



SPEEDWAY[®]

THE NEW CENTURY SERIES[®]

Wire Rope Electric Hoists

Installation, Operation, Maintenance and Parts Manual

SERIAL NUMBER

⚠ WARNING

This equipment should not be installed, operated or maintained by any person who has not read all the contents of these instructions. Failure to read and comply with these instructions or any one of the limitations noted herein can result in serious bodily injury or death, and/or property damage.

There are no other warranties which extend beyond the description of the Order Acknowledgment and as it may apply to the specifications provided in this publication. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXCLUDED. Acco Material Handling Solutions/Harrington Hoists, Inc., shall in no event be liable for any special, direct, indirect, incidental or consequential damages to anyone beyond the cost of replacement of the goods sold hereby.



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NOTICE

Manual 70345 covers installation, operation, maintenance, and parts information in reference to the WRIGHT® SPEEDWAY® THE NEW CENTURY SERIES® Product Series 31 wire rope electric hoist line. This manual includes instructions and parts information for a variety of hoist types. Therefore, all instructions and parts information may not apply to any one type or size of specific hoist. Disregard those portions of the instructions and parts information that do not apply. Manuals for special engineered hoists will contain additional pages in accordance with product specifications.

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NOTICE

TO ORDER PARTS: Provide part number, part description, quantity required, and Product Number or Serial Number of Hoist.

IMPORTANT INFORMATION AND WARNINGS

SAFETY ALERT SYMBOL

The Safety Alert Symbol is used in this manual to indicate hazards and to alert the reader to information that should be known, understood, and followed in order to avoid DEATH or SERIOUS INJURY.

Read and understand this manual before using the hoist.

Important issues to remember during operation are provided at the hoist control stations, at various locations on the hoist and in the manuals by DANGER, WARNING, or CAUTION instructions or placards, that alert the personnel to potential hazards, proper operation, load limitations, and more.

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

CAUTION

These general instructions deal with the normal installation, operation, and maintenance situations encountered with the equipment described herein. The instructions should not be interpreted to anticipate every possible contingency or to anticipate the final system, crane, or configuration that uses this equipment.

This manual includes instructions and parts information for a variety of hoist types. Therefore, all instructions and parts information may not apply to any one type or size of specific hoist. Disregard those portions of the instructions that do not apply.

Record hoist serial number on the front cover of this manual for identification and future reference to avoid referring to the wrong manual for information or instructions on installation, operation, inspection, maintenance, or parts.

Use only Wright® authorized replacement parts in the service and maintenance of this hoist.

WARNING

Equipment described herein is not designed for and should not be used for lifting, supporting, or transporting humans.

Equipment described herein should not be used in conjunction with other equipment unless necessary and/or required safety devices applicable to the system, crane, or application are installed by the system designer, system manufacturer, crane manufacturer, installer, or user.

Modifications to upgrade, rerate, or otherwise alter this equipment shall be authorized only by the original equipment manufacturer or qualified professional engineer.

Equipment described herein may be used in the design and manufacture of cranes or monorails. Additional equipment or devices may be required for the crane or monorail to comply with applicable crane design and safety standards. The crane designer, crane manufacturer, or user is responsible to furnish these additional items for compliance. Refer to ASME B30.17, Safety Standard for Cranes and Monorails (with Underhung Trolley or Bridge); and ASME B30.2 Safety Standard for Top-Running Double-Girder Cranes. If a below-the-hook lifting device or sling is used with a hoist, refer to ASME B30.9, Safety Standard for Slings, or ASME B30.20, Safety Standard for Below-the-Hook Lifting De-vices.

Hoists and cranes, used to handle hot molten material may require additional equipment or devices. Refer to ANSI Z241.2, Safety Requirements for Melting and Pouring of Metals in the Metalcasting Industry.

Electrical equipment described herein is designed and built in compliance with ACCO/HARRINGTON Material Handling Solutions interpretation of ANSI/NFPA 70, National Electrical Code. The system designer, system manufacturer, crane designer, crane manufacturer, installer, or user is responsible to assure that the installation and associated wiring of these electrical components is in compliance with ANSI/NFPA 70, and all applicable Federal, State, and Local Codes.

Failure to read and comply with any of the limitations noted herein can result in serious bodily injury or death, and/or property damage.

IMPORTANT INFORMATION AND WARNINGS

DANGER

HAZARDOUS VOLTAGES ARE PRESENT IN THE CONTROL ENCLOSURE, OTHER ELECTRICAL COMPONENTS, AND CONNECTIONS BETWEEN THESE COMPONENTS.

Before performing ANY mechanical or electrical maintenance on the equipment, de-energize (disconnect) the main switch supplying power to the equipment; and lock and tag the main switch in the de-energized position. Refer to ANSI Z244.1, Personnel Protection - Lockout/Tagout of Energy Sources.

Do not operate the equipment without control enclosure cover or covers in place.

Only trained and competent personnel should inspect and repair this equipment.

NOTICE

It is the responsibility of the owner/user to install, inspect, test, maintain, and operate a hoist in accordance with ASME B30.16, Safety Standard for Overhead Hoists, OSHA Regulations, and ANSI/NFPA 70, National Electrical Code. If the hoist is installed as part of a total lifting system, such as an overhead crane or monorail, it is also the responsibility of the owner/user to comply with the applicable ASME B30 volume that addresses that type of equipment.

It is the responsibility of the owner/user to have all personnel that will install, inspect, test, maintain, and operate a hoist read the contents of this manual and applicable portions of ASME B30.16, Safety Standard for Overhead Hoists, OSHA Regulations, and ANSI/NFPA 70, National Electrical Code. If the hoist is installed as part of a total lifting system, such as an overhead crane, the applicable ASME B30 volume that addresses that type of equipment must also be read by all personnel.

Any ANSI Standards referenced in this manual may be obtained from the American National Standards Institute, 1430 Broadway, New York, New York 10018.

This manual contains information for safe operation of an overhead hoist. Taking precedence over any specific rule, however, is the most important rule of all "USE COMMON SENSE." Operation of an overhead hoist involves more than operating the controls. The operator must consider and anticipate the motions and actions that will occur as a result of operating the controls.

If the hoist owner/user requires additional information, or if any information in the manual is not clear, contact Acco/Harrington, or the distributor of the hoist. Do not install, inspect, test, maintain, or operate the hoist unless this information is fully understood.

When contacting Acco/Harrington or the distributor of the hoist, always make reference to the serial number of the hoist.

A regular schedule of inspection of the hoist in accordance with the requirements of ASME B30.16 should be established and records maintained.

WARNING

Before installing, removing, inspecting, or performing any maintenance on a hoist, the main switch shall be de-energized. Lock and tag the main switch in the de-energized position in accordance with ANSI 2244.1. Follow other maintenance procedures outlined in this manual and applicable ASME B30 volumes.

Additional WARNINGS are listed in various portions of this manual. Personnel shall read and follow these WARNINGS. Failure to read and comply with these WARNINGS as well as other instructions or any limitations noted in this manual and applicable ASME B30 volumes could result in serious bodily injury or death, and/or property damage.

INSTALLATION

PRIOR TO INSTALLING HOIST:

1. Read and observe the instructions and warnings contained in this manual. Read and observe any instructions and warning tags attached to the hoist.
2. Check for any damage to the hoist during shipment. If any damage has occurred, place a claim with the carrier. DO NOT install a damaged hoist.
3. Check wire rope for damage and spooling on drum. Be sure rope is properly seated in drum grooves and sheaves.
4. Locate any vent plugs attached to or included with the hoist and trolley. Remove solid shipping plug or plugs and replace them with a vent plug.
5. Check lubricant in gear housing. Oil level should be even with oil level plug in housing. If additional gear housing lubricant is required, refer to the LUBRICATION section of this manual. Lubricate any exposed gears and pinions on the trolley with the open gear lubricant supplied with the trolley.
6. Remove drain plug, if provided, from the lowest position of the motor. This will allow moisture to escape so that it does not condense and accumulate inside the motor housing.
7. Check that the crane, monorail, or other supporting structure where the hoist will be installed has a load rating capable to handle loads equal to the rated load capacity of the hoist.
8. If hoist has a trolley, check that the crane bridge beam or monorail beam is level, straight, and clean. Check that trolley stops are installed, or install trolley stops, at the open end or ends of the beam to prevent the trolley from traveling off the beam. Trolley stops that engage trolley wheels are not recommended. Check that trolley stops will prevent overhanging parts of the hoist and trolley from interfering with other equipment beyond the ends of the beam or monorail.
9. If hoist is to be installed on an existing crane, the crane should be run to a location where it will cause the least interference with other cranes and operations in the area; and all controllers placed in the off position.
10. Warning signs and barriers shall be utilized on the floor beneath the crane or area where the hoist will be installed.

DANGER

11. The main switch (disconnect) supplying power to the crane, monorail, or other piece of equipment where the hoist is to be installed, shall be de-energized. Lock and tag the main switch in the de-energized position in accordance with ANSI Z244.1.
12. If the hoist is to be installed on an existing crane, and the crane runway remains energized because of other cranes operating on the same runway; stops or a signal person(s), located full-time at a visual vantage point for observing the approach of an active crane(s), shall be provided to prohibit contact by the active crane(s) with the idle crane.
13. If personnel will be required to work on the runway during installation, a guard or barrier shall be installed between adjacent runways for the length of the established work area to prevent contact between persons performing installation and a crane on the adjacent runway.
14. If personnel are required to work at elevations in excess of 6' feet above floor or ground level, a fall prevention policy and procedure shall be developed, documented, and implemented prior to installation being started.
15. Check power supply that will be furnished to the hoist. It must be the same as shown on the hoist serial plate.
 - a. Standard hoist single-speed motors are reconnectable for 230V or 460V, three phase, 60 Hz operation. Standard trolley single-speed motors are reconnectable for 208/230V or 460V, three-phase, 60 Hz operation. Such motors and control will be connected at the factory for 460V unless otherwise specified.
 - b. All two-speed motors, 200V single-speed motors, and 575V single-speed motors are single voltage motors, and are not reconnectable.

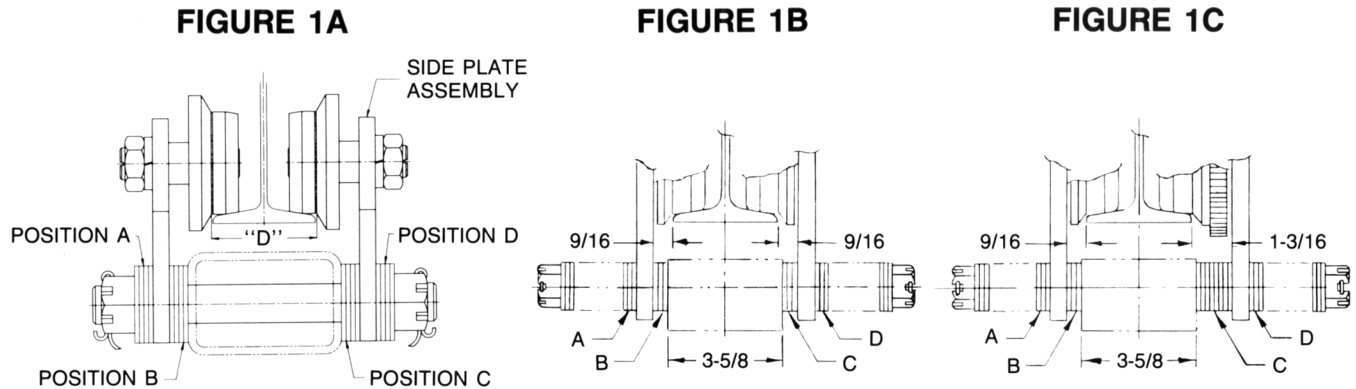
INSTALLATION

- c. If the power supply that will be furnished to the hoist is not the same as shown on the hoist serial plate for two-speed, 200V single-speed, and 575V single-speed hoists; DO NOT INSTALL. Contact Acco/Harrington or the distributor of the hoist.
- d. If reconnection of a 230/460 volt motor is required, proceed as follows:
 - (1) If hoist is connected to the main power supply, de-energize, lock, and tag the main switch (disconnect) in accordance with step 11 of "PRIOR TO INSTALLING HOIST" instructions.
 - (2) Reconnect the control circuit transformer, located inside the control enclosure. Connection instructions are located on the transformer and in the ELECTRICAL COMPONENTS section of this manual.
 - (3) Reconnect the hoist motor leads inside the hoist motor junction box; and hoist motor brake leads inside the hoist motor brake cover. Connection instructions are located in the ELECTRICAL COMPONENTS section of this manual.
 - (4) Reconnect the trolley motor leads (and trolley motor brake leads, if so equipped) inside the trolley motor junction box. Connection instructions are located in the ELECTRICAL COMPONENTS section of this manual.
 - (5) If the hoist is equipped with optional motor circuit fuses or overload relays sized for the original connection voltage, they must be replaced with ones properly sized for the reconnected voltage.
 - (6) If the hoist is equipped with other optional features effected by power supply voltage, reconnect as per instructions included on the component.
16. Conductors supplying power to the hoist and associated equipment must be sized to maintain the operating voltage at the hoist at plus or minus 10% of the nominal operating voltage at all times. Standard nominal operating voltages are 200, 208, 230, 460, and 575 volts.
17. Conductors supplying power to the hoist and associated equipment must be protected against short circuit and over-current conditions in compliance with ANSI/NFPA 70, National Electrical Code. These requirements are listed in Article 610 and are the responsibility of the owner/user. It is also the responsibility of the owner/user to insure that all protective devices and associated wiring comply with applicable Federal, State, and Local Codes.

INSTALLING HOIST:

1. **Stationary or Lug Mounting:** Fasten securely with wall or base mounting fixtures or lug suspension pins. Check that there are no obstructions to the operation of the hoist including the path of the rope. On winch type units, the fleet angle of the rope feeding off the drum should not exceed 4°.
2. **Under Running Trolley Hoist Unit:** Trolley or trolleys are mounted on hoist unit and shipped as one unit. Trolley wheels have a dual tread and will operate on standard S-shapes having 9 1/2° slope flanges or W-shapes having flat flanges. Proceed as follows:
 - a. If trolley hoist is mounted on a skid, do not remove it immediately. The skid will hold the trolley hoist unit in an upright position until assembled on the crane or monorail.
 - b. Trolley shipping restraining rods are used on some of the single stud 4-wheel trolleys. If present, these rods will be located below the wheels and above the trolley stud. Remove and dispose of these rods before placing the hoist in operation.
 - c. Even if the unit was ordered for a specific beam size or beam flange width; check trolley wheel spacing between wheel flanges on 1-ton 2PD and all 2 through 5 ton hoists; or check spacing between trolley sideplates on 1-ton 2PS hoists.
 - d. **For 1-ton 2PD and all 2 through 5 ton hoists:** Check trolley dimension D between wheel flanges at tread of wheel as shown in Figure 1A. Dimension D must be at least 1/8" inch (3.2 mm) greater than the beam flange width, and not more than 1/4" inch (6.4 mm) greater than the beam flange width. Rearrange washers, if necessary, to achieve proper spacing. Distribute washers equally between positions B and C so that the hoist will be centered between trolley side plates and under beam. A difference of one washer between positions B and C is permissible. NOTE: Some trolleys, especially two-wheel swiveling trolleys, do not have washers for adjustment. The trolley crosshead varies in width according to the beam size and flange width. If this type trolley is furnished and the wheel spacing between flanges does not fit the beam flange width to be mounted upon, contact Acco/Harrington or the distributor of the hoist.

INSTALLATION



For 1-ton 2PS hoists: Check spacing dimension between trolley sideplates. Total spacing dimension between trolley sideplates should be: $\frac{9}{16}'' + \frac{9}{16}'' + \text{flange width}$ for plain trolleys; or $\frac{9}{16}'' + 1\text{-}\frac{3}{16}'' + \text{flange width}$ for geared trolleys. For plain trolleys, distribute washers equally between positions B and C as shown in Figure 1B so that the hoist will be centered between trolley side plates and under beam. A difference of one washer between positions B and C is permissible. For geared trolleys, position C requires 5 more washers than position B as shown in Figure 1C.

- e. Place trolley hoist in correct position relative to bridge beam or monorail, orienting it for proper end approach in accordance with specification requirements. Be sure collectors and conductors are properly positioned and aligned.
- f. Place trolley hoist unit in position on bridge beam or monorail. Check that trolley bumpers, if provided, meet trolley stops on beam, and reposition if necessary.

The simplest way to mount the trolley hoist on the beam, if crane or building construction permits it, is to remove the trolley stops on an open end of the beam, run the trolley onto the beam, and replace the trolley stops. If this method is not possible because of crane or building interference, mount the trolley hoist according to the following instructions, referring to Figure 1.

- (1) Remove side plate assembly, with wheels intact, from one side of trolley only. On geared and motorized trolleys, it is recommended that the side with the plain wheels be removed.
- (2) Be sure that distribution of washers at positions B and C will allow the proper clearance between beam flange width and wheel flanges.
- (3) Position wheels of side plate assembly still attached to hoist on the beam flange.
- (4) Replace side plate assembly removed in step (1) by sliding it over protruding trolley studs, with washers distributed as prior to dis-assembly at positions A and D, and positioning wheels on the beam flange. Secure trolley stud nuts as follows:
 - Tighten slotted nuts using a wrench until snug.
 - Back off to next slot in nut that aligns with cotter pin hole and secure with cotter pins.

Trolleys using variable width crossheads in place of washers have bolts through side plates that screw into tapped holes in the crosshead. Replace bolts using a lock washer under the bolt head. Tighten bolt until lock washer flattens.

- (5) Check that hoist is centered between trolley side plates and centered under beam.
- (6) Check clearance between wheel flange and beam flange at tread of wheel. Clearance should be $\frac{1}{16}$ inch (1.6 mm) to $\frac{1}{8}$ inch (3.2 mm) on each side, or $\frac{1}{8}$ inch (3.2 mm) to $\frac{1}{4}$ inch (6.4 mm) total.
- (7) Check that all studs, bolts, lock washers, nuts, and cotter pins have been replaced.
- (8) Check that collectors are positioned for proper contact with conductors.

SPRING LOADED COLLECTORS - Set midway between free state and collapsed state.

TOW TYPE COLLECTORS- Make sure they are properly seated. Check that towing harness allows collector shoes to operate freely and will not foul on other objects.

INSTALLATION

3. If under running trolley hoist unit was installed on a crane prior to installing the crane, the trolley wheels should be blocked to keep the trolley hoist from moving until the crane is completely installed. If stop angles are welded to the beam to act as blocks and to be removed after crane installation, **DO NOT** weld them on surfaces where wheels or rollers will operate.
4. On hand chain operated trolleys, unless otherwise specified, the length of the trolley hand chain is based on the standard lift of the hoist model. If the hand chain length must be shortened, find the open link in the chain and open enough to release the adjoining link. Cut the hand chain to required length, remove any twist in chain and reassemble to open link, and close the open link.
5. If pendant control cable is too long, it may be shortened only under the following conditions:
 - a. Only a qualified electrician should perform this work.
 - b. If hoist is connected to the main power supply, de-energize, lock, and tag the main switch (disconnect) in accordance with step 11 of "prior to installing hoist" instructions.
 - c. Shorten cable at the hoist end. DO NOT disturb connections inside the pendant station.
 - d. Check that all wires shortened are reconnected the same as originally connected. Refer to electrical wiring diagram located inside control enclosure.
 - e. Shorten the strain chain an amount equal to the length the cable was shortened. This is to assure that any strain caused by pulling on the pendant control will be absorbed by the strain chain. To check, pull firmly on the pendant station. When strain chain becomes taut, there should be some slack in the cable. If cable is taut and strain chain is slack, remove additional length of strain chain. DO NOT USE until a condition of taut strain chain and slack cable is achieved.
6. Trolley hoists are balanced at the factory based upon the condition of the hoist "as ordered" and "as shipped". Auxiliary equipment or devices furnished and mounted by others may require additional counterweight to balance the hoist and is the responsibility of the party mounting such auxiliary equipment or devices. Lug mounted, deck mounted, winch units, and all hoists furnished without components, such as motors, control, etc., are not balanced at the factory. Hoist must hang level without a load.
7. Load block must hang straight and directly under the hoist drum. Check that limit switch weight hangs freely suspended by its cable, and that nothing interferes with its normal movement. Wire rope must be free of kinks or twists or any other damage that has distorted the rope structure. If rope is damaged, DO NOT USE hoist until rope is replaced. Check any sheaves mounted in the hoist frame for free and unobstructed rotation and movement. The hook throat opening should be measured and recorded for future reference in hook inspection and replacement. Refer to the HOOKS section of this manual.

CONNECTING POWER SUPPLY TO HOIST:



1. DISCONNECT POWER AND LOCKOUT DISCONNECTING MEANS BEFORE CONNECTING POWER SUPPLY TO HOIST.
2. Only a qualified electrician should connect the power supply to the hoist.

INSTALLATION

3. Check power supply that will be furnished to the hoist. It must be the same as shown on the hoist serial number plate. If the power supply that will be connected to the hoist is not the same as shown on the hoist serial number plate, DO NOT connect power supply to hoist. Refer to step 15 of "PRIOR TO INSTALLING HOIST" instructions.
4. Make all electrical connections in accordance with wiring diagram located in control enclosure.

BEFORE OPERATING HOIST:

1. Before energizing the power supply, and inspecting and testing the hoist prior to initial operational use, check that all electrical connections are in accordance with the wiring diagram located in hoist control enclosure.
2. ASME B30.16 requires that all new, altered, or modified hoists be inspected by a designated person prior to initial use to verify that the equipment and installation comply with applicable provisions of the standard. Such an inspection should be performed at this time, using ASME B30.16 as the basis for inspection procedures.
3. Energize the power supply to the hoist.
4. Check hoist travel for correct hook motion (hoist motor is properly phased). Since motor rotation of a three-phase AC motor can be changed by reversing any two of the lines feeding power to the motor, the direction of hook motion must be checked to verify that it is correct in accordance with the hoist control device markings.

To check hook motion direction or motor phasing:

DO NOT ACTIVATE THE DOWN BUTTON OR LEVER OF THE HOIST CONTROL DEVICE. MOMENTARILY activate the UP button or lever of the hoist control device and observe the direction of hook motion. If direction of hook travel agrees with the direction marking of the hoist control device activated (i.e., hook direction is UP when the hoist UP control device is activated), hoist motor is properly phased and proceed to step 5. If the direction of hook travel does not agree with the direction marking of the hoist control device activated (i.e., hook direction is DOWN when the hoist UP control device is activated), hoist motor is improperly phased and must be corrected. DO NOT USE HOIST until motor phasing is corrected.

WARNING

DO NOT OPERATE HOIST IF DIRECTION OF HOOK MOTION DOES NOT AGREE WITH THE DIRECTION MARKING ON THE HOIST CONTROL DEVICE ACTIVATED.

WARNING

DO NOT ATTEMPT TO CORRECT AN IMPROPERLY PHASED HOIST BY CHANGING ANY WIRING IN THE HOIST CONTROL DEVICE OR AT THE HOIST CONTACTORS; OR BY CHANGING THE MARKINGS ON THE HOIST CONTROL DEVICE.

To correct hoist motor phasing:

DANGER

- a. DISCONNECT POWER AND LOCKOUT DISCONNECTING MEANS BEFORE RECONNECTING (REVERSING) POWER LINES TO HOIST.
- b. Only a qualified electrician should reconnect the power lines to the hoist.

INSTALLATION

- c. Interchange any two lines supplying power to the hoist.
 - d. Re-energize power supply to the hoist.
 - e. Re-check hoist travel for correct hook motion. If direction of hook travel agrees with the direction marking of the hoist control device activated (i.e., hook direction is UP when the hoist UP control device is activated), hoist motor is properly phased and proceed to step 5. If the direction of hook travel does not agree with the direction marking of the hoist control device activated (i.e., hook direction is DOWN when the hoist UP control device is activated), hoist motor is improperly phased and must be corrected by repeating steps a through e.
5. If hoist has a motorized trolley, check trolley travel motion for agreement with the direction marking of the trolley control device.

To check trolley motion direction or trolley motor phasing:

MOMENTARILY activate one button or lever of the trolley control device and observe the direction of trolley motion. If direction of trolley travel agrees with the direction marking of the trolley control device activated (i.e., trolley direction is EAST when the trolley EAST control device is activated), trolley motor is properly phased. If the direction of trolley travel does not agree with the direction marking of the trolley control device activated (i.e., trolley direction is WEST when the trolley EAST control device is activated), trolley motor is improperly phased and must be corrected. DO NOT USE TROLLEY until motor phasing is corrected.

WARNING

DO NOT OPERATE TROLLEY IF DIRECTION OF TROLLEY MOTION DOES NOT AGREE WITH THE DIRECTION MARKING ON THE TROLLEY CONTROL DEVICE ACTIVATED.

WARNING

DO NOT ATTEMPT TO CORRECT AN IMPROPERLY PHASED TROLLEY BY CHANGING ANY WIRING IN THE TROLLEY CONTROL DEVICE OR AT THE TROLLEY CONTACTORS; OR BY CHANGING THE MARKINGS ON THE TROLLEY CONTROL DEVICE.

To correct trolley motor phasing:

DANGER

- a. DISCONNECT POWER AND LOCKOUT DISCONNECTING MEANS BEFORE RECONNECTING (REVERSING) POWER LINES TO TROLLEY.
- b. Only a qualified electrician should reconnect the power lines to the trolley.

- c. Interchange any two lines supplying power to the trolley motor only. DO NOT reverse main power leads to the hoist as this will also affect the phasing of the hoist motor.
- d. Re-energize power supply to the hoist.
- e. Re-check trolley travel for correct trolley motion. If direction of trolley travel agrees with the direction marking of the trolley control device activated (i.e., trolley direction is LEFT when the trolley LEFT control device is activated), trolley motor is properly phased. If the direction of trolley travel does not agree with the direction marking of the trolley control device activated (i.e., trolley direction is RIGHT when the trolley LEFT control device is activated), trolley motor is improperly phased and must be corrected by repeating steps a through e.

INSTALLATION

6. If hoist is trolley mounted, check that end stops are installed on all open ends of the monorail or bridge girder. If end stops are not present on all open ends, DO NOT operate trolley until end stops are installed.
7. Operate hoist in the raising and lowering direction, without load on the hook, and stop motion to check operation of the motor brake. The drift of the hook should not exceed one inch in either direction.
8. Complete hoists are furnished standard with a gravity type upper limit switch. An optional geared limit switch will be furnished when specified in addition to the standard gravity upper limit switch. All limit switches must be operating and must be checked.

The optional geared type limit switch operates in relation to drum turns. If the wire rope does not track in the drum grooves or if the wire rope over wraps on the drum, the relationship between turns of the drum and turns of the upper geared limit device circuit become out of sequence; and the load block will travel up to the hoist frame and drum area of the hoist before the upper limit device circuit is activated. While the hoist should never be operated with the wire rope not seated in the drum grooves or with over wrapping of the wire rope on the drum, the gravity type limit switch is furnished with the optional geared limit switch in case such a situation occurs wherein the upper geared limit device becomes out of sequence with drum turns. For this reason, the optional geared upper limit device circuit must trip prior to the load block hitting the gravity-type limit switch weight.

Check operation of limit switch or switches as follows:

- a. All checking of limit switches should be accomplished without a load on the hook. All checking of limit switches should be accomplished by using the low speed of multiple-speed hoists, or inched into the limit if the hoist is a single-speed unit.



DISCONNECT POWER AND LOCKOUT DISCONNECTING MEANS BEFORE ADJUSTING LIMIT SWITCHES. LIMIT SWITCHES SHOULD BE ADJUSTED USING A CONTINUITY TESTER OR OTHER TYPE OF TESTER THAT WILL INDICATE OPEN OR CLOSED CIRCUITS WITHOUT THE NEED OF ELECTRICAL POWER.

Only a qualified electrician should adjust switches.

- b. Hoists with the standard gravity type upper limit switch:
 - (1) Check the gravity type upper limit switch by operating the hoist in the lifting direction. While the load block is raising, lift the weight of the upper gravity type limit switch manually until motion of the load block stops. Lifting the weight higher should cause the load block to lower until the weight is released. If raising motion does not stop when the weight is lifted, STOP hoist motion as the upper gravity limit switch requires adjustment or replacement. The lowering motion achieved by lifting the weight after raising motion of the load block has stopped is a reverse plugging feature to minimize the possibility of the load block striking the hoist frame or drum if the motor brake is out of adjustment. If adjustment of the gravity type upper limit switch is required, refer to the LIMIT SWITCHES section of this manual.
 - (2) Operate hoist in the lifting direction to a point where the block is about 12" inches below the hoist drum. If the hoist has more than one speed, continue to raise at low speed or; if hoist is a single-speed unit, inch the load block in the lifting direction until motion of the load block stops. This is to check that load block stops when striking the weight of the gravity upper limit switch before striking any other part of the hoist. If the load block will hit any part of the hoist prior to striking the weight of the gravity type limit switch, STOP hoist motion as the upper gravity limit switch requires adjustment or replacement. If adjustment of the gravity type upper limit device is required, refer to the LIMIT SWITCHES section of this manual.
 - (3) Operate the hoist in the lowering direction until the load block reaches its lowest point of travel. At this location of the load block two wraps of wire rope must remain at each anchorage on the hoist drum. IF LESS THAN TWO WRAPS REMAIN AT EACH ANCHORAGE ON THE DRUM, DO NOT USE THE HOIST AT THIS LOCATION. Contact Acco/Harrington or the distributor of the hoist.

WARNING

HOISTS THAT ARE LOCATED WHERE THE LOAD BLOCK CAN BE LOWERED INTO PITS OR LOWERED TO OTHER LEVELS BELOW THE OPERATING FLOOR LEVEL OF THE HOIST MUST HAVE A LOWER LIMIT SWITCH IN ACCORDANCE WITH ASME B30.16. IF THE HOIST IS TO BE USED IN SUCH AN APPLICATION AND IT DOES NOT HAVE A LOWER LIMIT SWITCH, DO NOT USE THE HOIST; CONTACT ACCO MATERIAL HANDLING SOLUTIONS OR THE DISTRIBUTOR OF THE HOIST.

- c. Hoists with the standard gravity type upper limit switch and an optional geared type upper and lower limit switch:
- (1) Operate hoist in the lowering direction until motion of the load block stops to check lower geared limit device circuit. While lowering the load block, watch the wire rope paying off the drum. If all the wire rope will pay off the drum before the lower geared limit device stops load block motion, STOP hoist motion as the lower geared limit device requires adjustment. The hoist lower geared limit device is set at the factory to stop lower travel of the load block with two wraps of wire rope remaining at each anchorage on the drum. ASME B30.16 allows one wrap of wire rope remaining at each anchorage on the drum when a lower limit device is used. It is recommended that the lower geared limit device be set to prevent the load block from resting on the floor and allowing the hoisting ropes to go slack. If adjustment of the lower geared limit device is required, refer to the LIMIT SWITCHES section of this manual.
 - (2) Operate hoist in the lifting direction to a point where the block is about 12" inches below the hoist drum. If the hoist has more than one speed, continue to raise at low speed or; if hoist is a single-speed unit, inch the load block in the lifting direction until motion of the load block stops to check upper geared limit switch circuit. If the load block will hit the weight of the gravity type limit switch before the upper geared limit device stops load block motion, STOP hoist motion as the upper geared limit device requires adjustment. The hoist upper geared limit device is set at the factory to stop upper hook travel when the top of the load block is 2" inches below the weight of the gravity type limit switch. If adjustment of the upper geared limit device is required, refer to the LIMIT SWITCHES section of this manual.

WARNING

OPTIONAL GEARED UPPER LIMIT DEVICE MUST BE ADJUSTED SO THAT WHEN IT IS TRIPPED, THERE IS A MINIMUM OF 2" INCHES BETWEEN THE TOP OF THE LOAD BLOCK AND THE WEIGHT OF THE GRAVITY TYPE UPPER LIMIT SWITCH.

- d. An optional hoist power-circuit limit switch is available when specified. A power circuit limit switch is checked in the same manner as the gravity type upper limit switch by manually lifting the limit switch tripping device while operating the hoist in the lifting direction.

WARNING

NEVER OPERATE HOIST WITHOUT THE PROTECTION OF PROPERLY FUNCTIONING LIMIT SWITCHES.

HOIST LIMIT SWITCHES SHALL NOT BE USED AS A NORMAL MEANS OF STOPPING TRAVEL MOTION OR THE LOAD. THESE ARE EMERGENCY DEVICES ONLY.

THE PRIMARY UPPER AND LOWER LIMIT SWITCH SHOULD BE CHECKED WITHOUT LOAD ON THE HOOK AT THE START OF EACH SHIFT, OR THE FIRST TIME HOIST IS TO BE OPERATED DURING EACH SHIFT.

THESE INSTRUCTIONS APPLY TO LIMIT SWITCH ADJUSTMENT FOR AN UNLOADED LOAD BLOCK ONLY. LIMIT SWITCHES MUST BE ADJUSTED TO PREVENT THE LOAD BLOCK OR THE LOAD BEING LIFTED FROM COMING INTO CONTACT WITH ANY PART OF THE HOIST; OR THE CRANE, HOIST SUPPORT STRUCTURE, OR OTHER EQUIPMENT WHERE THE HOIST IS INSTALLED.

INSTALLATION

9. Winch type units may be furnished with only an optional geared type limit switch or without any type of limit switch depending upon ordering specifications. The majority of winch units are furnished without wire rope, or with wire rope lengths to be reeved into a system of sheaves designed by others. Therefore, the standard gravity type limit switch mounted on the hoist frame has no effect on the relative upper limit position of the load block or load. **THEREFORE,**

WARNING

SYSTEM DESIGNERS, MANUFACTURERS, AND/OR OWNERS/USERS OF SYSTEMS USING A WINCH TYPE UNIT ARE RESPONSIBLE FOR THE INSTALLATION AND ADJUSTMENT OF LIMIT SWITCHES IN THE LIFTING SYSTEM TO PREVENT THE LOAD BLOCK OR THE LOAD BEING LIFTED FROM COMING INTO CONTACT WITH ANY PART OF THE WINCH; OR THE SYSTEM, SYSTEM SUPPORT STRUCTURE, OR OTHER EQUIPMENT THAT IS PART OF THE SYSTEM WHERE THE WINCH IS INSTALLED.

10. Operate the hoist without a load on the hook through the entire lifting range to check that limit switches function properly and that load block and hook do not interfere with any other items or pieces of equipment located in the operating area.
11. If hoist has a trolley, operate the trolley, without a load on the hoist hook, for the entire travel distance of the trolley to check that trolley, hoist, load block, and hook do not interfere with any other items or pieces of equipment located in the path of travel.
12. Hoist is now ready to be load tested, if required.

HOIST LOAD TEST:

1. Complete hoists are load tested by Acco/Harrington in accordance with ASME B30.16. Exceptions to this procedure could occur if special design features of the hoist do not permit it to be placed in the Acco/Harrington hoist load test stand. In such cases, the purchaser shall be notified of this fact, and it is the responsibility of the owner/user to load test the hoist in accordance with ASME B30.16.
2. Hoists furnished in an uncompleted condition (i.e. less controls, less motor, less wire rope, etc.) as hoist components, and winch units are not load tested by Acco/Harrington. Therefore, it is the responsibility of the owner/user to load test the final lifting system using such hoist components or winches in accordance with ASME B30.16.
3. If the hoist is installed on a crane, load testing of the crane in accordance with, as applicable, ASME B30.2, ASME B30.11, or ASME B30.17 may be required.
4. If a load test in accordance with one of the B30 Standards is not required, the hoist should still be operated with a load on the hoist hook prior to being released for operating purposes.
 - a. Attach a load to the hoist hook. Load shall not exceed the rated load capacity of the hoist.
 - b. Before lifting the load, operate the hoist in the raising direction to take any slack out of the hoist wire rope.
 - c. Raise the load a few inches and stop the hoist. If brakes stop and hold the load, continue raising and lowering the load several feet, stopping the hoist several times in each direction to check that the hoist braking system stops and holds the load.
 - d. If the hoist braking system stops and holds the load, the hoist operates in accordance with the control devices, and no unusual sounds are present during operation, the hoist is ready to be released for operating purposes.
 - e. If the hoist braking system does not stop and hold the load, the hoist does not operate in accordance with the control devices, or any unusual sounds are present during operation, the hoist is not ready to be released for operating purposes; and corrective action must be taken.
5. All personnel that will operate the hoist shall read the OPERATION section of this manual, the WARNINGS contained in this manual, and instruction and WARNING labels on the hoist before operating the hoist or lifting system.

OPERATION

Operation of an overhead hoist involves more than activating the buttons or levers of the hoist control device. It is emphasized in the ASME B30 Standards that the use of overhead hoists is subject to certain hazards that cannot be met by mechanical means, but only by the exercise of intelligence, care, common sense, and experience in anticipating the motions that will occur as a result of activating the hoist controls. Certain precautions are necessary before moving the load and this includes the proper rigging of loads to the hoist hook.

⚠ WARNING

HOIST OPERATORS SHALL BE REQUIRED TO READ THE OPERATION SECTION OF THIS MANUAL, THE WARNINGS CONTAINED IN THIS MANUAL, INSTRUCTION AND WARNING LABELS ON THE HOIST OR LIFTING SYSTEM, AND THE OPERATION SECTION OF ASME B30.16; AND TO BE FAMILIAR WITH THE HOIST AND HOIST CONTROLS BEFORE BEING AUTHORIZED TO OPERATE THE HOIST OR LIFTING SYSTEM.

HOIST OPERATORS SHOULD BE TRAINED IN PROPER RIGGING PROCEDURES TO BE FOLLOWED IN THE ATTACHMENT OF LOADS TO THE HOIST HOOK.

HOIST OPERATORS SHOULD BE TRAINED TO BE AWARE OF POTENTIAL MALFUNCTIONS OF THE EQUIPMENT THAT REQUIRE ADJUSTMENT OR REPAIR, AND TO BE INSTRUCTED TO STOP OPERATION IF SUCH MALFUNCTIONS OCCUR, AND TO IMMEDIATELY ADVISE THEIR SUPERVISOR SO CORRECTIVE ACTION CAN BE TAKEN.

HOIST OPERATORS SHOULD HAVE NORMAL DEPTH PERCEPTION, FIELD OF VISION, REACTION TIME, MANUAL DEXTERITY, AND COORDINATION.

HOIST OPERATORS SHOULD NOT BE SUBJECT TO SEIZURES, LOSS OF PHYSICAL CONTROL, PHYSICAL DEFECTS, OR EMOTIONAL INSTABILITY THAT COULD RESULT IN ACTIONS OF THE OPERATOR BEING A HAZARD TO THE OPERATOR OR OTHERS.

HOIST OPERATORS SHOULD NOT OPERATE A HOIST OR LIFTING SYSTEM WHEN UNDER THE INFLUENCE OF ALCOHOL, DRUGS, OR MEDICATION.

OVERHEAD HOISTS ARE INTENDED ONLY FOR VERTICAL LIFTING SERVICE OF FREELY SUSPENDED UNGUIDED LOADS. DO NOT USE HOIST FOR LOADS THAT ARE NOT LIFTED VERTICALLY, LOADS THAT ARE NOT FREELY-SUSPENDED, OR LOADS THAT ARE GUIDED. IF SUCH CONDITIONS EXIST, CONTACT ACCO/HARRINGTON.

BEFORE EACH SHIFT OR BEFORE THE FIRST TIME THE HOIST IS TO BE USED EACH SHIFT:

THE OPERATOR:

- SHALL visually inspect wire rope for broken wires, broken strands, kinks, and any type of deformation or damage of the rope structure.
- SHALL visually inspect hooks for nicks, gouges, deformation of the throat opening, wear on saddle or load bearing point, and twisting.
- SHALL visually inspect hook latches for proper operation or damage that does not allow proper operation.
- SHALL replace warning label if missing or illegible.

OPERATION

SHALL report any damage or malfunctions to the supervisor.

SHALL NOT operate hoist if any damage or malfunctions exist.

SHALL NOT operate hoist if it is tagged with an out-of-order sign.

BEFORE OPERATING THE HOIST AND APPLYING THE LOAD:

THE OPERATOR:

SHALL be familiar with all operating controls of the hoist.

SHALL be familiar with the OPERATION Section of this manual, the WARNINGS contained in this manual, instructions and WARNING labels on the hoist and lifting system, and the OPERATION Section of ASME B30.16.

SHALL be instructed in the operation or operations to be performed.

SHALL NOT operate hoist if any damage or malfunctions exist; and SHALL report any damage or malfunctions to the supervisor.

SHALL NOT operate hoist if it is tagged with an out-of-order sign.

SHALL center hoist over load.

SHALL NOT use the hoist wire rope as a sling to wrap around the load.

SHALL attach the load to the hoist hook by suitable means such as slings or lifting devices.

SHALL only attach loads to the hoist hook that do not exceed the rated load capacity of the hoist.

SHALL verify that the size of the attachment of the sling or other lifting device to be used is compatible with the size of the hoist hook.

SHALL verify that the attachment part of the sling or other lifting device is properly seated in the base, bowl, or saddle of the hoist hook.

SHALL verify that the hook latch operates properly and that the hook latch properly bridges and closes the hook throat opening.

SHALL verify that the latch of the hoist hook will not support any part of the load.

SHALL verify that the load or any part of the load will not be applied to and/or not supported by the tip or point of the hook.

SHALL verify that load will be properly balanced when it is lifted.

SHALL verify that side loads will not be applied to the hoist when the load is lifted.

SHALL verify that hoist wire rope is not kinked or twisted, and that wire rope parts are not twisted about each other.

SHALL verify that hoist wire rope is properly seated in the drum grooves and sheaves.

SHALL notify personnel in the area that a load will be lifted and verify that all personnel are clear of the load.

SHALL verify that when the load is lifted, it will clear all material, machinery, or other obstructions in the area.

OPERATION

WHILE OPERATING THE HOIST AND MOVING THE LOAD:

THE OPERATOR:

SHALL NOT engage in any activity that will divert the attention of the operator.

SHALL NOT lift, lower, or transport a load with the hoist until the operator and all other personnel are clear of the load and the path of the load.

SHALL verify that the load and hoist will clear all obstacles before moving or rotating the load.

SHALL avoid moving loads over personnel.

SHALL NOT lift, lower, or transport personnel by means of the hoist, trolley, hoist hook, or load.

SHALL slowly inch the hook into engagement with the load to eliminate wire rope slack and reduce impact loading of the hoist.

SHALL avoid unnecessary inching and quick reversals of direction.

SHALL only lift the load a few inches to verify that the load is properly balanced before continuing with the lift.

SHALL only lift the load a few inches to verify that the hoist braking system is functioning properly before continuing with the lift.

SHALL avoid swinging of the load or hoist hook when the hoist is traveling.

SHALL avoid sharp contact between trolleys or between trolleys and stops.

SHALL NOT use hoist limit switches or devices as a normal means of stopping the hoist.

SHALL NOT lower the load beyond the point where less than two wraps of wire rope remain at each anchorage on the drum, unless a lower limit device is provided, in which case no less than one wrap of wire rope shall remain at each anchorage on the drum.

PARKING THE LOAD:

THE OPERATOR:

SHALL NOT lower a load with the hoist until the operator and all other personnel are clear of the load and the path of the load.

SHALL verify that the load will clear all obstacles before lowering the load.

SHALL block loads before landing if slings or other lifting devices must be removed from under the landed load.

SHALL exercise care when removing a sling from under a landed and blocked load.

SHALL NOT leave a suspended load unattended unless specific precautions to prevent the load from inadvertent lowering have been instituted and are in place.

SHALL position the hoist load block and hook above head level for storage when the hoist is not in use.

OPERATION

GENERAL:

THE OPERATOR:

SHALL know hand signals used for hoist and crane operations if a signal-person is used in the operation, and accept signals of only persons authorized to give hand signals EXCEPT to obey a stop signal regardless of who gives it.

SHALL NOT adjust or repair a hoist unless qualified and authorized to perform maintenance.

SHALL NOT use a hoist load limiting device as a means to measure the load.

GENERAL DO'S AND DO NOT'S:

DO establish a regular inspection schedule and maintain a record of all inspections performed with special attention directed to wire ropes, hooks, and brakes.

DO remove the hoist from service and perform necessary maintenance and repair.

DO follow recommended maintenance procedures for taking a hoist out of service to inspect and perform maintenance and repair.

DO use the original hoist manufacturer's recommended parts when repairing a hoist and replacing worn or damaged parts.

DO NOT allow unqualified or unauthorized personnel to operate, inspect, maintain, or repair the hoist.

DO NOT operate a hoist that is damaged or has any actual or suspected mechanical or electrical malfunction.

DO NOT attempt to lengthen wire rope or repair damaged wire rope.

DO NOT use the wire rope, any part of the hoist, or the load block and hook as a ground for welding.

DO NOT allow a welding electrode to be touched to the wire rope.

DO NOT remove or obscure any warnings or warning labels on the hoist.

DO NOT walk under a suspended load.

DO NOT perform ANY work on a suspended load that requires a worker to be positioned under the suspended load.

WARNING

DO NOT WALK UNDER A SUSPENDED LOAD.

DO NOT PERFORM ANY WORK ON A SUSPENDED LOAD THAT REQUIRES A WORKER TO BE POSITIONED UNDER THE SUSPENDED LOAD.

IF IT IS ESSENTIAL THAT A WORKER BE POSITIONED UNDER A SUSPENDED LOAD TO PERFORM WORK ON THE SUSPENDED LOAD; SUCH WORK SHALL NOT BE STARTED OR PERFORMED UNTIL OTHER AUXILIARY SUPPORTING MEANS ARE PLACED UNDER THE SUSPENDED LOAD. FAILURE TO USE OTHER AUXILIARY SUPPORTING MEANS COULD RESULT IN SERIOUS BODILY INJURY OR DEATH, AND/OR PROPERTY DAMAGE.

MOTOR OVERLOAD FEATURES

Complete hoists are furnished with several motor overload features. These features de-energize the hoist motor or the hoist control circuit for the purpose of stopping operation of the hoist when a condition arises that makes it unwise, or even hazardous, for continued operation. Therefore, if the hoist should stop during operation, or if the hoist should fail to pick up a load, first consider and investigate these motor overload features. Standard features, unless otherwise specified, on complete hoists include:

- Limit Switches
- Motor Thermostats

LIMIT SWITCHES:

A gravity type upper limit switch is standard on all complete hoists, unless otherwise specified. An optional upper and lower geared limit switch is available when specified. Limit switches are not supplied with winch type units or single line units unless specified.

These limit switches are described in item 8 of "BEFORE OPERATING HOIST" instructions of the INSTALLATION section of this manual. If the hoist should stop during operation, or if the hoist should fail to pick up a load, check to determine if one of the limit switches has tripped. Refer to the LIMIT SWITCHES section of this manual for instructions if adjustment of either the geared type limit switch or the gravity type limit switch is required.

MOTOR THERMOSTATS:

A bi-metallic, automatic thermostat is built into the motor windings. This thermostat will cause the motor control to be de-energized when the temperature of the motor winding exceeds a predetermined temperature limit. It provides full running protection against motor overheating. The motor control will continue to be de-energized until the temperature of the winding is reduced below the temperature cutoff point and then the hoist may be operated as before.

OPTIONAL ITEMS:

Other motor overload features may be furnished on the hoist as specified; furnished by others as part of a crane or lifting system that utilizes the hoist; or installed as part of the system or building by the installer or owner/user of the hoist as required by ANSI/NFPA 70, National Electrical Code, or applicable Federal, State, or Local Codes. Such items could include thermal overload relays, branch circuit fuses, or main line fuses. Refer to wiring diagram enclosed in the hoist control enclosure to determine if any additional motor overload features are furnished with the hoist. If the hoist is installed in a crane or lifting system designed and manufactured by others, refer to the wiring diagram for the crane or lifting system to determine if any additional motor overload features are furnished as part of the crane or lifting system.

An overload cutoff device is available as an optional feature on all complete hoists. An overload cutoff device is not available with winch type units or single line units as a part of the unit. If the hoist is equipped with an optional overload cutoff device, refer to the OVERLOAD CUTOFF DEVICE section of this manual.

MAINTENANCE AND INSPECTION PROCEDURES

Hoists shall be maintained, inspected, and tested in accordance with the MAINTENANCE AND REPAIR section and INSPECTION AND TEST section of this manual and in accordance with the intervals and requirements of ASME B30.16. Cranes shall be maintained, inspected, and tested in accordance with the manual furnished by the crane manufacturer and in accordance with the intervals and requirements of, as applicable, ASME B30.2, ASME B30.11, or ASME B30.17.

Before maintenance or inspections are performed on a hoist, trolley, crane, crane runway, crane runway or monorail support, or crane runway or monorail conductors, the following precautions shall be taken as applicable.

1. The hoist, trolley, or crane to be inspected, tested, or repaired shall be run to a location where it will cause the least interference with other hoists, cranes, and operations in the area.
2. If a load is attached to the hoist hook, it shall be landed.
3. All controllers shall be placed in the off position.
4. If hoist is trolley suspended, the trolley shall be blocked to prevent trolley movement.
5. If hoist is installed on a crane, the crane shall be blocked to prevent crane movement.

DANGER

6. HAZARDOUS VOLTAGES ARE PRESENT IN THE CONTROL BOX, OTHER ELECTRICAL COMPONENTS, AND CONNECTIONS BETWEEN THESE COMPONENTS.

The main switch (disconnect) of the hoist, crane, or lifting system shall be de-energized. Lock and tag the main switch in the de-energized position in accordance with ANSI Z244.1.

7. Warning signs and barriers shall be utilized on the floor beneath the hoist, crane, or lifting system where overhead maintenance, repair, or inspection work creates a hazardous area on the floor beneath the hoist, crane, or lifting system.
8. If the crane runway or monorail remains energized because other hoists or cranes on the same runway or monorail are in operation, rail stops or a signal person(s), located full-time at a visual vantage point for observing the approach of an active hoist(s) or an active crane(s), shall be provided to prohibit contact by the active hoist(s) or crane(s) with the idle hoist or crane; with persons performing maintenance, repair, or inspection; and with equipment used in performing the maintenance, repair, or inspection.
9. A guard or barrier shall be installed between adjacent runways for the length of the established work area to prevent contact between persons performing maintenance, repair, or inspection and a crane on the adjacent runway.
10. Safe access to the hoist, crane, or lifting system, such as scaffolding, work platforms, etc., shall be provided for personnel that will perform maintenance, repair, or inspection. If personnel are required to work at elevations in excess of 6' feet above floor or ground level, a fall prevention policy and procedure shall be developed, documented, and implemented by the owner/user.
11. After maintenance, repair, or inspection work is completed, and before the hoist, crane, or lifting system is returned to normal operation:
 - a. Any guards on the hoist, crane, or lifting system that were removed to perform maintenance, repair, or inspection work shall be reinstalled.
 - b. Any safety devices on the hoist, crane, or lifting system that were deactivated to perform maintenance, repair, or inspection work shall be reactivated.
 - c. Any parts that were replaced and other loose material shall be removed.
 - d. All equipment used in the maintenance, repair, or inspection work shall be removed.

MAINTENANCE AND INSPECTION PROCEDURES

12. Warning signs, barriers, and guards shall be removed only by authorized personnel.
13. Lock and tag on the main switch (disconnect) of the hoist, crane, or lifting device shall be removed only by the person that locked and tagged the main switch originally, or an authorized person.
14. If the extent of the maintenance or repair work requires any testing as outlined in the INSPECTION AND TEST SECTION of this manual; the manual furnished by the crane manufacturer; or as required by, as applicable, the provisions of ASME B30.16, ASME B30.2, ASME B30.11, or ASME B30.17; such tests shall be conducted before the hoist, crane, or lifting system is returned to normal operation.

INSPECTION

Inspection procedure for hoists in regular service is divided into two general classifications as outlined in ASME B30.16. These two general classifications are based upon the intervals at which inspections should be performed. The intervals are dependent upon the nature of the critical components of the hoist, and the degree of exposure of hoist components and parts to wear and deterioration. The degree of exposure is dependent upon hoist activity, severity of hoist service, and the environment of hoist location. These two general classifications of hoist inspection are designated as frequent and periodic. In addition, daily inspections are required to be performed by the operator at the start of each shift, or at the time the hoist is first used during each shift.

FREQUENT INSPECTION: Frequent inspections are visual inspections and examinations by the operator or other designated personnel with records not required. Nominal inspection intervals are as follows:

Normal service - monthly

Heavy service - weekly to monthly

Severe service - daily to weekly

PERIODIC INSPECTION: Periodic inspections are visual and audio inspections and examinations by designated personnel making records of external conditions to provide the basis for a continuing evaluation of the hoist and components. If the external inspection indicates the need, some disassembly may be required to make a more detailed inspection and examination. Nominal inspection intervals are as follows:

Normal service - annually

Heavy service - semiannually

Severe service - quarterly

WARNING

THE INSPECTION INTERVALS LISTED ABOVE ARE NOMINAL RECOMMENDATIONS FOR REFERENCE PURPOSES ONLY. THEY ARE BASED ON SINGLE SHIFT OPERATION UNDER NORMAL OPERATING CONDITIONS AND NORMAL ENVIRONMENTAL CONDITIONS. ACTUAL OPERATING AND ENVIRONMENTAL CONDITIONS SHOULD BE REVIEWED BY A QUALIFIED PERSON AND INSPECTION INTERVALS ESTABLISHED ON THE RECOMMENDATIONS OF THE QUALIFIED PERSON.

Definitions of service from ASME B30.16 are as follows:

Normal service involves operation of the hoist with randomly distributed loads within the rated load limit, or uniform loads less than 65% of rated load, for not more than 25% of the time for a single work shift.

Heavy service involves operation of the hoist within the rated load limit that exceeds normal service.

Severe service involves operation of the hoist in normal service or heavy service with abnormal operating conditions.

A hoist that is not in regular service, that has been idle for a period of one month or more, but less than one year, shall be inspected in accordance with the requirements for frequent inspection before being placed into service.

A hoist that is not in regular service, that has been idle for a period of one year or more, shall be inspected in accordance with the requirements for periodic inspection before being placed into service.

INSPECTION

Required daily inspection items to be performed by the operator at the start of each shift, or at the time the hoist is first used during each shift are shown in Table 1.

**TABLE 1
DAILY INSPECTIONS BY THE OPERATOR**

INSPECTION ITEM	DESCRIPTION OF INSPECTION CHECK POINTS
Tagged Hoist	Check that hoist is not tagged with an out-of-order sign.
Control Devices	Check that travel motions agree with control device markings.
Hook	Check for damage, cracks, nicks, gouges, deformation of the throat opening, wear on saddle or load bearing point, and twist. Refer to HOOK section of this manual.
Hook Latch	Check that hook latch is not missing and that it operates properly.
Wire Rope	Check for broken wires, broken strands, kinks, and any type of deformation or damage to the rope structure. Refer to WIRE ROPE section of this manual.
Reeving	Check that wire rope is properly reeved and that rope parts are not twisted about each other. Refer to WIRE ROPE section of this manual.
Brakes	Check that hoist and trolley motions do not have excessive drift.
Limit Switches	Check that gravity type upper limit switch stops lifting motion of the hoist load block before striking any part of the hoist. If supplied, check that the upper geared limit device stops lifting motion of the hoist load block 2" inches below the weight of the gravity type limit switch. If supplied, check that the lower geared limit device stops lowering motion of the hoist hook with two wraps of wire rope at each anchorage on the drum (unless the lower geared limit device is set for one wrap at each anchorage).
Oil Leakage	Check for any sign of oil leakage on the hoist and on the floor area beneath the hoist.
Unusual Sounds	Check for any unusual sounds from the hoist and hoist mechanism while operating the hoist.
Warning Label	Check that warning label is not missing and that it is legible.

WARNING

IF ANY DAMAGE OR MALFUNCTIONS ARE NOTED BY THE DAILY INSPECTION ITEMS OF TABLE 1, THE OPERATOR SHALL NOT OPERATE THE HOIST, AND SHALL IMMEDIATELY ADVISE THE SUPERVISOR SO CORRECTIVE ACTION CAN BE TAKEN. IF THE HOIST IS TAGGED WITH AN OUT-OF-ORDER SIGN, THE OPERATOR SHALL NOT OPERATE THE HOIST.

HOIST OPERATORS SHOULD BE TRAINED TO BE AWARE OF MALFUNCTIONS OF THE EQUIPMENT DURING OPERATION, AND TO IMMEDIATELY STOP OPERATION IF SUCH MALFUNCTIONS OCCUR, AND TO IMMEDIATELY ADVISE THE SUPERVISOR SO CORRECTIVE ACTION CAN BE TAKEN.

INSPECTION

Recommended items to be checked for deficiencies or damage during frequent and periodic inspections are shown in Table 2. Detailed inspection procedures for some items will be found in specific sections of this manual. These inspections may be performed with the hoist in its normal location and do not require that the hoist be disassembled. Covers and other items normally supplied to allow inspection of components should be opened or removed for these inspections. Any deficiencies or damage such as those listed in Table 2 shall be examined by a designated person to determine whether they constitute a hazard, or whether any disassembly is necessary for a more detailed examination. The hoist operator should make observations during regular operation for any deficiencies or damage that might appear between inspections.

**TABLE 2
FREQUENT AND PERIODIC INSPECTIONS**

INSPECTION ITEM	FREQUENCY		DEFICIENCIES OR DAMAGE TO LOOK FOR
	FREQUENT	PERIODIC	
All functional operating mechanisms	•	•	Maladjustment that interferes with operating mechanisms proper operation and unusual sounds
Control devices	•	•	Improper operation
Limit switch devices (For detailed inspection procedures, refer to LIMIT SWITCH section of this manual)	•	•	Maladjustment or malfunction
Hook (For detailed inspection procedures, refer to HOOK section of this manual. Also refer to ASME B30.10)	•	•	Chemical damage, cracks, deformation, excessive throat opening, twist, and wear on load bearing surface
Hook latch	•	•	Missing or damage that prevents proper operation
Hook retaining members (Nuts, collars, pins, etc.)	•	•	Not properly secured (tightened), damaged or missing parts
Wire rope reeving	•	•	Reeving not in accordance with the WIRE ROPE section of this manual
Wire rope (For detailed inspection procedures, refer to WIRE ROPE section of this manual)	•	•	Broken wires, broken strands, wear, twist, kinks, distortion of rope structure, end connections, deposits of foreign material, heat damage, and in adequate lubrication
WARNING label	•	•	Missing or illegible
Control device markings	•	•	Missing or illegible
Lubricant levels (For detailed inspection procedures, refer to LUBRICATION section of this manual)	•	•	Lubricant must be added or replaced
Fastening devices (bolts, nuts, pins, etc.)	•	•	Not properly secured (tightened), damaged or missing parts

INSPECTION

Drums and sheaves	•	•	Cracks, damage to groves, and excessive wear
Motor brake (For detailed inspection procedures, refer to MOTOR BRAKE section of this manual)	•	•	Drift and excessive wear
Load brake (For detailed inspection procedures, refer to LOAD BRAKE section of this manual)	•	•	Drift
Load block, suspension frame	•	•	Cracks, damage and distortion
Supporting structure and trolley	•	•	Cracks, damage and distortion
Trolley wheels	•	•	Flat spots, damage excessive wear
Electrical apparatus	•	•	Pitting, deterioration, wear and improper operation
Wiring and fittings	•	•	Loose connections, abraded, cut, or nicked insulation

WARNING

IF ANY DAMAGE OR MALFUNCTIONS ARE NOTED BY THE FREQUENT OR PERIODIC INSPECTION ITEMS OF TABLE 2, THE HOIST SHALL BE TAGGED WITH AN OUT-OF-ORDER SIGN AND SHALL NOT BE RETURNED TO REGULAR OPERATION UNTIL MAINTENANCE AND REPAIR OF THE DAMAGE OR DEFICIENCIES FOUND DURING THE INSPECTION HAVE BEEN CORRECTED.

Records of the condition of critical components such as wire rope, hooks, and brakes observed during frequent and periodic inspections should be established. This record should also record replacement, maintenance, and repair information. Use of this recorded information will allow a preventative maintenance program to be established for replacement of worn components on a regular basis, thereby eliminating or reducing unscheduled downtime situations.

If maintenance, adjustment, replacement of parts, or repair of the hoist is required because of any damage or malfunctions noted during the frequent or periodic inspections, refer to the MAINTENANCE AND REPAIR section of this manual and other sections of this manual for specific instructions or parts identification. Before performing any maintenance on the hoist, refer to the MAINTENANCE AND INSPECTION PROCEDURES section of this manual. After performing maintenance, adjustment, or replacement of parts or components, refer to the TEST section of this manual.

