of (P) or (d) must be within the undermentioned sizes.

The chain wheel must be examined for wear when replacing the chain.




| | Standard Dimension | Limited Dimension |
|---|---|---|
| d | 6.3 mm | 5.9 mm |
| P | 95.5 mm | 97.4 mm |

2). Clean the strainer inside of adaptor of air inlet periodically, in order to protect from deterioration of performance due to accumulation of dust.

## 4. Inspection Procedures when Hoists Malfunction

1). In case the hoist does not start and loss of power

(1). Air pressure or volume of air not sufficient.
(2). Main valve not open.
Bolts to be connected with valve lever are loosened. (Refer to Index #61 and #110 of assembly drawing).
(3). Strainer inside adaptor of air inlet is blocked with dust.
(4). Dust or other particles in the pipe in motor.
(5). Lubrication oil in the air motor not sufficient.
(6). Vanes are broken or worn out.
(7). Brake not completely released.
(8). Wear or damage of gears, bearings or something else.

2). high temparature on the surface of hoists

(1). Lubricant oil (or grease) not sufficient in part of gears and bearings.
(2). Extraordinary-wear of gears, bearings or something else.
(3). Brake not completely released.

3). In case of loads drifting

(1). Main valve does not return to neutral.
(2). Wear or tear or brake lining and/or something else.

## 5. Storing the hoists

If the hoist is to be stored for a long period of time, spray a mist of anti-rust oil into the intake port and operate the hoist for several seconds at a low air pressure ($1 - 2\ kg/cm^2$). Select a dry location for the storage.

# V. DISASSEMBLING AND ASSEMBLING

## 1. Procedure of Disassembly (Disassemble in order of description)

In the event of the hoist malfunctioning and it is necessary to disassemble the following procedures are recommended.

With a hoist of pendant control type, first remove the complete unit of pendant cylinder and cylinder holder. (Remove cover of cylinder holder, and further remove hex socket head screw).

1). Remove chain bucket.

2). Remove cover (#111), and take hex socket head cap screw (M4 x 12) (#110) of shaft (#54).

3). Remove hex socket head cap screw (M6 x 55) (#109) and take out valve housing (#79).

**⚠ CAUTION** **Prior to loosening hex socket head cap screw (#109), be sure to remove M4 x 12 socket head cap screw (#110).**

**Be certain to loosen hex socket head cap screw (#109) gradually in order.**

4). Valve Housing section

(1). Remove retaining ring C-type (R18) (#98), and extract lever set (#95).

(2). Remove retaining ring C-type (R40) (#94). And take out valve cone (#81) by removing cover (#93).

5). Screw in hex socket head cap screw (#109) into tapped hole in the end plate (#65) and take out the air motor by pulling the hex socket head cap screw straight forward.
Pull out coned disc spring (#33) and coupling (#64).

6). Air Motor section

(1). Remove retaining ring C-type (S11) (#78). Take coned disc spring (#77) and end plate (#76) off rotor (#71).

(2). Remove cylinder (#74) and take vanes (#75) off rotor.

(3). Make sure rotor turns smoothly. It is not required to dismantle end plate (#65) if rotor turns smoothly.

**NOTICE** **The end plate is fixed with countersunk head socket screw (#73) which is securely locked with metal cement for the purpose of maintaining the specified clearance between the end plate and rotor. Do not therefore disconnect the end plate without a good reason.**

(4). When it becomes necessary to disconnect the end plate for replacement thereof or of countersunk head socket screw (#73), heat the locked screw with a burner or other heating method at a temparature lower than 200°C before it is loosened and removed.

7). Stand hoist at the position of down side for the part to be mounted the valve housing and up side for the part to be attached rear cover.

8). Remove rear cover, and detach hex head bolt (#50), brake spring (#52), self-locking nut (U-nut M8) (#53) and brake shoe (#46).

9). Detach hex socket head cap screw (#61) from valve lever (#58), and pull out unit of brake cam (#55) and shaft (#54).

10). Remove hex socket head cap screw (M6 x 16) (#45), and take off unit of cover (#34), shaft (#37) and brake wheel (#43).