TEST

All new complete hoists, less trolley or trolleys, are load tested by Acco/Harrington in accordance with ASME B30.16. Exceptions to this procedure could occur if special design features of the hoist do not permit it to be placed in the Acco/Harrington hoist load test stand. In such cases, the purchaser shall be notified of this fact, and it is the responsibility of the owner/user to load test the hoist in accordance with ASME B30.16.

Hoists furnished in an uncompleted condition (i.e. less controls, less motor, less wire rope, etc.) as hoist components, and winch units are not load tested by Acco/Harrington. Therefore, it is the responsibility of the owner/user to load test the final lifting system using such hoist components or winches in accordance with ASME B30.16. Refer to the "HOIST LOAD TEST" portion of the INSTALLATION section of this manual for instructions for performing a load test on new hoists or new hoists used in a lifting system.

If the hoist is installed on a crane, load testing of the crane in accordance with, as applicable, ASME B30.2, ASME B30.11, or ASME B30.17 may be required.

Testing of hoists after original installation is required when the hoist has been altered or repaired; has been idle for a period of 12 months or longer; or in accordance with specific testing requirements established by the owner/user. General testing requirements are outlined in ASME B30.16 and should be followed. ASME B30.16 lists two types of hoist tests as follows:

1. Operational test
2. Load Test

ASME B30.16 uses the words SHALL and SHOULD in listing requirements, and defines these two words as follows:

SHALL - indicates that the rule is mandatory and must be followed.

SHOULD - indicates that the rule is a recommendation, the advisability of which depends on the facts in each situation.

OPERATIONAL TEST:

All altered or repaired hoists, or hoists that have not been used within the preceding 12 months, **SHALL** be tested by the owner/user before being placed in operational service. The operational test is performed without a load on the hook and includes: (1) operation of control devices; (2) lifting and lowering; (3) operation of brakes; and (4) operation and setting of limit switch devices.

Operational test steps are as follows:

1. Check hoist travel for correct hook motion (hoist motor is properly phased). Since motor rotation of a three-phase AC motor can be changed by reversing any two of the lines feeding power to the motor, the direction of hook motion must be checked to verify that it is correct in accordance with the hoist control device markings.

To check hook motion direction or motor phasing:

MOMENTARILY activate the **UP** button or lever of the hoist control device and observe the direction of hook motion. If direction of hook travel agrees with the direction marking of the hoist control device activated (i.e., hook direction is UP when the hoist UP control device is activated), hoist motor is properly phased and proceed to step 2. If the directions of hook travel does not agree with the direction marking of the hoist control device activated (i.e., hook direction is DOWN when the hoist UP control device is activated), hoist motor is improperly phased and must be corrected. **DO NOT USE HOIST** until motor phasing is corrected.

WARNING

DO NOT OPERATE HOIST IF DIRECTION OF HOOK MOTION DOES NOT AGREE WITH THE DIRECTION MARKING ON THE HOIST CONTROL DEVICE ACTIVATED.

WARNING

DO NOT ATTEMPT TO CORRECT AN IMPROPERLY PHASED HOIST BY CHANGING ANY WIRING IN THE HOIST CONTROL DEVICE OR AT THE HOIST CONTACTORS; OR BY CHANGING THE MARKINGS ON THE HOIST CONTROL DEVICE.

TEST

To correct hoist motor phasing:

DANGER

- a. DISCONNECT POWER AND LOCKOUT DISCONNECTING MEANS BEFORE RECONNECTING (REVERSING) POWER LINES TO HOIST.
 - b. Only a qualified electrician should reconnect the power lines to the hoist.
- c. Interchange any two lines supplying power to the hoist.
 - d. Re-energize power supply to the hoist.
 - e. Re-check hoist travel for correct hook motion. If direction of hook travel agrees with the direction marking of the hoist control device activated (i.e., hook direction is UP when the hoist UP control device is activated), hoist motor is properly phased and proceed to step 2. If the direction of hook travel does not agree with the direction marking of the hoist control device activated (i.e., hook direction is DOWN when the hoist UP control device is activated), hoist motor is improperly phased and must be corrected by repeating steps a through e.
2. If hoist has a motorized trolley, check trolley travel motion for agreement with the direction marking of the trolley control device.

To check trolley motion direction or trolley motor phasing:

MOMENTARILY activate one button or lever of the trolley control device and observe the direction of trolley motion. If direction of trolley travel agrees with the direction marking of the trolley control device activated (i.e., trolley direction is EAST when the trolley EAST control device is activated), trolley motor is properly phased. If the direction of trolley travel does not agree with the direction marking of the trolley control device activated (i.e., trolley direction is RIGHT when the trolley LEFT control device is activated), trolley motor is improperly phased and must be corrected. DO NOT USE TROLLEY until motor phasing is corrected.

WARNING

DO NOT OPERATE TROLLEY IF DIRECTION OF TROLLEY MOTION DOES NOT AGREE WITH THE DIRECTION MARKING ON THE TROLLEY CONTROL DEVICE ACTIVATED.

WARNING

DO NOT ATTEMPT TO CORRECT AN IMPROPERLY PHASED TROLLEY BY CHANGING ANY WIRING IN THE TROLLEY CONTROL DEVICE OR AT THE TROLLEY CONTACTORS; OR BY CHANGING THE MARKINGS ON THE TROLLEY CONTROL DEVICE.

To correct trolley motor phasing:

DANGER

- a. DISCONNECT POWER AND LOCKOUT DISCONNECTING MEANS BEFORE RECONNECTING (REVERSING) POWER LINES TO TROLLEY.
 - b. Only a qualified electrician should reconnect the power lines to the trolley.
- c. Interchange any two lines supplying power to the trolley motor only. DO NOT reverse main power leads to the hoist as this will also effect the phasing of the hoist motor.
 - d. Re-energize power supply to the hoist.

TEST

- e. Re-check trolley travel for correct trolley motion. If direction of trolley travel agrees with the direction marking of the trolley control device activated (i.e., trolley direction is LEFT when the trolley LEFT control device is activated), trolley motor is properly phased. If the direction of trolley travel does not agree with the direction marking of the trolley control device activated (i.e., trolley direction is RIGHT when the trolley LEFT control device is activated), trolley motor is improperly phased and must be corrected by repeating steps a through e.
3. Operate hoist in the raising and lowering direction, without load on the hook, and stop motion to check operation of the motor brake. The drift of the hook should not exceed one inch in either direction. If hook drift exceeds one inch, the motor brake requires adjustment. Refer to the MOTOR BRAKE section of this manual for instructions on motor brake adjustment.
 4. Check operation of limit switches as follows:
 - a. All checking of limit switches should be accomplished without a load on the hook. All checking of limit switches should be accomplished by using the low speed of multiple-speed hoists, or inched into the limit if the hoist is a single-speed unit.

DANGER

DISCONNECT POWER AND LOCKOUT DISCONNECTING MEANS BEFORE ADJUSTING LIMIT SWITCHES. LIMIT SWITCHES SHOULD BE ADJUSTED USING A CONTINUITY TESTER OR OTHER TYPE OF TESTER THAT WILL INDICATE OPEN OR CLOSED CIRCUITS WITHOUT THE NEED OF ELECTRICAL POWER.

Only a qualified electrician should adjust switches.

- b. Hoists with the standard gravity type upper limit switch:
 - (1) Check the gravity type upper limit switch by operating the hoist in the lifting direction. While the load block is raising, lift the weight of the upper gravity type limit switch manually until motion of the load block stops. Lifting the weight higher should cause the load block to lower until the weight is released. If raising motion does not stop when the weight is lifted, STOP hoist motion as the upper gravity limit switch requires adjustment or replacement. The lowering motion achieved by lifting the weight after raising motion of the load block has stopped is a reverse plugging feature to minimize the possibility of the load block striking the hoist frame or drum if the motor brake is out of adjustment. If adjustment of the gravity type upper limit switch is required, refer to the LIMIT SWITCHES section of this manual.
 - (2) Operate hoist in the lifting direction to a point where the block is about 12" inches below the hoist drum. If the hoist has more than one speed, continue to raise at low speed or; if hoist is a single-speed unit, inch the load block in the lifting direction until motion of the load block stops to check that load block stops when striking the weight of the gravity upper limit switch before striking any other part of the hoist. If the load block will hit any part of the hoist prior to striking the weight of the gravity type limit switch, STOP hoist motion as the upper gravity limit switch requires adjustment or replacement. If adjustment of the gravity type upper limit device is required, refer to the LIMIT SWITCHES section of this manual.
 - (3) Operate the hoist in the lowering direction until the load block reaches its lowest point of travel. At this location of the load block two wraps of wire rope must remain at the anchorage on the hoist drum. IF LESS THAN TWO WRAPS REMAIN AT EACH ANCHORAGE ON THE DRUM, DO NOT USE THE HOIST AT THIS LOCATION. Contact Acco/Harrington or the distributor of the hoist.
- c. If a geared limit switch is specified and furnished on the hoist, operate hoist in the lowering direction until motion of the load block stops to check lower geared limit device circuit. While lowering the load block, watch the wire rope paying off the drum. If all the wire rope will pay off the drum before the lower geared limit device stops load block motion, STOP hoist motion as the lower geared limit device requires adjustment. The hoist lower geared limit device is set at the factory to stop lower travel of the load block with two wraps of wire rope remaining at each anchorage on the drum. ASME B30.16 allows one wrap of wire rope remaining at each anchorage on the drum when a lower limit device is used. It is recommended that the lower geared limit device be set to prevent the load block from resting on the floor and allowing the hoisting ropes to go slack. If adjustment of the lower geared limit device is required, refer to the LIMIT SWITCHES section of this manual.

TEST

- d. If a geared limit switch is specified and furnished on the hoist, operate hoist in the raising direction to a point where the block is about 12" inches below the hoist drum. If the hoist has more than one speed, continue to raise at low speed or; if hoist is a single-speed unit, inch the load block in the raising direction until motion of the load block stops to check upper geared limit switch circuit. If the load block will hit the weight of the gravity type upper limit switch before the upper geared limit device stops load block motion, STOP hoist motion as the upper geared limit device requires adjustment. The hoist upper geared limit device is set at the factory to stop upper hook travel when the top of the load block is 2" inches below the weight of the gravity type limit switch. If adjustment of the upper geared limit device is required, refer to the LIMIT SWITCHES section of this manual.

WARNING

GEARED UPPER LIMIT DEVICE MUST BE ADJUSTED SO THAT WHEN IT IS TRIPPED, THERE IS A MINIMUM OF 2" INCHES BETWEEN THE TOP OF THE LOAD BLOCK AND THE GRAVITY TYPE UPPER LIMIT SWITCH

WARNING

NEVER OPERATE HOIST WITHOUT THE PROTECTION OF PROPERLY FUNCTIONING LIMIT SWITCH.

LOAD TEST:

All hoists in which load suspension parts have been altered, replaced, or repaired SHALL be dynamically tested by the owner/user before being placed in operational service. The load test shall be conducted under the direction of a designated person and a record of the test should be made. The test load applied to the hoist shall be at least equal to the rated load capacity of the hoist, or greater as approved by the hoist manufacturer. Functions to be performed during the load test include: (1) operation of control devices; (2) lifting and lowering; and (3) operation of brakes.

Load test steps are as follows:

1. Attach test load to the hoist hook. Test load shall be at least equal to the rated load capacity of the hoist. Acco/Harrington will authorize the use of a hoist test load equal to 125% of the rated load capacity of the hoist for load test purposes only.
2. Before lifting the load, operate the hoist in the lifting direction to take any slack out of the hoist wire rope.
3. Lift the load a few inches and stop the hoist. If brakes stop and hold the load, continue lifting and lowering the load several feet, stopping the hoist several times in each direction to check that the hoist braking system stops and holds the load.
4. If the hoist braking system stops and holds the load, the hoist operates in accordance with the control devices, and no unusual sounds are present during operation, the hoist is ready to be released for operating purposes.
5. If the hoist braking system does not stop and hold the load, the hoist does not operate in accordance with the control devices, or any unusual sounds are present during operation, the hoist is not ready to be released for operating purposes; and corrective action must be taken.

MAINTENANCE AND REPAIR

If maintenance, adjustment, replacement of parts, or repair of the hoist is required because of any damage or malfunctions noted during the daily, frequent, or periodic inspections outlined in the INSPECTION section of this manual; because of conditions found during a hoist test as outlined in the TEST section of this manual; or based upon specific instructions outlined in other sections of this manual; the hoist shall be taken out of service, and maintenance performed as required.

WARNING

BEFORE PERFORMING ANY MAINTENANCE OR ADJUSTMENTS ON THE HOIST, REFER TO THE MAINTENANCE AND INSPECTION PROCEDURES SECTION OF THIS MANUAL.

DANGER

HAZARDOUS VOLTAGES ARE PRESENT IN THE CONTROL BOX, OTHER ELECTRICAL COMPONENTS, AND CONNECTIONS BETWEEN THESE COMPONENTS.

The main switch (disconnect) of the hoist, crane, or lifting system shall be de-energized. Lock and tag the main switch in the de-energized position in accordance with ANSI Z244.1.

CAUTION

DO NOT USE COTTER PINS, GROOVE PINS, OR LOCKNUTS THAT HAVE BEEN REMOVED DURING DISASSEMBLY. THEY MAY BE DAMAGED DURING REMOVAL AND WILL NOT FUNCTION PROPERLY IF REUSED. ALWAYS INSTALL COMPONENTS USING NEW COTTER PINS, GROOVE PINS, OR LOCKNUTS.

Follow the instructions outlined in various sections of this manual for specific components or portions of the hoist where maintenance or adjustment is required. Refer to the parts identification pages for the specific portion of the hoist where maintenance or adjustment is being performed and to identify any part numbers requiring replacement.

If any instructions are not clear; or if any additional information is required in reference to adjustment, maintenance, or identification of parts; contact Acco/Harrington or the distributor of the hoist.

LUBRICATION

All moving parts of the hoist or trolley for which lubrication is specified should be inspected, checked, and lubricated on a regular basis. The method used to deliver lubricant should be checked for proper delivery of the lubricant. This section applies to the hoist and trolley only. If the hoist is installed as part of a crane or as part of a lifting system, lubrication instructions covered in the manual furnished by the crane or lifting system manufacturer should be followed.

Hoist and trolley drive unit gear housings are enclosed and provide a liberal oil reservoir from which gears and bearings inside the housing are splash-lubricated. Check oil level in gear housings periodically, with intervals determined by use and operating conditions. Refer to INSPECTION section of this manual.

Hoist and trolley machinery shall be stationary when inspecting, checking, adding or changing lubricants. The main switch (disconnect) of the hoist, crane, or lifting system shall be de-energized. Lock and tag the main switch in the de-energized position in accordance with **ANSI 2244.1**.

▲ WARNING

BEFORE INSPECTING, CHECKING, ADDING, OR CHANGING LUBRICANTS OF THE HOIST OR TROLLEY, REFER TO THE MAINTENANCE AND INSPECTION PROCEDURES SECTION OF THIS MANUAL.

▲ CAUTION

DO NOT USE LUBRICANTS THAT DO NOT MEET THE SPECIFICATIONS OF THE RECOMMENDED LUBRICANTS.

▲ WARNING

NEVER USE GEAR OILS IN THE HOIST GEAR HOUSINGS IF THEY CONTAIN ADDITIVES FOR FRICTION REDUCTION. GEAR OILS THAT CONTAIN FRICTION REDUCTION ADDITIVES WILL EFFECT THE OPERATION OF THE LOAD BRAKE AND COULD RENDER THE LOAD BRAKE INOPERATIVE. FOR EXAMPLE, DO NOT USE WORM GEAR OILS IN HOIST GEAR HOUSINGS.

▲ WARNING

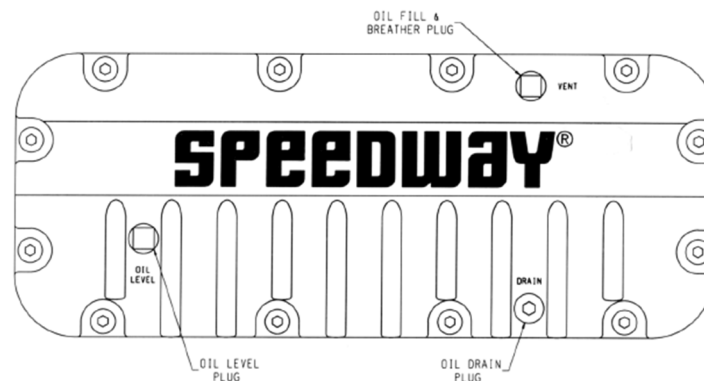
**ALL LUBRICANTS:
MAY CAUSE MILD EYE IRRITATION - AVOID CONTACT WITH EYES.
MAY CAUSE MODERATE SKIN IRRITATION - AVOID PROLONGED OR REPEATED CONTACT WITH SKIN. WASH THOROUGHLY AFTER HANDLING.
ARE SLIGHTLY COMBUSTIBLE - KEEP AWAY FROM EXTREME HEAT AND OPEN FLAME.**

LUBRICATION

HOIST GEAR HOUSING:

The gear housing cover contains the oil fill hole and breather plug, oil level hole and plug, and oil drain hole and plug as shown in Figure 2.

FIGURE 2



When the hoist is shipped from the factory, the oil fill hole is closed by use of a breather plug. When the breather plug is removed to add oil, it must be re-installed with the breather hole on one side of the square head on the outside of the plug directed upward. During hoist inspection, clean the breather plug and check that the breather hole in the plug is not closed because of foreign matter or dirt. If the breather hole is closed, either clean the plug to open the breather hole or replace with a new breather plug.

The oil level plug is a clear plastic plug that should allow the level of the oil inside the housing to be viewed through the plug. If the oil level cannot be viewed through the oil level plug, check oil level by removing the oil level plug and checking the oil level. The level of the oil in the housing should be level with the bottom of the oil level hole. If the level of the oil in the housing is below this point, add oil. Add oil through the oil fill hole until oil level in the housing is level with the bottom of the oil level hole or as noted through the clear oil level plug. Refer to Table 3 for recommended lubricants. Approximate capacity is 5 quarts. AGMA stands for American Gear Manufacturers Association. Table 5 lists lubricants of some lubricant manufacturers in accordance with AGMA lubricant numbers.

**TABLE 3
HOIST GEAR HOUSING LUBRICANTS**

AMBIENT TEMPERATURE	AGMA LUBRICANT
Below 15° F (-9° C)	Contact Acco/Harrington
15° to 60° F (-9° to 16° C)	AGMA No. 4 EP
50° to 125° F (10° to 52° C)	AGMA No. 6 EP
Above 100° F (38° C)	Contact Acco/Harrington

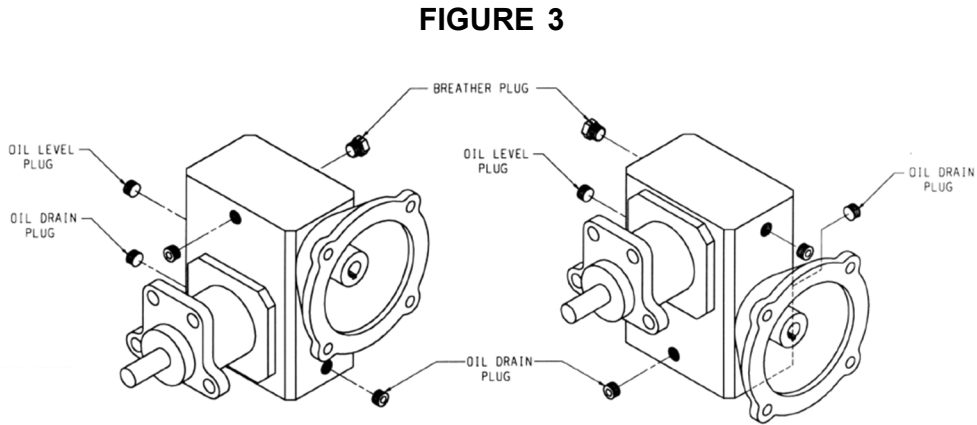
Based on Mineral Oil which is standard.

For normal service, replace hoist gear housing gear oil after 300 operational hours or 6 months, whichever comes first. Replace oil more frequently for heavy duty service or as required. Select lubricant from Table 3. The hoist is shipped from the factory with AGMA No. 6 EP oil. Remove oil from housing through the drain hole and replace plug. Add oil through the oil fill hole until oil level in the housing is level with the bottom of the oil level hole or as noted through the clear oil level plug. Make sure all plugs have been replaced before operating hoist.

LUBRICATION

TROLLEY GEAR HOUSING (RIGHT-ANGLE WORM GEAR REDUCER UNIT):

The location of the breather plug, oil level plug, and drain plugs on the gear housing of the right-angle worm gear reducer unit are shown in Figure 3. Note that the trolley drive unit can be assembled or mounted with the motor input shaft either above or below the output shaft of the unit. The location of the motor determines which plugs are identified as breather, oil level, and drain. Refer to the portion of Figure 3 that applies to the reducer assembly on the hoist and trolley.



When the trolley is shipped from the factory, the breather plug hole is closed by use of a breather plug. If the breather plug is removed, it must be re-installed with the breather hole on the outside of the plug directed upward. During hoist and trolley inspection, clean the breather plug and check that the breather hole in the plug is not closed because of foreign matter or dirt. If the breather hole is closed, either clean the plug to open the breather hole or replace with a new breather plug.

The level of the oil in the housing should be level with the bottom of the oil level hole. If the level of the oil in the housing is below this point, add oil. Add oil through the oil fill hole at the breather plug until oil level in the housing is level with the bottom of the oil level hole. Refer to Table 4 for recommended lubricants. Capacity of the right-angle worm gear reducer unit housing is 1/2 pint (0.25 liter) for 1-ton 2PS hoists and 1 pint (0.5 liter) for 1-ton 2PD and all 2 through 5 ton hoists. **AGMA** stands for American Gear Manufacturers Association. Table 5 lists lubricants of some lubricant manufacturers in accordance with **AGMA** lubricant numbers.

TABLE 4
TROLLEY GEAR HOUSING LUBRICANTS
RIGHT-ANGLE WORM REDUCER UNIT

AMBIENT TEMPERATURE	AGMA LUBRICANT
Below 15° F (-9° C)	Contact Acco/Harrington
15° to 60° F (-9° to 16° C)	AGMA No. 7 Comp.
50° to 125° F (10° to 52° C)	AGMA No. 8 Comp.
Above 100° F (38° C)	Contact Acco/Harrington

Based on Mineral Oil which is standard pre 2017.

LUBRICATION

For Units shipped before 2017:

After original installation, the oil in the trolley right-angle worm gear reducer unit should be changed after 80 operational hours. Select lubricant from Table 4. The trolley is shipped from the factory with AGMA No. 8 Comp. oil. Remove oil from housing through the drain hole and replace plug. Add oil through the oil fill hole until oil level in the housing is level with the bottom of the oil level hole. Make sure all plugs have been replaced before operating trolley.

For normal service, replace trolley right-angle worm gear housing gear oil after 300 operational hours or 6 months, whichever comes first. Replace oil more frequently for heavy duty service or as required. Select lubricant from Table 4. The trolley is shipped from the factory with AGMA No. 8 Comp. oil. Remove oil from housing through the drain hole and replace plug. Add oil through the oil fill hole until oil level in the housing is level with the bottom of the oil level hole. Make sure all plugs have been replaced before operating trolley.

For Units shipped 2017 or later:

As of 2017, the trolley is shipped from the factory with AGMA No. 7 Comp. PAG (polyglycol) synthetic oil. The trolley gear housing nameplate will be stamped PAG460 to indicate the PAG synthetic oil was installed. The factory installed PAG synthetic oil should be changed only when performing maintenance that requires gear housing disassembly. PAG synthetic oil is not compatible with mineral oil or non-PAG synthetic oil. So, when changing or adding oil, do not use any oil other than PAG synthetic oil. See Table 5 for specific PAG synthetic oil installed at the factory.

**TABLE 5
AGMA LUBRICANTS BY MANUFACTURER**

MANUFACTURER	Hoist Gear Housings with Spur and Helical Gears		Trolley Gear Housings with Worm Gears		
	AGMA 4EP	AGMA 6EP	AGMA 7 Compound	AGMA 8 Compound	
ISO Viscosity Grade	150	320	460	680	
MINERAL OIL	Amoco Oil Co.	Perma Gear EP 150	Perma Gear EP 320	Worm Gear Oil	Cylinder Oil 680
	ARCO	Pennant NL Oil 150	Pennant NL Oil 320	Modoc 175	Modoc 175
	Chevron USA, Inc.	Meropa 150	Meropa 320	Cylinder Oil W460	Cylinder Oil W680
	Conoco Inc.	Extra Duty 150 Gear Lube	Extra Duty 320 Gear Lube	Compounded Gear Oil 460	Compounded Gear Oil 680
	Exxon Co. USA	Spartan EP Grade 150	Spartan EP Grade 320	Cylestic TK-460	Cyiestic TK-680
	Gulf Oil Co.	EP Lubricant HD 150	EP Lubricant HD 320	Senate 460	Senate 680
	Mobil Oil Corp.	Mobilgear 600 XP 150	Mobilgear 600 XP 320	600W Super Cylinder Oil	Extra Hecla Super Cylinder Oil
	Shell Oil Co.	Omala 150	Omala 320	Valvata Oil J460	Valvata Oil J680
	Sun Oil Co.	Sun EP 150 Gear Oil	Sun EP 320 Gear Oil	Gear Oil C460	Gear Oil C680
	Texaco	Meropa 150	Meropa 320	Cylinder Oil W460	Cylinder Oil W680
	Ambient Temperature	15° to 60° F (-9° to 16° C)	50° to 125° F (10° to 52° C)	15° to 60° F (-9° to 16° C)	50° to 125° F (10° to 52° C)
SYNTHETIC OIL	Mobil Oil Corp.	N/A	Mobil SHC Gear 320	Glygoyle 460	N/A
	Ambient Temperature	N/A	-10° to 125° F (-20° to 52° C)	-10° to 120° F (-20° to 50° C)	N/A
	Note:	Not compatible with mineral oil. Optional at an additional price. Must specify on order.		This is a PAG (polyglycol) synthetic oil and is not compatible with mineral oil or non-PAG synthetic oil. Standard in Trolley Gear Housings with Worm Gears as of 2017. PAG460 is stamped on the gear housing name plate.	

LUBRICATION

BEARINGS:

Bearings not located inside gear housings are pre-lubricated and provided with shields or seals. This includes bearings located in the motor and sheaves. No additional lubrication is required.

HOOK THRUST BEARING:

For normal service, apply light machine oil to the thrust bearing that supports the load hook every 6 months. Apply oil more frequently for heavy duty service or as required.

EXPOSED OR OPEN GEARS AND PINIONS:

Exposed gears and pinions on trolleys are shipped from the factory without lubricant. EP Moly D Grease, packaged in a 4-ounce squeeze bottle container, is furnished with all hoists that have trolleys specified. During installation, the EP Moly D Grease should be applied to all exposed gears and pinions so that a coating of lubricant is on all pinion and gear teeth.

For normal service, apply EP Moly D Grease to all exposed gears and pinions every 3 months to maintain a coating of lubricant on all pinion and gear teeth. Apply grease more frequently for heavy duty service or as required.

In applications where foreign matter or dirt combines with the grease on exposed gears and pinions, the dirty grease should be cleaned off the teeth prior to applying new grease.

Additional containers of EP Moly D Grease, packaged in a 4-ounce squeeze bottle, can be obtained by ordering Acco/Harrington part no. ACC69807.

WIRE ROPE:

Lubrication for wire rope operating over Polyamide sheaves is not recommended. Wire rope operating over steel sheaves should be maintained in a lubricated condition to reduce internal friction and prevent corrosion. Sections of rope located over sheaves or hidden during inspection and maintenance procedures require special attention when lubricant is applied. Wire rope should be lubricated with Crown Heavy-Duty Rope Lube or equivalent. Fitting on the loaded end of wire rope assemblies should be lubricated with Lubriplate 630-AA or 630-2.

For normal service, apply lubricant to wire rope and end fitting every 3 months. Apply lubricant more frequently for heavy duty service or as required.

In applications where foreign matter or dirt combines with the lubricant applied to the wire rope, the dirty lubricant should be cleaned off the rope prior to applying new lubricant.

LUBRICATION

UNIVERSAL JOINTS:

Universal joints on hoists are shipped from the factory with lubricant. The individual parts of universal joints should be well lubricated at all times. This allows the parts to easily oscillate or slide on each other.

Remove universal joint boots and lubricate universal joints by injecting EP Moly D Grease into the large pin via the lube fitting in the end of the pin. Grease should also be applied to the external surfaces of the center block and the pins (especially where they engage the forks). If a grease gun is not available, the universal joint should be disassembled and the contact surfaces of the pins, center block and forks should be greased. After reassembly of joints, reinstall boots. See pages 75 through 78 for depiction of parts and assembly and disassembly instructions.

For normal service, apply lubricant to universal joints every 3 months. Apply lubricant more frequently for heavy duty service or as required.

The universal joint boot should keep foreign matter or dirt away from the grease. If for some reason the grease has become contaminated, the dirty grease should be cleaned out of the universal joints prior to applying new grease.

Containers of EP Moly D Grease, packaged in a 4-ounce squeeze bottle, can be obtained by ordering Acco/Harrington part number ACC69807.

REASSEMBLY:

When hoist or trolley is disassembled for overhaul or major repair, apply Lubriplate 630-AA or 630-2 to the inside of the bores of the coupling or universal joints connecting the motor shaft to the input shaft of the hoist gear housing or the input shaft of the trolley gear housing during reassembly.

WARNING

NEVER APPLY ANY LUBRICANTS TO PARTS OF THE HOIST OR TROLLEY MOTOR BRAKE.

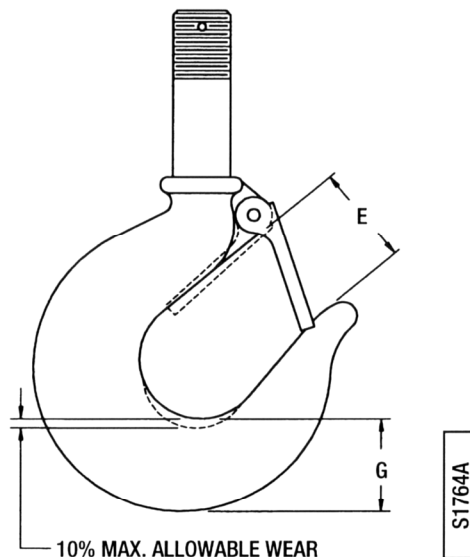
HOOKS

Load hooks on hoists in regular service should be visually inspected daily by the operator. If the hoist is used in multiple shift operations, load hooks should be visually inspected by the operator at the start of each shift. When visual inspection indicates that a more detailed inspection is required, follow the procedure outlined below. This procedure also applies to scheduled frequent and periodic inspections.

1. Measure hook throat opening from metal to metal of the hook as shown by dimension E in Figure 4. DO NOT measure from latch to metal. Hook must be replaced when throat opening measurement has increased 5%, not to exceed 1/4" inch, over the original throat opening dimension of a new hook. Refer to Table 6 for original dimensions and replacement dimensions for throat openings of standard hooks specified for the SPEEDWAY® hoist line. To aid in measuring the throat opening, it is recommended the hoist owner/user make a gage of the dimensions shown in Table 6. This will allow quick measurement of the throat opening and immediate indication that hook replacement is required.

When SPEEDWAY® hoists are specified with special hooks not covered in Table 6, the hook throat opening should be measured by the owner/user prior to installing the hoist. This will establish a reference point to use in future inspections for determination when the throat opening dimension has increased 5%, not to exceed 1/4" inch, requiring hook replacement. A gage similar to the one discussed above is recommended. The gage should have the throat opening dimension measured prior to installation, and a dimension 5%, not to exceed 1/4" inch, greater than the throat opening dimension measured prior to installation.

FIGURE 4



2. Measure hook depth at load bearing point (base, bowl, or saddle) of the hook as shown by dimension G in Figure 4. Hook must be replaced when wear at load bearing point is 10% of the original depth of the hook load bearing point. Refer to Table 7 for original dimensions and replacement dimensions for depth at load bearing point of standard hooks specified for the SPEEDWAY® hoist line.

When SPEEDWAY® hoists are specified with special hooks not covered in Table 7, the hook depth at load bearing point should be measured by the owner/user prior to installing the hoist. This will establish a reference point to use in future inspections for determination when wear at the load bearing point has reached 10% requiring hook replacement.

3. Any bend or twist of the hook from the plane of the unbent hook requires replacement of the hook.
4. A hook latch, when required, that is missing shall be replaced.
5. A hook latch, when required, that is inoperative shall be repaired or replaced.

**TABLE 6
HOOK THROAT OPENING DIMENSIONS
FIGURE 4, DIMENSION E
SPEEDWAY® HOIST STANDARD HOOKS**

ROPE DIA.	REEVING	MAX. CAP. TONS	HOOK TYPE	HOOK PART NO.	NEW HOOK DIM. E	REPLACE HOOK DIM. E
1/4	2PS	1	Steel Latch Type	68697	1.25	1.31
5/16	2PS	2		70889 (a)	1.19	1.25
3/16	2PD	1				
1/4	2PD	2				
1/4	2PS	1	Bullard Gate Type	39796	1.25	1.31
5/16	2PS	2		42641	1.25	1.31
3/16	2PD	1				
1/4	2PD	2				
1/4	2PS	1	Bronze Latch Type	42641	1.25	1.31
				70896 (a)	1.19	1.25
5/16	2PS	2	Bronze Latch Type	70461	1.50	1.58
3/16	2PD	1		70897 (a)	1.50	1.58
1/4	2PD	2				
5/16	4PS	4	Steel Latch Type	70379	1.50	1.58
5/16	2PD	3		70890 (a)	1.50	1.58
5/16	4PS	4	Bullard Gate Type	70380	1.50	1.58
5/16	2PD	3				
5/16	4PS	4	Bronze Latch Type	70381	2.25	2.36
5/16	2PD	3		70898 (a)	2.41	2.53
5/16	4PD	5	Steel Latch Type	41732	1.88	1.98
				71192 (a)	1.78	1.87
5/16	4PD	5	Bullard Gate Type	71207	1.88	1.98
5/16	4PD	5	Bronze Latch Type	42643	2.25	2.36
				70900 (a)	2.41	2.53

NOTE:

(a) These are Spring Latch Hooks with a hole in the tip of the hook. Other listed Spring Latch Hooks do not have a hole in the tip of the hook. See paragraph 9 on page 39.

**TABLE 7
HOOK DEPTH DIMENSIONS AT LOAD POINT
FIGURE 4, DIMENSION G
SPEEDWAY® HOIST STANDARD HOOKS**

ROPE DIA.	REEVING	MAX. CAP TONS	HOOK TYPE	HOOK PART NO.	NEW HOOK DIM.G	REPLACE HOOK DIM.G
1/4	2PS	1	Steel Latch Type	68697	1.12	1.00
5/16	2PS	2		70889 (a)	1.14	1.03
3/16	2PD	1	Bullard Gate Type		39796	1.12
1/4	2PD	2				
1/4	2PS	1	Bronze Latch Type	42641	1.12	1.00
				70896 (a)	1.14	1.03
5/16	2PS	2	Bronze Latch Type		70461	1.44
3/16	2PD	1		70897 (a)	1.44	1.28
1/4	2PD	2				
5/16	4PS	4	Steel Latch Type	70379	1.44	1.28
5/16	2PD	3		70380	1.50	1.35
5/16	4PS	4	Bullard Gate Type		70381	2.25
5/16	2PD	3				
5/16	4PD	5	Steel Latch Type	41732	1.81	1.62
				71192 (a)	1.81	1.62
5/16	4PD	5	Bullard Gate Type		71207	1.81
5/16	4PD	5	Bronze Latch Type	42643	2.25	2.00
				70900 (a)	2.25	2.00

NOTE:

(a) These are Spring Latch Hooks with a hole in the tip of the hook. Other listed Spring Latch Hooks do not have a hole in the tip of the hook. See paragraph 9 on page 39.

HOOKS

6. A hook with a hook latch that does not close the throat opening of the hook shall be removed from service or moused until the latch is replaced or repaired.
7. Hooks having damage from chemicals, corrosion, or deformation shall be repaired or replaced. Damage in the form of cracks, nicks, and gouges may be repaired by a designated person by grinding longitudinally, following the contour of the hook, provided no dimension of the hook is reduced by more than 10% of the original dimension of a new hook. If the repair reduces the dimension of the hook by more than 10% of the original dimension of a new hook, the hook shall be replaced.

NOTICE

ANY HOOK THAT REQUIRES REPLACEMENT BECAUSE OF EXCESSIVE BENDS, TWISTS, OR THROAT OPENING INDICATES ABUSE OR OVERLOADING OF THE HOIST. THEREFORE, OTHER LOAD-SUPPORTING COMPONENTS OF THE HOIST SHOULD BE INSPECTED FOR POSSIBLE DAMAGE WHEN SUCH CONDITIONS ARE FOUND.

⚠ CAUTION

NEVER REPAIR HOOKS BY WELDING OR RESHAPING. HEAT APPLIED TO THE HOOK WILL ALTER THE ORIGINAL HEAT TREATMENT OF THE HOOK MATERIAL AND REDUCE THE STRENGTH OF THE HOOK.

⚠ CAUTION

NEVER WELD HANDLES OR OTHER ATTACHMENTS TO THE HOOK. HEAT APPLIED TO THE HOOK WILL ALTER THE ORIGINAL HEAT TREATMENT OF THE HOOK MATERIAL AND REDUCE THE STRENGTH OF THE HOOK. IF HANDLES OR OTHER ATTACHMENTS ARE REQUIRED ON THE HOOK, CONTACT ACCO OR THE DISTRIBUTOR OF THE HOIST.

8. When replacing a hook, do not use the cotter pin that was removed from the hook nut. ALWAYS use a new cotter pin.

⚠ CAUTION

DO NOT USE COTTER PINS, GROOVE PINS, OR LOCKNUTS THAT HAVE BEEN REMOVED DURING DISASSEMBLY. THEY MAY BE DAMAGED DURING REMOVAL AND WILL NOT FUNCTION PROPERLY IF REUSED. ALWAYS INSTALL HOOK NUTS USING NEW COTTER PINS.

9. **Previous style Spring Latch Hooks were phased out by Acco/Harrington's supplier. The current style Spring Latch Hooks have a hole in the tip of the hook. This hole allows the addition of a cotter pin to prevent the latch from opening. Cotter pin is not supplied by Acco/Harrington. Current style hooks are interchangeable with old style hooks, but current style hooks have a thicker cross section. Latches are not interchangeable between the two style hooks. Previous style hooks are no longer available. Latches for previous style hooks continue to be available. When ordering, identify whether or not hook has a hole in the tip and select part numbers accordingly from the applicable load block page in this manual.**

LIMIT SWITCHES

Complete WRIGHT® SPEEDWAY® hoists are furnished standard with a gravity type upper limit switch. An optional geared limit switch will be furnished when specified in addition to the standard gravity upper limit switch. All limit switches must be operating and must be checked.

The optional geared type limit switch operates in relation to drum turns. If the wire rope does not track in the drum grooves or if the wire rope over wraps on the drum, the relationship between turns of the drum and turns of the upper geared limit device circuit become out of sequence; and the load block will travel up to the hoist frame and drum area of the hoist before the upper limit device circuit is activated. While the hoist should never be operated with the wire rope not seated in the drum grooves or with over wrapping of the wire rope on the drum, the gravity type limit switch is furnished with the optional geared limit switch in case such a situation occurs wherein the upper geared limit device becomes out of sequence with drum turns. For this reason, the optional geared upper limit device circuit must trip prior to the load block hitting the gravity-type limit switch weight. On hoists having both gravity and geared upper limit switches, the gravity limit switch must **NEVER** be deactivated or removed from the circuit.

The primary (gravity if it is the only limit switch furnished, or geared upper and lower if both gravity and geared furnished) limit switch on hoists in regular service should be checked without load on the hook by the operator at the start of each shift, or the first time the hoist is to be operated during each shift.

Both the primary (gravity if it is the only limit switch furnished, or geared upper and lower if both gravity and geared furnished), and the secondary (gravity upper if both gravity and geared furnished) limit switches are to be checked during scheduled frequent and periodic inspections.

WARNING

ALL CHECKING OF LIMIT SWITCHES SHOULD BE ACCOMPLISHED WITHOUT A LOAD ON THE HOOK. ALL CHECKING OF LIMIT SWITCHES SHOULD BE ACCOMPLISHED BY USING THE LOW SPEED OF MULTIPLE-SPEED HOISTS, OR INCHED INTO THE LIMIT IF THE HOIST IS A SINGLE-SPEED UNIT.

DANGER

DISCONNECT POWER AND LOCKOUT DISCONNECTING MEANS BEFORE ADJUSTING LIMIT SWITCHES. LIMIT SWITCHES SHOULD BE ADJUSTED USING A CONTINUITY TESTER OR OTHER TYPE OF TESTER THAT WILL INDICATE OPEN OR CLOSED CIRCUITS WITHOUT THE NEED OF ELECTRICAL POWER.

Only a qualified electrician should adjust switches.

CHECK OPERATION - GRAVITY LIMIT SWITCH:

Check operation of gravity limit switch as follows:

1. Check the gravity type upper limit switch by operating the hoist in the lifting direction. While the load block is raising, lift the weight of the upper gravity type limit switch manually until motion of the load block stops. Lifting the weight higher should cause the load block to lower until the weight is released. If raising motion does not stop when the weight is lifted, STOP hoist motion as the upper gravity limit switch requires adjustment or replacement. The lowering motion achieved by lifting the weight after raising motion of the load block has stopped is a reverse plugging feature to minimize the possibility of the load block striking the hoist frame or drum if the motor brake is out of adjustment. If adjustment of the gravity type upper limit switch is required, refer to adjustment instructions outlined below.

LIMIT SWITCHES

2. Operate hoist in the lifting direction to a point where the block is about 12 inches below the hoist drum. If the hoist has more than one speed, continue to raise at low speed or; if hoist is a single-speed unit, inch the load block in the lifting direction until motion of the load block stops to check that load block stops when striking the weight of the gravity upper limit switch before striking any other part of the hoist. If the load block will hit any part of the hoist prior to striking the weight of the gravity type limit switch, STOP hoist motion as the upper gravity limit switch requires adjustment or replacement. If adjustment of the gravity type upper limit device is required, refer to adjustment instructions outlined below.
3. Operate the hoist in the lowering direction until the load block reaches its lowest point of travel. At this location of the load block two wraps of wire rope must remain at each anchorage on the hoist drum. IF LESS THAN TWO WRAPS REMAIN AT EACH ANCHORAGE ON THE DRUM, DO NOT USE THE HOIST AT THIS LOCATION. Contact Acco Chain & Lifting Products or the distributor of the hoist.

WARNING

HOISTS THAT ARE LOCATED WHERE THE LOAD BLOCK CAN BE LOWERED INTO PITS OR LOWERED TO OTHER LEVELS BELOW THE OPERATING FLOOR LEVEL OF THE HOIST MUST HAVE A LOWER LIMIT SWITCH IN ACCORDANCE WITH ANSI B30.16. IF THE HOIST IS TO BE USED IN SUCH AN APPLICATION AND IT DOES NOT HAVE A LOWER LIMIT SWITCH, DO NOT USE THE HOIST; CONTACT ACCO CHAIN & LIFTING PRODUCTS OR THE DISTRIBUTOR OF THE HOIST.

CHECK OPERATION - GEARED LIMIT SWITCH:

1. Operate hoist in the lowering direction until motion of the load block stops to check lower geared limit device circuit. While lowering the load block, watch the wire rope paying off the drum. If all the wire rope will pay off the drum before the lower geared limit device stops load block motion, STOP hoist motion as the lower geared limit device requires adjustment. The hoist lower geared limit device is set at the factory to stop lower travel of the load block with two wraps of wire rope remaining at each anchorage on the drum. ASME B30.16 allows one wrap of wire rope remaining at each anchorage on the drum when a lower limit device is used. It is recommended that the lower geared limit device be set to prevent the load block from resting on the floor and allowing the hoisting ropes to go slack. If adjustment of the lower geared limit device is required, refer to the adjustment instructions outlined below.
2. Operate hoist in the lifting direction to a point where the block is about 12 inches below the hoist drum. If the hoist has more than one speed, continue to raise at low speed or; if hoist is a single-speed unit, inch the load block in the lifting direction until motion of the load block stops to check upper geared limit switch circuit. If the load block will hit the weight of the gravity type limit switch before the upper geared limit device stops load block motion, STOP hoist motion as the upper geared limit device requires adjustment. The hoist upper geared limit device is set at the factory to stop upper hook travel when the top of the load block is two inches below the weight of the gravity type limit switch. If adjustment of the upper geared limit device is required, refer to the adjustment instructions outlined below.

WARNING

OPTIONAL GEARED UPPER LIMIT DEVICE MUST BE ADJUSTED SO THAT WHEN IT IS TRIPPED, THERE IS A MINIMUM OF 2 INCHES BETWEEN THE TOP OF THE LOAD BLOCK AND THE WEIGHT OF THE GRAVITY TYPE UPPER LIMIT SWITCH.

An optional hoist power-circuit limit switch is available when specified. A power circuit limit switch is checked in the same manner as the gravity type upper limit switch by manually lifting the limit switch tripping device while operating the hoist in the lifting direction.

LIMIT SWITCHES

⚠ WARNING

NEVER OPERATE HOIST WITHOUT THE PROTECTION OF PROPERLY FUNCTIONING LIMIT SWITCHES.

HOIST LIMIT SWITCHES SHALL NOT BE USED AS A NORMAL MEANS OF STOPPING TRAVEL MOTION OR THE LOAD. THESE ARE EMERGENCY DEVICES ONLY.

THE PRIMARY UPPER AND LOWER LIMIT SWITCH SHOULD BE CHECKED WITHOUT LOAD ON THE HOOK AT THE START OF EACH SHIFT, OR THE FIRST TIME HOIST IS TO BE OPERATED DURING EACH SHIFT.

THESE INSTRUCTIONS APPLY TO LIMIT SWITCH ADJUSTMENT FOR AN UNLOADED LOAD BLOCK ONLY. LIMIT SWITCHES MUST BE ADJUSTED TO PREVENT THE LOAD BLOCK OR THE LOAD BEING LIFTED FROM COMING INTO CONTACT WITH ANY PART OF THE HOIST; OR THE CRANE, HOIST SUPPORT STRUCTURE, OR OTHER EQUIPMENT WHERE THE HOIST IS INSTALLED.

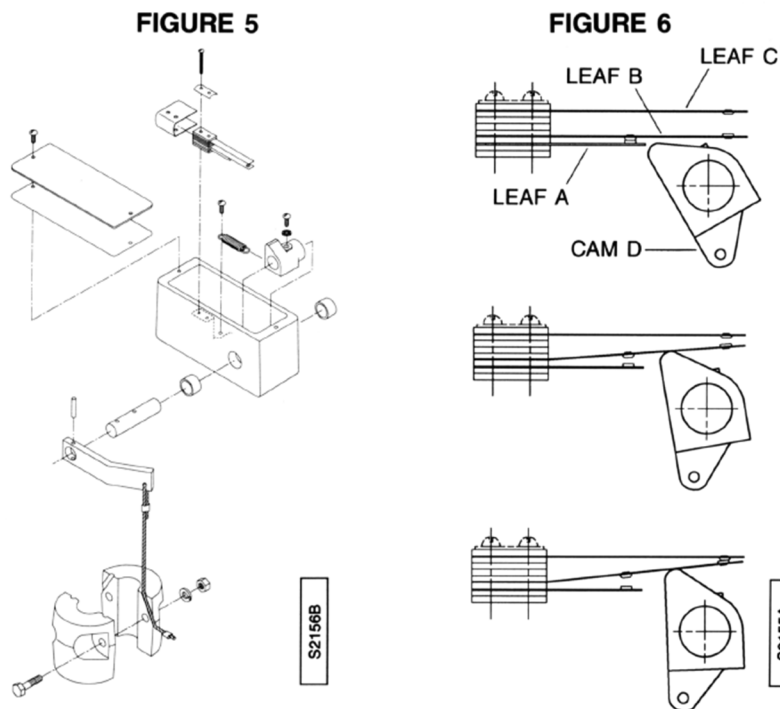
ADJUSTMENT - GRAVITY LIMIT SWITCH:

⚠ DANGER

DISCONNECT POWER AND LOCKOUT DISCONNECTING MEANS BEFORE ADJUSTING LIMIT SWITCHES. LIMIT SWITCHES SHOULD BE ADJUSTED USING A CONTINUITY TESTER OR OTHER TYPE OF TESTER THAT WILL INDICATE OPEN OR CLOSED CIRCUITS WITHOUT THE NEED OF ELECTRICAL POWER.

Only a qualified electrician should adjust switches.

The gravity type upper limit switch unit is mounted in a separate enclosure near the rope dead end on single reeved hoists, or near the equalizing sheave on double reeved hoists. Figure 5 shows the gravity limit switch unit enclosure and gravity-operated weight. Figure 6 shows the switch contact unit and operating cam located inside the gravity limit switch unit enclosure.



LIMIT SWITCHES

Adjust gravity limit switch as follows:

1. Disconnect power and lockout disconnecting means.
2. Referring to Figure 6, remove cover and gasket of the gravity limit switch enclosure by loosening and removing screws holding cover to housing.
3. Check that wires to leafs A, B, and C are connected.
4. Manually lift the gravity-operated weight and observe action of cam D opening the contacts on leafs A and B, and closing the contacts on leafs B and C by visual observation or with a continuity tester or other type of tester that will indicate open or closed circuits without the need of electrical power.

As gravity-operated weight is manually lifted, cam D should rotate against and lift leaf B, opening the lifting control circuit contacts on leafs A and B. Continuing the manual lifting of gravity-operated weight, cam D should continue to rotate against and lift leaf B, closing the control circuit reversing contacts on leafs B and C.

5. If contacts do not open and close properly, minor adjustment can be made to leafs A, B, or C by a slight bending of the leaf. If slight bending of the leafs does not correct the adjustment requirements, replace contact unit or the entire gravity limit switch unit.
6. After the gravity limit switch has been adjusted or replaced, the gravity limit switch should be rechecked in accordance with "CHECK OPERATION - GRAVITY LIMIT SWITCH" instructions.

OPTIONAL - GEARED LIMIT SWITCH:

When specified, a Wright® two-circuit geared limit switch or a commercial two-circuit or four-circuit geared rotary limit switch may be furnished on the hoist in addition to the gravity type limit switch. When specified, the Wright® geared limit switch or the commercial geared rotary limit switch is mounted in the enclosure at the drum end opposite the hoist gear reducer assembly.

ADJUSTMENT - WRIGHT® GEARED LIMIT SWITCH (WHEN SPECIFIED):



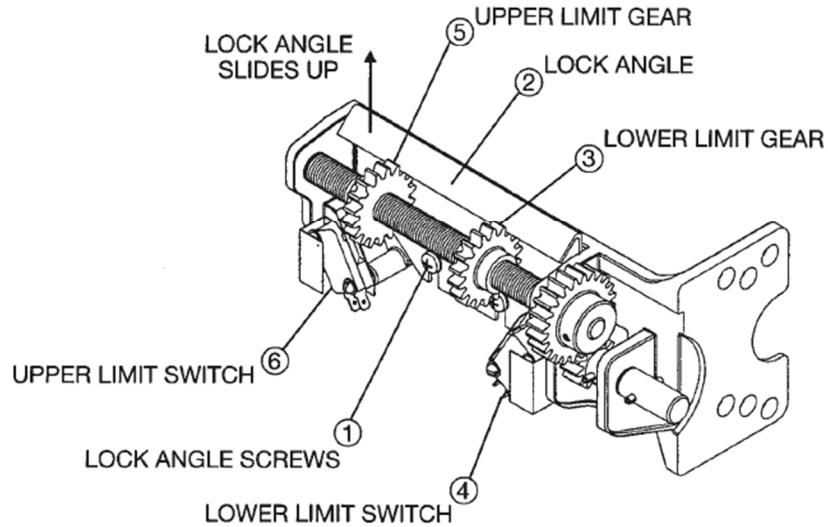
DISCONNECT POWER AND LOCKOUT DISCONNECTING MEANS BEFORE ADJUSTING LIMIT SWITCHES. LIMIT SWITCHES SHOULD BE ADJUSTED USING A CONTINUITY TESTER OR OTHER TYPE OF TESTER THAT WILL INDICATE OPEN OR CLOSED CIRCUITS WITHOUT THE NEED OF ELECTRICAL POWER.

Only a qualified electrician should adjust switches.

LIMIT SWITCHES

The WRIGHT® geared limit switch unit is mounted in the enclosure at the drum end opposite the hoist gear reducer assembly. Figure 7a illustrates the WRIGHT® geared limit switch unit. The lower limit is adjusted using limit gear (3) and limit switch (4) located at the right-hand end of the geared limit switch unit; and the upper limit is adjusted using limit gear (5) and limit switch (6) located at the left-hand end of the geared limit switch unit.

FIGURE 7a



Adjust WRIGHT® geared limit switch as follows:

1. Disconnect power and lockout disconnecting means.
2. Remove the cover of the enclosure at the drum end opposite the hoist gear reducer assembly.
3. If the upper limit is to be set at a higher point than the current setting or the lower limit is to be set at a lower point than the current setting, the current settings must be deleted before adjustments are made as follows:
 - a. Loosen the two screws (1) holding the lock angle (2) to the limit switch housing until the lock angle (2) can be released from the limit gears (3 and 5).
 - b. Rotate upper limit gear (5) away from upper limit switch (6) and/or rotate lower limit gear (3) away from lower limit switch (4).
4. Adjust upper limit as follows:
 - a. Connect power to the hoist and operate hoist in the lifting direction until load block reaches position where upper limit is to operate. The minimum distance allowed between the top of the load block and the weight of the gravity type upper limit switch is 2" inches.
 - b. Disconnect power and lockout disconnecting means before adjusting upper limit of geared limit switch.
 - c. Connect a continuity tester or other type of tester that will indicate open or closed circuits without the need of electrical power to upper limit switch (6).
 - d. Loosen the two screws (1) holding the lock angle (2) to the limit switch housing until the lock angle (2) can be released from the tooth spaces of the limit gears (3 and 5).
 - e. Rotate upper limit gear (5) toward upper limit switch (6) until the upper limit gear (5) actuates the upper limit switch (6) as indicated by the continuity tester.

LIMIT SWITCHES

- f. Position locking angle (2) in the tooth spaces of the limit gears (3 and 5). Secure locking angle in place using the two screws (1).
- g. Connect power to the hoist and operate hoist in the lifting direction to check operation of the geared upper limit switch. If geared upper limit switch does not operate at the desired position of the load block, repeat steps 4a through 4g.

WARNING

GEARED UPPER LIMIT DEVICE MUST BE ADJUSTED SO THAT WHEN IT IS TRIPPED, THERE IS A MINIMUM OF 2" INCHES BETWEEN THE TOP OF THE LOAD BLOCK AND THE WEIGHT OF THE GRAVITY TYPE UPPER LIMIT SWITCH.

5. Adjust lower limit as follows:

- a. Connect power to the hoist and operate hoist in the lowering direction until load block reaches position where lower limit is to operate. A minimum of one wrap of wire rope must remain at each anchorage on the drum.
- b. Disconnect power and lockout disconnecting means before adjusting lower limit of geared limit switch.
- c. Connect a continuity tester or other type of tester that will indicate open or closed circuits without the need of electrical power to lower limit switch (4).
- d. Loosen the two screws (1) holding the lock angle (2) to the limit switch housing until the lock angle (2) can be released from the tooth spaces of the limit gears (3 and 5).
- e. Rotate lower limit gear (3) toward lower limit switch (4) until the lower limit gear (3) actuates the lower limit switch (4) as indicated by the continuity tester.
- f. Position locking angle (2) in the tooth spaces of the limit gears (3 and 5). Secure locking angle in place using the two screws (1).
- g. Connect power to the hoist and operate hoist in the lowering direction to check operation of the geared lower limit switch. If geared lower limit switch does not operate at the desired position of the load block, repeat steps 5a through 5g.

WARNING

GEARED LOWER LIMIT DEVICE MUST BE ADJUSTED SO THAT WHEN IT IS TRIPPED, THERE IS A MINIMUM OF ONE WRAP OF WIRE ROPE REMAINING AT EACH ANCHORAGE ON THE DRUM.

- 6. After both the geared upper and lower limit devices have been adjusted, the geared limit switch should be rechecked in accordance with "CHECK OPERATION - GEARED LIMIT SWITCH" instructions.

CAUTION

AFTER ADJUSTING LIMIT SWITCHES, REPLACE AND TIGHTEN ALL LIMIT SWITCH ENCLOSURE COVERS BEFORE RETURNING THE HOIST TO REGULAR SERVICE.

LIMIT SWITCHES

ADJUSTMENT – GE® GEARED ROTARY LIMIT SWITCH (WHEN SPECIFIED):

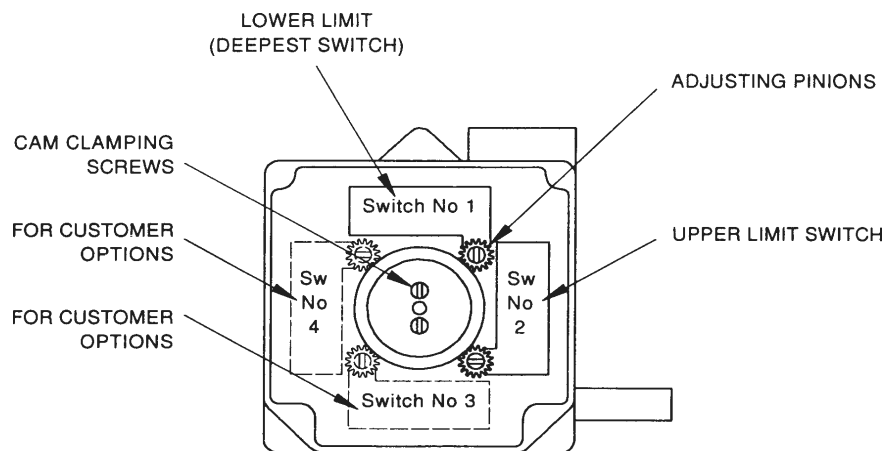
⚠ DANGER

DISCONNECT POWER AND LOCKOUT DISCONNECTING MEANS BEFORE ADJUSTING LIMIT SWITCHES. LIMIT SWITCHES SHOULD BE ADJUSTED USING A CONTINUITY TESTER OR OTHER TYPE OF TESTER THAT WILL INDICATE OPEN OR CLOSED CIRCUITS WITHOUT THE NEED OF ELECTRICAL POWER.

Only a qualified electrician should adjust switches.

The GE® geared rotary limit switch unit is mounted in the enclosure at the drum end opposite the hoist gear reducer assembly. Figure 7b is a diagram of the switch arrangement from the instructions on the inside of the cover on the enclosure of the GE® geared rotary limit switch unit.

FIGURE 7b



A two-circuit limit switch will have switches 1 and 2 as shown in Figure 7b. A four-circuit limit switch will have switches 1, 2, 3, and 4 as shown in Figure 7b. Switch no. 1 is the bottom or deepest switch in the enclosure and is operated by the bottom or deepest gear cam in the enclosure. Switch no. 1 is connected in the hoist control circuit to operate as the lower limit device. Switch no. 2 is the second switch from the bottom of the enclosure and is operated by the second gear cam from the bottom of the enclosure. Switch no. 2 is connected in the hoist control circuit to operate as the upper limit device. Switch no. 3 is the third switch from the bottom of the enclosure and is operated by the third gear cam from the bottom of the enclosure. Switch no. 3 is not connected in the hoist control circuit and is for the option of the owner/user. Switch no. 4 is the fourth switch from the bottom of the enclosure and is operated by the fourth gear cam from the bottom of the enclosure. Switch no. 4 is not connected in the hoist control circuit and is for the option of the owner/user.

Adjust GE® geared rotary limit switch as follows:

1. Disconnect power and lockout disconnecting means.
2. Remove the cover of the enclosure at the drum end opposite the hoist gear reducer assembly.
3. Remove the cover of the GE® geared rotary limit switch enclosure.
4. Adjust upper limit as follows:
 - a. Connect power to the hoist and operate hoist in the lifting direction until load block reaches position where upper limit is to operate. The minimum distance allowed between the top of the load block and the weight of the gravity type upper limit switch is 2" inches.
 - b. Disconnect power and lockout disconnecting means before adjusting upper limit of geared rotary limit switch.
 - c. Connect a continuity tester or other type of tester that will indicate open or closed circuits without the need of electrical power to switch number 2.

LIMIT SWITCHES

- d. Loosen the two cam clamping screws on top of the cam assembly one-half turn each.
- e. Locate the adjusting pinion for cam no. 2 by referring to the indicating arrow on insulation shield.
- f. Depress adjusting pinion for cam no. 2 with a screwdriver until pinion teeth mesh with teeth of gear cam no. 2.
- g. Rotate cam in direction to operate switch no. 2.
- h. The white marker on the gear teeth is directly over the cam lobe that trips the switch. When the operating cam has been adjusted so the cam lobe has tripped the switch, the adjustment is complete. In addition to visual observation, a continuity tester or other type of tester that will indicate open or closed circuits without the need of electrical power can be connected to the switch.
- i. Re-tighten clamping screws.
- j. Connect power to the hoist and operate hoist in the lifting direction to check operation of the geared rotary upper limit switch. If geared rotary upper limit switch does not operate at the desired position of the load block, repeat steps 4a through 4j.

WARNING

GEARED UPPER LIMIT DEVICE MUST BE ADJUSTED SO THAT WHEN IT IS TRIPPED, THERE IS A MINIMUM OF 2" INCHES BETWEEN THE TOP OF THE LOAD BLOCK AND THE WEIGHT OF THE GRAVITY TYPE UPPER LIMIT SWITCH.

5. Adjust lower limit as follows:
 - a. Connect power to the hoist and operate hoist in the lowering direction until load block reaches position where lower limit is to operate. A minimum of one wrap of wire rope must remain at each anchorage on the drum.
 - b. Disconnect power and lockout disconnecting means before adjusting lower limit of geared rotary limit switch.
 - c. Connect a continuity tester or other type of tester that will indicate open or closed circuits without the need of electrical power to switch number 1.
 - d. Loosen the two cam clamping screws on top of the cam assembly one-half turn each.
 - e. Locate the adjusting pinion for cam no. 1 by referring to the indicating arrow on insulation shield.
 - f. Depress adjusting pinion for cam no. 1 with a screwdriver until pinion teeth mesh with teeth of gear cam no.1.
 - g. Rotate cam in direction to operate switch no. 1.
 - h. The white marker on the gear teeth is directly over the cam lobe that trips the switch. When the operating cam has been adjusted so the cam lobe has tripped the switch, the adjustment is complete. In addition to visual observation, a continuity tester or other type of tester that will indicate open or closed circuits without the need of electrical power can be connected to the switch.
 - i. Re-tighten clamping screws.
 - j. Connect power to the hoist and operate hoist in the lowering direction to check operation of the geared rotary lower limit switch. If geared rotary lower limit switch does not operate at the desired position of the load block, repeat steps 5a through 5j.

WARNING

GEARED LOWER LIMIT DEVICE MUST BE ADJUSTED SO THAT WHEN IT IS TRIPPED, THERE IS A MINIMUM OF ONE WRAP OF WIRE ROPE REMAINING AT EACH ANCHORAGE ON THE DRUM.

6. After both the geared upper and lower limit devices have been adjusted, the geared rotary limit switch should be rechecked in accordance with "CHECK OPERATION-GEARED LIMIT SWITCH" instructions.

CAUTION

AFTER ADJUSTING LIMIT SWITCHES, REPLACE AND TIGHTEN ALL LIMIT SWITCH ENCLOSURE COVERS BEFORE RETURNING THE HOIST TO REGULAR SERVICE.

LIMIT SWITCHES

ADJUSTMENT - HUBBELL® GEARED ROTARY LIMIT SWITCH (WHEN SPECIFIED):

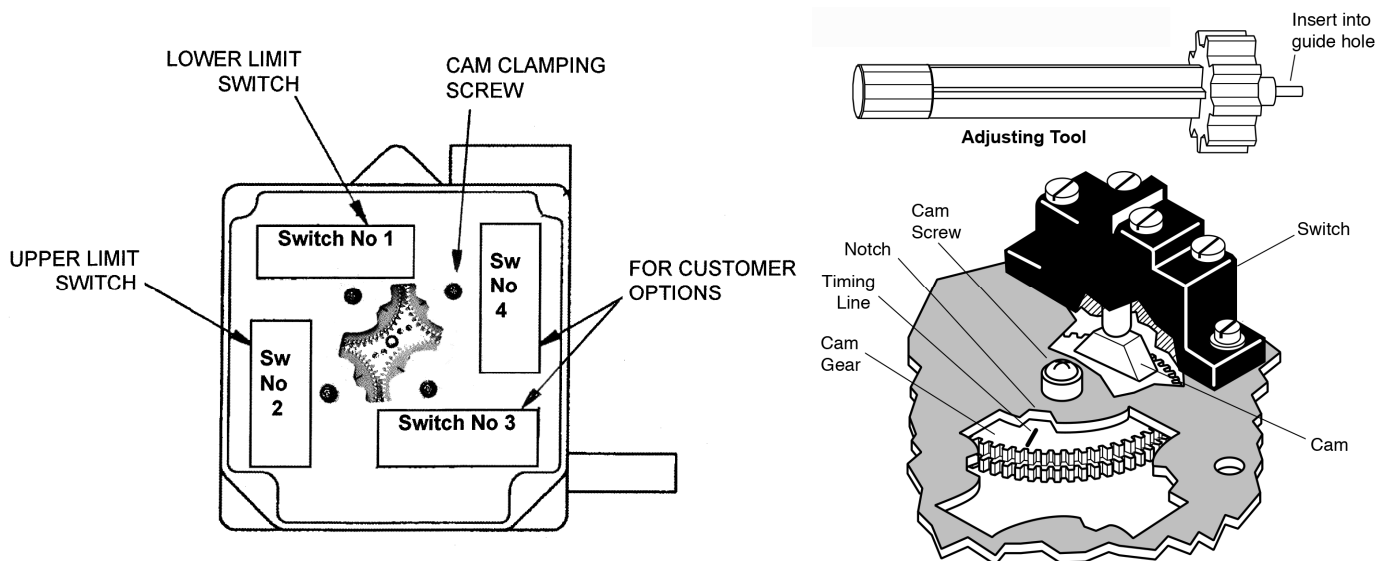
▲ DANGER

DISCONNECT POWER AND LOCKOUT DISCONNECTING MEANS BEFORE ADJUSTING LIMIT SWITCHES. LIMIT SWITCHES SHOULD BE ADJUSTED USING A CONTINUITY TESTER OR OTHER TYPE OF TESTER THAT WILL INDICATE OPEN OR CLOSED CIRCUITS WITHOUT THE NEED OF ELECTRICAL POWER.

Only a qualified electrician should adjust switches.

The HUBBELL® geared rotary limit switch unit is mounted in the enclosure at the drum end opposite the hoist gear reducer assembly. Figure 7c is a diagram of the switch arrangement.

FIGURE 7c



A two-circuit limit switch will have switches 1 and 2 as shown in Figure 7c. A four-circuit limit switch will have switches 1, 2, 3, and 4 as shown in Figure 7c. Switches are operated by the cam upon which they sit. Switch number 1 is connected in the hoist control circuit to operate as the lower limit device. Switch no. 2 is connected in the hoist control circuit to operate as the upper limit device. Switches number 3 and 4 are not connected in the hoist control circuit and are for the option of the owner/user.

Adjust HUBBELL® geared rotary limit switch as follows:

1. Disconnect power and lockout disconnecting means.
2. Remove the cover of the enclosure at the drum end opposite the hoist gear reducer assembly.
3. Remove the cover of the HUBBELL® geared rotary limit switch enclosure.
4. Adjust upper limit as follows:
 - a. Connect power to the hoist and operate hoist in the lifting direction until load block reaches position where upper limit is to operate. The minimum distance allowed between the top of the load block and the weight of the gravity type upper limit switch is 2" inches.
 - b. Disconnect power and lockout disconnecting means before adjusting upper limit of geared rotary limit switch.
 - c. Connect a continuity tester or other type of tester that will indicate open or closed circuits without the need for electrical power to switch number 2.

LIMIT SWITCHES

- d. Loosen the screw for the cam which actuates switch number 2.
- e. Insert the included adjustment tool into the guide hole closest to cam number 2.
- f. Engage teeth on adjustment tool with teeth on cam number 2.
- g. Rotate cam in direction to operate switch number 2.
- h. The black line on the cam will appear in the notch. This will be the approximate position at which the switch will be actuated. When the operating cam has tripped the switch, the adjustment is complete. In addition to visual observation, a continuity tester or other type of tester that will indicate open or closed circuits without the need of electrical power can be connected to the switch.
- i. Re-tighten the screw for the cam. Avoid over-tightening which could damage screw and screw threads.
- j. Connect power to the hoist and operate hoist in the lifting direction to check operation of the geared rotary upper limit switch. If geared rotary upper limit switch does not operate at the desired position of the load block, repeat steps 4a through 4j.

WARNING

GEARED UPPER LIMIT DEVICE MUST BE ADJUSTED SO THAT WHEN IT IS TRIPPED, THERE IS A MINIMUM OF 2" INCHES BETWEEN THE TOP OF THE LOAD BLOCK AND THE WEIGHT OF THE GRAVITY TYPE UPPER LIMIT SWITCH.

5. Adjust lower limit as follows:

- a. Connect power to the hoist and operate hoist in the lowering direction until load block reaches position where lower limit is to operate. A minimum of one wrap of wire rope must remain at each anchorage on the drum.
- b. Disconnect power and lockout disconnecting means before adjusting lower limit of geared rotary limit switch.
- c. Connect a continuity tester or other type of tester that will indicate open or closed circuits without the need of electrical power to switch number 1.
- d. Loosen the screw for the cam which actuates switch number 1.
- e. Insert the included adjustment tool into the guide hole closest to cam number 1.
- f. Engage teeth on adjustment tool with teeth on cam number 1.
- g. Rotate cam in direction to operate switch number 1.
- h. The black line on the cam will appear in the notch. This will be the approximate position at which the switch will be actuated. When the operating cam has tripped the switch, the adjustment is complete. In addition to visual observation, a continuity tester or other type of tester that will indicate open or closed circuits without the need of electrical power can be connected to the switch.
- i. Re-tighten the screw for the cam. Avoid over-tightening which could damage screw and screw threads.
- j. Connect power to the hoist and operate hoist in the lowering direction to check operation of the geared rotary lower limit switch. If geared rotary lower limit switch does not operate at the desired position of the load block, repeat steps 5a through 5j.

WARNING

GEARED LOWER LIMIT DEVICE MUST BE ADJUSTED SO THAT WHEN IT IS TRIPPED, THERE IS A MINIMUM OF ONE WRAP OF WIRE ROPE REMAINING AT EACH ANCHORAGE ON THE DRUM.

6. After both the geared upper and lower limit devices have been adjusted, the geared rotary limit switch should be rechecked in accordance with "CHECK OPERATION-GEARED LIMIT SWITCH" instructions.

CAUTION

AFTER ADJUSTING LIMIT SWITCHES, REPLACE AND TIGHTEN ALL LIMIT SWITCH ENCLOSURE COVERS BEFORE RETURNING THE HOIST TO REGULAR SERVICE.

If other types of limit switches are specified, refer to instructions furnished with the switch unit or as additional pages with this manual for adjustment information.

MECHANICAL LOAD BRAKE

WRIGHT® SPEEDWAY® hoists are furnished with a mechanical load brake specified as standard. The mechanical load brake is located in the hoist gear reducer housing. The mechanical load brake serves as a control braking means, and in conjunction with the hoist motor brake comprises the hoist braking system. When another type of control braking means is specified, the mechanical load brake will not be included with the hoist.

The hoist braking system on hoists in regular service should be checked without load on the hook by the operator at the start of each shift, or the first time the hoist is to be operated during each shift. The hoist braking system should be checked during scheduled frequent and periodic inspections.

The mechanical load brake is self-adjusting, and does not require any regular maintenance except as noted by daily, frequent, or periodic inspections.

During daily, frequent, or periodic inspections, the hoist braking system should be checked as follows:

1. Operate hoist in the lifting and lowering direction, without load on the hook, and stop motion to check operation of the hoist braking system. The drift of the hook should not exceed one inch in either direction. If hook drift exceeds one inch, the motor brake normally requires adjustment or lining replacement. Refer to the HOIST MOTOR BRAKE section of this manual for instructions on motor brake adjustment or lining replacement.
2. After completing hoist motor brake adjustment or lining replacement, operate hoist in the lifting and lowering direction, without load on the hook, and stop motion to check operation of the hoist braking system. If hook drift is still excessive, a test of the mechanical load brake should be conducted.
3. Procedure for testing the mechanical load brake is as follows:
 - a. Lock the motor brake in an open or disengaged position. To disengage hoist motor brake, refer to Figure 11 of the HOIST MOTOR BRAKE section of this manual, and lock armature plate (B) against magnet (A).
 - b. Attach a test load of 25% to 50% of hoist rated load capacity to the hoist hook.
 - c. Lift the test load a distance of 6" - 8" inches. Hoist may hold test load or test load may drift back to floor. This step is to check if drift will occur and must be considered in future steps of the test. If hoist holds test load, the hoist mechanical load brake passes test. If drift occurs, proceed with test.
 - d. Lift test load several feet and stop motion. If hoist mechanical load brake holds test load, proceed to step e. If test load drifts downward, and lowering speed does not exceed normal specified lowering speed, hoist passes mechanical load brake test. If test load drifts downward, and lowering speed exceeds normal specified lowering speed; and speed and sound indicates test load is in free fall, depress lowering control and lower test load the remaining distance by use of the hoist motor. Mechanical load brake has failed test.
 - e. If hoist mechanical load brake held test load in step d., proceed as follows: Depress lowering control, and as soon as hoist has started to lower test load, release lowering control. If hoist stops and holds test load, the hoist mechanical load brake passes test. If test load drifts downward, proceed as outlined in step d.
 - f. If the mechanical load brake fails the test, disassembly of the gear reducer housing is required for adjustment or replacement of the ratchet unit of the mechanical load brake unit.

CAUTION

UNLOCK OR ENGAGE HOIST MOTOR BRAKE IN ITS NORMAL OPERATING CONDITION PRIOR TO PLACING THE HOIST BACK IN REGULAR SERVICE.

MECHANICAL LOAD BRAKE

- g. If additional information about testing of the mechanical load brake is required, or if the procedure for testing the mechanical load brake is not clear, contact Acco/Harrington or the distributor of the hoist. Do not test the mechanical load brake unless this information is fully understood.

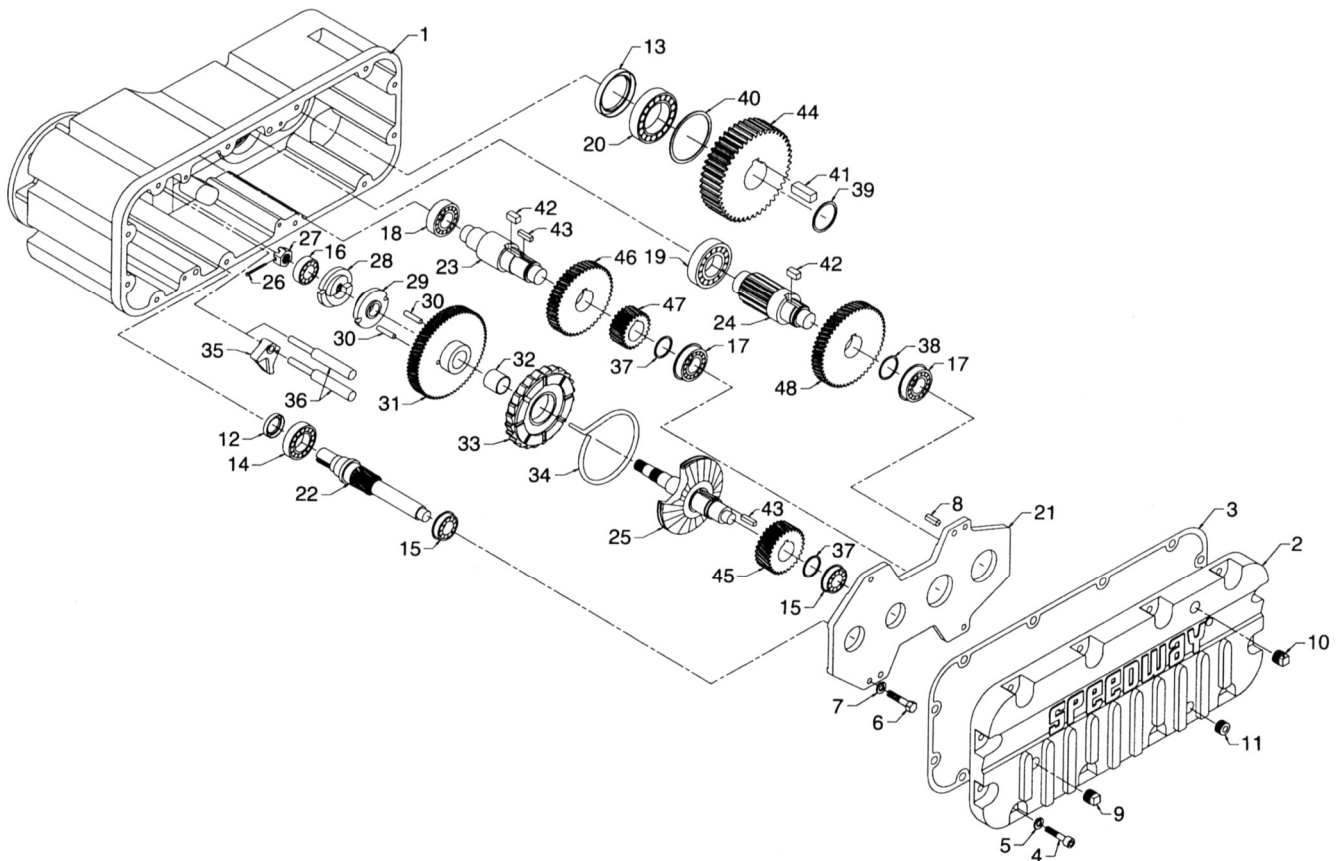
▲WARNING

DURING MECHANICAL LOAD BRAKE TEST, ALL PERSONNEL SHOULD BE ALERTED TO THE FACT THAT A FREE-FALL CONDITION OF THE TEST LOAD COULD BE EXPERIENCED. ALL PERSONNEL SHOULD BE POSITIONED AS FAR FROM THE PATH OF THE TEST LOAD AS POSSIBLE.

TO REPLACE RATCHET UNIT:

The hoist gear reducer housing must be disassembled to replace the mechanical load brake ratchet unit. The hoist gear reducer housing and parts are shown in Figure 8. Part numbers for gear reducer assembly parts can be found in the HOIST GEAR HOUSING ASSEMBLY section of this manual.

FIGURE 8



MECHANICAL LOAD BRAKE

Disassemble gear reducer housing assembly as follows:

1. Follow the procedures and instructions listed in the MAINTENANCE AND INSPECTION PROCEDURES section of this manual.
2. Block the drum to prevent it from rotating due to the weight of the wire rope and load block when meshing of the gears in the gear reduction is interrupted because of disassembly.
3. Remove the drain plug (11) from the gear housing cover (2) to drain the lubricant from hoist gear reducer housing. Discard gear housing lubricant in an approved manner. Do not reuse lubricant. When unit is reassembled, new lubricant should be used.
4. Loosen and remove the bolts (4) and lockwashers (5) holding the gear housing cover (2) to the gear housing (1) and remove the gear housing cover (2).
5. Remove and discard gear cover gasket (3). Do not reuse gasket. When unit is reassembled, a new gasket should be used.
6. Loosen and remove the bolts (6) and lockwashers (7) holding the gear spider (21) to the gear housing (1). Remove gear spider (21).
7. Rotate mechanical load brake assembly counterclockwise to release pawl (35) from slot in ratchet. Remove pins (36), then remove pawl (35) from pawl spring (34).
8. Remove mechanical load brake unit (25, 37, 45, 43, 34, 33, 31, 30, 29, 28, 16, 27, and 26) and take it to a service area.
9. Remove cotter pin (26), nut (27), bearing (16), brake cams (28 and 29), and brake gear (31) from brake shaft (25).
10. Remove ratchet unit (33) and measure thickness of linings on each side of ratchet. Replace ratchet unit if the thickness of either lining has worn to 1/4 inch (3.2 mm) or less.
11. While gear housing is disassembled, inspect all parts for wear or damage that would indicate a need for replacement. Replace parts as required when reassembly is performed.

Reassemble gear reducer housing assembly as follows:

1. Lightly coat linings on ratchet unit (33) and inside hub of brake gear (31) with new gear housing lubricant. Refer to LUBRICATION section of this manual.
2. Assemble ratchet unit (33) on brake shaft (25) with ratchet teeth pointing clockwise as shown in Figure 9, when viewed from the pinion (45) end of brake shaft (25).

FIGURE 9

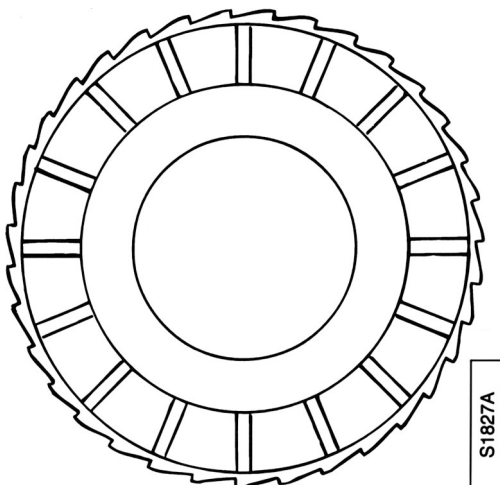
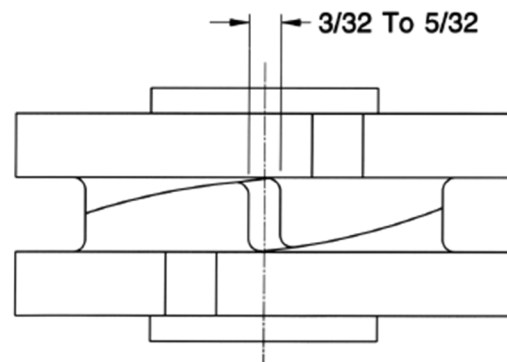


FIGURE 10



MECHANICAL LOAD BRAKE

3. Assemble brake gear (31) and brake cam (29) onto brake shaft (25) against ratchet unit (33).
4. Place brake cam (28) on splined end of brake shaft (25) with clearance between stop lugs on brake cam (29) and brake cam (28) as shown in Figure 10. Clearance between the stop lugs should be set as close to the minimum clearance (3/32 inch.) as possible.
5. Replace bearing (16), nut (27), and cotter pin (26) on end of brake shaft (25). DO NOT use cotter pin that was removed during disassembly. ONLY USE a new cotter pin. Bend cotter pin legs so they will not contact casting bore behind bearing (16) in the housing (1).
6. Replace mechanical load brake unit in gear housing.
 - a. Insert brake cam end of brake shaft into housing (1), meshing pinion teeth with teeth of gears.
 - b. Rotate brake shaft until right angle bend of pawl spring (34) is next to pawl slot in housing.
 - c. Place pawl (35) on end of spring and rotate brake shaft until pawl is in pawl slot.
 - d. Replace pawl pins (36) to secure pawl (35).
7. Check mesh of all pinions and gears.
8. Position spider (21) over bearings and dowel pins (8) in housing.
9. Secure spider (21) to gear housing with bolts (6) and lockwashers (7). Bolts (6) should be tightened to a torque of 23 lb ft (31.1 Nm).
10. Apply RTV Sealant to the face of the gear housing. Apply as a continuous bead around the gear housing, keeping the bead inside of (or completely around) the gear housing cover holes.
11. Secure gear cover (2) to gear housing with bolts (4) and lockwashers (5). Bolts (4) should be tightened to a torque of 30 lb ft (40.6 Nm).
12. Replace drain plug (11).
13. Fill the gear reducer with new lubricant as outlined in the LUBRICATION section of this manual.
14. Remove the blocks that were used to prevent the drum from rotating prior to returning the hoist to regular service.
15. Test the hoist before returning the hoist to regular service.

HOIST MOTOR BRAKE

WRIGHT® SPEEDWAY® hoists are furnished with a WRIGHT® hoist motor brake specified as standard. The hoist motor brake is located on the end of the hoist motor opposite the hoist gear reducer housing. The hoist motor brake operates in conjunction with the mechanical load brake to comprise the hoist braking system. When specified, another type of hoist motor brake will be furnished in place of the WRIGHT® hoist motor brake. Standard specified hoist motor sizes and hoist motor brake ratings for SPEEDWAY® hoists are listed in Table 8.

**TABLE 8
WRIGHT® SPEEDWAY® HOISTS
STANDARD SPECIFIED MOTORS AND MOTOR BRAKES**

HOIST MOTOR SIZE	HOIST MOTOR BRAKE RATING
1 HP	4.5 lb. ft.
2 HP	9 lb. ft.
3 & 4 HP	18 lb. ft.

The hoist braking system on hoists in regular service should be checked without load on the hook by the operator at the start of each shift, or the first time the hoist is to be operated during each shift. The hoist braking system should be checked during scheduled frequent and periodic inspections.

During daily, frequent, or periodic inspections, the hoist braking system should be checked as follows:

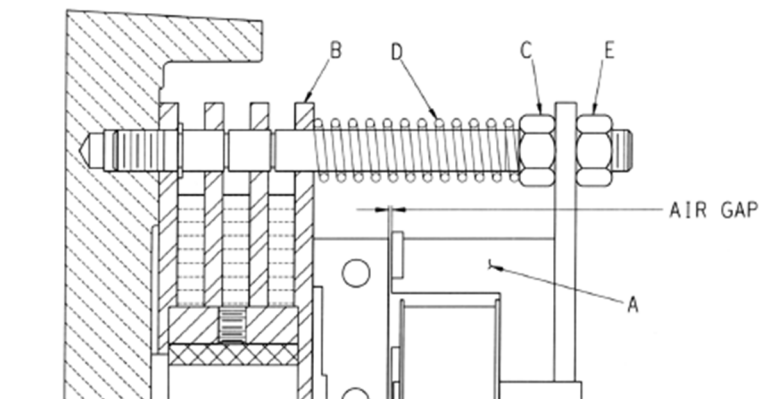
1. Operate hoist in the lifting and lowering direction, without load on the hook, and stop hook motion to check operation of the hoist braking system. The drift of the hook should not exceed one inch in either direction. If hook drift exceeds one inch, the motor brake normally requires adjustment or lining replacement.
2. After completing motor brake adjustment or lining replacement, operate hoist in the lifting and lowering direction, without load on the hook, and stop motion to check operation of the hoist braking system. If hook drift is still excessive, a test of the mechanical load brake should be conducted. Refer to the MECHANICAL LOAD BRAKE section of this manual.

▲ DANGER

DISCONNECT POWER AND LOCKOUT DISCONNECTING MEANS BEFORE ADJUSTING MOTOR BRAKE.
Only qualified personnel should adjust brakes.

ADJUSTMENT - HOIST MOTOR BRAKE:

FIGURE 11



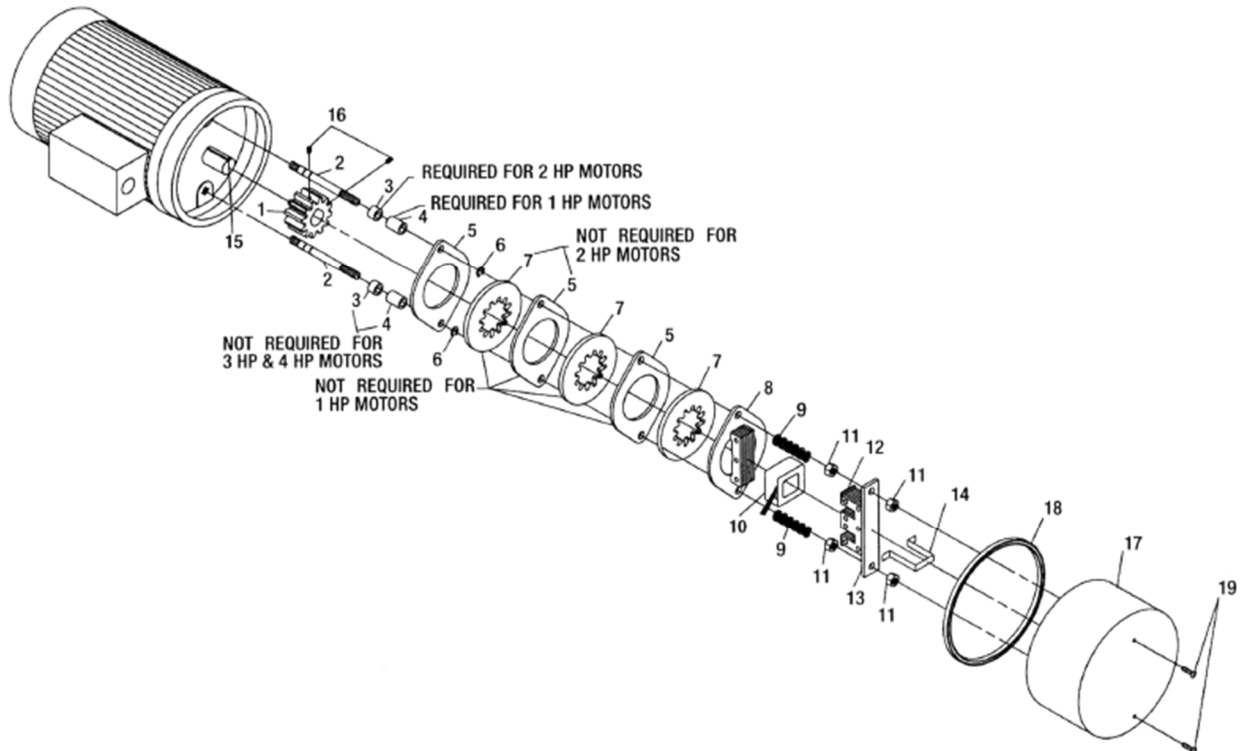
HOIST MOTOR BRAKE

The air gap between magnet (A) and armature plate (8) of Figure 11 is set at 0.030 - 0.035 inch (0.8 - 0.9 mm). As the brake discs wear, this gap increases. When gap is approximately 0.090 inch (2.3 mm), the brake will not release, and the brake air gap requires adjustment. It is recommended that the air gap be reset at the minimum setting of 0.030 - 0.035 inch (0.8 - 0.9 mm) whenever the brake cover is removed for inspection or maintenance.

TO ADJUST AIR GAP:

The hoist motor brake parts are shown in Figure 12. Part numbers for motor brake parts can be found in the HOIST MOTOR BRAKE ASSEMBLY section of this manual.

FIGURE 12



Adjust hoist motor brake air gap as follows: (Refer to Figures 11 and 12)

1. Follow the procedures and instructions listed in the MAINTENANCE AND INSPECTION PROCEDURES section of this manual.
2. Loosen and remove bolts (19) securing brake cover (17).
3. Remove brake cover (17).
4. Use brush or rag to remove any lining dust that has accumulated on brake parts. Specific attention should be directed to removal of dust from the air gap between magnet (A) and armature plate (B).

⚠ WARNING

USE PROPER EYE AND BREATHING PROTECTION EQUIPMENT DURING DUST REMOVAL.

HOIST MOTOR BRAKE

5. Nuts (C) and (E) are locked on brake studs by tightening them against each other against the magnet plate. Loosen nuts (C) and (E) on each brake stud by turning both nuts away from the magnet plate. Turn nuts (C) to compress springs (D) to permit the magnet to be moved toward armature until the air gap between magnet and armature plate is 0.030 - 0.035 inch (0.8 - 0.9 mm). Turn nut (E) against magnet plate. Lock nuts (C) and (E) by tightening them against each other against the magnet plate.
6. Replace brake cover (17) and secure with bolts (19). Bolts (19) are self-locking type with locking insert. Do not reuse bolts with damaged locking insert or that do not tighten properly. When replacing the brake cover, the ends of the rubber gasket should face downward to prevent water or foreign substances from getting inside the brake cover.

TO REPLACE BRAKE DISCS OR OTHER PARTS:

The hoist motor brake parts are shown in Figure 12. Part numbers for motor brake parts can be found in the HOIST MOTOR BRAKE ASSEMBLY section of this manual.

Replace hoist motor brake discs or parts as follows: (Refer to Figures 11 and 12)

1. Follow the procedures and instructions listed in the MAINTENANCE AND INSPECTION PROCEDURES section of this manual.
2. Loosen and remove bolts (19) securing brake cover (17).
3. Remove brake cover (17).
4. Use brush or rag to remove any lining dust that has accumulated on brake parts. Specific attention should be directed to removal of dust from the air gap between magnet (A) and armature plate (B).

WARNING

USE PROPER EYE AND BREATHING PROTECTION EQUIPMENT DURING DUST REMOVAL.

5. Rotate nuts (E) and remove from brake studs (2).
6. Remove magnet (A or 13) from brake studs (2).
7. Rotate nuts (C) and remove from brake studs (2).
8. Remove springs (D or 9) from brake studs (2).
9. Remove armature plate (8) and plates (5) from brake studs (2), and brake disc or discs (7) from brake hub (1).
10. Inspect all parts as outlined in the "Motor Brake Inspection" instructions of this section. Replace parts as required and reassemble motor brake.
11. Replace brake discs (7) on brake hub (1), and armature plates (8 or 5) on brake studs (2) in the order shown in Figure 12.
12. Replace springs (D or 9) on brake studs (2).
13. Replace nuts (C) on brake studs (2) and turn nuts (C) to compress springs (D).
14. Replace magnet (A) on brake studs (2) and push magnet (A) toward armature plate (B) against nuts (C).
15. Replace nuts (E) on brake studs (2).
16. Adjust air gap according to "To Adjust Air Gap" instructions of this section.
17. Replace brake cover (17) and secure with bolts (19). Bolts (19) are self-locking type with locking insert. Do not reuse bolts with damaged locking insert or that do not tighten properly. When replacing the brake cover, the ends of the rubber gasket should face downward to prevent water or foreign substances from getting inside the brake cover.

HOIST MOTOR BRAKE

MOTOR BRAKE INSPECTION:

The hoist motor brake and parts are shown in Figures 11 and 12. Hoist motor brake should be inspected every three months, and during scheduled frequent and periodic inspections, as follows:

1. Follow the procedures and instructions listed in the **MAINTENANCE AND INSPECTION PROCEDURES** section of this manual.
2. Loosen and remove bolts (19) securing brake cover (17).
3. Remove brake cover (17).
4. Use brush or rag to remove any lining dust that has accumulated on brake parts. Specific attention should be directed to removal of dust from the air gap between magnet (A) and armature plate (B).

WARNING

USE PROPER EYE AND BREATHING PROTECTION EQUIPMENT DURING DUST REMOVAL.

5. Check brake coils (10) for proper fit and retention in magnet (13). Adjust coil straps (14) to tighten.
6. Check for loose electrical connections or broken wires. Repair or replace as required.
7. Check thickness of brake discs (7). Replace ALL discs if any disc has worn to a thickness of 3/32 inch (2.4 mm) or less. ALWAYS REPLACE ALL BRAKE DISCS.
8. Check air gap and adjust if required. Minimum air gap - 0.030 - 0.035 inch (0.8 - 0.9 mm). Maximum air gap - 0.090 inch (2.3 mm). Adjust in accordance with "To Adjust Air Gap" instructions of this section.
9. If motor brake is disassembled, or during a general overhaul of hoist, inspect armature plates (8 or 5) for warping.
 - a. Place armature plate (8 or 5) flat on a flat level surface.
 - b. Lay straight edge across center of armature plate.
 - c. Check for any gaps between straight edge and armature plate.
 - d. Rotate straight edge 180° on armature plate, checking for gaps.
 - e. Any armature plate that has warping gaps of 1/32 inch (0.8 mm) or more requires replacement.
10. After inspection is completed, reassemble motor brake in accordance with "To Adjust Air Gap" or "To Replace Brake Discs Or Other Parts" instructions of this section.

ELECTRICAL COMPONENTS

DANGER

HAZARDOUS VOLTAGES PRESENT.

DISCONNECT POWER AND LOCKOUT DISCONNECTING MEANS BEFORE INSPECTING OR SERVICING.

Only qualified electricians should inspect, service, repair, or replace electrical components.

ELECTRICAL COMPONENTS INSPECTION:

Electrical components should be inspected every three months, and during scheduled frequent and periodic inspections, as follows:

1. Follow the procedures and instructions listed in the MAINTENANCE AND INSPECTION PROCEDURES section of this manual.
2. Components to examine:
 - a. Magnetic contactors.
 - b. Limit switches.
 - c. Control devices.
 - d. Wiring and connections.
3. Damage to look for:
 - a. Pitting.
 - b. Corrosion.
 - c. Broken parts.
 - d. Damage and deterioration of any kind.
 - e. Damaged or frayed wire.
 - f. Loose terminal connections.
4. Corrective action required:
 - a. Tighten any loose connections.
 - b. Replace any damaged or frayed wires.
 - c. Replace any pitted, burned, or corroded contacts or the entire contactor. Replace contacts in sets only. NEVER attempt to smooth contacts by filing or other means.
 - d. Replace damaged components.
 - e. Lubricate controller parts only if recommended by the controller manufacturer.

ELECTRICAL COMPONENTS

RECONNECTABLE MOTORS:

Standard hoist single-speed motors are reconnectable for 230 volt or 460 volt, three phase, 60 Hz. operation. Standard trolley single-speed motors are reconnectable for 208/230 volt or 460 volt, three-phase, 60 Hz. operation. Such motors and control will be connected at the factory for 460 volt unless otherwise specified. All two-speed motors, 200 volt single-speed motors, and 575 volt single-speed motors are single voltage motors, and are not reconnectable.

If reconnection of a 230/460 volt motor is required, proceed as follows:

1. If hoist is connected to the main power supply, de-energize, lock, and tag the main switch (disconnect).
2. Reconnect the control circuit transformer, located inside the control enclosure. Connection instructions are located on the transformer. Refer to Table 11 and Figure 16.
3. Reconnect the hoist motor leads inside the hoist motor junction box, and hoist motor brake leads inside the hoist motor brake cover. Refer to Table 9 and Figures 13 and 14 for hoist motor and Table 12 and Figure 17 for hoist motor brake.
4. Reconnect the trolley motor leads inside the trolley motor junction box. Refer to Table 9 and Figures 13 and 14.
5. Reconnect the trolley motor brake leads, if so equipped, inside the trolley motor junction box. Refer to Table 12 and Figure 17. Refer to the TROLLEY section of this manual for additional trolley brake information.
6. If the hoist is equipped with optional motor circuit fuses or overload relays sized for the original connection voltage, they must be replaced with ones properly sized for the reconnected voltage.

⚠ CAUTION

WHEN RECONNECTING FOR A DIFFERENT VOLTAGE, MOTOR CIRCUIT FUSES AND THERMAL OVERLOADS (IF ANY) MUST BE REPLACED WITH UNITS THAT COMPLY WITH THE NEW VOLTAGE AND CURRENT RATINGS.

⚠ WARNING

WHENEVER ANY CHANGES HAVE BEEN MADE, DO NOT OPERATE HOIST UNTIL ALL SAFETY DEVICES HAVE BEEN RECHECKED IN THE SAME MANNER AS DURING ORIGINAL INSTALLATION. REFER TO INSTALLATION SECTION OF THIS MANUAL.

Refer to Table 10 and Figure 15 for two-speed motor connections.

FIGURE 13

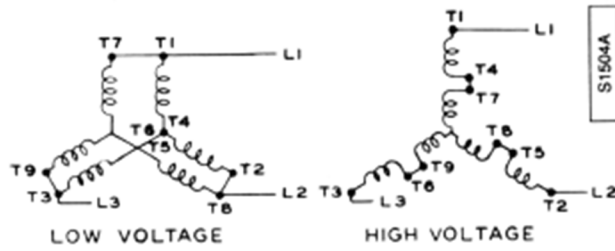


FIGURE 14

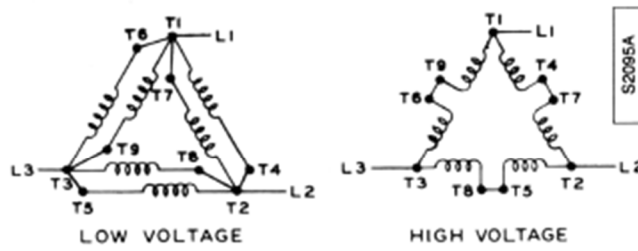


FIGURE 15



FIGURE 16

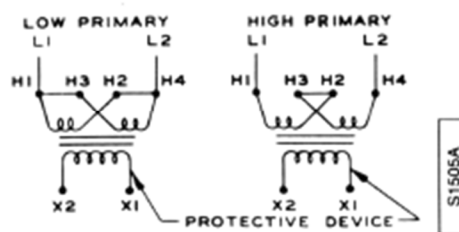
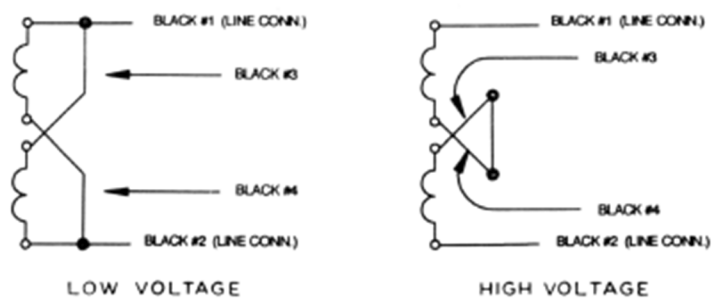


FIGURE 17



ELECTRICAL COMPONENTS

TABLE 9
MOTOR CONNECTIONS
Y-CONNECTED (Figure 13) DELTA-CONNECTED (Figure 14)

LOW VOLTAGE	HIGH VOLTAGE	LOW VOLTAGE	HIGH VOLTAGE
L1,T1,T7	L1,T1	L1,T1,T6,T7	L1,T1
L2,T2,T8	L2,T2	L2,T2,T4,T8	L2,T2
L3,T3,T9	L3,T3	L3,T3,T5,T9	L3,T3
	T4,T7		T4,T7
T4,T5,T6	T5,T8		T5,T8
	T6,T9		T6,T9

TABLE 10
TWO-SPEED MOTOR CONNECTIONS

LOW SPEED	HIGH SPEED
L1,T1	L1,T11
L2,T2	L2,T12
L3,T3	L3,T13
INSULATE SEPARATELY	INSULATE SEPARATELY
T11-T12-T13	T1-T2-T3

TABLE 11
TRANSFORMER CONNECTIONS
(Figure 16)

LOW VOLTAGE	HIGH VOLTAGE
H1,H3-L1	H1-L1
H2,H4-L2	H4-L2
	H2-H3

TABLE 12
HOIST & TROLLEY MOTOR BRAKE COIL CONNECTIONS

VOLTAGE	BRAKE COIL PART NO. 39783-3
230 VAC	Figure 17, Low voltage
380 VAC	Figure 17, High voltage
480 VAC	Figure 17, High voltage

NOTICE

When the hoist is installed on a new or existing crane system that requires a common control voltage between the crane and hoist controls, the following must be adhered to:

1. Primary phasing to the control transformer in both the hoist and crane must be identical.
2. X1 must be connected between the hoist and crane controls.
3. The X2 secondary leads **MUST NOT** be connected together or to ground.

FAILURE TO FOLLOW THESE GUIDELINES WILL RESULT IN MISMATCHED VOLTAGES AND BLOWN CONTROL TRANSFORMER FUSES.

On installations where a grounded X2 secondary is required, **SEPARATE** X1 leads must be used for:

1. the mainline contactor (on the crane) and crane motion, and
2. the trolley/hoist motion controls or push buttons.

The X1 of transformers with grounded X2 secondaries **MUST NOT** be tied together.

If additional information is required, contact Acco/Harrington Host or the distributor of the hoist.

ACCELERATION CONTROL MODULE V

An Acceleration Control Module V (ACM V) is available as an optional feature on all power-driven trolleys using a three-phase electric motor. The ACM V is a solid state device designed to provide reduced starting torque and controlled acceleration of three-phase motors. The ACM V offers a soft controlled start that reduces the swinging action of suspended loads caused by uncontrolled abrupt starts. Starting torque and acceleration rate can be adjusted to accommodate differing requirements.

DANGER

HAZARDOUS VOLTAGES ARE PRESENT IN THE CONTROL BOX, OTHER ELECTRICAL COMPONENTS, AND CONNECTIONS BETWEEN THESE COMPONENTS.

The main switch (disconnect) of the hoist, crane, or lifting system shall be de-energized. Lock and tag the main switch in the de-energized position in accordance with ANSI 2244.1.

Only qualified electricians should inspect, adjust, service, repair, or replace electrical components.

All adjustments of **ACM V** must be made with the main switch locked and tagged in the de-energized position. After adjustments are made, re-energize power supply and test operation of **ACM V**. If additional adjustment is required, repeat this procedure.

NOTICE

Multi-Voltage Controls must be set for correct voltage before operating.

ACM V SINGLE SPEED ADJUSTMENT:

1. Set the TIME adjustment at the maximum point and the INITIAL TORQUE adjustment at the minimum point. (This initial setting provides the softest start, but the initial torque may be too small to start the motor for the first few cycles.)
2. Set the INITIAL TORQUE adjustment first; usually 1/4 to 1/2 of a turn from the minimum torque setting is adequate.
3. Decrease the TIME adjustment if the starting is too soft under a half load condition. Strive for a smooth even transition from zero to maximum speed with a minimal INITIAL TORQUE setting.

ACM V TWO SPEED ADJUSTMENT:

1. Set the TIME adjustment at the maximum point and the ACCELERATION and DECELERATION INITIAL TORQUE adjustments at the minimum points. (This setting provides the softest start, but the initial torque may be too small to start the motor for the first few cycles.)
2. Set the ACCELERATION TORQUE adjustment first; usually 1/4 to 1/2 of a turn from the minimum torque setting is adequate.
3. Next set the DECELERATION TORQUE adjustment by turning it to the minimum torque setting. If the transition from high to low speed is too soft, increase the setting until an appropriate transition is obtained. Usually setting the DECELERATION TORQUE adjustment to minimum proves to be the best setting.

DANGER

SERVICE CHECKS OF THE **ACM V** REQUIRE THAT THE ELECTRICAL POWER SUPPLY BE ENERGIZED.

THEREFORE, only electricians qualified and certified to work on energized circuits and equipment should perform this service.

NOTICE

All readings should be taken with a standard analog type VOM (volt-ohm-meter)

ACM V SINGLE SPEED SERVICE:

1. Disconnect motor from T1, T2, and T3.
2. Set INITIAL TORQUE adjustment to minimum and the TIME adjustment to maximum.
3. Energize the contactor. For proper operation the following readings should be taken (example is for a 460 VAC, three-phase system with 115 VAC control voltage):
 - a. TL1 to TL2, TL2 to TL3, and TL1 to TL3 - 460 VAC.
 - b. Control signal point A and B terminals - 115 VAC. It is important that this reading be taken across the A and B terminal screws on the ACM unit. If no voltage can be read across these two points, first check for misplacement of an electrical interlock from the reversing or two-speed contactor. The "common" side of the control signal is sensed through the coil which is not *energized*, so do not interlock the common wire out of the circuit. Simply checking for 115 VAC from one screw terminal and the "common" wire is NOT sufficient. Without a proper signal to the A and B terminals (and the HI, LO, and COMMON on two-speed models), the output of the ACM at T1, T2, and T3 will remain zero (0) VAC. A and B must only be connected to the contactor coils, **NEVER THE CONTROL TRANSFORMER.**
 - c. After six seconds, take readings at T1, T2, and T3 (with the motor disconnected).
 - (1) From T1 to T2, T2 to T3, and T1 to T3, the voltage is approximately 80-95% of line voltage. For the 460 VAC ACM, the reading is approximately 405 VAC.
 - (2) A zero (0) VAC output will occur if the proper control signal is not being received (See b above and a, b, and c listed under two-speed service).
 - d. With the TORQUE adjustment at minimum and the TIME adjustment at maximum, take a meter reading across terminals T1, T2, and T3 (as in c(1) above), from the instant the contactor is closed. The meter should move slowly during the first five seconds, then quickly for the last second. The total time to reach 88% of the line voltage should be approximately six to nine seconds. Each phase to phase test should be similar in voltage profile, no matter where the TIME and TORQUE adjustments are set. Due to the dampening factor in volt-ohm-meters, it is difficult to detect the exact voltage level at a particular torque setting. However, the varying of the TORQUE and TIME settings can be readily identified on the meter. THE IMPORTANT POINT IS THAT ALL THREE VOLTAGE PROFILES ARE THE SAME.

ACM V TWO SPEED SERVICE:

Steps 1, 2, and 3 are the same as for single-speed control. The difference lies with the control signal circuitry. For proper operation, check the following control signals across the screws on the ACM. See 3b of single-speed service for general testing procedure.

- a. When the contactor is energized for low speed operation, the meter will read:
 - (1) Between HI and COMMON 0 VAC
 - (2) Between LO and COMMON 115 VAC
 - (3) Between LO and HI 115 VAC
 - (4) Between A and B 115 VAC
- b. When the contactor is energized for high speed operation, the meter will read:
 - (1) Between HI and COMMON 115 VAC
 - (2) Between LO and COMMON 0 VAC
 - (3) Between LO and HI 115 VAC
 - (4) Between A and B 115 VAC
- c. If another control voltage is used, it will appear instead of the 115 VAC listed above.

OVERLOAD CUTOFF DEVICE (OPTIONAL)

An overload cutoff device is available as an optional device on all complete SPEEDWAY® hoists. An overload cutoff device is not available for winch type units or single line units.

The overload cutoff device is an electro-mechanical device designed to interrupt the hoist lifting circuit if the load it senses exceeds the preset capacity of the overload cutoff device. When the device interrupts the hoist lifting circuit, the lowering circuit remains intact to allow the hoist load to be lowered and removed. When the excessive overload, that has caused the device to trip, is removed from the hoist hook, the hoist lifting circuit is automatically restored.

▲WARNING

THE OVERLOAD CUTOFF DEVICE IS DESIGNED TO PERMIT THE HOIST TO LIFT A FREELY SUSPENDED LOAD WITHIN ITS RATED LOAD CAPACITY AND TO LIMIT THE AMOUNT OF OVERLOAD THAT CAN BE LIFTED BY A PROPERLY MAINTAINED HOIST, UNDER NORMAL OPERATING CONDITIONS.

VARIABLES EXPERIENCED WITHIN THE HOISTING SYSTEM, SUCH AS, BUT NOT LIMITED TO, ACCELERATION OF THE LOAD, DYNAMICS OF THE SYSTEM, TYPE AND LENGTH OF WIRE ROPE, AND OPERATOR EXPERIENCE, DO NOT PERMIT THE ADJUSTMENT OF AN OVERLOAD CUTOFF DEVICE THAT WOULD PREVENT THE LIFTING OF ANY OVERLOAD OR ANY LOAD IN EXCESS OF RATED LOAD CAPACITY.

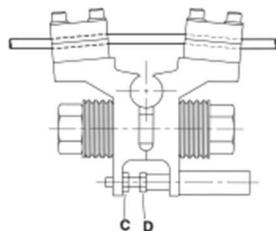
THE ADJUSTMENT OF THE OVERLOAD CUTOFF DEVICE WILL ALLOW THE LIFTING OF AN OVERLOAD OF SUCH MAGNITUDE THAT WILL NOT CAUSE PERMANENT DAMAGE TO A PROPERLY MAINTAINED HOIST, TROLLEY, OR CRANE; AND WILL PREVENT THE LIFTING OF AN OVERLOAD OF SUCH MAGNITUDE THAT COULD CAUSE PERMANENT DAMAGE TO A PROPERLY MAINTAINED HOIST, TROLLEY, OR CRANE.

THE OVERLOAD CUTOFF DEVICE IS ACTUATED ONLY BY LOADS INCURRED WHEN LIFTING A FREELY SUSPENDED LOAD ON THE HOIST HOOK. THEREFORE, THE OVERLOAD CUTOFF DEVICE CANNOT BE RELIED UPON TO RENDER THE HOISTING MECHANISM INOPERATIVE IF OTHER SOURCES, SUCH AS, BUT NOT LIMITED TO, SNAGGING OF THE LOAD, TWO BLOCKING OF THE LOAD BLOCK, OR SNATCHING A LOAD, INDUCE LOADS INTO THE HOISTING SYSTEM.

THE OVERLOAD CUTOFF DEVICE IS CONNECTED IN THE HOIST LIFTING CONTROL CIRCUIT AND, THEREFORE, WILL NOT PREVENT DAMAGE TO THE HOIST, TROLLEY, OR CRANE IF EXCESSIVE OVERLOADS ARE INDUCED INTO THE HOISTING SYSTEM WHEN THE HOISTING MECHANISM IS IN A NON-OPERATING OR STATIC MODE.

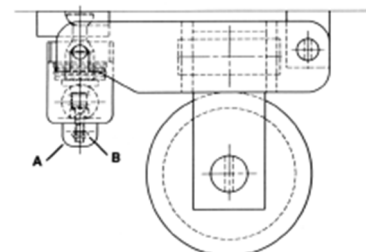
THE OVERLOAD CUTOFF DEVICE IS AN EMERGENCY DEVICE ONLY AND SHALL NOT BE USED TO MEASURE THE MAXIMUM LOAD TO BE LIFTED, OR TO SENSE ANY OVERLOAD IMPOSED BY A CONSTRAINED LOAD.

FIGURE 18



**OVERLOAD CUTOFF ASSEMBLY
SINGLE REEVED**

FIGURE 19



**OVERLOAD CUTOFF ASSEMBLY
DOUBLE REEVED**

OVERLOAD CUTOFF DEVICE (OPTIONAL)

SINGLE REEVED HOIST UNITS

The optional overload cutoff device used on single reeved hoists is a commercial overload device mounted on the horizontal portion of the wire rope between the dead end equalizing quarter sheave and the dead end wire rope fitting located in the center of the hoist, as shown in Figure 18. One clamp of the device will grip the wire rope securely and the other will allow a sliding fit on the wire rope. The device can be mounted with either clamp toward the dead end wire rope fitting.

SINGLE REEVED OVERLOAD CUTOFF DEVICE ADJUSTMENT:

If it becomes necessary to readjust the commercial overload cutoff device, proceed as follows:

1. Loosen jam nut (C).
2. Make necessary adjustment of adjusting screw (D) as follows:
 - To increase load lifting capacity, turn adjusting screw (D) in small increments (5° to 10°) counter-clockwise until required test load can be lifted. Tighten jam nut (C) while holding adjusting screw stationary.
 - To decrease load lifting capacity, turn adjusting screw (D) in small increments (5° to 10°) clockwise until required setting is achieved. Tighten jam nut (C) while holding adjusting screw stationary.
3. Operate hoist in the lifting direction to confirm overload cutoff device setting.
4. If overload cutoff device requires additional adjustment, remove load from hoist hook and repeat steps 1, 2 and 3.

DOUBLE REEVED HOIST UNITS

The optional overload cutoff device used on double reeved hoists is the WRIGHT® overload cutoff device mounted in the frame of the hoist. Figure 19 shows the WRIGHT® overload cutoff device unit and the equalizing sheave hanger unit that will actuate the overload cutoff device.

DOUBLE REEVED OVERLOAD CUTOFF DEVICE ADJUSTMENT:

If it becomes necessary to readjust the WRIGHT® overload cutoff device, proceed as follows:

1. Remove adjusting nut cover (A).
2. Make necessary adjustment of adjusting nut (B) as follows:
 - To increase load lifting capacity, turn adjusting nut (B) in small increments (5° to 10°) counter-clockwise until required test load can be lifted.
 - To decrease load lifting capacity, turn adjusting nut (B) in small increments (5° to 10°) clockwise until required setting is achieved.
3. Operate hoist in the lifting direction to confirm overload cutoff device setting.
4. If overload cutoff device requires additional adjustment, remove load from hoist hook and repeat steps 2 and 3.
5. After adjustment is completed, replace adjusting nut cover.

NOTICE

WHEN ADJUSTING AN OVERLOAD CUTOFF DEVICE ON TWO-SPEED OR VARIABLE SPEED HOISTS, ADJUSTMENT SETTING SHOULD BE MADE AT THE HIGHER LIFTING SPEED. THIS MAY PERMIT THE HOIST TO OPERATE WITH HIGHER LOADS AT LOW SPEED, BUT WILL NOT SUBJECT THE HOIST TO DYNAMIC LOADS GREATER THAN THE DYNAMIC LOAD EXPERIENCED WHEN LIFTING RATED LOAD AT HIGH SPEED. ADJUSTMENT MAY BE MADE AT A LOWER SPEED IF REQUIRED; HOWEVER, THE OVERLOAD CUTOFF DEVICE MAY ACTIVATE AT LOADS LESS THAN RATED LOAD, OR SETTING LOAD, WHEN OPERATING AT HIGHER SPEEDS.

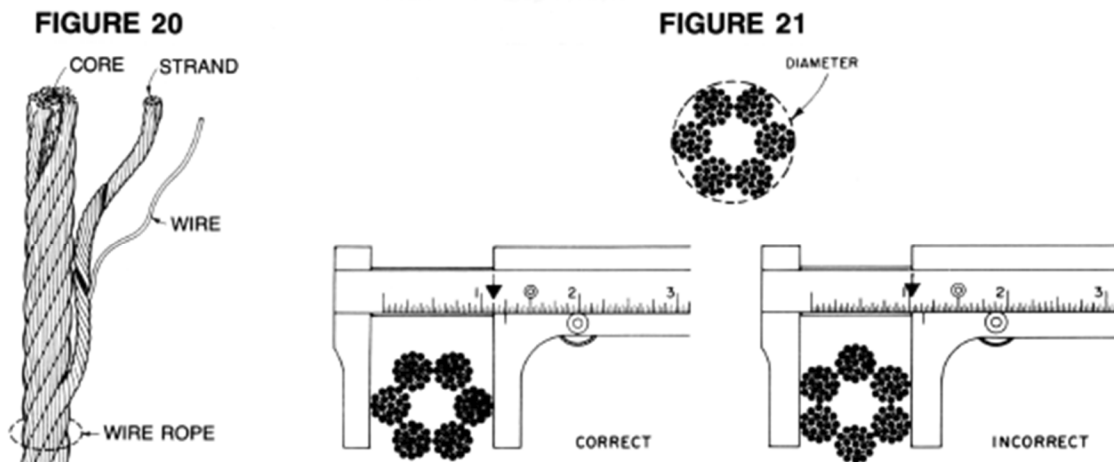
WIRE ROPE

Wire rope on hoists in regular service should be visually inspected daily by the operator. If the hoist is used in multiple-shift operations, wire rope should be visually inspected by the operator at the start of each shift. The daily inspection by the operator is for visual damage to the wire rope. Such damage includes excessive broken wires or wear, broken strand, kinks, birdcaging, or damage resulting in deformation of the wire rope structure. When visual damage is present, the operator shall report such damage to the supervisor, and shall not operate the hoist until a more detailed inspection is performed to determine that the wire rope can be used, or the wire rope is replaced. Detailed inspection procedures are outlined below. These procedures also apply to scheduled frequent and periodic inspections.

⚠ WARNING

DO NOT OPERATE A HOIST WITH WIRE ROPE THAT SHOWS ANY SIGN OF DAMAGE, DEFORMATION, OR EXCESSIVE WEAR.

Wire rope consists of a core, strands, and wires that comprise a strand as shown in Figure 20. The diameter of the wire rope is the diameter of a circle that would enclose the wire rope strands. Correct and incorrect methods of measuring wire-rope diameter are shown in Figure 21. The term one rope lay refers to the length of wire rope assembly wherein one strand completely wraps 360° around the wire-rope assembly.



WIRE ROPE INSPECTION:

⚠ CAUTION

ALWAYS WEAR GLOVES OR OTHER HAND PROTECTION DEVICES WHEN HANDLING WIRE ROPE.