**⚠ CAUTION** **Loosen hex socket head cap screw (M6 x 16) (#45) gradually in order.**

11). Cover (#34) section

(1). Remove retaining ring C-type (S12) (#39), and pull out shaft and brake wheel.

(2). Check condition of shaft and brake wheel for wear. It is not necessary to dismantle brake wheel if no parts are damaged.

**NOTICE** **The shaft and brake wheel are fixed with hex socket head cap screw (M6 x 12) (#17) which are securely locked with metal cement.**

(3). When it becomes necessary to dismantle shaft and brake wheel for replacement thereof or of hex socket head screw (#17), heat the locked screw with a burner or other method at temperature lower than 392°F before it is loosened and removed.

**NOTICE** **DON'T HEAT THE ASSEMBLY COVER, otherwise the oil seal (#41) will be damaged.**

12). Take out coned disc spring (#33), ball bearing (#26), gear wheel (#28), planet shaft (#27), internal gear (#30), coned disc spring (#31) and gear wheel (#32).

13). Take out an assembly unit of ball bearing (#26), gear wheel (#23) and planet shaft (#21).

14). Eliminate lock screw (#20) and take out internal gear (#19) and washer (#18).

15). Take chain off hoist.

In case of roller chain, remove fitting link on end of terminal and pull chain out of hoist from lifting side.

16). Remove washers (#16) and pull out chain guide (#15).

17). Disconnect assembly unit of ball bearing (#11) and chain wheel (#13) to a side of reduction section, and remove chain guide (#12).

18). Remove hex head bolt (#9). Hook (#2) is detached from case by taking out steel ball (#7) of inside of hook holder (#6).

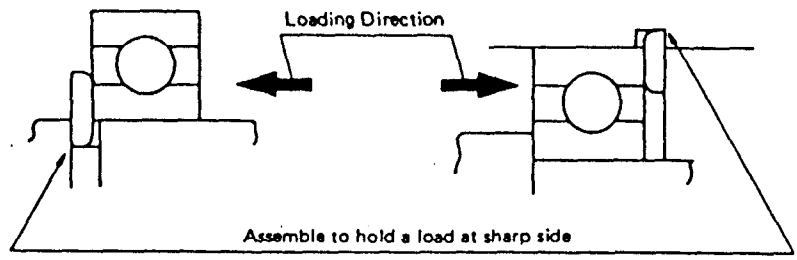
## 2. Re-assembling the hoist

Thoroughly clean all disassembled parts and components. Replace damaged or worn-out parts, if any.

Re-assemble the hoist in reversed order of disassembly while taking the following care:

1). Retaining rings C-type (S12 & S11) (#39 & #78) must be replaced by new ones.

Make sure condition of retaining rings C-type are undamaged and replace with new one, if it is damaged. Assemble to hold a load at sharp side in the end of retaining rings C-type, as described in the following sketch.




2). Reduction Gear section

(1). Clean up lock screw (#20) and a part to be connected on casing (#1), and coat sealing paste (loc-tite 510 or equivalent) on tapered part of head of lock screw and fasten at torque of about 2 – 2.5 kg-m.

(2). Assemble planet shaft (#21) and lubricate grease.

(refer to Chapter IV-1-(2) of this manual).

(3). Assemble shaft (#37) firstly to cover (#34), and assemble unit of cover section such as brake wheel (#43) and fix to casing.

(4). Hex socket head cap screws (#45) must be fastened gradually in order.

3). Air Motor section

(1). Insert ball bearing (6001Z) (#69) into end plate (#65).