Wire rope items to inspect during scheduled frequent and periodic inspections; or if the daily visual inspection by the operator indicates a more detailed inspection is required; are as follows:

1. Rope distortion such as kinking, crushing, unstranding, birdcaging, main strand displacement, or core protrusion.
2. General corrosion.
3. Broken or cut strands.
4. Number, distribution, and type of visible broken or cut wires.
5. Reduction of rope diameter due to loss of core support, or internal or external corrosion, or wear.
6. Damage from heat.

WIRE ROPE

7. Reduction of nominal rope diameter of more than 5%.
8. Corroded or broken wires at end connections.
9. Corroded, cracked, bent, worn, damaged, or improperly applied end connections.
10. Rope lubrication, if recommended.

During wire rope inspection, special attention should be directed to sections of rope subject to rapid deterioration such as the following:

- Rope sections in contact with saddles, equalizer sheaves, or other sheaves where rope travel is limited.
- Rope sections at or near terminal ends where corroded or broken wires may protrude.
- Rope sections subject to reverse bends.
- Rope sections that are normally hidden during visual inspections, such as sections passing over sheaves.

Rope conditions found during the inspection should be recorded in a written report. Amount and type of rope deterioration from one inspection report until the next inspection report should be evaluated for determination if rope replacement is required.

WIRE ROPE REPLACEMENT:

Rope conditions found during the inspection, in addition to review of previous inspection reports, should be the basis for determination that hoist use should be discontinued and that rope replacement is required. Once determined that rope replacement is required, the hoist may be allowed to operate to the end of the work shift, based on the judgment of a qualified person. The rope shall be replaced after that work shift, at the end of the day, or at the latest time prior to the equipment being used by the next work shift. Rope conditions requiring replacement of the rope are as follows:

1. One broken strand.
2. Six randomly distributed broken wires in a length equal to six rope diameters, except as noted in line 4.
3. Three broken wires in one strand in a length equal to six rope diameters, except as noted in line 4.
4. In rotation-resistant ropes, two randomly distributed broken wires in a length equal to six rope diameters or four randomly distributed broken wires in a length equal to thirty rope diameters.
5. One outer wire broken at the contact point with the core of the rope that has worked its way out of the rope structure and protrudes or loops out from the rope structure.
6. Kinking, crushing, unstranding, birdcaging, main strand displacement, core protrusion, or any other damage resulting in deformation or distortion of the rope structure.
7. Evidence of heat damage from any cause.
8. Reduction of rope diameter due to loss of core support or internal or external corrosion.
9. Reduction of rope nominal diameter greater than 5%.
10. Corroded or two broken wires at a socketed or swaged end fitting.
11. Corroded, cracked, bent, damaged, or worn end fitting.

WIRE ROPE MAINTENANCE:

Wire rope assemblies specified with WRIGHT® SPEEDWAY® hoists, or furnished as authorized WRIGHT® replacement parts, are manufactured with wire rope constructions and end fittings in accordance with design specifications established by Acco® for the WRIGHT® SPEEDWAY® hoist line. Only authorized WRIGHT® wire rope assemblies should be used when replacing wire rope on the hoist.

Specific attention should be directed to the following:

- Wire rope should be stored in a manner to prevent damage or deterioration to the rope.
- Wire rope shall be unreeled or uncoiled in a manner to avoid kinking of or inducing a twist in the rope.
- During installation of wire rope, care should be exercised to avoid dragging the rope in dirt or around objects that will scrape, nick, cut, crush, or induce sharp bends in the rope.
- If recommended, rope should be maintained in a lubricated condition.

WIRE ROPE

The load block on new hoists or after installation of replacement rope may turn when a load is applied or released. Such load block turning may cause the lines of rope to twist about each other. Do not operate the hoist in this condition. This indicates a twist was induced into the rope during installation. Remove the rope from the hoist, lay the rope out to remove any twist, and re-install on the hoist. On single reeved hoists, the twist may be able to be removed by releasing the threaded sleeve fitting end of wire rope from the dead end connection plate in the hoist frame; removing the optional overload cutoff device, if furnished; lifting the wire rope from the dead end equalizing quarter sheave; and rotating threaded sleeve fitting end of wire rope to remove twist. Reattach the threaded sleeve fitting end of wire rope as outlined in instructions to replace wire rope.

When replacing wire rope, inspect the drum and sheaves. Drums that have scored grooves or have sharp edges from wear should be smoothed out or the drum should be replaced. Sheaves that have scored grooves, cracked or broken flanges, or sharp edges from wear should be replaced.

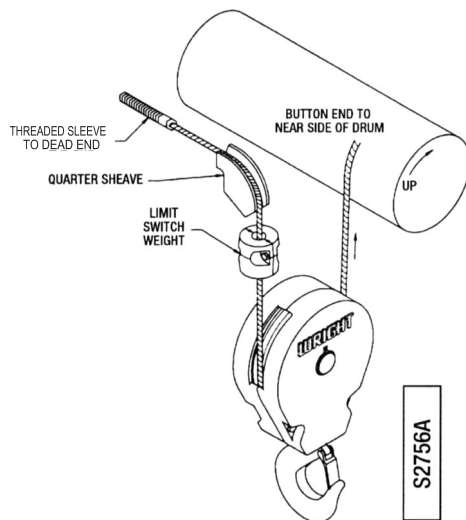
TO REPLACE WIRE ROPE:

Instructions for replacing wire rope on the hoist are outlined below. Steps 1 through 5 apply to any hoist, regardless of reeving. Beginning with step 6, follow instructions for either single reeving or double reeving, as required.

Refer to Figures 22, 23, 24, and 25.

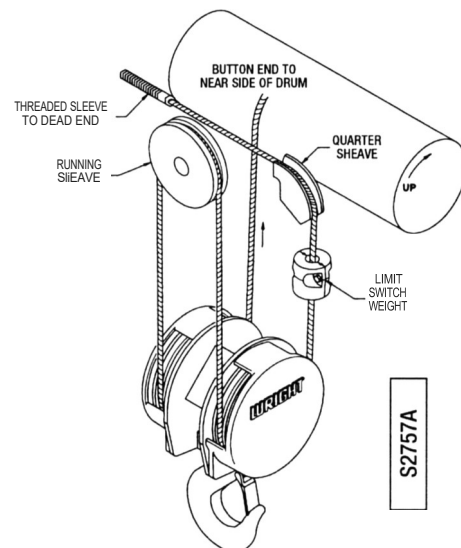
1. Follow the procedures and instructions listed in the MAINTENANCE AND INSPECTION PROCEDURES section of this manual.
2. Lower load block to floor or working surface.
3. Disassemble load block covers or load block to remove wire rope from sheaves. Refer to the LOAD BLOCK sections of this manual.
4. Continue to operate hoist to unwind remaining wire rope from the drum. If hoist has a geared limit switch, reset lower limit of the geared limit switch to allow wire rope to unwind completely from the drum. Refer to the LIMIT SWITCHES section of this manual for instructions.
5. Release button end (single reeved) or ends (double reeved) of wire rope from drum openings.

FIGURE 22



2-PART SINGLE REEVING

FIGURE 23



4-PART SINGLE REEVING

WIRE ROPE

INSTRUCTIONS FOR 2-PART SINGLE REEVED HOISTS ONLY: REFER TO FIGURE 22

6. Remove optional overload cutoff device, if furnished, from wire rope. Release threaded sleeve fitting end of wire rope from dead end connection plate in hoist frame.
7. Install and reeve new wire rope as follows:
 - a. Insert button end of wire rope in drum opening.
 - b. WEARING PROTECTIVE GLOVES OR OTHER HAND PROTECTION DEVICES, AND KEEPING HANDS WELL AWAY FROM THE DRUM, guide the wire rope into the drum grooves while operating the hoist in the lifting direction. Leave enough wire rope to reeve through the load block sheave and to reach the dead end. This guiding operation will eliminate most of the twist in the wire rope.

CAUTION

WHEN GUIDING THE WIRE ROPE INTO THE DRUM GROOVES, USE ONLY A LIGHT SQUEEZING PRESSURE. DO NOT SQUEEZE ROPE THAT WILL ALLOW HAND BEING PULLED INTO THE GROOVES AND ROPE. KEEP HANDS WELL POSITIONED AWAY FROM DRUM. ALWAYS WEAR GLOVES OR OTHER HAND PROTECTION DEVICES WHEN HANDLING WIRE ROPE. NEVER HANDLE MOVING WIRE ROPE WITH BARE HANDS.

- c. Reeve wire rope around load block sheave and reassemble load block.
- d. Insert threaded sleeve fitting end of wire rope through gravity limit switch weight.
- e. Rotate threaded sleeve fitting end of wire rope to remove any twist between the load block and dead end, and place wire rope over dead end equalizing quarter sheave.
- f. Attach threaded sleeve fitting end of wire rope to dead end connection plate in hoist frame. Lock in place using double washers, lockwashers, and nuts; one washer, one lockwasher, and one nut on each side of dead end connection plate. Lock nuts by turning each nut toward the dead end connection plate until lockwasher is flat.
- g. Reset the lower limit of the geared limit switch, if provided.
- h. Install and calibrate optional overload cutoff device, if provided.
- i. Test all limit switches before returning the hoist to regular service.

WARNING

NEVER OPERATE HOIST WITHOUT THE PROTECTION OF PROPERLY FUNCTIONING LIMIT SWITCHES.

INSTRUCTIONS FOR 4-PART SINGLE REEVED HOISTS ONLY: REFER TO FIGURE 23

6. Remove top running sheave to release wire rope.
7. Remove optional overload device, if furnished, from wire rope. Release threaded sleeve fitting end of wire rope from dead end connection plate in hoist frame.
8. Install and reeve new wire rope as follows:
 - a. Loop center of wire rope around top running sheave and reassemble running sheave into frame.
 - b. Working toward the button end of the wire rope, eliminate any twist in rope, and reeve rope around one load block sheave.
 - c. Insert button end of wire rope in drum opening.

WIRE ROPE

- d. WEARING PROTECTIVE GLOVES OR OTHER HAND PROTECTION DEVICES, AND KEEPING HANDS WELL AWAY FROM THE DRUM, guide the wire rope into the drum grooves while operating the hoist in the lifting direction. Only wind a few wraps (4 to 6) of wire rope onto the drum.

⚠ CAUTION

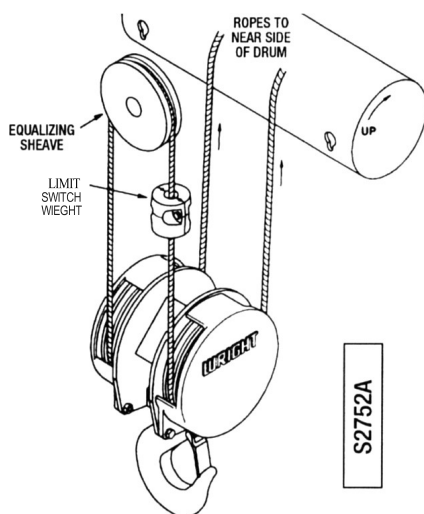
WHEN GUIDING THE WIRE ROPE INTO THE DRUM GROOVES, USE ONLY A LIGHT SQUEEZING PRESSURE. DO NOT SQUEEZE ROPE THAT WILL ALLOW HAND BEING PULLED INTO THE GROOVES AND ROPE. KEEP HANDS WELL POSITIONED AWAY FROM DRUM. ALWAYS WEAR GLOVES OR OTHER HAND PROTECTION DEVICES WHEN HANDLING WIRE ROPE. NEVER HANDLE MOVING WIRE ROPE WITH BARE HANDS.

- e. Working from the top running sheave, toward the threaded sleeve fitting end of the wire rope, eliminate any twist in rope, and reeve rope around other load block sheave.
- f. Reassemble load block covers.
- g. Insert threaded sleeve fitting end of wire rope through gravity limit switch weight.
- h. Rotate threaded sleeve fitting end of wire rope to remove any twist between the load block and dead end, and place wire rope over dead end equalizing quarter sheave.
- i. Attach threaded sleeve fitting end of wire rope to dead end connection plate in hoist frame. Lock in place using double washers, lockwashers, and nuts; one washer, one lockwasher, and one nut on each side of dead end connection plate. Lock nuts by turning each nut toward the dead end connection plate until lockwasher is flat.
- j. Reset the lower limit of the geared limit switch, if provided.
- k. Install and calibrate optional overload cutoff device, if provided.
- l. Test all limit switches before returning the hoist to regular service.

⚠ WARNING

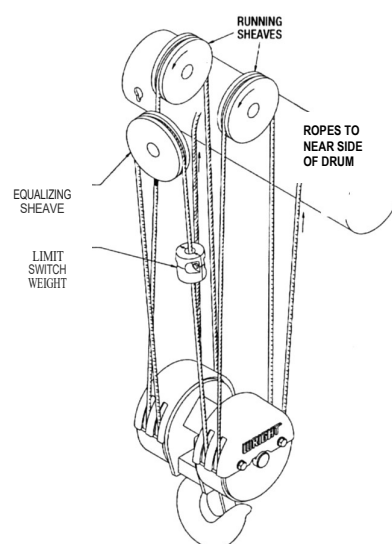
NEVER OPERATE HOIST WITHOUT THE PROTECTION OF PROPERLY FUNCTIONING LIMIT SWITCHES.

FIGURE 24



**2-PART DOUBLE
REEVING**

FIGURE 25



**4-PART DOUBLE
REEVING**

WIRE ROPE

INSTRUCTIONS FOR 2-PART DOUBLE REEVED HOISTS ONLY: REFER TO FIGURE 24

6. Remove equalizing sheave from sheave hanger to release wire rope.
7. Install and reeve new wire rope as follows:
 - a. Loop center of wire rope around equalizing sheave and reassemble equalizing sheave into sheave hanger.
 - b. Insert one end of the wire rope from the equalizing sheave through the gravity limit switch weight.
 - c. Working with only one end of the wire rope from the equalizing sheave, eliminate any twist, and reeve around one load block sheave.
 - d. Reassemble load block cover over sheave.
 - e. Insert button end of wire rope into drum opening after eliminating any twist between load block and drum.
 - f. Repeat steps c, d, and e with the other end of the wire rope from the equalizing sheave.
 - g. WEARING PROTECTIVE GLOVES OR OTHER HAND PROTECTION DEVICES, AND KEEPING HANDS WELL AWAY FROM THE DRUM, guide the wire ropes into the drum grooves while operating the hoist in the lifting direction.
NOTE: An assistant is required to either operate hoist or guide ropes during this procedure.

CAUTION

WHEN GUIDING THE WIRE ROPE INTO THE DRUM GROOVES, USE ONLY A LIGHT SQUEEZING PRESSURE. DO NOT SQUEEZE ROPE THAT WILL ALLOW HAND BEING PULLED INTO THE GROOVES AND ROPE. KEEP HANDS WELL POSITIONED AWAY FROM DRUM. ALWAYS WEAR GLOVES OR OTHER HAND PROTECTION DEVICES WHEN HANDLING WIRE ROPE. NEVER HANDLE MOVING WIRE ROPE WITH BARE HANDS.

- h. Reset the lower limit of the geared limit switch, if provided.
- i. Test all limit switches before returning the hoist to regular service.

WARNING

NEVER OPERATE HOIST WITHOUT THE PROTECTION OF PROPERLY FUNCTIONING LIMIT SWITCHES.

INSTRUCTIONS FOR 4-PART DOUBLE REEVED HOISTS ONLY: REFER TO FIGURE 25

6. Remove top running sheaves to release wire rope
7. Remove equalizing sheave from sheave hanger to release wire rope.
8. Install and reeve new wire rope as follows:
 - a. Loop center of wire rope around equalizing sheave and reassemble equalizing sheave into sheave hanger.
 - b. Insert one end of the wire rope from the equalizing sheave through the gravity limit switch weight.
 - c. Working with only one end of the wire rope from the equalizing sheave, eliminate any twist, and reeve around one inner load block sheave, one top running sheave, and one outer load block sheave.

WIRE ROPE

- d. Reassemble load block cover over sheaves.
- e. Insert button end of wire rope into drum opening after eliminating any twist between load block and drum.
- f. Repeat steps c, d, and e with the other end of the wire rope from the equalizing sheave.
- g. WEARING PROTECTIVE GLOVES OR OTHER HAND PROTECTION DEVICES, AND KEEPING HANDS WELL AWAY FROM THE DRUM, guide the wire ropes into the drum grooves while operating the hoist in the lifting direction.
NOTE: An assistant is required to either operate hoist or guide ropes during this procedure.

CAUTION

WHEN GUIDING THE WIRE ROPE INTO THE DRUM GROOVES, USE ONLY A LIGHT SQUEEZING PRESSURE. DO NOT SQUEEZE ROPE THAT WILL ALLOW HAND BEING PULLED INTO THE GROOVES AND ROPE. KEEP HANDS WELL POSITIONED AWAY FROM DRUM. ALWAYS WEAR GLOVES OR OTHER HAND PROTECTION DEVICES WHEN HANDLING WIRE ROPE. NEVER HANDLE MOVING WIRE ROPE WITH BARE HANDS.

- h. Reset the lower limit of the geared limit switch, if provided.
- i. Test all limit switches before returning the hoist to regular service.

WARNING

NEVER OPERATE HOIST WITHOUT THE PROTECTION OF PROPERLY FUNCTIONING LIMIT SWITCHES.

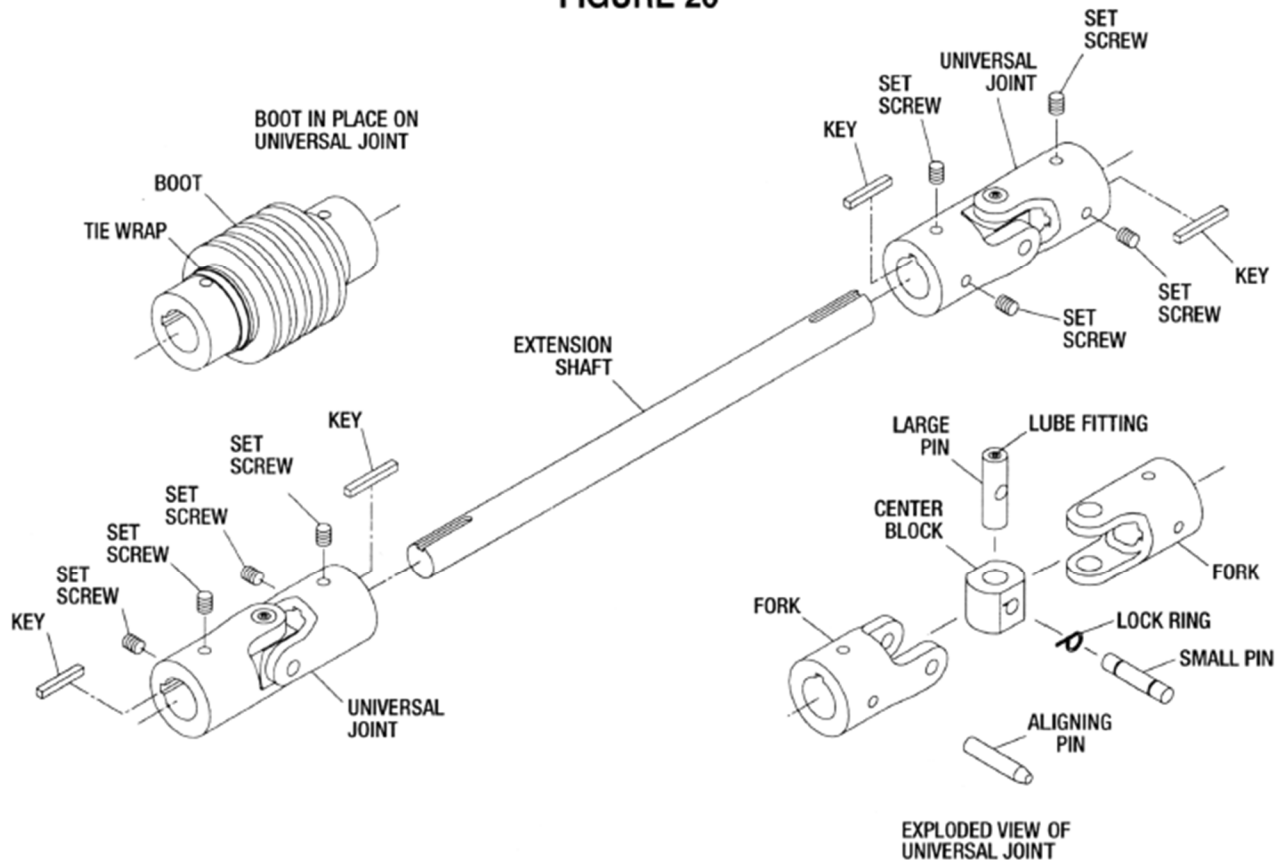
CAUTION

CERTAIN PRECAUTIONS SHOULD BE TAKEN WHEN THE HOIST IS NOT IN USE.

1. Position load block at a height that will minimize personnel from walking into the block. It is recommended that the block be positioned at a height of at least 7' feet above the floor level when not in use.
2. Always anchor outdoor hoists or cranes when not attended or not in use. The load block makes a convenient means to be used in the anchoring process.
3. Always disconnect power to a hoist or crane when not in use.

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FIGURE 26



Cross mounted hoists utilize universal joints. Removal of universal joints does not require removal of the motor. Removal of universal joints without removal of the motor requires disassembly of at least one of the universal joints. To disassemble one or both universal joints, refer to Figure 26 and use one of the following two sets of instructions.

TO DISASSEMBLE ONE UNIVERSAL JOINT ONLY:

1. Follow the procedures and instructions listed in the MAINTENANCE AND INSPECTION PROCEDURES section of this manual.
2. Remove the two tie wraps from the universal joint boot. Slide the boot onto the extension shaft.
3. If necessary, rotate the extension shaft so that the small diameter pin is in a position in which it can be driven out. This may require re-energizing the hoist and pressing the up or down button as appropriate.

▲ WARNING

KEEP HANDS AND TOOLS AWAY FROM THE EXPOSED UNIVERSAL JOINT AND THE EXTENSION SHAFT WHEN OPERATING THE HOIST.

DISCONNECT POWER FROM THE HOIST AND LOCKOUT DISCONNECTING MEANS BEFORE CONTINUING WITH DISASSEMBLY.

4. Support the extension shaft with a sling near the end of the shaft which mates with the universal joint to be disassembled. Support should be such that the extension shaft will not fall when the universal joint is disengaged.

UNIVERSAL JOINTS

5. The small diameter pin should now be in an accessible position. Support the universal joint and press out the small diameter pin, being careful not to lose the lock ring which is in the recess of the center block.
6. Once the small diameter pin is removed, the lock ring, the large diameter pin, and the center block can be removed. The forks will remain attached to the extension shaft and the adjoining shaft (motor shaft or motor pinion shaft depending on the end of hoist being worked on). The extension shaft will now be solely supported by the sling and the universal joint on the other end of the shaft.
7. Loosen the set screws and remove the forks and the keys from the shafts they are attached to. To remove the forks, it will be necessary to tilt the extension shaft away from the adjoining shaft.
8. Slide the boot from the extension shaft. The universal joint is now totally disassembled and totally removed from the shafts it joined.

TO DISASSEMBLE BOTH UNIVERSAL JOINTS:

1. Follow the procedures and instructions listed in the MAINTENANCE AND INSPECTION PROCEDURES section of this manual.
2. Remove the two tie wraps from each of the universal joint boots. Slide the boots onto the extension shaft.
3. If necessary, rotate the extension shaft so that the small diameter pin in each universal joint is in a position in which it can be driven out. This may require re-energizing the hoist and pressing the up or down button as appropriate.

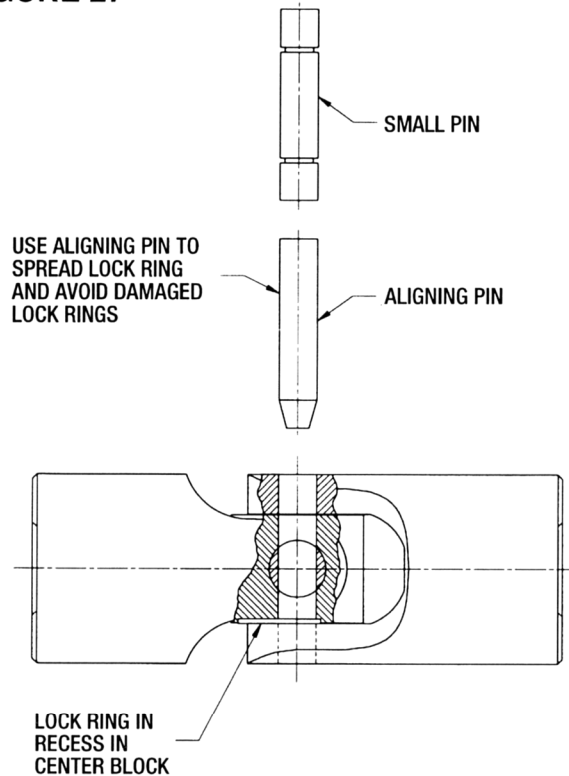
▲ WARNING

KEEP HANDS AND TOOLS AWAY FROM THE EXPOSED UNIVERSAL JOINTS AND THE EXTENSION SHAFT WHEN OPERATING THE HOIST.

DISCONNECT POWER FROM THE HOIST AND LOCKOUT DISCONNECTING MEANS BEFORE CONTINUING WITH DISASSEMBLY.

4. Support the extension shaft with a sling near each end of the shaft. Support should be such that the extension shaft will not fall when the universal joints are disengaged.
5. The small diameter pin in each universal joint should now be in an accessible position. Start with one universal joint. Support the joint and press out the small diameter pin, being careful not to lose the lock ring which is in the recess of the center block.
6. Once the small diameter pin is removed, the lock ring, the large diameter pin, and the center block can be removed. The forks will remain attached to the extension shaft and the adjoining shaft (motor shaft or motor pinion shaft depending on the end of hoist being worked on). The extension shaft will now be solely supported by the slings and the universal joint on the other end of the shaft.
7. Repeat steps 5 and 6 for the other universal joint. Do not mix parts between the two universal joints. The extension shaft will now be solely supported by the slings.
8. Loosen the set screws and remove the forks and the keys from the shafts they are attached to. To remove the forks, it will be necessary to move the loose extension shaft away from the adjoining shafts.
9. Slide the boots from the extension shaft. The universal joints are now totally disassembled and totally removed from the shafts they joined.

FIGURE 27



TO REASSEMBLE UNIVERSAL JOINTS:

1. Follow the procedures and instructions listed in the MAINTENANCE AND INSPECTION PROCEDURES section of this manual.
2. Support extension shaft with sling(s).
3. Slide boots onto extension shaft.
4. Insert keys into shaft keyways and slide forks onto shafts.
5. If possible, rotate the shafts so that the small diameter pins will be in the most accessible position when parts will be assembled.
6. Starting with one universal joint, mount parts as shown in Figures 26 and 27, making sure lock ring is in its recess in the center block. As shown in Figure 27, insert a pointed aligning pin into the small hole and push it through, following with the small pin which will automatically lock itself into place. A pointed aligning pin can be obtained by ordering Acco part number 70992. If a grease gun is not available (see step 9) to lubricate the joint after assembly, the contact surfaces of the pins, center block and forks should be greased before assembly.
7. Repeat step 6 for the other universal joint.
8. Equalize the spaces between the three shafts and the center blocks of the two universal joints. Make sure keys do not extend into the spaces between the shafts and the center blocks (this would indicate keys are not fully engaged). Then insert set screws into the forks and tighten them. Application of Loctite Threadlocker Adhesive on set screws is recommended.
9. Lubricate universal joints by injecting EP Moly D Grease into the large pin via the lube fitting in the end of the pin. Grease should also be applied to the external surfaces of the center block and the pins (especially where they engage the forks). Containers of EP Moly D Grease, packaged in a 4-ounce squeeze bottle, can be obtained by ordering Acco/Harrington part number ACC69807.
10. Slide boots onto the universal joints, center them on the joints, and secure with commonly available tie wraps. Pull the tie wraps tight with a pliers and snip off the excess. Failure to pull the tie wraps tight may result in boot migration.

UNIVERSAL JOINTS

Universal joints can be removed intact. Removal of universal joints intact requires removal of the motor. To remove the universal joints intact, refer to Figure 26 and use the following set of instructions.

TO REMOVE UNIVERSAL JOINTS INTACT:

1. Follow the procedures and instructions listed in the MAINTENANCE AND INSPECTION PROCEDURES section of this manual.
2. Remove the two tie wraps from each of the universal joint boots. Slide the boots onto the extension shaft.
3. Support the extension shaft with a sling near each end of the shaft. Support should be such that the extension shaft will not fall when the universal joints are removed.
4. Start with the universal joint nearest the motor. Loosen the set screws which secure the universal joint to the motor shaft.
5. Support the motor with a sling. Loosen and remove the motor bolts and lockwashers. Remove the motor.
6. Loosen the set screws which secure the universal joint to the extension shaft. Remove the universal joint closest to the motor by sliding it off the extension shaft
7. Loosen the set screws which secure the other universal joint to the extension shaft. Remove the extension shaft by sliding it out of the universal joint. Slide the boots off of the extension shaft.
8. Loosen the set screws which secure the universal joint to the motor pinion shaft. Remove the universal joint by sliding it off of the motor pinion shaft.
9. Universal joints are now removed intact. Keys can be removed from the shafts if desired.

TO INSTALL UNIVERSAL JOINTS INTACT:

1. Follow the procedures and instructions listed in the MAINTENANCE AND INSPECTION PROCEDURES section of this manual.
2. Slide boots onto extension shaft.
3. Insert keys into shaft keyways.
4. Slide universal joint onto motor pinion shaft.
5. Support the extension shaft with a sling near each end of the shaft. Slide the extension shaft into the universal joint.
6. Slide the second universal joint onto the other end of the extension shaft.
7. Install the motor by sliding the motor shaft into the second universal joint and installing and tightening the motor bolts and lockwashers. The extension shaft is now supported by the two universal joints.
8. Equalize the spaces between the three shafts and the center blocks of the two universal joints. Make sure keys do not extend into the spaces between the shafts and the center blocks (this would indicate keys are not fully engaged). Then insert set screws into the forks of the universal joints and tighten them. Application of Loctite Threadlocker Adhesive on set screws is recommended.
9. Lubricate universal joints by injecting EP Moly D Grease into the large pin via the lube fitting in the end of the pin. Grease should also be applied to the external surfaces of the center block and the pins (especially where they engage the forks). Containers of EP Moly D Grease, packaged in a 4 -ounce squeeze bottle, can be obtained by ordering Acco/Harrington part number ACC69807.
10. Slide boots onto the universal joints, center them on the joints, and secure with commonly available tie wraps. Pull the tie wraps tight with a pliers and snip off the excess. Failure to pull the tie wraps tight may result in boot migration.

TROLLEYS

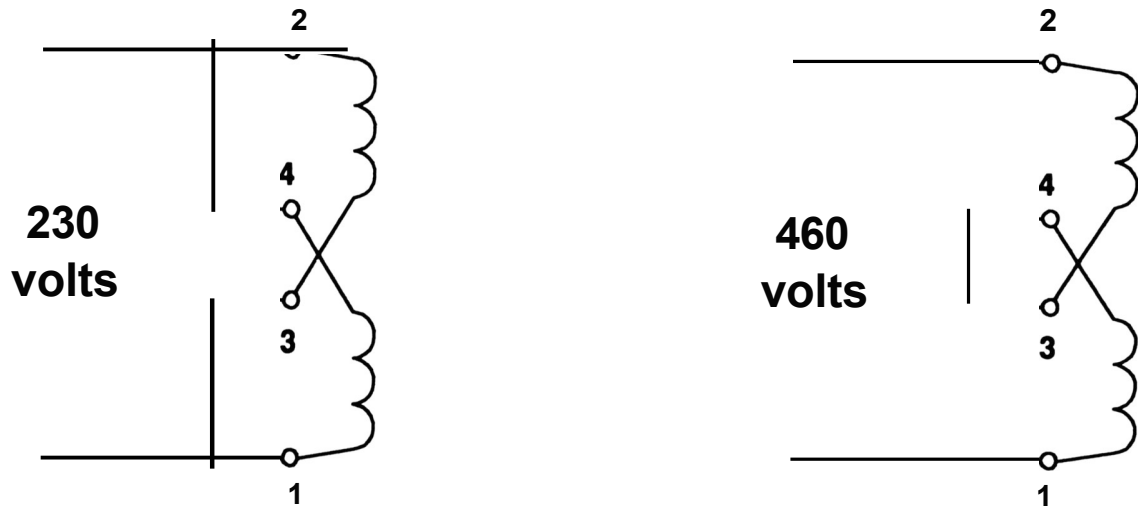
Trolleys specified for the WRIGHT® SPEEDWAY® hoist line include:

- Plain under-running trolleys
- Hand-gearred under-running trolleys
- Motor-driven under-running trolleys

Motor-driven trolleys use a right-angle worm gear reducer unit. Refer to the MOTORIZED MONORAIL TROLLEY section and LUBRICATION section of this manual. Motor brakes are optional on motor-driven trolleys and are only furnished when specified.

The brake coil on reconnectable 230/460 volt single-speed motors may be connected for 230 volts or 460 volts. The brake coil must be reconnected as shown in Figure 28 if the motor voltage is reconnected.

FIGURE 28



The trolley brake (if specified) on hoists in regular service should be checked without load on the hook by the operator at the start of each shift, or the first time the hoist is to be operated during each shift. The trolley brake should be checked during scheduled frequent and periodic inspections.

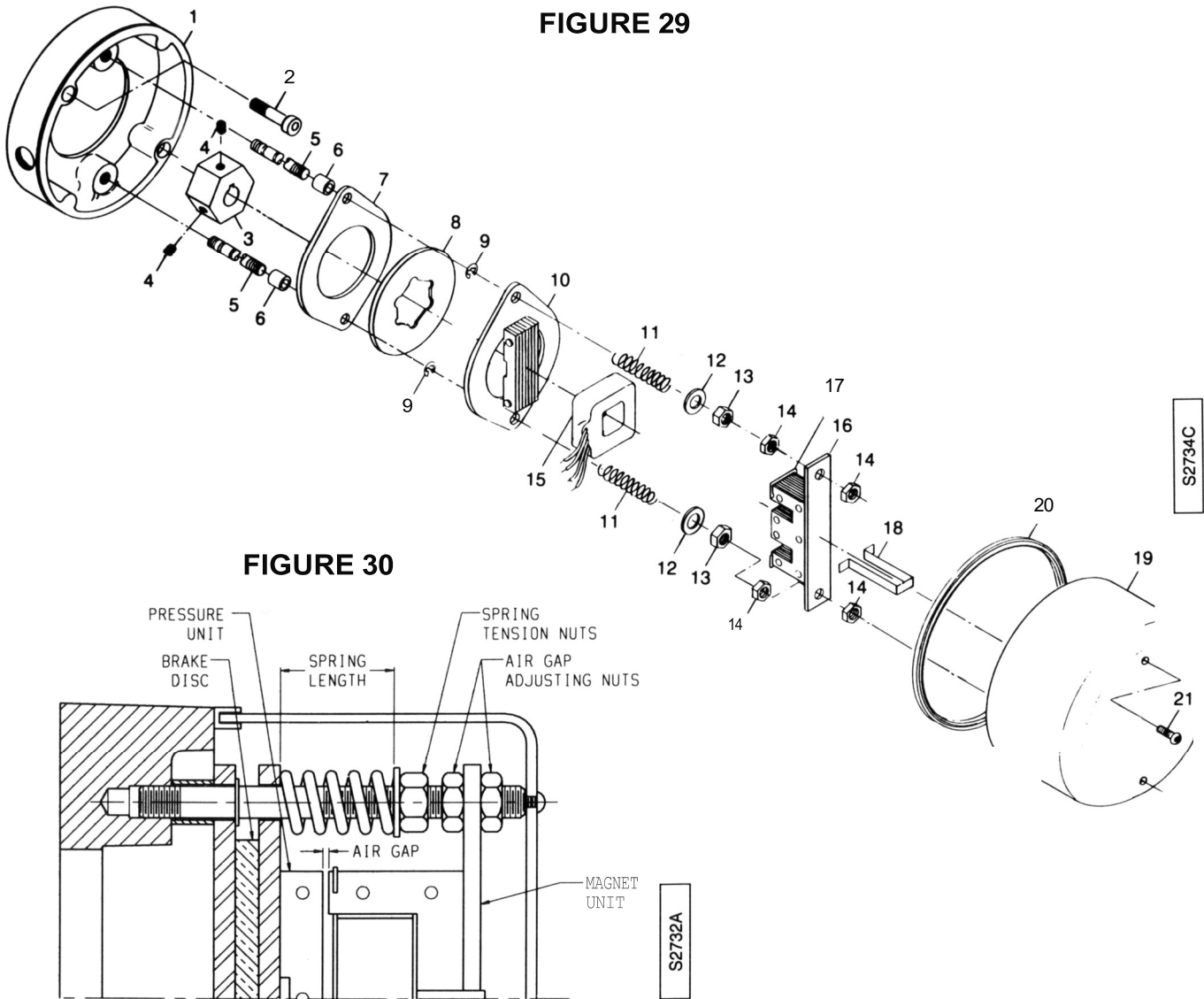
During daily, frequent, or periodic inspections, the trolley brake should be checked as follows:

1. Operate trolley in both travel directions, without load on the hook, and stop motion to check operation of the trolley brake. The drift of the trolley should not exceed a distance equal to 10% of the trolley travel speed in either direction. If trolley drift exceeds this distance, the motor brake normally requires adjustment or lining replacement.
2. After completing trolley brake adjustment or lining replacement, operate trolley in both travel directions, without load on the hook, and stop motion to check operation of the trolley brake. If trolley drift is still excessive, replace the brake assembly.

▲ DANGER

DISCONNECT POWER AND LOCKOUT DISCONNECTING MEANS BEFORE ADJUSTING MOTOR BRAKE.

Only qualified personnel should adjust brakes.



TROLLEY MOTOR BRAKE INSPECTION:

The trolley motor brake and parts are shown in Figures 29 and 30. Trolley motor brake should be inspected every three months, and during scheduled frequent and periodic inspections, as follows:

1. Follow the procedures and instructions listed in the MAINTENANCE AND INSPECTION PROCEDURES section of this manual.
2. Loosen and remove bolts (21) securing brake cover (19).
3. Remove brake cover (19).
4. Use brush or rag to remove any lining dust that has accumulated on brake parts. Specific attention should be directed to removal of dust from the air gap between magnet (16) and armature plate (10).

▲WARNING

USE PROPER EYE AND BREATHING PROTECTION EQUIPMENT DURING DUST REMOVAL.

TROLLEYS

5. Check brake coil (15) for proper fit and retention in magnet (16). Adjust coil strap (18) to tighten.
6. Check for loose electrical connections or broken wires. Repair or replace as required.
7. Check thickness of brake disc (8). Replace disc if worn to a thickness of 3/32 inch (2.4 mm) or less.
8. Check air gap and adjust if required. Minimum air gap - 0.020 inch (0.5 mm) Maximum air gap - 0.045 inch (1.1 mm) Adjust in accordance with "To Adjust Air Gap" instructions of this section.
9. Replace brake cover (19) and secure with bolts (21). Bolts (21) are self-locking type with locking insert. Do not reuse bolts with damaged locking insert or that do not tighten properly. When replacing the brake cover, the ends of the rubber gasket should face downward to prevent water or foreign substances from getting inside the brake cover.

TO ADJUST AIR GAP:

Adjust trolley motor brake air gap as follows:

1. Loosen the air gap adjusting nuts (14) to allow the magnet unit (16) to move toward the pressure unit (10). Using a feeler gage, set the air gap to 0.020 inches. Tighten air gap adjusting nuts (14) to lock the position on the magnet unit (16). Check air gap at several points to verify uniform setting.
2. As brake disc wear occurs, the compressed length of spring (11) will increase. Select the recommended compressed spring length from Table 13, based on trolley motor horsepower. Adjust both spring lengths in accordance with Table 13 plus or minus 1/32 inch. If trolley stopping performance is not satisfactory, increase compressed spring length for less brake torque or decrease compressed spring length for more brake torque.

**TABLE 13
COMPRESSED LENGTH OF SPRING
TROLLEY MOTOR BRAKE**

MOTOR HORSEPOWER 1800	BRAKE TORQUE (LB FT)	COMPRESSED LENGTH SPRING (IN)
1/2	3/4	1-5/8
3/4	1-1/8	1-9/16
1	1-1/2	1-1/2

TROLLEY INSPECTION:

The trolley should be inspected every three months, and during scheduled frequent and periodic inspections, as follows:

1. Follow the procedures and instructions listed in the MAINTENANCE AND INSPECTION PROCEDURES section of this manual.
2. Inspect trolley wheel bearings for wear by manually rotating and rocking wheels. If excessive bearing play is present, replace bearings.
3. Inspect for wear, flat spots, or damage to wheel tread; and cracked or broken wheel flanges. Replace wheels as required. When wheel replacement is required, all the wheels of a trolley should be replaced.
4. Inspect gear teeth of geared wheels and pinion for wear, cracks, or damage. Replace geared wheels or pinion as required. Geared wheels should always be replaced in pairs.
5. Inspect and tighten or replace as required all bolts, nuts, and locking devices.
6. Check lubrication in accordance with the LUBRICATION section of this manual.

TROUBLESHOOTING

If hoist operates erratically, or not at all, the hoist should be taken out of service. Any problem should be diagnosed and corrected before the hoist is returned to regular service. Refer to Table 14 for some problem areas to consider and investigate.

DANGER

DISCONNECT POWER AND LOCKOUT DISCONNECTING MEANS BEFORE PERFORMING SERVICE TO ELECTRICAL PARTS OF THIS EQUIPMENT.

Only a qualified electrician should perform service to electrical parts of this equipment.

TABLE 14

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
Hoist will not operate.	Power failure in power lines.	Check circuit breakers, switches, and connections in power lines.
	Low voltage or frequency.	Check voltage and frequency, or power supply. They must agree with data on nameplate.
	Hoist overload cutoff (if provided) has tripped.	Reduce load to within rated capacity of hoist.
	Motor overheated. (Thermostat or thermal overload relays have tripped.)	Refer to motor or brake overheating problem area. Check thermostat or thermal overloads.
	Improper, loose, or broken wire connection.	Check connections and lead wires. Check connections in control devices.
	Brake does not release.	Check connections to magnet coil. Check for open or short circuit.
	Magnetic contactor not operating.	Check coil for open or short circuit. Check all connections in control circuit. Check for open contact. Replace as needed.
	Control transformer damaged.	Check transformer fuse. Check transformer coil. Check transformer for open winding.
	Motor burned out.	Replace motor.
Hook moves in wrong direction.	Reverse phasing.	Interchange any two power supply line leads.
	Improper electrical connections.	Check all connections with wiring diagram.

TROUBLESHOOTING

TABLE 14 (CONTINUED)

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
Hook lifts but will not lower.	<p>Lowering circuit open.</p> <p>Broken conductor in pendant cable.</p> <p>Magnetic contactor not operating.</p>	<p>Check circuit for loose connections. Check lower limit switch (if provided).</p> <p>Check continuity of each conductor in the cable. If one is broken, replace cable.</p> <p>Check coil for open or short circuit. Check all connections in motor circuit. Check for burned contacts. Replace as needed.</p>
Hook lowers but will not lift.	<p>Hoist overload cutoff (if provided) has tripped.</p> <p>Low voltage.</p> <p>Lifting circuit open.</p> <p>Broken conductor in pendant cable.</p> <p>Magnetic contactor not operating.</p>	<p>Reduce load to within rated capacity of hoist.</p> <p>Determine cause of low voltage and correct to within 10% of specified name plate voltage. Measure voltage at hoist contactor.</p> <p>Check circuit for loose connections. Check upper limit switch.</p> <p>Check continuity of each conductor in the cable. If one is broken, replace cable.</p> <p>Check coil for open or short circuit. Check all connections in motor circuit. Check for burned contacts. Replace as needed.</p>
Hoist will not lift rated load or does not have proper lifting speed.	<p>Hoist overloaded.</p> <p>Low voltage.</p> <p>Hoist motor brake dragging.</p>	<p>Reduce load to within rated capacity of hoist.</p> <p>Determine cause of low voltage and correct to within 10% of specified name plate voltage. Measure voltage at hoist contactor.</p> <p>Check motor brake adjustment for proper clearance and magnet mounting for proper location and tightness.</p>

TROUBLESHOOTING

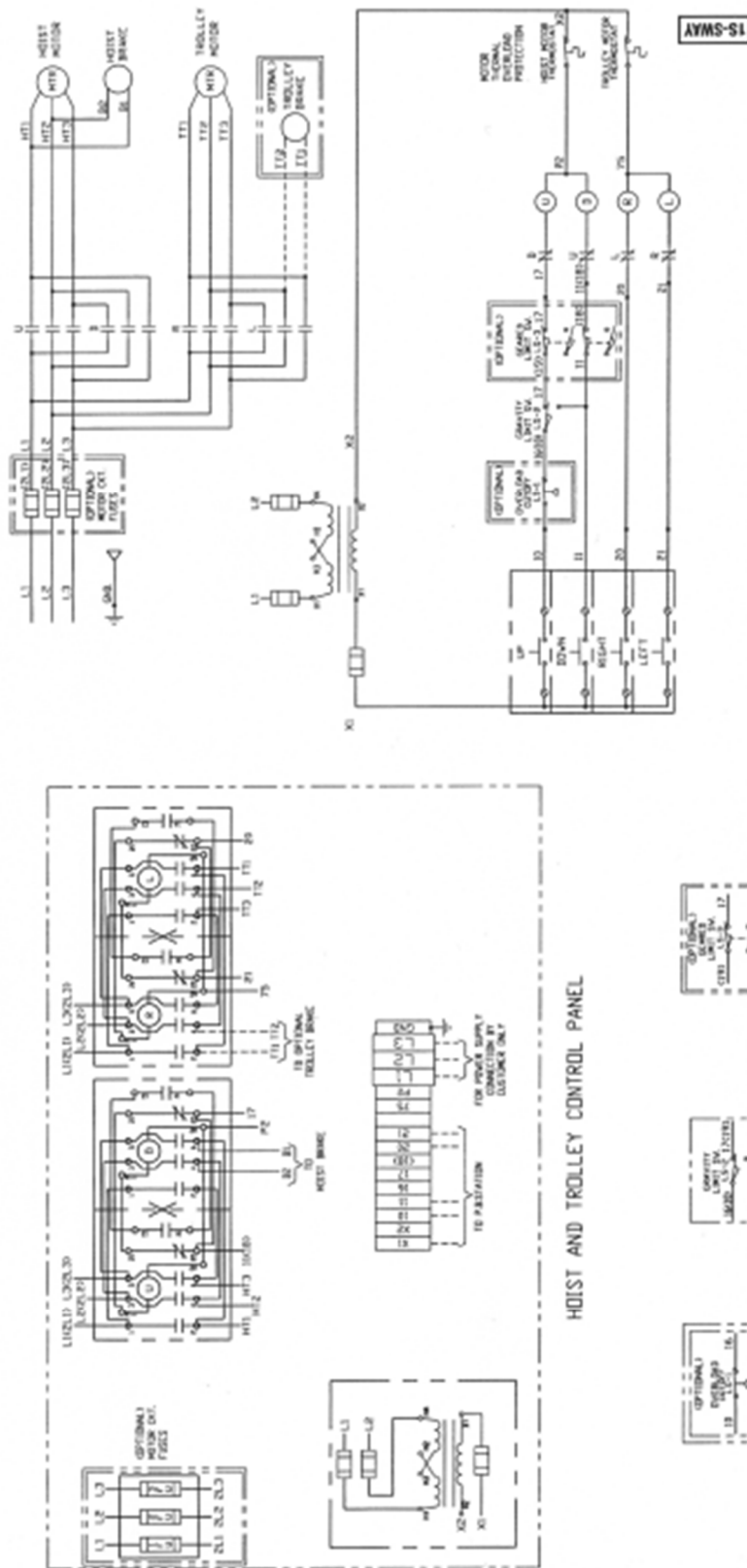
TABLE 14 (CONTINUED)

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
Hook or load drifts excessively when hoist is stopped.	<p>Hoist motor brake not holding.</p> <p>Hoist mechanical brake not holding.</p>	<p>Inspect and check hoist motor brake as outlined in MOTOR BRAKE section of this manual.</p> <p>Inspect and check mechanical load brake as outlined in MECHANICAL LOAD BRAKE section of this manual.</p>
Hoist motor or motor brake overheating.	<p>Hoist overloaded.</p> <p>Excessive duty cycle.</p> <p>Wrong voltage or frequency.</p> <p>Hoist motor brake dragging.</p> <p>Extreme external heating.</p>	<p>Reduce load to within rated capacity of hoist.</p> <p>Reduce frequency of lifts.</p> <p>Check voltage and frequency of power supply. They must agree with data on nameplate.</p> <p>Check motor brake adjustment for proper clearance and magnet mounting for proper location and tightness.</p> <p>If ambient temperature exceeds 100°F, frequency of hoist operation must be limited to avoid overheating. Special provisions may be required to ventilate the hoist or shield it from the heat source.</p>
Hook or load accelerates during lowering.	<p>Hoist mechanical load brake slipping.</p> <p>Hoist mechanical load braking not operating.</p>	<p>Check mechanical load brake lining.</p> <p>Check mechanical load brake pawl and ratchet for proper engagement or for damage. Check ratchet bushing for wear. Replace parts as necessary.</p>
Hoist operates intermittently.	<p>Poor collector contact.</p> <p>Broken wires.</p> <p>Worn contacts.</p>	<p>Check for dirt or foreign matter on, and wear of, contact surfaces. Clean or replace as necessary.</p> <p>Check wiring. Replace any broken wires.</p> <p>Locate and replace worn or burnt contacts.</p>

TABLE 14 (CONTINUED)

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
Excessive wire rope wear.	Inadequate lubrication Side-pulling or abuse.	Replace wire rope and lubricate. Replace wire rope and avoid improper operation.
Oil leaks.	Worn or damaged gaskets and/or oil seals. Joints not tight.	Replace worn or damaged parts. Tighten bolts to recommended torque.
Trolley brake does not release.	Power failure in power lines. Improper, loose, or broken wire connection. Wrong voltage or frequency. Broken or damaged parts. Coil burned out.	Check circuit breakers, switches, and connections in power lines. Check connections and lead wires. Check connections in control devices. Check voltage and frequency of power supply. They must agree with data on nameplate. Inspect and replace parts as necessary. Replace coil.
Trolley brake does not stop.	Trolley motor brake not holding.	Inspect and check trolley motor brake as outlined in TROLLEYS section of this manual.
Trolley brake chatters or hums.	Magnet faces not clean or broken shading coil on magnet.	Clean magnet surface and replace shading coils if broken.
Trolley does not track on beam or bumps as it travels on beam.	Excessive wear of trolley wheel treads or flat spots on trolley wheel treads.	Inspect trolley wheels and replace as necessary.

SINGLE SPEED HOIST & SINGLE SPEED TROLLEY



HIGHLIGHTED ITEMS ARE OPTIONAL FEATURES AND INSTALLED IF SPECIFIED. WIRE NUMBER INSIDE () IS USED TO REPLACE THE ADJACENT WIRE NUMBER, I.e. IF FUSES ARE SPECIFIED, REVERSING CONTACTOR WIRES, L1, L2, L3 BECOME 2L1, 2L2, 2L3, RESPECTIVELY.

MULTIPLE VOLTAGE COMPONENTS MUST BE CONNECTED AS PER NAMEPLATE DATA, TO MATCH SUPPLY VOLTAGE.

⚡ DANGER

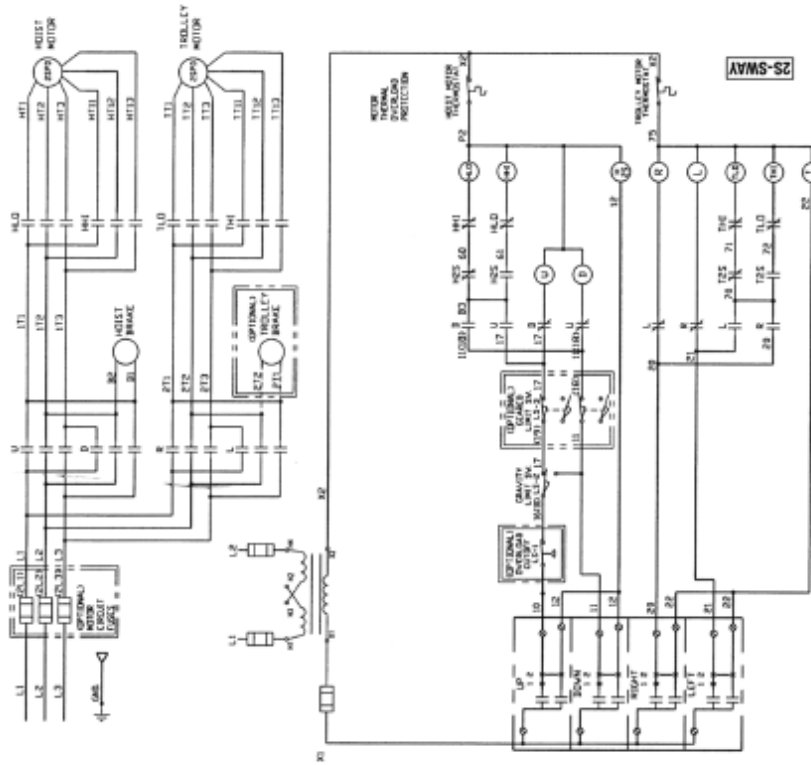
DISCONNECT POWER AND LOCKOUT DISCONNECTING MEANS BEFORE REMOVING COVER OR SERVICING THIS EQUIPMENT. SERVICE SHOULD BE PERFORMED ONLY BY A QUALIFIED ELECTRICIAN.

⚠ CAUTION

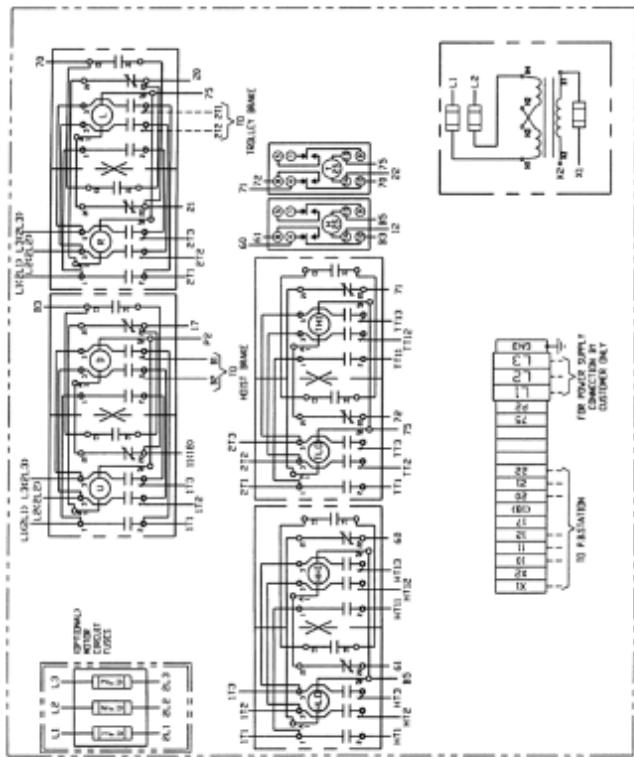
WIRING DIAGRAMS SHOWN ARE "TYPICAL" AND MAY NOT INCLUDE ALL DEVICES SUPPLIED WITH A PARTICULAR HOIST OR TROLLEY. ALWAYS REFER TO THE WIRING DIAGRAM SUPPLIED INSIDE OF THE CONTROL ENCLOSURE COVER OF A SPECIFIC PIECE OF EQUIPMENT, BEFORE PERFORMING ANY SERVICE.

TYPICAL WIRING DIAGRAM

TWO SPEED HOIST & TWO SPEED TROLLEY



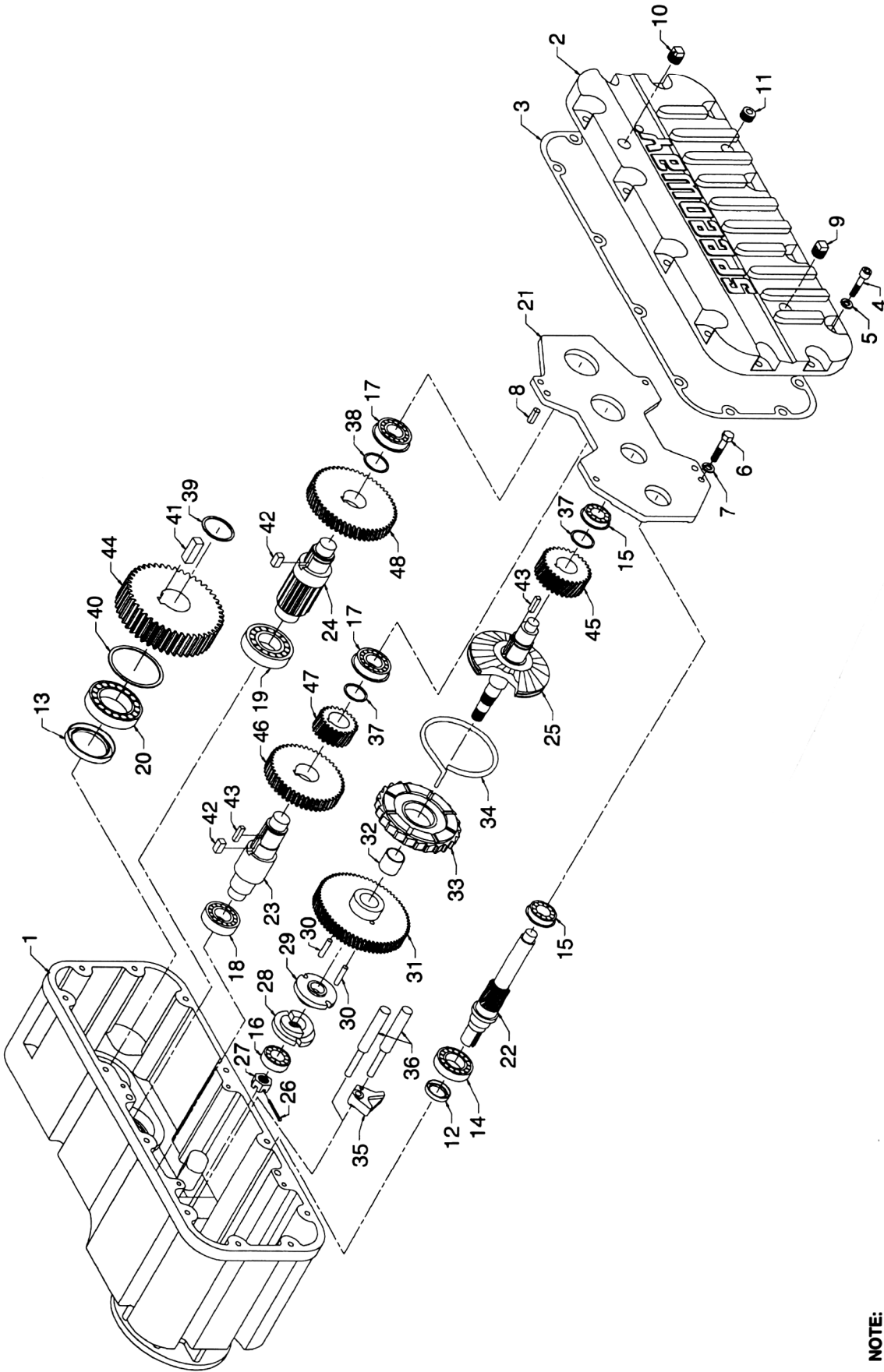
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 MULTIPLE VOLTAGE COMPONENTS MUST BE CONNECTED AS PER NAMEPLATE DATA, TO MATCH SUPPLY VOLTAGE.



CAUTION
 WIRING DIAGRAMS SHOWN ARE "TYPICAL" AND MAY NOT INCLUDE ALL DEVICES SUPPLIED WITH A PARTICULAR HOIST OR TROLLEY. ALWAYS REFER TO THE WIRING DIAGRAM SUPPLIED INSIDE OF THE CONTROL ENCLOSURE COVER OF A SPECIFIC PIECE OF EQUIPMENT, BEFORE PERFORMING ANY SERVICE.

DANGER
 DISCONNECT POWER AND LOCKOUT DISCONNECT DEVICES BEFORE REMOVING COVER OR SERVICING THIS EQUIPMENT. SERVICE SHOULD BE PERFORMED ONLY BY A QUALIFIED ELECTRICAL.

HOIST GEAR HOUSING ASSEMBLY



NOTE:
 Approximate capacity of oil bath is 5 quarts.
 Motor snout not part of gear housing on cross mounted hoist.

PARTS LIST - PRODUCT SERIES 31

HOIST GEAR HOUSING ASSEMBLY

HOIST GEAR HOUSING PARTS

ITEM NO.	PART NUMBER	DESCRIPTION	QTY/ ASSY
1	(a)	Gear Housing	1
2	70515	Gear Housing Cover	1
3	N/A	RTV sealant	1
4	1-6-16	Bolt, 3/8-16 x 1	12
5	17-6C	Lockwasher, 3/8	12
6	39H5-16	Bolt, 5/16-18 x 1	4
7	17-5C	Lockwasher, 5/16	4
8	PA7532	Dowel Pin	2
9	PA7380	Oil Level Plug	1
10	PA7381	Vent Plug	1
11	PA798	Pipe Plug	1
12*	PA7525	Oil Seal	1
13*	PA7524	Oil Seal	1
14	PA6655	Bearing	1
15	PA7670	Bearing	2
16	PA2464	Bearing	1
17	PA7217	Bearing	2
18	PA6562	Bearing	1
19	PA7671	Bearing	1
20	PA7531	Bearing	1
21	71419	Spider	1
22	(b)	Motor Pinion Shaft	1
23	70543	Change Shaft	1
24	70544	Drum Pinion Shaft	1

ITEM NO.	PART NUMBER	DESCRIPTION	QTY/ ASSY
25	70389	Brake Shaft Unit	1
26	PA3571	Cotter Pin	1
27	27-10C	Slotted Nut	1
28	35718	Brake Cam	1
29	35717	Brake Cam	1
30	38761	Drill Rod	2
31	70523	Brake Gear	1
32	PA2497	Bushing	1
33	37779	Ratchet Unit	1
34	37193	Pawl Spring	1
35	40493	Pawl	1
36	69745	Pawl Pin	2
37	PA7528	Retaining Ring	2
38	PA6813	Retaining Ring	1
39	PA7527	Retaining Ring	1
40	PA7526	Retaining Ring	1
41	70056	Key	1
42	PA6293	Key	2
43	60846	Key	2
44	70530	Drum Gear	1
45	(c)	Change Pinion	1
46	(c)	Change Gear	1
47	(c)	Change Pinion	1
48	(c)	Change Gear	1

*Recommended Spare Parts

NOTES:

(a) Gear Housing part numbers:

Parallel Mounted Hoist ----- 71420

Cross Mounted Hoist ----- 71421

(b) Motor Pinion Shaft part numbers:

Parallel Mounted Hoist ----- 70541

Cross Mounted Hoist ----- 70981

(c) Gearing varies with the speed of the hoist. Five gear sets are available, each identified by Gear Housing Assembly No. 71418 with dash number suffix (-01 through -05 for parallel mounted hoist and -11 through -15 for cross mounted hoist). Select proper dash number by counting and comparing number of teeth in gear and pinion.

The parts of this assembly that affect the speed of the hoist are items 45, 46, 47, and 48.

GEAR HOUSING ASSEMBLY	71418-01	71418-02	71418-03	71418-04	71418-05	
GEAR HOUSING ASSEMBLY PARALLEL MOUNTED HOIST	71418-01	71418-02	71418-03	71418-04	71418-05	
GEAR HOUSING ASSEMBLY CROSS MOUNTED HOIST	71418-11	71418-12	71418-13	71418-14	71418-15	
LIFTING SPEED (2PS/2PD)	15 FPM	20 FPM	30 FPM	40 FPM	N/A	
LIFTING SPEED (4PS)	N/A	N/A	15 FPM	20 FPM	N/A	
LIFTING SPEED (4PD)	N/A	N/A	N/A	N/A	12 FPM	
ITEM NO.	DESCRIPTION	PART NO.	PART NO.	PART NO.	PART NO.	PART NO.
45	Pinion	70524 (23 teeth)	70526 (30 teeth)	70526 (30 teeth)	70528 (36 teeth)	71202 (34 teeth)
46	Gear	70525 (54 teeth)	70527 (47 teeth)	70527 (47 teeth)	70529 (41 teeth)	71203 (43 teeth)
47	Pinion	70524 (23 teeth)	70524 (23 teeth)	70526 (30 teeth)	70526 (30 teeth)	70524 (23 teeth)
48	Gear	70525 (54 teeth)	70525 (54 teeth)	70527 (47 teeth)	70527 (47 teeth)	70525 (54 teeth)

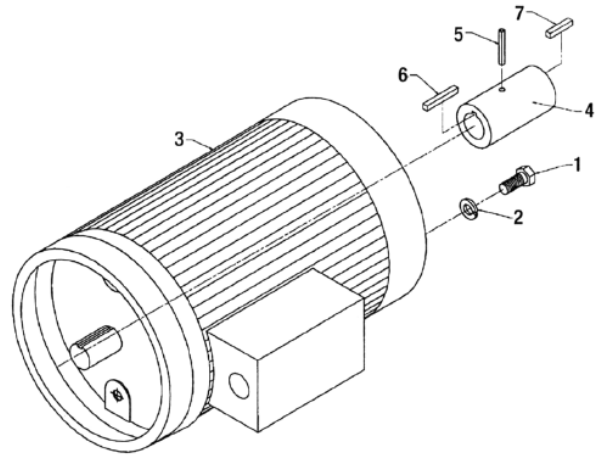
PARTS LIST - PRODUCT SERIES 31

HOIST MOTOR - PARALLEL MOUNTED HOIST

HOIST MOTOR PARTS

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	35-6-14C	Bolt, Hex Head	4
2	17-6C	Lockwasher	4
3	(b)	Hoist Motor	1
4	70546	Coupling	1
5	PA5391	Roll Pin	1
6	70880	Key (a)	1
7	70560	Key	1

No Recommended Spare Parts



NOTES:

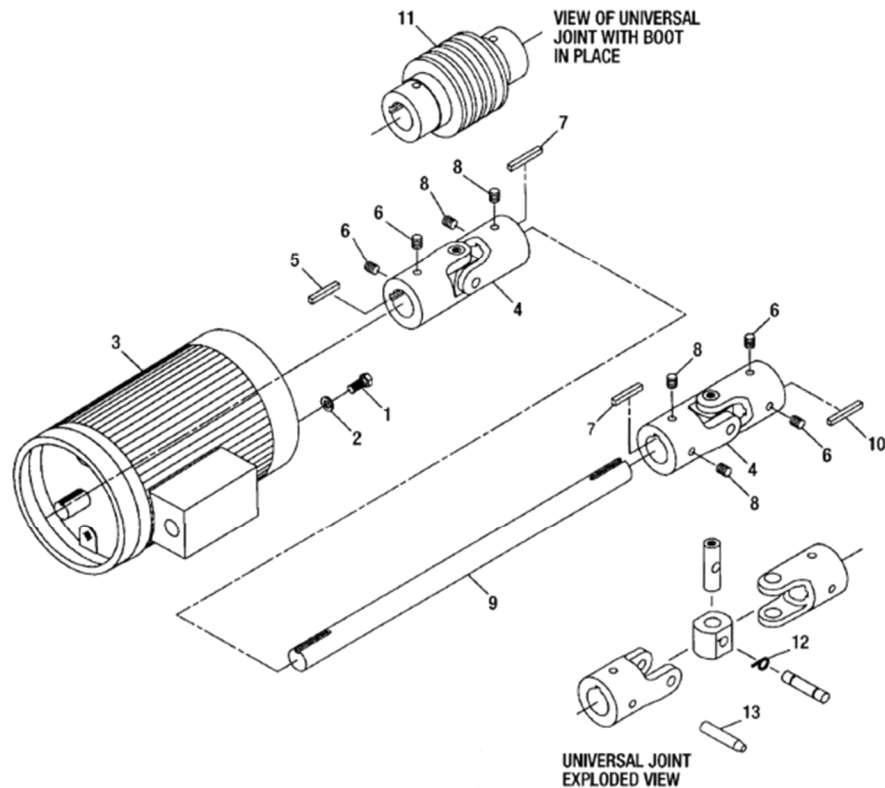
- (a) Included with hoist motor. Also available individually.
- (b) Select standard hoist motor by part number according to motor specifications as follows:

PART NO.	VOLTAGE	HP	RPM	SPEED	FRAME
70359-01	200	1	1800	Single	145TC
70359-02	230/460				
70359-03	575				
70359-04	200	2			
70359-05	230/460				
70359-06	575				
70359-07	200	3			
70359-08	230/460				
70359-09	575				
70359-10	200	4			
70359-11	230/460				
70359-12	575				
70360-01	200	1/1/3	1800/600	Two	184TC
70360-02	230				
70360-03	460				
70360-04	575	2/2/3			
70360-05	200				
70360-06	230				
70360-07	460	3/1			
70360-08	575				
70360-09	200				
70360-10	230	4/1-1/3			
70360-11	460				
70360-12	575				
70360-13	200	4/1-1/3			
70360-14	230				
70360-15	460				
70360-16	575				

For other specified special motors, refer to additional information pages supplied with manual.

PARTS LIST - PRODUCT SERIES 31

HOIST MOTOR CROSS MOUNTED HOIST



HOIST MOTOR PARTS

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	35-6-16-C	Bolt, Hex Head	4
2	17-6C	Lockwasher	4
3	(b)	Hoist Motor	1
4	70982	Universal Joint	2
5	70880	Key (a)	1
6	12-5-5	Set Screw	4
7	PA6956	Key	2
8	12-6-5	Set Screw	4
9	(c)	Extension Shaft	1
10	70991	Key	1
11	PA7594	Boot Kit (d)	2
12*	PA7595	Lock Ring	(e)
13*	70992	Aligning Pin	(f)

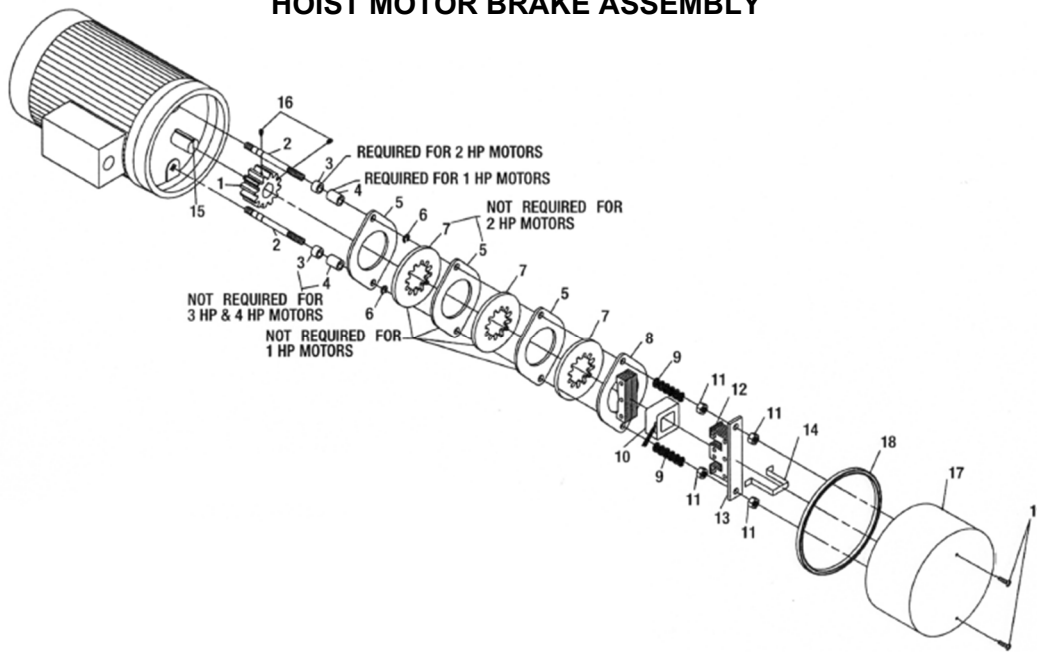
*Recommended Spare Parts

NOTES:

- (a) Included with hoist motor. Also available individually.
- (b) Select standard hoist motor by part number according to motor specifications as listed in note (b) on page 90. For other specified special motors, refer to additional information pages supplied with manual.
- (c) For part number, see Suspension parts list on pages 97, 99, 101, and 103.
- (d) Kit includes one boot and two ties.
- (e) Included with universal joint. Also available individually. Quantity of one required per joint.
- (f) Not included with hoist. Recommended for re-assembly of universal joint. Used to align parts and spread lock ring.

PARTS LIST - PRODUCT SERIES 31

HOIST MOTOR BRAKE ASSEMBLY



HOIST MOTOR BRAKE PARTS (e)

ITEM NO.	PART NUMBER	DESCRIPTION	QTY. (a) 4.5 LB FT TORQUE	QTY. (a) 9LBFT TORQUE	QTY. (a) 18 LB FT TORQUE
1	71183	Brake Hub	1	1	1
2	70539	Stud	2	2	2
3	70538	Spacer	0	2	0
4	70537	Spacer	2	0	0
5	39794	Brake Plate	1	2	3
6	PA5623	Retaining Ring	2	2	2
7*	71182	Brake Lining Disc	1	2	3
8	39781	Pressure Unit	1	1	1
9	39778	Spring	2	2	2
10*	39783-2 39783-3 39783-6	Coil 575 VAC 230/460 VAC 208 VAC	1	1	1
11	24-6C	Jam Nut, 3/8	4	4	4
12	39784	Shading Coil (b)	2	2	2
13	39780	Magnet Unit	1	1	1
14	39877	Coil Strap	1	1	1
15	70880	Key (c)	1	1	1
16	12-4-4C	Set Screw	2	2	2
17	69161	Brake Cover	1	1	1
18	PA7110	Gasket	1.77ft.	1.77 ft.	1.77 ft.
19*	PA7323	Screw, LOC-WEL, #10-24 (d)	2	2	2

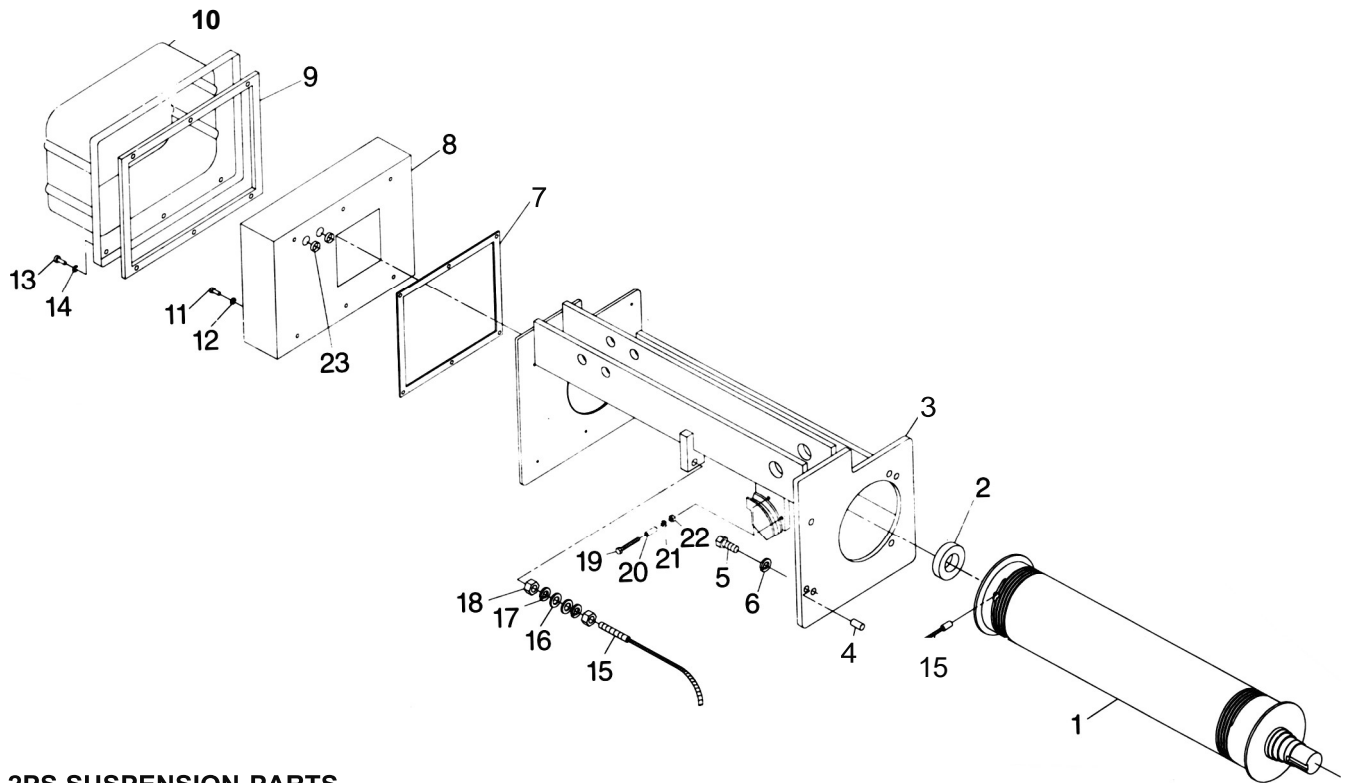
*Recommended Spare Parts

NOTES:

- On standard single-speed and two-speed hoists, 4.5 LB FT brakes are used with 1 HP motors, 9 LB FT brakes are used with 2 HP motors, and 18 LB FT brakes are used with 3 HP and 4 HP motors.
- Shading Coil is furnished with Magnet Unit, but also is available as a spare.
- Included with motor. Also available individually.
- Screw with self-locking feature must be utilized. Substitutes are not permissible.
- This brake is not used on hoists in Hazardous (Classified) locations as identified by the National Electrical Code.

PARTS LIST - PRODUCT SERIES 31

SUSPENSION - 2PS REEVING - 1/4" ROPE DIAMETER



2PS SUSPENSION PARTS

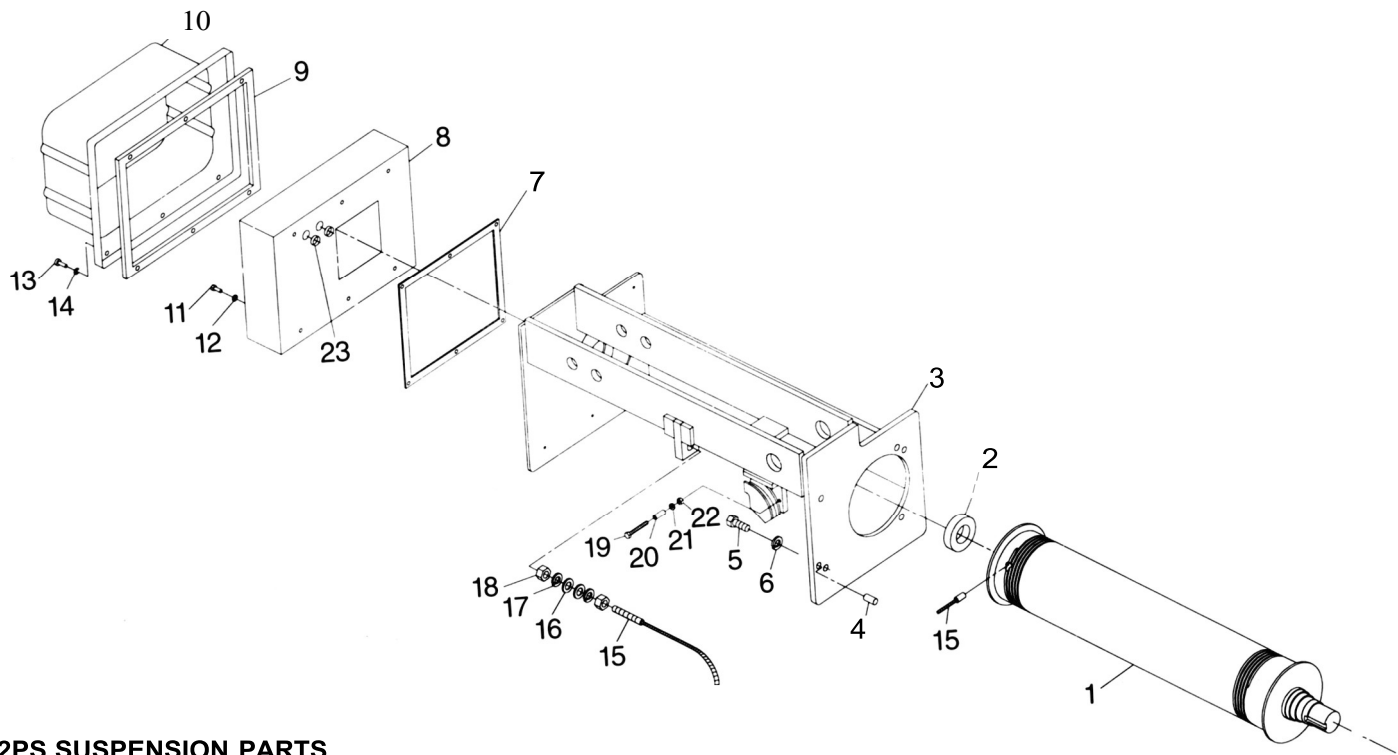
ITEM NO.	DESCRIPTION	QTY.	26 FT. LIFT PART NO.	59 FT. LIFT PART NO.	107 FT. LIFT PART NO.
1	Drum Single Grooving	1	70556-01	70556-02	70556-03
2	Bearing	1	PA7393	PA7393	PA7393
3	Frame Unit	1	70664-01	70664-02	70664-03
4	Dowel Pin	2	PA7533	PA7533	PA7533
5	Hex Head Bolt	4	35-8-20C	35-8-20C	35-8-20C
6	Lockwasher	4	17-8C	17-8C	17-8C
7	Gasket	1	70595	70595	70595
8	Enclosure	1	70594	70594	70594
9	Gasket	1	59730	59730	59730
10	Cover	1	52822	52822	52822
11	Hex Head Bolt	6	35-4-6C	35-4-6C	35-4-6C
12	Lockwasher	6	17-4C	17-4C	17-4C
13	Captive Screw	6	58597	58597	58597
14	Retaining Ring	6	PA6634	PA6634	PA6634
15*	Wire Rope Assembly (a)	1	70568-01	70568-02	70568-03
16	Washer	2	15-8-1C	15-8-1C	15-8-1C
17	Lockwasher	2	17-8C	17-8C	17-8C
18	Hex Nut	2	22-8C	22-8C	22-8C
19	Hex Head Bolt	2	35-4-32C	35-4-32C	35-4-32C
20	Spacer Tubing	2	70681	70681	70681
21	Lockwasher	2	17-4C	17-4C	17-4C
22	Hex Nut	2	22-4C	22-4C	22-4C
23	Grommet	2	PA7409	PA7409	PA7409

*Recommended Spare Parts

NOTE: (a) Part numbers shown for Item 15, Wire Rope Assembly, are for standard hoists using 1/4" dia. 19x7 XIP wire rope. For special hoists using other size or type wire rope, refer to the wire rope part number listed in additional pages included with this manual; or contact Acco/Harrington or the distributor of the hoist.

PARTS LIST - PRODUCT SERIES 31

SUSPENSION - 2PS REEVING - 5/16" ROPE DIAMETER



2PS SUSPENSION PARTS

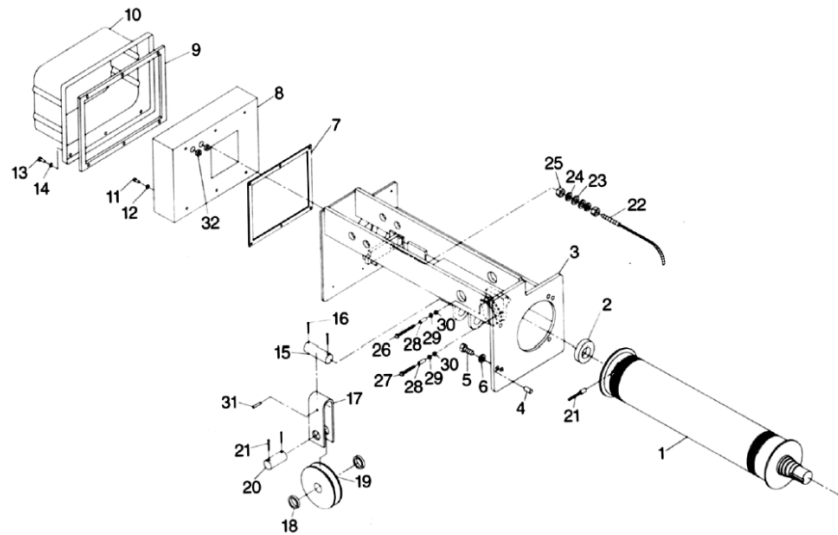
ITEM NO.	DESCRIPTION	QTY.	22 FT	50 FT	90 FT	LUG DECK/TRT
			20 FT LIFT PART NO.	48 FT LIFT PART NO.	89 FT LIFT PART NO.	
1	Drum, Single Grooving	1	70557-01	70557-02	70557-03	
2	Bearing	1	PA7393	PA7393	PA7393	
3	Frame Unit	1	70610-01	70610-02	70610-03	
4	Dowel Pin	2	PA7533	PA7533	PA7533	
5	Hex Head Bolt	4	35-8-20C	35-8-20C	35-8-20C	
6	Lockwasher	4	17-8C	17-8C	17-8C	
7	Gasket	1	70595	70595	70595	
8	Enclosure	1	70594	70594	70594	
9	Gasket	1	59730	59730	59730	
10	Cover	1	52822	52822	52822	
11	Hex Head Bolt	6	35-4-6C	35-4-6C	35-4-6C	
12	Lockwasher	6	17-4C	17-4C	17-4C	
13	Captive Screw	6	58597	58597	58597	
14	Retaining Ring	6	PA6634	PA6634	PA6634	
15*	Wire Rope Assembly (a)	1	70569-01	70569-02	70569-03	LUG DECK/TRT
15*	Wire Rope Assembly (a)	1	70569-31	70569-32	70569-33	LUG DECK/TRT
16	Washer	2	15-10-1C	15-10-1C	15-10-1C	
17	Lockwasher	2	17-10C	17-10C	17-10C	
18	Hex Nut	2	22-10C	22-10C	22-10C	
19	Hex Head Bolt	2	35-4-32C	35-4-32C	35-4-32C	
20	Spacer Tubing	2	70681	70681	70681	
21	Lockwasher	2	17-4C	17-4C	17-4C	
22	Hex Nut	2	22-4C	22-4C	22-4C	
23	Grommet	2	PA7409	PA7409	PA7409	

*Recommended Spare Parts

NOTE: (a) Part numbers shown for Item 15, Wire Rope Assembly, are for standard hoists using 5/16" dia 6X37 XIP wire rope. For special hoists using another size or type wire rope, refer to the wire rope part number listed in additional pages included with this manual; or contact Acco/Harrington or the distributor of the hoist.

PARTS LIST - PRODUCT SERIES 31

SUSPENSION - 4PS REEVING - 5/16" ROPE DIAMETER



4PS SUSPENSION PARTS

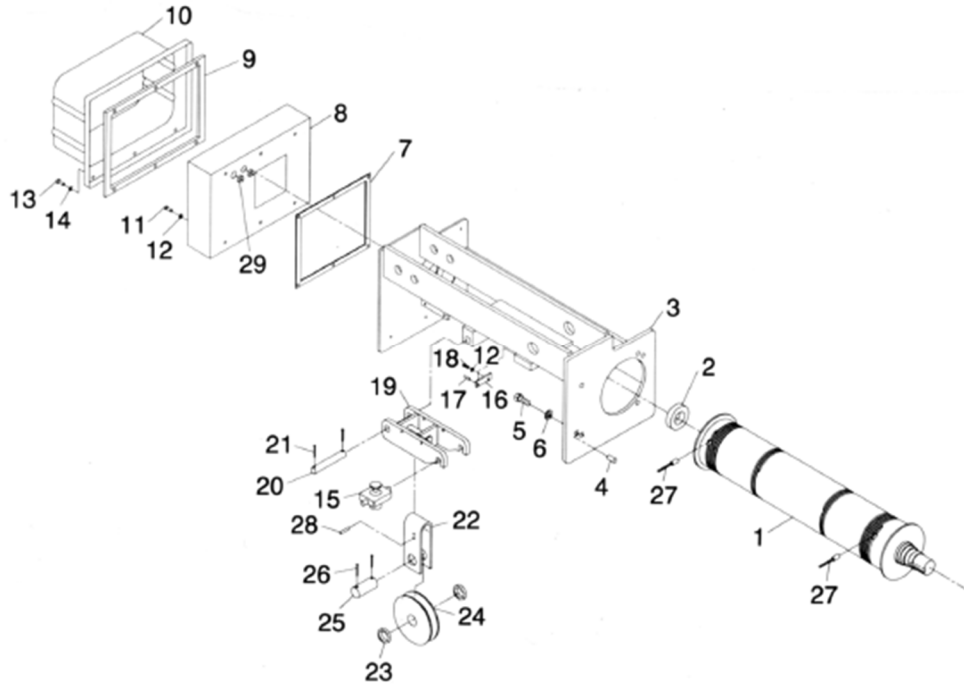
ITEM NO.	DESCRIPTION	QTY.			LUG DECK/TRT
			20 FT 18 FT LIFT PART NO.	40 FT 38 FT LIFT PART NO.	
1	Drum, Single Grooving	1	70557-02	70557-03	
2	Bearing	1	PA7393	PA7393	
3	Frame Unit	1	70609-02	70609-03	
4	Dowel Pin	2	PA7533	PA7533	
5	Hex Head Bolt	4	35-8-20C	35-8-20C	
6	Lockwasher	4	17-8C	17-8C	
7	Gasket	1	70595	70595	
8	Enclosure	1	70594	70594	
9	Gasket	1	59730	59730	
10	Cover	1	52822	52822	
11	Hex Head Bolt	6	35-4-6C	35-4-6C	
12	Lockwasher	6	17-4C	17-4C	
13	Captive Screw	6	58597	58597	
14	Retaining Ring	6	PA6634	PA6634	
15	Pin	1	70617	70617	
16	Cotter Pin	2	PA1144	PA1144	LUG DECK/TRT
17	Sheave Hanger	1	70618	70618	
18	Spacer	2	70574	70574	
19	Polyamide Sheave with Bearing	1	70371	70371	
19	Steel Sheave with Bearing	1	70372	70372	
20	Pin	1	70575	70575	
21	Cotter Pin	2	PA1144	PA1144	
22*	Wire Rope Assembly (a)	1	70569-12	70569-13	
22*	Wire Rope Assembly (a)	1	70569-42	70569-43	
23	Washer	2	15-10-1C	15-10-1C	
24	Lockwasher	2	17-10C	17-10C	
25	Hex Nut	2	22-10C	22-10C	
26	Hex Head Bolt, 2-3/4" Long	1	35-4-44C	35-4-44C	
27	Hex Head Bolt, 2" Long	1	35-4-32C	35-4-32C	
28	Spacer Tubing	2	70681	70681	
29	Lockwasher	2	17-4C	17-4C	
30	Hex Nut	2	22-4C	22-4C	
31	Roll Pin	1	PA5390	PA5390	
32	Grommet	2	PA7409	PA7409	

*Recommended Spare Parts

NOTE: (a) Part numbers shown for Item 22, Wire Rope Assembly, are for standard hoists using 5/16" dia 6X37 XIP wire rope. For special hoists using another size or type wire rope, refer to the wire rope part number listed in additional pages included with this manual; or contact Acco/Harrington or the distributor of the hoist.

PARTS LIST - PRODUCT SERIES 31

SUSPENSION - 2PD REEVING - 3/16" ROPE DIAMETER PARALLEL MOUNTED HOIST



2PD SUSPENSION PARTS

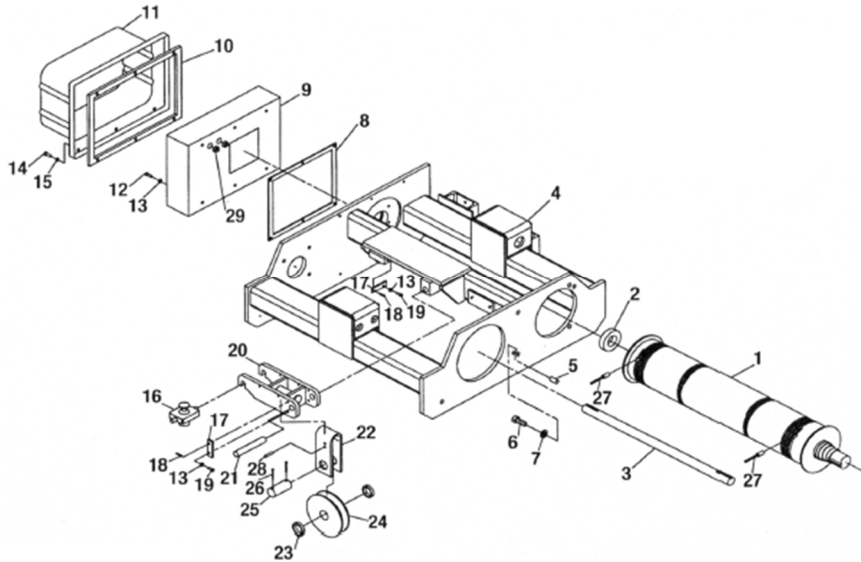
ITEM NO.	DESCRIPTION	QTY.	32 FT LIFT PART NO.	61 FT LIFT PART NO.
1	Drum, Double Grooving	1	70558-02	70558-03
2	Bearing	1	PA7393	PA7393
3	Frame Unit	1	70597-02	70597-03
4	Dowel Pin	2	PA7533	PA7533
5	Hex Head Bolt	4	35-8-20C	35-8-20C
6	Lockwasher	4	17-8C	17-8C
7	Gasket	1	70595	70595
8	Enclosure	1	70594	70594
9	Gasket	1	59730	59730
10	Cover	1	52822	52822
11	Hex Head Bolt	6	35-4-6C	35-4-6C
12	Lockwasher	7	17-4C	17-4C
13	Captive Screw	6	58597	58597
14	Retaining Ring	6	PA6634	PA6634
15	Dead End Assembly	1	59666-01	59666-01
16	Keeper Plate	1	53219	53219
17	Roll Pin	1	PA4607	PA4607
18	Hex Head Bolt	1	35-4-8C	35-4-8C
19	Sheave Mounting Unit	1	70582	70582
20	Pin	1	69717	69717
21	Cotter Pin	2	PA1364	PA1364
22	Sheave Hanger	1	70532	70532
23	Spacer	2	PA5243	PA5243
24	Polyamide Equalizing Sheave	1	70469	70469
24	Steel Equalizing Sheave	1	70470	70470
25	Pin	1	70534	70534
26	Cotter Pin	2	PA1290	PA1290
27*	Wire Rope Assembly (a)	1	70570-02	70570-03
28	Roll Pin	1	PA5391	PA5391
29	Grommet	2	PA7409	PA7409

* Recommended Spare Parts

NOTE: (a) Part numbers shown for Item 27, Wire Rope Assembly, are for standard hoists using 3/16" dia. 6x19 XIP wire rope. For special hoists using other size or type wire rope, refer to the wire rope part number listed in additional pages included with this manual; or contact Acco/Harrington or the distributor of the hoist.

PARTS LIST - PRODUCT SERIES 31

SUSPENSION - 2PD REEVING 3/16" ROPE DIAMETER CROSS MOUNTED HOIST



2PD SUSPENSION PARTS

ITEM NO.	DESCRIPTION	QTY.	32 FT. LIFT PART NO.	61 FT. LIFT PART NO.
1	Drum, Double Grooving	1	70558-02	70558-03
2	Bearing	1	PA7393	PA7393
3	Extension Shaft	1	70989-02	70989-03
4	Frame Unit (b)	1	70978-02	70978-03
5	Dowel Pin	2	PA7533	PA7533
6	Hex Head Bolt	4	35-8-20C	35-8-20C
7	Lockwasher	4	17-8C	17-8C
8	Gasket	1	70595	70595
9	Enclosure	1	70594	70594
10	Gasket	1	59730	59730
11	Cover	1	52822	52822
12	Hex Head Bolt	6	35-4-6C	35-4-6C
13	Lockwasher	8	17-4C	17-4C
14	Captive Screw	6	58597	58597
15	Retaining Ring	6	PA6634	PA6634
16	Dead End Assembly	1	59666-01	59666-01
17	Keeper Plate	2	53219	53219
18	Roll Pin	2	PA4607	PA4607
19	Hex Head bolt	2	35-4-8C	35-4-8C
20	Sheave Mounting Unit	1	70582	70582
21	Pin	1	70839	70839
22	Sheave Hanger	1	70532	70532
23	Spacer	2	PA5243	PA5243
24	Polyamide Equalizing Sheave	1	70469	70469
24	Steel Equalizing Sheave	1	70470	70470
25	Pin	1	70534	70534
26	Cotter Pin	2	PA1290	PA1290
27*	Wire Rope Assembly (a)	1	70570-02	70570-03
28	Roll Pin	1	PA5391	PA5391
29	Grommet	2	PA7409	PA7409

*Recommended Spare Parts

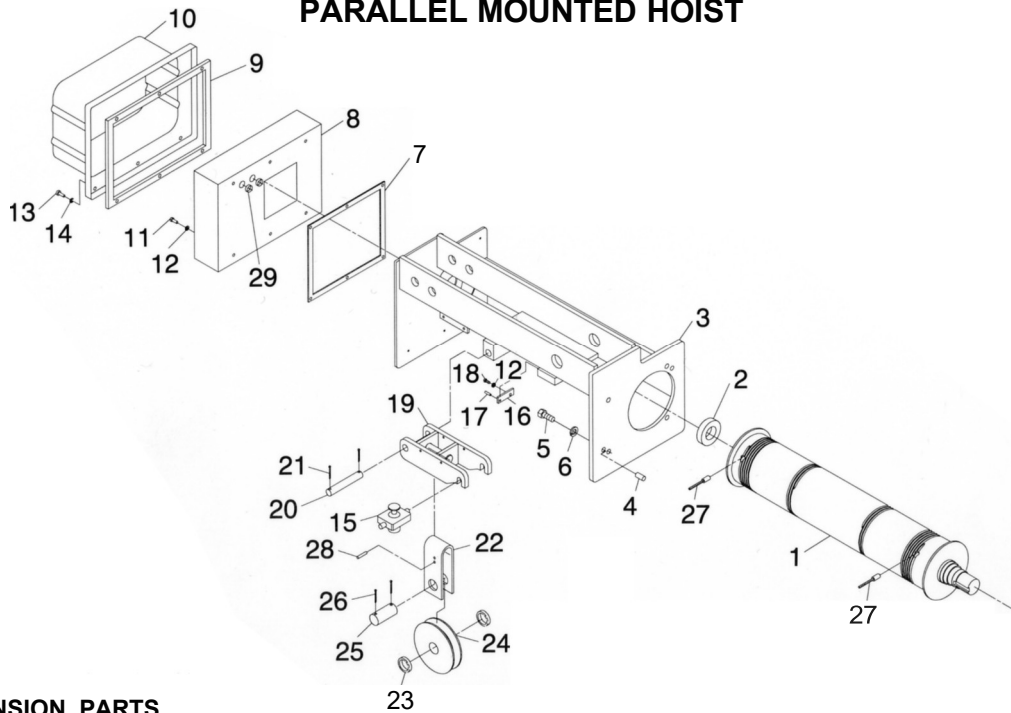
NOTES:

(a) Part numbers shown for Item 27, Wire Rope Assembly, are for standard hoists using 3/16" dia. 6X19 XIP wire rope. For special hoists using other size or type wire rope, refer to the wire rope part number listed in additional pages included with this manual; or contact Acco/Harrington or the distributor of the hoist.

(b) Use of Swivel Trolleys requires different Frame Unit. See page 147.

PARTS LIST - PRODUCT SERIES 31

SUSPENSION - 2PD REEVING - 1/4" ROPE DIAMETER PARALLEL MOUNTED HOIST



2PD SUSPENSION PARTS

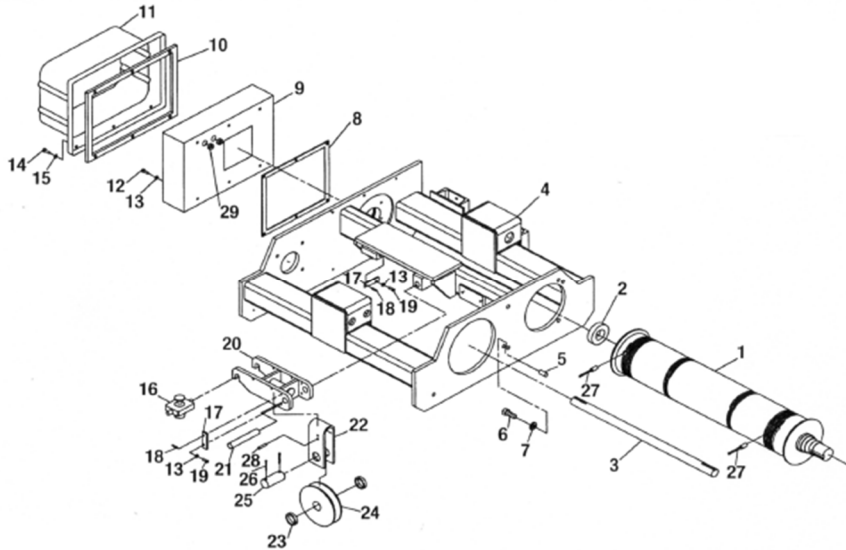
ITEM NO.	DESCRIPTION	QTY.	25 FT. LIFT PART NO.	49 FT. LIFT PART NO.
1	Drum, Double Grooving	1	70559-02	70559-03
2	Bearing	1	PA7393	PA7393
3	Frame Unit	1	70597-02	70597-03
4	Dowel Pin	2	PA7533	PA7533
5	Hex Head Bolt	4	35-8-20C	35-8-20C
6	Lockwasher	4	17-8C	17-8C
7	Gasket	1	70595	70595
8	Enclosure	1	70594	70594
9	Gasket	1	59730	59730
10	Cover	1	52822	52822
11	Hex Head Bolt	6	35-4-6C	35-4-6C
12	Lockwasher	7	17-4C	17-4C
13	Captive Screw	6	58597	58597
14	Retaining Ring	6	PA6634	PA6634
15	Dead End Assembly	1	59666-01	59666-01
16	Keeper Plate	1	53219	53219
17	Roll Pin	1	PA4607	PA4607
18	Hex Head Bolt	1	35-4-8C	35-4-8C
19	Sheave Mounting Unit	1	70582	70582
20	Pin	1	69717	69717
21	Cotter Pin	2	PA1364	PA1364
22	Sheave Hanger	1	70532	70532
23	Spacer	2	PA5243	PA5243
24	Polyamide Equalizing Sheave	1	70469	70469
24	Steel Equalizing Sheave	1	70470	70470
25	Pin	1	70534	70534
26	Cotter Pin	2	PA1290	PA1290
27*	Wire Rope Assembly (a)	1	70571-02	70571-03
28	Roll Pin	1	PA5391	PA5391
29	Grommet	2	PA7409	PA7409

*Recommended Spare Parts

NOTE: (a) Part numbers shown for Item 27, Wire Rope Assembly, are for standard hoists using 1/4" dia. 6X31 XIP wire rope. For special hoists using other size or type wire rope, refer to the wire rope part number listed in additional pages included with this manual; or contact Acco/Harrington or the distributor of the hoist.

PARTS LIST - PRODUCT SERIES 31

SUSPENSION - 2PD REEVING 1/4" ROPE DIAMETER CROSS MOUNTED HOIST



2PD SUSPENSION PARTS

ITEM NO.	DESCRIPTION	QTY.	25 FT. LIFT PART NO.	49 FT. LIFT PART NO.
1	Drum, Double Grooving	1	70559-02	70559-03
2	Bearing	1	PA7393	PA7393
3	Extension Shaft	1	70989-02	70989-03
4	Frame Unit (b)	1	70978-02	70978-03
5	Dowel Pin	2	PA7533	PA7533
6	Hex Head Bolt	4	35-8-20C	35-8-20C
7	Lockwasher	4	17-8C	17-8C
8	Gasket	1	70595	70595
9	Enclosure	1	70594	70594
10	Gasket	1	59730	59730
11	Cover	1	52822	52822
12	Hex Head Bolt	6	35-4-6C	35-4-6C
13	Lockwasher	8	17-4C	17-4C
14	Captive Screw	6	58597	58597
15	Retaining Ring	6	PA6634	PA6634
16	Dead End Assembly	1	59666-01	59666-01
17	Keeper Plate	2	53219	53219
18	Roll Pin	2	PA4607	PA4607
19	Hex Head bolt	2	35-4-8C	35-4-8C
20	Sheave Mounting Unit	1	70582	70582
21	Pin	1	70839	70839
22	Sheave Hanger	1	70532	70532
23	Spacer	2	PA5243	PA5243
24	Polyamide Equalizing Sheave	1	70469	70469
24	Steel Equalizing Sheave	1	70470	70470
25	Pin	1	70534	70534
26	Cotter Pin	2	PA1290	PA1290
27*	Wire Rope Assembly (a)	1	70571-02	70571-03
28	Roll Pin	1	PA5391	PA5391
29	Grommet	2	PA7409	PA7409

*Recommended Spare Parts

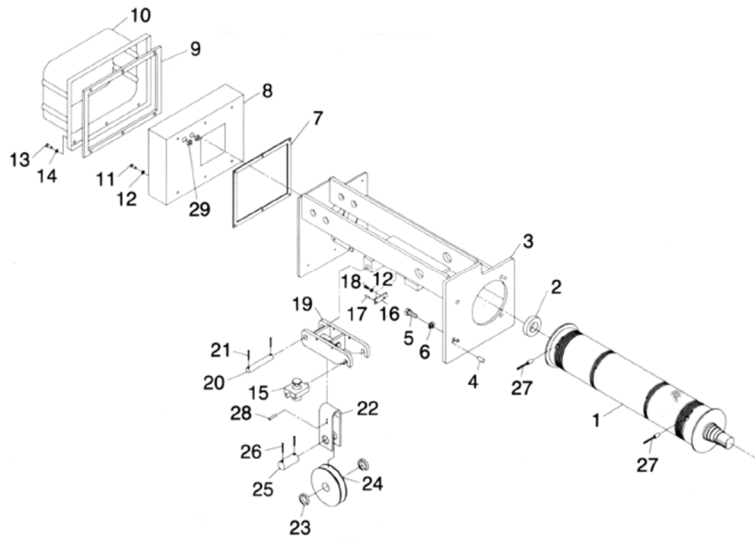
NOTES:

(a) Part numbers shown for Item 27, Wire Rope Assembly, are for standard hoists using 1/4" dia. 6X31 XIP wire rope. For special hoists using other size or type wire rope, refer to the wire rope part number listed in additional pages included with this manual; or contact Acco/Harrington or the distributor of the hoist.

(b) Use of Swivel Trolleys requires different Frame Unit. See page 147.

PARTS LIST - PRODUCT SERIES 31

SUSPENSION - 2PD REEVING - 5/16" ROPE DIAMETER PARALLEL MOUNTED HOIST



2PD SUSPENSION PARTS

ITEM NO.	DESCRIPTION	QTY	21 FT LIFT PART NO.	41 FT LIFT PART NO.
1	Drum, Double Grooving	1	70563-02	70563-03
2	Bearing	1	PA7393	PA7393
3	Frame Unit	1	70597-02	70597-03
4	Dowel Pin	2	PA7533	PA7533
5	Hex Head Bolt	4	35-8-20C	35-8-20C
6	Lockwasher	4	17-8C	17-8C
7	Gasket	1	70595	70595
8	Enclosure	1	70594	70594
9	Gasket	1	59730	59730
10	Cover	1	52822	52822
11	Hex Head Bolt	6	35-4-6C	35-4-6C
12	Lockwasher	7	17-4C	17-4C
13	Captive Screw	6	58597	58597
14	Retaining Ring	6	PA6634	PA6634
15	Dead End Assembly	1	59666-01	59666-01
16	Keeper Plate	1	53219	53219
17	Roll Pin	1	PA4607	PA4607
18	Hex Head Bolt	1	35-4-8C	35-4-8C
19	Sheave Mounting Unit	1	70582	70582
20	Pin	1	69717	69717
21	Cotter Pin	2	PA1364	PA1364
22	Sheave Hanger	1	70532	70532
23	Spacer	0	(b)	(b)
24	Polyamide Equalizing Sheave	1	70471	70471
24	Steel Equalizing Sheave	1	70472	70472
25	Pin	1	70534	70534
26	Cotter Pin	2	PA1290	PA1290
27*	Wire Rope Assembly (a)	1	70572-02	70572-03
28	Roll Pin	1	PA5391	PA5391
29	Grommet	2	PA7409	PA7409

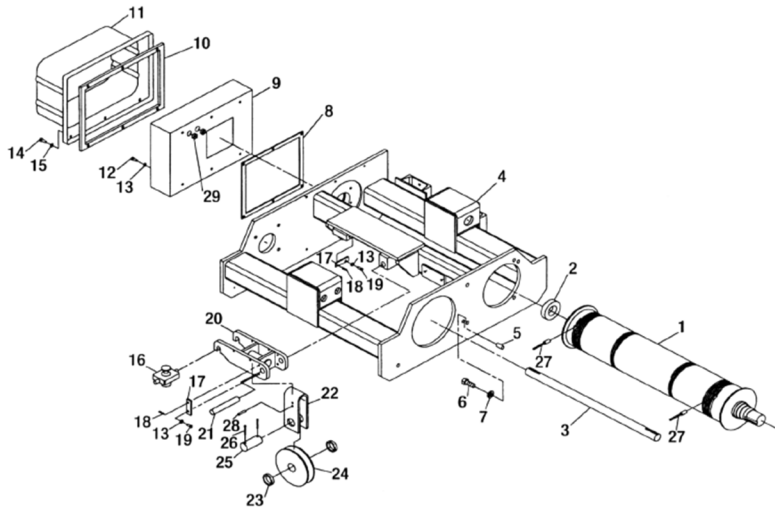
*Recommended Spare Parts

NOTES: (a) Part numbers shown for Item 27, Wire Rope Assembly, are for standard hoists using 5/16" dia. 6X31 XIP wire rope. For special hoists using other size or type wire rope, refer to the wire rope part number listed in additional pages included with this manual; or contact Acco/Harrington or the distributor of the hoist.

(b) Item Number 23, Spacer, not used.

PARTS LIST - PRODUCT SERIES 31

SUSPENSION - 2PD REEVING 5/16" ROPE DIAMETER CROSS MOUNTED HOIST



2PD SUSPENSION PARTS

ITEM NO.	DESCRIPTION	QTY.	21 FT. LIFT PART NO.	41 FT. LIFT PART NO.
1	Drum, Double Grooving	1	70563-02	70563-03
2	Bearing	1	PA7393	PA7393
3	Extension Shaft	1	70989-02	70989-03
4	Frame Unit (b)	1	70978-02	70978-03
5	Dowel Pin	2	PA7533	PA7533
6	Hex Head Bolt	4	35-8-20C	35-8-20C
7	Lockwasher	4	17-8C	17-8C
8	Gasket	1	70595	70595
9	Enclosure	1	70594	70594
10	Gasket	1	59730	59730
11	Cover	1	52822	52822
12	Hex Head Bolt	6	35-4-6C	35-4-6C
13	Lockwasher	8	17-4C	17-4C
14	Captive Screw	6	58597	58597
15	Retaining Ring	6	PA6634	PA6634
16	Dead End Assembly	1	59666-01	59666-01
17	Keeper Plate	2	53219	53219
18	Roll Pin	2	PA4607	PA4607
19	Hex Head bolt	2	35-4-8C	35-4-8C
20	Sheave Mounting Unit	1	70582	70582
21	Pin	1	70839	70839
22	Sheave Hanger	1	70532	70532
23	Spacer	0	(c)	(c)
24	Polyamide Equalizing Sheave	1	70471	70471
24	Steel Equalizing Sheave	1	70472	70472
25	Pin	1	70534	70534
26	Cotter Pin	2	PA1290	PA1290
27*	Wire Rope Assembly (a)	1	70572-02	70572-03
28	Roll Pin	1	PA5391	PA5391
29	Grommet	2	PA7409	PA7409

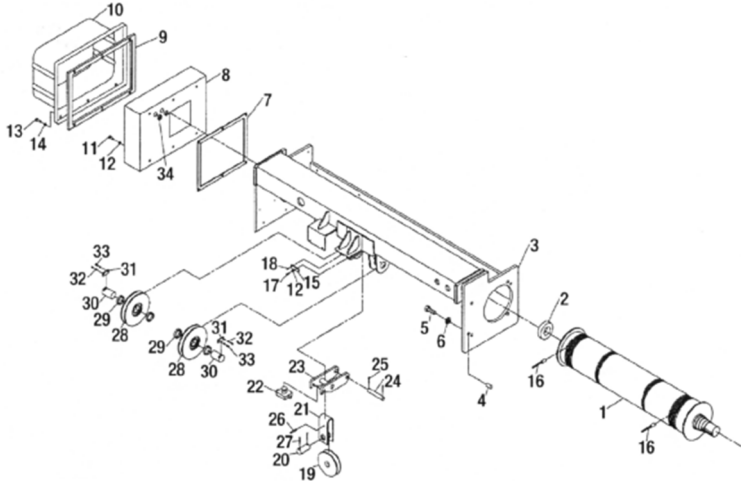
*Recommended Spare Parts

NOTES:

- (a) Part numbers shown for Item 27, Wire Rope Assembly, are for standard hoists using 5/16" dia. 6X31 XIP wire rope. For special hoists using other size or type wire rope, refer to the wire rope part number listed in additional pages included with this manual; or contact Acco/Harrington or the distributor of the hoist.
- (b) Use of Swivel Trolleys requires different Frame Unit. See page 147.
- (c) Item Number 23, Spacer, not used.

PARTS LIST - PRODUCT SERIES 31

SUSPENSION - 4PD REEVING - 5/16" ROPE DIAMETER PARALLEL MOUNTED HOIST



4PD SUSPENSION PARTS

ITEM NO.	DESCRIPTION	QTY.	19 FT. LIFT PART NO.
1	Drum, Double Grooving	1	70563-03
2	Bearing	1	PA7393
3	Frame Unit	1	71212-03
4	Dowel Pin	2	PA7533
5	Hex Head Bolt	4	35-8-20C
6	Lockwasher	4	17-8C
7	Gasket	1	70595
8	Enclosure	1	70594
9	Gasket	1	59730
10	Cover	1	52822
11	Hex Head Bolt	6	35-4-6C
12	Lockwasher	7	17-4C
13	Captive Screw	6	58597
14	Retaining Ring	6	PA6634
15	Keeper Plate	1	53219
16*	Wire Rope Assembly (a)	1	70572-33
17	Hex Head Bolt	1	35-4-8C
18	Roll Pin	1	PA4607
19	Polyamide Equalizing Sheave	1	70471
19	Steel Equalizing Sheave	1	70472
20	Pin	1	70534
21	Sheave Hanger	1	71225
22	Dead End Assembly	1	59666-01
23	Sheave Mounting Unit	1	71222
24	Pin	1	69717
25	Cotter Pin	2	PA1364
26	Roll Pin	1	PA5391
27	Cotter Pin	2	PA1290
28	Polyamide Running Sheave with Bearing	2	71256
28	Steel Running Sheave with Bearing	2	71257
29	Spacer	4	70574
30	Axle	2	71215
31	Keeper Plate	2	50733
32	Lockwasher	4	17-010C
33	Screw	4	1-01-8
34	Grommet	2	PA7409

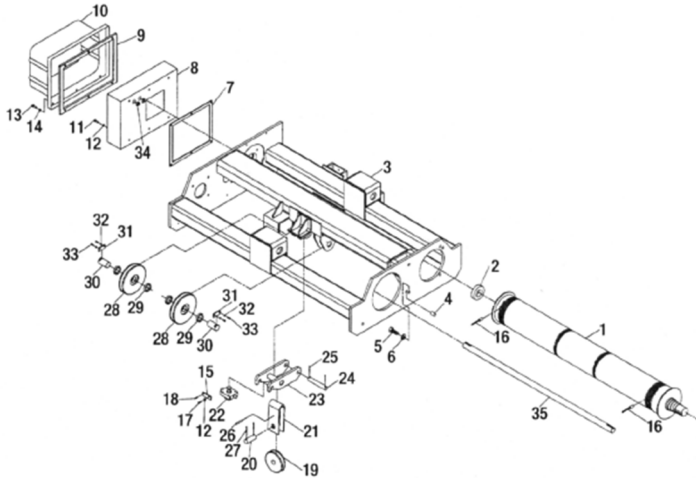
*Recommended Spare Parts

NOTES:

- (a) Item 16, Wire Rope Assembly, is for a standard hoist using 5/16" dia. 6X31 XIP wire rope. For special hoists using other size or type wire rope, refer to the wire rope part number listed in additional pages included with this manual; or contact Acco/Harrington or the distributor of the hoist.

PARTS LIST - PRODUCT SERIES 31

SUSPENSION - 4PD REEVING - 5/16" ROPE DIAMETER CROSS MOUNTED HOIST



4PD SUSPENSION PARTS

ITEM NO.	DESCRIPTION	QTY.	19 FT. LIFT PART NO.
1	Drum, Double Grooving	1	70563-03
2	Bearing	1	PA7393
3	Frame Unit (b)	1	71237-03
4	Dowel Pin	2	PA7533
5	Hex Head Bolt	4	35-8-20C
6	Lockwasher	4	17-8C
7	Gasket	1	70595
8	Enclosure	1	70594
9	Gasket	1	59730
10	Cover	1	52822
11	Hex Head Bolt	6	35-4-6C
12	Lockwasher	7	17-4C
13	Captive Screw	6	58597
14	Retaining Ring	6	PA6634
15	Keeper Plate	1	53219
16*	Wire Rope Assembly (a)	1	70572-43
17	Hex Head Bolt	1	35-4-8C
18	Roll Pin	1	PA4607
19	Polyamide Equalizing Sheave	1	70471
19	Steel Equalizing Sheave	1	70472
20	Pin	1	70534
21	Sheave Hanger	1	71225
22	Dead End Assembly	1	59666-01
23	Sheave Mounting Unit	1	71222
24	Pin	1	69717
25	Cotter Pin	2	PA1364
26	Roll Pin	1	PA5391
27	Cotter Pin	2	PA1290
28	Polyamide Running Sheave with Bearing	2	71256
28	Steel Running Sheave with Bearing	2	71257
29	Spacer	4	70574
30	Axle	2	71215
31	Keeper Plate	2	50733
32	Lockwasher	4	17-010C
33	Screw	4	1-01-8
34	Grommet	2	PA7409
35	Extension Shaft	1	70989-03

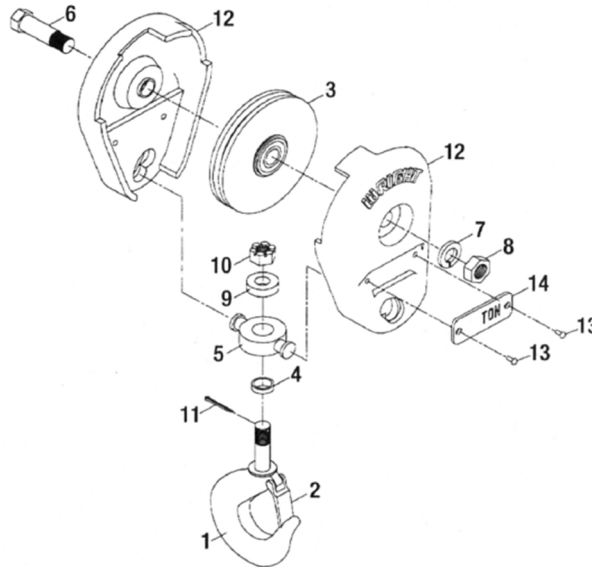
*Recommended Spare Parts

NOTE:

- (a) Item 16, Wire Rope Assembly, is for a standard hoist using 5/16" dia. 6X31 XIP wire rope. For special hoists using other size or type wire rope, refer to the wire rope part number listed in additional pages included with this manual; or contact Acco/Harrington or the distributor of the hoist.
- (b) Use of Swivel Trolleys requires different Frame Unit. See page 147.