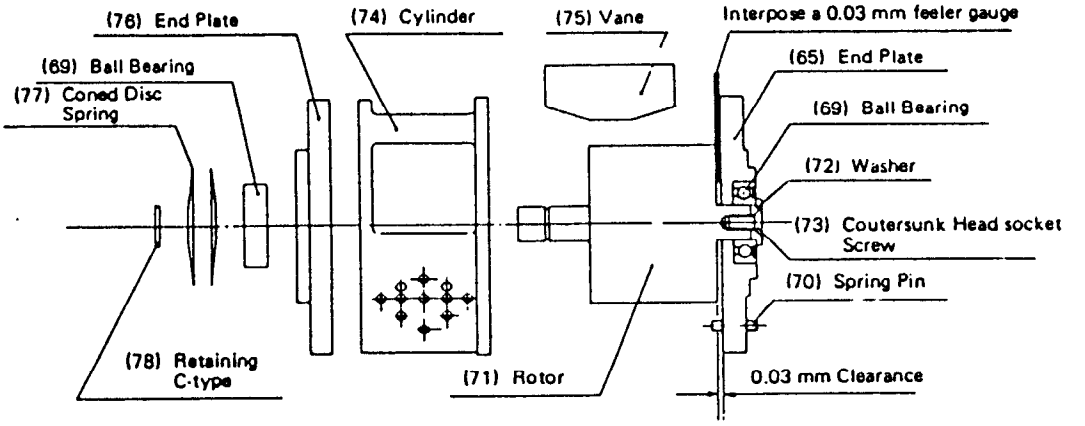
(2). Clean up tapped hole of rotor, washer (#72), countersunk head socket screw (#73) and inner ring of ball bearing (6001Z) (#69).

(3). Dab lubricant oil (the same oil as lubricator oil in piping) slightly on the surface of end part of 12 $\phi$ spindle (side of end plate (#65)) of rotor. As illustrated, interpose a 0.03 mm feeler gauge between the end plate and the rotor, and mount end plate at clearance of 0.03 mm.

(4). Coat sealing paste (loc-tite 601 or equivalent) into tapped hole of rotor, and fasten countersunk head socket screw.

(5). After dried sealing paste, set cylinder (#74) and vanes (#75), and lubricate an oil (the same oil which is used for lubricator in piping) slightly onto vanes.

(6). Keep casing at a level condition and assemble air motor.




4). Valve Housing section

(1). Lubricate an oil (the same oil which is used for lubricator in piping) onto O-ring of liner (#80), and set long hole at center part to meet to a fixation hole of lever (#95) and set into valve housing.

(2). Clean up both sides of casing as well as valve housing, and apply a sealing paste (loc-tite 510 or equivalent) on the side of casing, and put on valve housing.
Make sure to insert spring pin (#70) into the hole of valve housing.

(3). Fix brake cam (#55) to shaft (#54) and insert it from a side of reduction gear. When insert shaft, put in order of washer (#57), valve lever (#58), washer (#57) and angle piece (#108) surely.

(4). Fix valve housing by hex socket head cap screw (M6 x 55) (#109).
Fasten these screws gradually in order.

(5). Fix angle piece. Fasten hex socket head cap screw (M4 x 12) (#110) at the torque of 0.45 – 0.55 kg-m;

(6). Fix valve lever. Fasten hex socket head cap screw (M5 x 8) (#61) at the torque of 0.86 – 1.0 kg-m.

5). Adjust fastening condition of hex socket set screw (M4 x 12) (#59), and fix by hex nuts (M4) (#60) after making sure the condition of operation of valve lever, valve cone (#81) stops at a slight position before final stopping position.

6). How to install chain

- Prior to insertion of chain, insert steel wire into chain guide (#15) as illustrated. (It can be easily inserted from lowering side (B)).
- After this operation, suspend hoist and adjust air pressure of piping at 15-30 PSI.

## A). Model ACH05

(1). Fasten a steel wire to the end of link chain, and pull the steel wire to insert the link chain into the chain guide (#15) on the lifting side of hoist.