PARTS LIST - PRODUCT SERIES 31

LOAD BLOCK – 2 PS REEVING 1/4" ROPE DIAMETER



Load Block Assembly 61762-01 – Steel Spring Latch Type Hook, Polyamide Sheave
 Load Block Assembly 61762-02 – Bullard Swivel Latch Type Hook, Polyamide Sheave
 Load Block Assembly 61762-03 – Bronze Spring Latch Type Hook, Polyamide Sheave
 Load Block Assembly 61762-04 – Steel Spring Latch Type Hook, Steel Sheave
 Load Block Assembly 61762-05 – Bullard Swivel Latch Type Hook, Steel Sheave
 Load Block Assembly 61762-06 – Bronze Spring Latch Type Hook, Steel Sheave

LOAD BLOCK PARTS

ITEM NO.	DESCRIPTION	QTY.	STEEL SPRING LATCH TYPE HOOK	BULLARD SWIVEL LATCH TYPE HOOK	BRONZE SPRING LATCH TYPE HOOK
1	Hook without hole in tip	1	68697 (a)	39796	42641 (a)
1	Hook with hole in tip	1	70889 (a)	N/A	70896 (a)
2	Latch for hook w/o hole in tip	1	PA3823 (a)	N/A	PA3823 (a)
2	Latch for hook w/hole in tip	1	PA7580 (a)	N/A	PA7791 (a)
3	Polyamide Sheave with Bearings	1	61752	61752	61752
3	Steel Sheave with Bearings	1	70368	70368	70368
4	Spacer	1	N/A	39799	N/A
5	Crosshead	1	39643	39643	39643
6	Axle Bolt	1	39790	39790	39790
7	Lockwasher	1	17-10C	17-10C	17-10C
8	Hex Jam Nut	1	24-10C	24-10C	24-10C
9	Thrust Bearing	1	PA1073	PA1073	PA1073
10	Slotted Hex Nut	1	26-12C	26-12C	26-12C
11	Cotter Pin	1	PA5294	PA5294	PA5294
12	Load Block Half	2	61761	61761	61761
13	Drive Screw	4	PA893	PA893	PA893
14	Capacity Plate	2	(b)	(b)	(b)

No Recommended Spare Parts

NOTES:

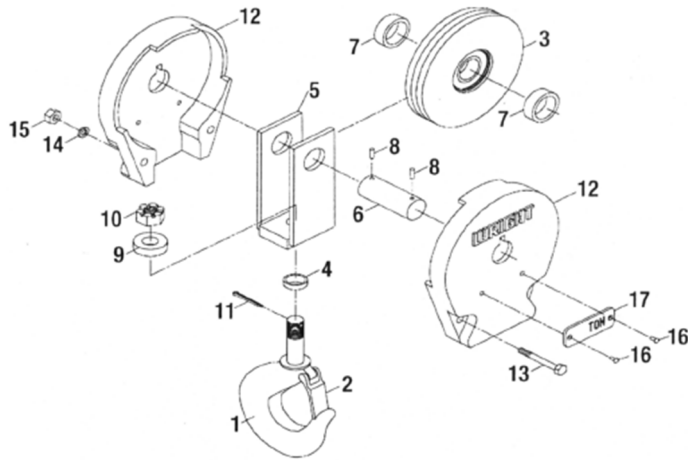
(a) Previous style Spring Latch Hooks were phased out by Acco/Harrington's supplier. The current style Spring Latch Hooks have a hole in the tip of the hook. This hole allows the addition of a cotter pin to prevent the latch from opening. Cotter pin is not supplied by Acco/Harrington. Current style hooks are interchangeable with old style hooks, but current style hooks have a thicker cross section. Latches are not interchangeable between the two style hooks. Previous style hooks are no longer available. Latches for previous style hooks continue to be available. When ordering, identify whether or not hook has a hole in the tip and select part numbers accordingly from the above chart.

(b) Capacity Plate part numbers:

1/2 Ton - 69684-005 1/2 tonne - 69684-1005
 1 Ton - 69684-010 1 tonne - 69684-1010

PARTS LIST - PRODUCT SERIES 31

LOAD BLOCK – 2PS REEVING 5/16” ROPE DIAMTER



- Load Block Assembly 70378-01 – Steel Spring Latch Type Hook, Polyamide Sheave
- Load Block Assembly 70378-02 – Bullard Swivel Latch Type Hook, Polyamide Sheave
- Load Block Assembly 70378-03 – Bronze Spring Latch Type Hook, Polyamide Sheave
- Load Block Assembly 70378-04 – Steel Spring Latch Type Hook, Steel Sheave
- Load Block Assembly 70378-05 – Bullard Swivel Latch Type Hook, Steel Sheave
- Load Block Assembly 70378-06 – Bronze Spring Latch Type Hook, Steel Sheave

LOAD BLOCK PARTS

ITEM NO.	DESCRIPTION	QTY.	STEEL SPRING LATCH TYPE HOOK	BULLARD SWIVEL LATCH TYPE HOOK	BRONZE SPRING LATCH TYPE HOOK
1	Hook without hole in tip	1	68697 (a)	39796	70461 (a)
1	Hook with hole in tip	1	70889 (a)	N/A	70897 (a)
2	Latch for hook w/o hole in tip	1	PA3823 (a)	N/A	PA3825 (a)
2	Latch for hook w/hole in tip	1	PA7580 (a)	N/A	PA7792 (a)
3	Polyamide Sheave with Bearing	1	70371	70371	70371
3	Steel Sheave with Bearing	1	70372	70372	70372
4	Spacer	1	N/A	39799	N/A
5	Frame	1	70375	70375	70375
6	Axle	1	70369	70369	70369
7	Spacer	2	70370	70370	70370
8	Roll Pin	2	PA4607	PA4607	PA4607
9	Thrust Bearing	1	PA1073	PA1073	PA1073
10	Slotted Hex Nut	1	26-12C	26-12C	26-12C
11	Cotter Pin	1	PA5294	PA5294	PA5294
12	Load Block Cover	2	70377	70377	70377
13	Hex Head Bolt	2	35-6-36	35-6-36	35-6-36
14	Lockwasher	2	17-6C	17-6C	17-6C
15	Hex Jam Nut	2	24-6C	24-6C	24-6C
16	Drive Screw	4	PA893	PA893	PA893
17	Capacity Plate	2	(b)	(b)	(b)

No Recommended Spare Parts

NOTES:

- (a) Previous style Spring Latch Hooks were phased out by Acco/Harrington's supplier. The current style Spring Latch Hooks have a hole in the tip of the hook. This hole allows the addition of a cotter pin to prevent the latch from opening. Cotter pin is not supplied by Acco/Harrington. Current style hooks are interchangeable with old style hooks, but current style hooks have a thicker cross section. Latches are not interchangeable between the two style hooks. Previous style hooks are no longer available. Latches for previous style hooks continue to be available. When ordering, identify whether or not hook has a hole in the tip and select part numbers accordingly from the above chart.

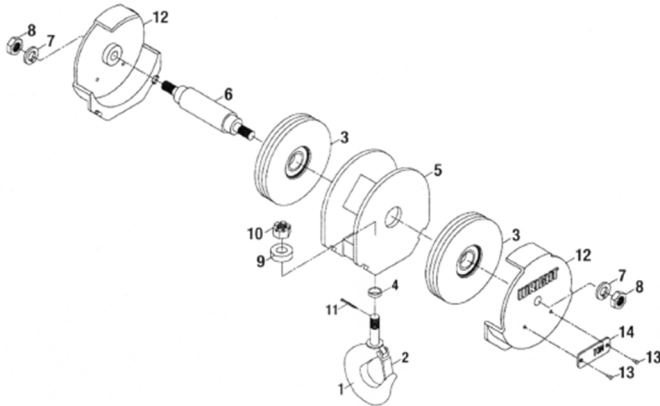
- (b) Capacity Plate part numbers:

1-1/2 Ton - 69684-015
2 Ton - 69684-020

1-1/2 tonne - 69684-1015
2 tonne - 69684-1020

PARTS LIST - PRODUCT SERIES 31

LOAD BLOCK – 4PS AND 2PD REEVING 5/16” ROPE DIAMTER



Load Block Assembly 70464-01 – Steel Spring Latch Type Hook, Polyamide Sheave
 Load Block Assembly 70464-02 – Bullard Swivel Latch Type Hook, Polyamide Sheave
 Load Block Assembly 70464-03 – Bronze Spring Latch Type Hook, Polyamide Sheave
 Load Block Assembly 70464-04 – Steel Spring Latch Type Hook, Steel Sheave
 Load Block Assembly 70464-05 – Bullard Swivel Latch Type Hook, Steel Sheave
 Load Block Assembly 70464-06 – Bronze Spring Latch Type Hook, Steel Sheave

LOAD BLOCK PARTS

ITEM NO.	DESCRIPTION	QTY.	STEEL SPRING LATCH TYPE HOOK	BULLARD SWIVEL LATCH TYPE HOOK	BRONZE SPRING LATCH TYPE HOOK
1	Hook without hole in tip	1	70379 (a)	70380	70381 (a)
1	Hook with hole in tip	1	70890 (a)	N/A	70898 (a)
2	Latch for hook w/o hole in tip	1	PA3825 (a)	N/A	PA5327 (a)
2	Latch for hook w/hole in tip	1	PA7581 (a)	N/A	PA7794 (a)
3	Polyamide Sheave with Bearing	2	70371	70371	70371
3	Steel Sheave with Bearing	2	70372	70372	70372
4	Spacer Washer	1	N/A	A210-02	N/A
5	Frame	1	70390	70390	70390
6	Axle	1	70386	70386	70386
7	Lockwasher	2	17-10C	17-10C	17-10C
8	Hex Jam Nut	2	24-10C	24-10C	24-10C
9	Thrust Bearing	1	PA1050	PA1050	PA1050
10	Slotted Hex Nut	1	26-16C	26-16C	26-16C
11	Cotter Pin	1	PA1290	PA1290	PA1290
12	Sheave Housing	2	70463	70463	70463
13	Drive Screw	4	PA893	PA893	PA893
14	Capacity Plate	2	(b)	(b)	(b)

No Recommended Spare Parts

NOTES:

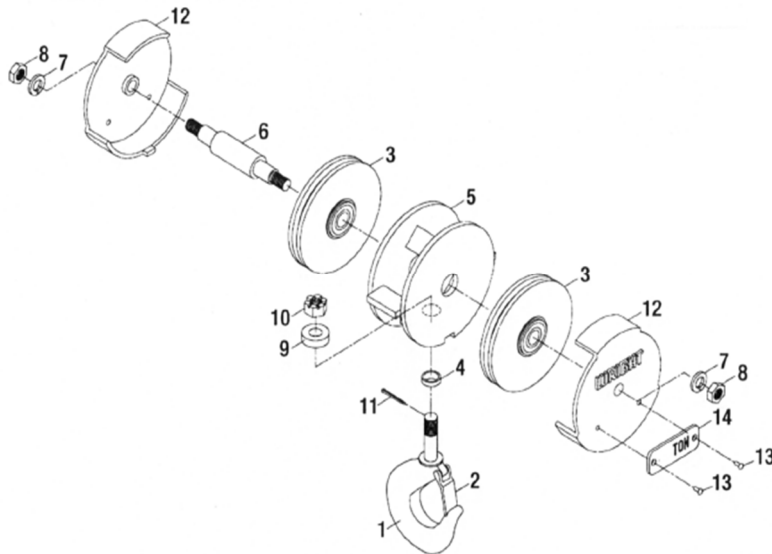
(a) Previous style Spring Latch Hooks were phased out by Acco/Harrington's supplier. The current style Spring Latch Hooks have a hole in the tip of the hook. This hole allows the addition of a cotter pin to prevent the latch from opening. Cotter pin is not supplied by Acco/Harrington. Current style hooks are interchangeable with old style hooks, but current style hooks have a thicker cross section. Latches are not interchangeable between the two style hooks. Previous style hooks are no longer available. Latches for previous style hooks continue to be available. When ordering, identify whether or not hook has a hole in the tip and select part numbers accordingly from the above chart.

(b) Capacity Plate part numbers:

2 Ton - 69684-020	2 tonne - 69684-1020
3 Ton - 69684-030	3 tonne - 69684-1030
4 Ton - 69684-040	4 tonne - 69684-1040

PARTS LIST - PRODUCT SERIES 31

LOAD BLOCK – 2PD REEVING 3/16” AND 1/4” ROPE DIAMETER



Load Block Assembly 61778-01 – Steel Spring Latch Type Hook, Polyamide Sheave
 Load Block Assembly 61778-02 – Bullard Swivel Latch Type Hook, Polyamide Sheave
 Load Block Assembly 61778-03 – Bronze Spring Latch Type Hook, Polyamide Sheave
 Load Block Assembly 61778-04 – Steel Spring Latch Type Hook, Steel Sheave
 Load Block Assembly 61778-05 – Bullard Swivel Latch Type Hook, Steel Sheave
 Load Block Assembly 61778-06 – Bronze Spring Latch Type Hook, Steel Sheave

LOAD BLOCK PARTS

ITEM NO.	DESCRIPTION	QTY.	STEEL SPRING LATCH TYPE HOOK	BULLARD SWIVEL LATCH TYPE HOOK	BRONZE SPRING LATCH TYPE HOOK
1	Hook without hole in tip	1	68697 (a)	39796	70461 (a)
1	Hook with hole in tip	1	70889 (a)	N/A	70897 (a)
2	Latch for hook w/o hole in tip	1	PA3823 (a)	N/A	PA3825 (a)
2	Latch for hook w/hole in tip	1	PA7580 (a)	N/A	PA7792 (a)
3	Polyamide Sheave with Bearing	2	61752	61752	61752
3	Steel Sheave with Bearing	2	70368	70368	70368
4	Spacer	1	N/A	39799	N/A
5	Frame	1	B3189	B3189	B3189
6	Axle	1	61777	61777	61777
7	Lockwasher	2	17-8C	17-8C	17-8C
8	Hex Jam Nut	2	24-8C	24-8C	24-8C
9	Thrust Bearing	1	PA1073	PA1073	PA1073
10	Slotted Hex Nut	1	26-12C	26-12C	26-12C
11	Cotter Pin	1	PA5294	PA5294	PA5294
12	Sheave Housing	2	61770	61770	61770
13	Drive Screw	4	PA893	PA893	PA893
14	Capacity Plate	2	(b)	(b)	(b)

No Recommended Spare Parts

NOTES:

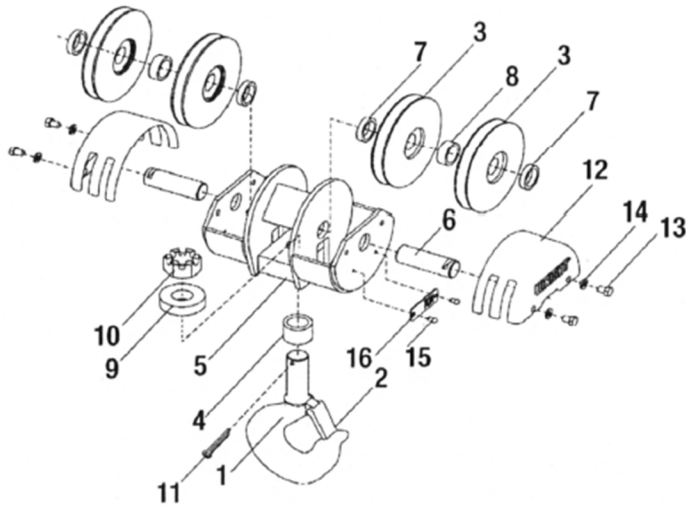
(a) Previous style Spring Latch Hooks were phased out by Acco/Harrington’s supplier. The current style Spring Latch Hooks have a hole in the tip of the hook. This hole allows the addition of a cotter pin to prevent the latch from opening. Cotter pin is not supplied by Acco/Harrington. Current style hooks are interchangeable with old style hooks, but current style hooks have a thicker cross section. Latches are not interchangeable between the two style hooks. Previous style hooks are no longer available. Latches for previous style hooks continue to be available. When ordering, identify whether or not hook has a hole in the tip and select part numbers accordingly from the above chart.

(b) Capacity Plate part numbers:

1/2 Ton - 69684-005	1/2 tonne - 69684-1005
1 Ton - 69684-010	1 tonne - 69684-1010
2 Ton - 69684-020	2 tonne - 69684-1020

PARTS LIST - PRODUCT SERIES 31

LOAD BLOCK – 4PD REEVING 5/16” ROPE DIAMETER



Load Block Assembly 71193-01 – Steel Spring Latch Type Hook, Polyamide Sheave
 Load Block Assembly 71193-02 – Bullard Swivel Latch Type Hook, Polyamide Sheave
 Load Block Assembly 71193-03 – Bronze Spring Latch Type Hook, Polyamide Sheave
 Load Block Assembly 71193-04 – Steel Spring Latch Type Hook, Steel Sheave
 Load Block Assembly 71193-05 – Bullard Swivel Latch Type Hook, Steel Sheave
 Load Block Assembly 71193-06 – Bronze Spring Latch Type Hook, Steel Sheave

LOAD BLOCK PARTS

ITEM NO.	DESCRIPTION	QTY.	STEEL SPRING LATCH TYPE HOOK	BULLARD SWIVEL LATCH TYPE HOOK	BRONZE SPRING LATCH TYPE HOOK
1	Hook without hole in tip	1	N/A	71207	42643 (a)
1	Hook with hole in tip	1	71192 (a)	N/A	70900(a)
2	Latch for hook w/o hole in tip	1	N/A	N/A	PA5327 (a)
2	Latch for hook w/hole in tip	1	PA7582 (a)	N/A	PA7794 (a)
3	Polyamide Sheave with Bearing	4	70371	70371	70371
3	Steel Sheave with Bearing	4	70372	70372	70372
4	Spacer	1	N/A	71208	N/A
5	Frame	1	71194	71194	71194
6	Axle	2	71199	71199	71199
7	Spacer	4	70574	70574	70574
8	Spacer	2	71201-02	71201-02	71201-02
9	Thrust Bearing	1	PA1082	PA1082	PA1082
10	Slotted Hex Nut	1	26-20	26-20	26-20
11	Cotter Pin	1	PA1771	PA1771	PA1771
12	Cover	2	71196	71196	71196
13	Hex Head Bolt	4	35-6-8C	35-6-8C	35-6-8C
14	Lockwasher	4	17-6C	17-6C	17-6C
15	Drive Screw	4	PA893	PA893	PA893
16	Capacity Plate	2	(b)	(b)	(b)

No Recommended Spare Parts

NOTES:

(a) Previous style Spring Latch Hooks were phased out by Acco/Harrington's supplier. The current style Spring Latch Hooks have a hole in the tip of the hook. This hole allows the addition of a cotter pin to prevent the latch from opening. Cotter pin is not supplied by Acco/Harrington. Current style hooks are interchangeable with old style hooks, but current style hooks have a thicker cross section. Latches are not interchangeable between the two style hooks. Previous style hooks are no longer available. Latches for previous style hooks continue to be available. When ordering, identify whether or not hook has a hole in the tip and select part numbers accordingly from the above chart.

(b) Capacity Plate part numbers:

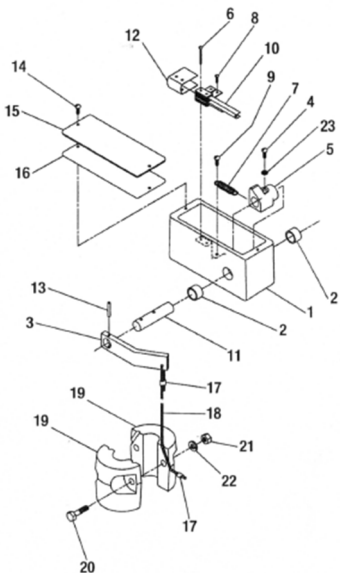
4 Ton - 69684-040 4 tonne - 69684-1040
 5 Ton - 69684-050 5 tonne - 69684-1050

PARTS LIST - PRODUCT SERIES 31

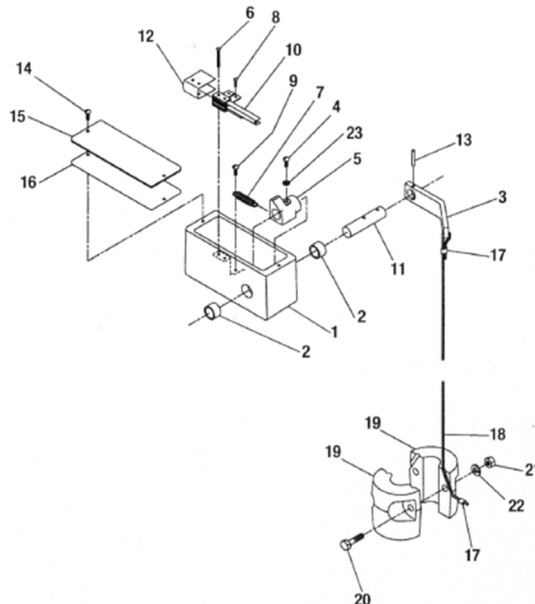
GRAVITY LIMIT SWITCH

Gravity Limit Switch Assembly 70265-01 -
Gravity Limit Switch Assembly 70265-11 -

Used on Series 31 2PS, 4PS, and 2PD hoists.
Used on Series 31 4PD hoists.



ASSEMBLY 70265-01



ASSEMBLY 70265-11

GRAVITY LIMIT SWITCH PARTS

ITEM NO.	PART NO.	DESCRIPTION	QTY. 70265-01	QTY. 70265-11
1	70262	Enclosure	1	1
2	PA3598	Bushing	(a)	(a)
3	69793	Arm	1	1
4	3-08-8C	Screw	1	1
5	70264	Cam	1	1
6	3-05-14C	Screw	2	2
7	PA7400	Spring	1	1
8	3-05-2C	Screw	3	3
9	3-010-6C	Screw	1	1
10	61717	Switch Unit	1	1
11	70263	Shaft	1	0
	70263-01	Shaft	0	1

ITEM NO.	PART NO.	DESCRIPTION	QTY. 70265-01	QTY. 70265-11
12	64104	Insulator	1	1
13	PA3810	Spring Pin	1	1
14	PA5155	Self-Tapping Screw	2	2
15	69804	Cover	1	1
16	69805	Gasket	1	1
17	PA2242	Oval Cable Sleeve	2	2
18	PA3113	Wire Rope	AR	AR
19	69827	Weight Half	2	2
20	35-4-16C	Bolt	2	2
21	22-4C	Hex Nut	2	2
22	17-4C	Lockwasher	2	2
23	19-08C	Lockwasher, Int. Tooth	1	1

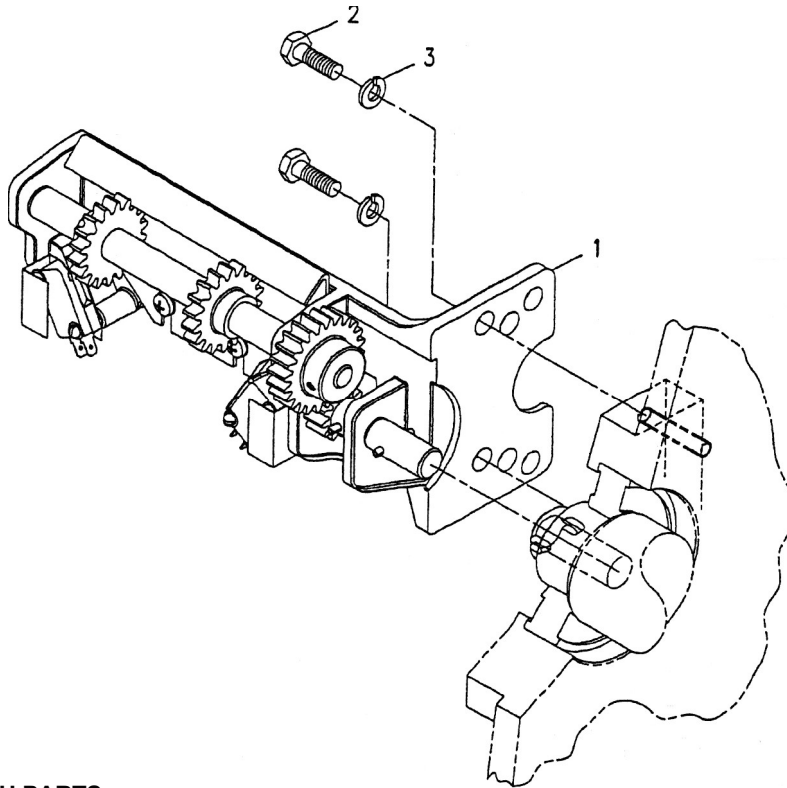
No Recommended Spare Parts

NOTES:

- (a) Included with Item 1.
- (b) Gravity limit switch attached to hoist frame with two (2) Round Head Screws, Part No. 3-010-16C, and two (2) Locknuts, Part No. PA2423.

PARTS LIST - PRODUCT SERIES 31

WRIGHT® GEARED LIMIT SWITCH



GEARED LIMIT SWITCH PARTS

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	71382-01	Geared Limit Switch 2 Circuit – 1:1 Ratio – ½-20 Thd. – 62.0 Maximum Turns	1
	71382-02	Geared Limit Switch 2 Circuit – 1:1 Ratio – ½-28 Thd. – 83.3 Maximum Turns	
	71382-03	Geared Limit Switch 2 Circuit – 2:1 Ratio – ½-20 Thd. – 124.0 Maximum Turns	
	71382-04	Geared Limit Switch 2 Circuit – 2:1 Ratio – ½-28 Thd. – 152.6 Maximum Turns	
2	35-4-8C	Hex Head Bolt	2
3	17-4C	Lockwasher	2

No Recommended Spare Parts

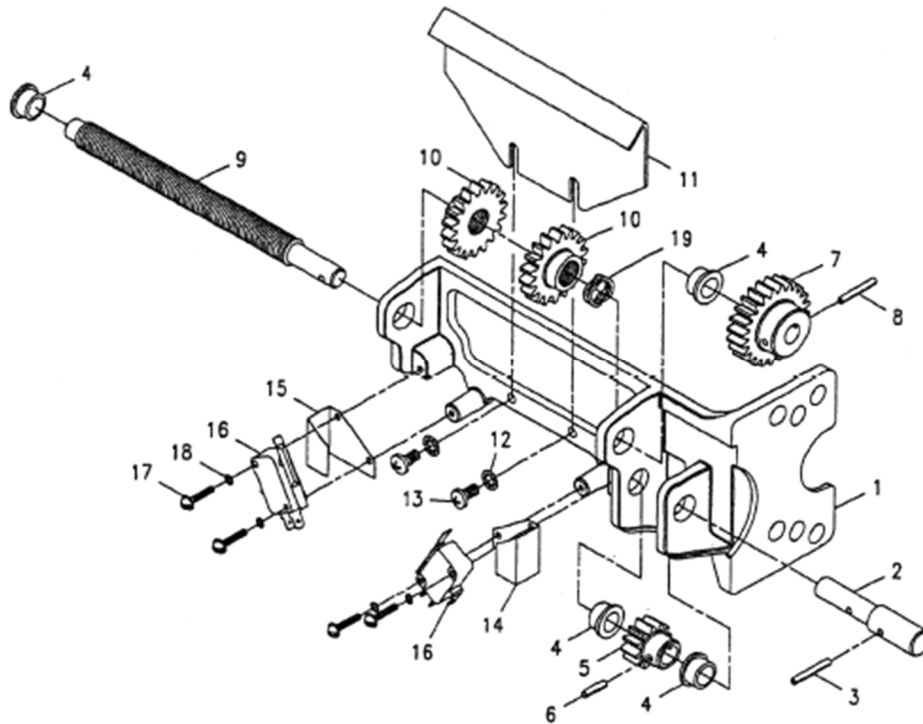
MAXIMUM STANDARD DRUM LENGTH NUMBER POSSIBLE WITH EACH SWITCH:

For Geared Limit Switch selection, the maximum possible number of input shaft turns must be greater than the total number of grooves on a single reeved drum or the total number of grooves per side on a double reeved drum. With standard grooving, the drum numbers in the following table are the maximum length standard drums on which the indicated switch part numbers can be used.

PART NO.	DESCRIPTION	2PS	4PS	2PD	4PD
71382-01	Geared Limit Switch 2 Circuit – 1:1 Ratio- ½-20 Thd. – 62.0 Maximum Turns	1	--	2 (All Rope) 3 (5/16 Rope)	3
71382-02	Geared Limit Switch 2 Circuit – 1:1 Ratio- ½-28 Thd. – 83.3 Maximum Turns	2	2	3 (¼ Rope)	--
71382-03	Geared Limit Switch 2 Circuit – 2:1 Ratio- ½-20 Thd. – 124.0 Maximum Turns	2	2	3 (3/16 Rope)	--
71382-04	Geared Limit Switch 2 Circuit – 2:1 Ratio- ½-28 Thd. – 152.6 Maximum Turns	3	3	--	--

PARTS LIST- PRODUCT SERIES 31

WRIGHT® GEARED LIMIT SWITCH



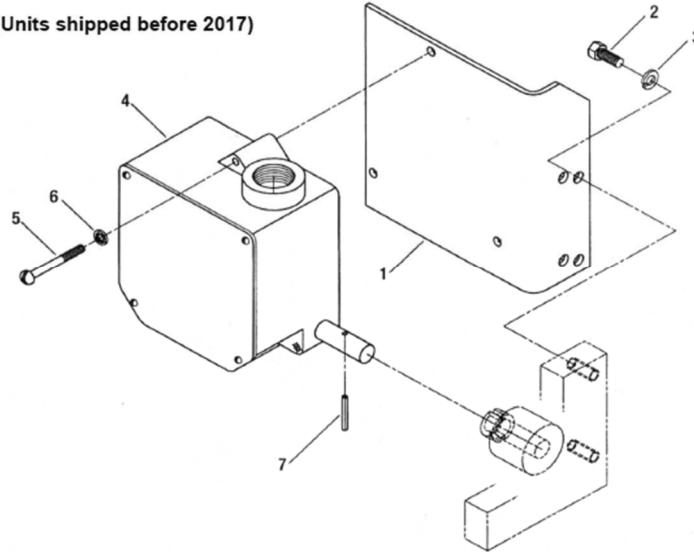
GEARED LIMIT SWITCH PARTS

LIMIT SWITCH ASS'Y PART NO.	71382-01	71382-02	71382-03	71382-04
MAXIMUM NO. OF TURNS	62	83.3	124	152.6

ITEM NO.	PART NO.				DESCRIPTION	QTY
1	71383	71383	71383	71383	Frame	1
2	71385	71385	71385	71385	Pinion Shaft	1
3	PA3810	PA3810	PA3810	PA3810	Roll Pin, 1/8 dia.	1
4	PA7655	PA7655	PA7655	PA7655	Flange Bushing	4
5	-	-	71388	71388	Pinion, (12 teeth)	1
	71389	71389	-	-	Pinion, (18 teeth)	
6	-	-	PA7654	PA7654	Roll Pin, 1/8 dia.	1
	PA2235	PA2235	-	-	Roll Pin, 1/8 dia.	
7	-	-	71390	71390	Gear (24 teeth)	1
	71389	71389	-	-	Gear, (18 teeth)	
8	PA2235	PA2235	PA2235	PA2235	Roll Pin, 1/8 dia.	1
9	71384-01	-	71384-01	-	Driving Screw, 1/2-20 UNF-2A	1
	-	71384-02	-	71384-02	Driving Screw, 1/2-28 UNEF-2A	
10	71387-01	-	71387-01	-	Limit Gear, 1/2-20 UNF-2A	2
	-	71387-02	-	71387-02	Limit Gear, 1/2-28 UNEF-2A	
11	71386	71386	71386	71386	Lock Angle	1
12	19-010C	19-010C	19-010C	19-010C	Lockwasher, Internal Tooth #10	2
13	3-010-6C	3-010-6C	3-010-6C	3-010-6C	Round Hd. Machine Screw #10 x 3/8"	2
14	71454-01	71454-01	71454-01	71454-01	Switch Insulator	1
15	71454-02	71454-02	71454-02	71454-02	Switch Insulator	1
16	PA7656	PA7656	PA7656	PA7656	Micro Switch	2
17	3-04-10	3-04-10	3-04-10	3-04-10	Round Hd. Machine Screw #4-40 x 5/8"	4
18	19-05C	19-05C	19-05C	19-05C	Lockwasher, Internal Tooth #5	4
19	PA7688	PA7688	PA7688	PA7688	Wave Spring	1

GE® GEARED LIMIT SWITCH

(Units shipped before 2017)



GEARED LIMIT SWITCH PARTS

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	69965	Mounting Plate	1
2	35-4-8C	Hex Head Bolt	2
3	17-4C	Lockwasher	2
4 (a)	61649-07	Geared Limit Switch 2 Circuit – 40:1 Ratio – 38 Max. Turns	1
	61649-05	Geared Limit Switch 4 Circuit – 40:1 Ratio – 38 Max. Turns	1
	61649-08	Geared Limit Switch 2 Circuit – 80:1 Ratio – 75 Max. Turns	1
	61649-06	Geared Limit Switch 4 Circuit – 80:1 Ratio – 75 Max. Turns	1
	61649-01	Geared Limit Switch 2 Circuit – 111:1 Ratio – 104 Max. Turns	1
	61649-03	Geared Limit Switch 4 Circuit – 111:1 Ratio – 104 Max. Turns	1
	61649-10	Geared Limit Switch 2 Circuit – 222:1 Ratio – 208 Max. Turns	1
	61649-12	Geared Limit Switch 4 Circuit – 222:1 Ratio – 208 Max. Turns	1
5	3-010-24C	Round Head Screw	3
6	19-010C	Lockwasher	3
7	PA3810	Drive Pin	1

No Recommended Spare Parts

NOTE:

(a) For Geared Limit Switch selection, the maximum possible number of input shaft turns must be greater than the total number of grooves on a single reeved drum or the total number of grooves per side on a double reeved drum. With standard grooving, the following drum numbers are the maximum length drums on which the indicated switch ratios can be used.

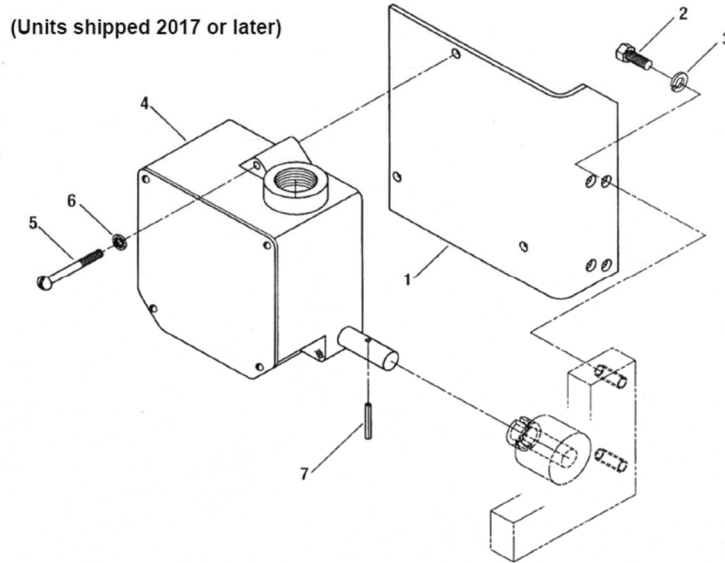
40:1 Ratio can be used up to 2PS Drum Number 1 or 2PD 1/4" and 5/16" diameter rope Drum Number 2.

80:1 Ratio can be used up to 2PS and 4PS 5/16" diameter rope Drum Number 2 or 2PD 3/16" diameter rope Drum Number 2 or 2PD 1/4" and 5/16" diameter rope Drum Number 3 or 4PD Drum Number 3.

111:1 Ratio can be used up to 2PS 1/4" diameter rope Drum Number 2 or 2PD 3/16" diameter rope Drum Number 3.

222:1 Ratio can be used up to 2PS and 4PS Drum Number 3.

HUBBELL® GEARED LIMIT SWITCH



GEARED LIMIT SWITCH PARTS

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	69965	Mounting Plate	1
2	35-4-8C	Hex Head Bolt	2
3	17-4C	Lockwasher	2
4 (a)	61649-07	Geared Limit Switch 2 Circuit – 42.5:1 Ratio – 36.5 Max. Turns	1
	61649-05	Geared Limit Switch 4 Circuit – 42.5:1 Ratio – 36.5 Max. Turns	1
	61649-08	Geared Limit Switch 2 Circuit – 80:1 Ratio – 68 Max. Turns	1
	61649-06	Geared Limit Switch 4 Circuit – 80:1 Ratio – 68 Max. Turns	1
	61649-01	Geared Limit Switch 2 Circuit – 111:1 Ratio – 97 Max. Turns	1
	61649-03	Geared Limit Switch 4 Circuit – 111:1 Ratio – 97 Max. Turns	1
	61649-10	Geared Limit Switch 2 Circuit – 222:1 Ratio – 192 Max. Turns	1
	61649-12	Geared Limit Switch 4 Circuit – 222:1 Ratio – 192 Max. Turns	1
5	3-010-24C	Round Head Screw	3
6	19-010C	Lockwasher	3
7	PA3810	Drive Pin	1

No Recommended Spare Parts

NOTE:

(a) For Geared Limit Switch selection, the maximum possible number of input shaft turns must be greater than the total number of grooves on a single reeved drum or the total number of grooves per side on a double reeved drum. With standard grooving, the following drum numbers are the maximum length drums on which the indicated switch ratios can be used.

40:1 Ratio can be used up to 2PS 5/16" diameter rope Drum Number 1 or 2PD 5/16" diameter rope Drum Number 2.

80:1 Ratio can be used up to 2PS 1/4" diameter rope Drum Number 1 or 2PD 3/16" and 1/4" diameter rope Drum Number 2 or 2PD and 4PD 5/16" diameter rope Drum Number 3.

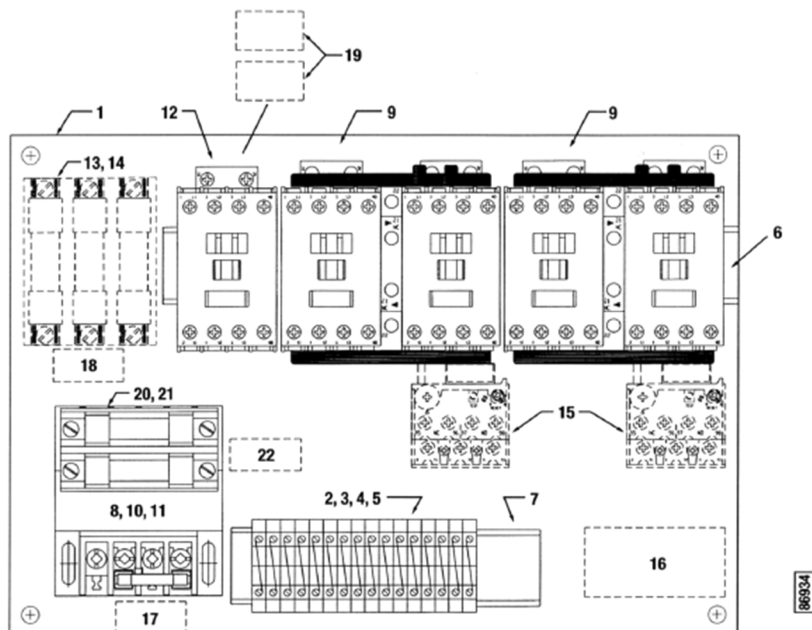
111:1 Ratio can be used on 2PS and 4PS Drum Number 2 and 2PD 3/16" and 1/4" diameter rope Drum Number 3.

222:1 Ratio can be used up to 2PS and 4PS Drum Number 3.

PARTS LIST - PRODUCT SERIES 31

CONTROL COMPONENTS

SINGLE SPEED HOIST AND SINGLE SPEED HOIST WITH SINGLE SPEED TROLLEY



REPLACEMENT PARTS

ITEM NO.	PART NO.*	DESCRIPTION
1	86831	Panel, Drilled
2	86710-04	Terminal, Grounding
3	86710-07	Terminal End Barrier
4	86710-05	Terminal End Anchor
5	86710-01	Terminal Block
6	86714-16	Din Rail, 10" L.
7	86714-14	Din Rail, 5 1/2" L.
8	52429-80	Fuse Block, Transformer
9*	86727-01	Contactor, Reversing, Size B, 115V
	86727-02	Contactor, Reversing, Size B, 24V
	86728-01	Contactor, Reversing, Size BC, 115V
	86728-02	Contactor, Reversing, Size BC, 24V
10	52429-02	Transformer, Control, 200-115V
	52429-14	Transformer, Control, 230/460-115V
	52429-37	Transformer, Control, 575-115V
	52429-52	Transformer, Control, 200-24V
	52429-26	Transformer, Control, 230/460-24V
	52429-64	Transformer, Control, 575-24V

ITEM NO.	PART NO.	DESCRIPTION
11*	PA7328	Transformer Fuse, 115V, Control
	PA7330	Transformer Fuse, 24V, Control
12	86732-01	Mainline Contactor, 115V (Optional)
	86732-02	Mainline Contactor, 24V (Optional)
13	PA7529	Fuse Block, Motor Circuit (Optional)
14*	86724-XX	Fuse, Motor Circuit (Optional)
15	86736-XX	Overload Relays (Optional)
16	69505-02	Danger Label, Electrical
17	70266	Fuse Identification Label, Type ABC
18	70732	Fuse Identification Label, Type CC
	70831	Mainline Contactor Label (English)
19	70832	Mainline Contactor Label (French)
	52429-81	Fuse Block, Primary
21*	86724-006	Fuse, Transformer – 200V
	86724-005	Fuse, Transformer – 230V
	86724-003	Fuse, Transformer – 460V
	86724-002	Fuse, Transformer – 575V
22	71399	Fuse Identification Label, Transformer

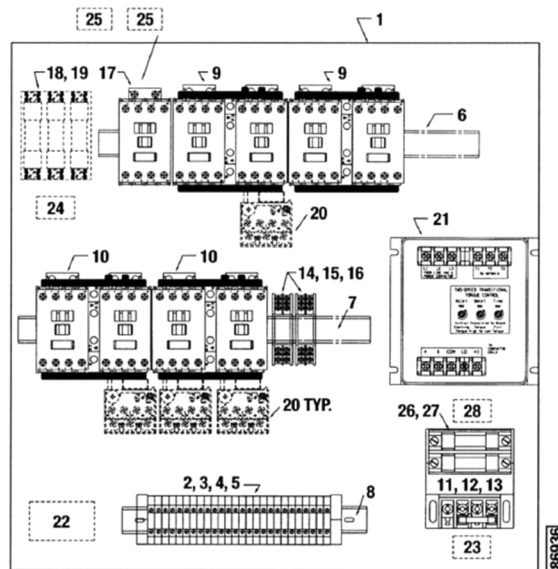
*Recommended Spare Parts

NOTE:

When ordering Motor Circuit Fuses or Overload Relays, provide as much information about the hoist as possible: Hoist serial number, motor H.P.'s, full load currents, supply voltage, etc.

PARTS LIST - PRODUCT SERIES 31

CONTROL COMPONENTS SINGLE OR TWO SPEED HOIST AND TROLLEY CONTROL COMBINATIONS



REPLACEMENT PARTS

ITEM NO.	PART NO.	DESCRIPTION
1	86833	Panel, Drilled
2	86710-04	Terminal, Grounding
3	86710-07	Terminal End Barrier
4	86710-05	Terminal End Anchor
5	86710-01	Terminal Block
6	86714-07	Din Rail, 14" L.
7	86714-06	Din Rail, 12" L.
8	86714-02	Din Rail, 8" L.
9*	86727-01	Contactors, Reversing, Size B, 115V
	86727-02	Contactors, Reversing, Size B, 24V
	86728-01	Contactors, Reversing, Size BC, 115V
	86728-02	Contactors, Reversing, Size BC, 24V
10*	86727-01	Contactors, Two Speed, Size B, 115V
	86727-02	Contactors, Two Speed, Size B, 24V
	86728-01	Contactors, Two Speed, Size BC, 115V
	86728-02	Contactors, Two Speed, Size BC, 24V
11	52429-02	Transformer, Control, 200-115V
	52429-14	Transformer, Control, 230/460-115V
	52429-37	Transformer, Control, 575-115V
	52429-52	Transformer, Control, 200-24V
	52429-26	Transformer, Control, 230/460-24V
	52429-64	Transformer, Control, 575-24V
12	52429-80	Transformer Fuse Block
13*	PA7328	Transformer Fuse, 115V Control
	PA7330	Transformer Fuse, 24V Control

ITEM NO.	PART NO.	DESCRIPTION
14	PA7382	Relay, Plug In, 115V (2 Speed Only)
	PA7383	Relay, Plug In, 24V (2 Speed Only)
15	PA7384	Relay Socket (2 Speed Only)
16	PA7385	Relay Hold Down Clip (2 Speed Only)
17	86732-01	Mainline Contactor, 115V Control
	86732-02	Mainline Contactor, 24V Control
18	PA7529	Fuse Block, Motor Circuit (Optional)
19*	86724-XX	Fuse, Motor Circuit (Optional)
20	86736-XX	Overload Relay (Optional)
21	86715-017	ACM, S.S., 1HP Max 200-230V, 2HP Max 460v
	86715-018	ACM, 2S., 1HP Max 200-230V, 2HP Max 460V
	86715-002	ACM, S.S., 2HP Max 575V
	86715-006	ACM, 2S., 2HP Max 575V
22	69505-02	Danger Label, Electrical
23	70266	Fuse Identification Label, Type ABC
24	70732	Fuse Identification Label Type CC
25	70831	Mainline Contactor Label (English)
	70832	Mainline Contactor Label (French)
26	52429-81	Fuse Block, Primary
27*	86724-006	Fuse, Transformer – 200V
	86724-005	Fuse, Transformer – 230V
	86724-003	Fuse, Transformer – 460V
	86724-002	Fuse, Transformer – 575V
28	71399	Fuse Identification Label, Transformer

*Recommended Spare Parts

NOTE:

Two speed contactor is a reversing contactor with the load side jumper assembly removed. When replacing a two speed contactor, insure the load side jumpers are removed before installing.

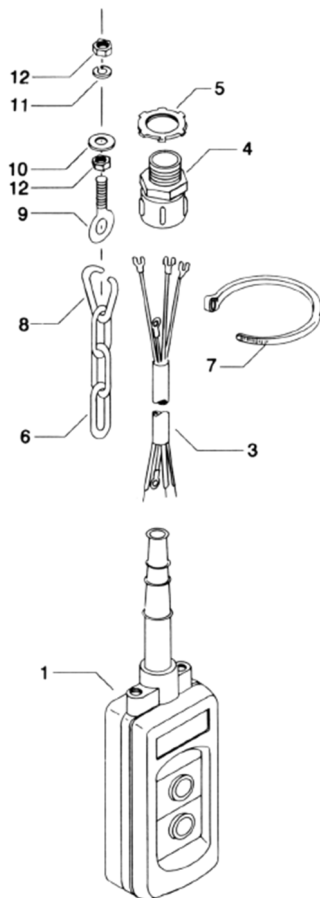
ACM's listed are for 115V control only. For 24V control, order by description.

When ordering Motor Circuit Fuses or Overload Relays, provide as much information about the hoist as possible: Hoist serial number, motor H.P.'s, full load currents, supply voltage, etc.

PENDANT CONTROL STATION

PENDANT CONTROL STATION PARTS LIST

ITEM NO.	PART NO.	DESCRIPTION
1	68898-01	2-Button, Single Speed Pushbutton Station Assembly
	68898-02	2-Button, Two Speed Pushbutton Station Assembly
	86718-02	4-Button, Pushbutton Station, Enclosure only
	86718-03	6-Button, Pushbutton Station, Enclosure only
	86718-04	8-Button, Pushbutton Station, Enclosure only
2	86718-16	Single Speed Contact Block (not shown)
	86718-19	Two Speed Contact Block (not shown)
	86718-05	Operator Button (Black)
	86718-06	Operator Button (Green)
	86718-07	Operator Button (Red)
3	62046	Cable, 16 AWG, 4 Cond.
	PA2513	Cable, 16 AWG, 8 Cond.
	PA2514	Cable, 16 AWG, 14 Cond.
4	PA2427	Cable Grip, 4 Cond. Cable
	PA2145	Cable Grip, 8 Cond. Cable
	PA2517	Cable Grip, 14 Cond. Cable
5	PA1827	Locknut for PA2427 & PA2145
	PA2036	Locknut for PA2517
6	PA2034	Strain Relief Chain
7	PA6750	Self Locking Tie
8	PA2035	Chain Repair Link
9	PA5037	Eye Bolt
10	15-4-2C	Washer
11	17-4C	Lockwasher
12	22-4C	Nut
13	63178-01	Warning Label



PUSHBUTTON STATION



**WARNING LABEL
63178-01
Replace Label
If Lost or Illegible**

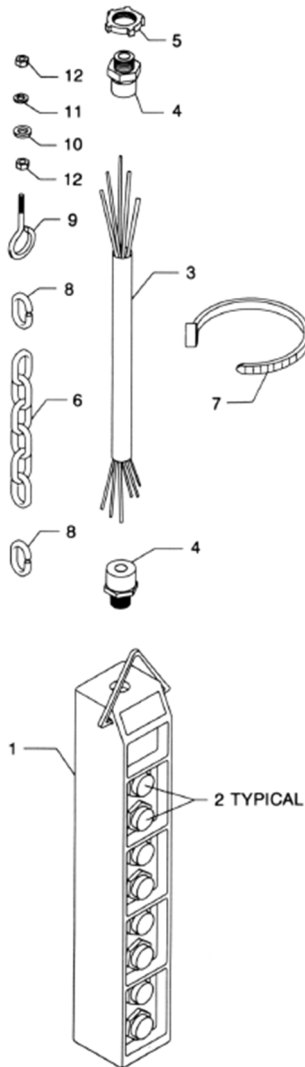
NOTE:

When ordering pushbutton control cable or strain relief chain, specify length in feet. When specifying length of control cable, allow sufficient length to make connections inside of pushbutton station and control enclosure.

PARTS LIST - PRODUCT SERIES 31

PENDANT CONTROL STATION

PENDANT CONTROL STATION PARTS LIST



PUSHBUTTON STATION

ITEM NO.	PART NO.	DESCRIPTION
1	86716-01	2-Button Enclosure
	86716-02	4-Button Enclosure
	86716-03	6-Button Enclosure
	86716-04	8-Button Enclosure
	86716-05	10-Button Enclosure
2	86716-06	Single Speed Button Assy.
	86716-07	Two Speed Button Assy.
	86716-08	Three Speed Button Assy.
	86716-09	Five Speed Button Assy.
	86716-10	On Button (Green)
	86716-11	Off Button (Red)
	86716-12	Pilot Light (Red)
	86716-13	Two Position Maint. Selector Switch
	86716-14	Three Position Maint. Selector Switch
	86716-15	Push-Pull Operator (Maint.)
	86716-16	Red Mushroom Keylock Selector (Maint.)
	86716-17	Two Position Keylock Selector (Maint.)
	86716-18	2-Button Maint. Operator (Interlocked)
	86716-19	Contact Block (1 N.O. & 1 N.C.)
	86716-20	Closing Button (For Unused Holes)
	86716-21	P.B. Operator (Black, 1 N.O. & 1 N.C.)
3	62046	Cable, 16 AWG, 4 Cond.
	PA2513	Cable, 16 AWG, 8 Cond.
	PA2514	Cable, 16 AWG, 14 Cond.
	PA6706	Cable, 16 AWG, 24 Cond.
4	PA2427	Cable Grip, 4 Cond. Cable
	PA6652	Cable Grip, 8 Cond. Cable
	PA2517	Cable Grip, 14 Cond. Cable
	PA6705	Cable Grip, 24 Cond. Cable
5	PA1827	Locknut for PA2427 & PA6652
	PA2036	Locknut for PA2517
	PA1828	Locknut for PA6705
6	PA2034	Strain Relief Chain
7	PA6750	Self Locking Tie
8	PA2035	Chain Repair Link
9	PA5037	Eye Bolt
10	15-4-2C	Washer
11	17-4C	Lockwasher
12	22-4C	Nut
13	63178-01	Warning Label



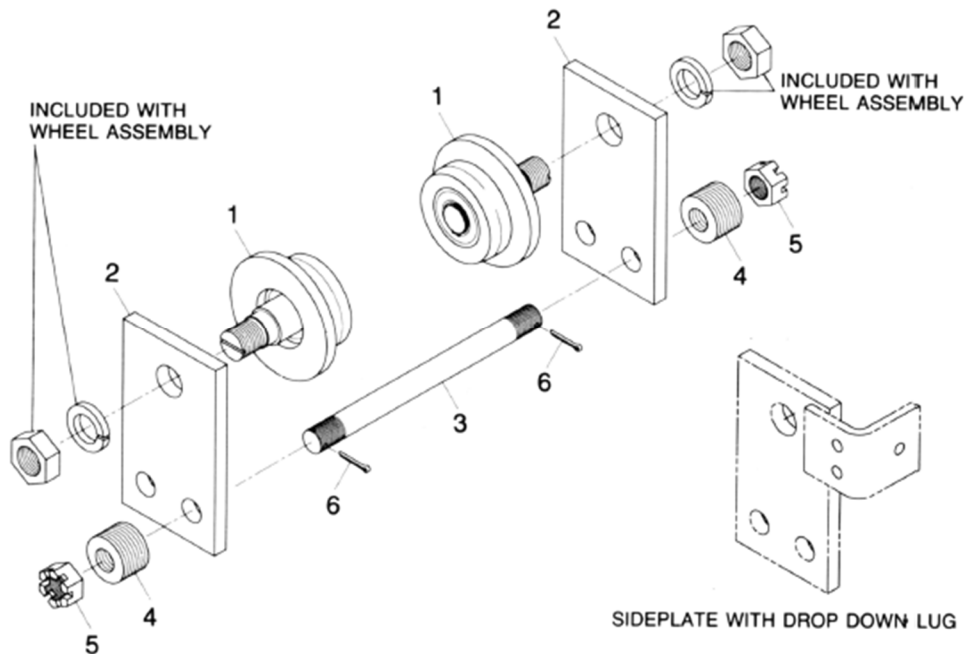
WARNING LABEL
63178-01
Replace Label
If Lost or Illegible

NOTE: When ordering pushbutton control cable or strain relief chain, specify length in feet. When specifying length of control cable, allow sufficient length to make connections inside of pushbutton station and control enclosure.

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PARTS LIST - PRODUCT SERIES 31

2-WHEEL PLAIN TROLLEY ASSEMBLY 4 IN. DIAMETER WHEEL NON-SWIVELING - TWO MOUNTING STUDS FOR 1-TON 2PS HOISTS



TROLLEY PARTS - 4" DIAMETER WHEELS

TROLLEY ASSEMBLY	BEAM FLANGE WIDTH (Inches)	DROP DOWN LUGS	WHEEL ASSEMBLY 2 PER TROLLEY		SIDEPLATE 1 PER TROLLEY	SIDEPLATE 1 PER TROLLEY	STUD 2 PER TROLLEY	WASHER		NUT 4 PER TROLLEY	COTTER PIN 4 PER TROLLEY		
			MATL (b)	ITEM 1	ITEM 2	ITEM 2	ITEM 3	QTY/TROL LY	ITEM 4	ITEM 5	ITEM 6		
62770-01	3 to 4-5/8	No	Gray Iron Dual Tread	62256-01	62764	62764	62241-01	44	PA52 43	26-14	PA1144		
62770-05	4-3/4 to 6-1/4											62241-02	70
62770-02	6-3/8 to 8											62241-03	66
62770-03	3 to 4-5/8		Bronze Dual Tread	62256-02	62764	62764	62241-01	44					
62770-06	4-3/4 to 6-1/4											62241-02	70
62770-04	6-3/8 to 8											62441-03	66
62770-07	3 to 4-5/8	Yes	Gray Iron Dual Tread	62256-01	62764-01	62764-02	62241-01	44					
62770-08	4-3/4 to 6-1/4											62241-02	70
62770-09	6-3/8 to 8											62241-03	66
62770-10	3 to 4-5/8		Bronze Dual Tread	62256-02	62764-01	62764-02	62241-01	44					
62770-11	4-3/4 to 6-1/4											62241-02	70
62770-12	6-3/8 to 8											62241-03	66
62770-13	3 to 4-1/8 (a)	No	Steel Flat	70668-01	62764	62764	62241-01	44					
62770-14	3 to 4-1/8 (a)		Bronze Flat	70668-02									
62770-15	3 to 4-1/8 (a)	Yes	Steel Flat	70668-01	62764-01	62764-02							
62770-16	3 to 4-1/8 (a)		Bronze Flat	70668-02									

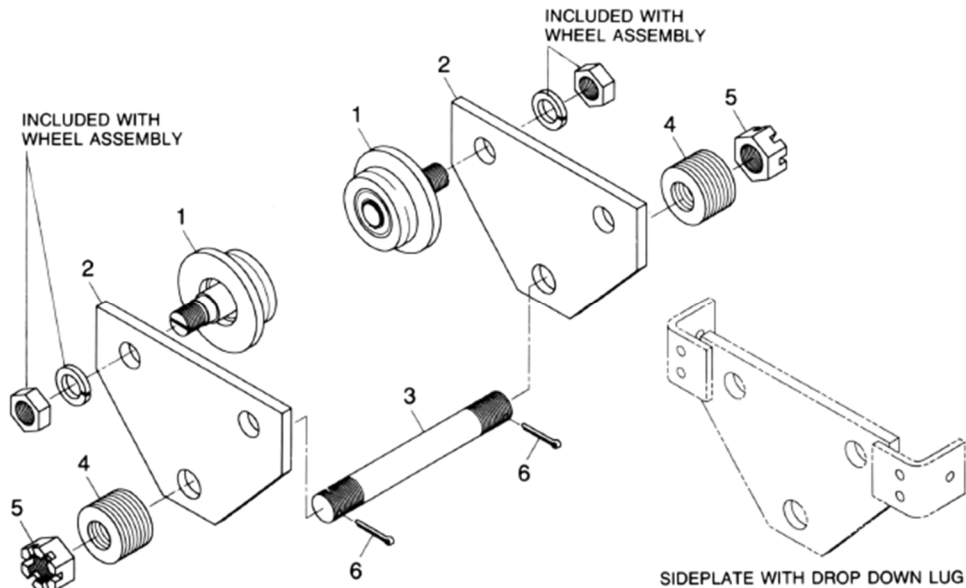
No Recommended Spare Parts

NOTE:

- (a) For operation on patented monorail track.
- (b) Standard wheels for 1 ton 2PS hoists are Gray Iron Dual Tread.

PARTS LIST - PRODUCT SERIES 31

4-WHEEL PLAIN TROLLEY ASSEMBLY 4 IN. DIAMETER WHEEL NON-SWIVELING - ONE MOUNTING STUD FOR 1-TON 2PS HOISTS



TROLLEY PARTS - 4" DIAMETER WHEELS

TROLLEY ASSEMBLY	BEAM FLANGE WIDTH (Inches)	DROP DOWN LUGS	WHEEL ASSEMBLY (4 PER TROLLEY)		SIDEPLATE (2 PER TROLLEY)	STUD (1 PER TROLLEY)	WASHER		NUT (2 PER TROLLEY)	COTTER PIN (2 PER TROLLEY)
			MATL (b)	ITEM 1			ITEM 2	ITEM 3		
62771-01	3 to 4-5/8	No	Gray Iron Dual Tread	62256-01	62766	62733-01	22	A210-04	26-22	PA2551
62771-05	4-3/4 to 6-1/4						35			
62771-02	6-3/8 to 8						33			
62771-03	3 to 4-5/8		Bronze Dual Tread	62256-02	62766	62733-01	22			
62771-06	4-3/4 to 6-1/4						35			
62771-04	6-3/8 to 8						33			
62771-07	3 to 4-5/8	Yes	Gray Iron Dual Tread	62256-01	62766-01	62733-01	22			
62771-08	4-3/4 to 6-1/4						35			
62771-09	6-3/8 to 8		Bronze Dual Tread	62256-02	62766-01	62733-01	22			
62771-10	3 to 4-5/8						35			
62771-11	4-3/4 to 6-1/4						33			
62771-12	6-3/8 to 8	No	Steel Flat	70668-01	62766	62733-01	22			
62771-13	3 to 4-1/8 (a)							Bronze Flat	70668-02	
62771-14	3 to 4-1/8 (a)		Steel Flat	70668-01						
62771-15	3 to 4-1/8 (a)				Bronze Flat			70668-02		
62771-16	3 to 4-1/8 (a)	Yes	62766-01							

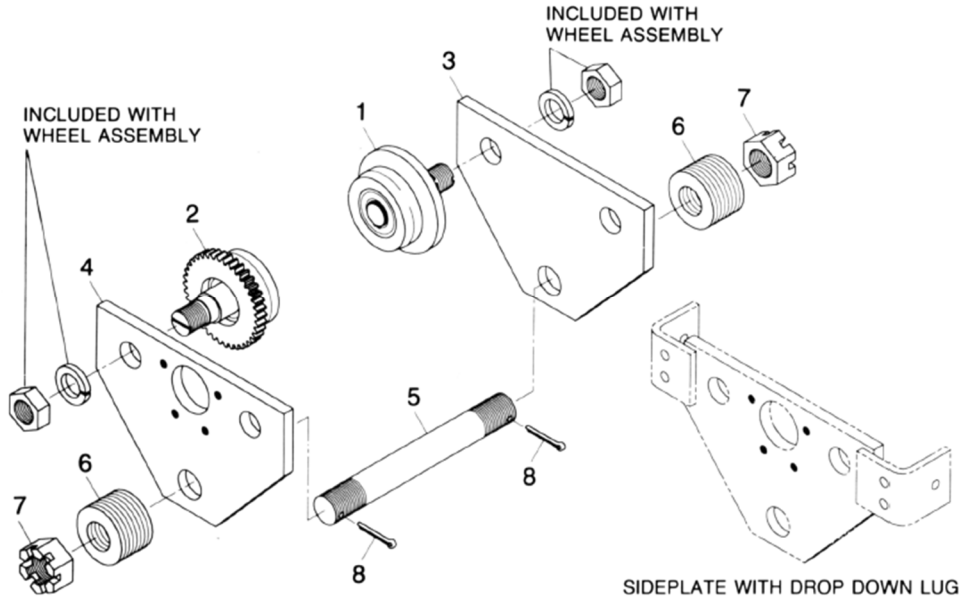
No Recommended Spare Parts

NOTE:

- (a) For operation on patented monorail track.
- (b) Standard wheels for 1 ton 2PS hoists are Gray Iron Dual Tread.

PARTS LIST - PRODUCT SERIES 31

4-WHEEL GEARED TROLLEY ASSEMBLY 4 IN. DIAMETER WHEEL NON-SWIVELING - ONE MOUNTING STUD FOR 1-TON 2PS HOISTS



TROLLEY PARTS - 4" DIAMETER WHEELS

TROLLEY ASSEMBLY	BEAM FLANGE WIDTH (Inches)	DROP DOWN LUGS	WHEEL ASSEMBLY (2 PER TROLLEY)			SIDEPLATE (1 PER TROLLEY)	SIDEPLATE (1 PER TROLLEY)	STUD (1 PER TROLLEY)	WASHER		NUT (2 PER TROLLEY)	COTTER PIN (2 PER TROLLEY)								
			MATL (b)	PLAIN ITEM 1	GEARED ITEM 2	ITEM 3	ITEM 4	ITEM 5	QTY/TRLY	ITEM 6	ITEM 7	ITEM 8								
62772-01	3 to 4-5/8	No	Gray Iron Dual Tread	62256-01	62259-01	62766	62768	62733-01	22	A210-04	26-22	PA2551								
62772-05	4-3/4 to 6-1/4												62733-02	35						
62772-02	6-3/8 to 8														62733-03	33				
62772-03	3 to 4-5/8																62733-01	22		
62772-06	4-3/4 to 6-1/4																		62733-02	35
62772-04	6-3/8 to 8																			
62772-07	3 to 4-5/8	Gray Iron Dual Tread	62256-01	62259-01	62766-01	62768-01	62733-01	22	A210-04	26-22	PA2551									
62772-08	4-3/4 to 6-1/4											62733-02	35							
62772-09	6-3/8 to 8													62733-03	33					
62772-10	3 to 4-5/8															62733-01	22			
62772-11	4-3/4 to 6-1/4																	62733-02	35	
62772-12	6-3/8 to 8																			62733-03
62772-13	3 to 4-1/8 (a)	Steel Flat	70668-01	70669-01	62766	62768	62733-01	22	A210-04	26-22	PA2551									
62772-14	3 to 4-1/8 (a)											Bronze Flat	70668-02							
62772-15	3 to 4-1/8 (a)	Yes	Steel Flat	70668-01	70669-01	62766-01	62768-01	62733-01	22	A210-04	26-22	PA2551								
62772-16	3 to 4-1/8 (a)		Bronze Flat	70668-02	70669-02															

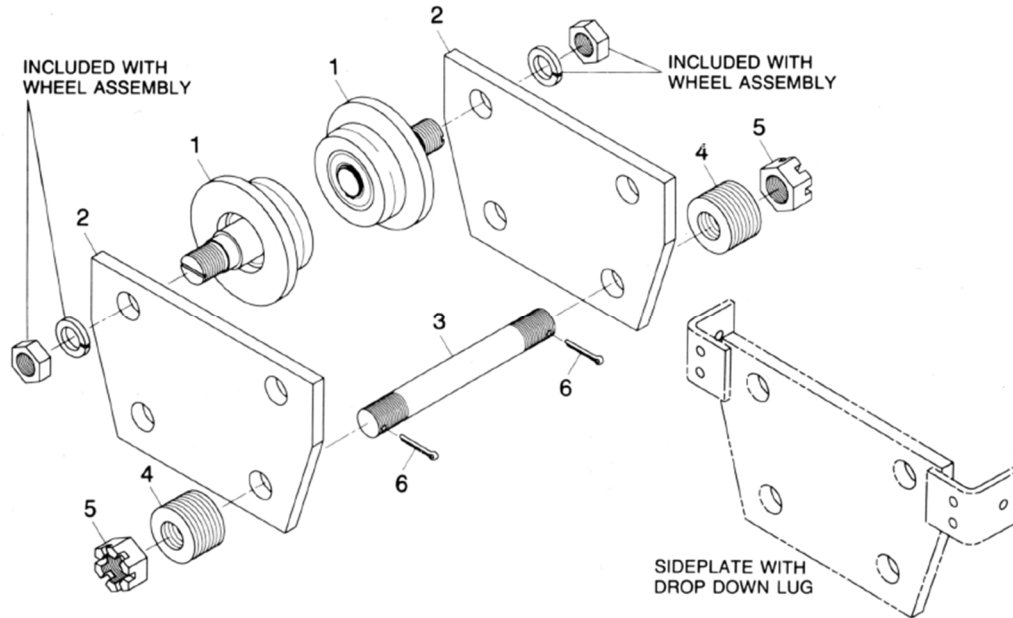
No Recommended Spare Parts

NOTE:

- (a) For operation on patented monorail track.
- (b) Standard wheels for 1 ton 2PS hoists are Gray Iron Dual Tread.

PARTS LIST - PRODUCT SERIES 31

4-WHEEL PLAIN TROLLEY ASSEMBLY 4 IN. DIAMETER WHEEL NON-SWIVELING – TWO MOUNTING STUDS FOR 1-TON 2PS HOISTS



TROLLEY PARTS - 4" DIAMETER WHEELS

TROLLEY ASSEMBLY	BEAM FLANGE WIDTH (Inches)	DROP DOWN LUGS	WHEEL ASSEMBLY (4 PER TROLLEY)		SIDEPLATE (2 PER TROLLEY)	STUD (2 PER TROLLEY)	WASHER		NUT (4 PER TROLLEY)	COTTER PIN (4 PER TROLLEY)							
			MATL (b)	ITEM 1	ITEM 2	ITEM 3	QTY/TRL Y	ITEM 4	ITEM 5	ITEM 6							
61794-01	3 to 4-5/8	No	Gray Iron Dual Tread	62256-01	61783	62241-01	44	PA5243	26-14	PA1144							
61794-06	4-3/4 to 6-1/4										62241-02	70					
61794-02	6-3/8 to 8												62241-03	66			
61794-03	3 to 4-5/8										Bronze Dual Tread	62256-02			61783	62241-01	44
61794-07	4-3/4 to 6-1/4												62241-02	70			
61794-04	6-3/8 to 8																
61794-08	3 to 4-5/8	Yes	Gray Iron Dual Tread	62256-01	61783-01	62241-01	44	PA5243	26-14	PA1144							
61794-09	4-3/4 to 6-1/4										62241-02	70					
61794-10	6-3/8 to 8												62241-03	66			
61794-11	3 to 4-5/8										Bronze Dual Tread	62256-02			61783-01	62241-01	44
61794-12	4-3/4 to 6-1/4												62241-02	70			
61794-13	6-3/8 to 8																
61794-14	3 to 4-1/8 (a)	No	Steel Flat	70668-01	61783	62241-01	44										
61794-15	3 to 4-1/8 (a)		Bronze Flat	70668-02													
61794-16	3 to 4-1/8 (a)	Yes	Steel Flat	70668-01	61783-01	62241-01	44										
61794-17	3 to 4-1/8 (a)		Bronze Flat	70668-02													

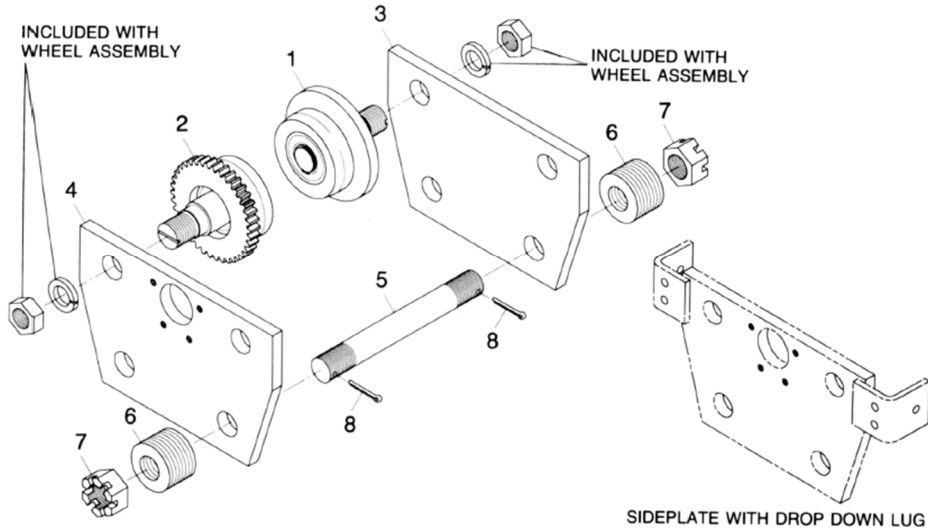
No Recommended Spare Parts

NOTE:

- (a) For operation on patented monorail track.
- (b) Standard wheels for 1 ton 2PS hoists are Gray Iron Dual Tread.

PARTS LIST - PRODUCT SERIES 31

4-WHEEL GEARED TROLLEY ASSEMBLY 4 IN. DIAMETER WHEEL NON-SWIVELING - TWO MOUNTING STUDS FOR 1-TON 2PS HOISTS



TROLLEY PARTS - 4" DIAMETER WHEELS

TROLLEY ASSEMBLY	BEAM FLANGE WIDTH (Inches)	DROP DOWN LUGS	WHEEL ASSEMBLY (2 PER TROLLEY)			SIDEPLATE (1 PER TROLLEY)	SIDEPLATE (1 PER TROLLEY)	STUD (2 PER TROLLEY)	WASHER		NUT (4 PER TROLLEY)	COTTER PIN (4 PER TROLLEY)
			MATL (b)	PLAIN ITEM 1	GEARED ITEM 2	ITEM 3	ITEM 4	ITEM 5	QTY/TRLY	ITEM 6	ITEM 7	ITEM 8
61795-01	3 to 4-5/8	No	Gray Iron Dual Tread	62256-01	62259-01	61783	61784	62241-01	44	PA5243	26-14	PA1144
61795-06	4-3/4 to 6-1/4					62241-02	70					
61795-02	6-3/8 to 8					61788	61792	62241-03	66			
61795-03	3 to 4-5/8		Bronze Dual Tread	62256-02	62259-02	61783	61784	62241-01	44			
61795-07	4-3/4 to 6-1/4					62241-02	70					
61795-04	6-3/8 to 8					61788	61792	62241-03	66			
61795-08	3 to 4-5/8	Yes	Gray Iron Dual Tread	62256-01	62259-01	61783-01	61784-01	62241-01	44			
61795-09	4-3/4 to 6-1/4					61788-01	61792-01	62241-02	70			
61795-10	6-3/8 to 8					61783-01	61784-01	62241-03	66			
61795-11	3 to 4-5/8		Bronze Dual Tread	62256-02	62259-02	61783-01	61784-01	62241-01	44			
61795-12	4-3/4 to 6-1/4					62241-02	70					
61795-13	6-3/8 to 8					61788-01	61792-01	62241-03	66			
61795-14	3 to 4-1/8 (a)	No	Steel Flat	70668-01	70669-01	61783	61784	62241-01	44			
61795-15	3 to 4-1/8 (a)		Bronze Flat	70668-02	70669-02							
61795-16	3 to 4-1/8 (a)	Yes	Steel Flat	70668-01	70669-01	61783-01	61784-01					
61795-17	3 to 4-1/8 (a)		Bronze Flat	70668-02	70669-02							

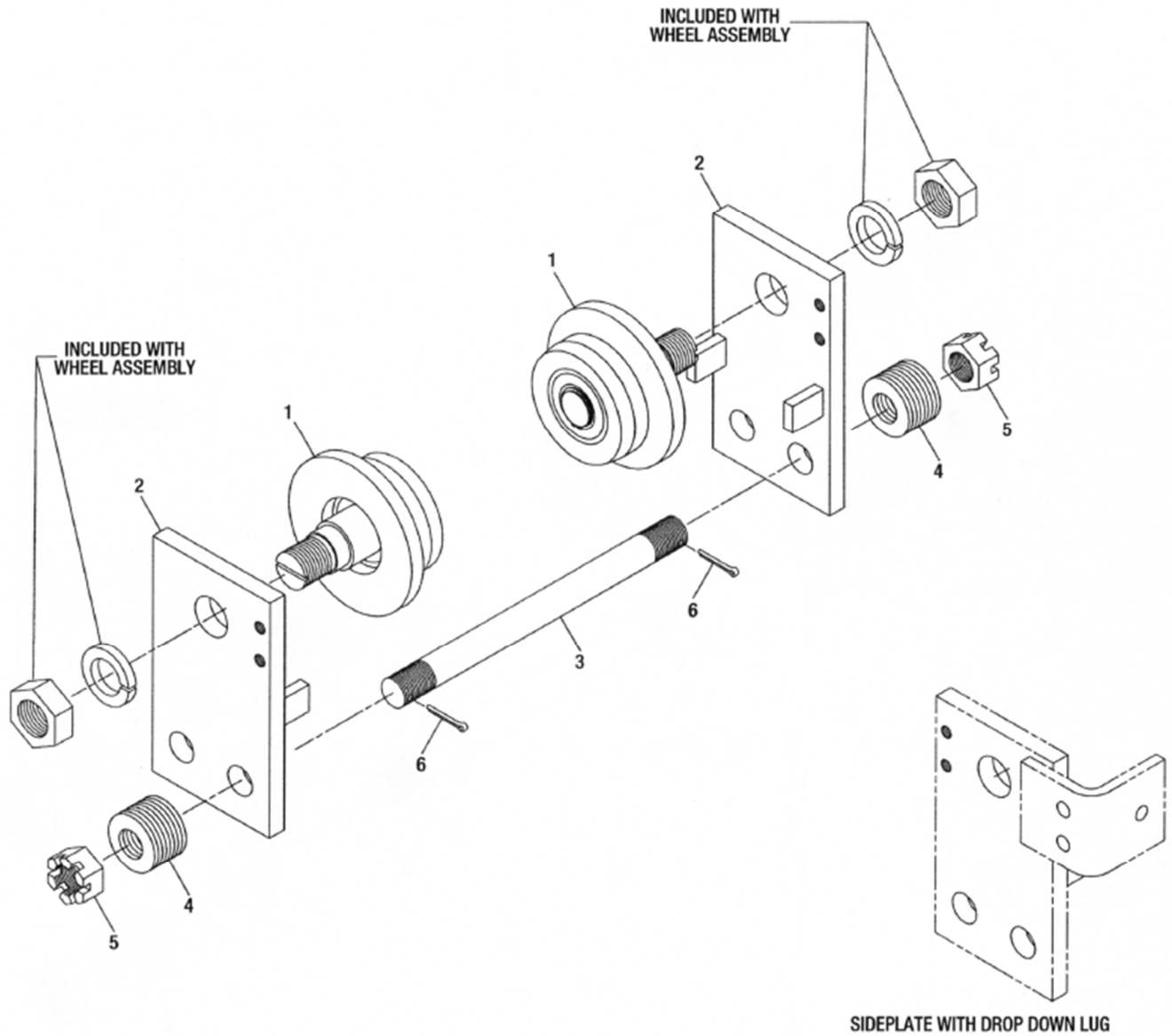
No Recommended Spare Parts

NOTE:

- (a) For operation on patented monorail track.
- (b) Standard wheels for 1 ton 2PS hoists are Gray Iron Dual Tread.

PARTS LIST - PRODUCT SERIES 31

2-WHEEL PLAIN TROLLEY ASSEMBLY 4 IN. DIAMETER WHEEL NON-SWIVELING - TWO MOUNTING STUDS FOR 1-TON 2PD AND ALL 2 THROUGH 5 TON HOISTS



PARTS LIST - PRODUCT SERIES 31

2-WHEEL PLAIN TROLLEY ASSEMBLY 4 IN. DIAMETER WHEEL NON-SWIVELING - TWO MOUNTING STUDS FOR 1-TON 2PD AND ALL 2 THROUGH 5 TON HOISTS

TROLLEY PARTS - 4" DIAMETER WHEELS

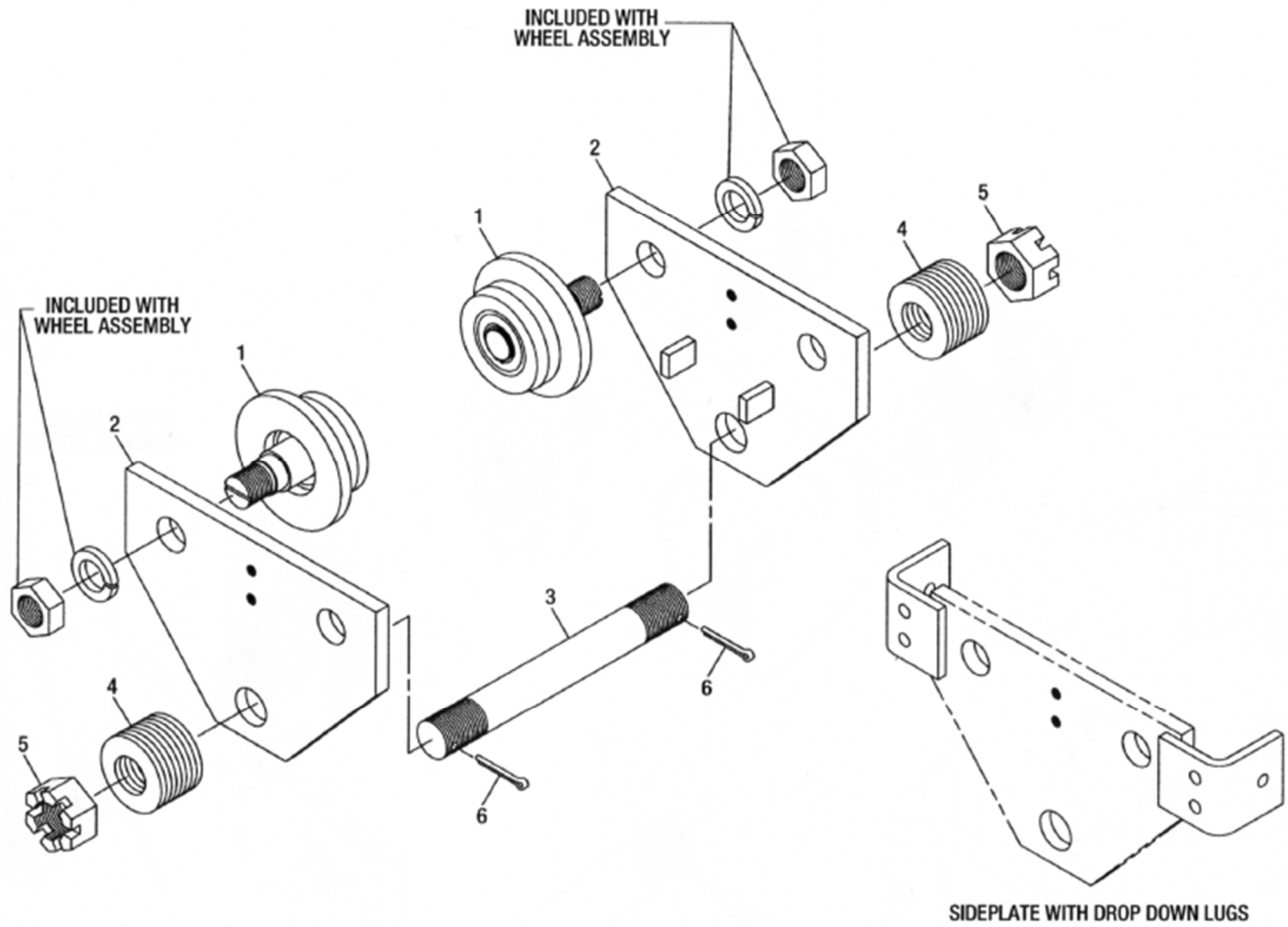
TROLLEY ASSEMBLY	BEAM FLANGE WIDTH (Inches)	DROP DOWN LUGS	WHEEL ASSEMBLY (2 PER TROLLEY)		SIDEPLATE (1 PER TROLLEY)	SIDEPLATE (1 PER TROLLEY)	STUD (2 PER TROLLEY)	WASHER		NUT (4 PER TROLLEY)	COTTER PIN (4 PER TROLLEY)
			MATL (b)	ITEM 1	ITEM 2	ITEM 2	ITEM 3	QTY/TRLY	ITEM 4	ITEM 5	ITEM 6
69824-01	3-1/4 to 5	No	Steel Dual Tread	69810-01	69818-01	69818-01	69812-01	32	15-16-1C	26-16	PA1501
69824-02	5-1/8 to 8				69812-02	76					
69824-03	8-1/8 to 10-1/2				69821-01	69821-01	69812-03	40			
69824-23	10-5/8 to 12-1/2				69821-04	69821-04	69812-04				
69824-24	12-5/8 to 14				69821-07	69821-07	69812-05				
69824-04	3-1/4 to 5		Bronze Dual Tread	69810-02	69818-01	69818-01	69812-01	32			
69824-05	5-1/8 to 8				69812-02	76					
69824-06	8-1/8 to 10-1/2				69821-01	69821-01	69812-03	40			
69824-25	10-5/8 to 12-1/2				69821-04	69821-04	69812-04				
69824-26	12-5/8 to 14				69821-07	69821-07	69812-05				
69824-17	3-1/4 to 5		Gray Iron Dual Tread	69810-03	69818-01	69818-01	69812-01	32			
69824-18	5-1/8 to 8				69812-02	76					
69824-19	8-1/8 to 10-1/2				69821-01	69821-01	69812-03	40			
69824-27	10-5/8 to 12-1/2				69821-04	69821-04	69812-04				
69824-28	12-5/8 to 14	69821-07			69821-07	69812-05					
69824-07	3-1/4 to 5	Yes	Steel Dual Tread	69810-01	69818-02	69818-03	69812-01	32			
69824-08	5-1/8 to 8				69812-02	76					
69824-09	8-1/8 to 10-1/2				69821-02	69821-03	69812-03	40			
69824-29	10-5/8 to 12-1/2				69821-05	69821-06	69812-04				
69824-30	12-5/8 to 14				69821-08	69821-09	69812-05				
69824-10	3-1/4 to 5		Bronze Dual Tread	69810-02	69818-02	69818-03	69812-01	32			
69824-11	5-1/8 to 8				69812-02	76					
69824-12	8-1/8 to 10-1/2				69821-02	69821-03	69812-03	40			
69824-31	10-5/8 to 12-1/2				69821-05	69821-06	69812-04				
69824-32	12-5/8 to 14				69821-08	69821-09	69812-05				
69824-20	3-1/4 to 5	Gray Iron Dual Tread	69810-03	69818-02	69818-03	69812-01	32				
69824-21	5-1/8 to 8			69812-02	76						
69824-22	8-1/8 to 10-1/2			69821-02	69821-03	69812-03	40				
69824-33	10-5/8 to 12-1/2			69821-05	69821-06	69812-04					
69824-34	12-5/8 to 14			69821-08	69821-09	69812-05					
69824-13	3-1/4 to 5 (a)	No	Steel Flat	69888-01	69818-01	69818-01	69812-01	32			
69824-14	3-1/4 to 5 (a)		Bronze Flat	69888-02							
69824-15	3-1/4 to 5 (a)	Yes	Steel Flat	69888-01	69818-02	69818-03	69812-01	32			
69824-16	3-1/4 to 5 (a)		Bronze Flat	69888-02							

No Recommended Spare Parts

NOTE:

- (a) For operation on patented monorail track.
- (b) Standard wheels for 1 ton 2PD and 2 ton hoists are Cast Gray Iron Dual Tread. Standard wheels for 3 through 5 ton hoists are Forged Steel Dual Tread.

**4-WHEEL PLAIN TROLLEY ASSEMBLY
4 IN. DIAMETER WHEEL
NON-SWIVELING - ONE MOUNTING STUD
FOR 1-TON 2PD AND ALL 2 THROUGH 5 TON HOISTS**



PARTS LIST - PRODUCT SERIES 31

4-WHEEL PLAIN TROLLEY ASSEMBLY 4 IN. DIAMETER WHEEL NON-SWIVELING - ONE MOUNTING STUD FOR 1-TON 2PD AND ALL 2 THROUGH 5 TON HOISTS

TROLLEY PARTS - 4" DIAMETER WHEELS

TROLLEY ASSEMBLY	BEAM FLANGE WIDTH (Inches)	DROP DOWN LUGS	WHEEL ASSEMBLY (4 PER TROLLEY)		SIDEPLATE (2 PER TROLLEY)	STUD (1 PER TROLLEY)	WASHER		NUT (2 PER TROLLEY)	COTTER PIN (2 PER TROLLEY)
			MATL (b)	ITEM 1	ITEM 2	ITEM 3	QTY/TRLY	ITEM 4	ITEM 5	ITEM 6
69822-01	3-1/4 to 5	No	Steel Dual Tread	69810-01	69814-01	69767-01	15	PA6932	26-24	PA1355
69822-02	5-1/8 to 8					69767-02	34			
69822-03	8-1/8 to 10-1/2				69819-01	69767-03	19			
69822-23	10-5/8 to 12-1/2					69767-04				
69822-24	12-5/8 to 14					69767-05				
69822-04	3-1/4 to 5					69814-01				
69822-05	5-1/8 to 8		69767-02	34						
69822-06	8-1/8 to 10-1/2		Bronze Dual Tread	69810-02	69819-01	69767-03	19			
69822-25	10-5/8 to 12-1/2					69767-04				
69822-26	12-5/8 to 14				69767-05					
69822-17	3-1/4 to 5				Gray Iron Dual Tread	69810-03				
69822-18	5-1/8 to 8		69767-02	34						
69822-19	8-1/8 to 10-1/2		69819-01	69767-03			19			
69822-27	10-5/8 to 12-1/2			69767-04						
69822-28	12-5/8 to 14	69767-05								
69822-07	3-1/4 to 5	Yes	Steel Dual Tread	69810-01	69814-02	69767-01	15			
69822-08	5-1/8 to 8					69767-02	34			
69822-09	8-1/8 to 10-1/2				69819-02	69767-03	19			
69822-29	10-5/8 to 12-1/2					69767-04				
69822-30	12-5/8 to 14					69767-05				
69822-10	3-1/4 to 5					Bronze Dual Tread		69810-02	69814-02	69767-01
69822-11	5-1/8 to 8		69767-02	34						
69822-12	8-1/8 to 10-1/2		69819-02	69767-03	19					
69822-31	10-5/8 to 12-1/2			69767-04						
69822-32	12-5/8 to 14			69767-05						
69822-20	3-1/4 to 5		Gray Iron Dual Tread	69810-03	69814-02	69767-01	15			
69822-21	5-1/8 to 8					69767-02	34			
69822-22	8-1/8 to 10-1/2				69819-02	69767-03	19			
69822-33	10-5/8 to 12-1/2					69767-04				
69822-34	12-5/8 to 14	69767-05								
69822-13	3-1/4 to 5 (a)	Steel Flat				69888-01		69814-01	69767-01	15
69822-14	3-1/4 to 5 (a)	Bronze Flat	69888-02							
69822-15	3-1/4 to 5 (a)	Steel Flat	69888-01							
69822-16	3-1/4 to 5 (a)	Bronze Flat	69888-02	69814-02						

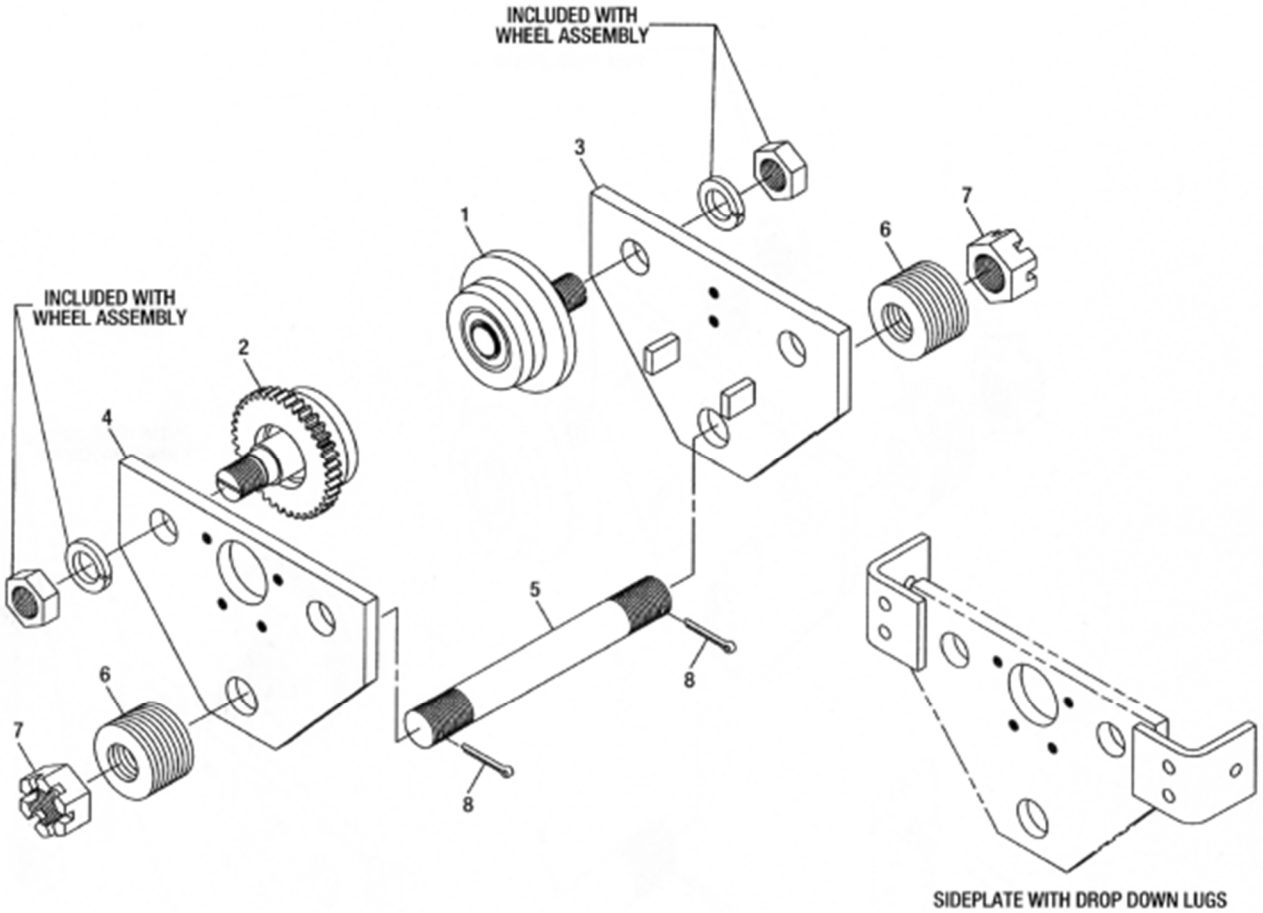
No Recommended Spare Parts

NOTE:

- (a) For operation on patented monorail track.
- (b) Standard wheels for 1 ton 2PD and 2 ton hoists are Cast Gray Iron Dual Tread.
Standard wheels for 3 through 5 ton hoists are Forged Steel Dual Tread.

PARTS LIST - PRODUCT SERIES 31

4-WHEEL GEARED TROLLEY ASSEMBLY 4 IN. DIAMETER WHEEL NON-SWIVELING - ONE MOUNTING STUD FOR 1-TON 2PD AND ALL 2 THROUGH 5 TON HOISTS



PARTS LIST - PRODUCT SERIES 31

4-WHEEL GEARED TROLLEY ASSEMBLY 4 IN. DIAMETER WHEEL NON-SWIVELING - ONE MOUNTING STUD FOR 1-TON 2PD AND ALL 2 THROUGH 5 TON HOISTS

TROLLEY PARTS - 4" DIAMETER WHEELS

TROLLEY ASSEMBLY	BEAM FLANGE WIDTH (Inches)	DROP DOWN LUGS	WHEEL ASSEMBLY (2 PER TROLLEY)			SIDEPLATE (1 PER TROLLEY)	SIDEPLATE (1 PER TROLLEY)	STUD (1 PER TROLLEY)	WASHER		NUT (2 PER TROLLEY)	COTTER PIN (2 PER TROLLEY)
			MATL (b)	PLAIN ITEM 1	GEARED ITEM 2	ITEM 3	ITEM 4	ITEM 5	QTY/TRLY	ITEM 6	ITEM 7	ITEM 8
69823-01	3-1/4 to 5	No	Steel Dual Tread	69810-01	69811-01	69814-01	69815-01	69767-01	15	PA6932	26-24	PA1355
69823-02	5-1/8 to 8					69767-02	34					
69823-03	8-1/8 to 10-1/2					69819-01	69820-01	69767-03	19			
69823-23	10-5/8 to 12-1/2					69819-03	69820-03	69767-04				
69823-24	12-5/8 to 14					69819-05	69820-05	69767-05				
69823-04	3-1/4 to 5		Bronze Dual Tread	69810-02	69811-02	69814-01	69815-01	69767-01	15			
69823-05	5-1/8 to 8					69767-02	34					
69823-06	8-1/8 to 10-1/2					69819-01	69820-01	69767-03	19			
69823-25	10-5/8 to 12-1/2					69819-03	69820-03	69767-04				
69823-26	12-5/8 to 14					69819-05	69820-05	69767-05				
69823-17	3-1/4 to 5		Gray Iron Dual Tread	69810-03	69811-03	69814-01	69815-01	69767-01	15			
69823-18	5-1/8 to 8					69767-02	34					
69823-19	8-1/8 to 10-1/2					69819-01	69820-01	69767-03	19			
69823-27	10-5/8 to 12-1/2					69819-03	69820-03	69767-04				
69823-28	12-5/8 to 14	69819-05				69820-05	69767-05					
69823-07	3-1/4 to 5	Yes	Steel Dual Tread	69810-01	69811-01	69814-02	69815-02	69767-01	15			
69823-08	5-1/8 to 8					69767-02	34					
69823-09	8-1/8 to 10-1/2					69819-02	69820-02	69767-03	19			
69823-29	10-5/8 to 12-1/2					69819-04	69820-04	69767-04				
69823-30	12-5/8 to 14					69819-06	69820-06	69767-05				
69823-10	3-1/4 to 5		Bronze Dual Tread	69810-02	69811-02	69814-02	69815-02	69767-01	15			
69823-11	5-1/8 to 8					69767-02	34					
69823-12	8-1/8 to 10-1/2					69819-02	69820-02	69767-03	19			
69823-31	10-5/8 to 12-1/2					69819-04	69820-04	69767-04				
69823-32	12-5/8 to 14					69819-06	69820-06	69767-05				
69823-20	3-1/4 to 5		Gray Iron Dual Tread	69810-03	69811-03	69814-02	69815-02	69767-01	15			
69823-21	5-1/8 to 8					69767-02	34					
69823-22	8-1/8 to 10-1/2					69819-02	69820-02	69767-03	19			
69823-33	10-5/8 to 12-1/2					69819-04	69820-04	69767-04				
69823-34	12-5/8 to 14	69819-06				69820-06	69767-05					
69823-13	3-1/4 to 5 (a)	No	Steel Flat	69888-01	69889-01	69814-01	69815-01	69767-01	15			
69823-14	3-1/4 to 5 (a)		Bronze Flat	69888-02	69889-02							
69823-15	3-1/4 to 5 (a)	Yes	Steel Flat	69888-01	69889-01	69814-02	69815-02					
69823-16	3-1/4 to 5 (a)			Bronze Flat	69888-02					69889-02		

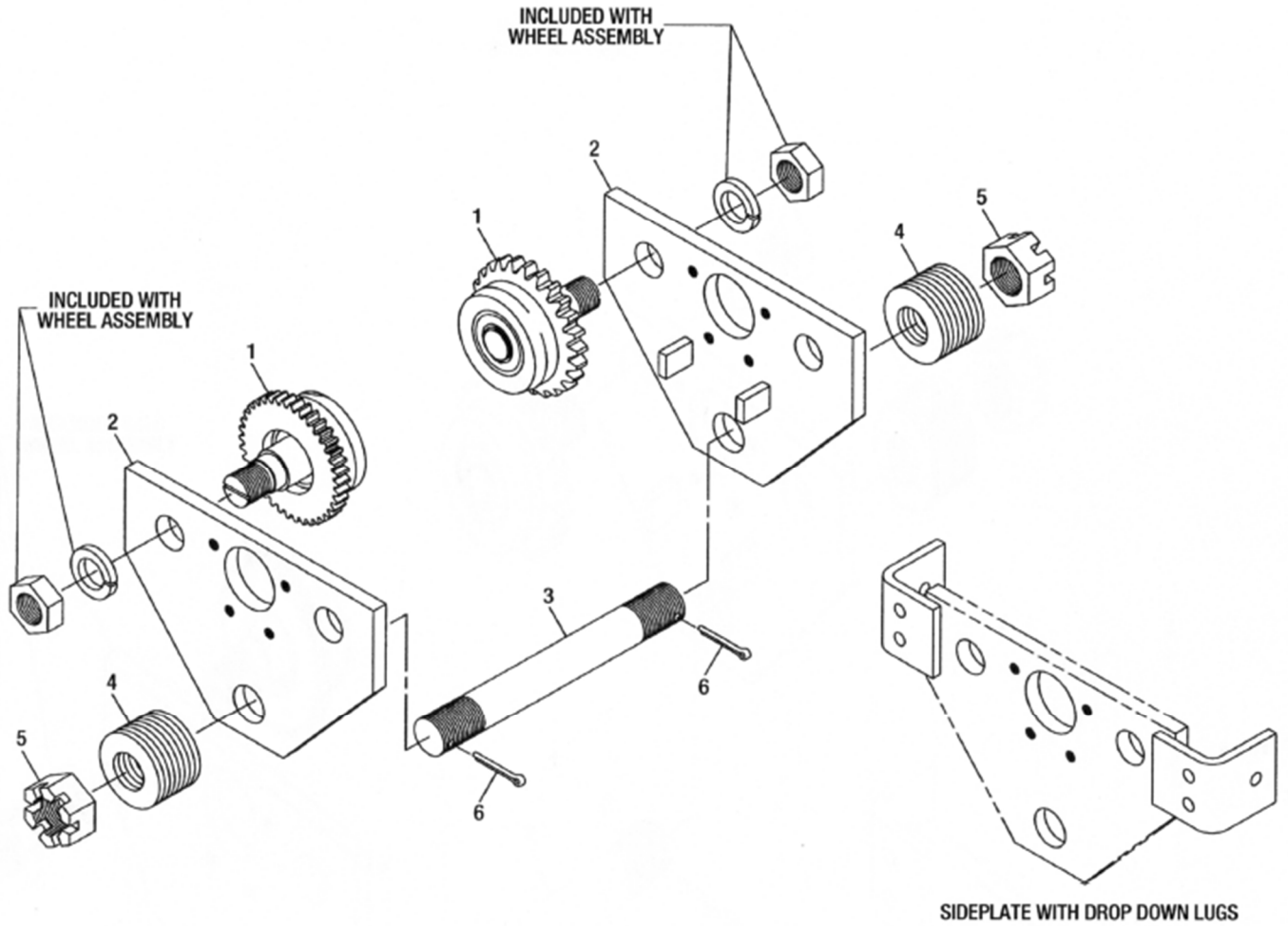
No Recommended Spare Parts

NOTE:

- (a) For operation on patented monorail track.
- (b) Standard wheels for 1 ton 2PD and 2 ton hoists are Cast Gray Iron Dual Tread.
Standard wheels for 3 through 5 ton hoists are Forged Steel Dual Tread.

PARTS LIST - PRODUCT SERIES 31

4 WHEEL GEARED TROLLEY ASSEMBLY DUAL DRIVE 4 IN. DIAMETER WHEEL - NON-SWIVELING - ONE MOUNTING STUD FOR 1-TON 2PD AND ALL 2 THROUGH 5 TON HOISTS



PARTS LIST - PRODUCT SERIES 31

4 WHEEL GEARED TROLLEY ASSEMBLY DUAL DRIVE 4 IN. DIAMETER WHEEL - NON-SWIVELING - ONE MOUNTING STUD FOR 1-TON 2PD AND ALL 2 THROUGH 5 TON HOISTS

TROLLEY PARTS - 4" DIAMETER WHEELS

TROLLEY ASSEMBLY	BEAM FLANGE WIDTH (Inches)	DROP DOWN LUGS	WHEEL ASSEMBLY (4 PER TROLLEY)		SIDEPLATE (2 PER TROLLEY)	STUD (1 PER TROLLEY)	WASHER		NUT (2 PER TROLLEY)	COTTER PIN (2 PER TROLLEY)
			MATL (b)	ITEM 1			ITEM 2	ITEM 3		
70866-01	3-1/4 to 5	No	Steel Dual Tread	69811-01	69815-01	69767-01	15	PA6932	26-24	PA1355
70866-02	5-1/8 to 8					69767-02	34			
70866-03	8-1/8 to 10-1/2				69820-01	69767-03	19			
70866-23	10-5/8 to 12-1/2				69820-03	69767-04				
70866-24	12-5/8 to 14		69820-05	69767-05						
70866-04	3-1/4 to 5		Bronze Dual Tread	69811-02	69815-01	69767-01	15			
70866-05	5-1/8 to 8					69767-02	34			
70866-06	8-1/8 to 10-1/2				69820-01	69767-03	19			
70866-25	10-5/8 to 12-1/2				69820-03	69767-04				
70866-26	12-5/8 to 14		69820-05	69767-05						
70866-17	3-1/4 to 5		Gray Iron Dual Tread	69811-03	69815-01	69767-01	15			
70866-18	5-1/8 to 8					69767-02	34			
70866-19	8-1/8 to 10-1/2				69820-01	69767-03	19			
70866-27	10-5/8 to 12-1/2				69820-03	69767-04				
70866-28	12-5/8 to 14		69820-05	69767-05						
70866-07	3-1/4 to 5		Yes	Steel Dual Tread	69811-01	69815-02	69767-01			
70866-08	5-1/8 to 8	69767-02					34			
70866-09	8-1/8 to 10-1/2	69820-02				69767-03	19			
70866-29	10-5/8 to 12-1/2	69820-04				69767-04				
70866-30	12-5/8 to 14	69820-06		69767-05						
70866-10	3-1/4 to 5	Bronze Dual Tread		69811-02	69815-02	69767-01	15			
70866-11	5-1/8 to 8					69767-02	34			
70866-12	8-1/8 to 10-1/2				69820-02	69767-03	19			
70866-31	10-5/8 to 12-1/2				69820-04	69767-04				
70866-32	12-5/8 to 14	69820-06		69767-05						
70866-20	3-1/4 to 5	Gray Iron Dual Tread		69811-03	69815-02	69767-01	15			
70866-21	5-1/8 to 8					69767-02	34			
70866-22	8-1/8 to 10-1/2				69820-02	69767-03	19			
70866-33	10-5/8 to 12-1/2				69820-04	69767-04				
70866-34	12-5/8 to 14	69820-06		69767-05						
70866-13	3-1/4 to 5 (a)	No		Steel Flat	69889-01	69815-01	69767-01	15		
70866-14	3-1/4 to 5 (a)		Bronze Flat	69889-02						
70866-15	3-1/4 to 5 (a)	Yes	Steel Flat	69889-01	69815-02					
70866-16	3-1/4 to 5 (a)		Bronze Flat	69889-02						

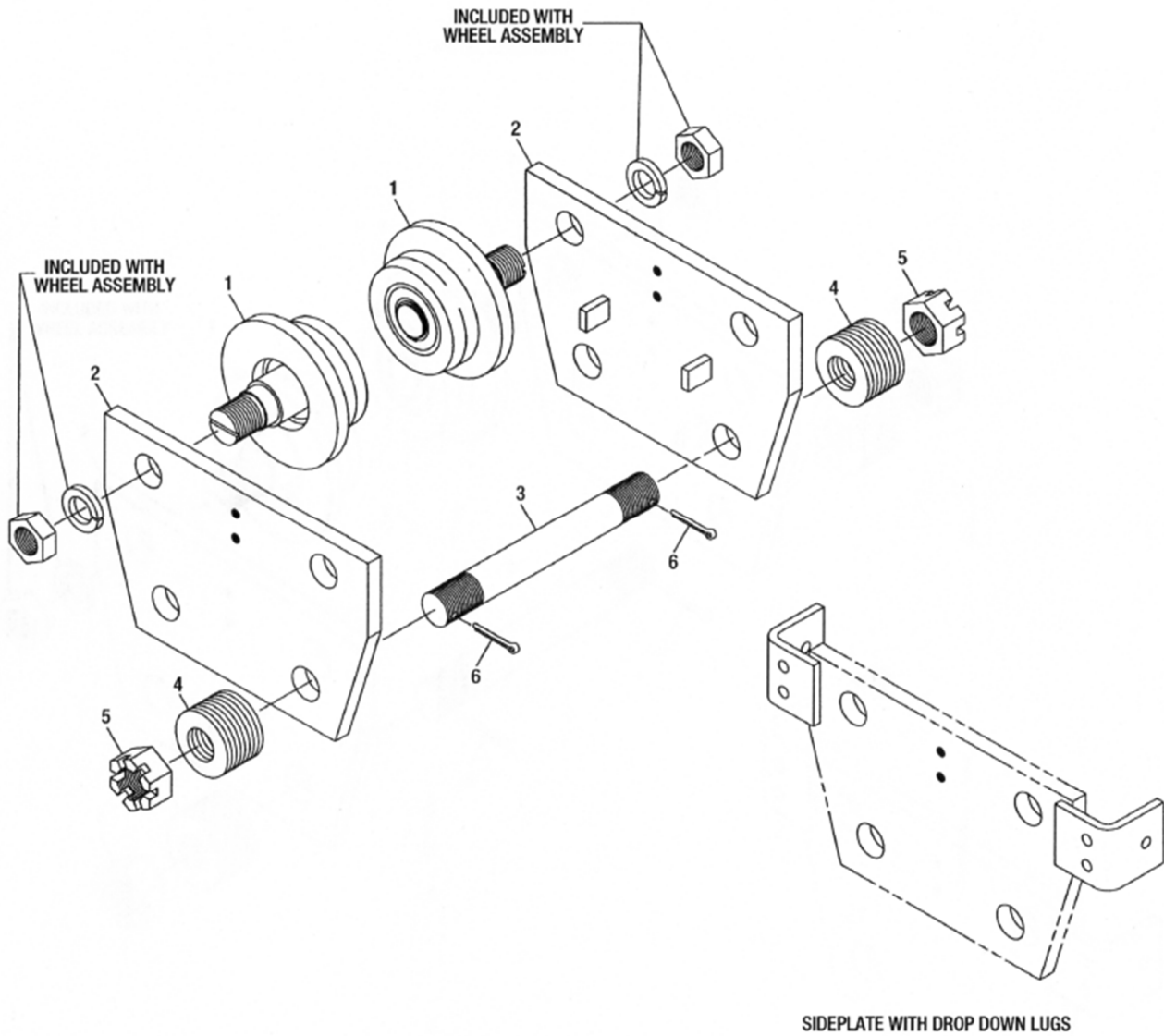
No Recommended Spare Parts

NOTE:

- (a) For operation on patented monorail track.
- (b) Standard wheels for 1 ton 2PD and 2 ton hoists are Cast Gray Iron Dual Tread.
Standard wheels for 3 through 5 ton hoists are Forged Steel Dual Tread.

PARTS LIST - PRODUCT SERIES 31

4-WHEEL PLAIN TROLLEY ASSEMBLY 4 IN. DIAMETER WHEEL NON-SWIVELING - TWO MOUNTING STUDS FOR 1-TON 2PD AND ALL 2 THROUGH 4 TON HOISTS



PARTS LIST - PRODUCT SERIES 31

4-WHEEL PLAIN TROLLEY ASSEMBLY 4 IN. DIAMETER WHEEL NON-SWIVELING - TWO MOUNTING STUDS FOR 1-TON 2PD AND ALL 2 THROUGH 4 TON HOISTS

TROLLEY PARTS - 4" DIAMETER WHEELS

TROLLEY ASSEMBLY	BEAM FLANGE WIDTH (Inches)	DROP DOWN LUGS	WHEEL ASSEMBLY (4 PER TROLLEY)		SIDEPLATE (2 PER TROLLEY)	STUD (2 PER TROLLEY)	WASHER		NUT (4 PER TROLLEY)	COTTER PIN (4 PER TROLLEY)
			MATL (b)	ITEM 1			ITEM 2	ITEM 3		
70583-01	3-1/4 to 5	No	Steel Dual Tread	69810-01	70578-01	69767-01	30	PA6932	26-24	PA1355
70583-02	5-1/8 to 8					69767-02	68			
70583-03	8-1/8 to 10-1/2				70580-01	69767-03	38			
70583-23	10-5/8 to 12-1/2				70580-03	69767-04				
70583-24	12-5/8 to 14		70580-05	69767-05						
70583-04	3-1/4 to 5		Bronze Dual Tread	69810-02	70578-01	69767-01	30			
70583-05	5-1/8 to 8					69767-02	68			
70583-06	8-1/8 to 10-1/2				70580-01	69767-03	38			
70583-25	10-5/8 to 12-1/2				70580-03	69767-04				
70583-26	12-5/8 to 14		70580-05	69767-05						
70583-17	3-1/4 to 5		Gray Iron Dual Tread	69810-03	70578-01	69767-01	30			
70583-18	5-1/8 to 8					69767-02	68			
70583-19	8-1/8 to 10-1/2				70580-01	69767-03	38			
70583-27	10-5/8 to 12-1/2				70580-03	69767-04				
70583-28	12-5/8 to 14		70580-05	69767-05						
70583-07	3-1/4 to 5		Yes	Steel Dual Tread	69810-01	70578-02	69767-01			
70583-08	5-1/8 to 8	69767-02					68			
70583-09	8-1/8 to 10-1/2	70580-02				69767-03	38			
70583-29	10-5/8 to 12-1/2	70580-04				69767-04				
70583-30	12-5/8 to 14	70580-06		69767-05						
70583-10	3-1/4 to 5	Bronze Dual Tread		69810-02	70578-02	69767-01	30			
70583-11	5-1/8 to 8					69767-02	68			
70583-12	8-1/8 to 10-1/2				70580-02	69767-03	38			
70583-31	10-5/8 to 12-1/2				70580-04	69767-04				
70583-32	12-5/8 to 14	70580-06		69767-05						
70583-20	3-1/4 to 5	Gray Iron Dual Tread		69810-03	70578-02	69767-01	30			
70583-21	5-1/8 to 8					69767-02	68			
70583-22	8-1/8 to 10-1/2				70580-02	69767-03	38			
70583-33	10-5/8 to 12-1/2				70580-04	69767-04				
70583-34	12-5/8 to 14	70580-06		69767-05						
70583-13	3-1/4 to 5 (a)	No		Steel Flat	69888-01	70578-01	69767-01	30		
70583-14	3-1/4 to 5 (a)		Bronze Flat	69888-02						
70583-15	3-1/4 to 5 (a)	Yes	Steel Flat	69888-01	70578-02					
70583-16	3-1/4 to 5 (a)		Bronze Flat	69888-02						

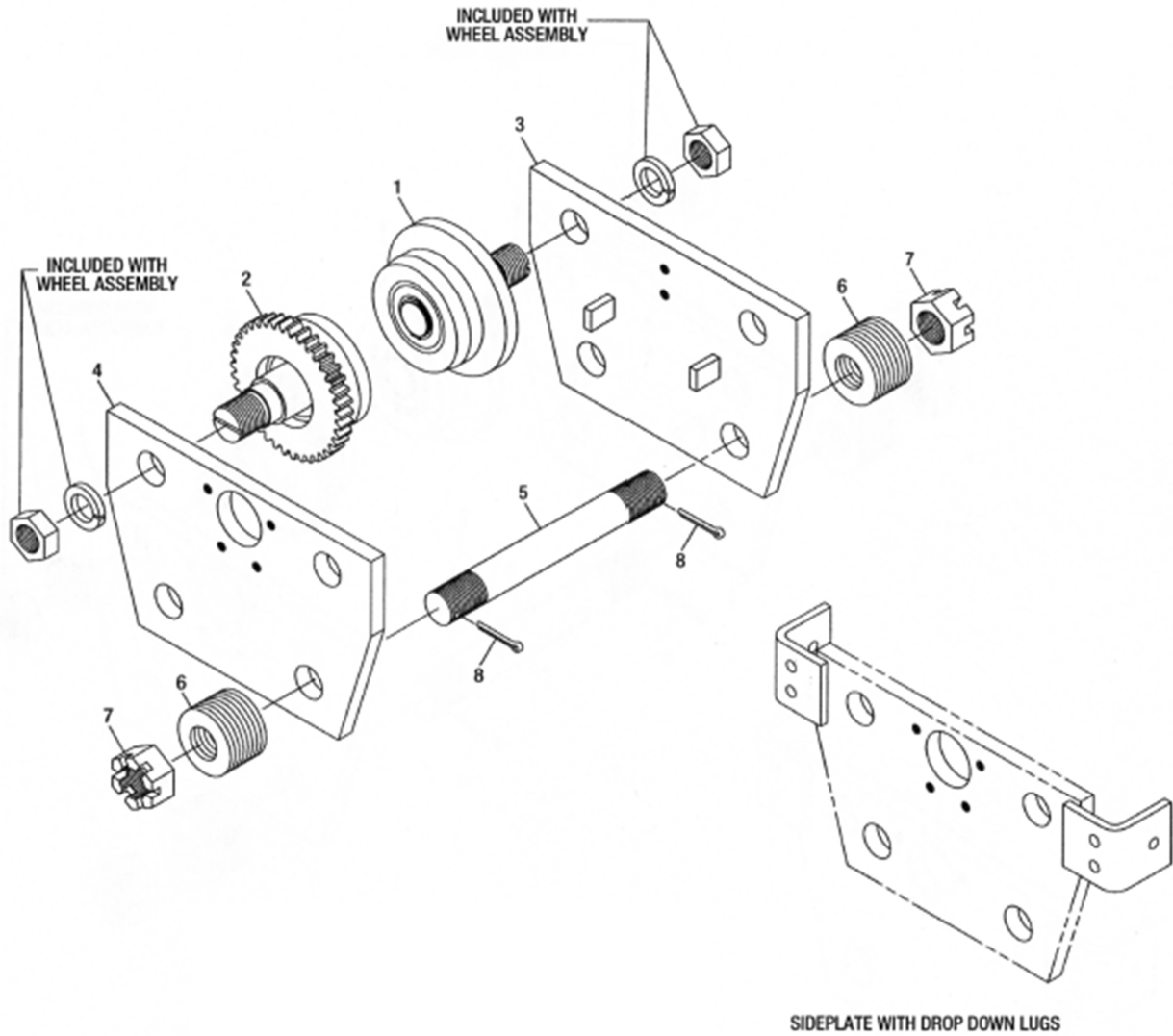
No Recommended Spare Parts

NOTE:

- (a) For operation on patented monorail track.
- (b) Standard wheels for 1 ton 2PD and 2 ton hoists are Cast Gray Iron Dual Tread.
Standard wheels for 3 and 4 ton hoists are Forged Steel Dual Tread.