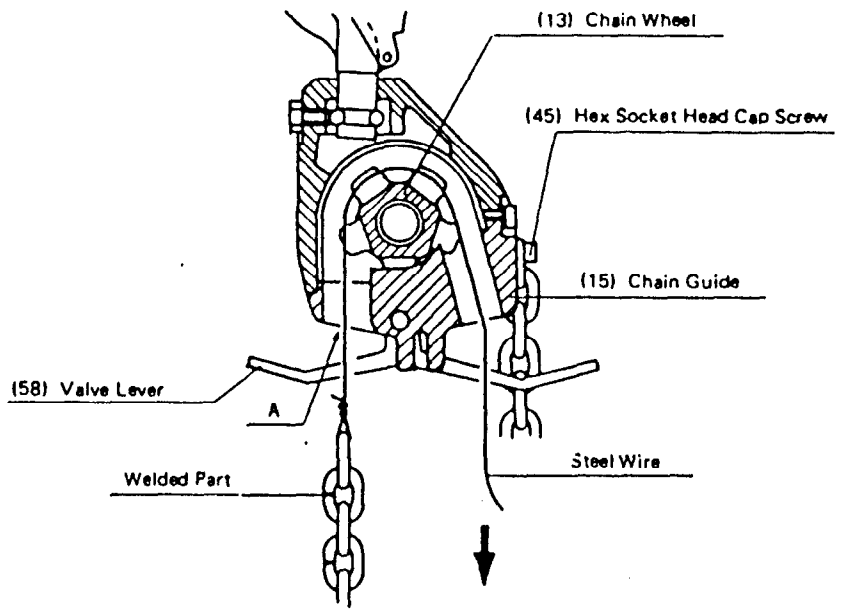
**⚠ CAUTION** **The first link of the end of the chain should be parallel to the longitudinal line of the hoist. (Refer to sketch).**

**The welded side of the chain should face outward.**

(2). Operate the hoist slowly in the lowering direction while pulling the steel wire until the endmost link enters the chain wheel pocket.

(3). After the end link has entered the pocket, slowly operate the hoist in the lifting direction.

(4). When the end of the chain comes out, check to see if the chain is not twisted. Then pass the chain under the valve lever (#58) and fix the end to the casing with hex socket head cap screw (M6 x 16) (#45).




## B). Model ACH1

(1). Fasten a steel wire to the end of the link chain, and pull the steel wire into the chain guide (#15) of the lowering side of the hoist.

**⚠ CAUTION** **The first link of the end of chain should be parallel to the longitudinal line of the hoist. (Refer to sketch).**

**The welded side of the chain should face outward.**

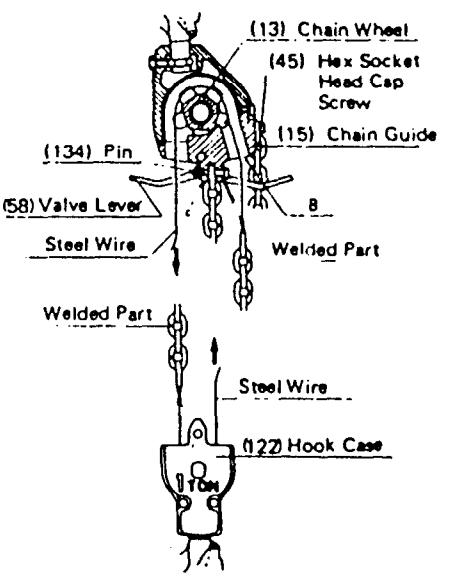
(2). Operate the hoist slowly in the lifting direction while pulling the steel wire until the endmost link enters the chain pocket.

(3). After the endmost link has entered the pocket, slowly operate the hoist in the lowering direction.

(4). When the chain comes out, lay the chain on its side in the hook case (#122) as shown.

**⚠ CAUTION** **The welded side of the chain should face outward.**

**Take cares not to twist the chain.**




(5). After making sure that the chain is not twisted, connect to the chain guide together with chain bucket with the pin (#134), plain washer (#135), hex slotted nut (#136) and split pin (#137).

(6). Pass the other end of the chain under the valve lever (#58) and fix it to the casing with the hex socket head cap screw (M6 x 16) (#45). Take care not to twist the chain.

# 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.

**INGERSOLL-RAND Material Handling Division**
2724 Sixth Avenue South, Seattle, Washington, USA 98134-2102
P.O. Box 24046, Seattle, Washington, USA 98124-0046
Phone (206) 624-0466, Telex: 3723554
Fax (206) 447-0715

INGERSOLL-RAND
MATERIAL HANDLING PRODUCTS
2724 SIXTH AVENUE SOUTH, SEATTLE WASHINGTON 98134-2102
PHONE (206) 624-0466, TELEX: 3723554, TELEFAX: (206) 447 0715
P.O. BOX 24046, SEATTLE, WASHINGTON 98124-0046