PARTS LIST - PRODUCT SERIES 31

4-WHEEL GEARED TROLLEY ASSEMBLY 4 IN. DIAMETER WHEEL NON-SWIVELING - TWO MOUNTING STUDS FOR 1-TON 2PD AND ALL 2 THROUGH 4 TON HOISTS



PARTS LIST - PRODUCT SERIES 31

4-WHEEL GEARED TROLLEY ASSEMBLY 4 IN. DIAMETER WHEEL NON-SWIVELING - TWO MOUNTING STUDS FOR 1-TON 2PD AND ALL 2 THROUGH 4 TON HOISTS

TROLLEY PARTS - 4" DIAMETER WHEELS

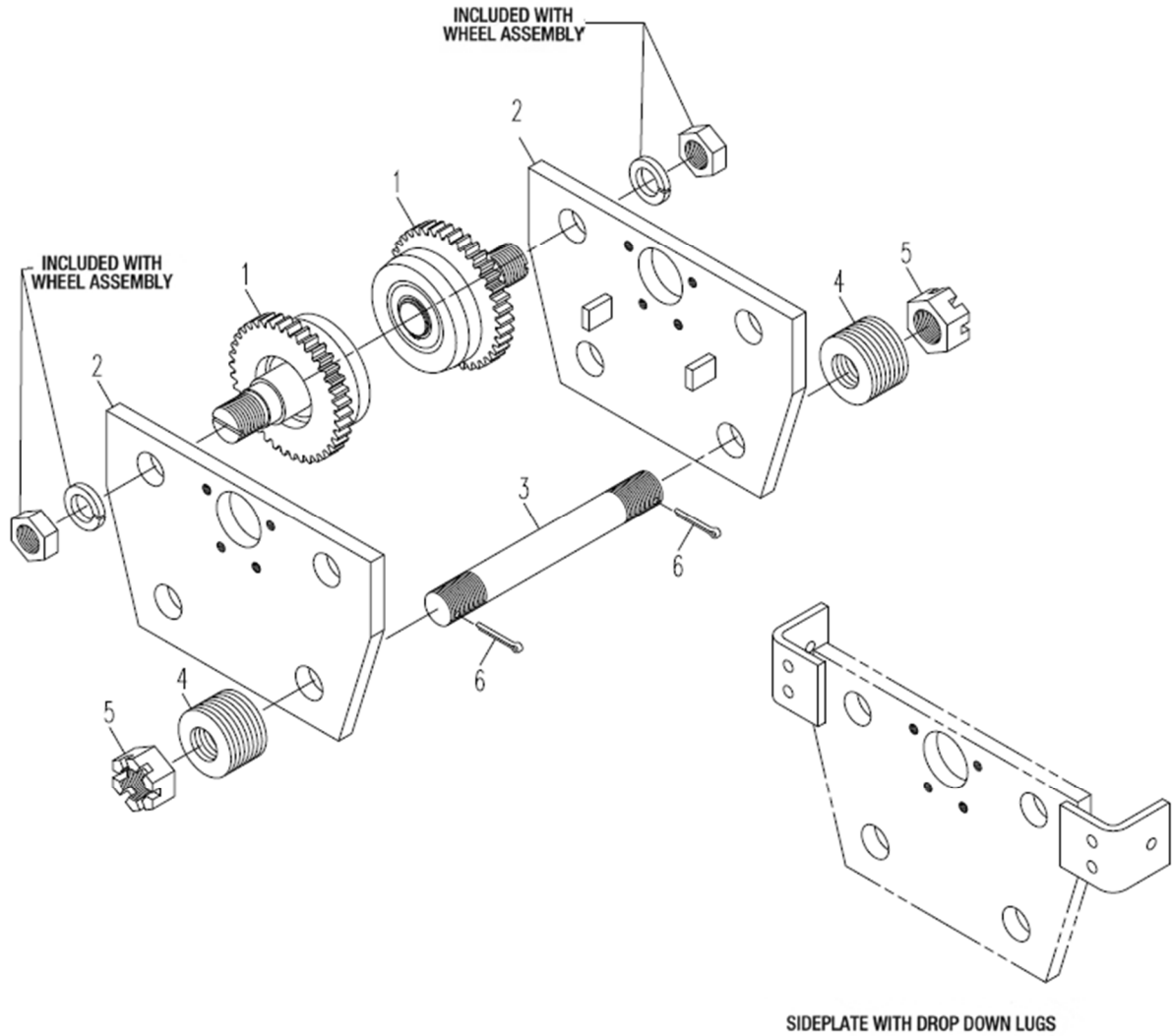
TROLLEY ASSEMBLY	BEAM FLANGE WIDTH (Inches)	DROP DOWN LUGS	WHEEL ASSEMBLY (2 PER TROLLEY)			SIDEPLATE (1 PER TROLLEY)	SIDEPLATE (1 PER TROLLEY)	STUD (2 PER TROLLEY)	WASHER		NUT (2 PER TROLLEY)	COTTER PIN (2 PER TROLLEY)	
			MATL (b)	PLAIN ITEM 1	GEARED ITEM 2	ITEM 3	ITEM 4	ITEM 5	QTY/TRLY	ITEM 6	ITEM 7	ITEM 8	
70584-01	3-1/4 to 5	No	Steel Dual Tread	69810-01	69811-01	70578-01	70579-01	69767-01	30	PA6932	26-24	PA1355	
70584-02	5-1/8 to 8							69767-02					68
70584-03	8-1/8 to 10-1/2							69767-03					38
70584-23	10-5/8 to 12-1/2							69767-04					
70584-24	12-5/8 to 14							69767-05					
70584-04	3-1/4 to 5		Bronze Dual Tread	69810-02	69811-02	70578-01	70579-01	69767-01	30				
70584-05	5-1/8 to 8							69767-02	68				
70584-06	8-1/8 to 10-1/2							69767-03	38				
70584-25	10-5/8 to 12-1/2							69767-04					
70584-26	12-5/8 to 14							69767-05					
70584-17	3-1/4 to 5		Gray Iron Dual Tread	69810-03	69811-03	70578-01	70579-01	69767-01	30				
70584-18	5-1/8 to 8							69767-02	68				
70584-19	8-1/8 to 10-1/2							69767-03	38				
70584-27	10-5/8 to 12-1/2							69767-04					
70584-28	12-5/8 to 14	69767-05											
70584-07	3-1/4 to 5	Yes	Steel Dual Tread	69810-01	69811-01	70578-02	70579-02	69767-01	30				
70584-08	5-1/8 to 8							69767-02	68				
70584-09	8-1/8 to 10-1/2							69767-03	38				
70584-29	10-5/8 to 12-1/2							69767-04					
70584-30	12-5/8 to 14							69767-05					
70584-10	3-1/4 to 5		Bronze Dual Tread	69810-02	69811-02	70578-02	70579-02	69767-01	30				
70584-11	5-1/8 to 8							69767-02	68				
70584-12	8-1/8 to 10-1/2							69767-03	38				
70584-31	10-5/8 to 12-1/2							69767-04					
70584-32	12-5/8 to 14							69767-05					
70584-20	3-1/4 to 5		Gray Iron Dual Tread	69810-03	69811-03	70578-02	70579-02	69767-01	30				
70584-21	5-1/8 to 8							69767-02	68				
70584-22	8-1/8 to 10-1/2							69767-03	38				
70584-33	10-5/8 to 12-1/2							69767-04					
70584-34	12-5/8 to 14	69767-05											
70584-13	3-1/4 to 5 (a)	No	Steel Flat	69888-01	69889-01	70578-01	70579-01	69767-01	30				
70584-14	3-1/4 to 5 (a)		Bronze Flat	69888-02	69889-02								
70584-15	3-1/4 to 5 (a)	Yes	Steel Flat	69888-01	69889-01	70578-02	70579-02						
70584-16	3-1/4 to 5 (a)			Bronze Flat	69888-02					69889-02			

No Recommended Spare Parts

NOTE:

- (a) For operation on patented monorail track.
- (b) Standard wheels for 1 ton 2PD and 2 ton hoists are Cast Gray Iron Dual Tread.
Standard wheels for 3 and 4 ton hoists are Forged Steel Dual Tread.

**4 WHEEL GEARED TROLLEY ASSEMBLY
DUAL DRIVE
4 IN. DIAMETER WHEEL- NON-SWIVELING -TWO MOUNTING STUDS
FOR 1-TON 2PD AND ALL 2 THROUGH 4 TON HOISTS**



PARTS LIST – PRODUCT SERIES 31

**4 WHEEL GEARED TROLLEY ASSEMBLY
DUAL DRIVE
4 IN. DIAMETER WHEEL – NON-SWIVELING – TWO MOUNTING STUDS
FOR 1-TON 2PD AND ALL 2 THROUGH 4 TON HOISTS**

TROLLEY PARTS – 4” DIAMETER WHEELS

TROLLEY ASSEMBLY	BEAM FLANGE WIDTH (Inches)	DROP DOWN LUGS	WHEEL ASSEMBLY (4 PER TROLLEY)		SIDEPLATE (2 PER TROLLEY)	STUD (2 PER TROLLEY)	WASHER		NUT (4 PER TROLLEY)	COTTER PIN (4 PER TROLLEY)
			MATL (b)	ITEM 1			ITEM 2	ITEM 3		
71953-01	3-1/4 to 5	No	Steel Dual Tread	69811-01	70579-01	69767-01	30	PA6932	26-24	PA1355
71953-02	5-1/8 to 8					69767-02	68			
71953-03	8-1/8 to 10-1/2				70581-01	69767-03	38			
71953-04	10-5/8 to 12-1/2				70581-03	69767-04				
71953-05	12-5/8 to 14				70581-05	69767-05				
71953-06	3-1/4 to 5		Bronze Dual Tread	69811-02	70579-01	69767-01	30			
71953-07	5-1/8 to 8					69767-02	68			
71953-08	8-1/8 to 10-1/2				70581-01	69767-03	38			
71953-09	10-5/8 to 12-1/2				70581-03	69767-04				
71953-10	12-5/8 to 14		70581-05	69767-05						
71953-11	3-1/4 to 5		Gray Iron Dual Tread	69811-03	70579-01	69767-01	30			
71953-12	5-1/8 to 8					69767-02	68			
71953-13	8-1/8 to 10-1/2				70581-01	69767-03	38			
71953-14	10-5/8 to 12-1/2				70581-03	69767-04				
71953-15	12-5/8 to 14				70581-05	69767-05				
71953-16	3-1/4 to 5	Steel Dual Tread	69811-01	70579-02	69767-01	30				
71953-17	5-1/8 to 8				69767-02	68				
71953-18	8-1/8 to 10-1/2			70581-02	69767-03	38				
71953-19	10-5/8 to 12-1/2			70581-04	69767-04					
71953-20	12-5/8 to 14			70581-06	69767-05					
71953-21	3-1/4 to 5	Bronze Dual Tread	69811-02	70579-02	69767-01	30				
70583-22	5-1/8 to 8				69767-02	68				
71953-23	8-1/8 to 10-1/2			70581-02	69767-03	38				
71953-24	10-5/8 to 12-1/2			70581-04	69767-04					
71953-25	12-5/8 to 14			70581-06	69767-05					
71953-26	3-1/4 to 5	Gray Iron Dual Tread	69811-03	70579-02	69767-01	30				
71953-27	5-1/8 to 8				69767-02	68				
71953-28	8-1/8 to 10-1/2			70581-02	69767-03	38				
71953-29	10-5/8 to 12-1/2			70581-04	69767-04					
71953-30	12-5/8 to 14			70581-06	69767-05					
71953-31	3-1/4 to 5 (a)	No	Steel Flat	69889-01	70579-01	69767-01	30			
71953-32	3-1/4 to 5 (a)		Bronze Flat	69889-02						
71953-33	3-1/4 to 5 (a)	Yes	Steel Flat	69889-01	70579-02					
71953-34	3-1/4 to 5 (a)		Bronze Flat	69889-02						

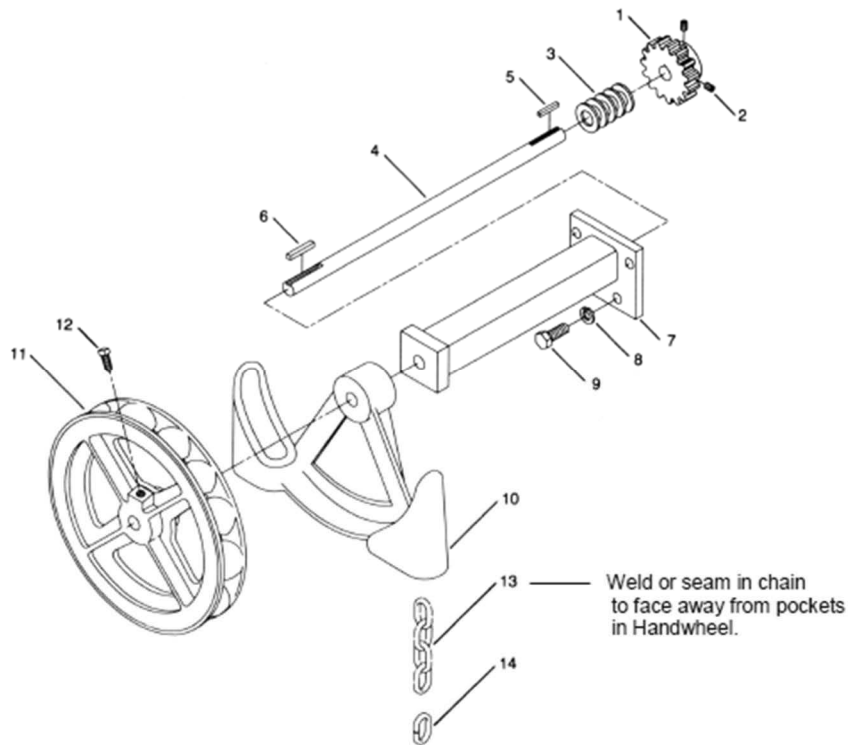
No Recommended Spare Parts

NOTE:

- (a) For operation on patented monorail track.
- (b) Standard wheels for 1 ton 2PD and 2 ton hoists are Cast Gray Iron Dual Tread. Standard wheels for 3 and 4 ton hoists are Forged Steel Dual Tread.

PARTS LIST - PRODUCT SERIES 31

HAND-GEARED TROLLEY DRIVE FOR 1-TON 2PS HOISTS



HAND-GEARED TROLLEY DRIVE PARTS

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	61782-02	Pinion 15T	1
2	12-4-4	Set Screw	1
3	15-12-1C	Washer	3
4	70658	Shaft	1
5	52674	Key 3/16 Sq. x 1-1/4	1
6	PA6956	Key 1/4 Sq. x 1-5/8	1
7	69803	Bearing	1

No Recommended Spare Parts

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
8	17-8C	Lockwasher 1/2	4
9	35-8-16C	Bolt 1/2 -13 x 1	4
10	B2143-1	Handchain Guide	1
11	B464-4	Handwheel	1
12	14-6-16	Set Screw	1
13	(a)	Handchain	1
14	(a)	Open Link	1

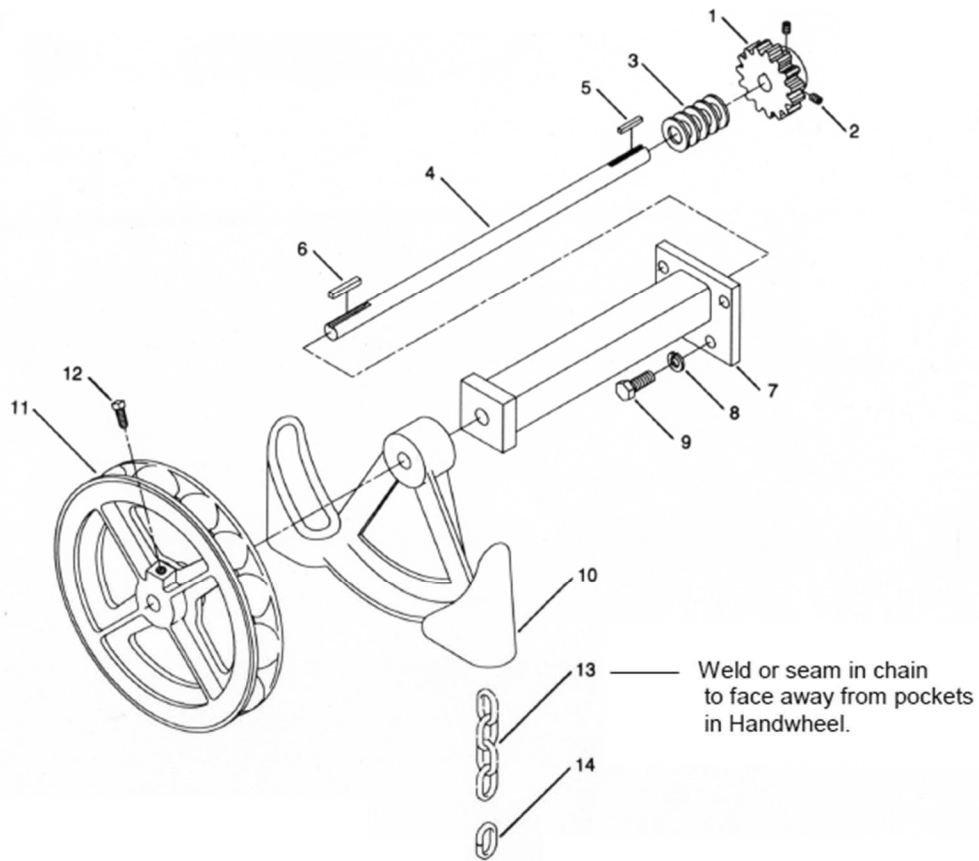
NOTES:

- (a) When ordering handchain, order Part Number (see below) and specify length.
- (b) Federal Specification QQ-Z-325, Type I, Class 3.
- (c) Federal Specification QQ-Z-325, Type I, Class 2.

TYPE OF TROLLEY	CHAIN MATERIAL	HANDCHAIN	OPEN LINK
Steel or Iron Wheels	Steel, Zinc Electro Plated (Acco Std) (b)	48158-1	60252-01
Steel or Iron Wheels	Steel, Zinc Electro Plated (c)	48158-11	60252-11
Bronze Wheels	Aluminum	48159-1	PA3985

PARTS LIST - PRODUCT SERIES

HAND-GEARED TROLLEY DRIVE FOR 1-TON 2PD AND ALL 2 THROUGH 5 TON HOISTS PARALLEL MOUNTED HOIST



HAND-GEARED TROLLEY DRIVE PARTS

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	69788	Pinion 15T	1
2	12-5-4	Set Screw 5/16-18x1/4	2
3	15-12-1C	Washer	5
4	69798	Shaft	1
5	52674	Key 3/16 Sq. x 1-1/4	1
6	PA6956	Key 1/4 Sq. x 1-5/8	1
7	69803	Bearing	1

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
8	17-8C	Lockwasher 1/2	4
9	35-8-20C	Bolt 1/2 -13 x 1-1/4	4
10	B2143-1	Handchain Guide	1
11	B464-4	Handwheel	1
12	14-6-16	Set Screw	1
13	(a)	Handchain	1
14	(a)	Open Link	1

No Recommended Spare Parts

NOTES:

- (a) When ordering handchain, order Part Number (see below) and specify length.
- (b) Federal Specification 00-2-325, Type I, Class 3.
- (c) Federal Specification 00-2-325, Type I, Class 2.

TYPE OF TROLLEY	CHAIN MATERIAL	HANDCHAIN	OPEN LINK
Steel or Iron Wheels	Steel, Zinc Electro Plated (Acco Std) (b)	48158-1	60252-01
Steel or Iron Wheels	Steel, Zinc Electro Plated (c)	48158-11	60252-11
Bronze Wheels	Aluminum	48159-1	PA3985

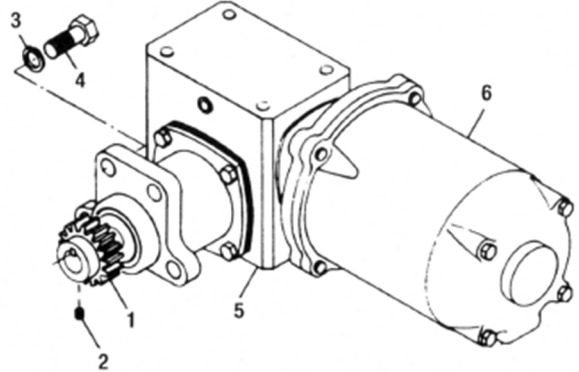
PARTS LIST – PRODUCT SERIES 31

MOTORIZED TROLLEY DRIVE FOR 1-TON 2PS MONORAIL TROLLEY HOISTS

MOTORIZED TROLLEY DRIVE PARTS

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	61782-01	Pinion (15 teeth)	1
2	12-4-4C	Set Screw	1
3	17-8C	Lockwasher	4
4	35-8-16C	Hex Head Bolt	4
5	(a)	Right-Angle Gear Reducer	1
6	(b) (d)	Motor	1
Not Shown	69807	EP Moly D Grease	(c)

No Recommended Spare Parts



NOTES :

- (a) Select right-angle gear reducer as specified from the following:
 50 FPM, Part No. 71055-3X, 15:1 Reduction, (standard speed).
 100 FPM, Part No. 71055-1X, 7.5:1 Reduction, (standard speed).
 33 FPM, Part No. 71055-4X, 20:1 Reduction, (non-standard speed).
 65 FPM, Part No. 71055-2X, 10:1 Reduction, (non-standard speed).
 125 FPM, Part No. 71055-0X, 5:1 Reduction, (non-standard speed).

X = Reducer Mounting Position Number 1, 2, 3 or 4. See Serial Record for position used. Complete the part number by inserting the position number in place of the 'X'.

- (b) Trolley motor brake is optional on motorized right-angle gear reducer trolley drive. Motors for trolley drive without motor brake have one shaft extension. Motors for trolley drive with motor brake have two shaft extensions. Select motor as specified from the following:

PART NO. MOTOR WITH ONE SHAFT EXT.	PART NO. MOTOR WITH TWO SHAFT EXT.	VOLTAGE	HP	RPM	SPEED	FRAME
61010-01	65818-04	200	1/2	1800	Single	56C
61010-02	65818-05	208/230/460				
61010-03	65818-06	575				
61010-04	65818-10	200	1			
61010-05	65818-11	208/230/460				
61010-06	65818-12	575				
61012-01	65819-01	200	1/2 / 1/6	1800/600	Two	
61012-02	65819-02	230				
61012-03	65819-03	460				
61012-04	65819-04	575				
61012-05	65819-09	200	1 / 1/3			
61012-06	65819-10	230				
61012-07	65819-11	460				
61012-08	65819-12	575				

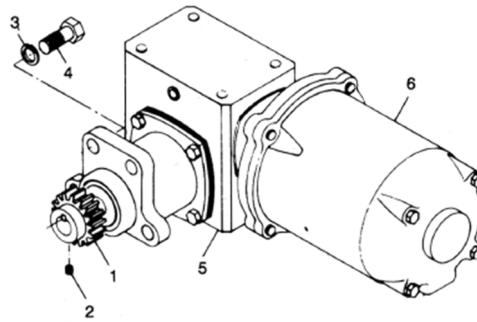
For other specified motors, refer to additional information pages supplied with manual.

- (c) Exposed gears and pinions on trolleys are shipped from the factory without lubricant. EP Moly D Grease, package in a 4-ounce squeeze bottle container, is furnished with all hoists that have trolleys specified. Refer to LUBRICATION section of this manual. Additional containers of EP Moly D Grease, packaged in a 4-ounce squeeze bottle, can be obtained by ordering Acco/Harrington part no. 69807.

- (d) Motor Key included with motor. Also available individually as part number 70880.

PARTS LIST – PRODUCT SERIES 31

MOTORIZED TROLLEY DRIVE FOR 1-TON 2PD AND ALL 2 THROUGH 5 TON MONORAIL TROLLEY HOISTS AND ALL TOP-RUNNING TROLLEY HOISTS



MOTORIZED TROLLEY DRIVE PARTS

ITEM NO.	PART NUMBER	DESCRIPTION	MONORAIL TROLLEY QTY	TOP RUNNING TROLLEY QTY
1	69788	Pinion (15 teeth)	1	0
	62214	Pinion (14 teeth)	0	1
2	12-5-4	Set Screw	2	0
	12-4-4C	Set Screw	0	2
3	17-8C	Lockwasher	4	4
4	35-8-20C	Hex Head Bolt	4	4
5	(a)	Right-Angle Gear Reducer	1	1
6	(b) (d)	Motor	1	1
Not Shown	69807	EP Moly D Grease	(c)	(c)

No Recommended Spare Parts

NOTES:

(a) Select right-angle gear reducer as specified from the following:

Part No. 71056-4X, 20:1 Reduction, 50 FPM Monorail Trolley or 32 FPM Top-Running Trolley, (standard).

Part No. 71056-2X, 10:1 Reduction, 100 FPM Monorail Trolley or 65 FPM Top-Running Trolley, (standard).

Part No. 71056-0X, 5:1 Reduction, 125 FPM Top-Running Trolley, (standard).

Part No. 71056-5X, 30:1 Reduction, 33 FPM Monorail Trolley, (non-standard).

Part No. 71056-3X, 15:1 Reduction, 65 FPM Monorail Trolley, (non-standard).

Part No. 71056-1X, 7.5:1 Reduction, 125 FPM Monorail Trolley, (non-standard).

X = Reducer Mounting Position Number 1, 2, 3 or 4. See Serial Record for position used. Complete the part number by inserting the position number in place of the 'X'.

(b) Trolley motor brake is optional on motorized right-angle gear reducer trolley drive. Motors for monorail trolley drive without motor brake have one shaft extension. Motors for monorail trolley drive with motor brake have two shaft extensions. Motors for top-running trolley drive with or without motor brake have one shaft extension. Select motor as specified from the following:

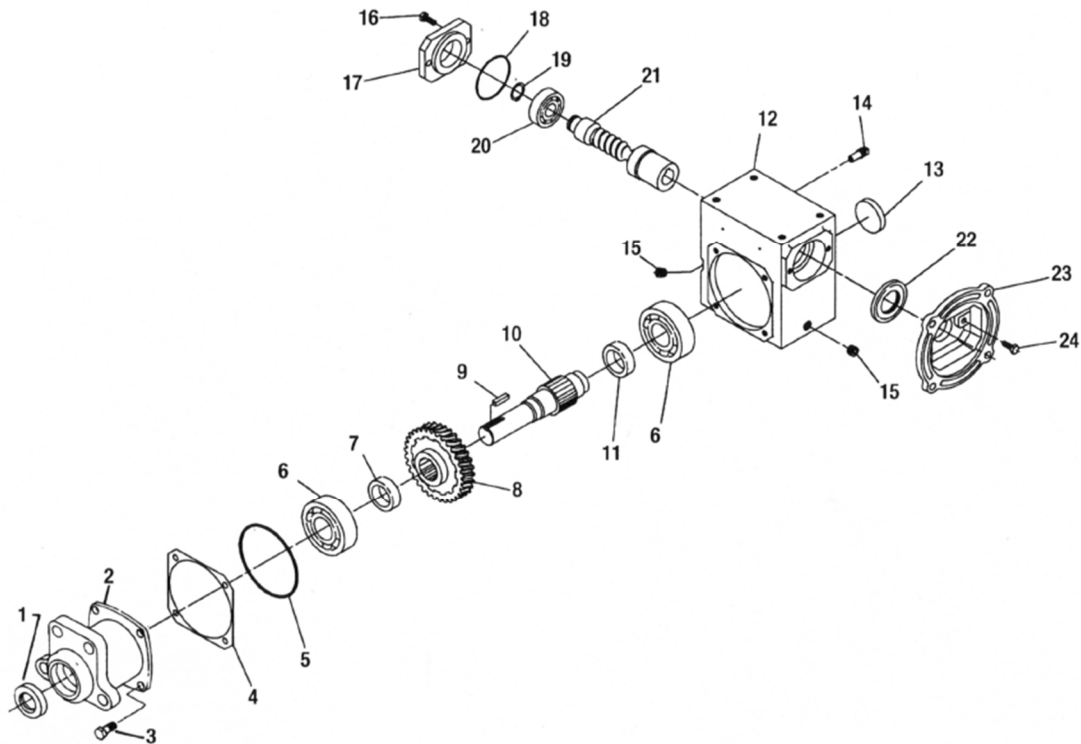
PART NO. MOTOR WITH ONE SHAFT EXT.	PART NO. MOTOR WITH TWO SHAFT EXT.	VOLTAGE	HP	RPM	SPEED	FRAME
61010-01	65818-04	200	1/2	1800	Single	56C
61010-02	65818-05	208/230/460				
61010-03	65818-06	575				
61010-04	65818-10	200	1			
61010-05	65818-11	208/230/460				
61010-06	65818-12	575				
61012-01	65819-01	200	1/2 / 1/6	1800/600	Two	
61012-02	65819-02	230				
61012-03	65819-03	460				
61012-04	65819-04	575	1 / 1/3			
61012-05	65819-09	200				
61012-06	65819-10	230				
61012-07	65819-11	460				
61012-08	65819-12	575				

For other specified motors, refer to additional information pages supplied with manual.

(c) Exposed gears and pinions on trolleys are shipped from the factory without lubricant. EP Moly D Grease, package in a 4-ounce squeeze bottle container, is furnished with all hoists that have trolleys specified. Refer to LUBRICATION section of this manual. Additional containers of EP Moly D Grease, packaged in a 4-ounce squeeze bottle, can be obtained by ordering Acco/Harrington part no. ACC69807.

(d) Motor Key included with motor. Also available individually as part number 70880.

**MOTORIZED TROLLEY RIGHT-ANGLE
GEAR REDUCER FOR 1-TON 2PS
MONORAIL TROLLEY HOISTS**



RIGHT-ANGLE GEAR REDUCER PARTS

ITEM NO.	PART NUMBER	DESCRIPTION	QTY/ ASSY
1*	V093095	Oil Seal	1
2	V28632C	Adapter	1
3	V8471404027	Hex Head Cap Screw	4
4	VZ13T	Output Cover Shim	AR
5	V095768A	O-Ring	1
6	V8322068002	Output Bearing, Cone	2
	V8322058002	Output Bearing, Cup	2
7	VY13SWC	Gear Spacer	1
8	VG13C05C	Worm Gear 5:1	1
	VG13C07C	Worm Gear 7.5:1	
	VG13C10C	Worm Gear 10:1	
	VG13C15C	Worm Gear 15:1	
	VG13C20C	Worm Gear 20:1	
9	V040304	Key	1
10	VS13SGX01	Output Shaft	1
11	VY13SWC	Gear Spacer	1
12	VH13CC	Gear Housing	1

ITEM NO.	PART NUMBER	DESCRIPTION	QTY/ ASSY
13	V093223A	Expansion Ring	1
14	V041752	Vent Plug	1
15	V040411	Pipe Plug	4
16	V8471404027	Hex Head Cap Screw	2
17	VC13MB	Input Cover	1
18	V8748009053	O-Ring	1
19	V8471786053	Retaining Ring	1
20	V8321116169	Input Bearing	1
21	VA13W05QS56	Quill Input Shaft 5:1	1
	VA13W07QS56	Quill Input Shaft 7.5:1	
	VA13W10QS56	Quill Input Shaft 10:1	
	VA13W15QS56	Quill Input Shaft 15:1	
	VA13W20QS56	Quill Input Shaft 20:1	
22*	V093212A	Oil Seal	1
23	VF13Q56DC	Quill Motor Flange	1
24	V8471404027	Hex Head Cap Screw	2

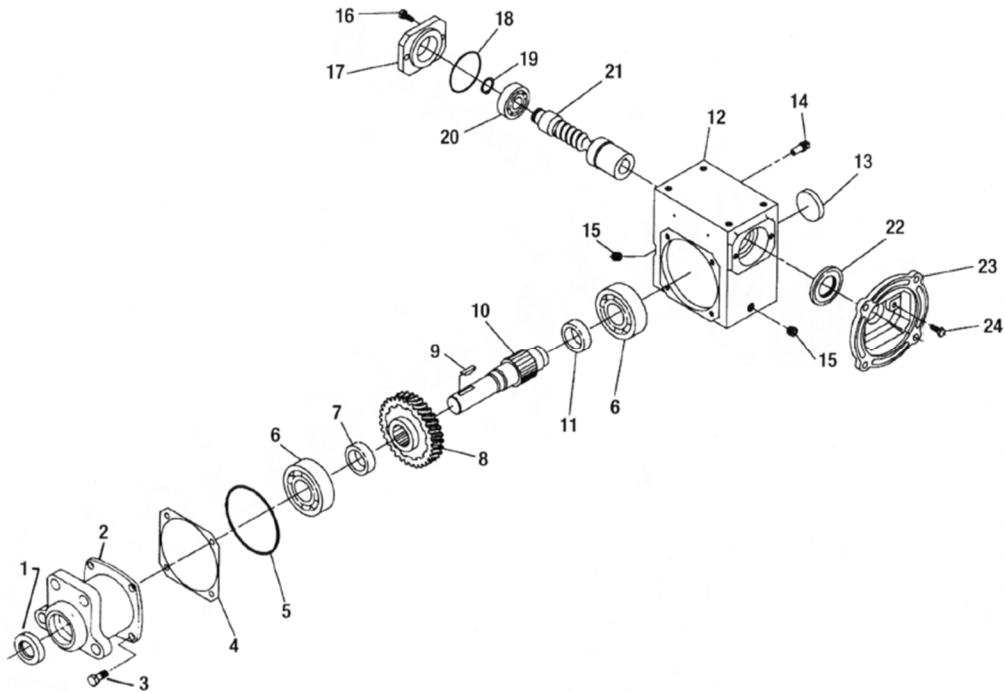
*Recommended Spare Parts

NOTE:

Approximate capacity of oil bath is 1/2 pint. Refer to Lubrication section of this manual.

PARTS LIST - PRODUCT SERIES 31

MOTORIZED TROLLEY RIGHT-ANGLE GEAR REDUCER FOR 1-TON 2PD AND ALL 2 THROUGH 5 TON MONORAIL TROLLEY HOISTS AND ALL TOP-RUNNING TROLLEY HOISTS



RIGHT-ANGLE GEAR REDUCER PARTS

ITEM NO.	PART NUMBER	DESCRIPTION	QTY/ ASSY
1*	V093094	Oil Seal	1
2	V286631C	Adapter	1
3	V8471404027	Hex Head Cap Screw	4
4	VZ13T	Output Cover Shim	AR
5	V8748009057	O-Ring	1
6	V8322068002	Output Bearing, Cone	2
	V8322058002	Output Bearing, Cup	2
7	VY13SWC	Gear Spacer	1
8	VG17S07C	Worm Gear 7.5:1	1
	VG17S10C	Worm Gear 10:1	
	VG17S15C	Worm Gear 15:1	
	VG17S20C	Worm Gear 20:1	
	VG17S30C	Worm Gear 30:1	
9	V040267	Woodruff Key	1
10	VS17SGX01	Output Shaft	1
11	VY17SG	Gear Spacer	1
12	VH17SG	Gear Housing	1

ITEM NO.	PART NUMBER	DESCRIPTION	QTY/ ASSY
13	V093224A	Expansion Ring	1
14	V041752	Vent Plug	1
15	V040411	Pipe Plug	4
16	V8471404027	Hex Head Cap Screw	2
17	VC13NB	Input Cover	1
18	V8748009053	O-Ring	1
19	V8471786053	Retaining Ring	1
20	V8321116169	Input Bearing	1
21	VA18W07QS56	Quill Input Shaft 7.5:1	1
	VA18W10QS56	Quill Input Shaft 10:1	
	VA18W15QS56	Quill Input Shaft 15:1	
	VA18W20QS56	Quill Input Shaft 20:1	
	VA18W30QS56	Quill Input Shaft 30:1	
22*	V093212A	Oil Seal	1
23	VF13Q56DC	Quill Motor Flange	1
24	V8471404027	Hex Head Cap Screw	2

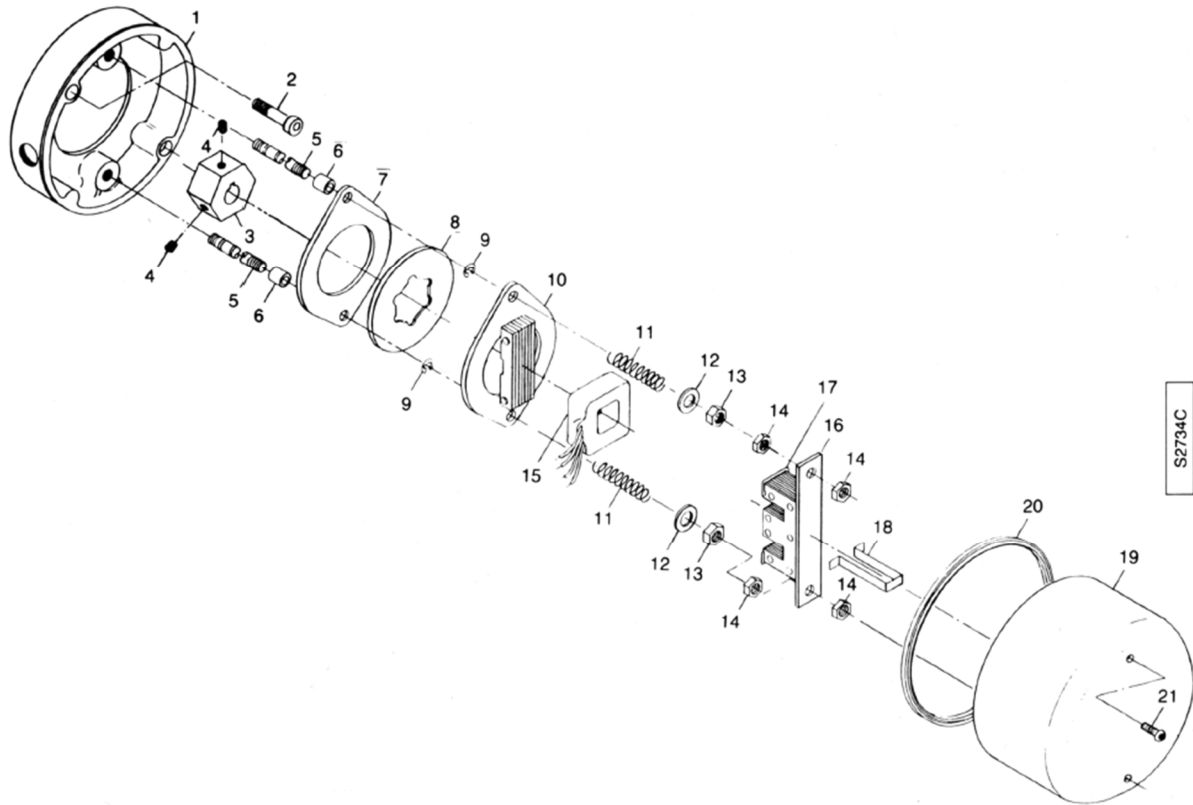
*Recommended Spare Parts

NOTE:

Approximate capacity of oil bath is 1 pint. Refer to Lubrication section of this manual.

PARTS LIST - PRODUCT SERIES 31

TROLLEY MOTOR BRAKE ASSEMBLY



TROLLEY MOTOR BRAKE PARTS

ITEM NO.	PART NUMBER	DESCRIPTION	QTY/ ASSY
1	65653	Adapter	1
2	1-6-24	Bolt, 3/8-16 x 1-1/2 lg	2
3	65654	Hub	1
4	12-4-6	Set Screw	2
5	65655	Stud	2
6	61459	Spacer	2
7	39794	Brake Plate	1
8*	39649	Brake Lining	1
9	PA5623	Retaining Ring	2
10	39781	Pressure Unit	1
11	PA5823	Spring	2
12	15-6-1	Flat Washer	2

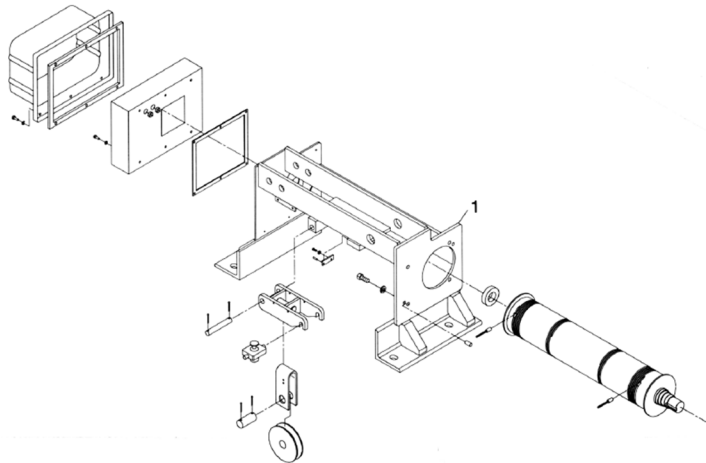
ITEM NO.	PART NUMBER	DESCRIPTION	QTY/ ASSY
13	PA2377	Locknut	2
14	24-6	Jam Nut, 3/8	4
15*	39783-2 39783-3 39783-6	Coil 575 VAC 230/460 VAC 208 VAC	1
16	39780	Magnet Unit	1
17	39784	Shading Coil (a)	2
18	39877	Coil Strap	1
19	69161	Brake Cover	1
20	PA7110	Gasket	1.77 ft
21*	PA7323	Screw, LOC-WEL, #10-24 (b)	2

*Recommended Spare Parts

(a) Shading Coil is furnished with Magnet Unit, but also available as a spare.

(b) Screw with self-locking feature must be utilized. Substitutes are not permissible.

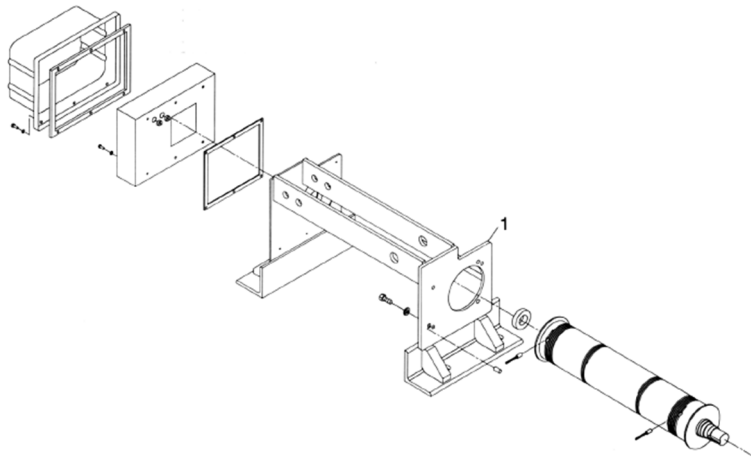
DECK MOUNTED FRAME



DECK MOUNTED FRAME PARTS						NOTE:
ITEM NO.	DESCRIPTION	QTY	DRUM LG. 1 PART NO.	DRUM LG. 2 PART NO.	DRUM LG. 3 PART NO.	For part numbers of other parts Shown, refer to pages 93, 94, 95, 96, 98, 100, or 102 as required for type of reeving specified.
1	Deck Mounted Fame Unit 1/2 & 1 Ton 2PS, 1/4" Rope 2 Ton 2PS, 5/16" Rope 3 & 4 Ton 4 PS 5/16" Rope All 2PD Units All 4PD Units	1	70664-11 70610-11 N/A N/A N/A	70664-12 70610-12 70609-12 70597-12 N/A	70664-13 70610-13 70609-13 70597-13 71212-13	

No Recommended Spare Parts

WINCH UNIT FRAME



WINCH UNIT FRAME PARTS

ITEM NO.	DESCRIPTION	QTY	DRUM LG. 1 PART NO.	DRUM LG. 2 PART NO.	DRUM LG. 3 PART NO.
1	Winch Unit Frame All Units	1	70611-01	70611-02	70611-03

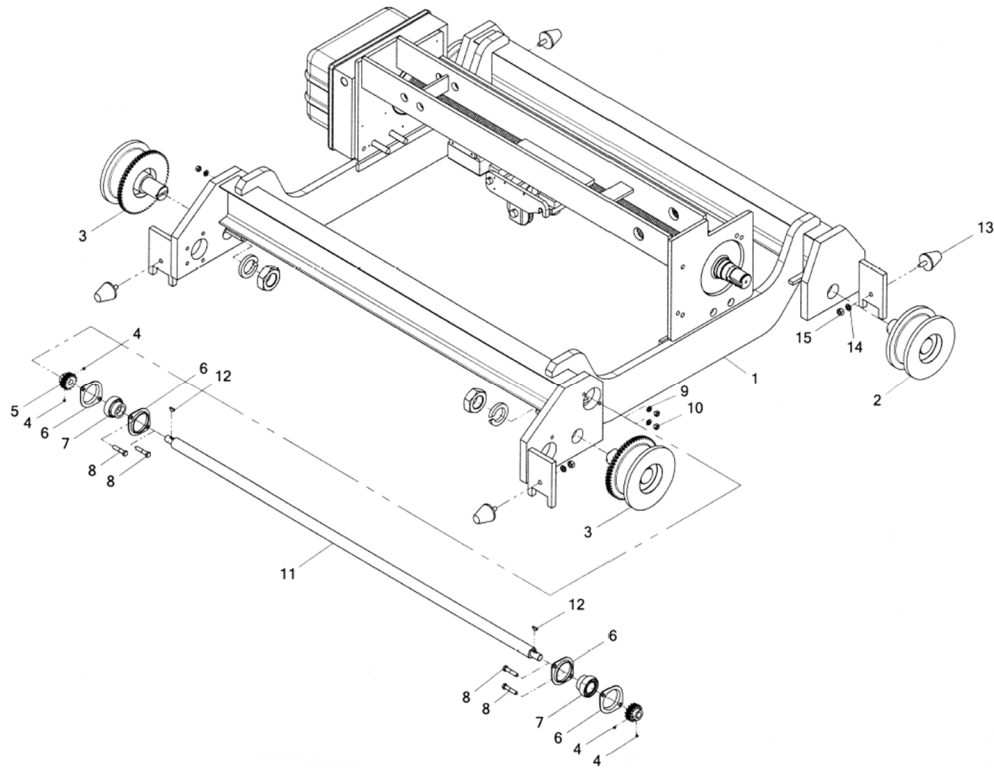
NOTE:

For part numbers of other parts shown, refer to pages 93, 94, 95, 96, 98, or 100 as required for type of reeving specified.

No Recommended Spare Parts

PARTS LIST - PRODUCT SERIES 31

TOP-RUNNING TROLLEY



TOP-RUNNING TROLLEY FRAME PARTS

ITEM NO.	DESCRIPTION	QTY	36 IN. GAGE PART NO.	48 IN. GAGE PART NO.	60 IN. GAGE PART NO.
1	Trolley Frame, Trolley End Beams, End Plates, Gear and Control End	1	(a)	(a)	(a)
2	Plain Steel Wheel Assembly	2	72035-02	72035-02	72035-02
2	Plain Bronze Wheel Assembly	2	72035-04	72035-04	72035-04
3	Geared Steel Wheel Assembly	2	72035-01	72035-01	72035-01
3	Geared Bronze Wheel Assembly	2	72035-03	72035-03	72035-03
4	Set Screw	4	12-4-4C	12-4-4C	12-4-4C
5	Pinion	2	62214	62214	62214
6	Bearing Flange	4	PA6154	PA6154	PA6154
7	Bearing	2	PA6153	PA6153	PA6153
8	Hex Head Bolt	4	35-6-28	35-6-28	35-6-28
9	Lockwasher	4	17-6C	17-6C	17-6C
10	Nut	4	22-6	22-6	22-6
11	Shaft, Wheel	1	69335-06	69335-07	69335
12	Woodruff Key	2	PA1357	PA1357	PA1357
13	Bumper (Optional)	4	65226	65226	65226
14	Lockwasher (Optional)	4	17-7	17-7	17-7
15	Nut (Optional)	4	22-7	22-7	22-7

No Recommended Spare Parts

NOTE:

For part numbers of other suspension frame parts, refer to page 93 for 2PS (1/4" wire rope), page 94 for 2PS (5/16" wire rope), page 95 for 4PS, page 96 for 2PD (3/16" wire rope), page 98 for 2PD (1/4" wire rope), page 100 for 2PD (5/16" wire rope), and page 102 for 4PD reeving.

(a) Trolley side frame, trolley end beams, and hoist end plates are a single welded unit. Contact Acco/Harrington or the distributor of the hoist with a hoist product number and/or hoist serial number; and wheel gage of trolley.

PARTS LIST - PRODUCT SERIES 31

LOADBAR ASSEMBLY – FOR SWIVELING TROLLEYS – PARALLEL MOUNTED HOIST

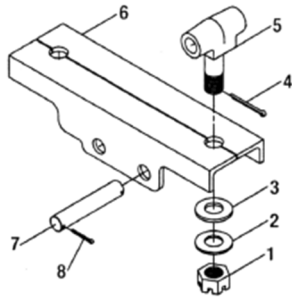


FIGURE A
2 PART SINGLE
DRUM NO. 1

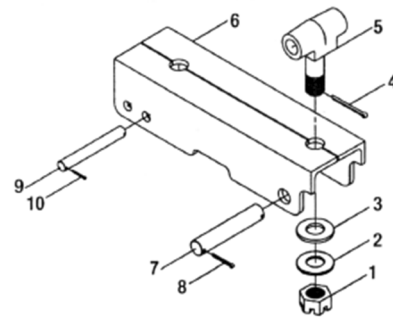


FIGURE B
2 PART SINGLE
4 PART SINGLE
2 PART DOUBLE
DRUMS NO'S. 2 & 3

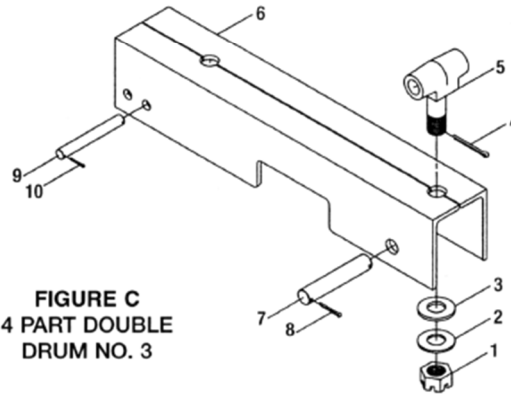


FIGURE C
4 PART DOUBLE
DRUM NO. 3

LOADBAR PARTS

REFER TO FIGURE		A		B		C	
ITEM NO.	DESCRIPTION	PART NUMBER	QTY	PART NUMBER	QTY	PART NUMBER	QTY
1	Hex Slotted Nut	26-28C	2	26-28C	2	26-28C	2
2	Thrust Washer	A4421	2	A4421	2	A4421	2
3	Thrust Bearing	A4420	2	A4420	2	A4420	2
4	Cotter Pin	PA1484	2	PA1484	2	PA1484	2
5	Suspension Stud	63160	2	63160	2	63160	2
6	Loadbar	70641	1	70644-02 (a)	1	71229	1
				70644-03 (a)			
				70644-12 (a)			
				70644-13 (a)			
7	Pin	63208-02	2	63208-02	1	63208-02	1
8	Cotter Pin	PA1932	4	PA1932	2	PA1932	2
9	Pin	---	---	63299	2	63299	2
10	Cotter Pin	---	---	PA1518	4	PA1518	4

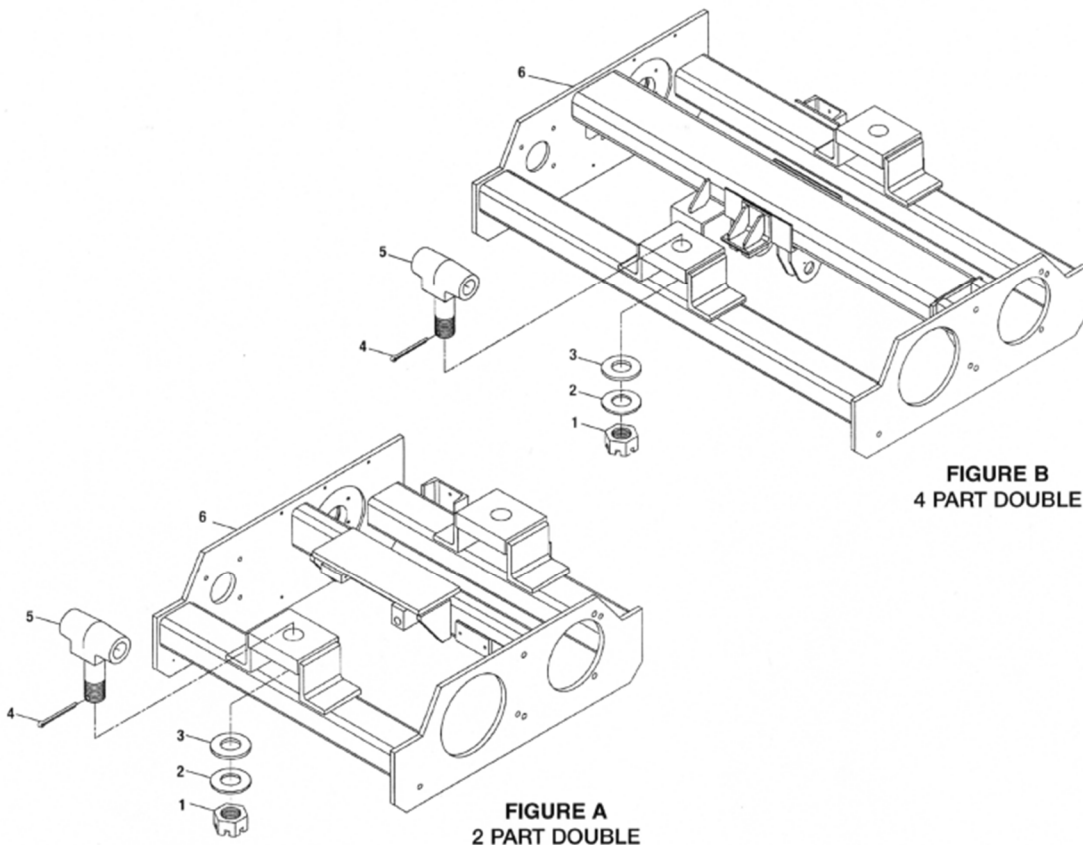
No Recommended Spare Parts

NOTES:

For trolley parts, refer to pages 126 through 131.

- (a) Part number 70644-02 used with 2PS drum length no. 2.
 Part number 70644-03 used with 2PS drum length no. 3.
 Part number 70644-12 used with 4PS and 2PD drum length no. 2. Part
 number 70644-13 used with 4PS and 2PD drum length no. 3.

FRAM ASSEMBLY – FOR SWIVELING TROLLEYS – CROSS MOUNTED HOIST



**FIGURE B
4 PART DOUBLE**

**FIGURE A
2 PART DOUBLE**

FRAME PARTS

ITEM NO.	DESCRIPTION	PART NUMBER	QTY
1	Hex Slotted Nut	26-28	2
2	Thrust Washer	A4421	2
3	Thrust Bearing	A4420	2
4	Cotter Pin	PA1484	2
5	Suspension Stud	63160	2
6	Frame Unit	(a)	1

No Recommended Spare Parts

NOTES:

For trolley parts, refer to pages 126 through 131.

(a) Frame Unit part numbers for:

Figure A	Figure B
70985-02	71239-03
70985-03	

(b) Dash number (-02, -03, etc.) indicates corresponding hoist drum length.
Example: 70985-02 for Drum No. 2, 70985-03 for Drum No. 3, etc.

FRAME ASSEMBLY- FOR LOUDEN TROLLEYS- CROSS MOUNTED HOIST

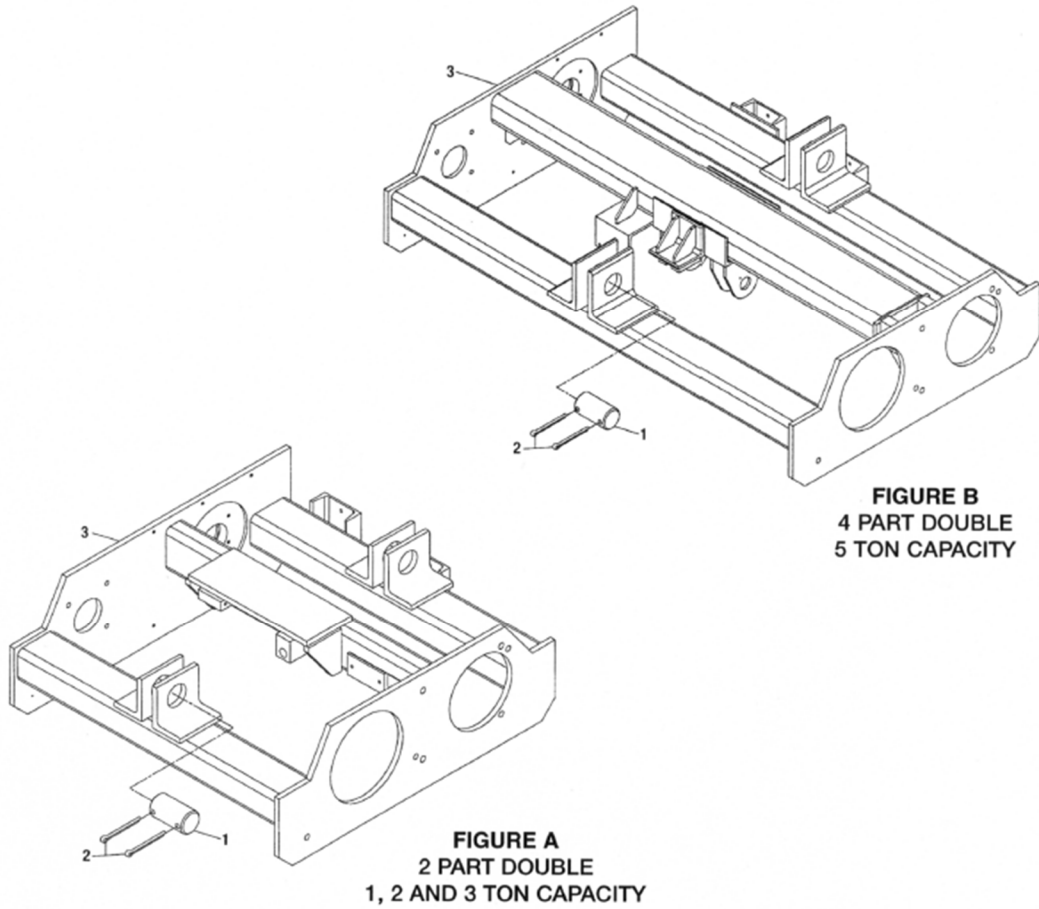


FIGURE B
4 PART DOUBLE
5 TON CAPACITY

FIGURE A
2 PART DOUBLE
1, 2 AND 3 TON CAPACITY

FRAME PARTS

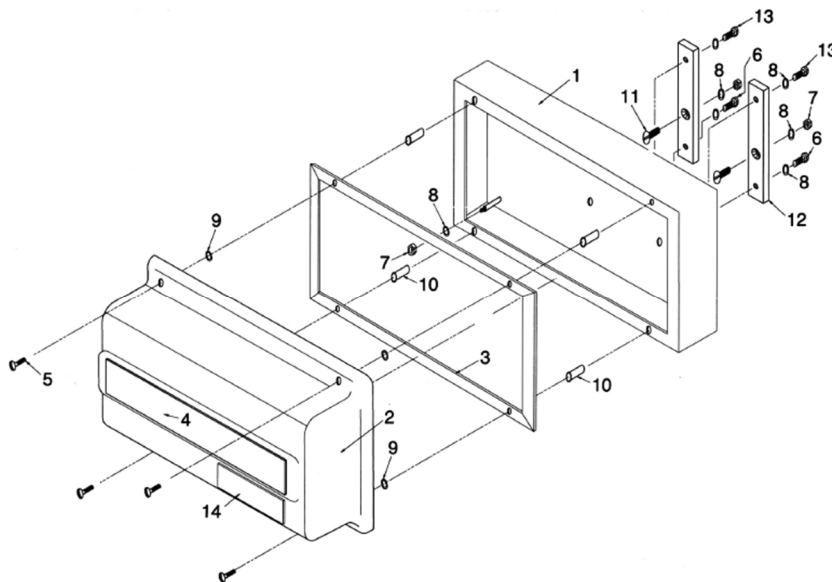
ITEM NO.	DESCRIPTION	QTY	1-3 TON HOIST CAPACITY PART NO.	5 TON HOIST CAPACITY PART NO.
1	Mounting Pin	2	70870	70871
2	Cotter Pin	4	PA3796	PA3796
3	Frame Unit (a)	1	70987-02	N/A
			70987-03	71241-03
Ref.	Louden Trolley (b)	2	280070	280074

No Recommended Spare Parts

NOTES:

- (a) Dash number (-02, -03, etc.) indicates corresponding hoist drum length.
Example: 70987-02 for Drum No. 2, 70987-03 for Drum No. 3, etc.
- (b) Louden Trolley part numbers shown for reference only. For trolley parts, refer to page 101 of manual 69879.

OPTIONAL ELECTRICAL CONTROL ENCLOSURE



REPLACEMENT PARTS

ITEM NO.	PART NO.	DESCRIPTION	QUANTITY BY ENCLOSURE SIZE		
			11" X 15"	15" X 21"	21" X 21"
1	70598	Enclosure, 11" x 15"	1	N/A	N/A
	69828-1	Enclosure, 15" x 21"	N/A	1	N/A
	69875-1	Enclosure, 21" x 21"	N/A	N/A	1
2	52822	Cover, 11" x 15"	1	N/A	N/A
	52826	Cover, 15" x 21"	N/A	1	N/A
	54268	Cover, 21" x 21"	N/A	N/A	1
3	59730	Gasket, 11" x 15"	1	N/A	N/A
	55204	Gasket, 15" x 21"	N/A	1	N/A
	55206	Gasket, 21" x 21"	N/A	N/A	1
4	55224-2	Label	1	1	1
5	58597	Screw, Captive, 5/8" L.	4	6	8
6	35-4-16	Hex Head Bolt, 1" L.	2	2	2
7	22-4C	Hex Nut	6 (b)	6 (b)	6 (b)
8	17-4C	Lockwasher	10 (c)	10 (c)	10 (c)
9	PA6634	Retaining Ring	4	6	8
10	PA7343	Nut Insert	8	10	12
11	5-4-20C	Flathead Screw, 1 1/4" L. (a)	2	2	2
12	70573	Control Box Mtg. Strap (a)	2	2	2
13	35-4-12	Hex Head Bolt, 3/4" L.	2	2	2
14	70518	Label	1	1	1

NOTES:

- (a) Item numbers 11 and 12 are not used on cross mounted hoists.
- (b) Item 7 quantity is 4 on cross mounted hoists.
- (c) Item 8 quantity is 8 on cross mounted hoists.

GENERAL CONDITIONS OF WARRANTY

Buyer must notify HHI in writing within sixty (60) days of discovery of any alleged defect, if within the applicable warranty period.

All products sold by HHI are warranted to be free from defects in material and workmanship from date of shipment by HHI for the following periods:

- 1 year – Air Powered Hoists, SNER, TNER, NER030L, and ED Electric Chain Hoists, Powered Trolleys, Powered Tiger Track Jibs and Gantries, Crane Components, Below the Hook Devices, Spare / Replacement Parts**
- 2 years – Manual Hoists & Trolleys, Beam Clamps, ACCO Wire Rope Hoists, ACCOLIFT Electric Chain Hoists, Louden and Trambeam Patented Track**
- 3 years – (N)ER2 Hoists, EQ/SEQ Hoists, (T)EM/(T)SEM hoists, and RY Hoists**
- 5 years – Manual Tiger Track Jibs and Gantries, Hoist Motor Brakes for EQ/SEQ, (T)EM/(T)SEM, and RY**
- 10 years – (N)ER2 Brake, TNER Hoist Motor Brake, Tiger Track Workstation Cranes and Monorails**

The product must be used in accordance with manufacturer's recommendations and must not have been subject to abuse, lack of maintenance, misuse, negligence, or unauthorized repairs or alterations.

Should any defect in material or workmanship occur during the above time period in any product, as determined by HHI's inspection of the product, HHI agrees, at its discretion, either to replace (not including installation) or repair the part or product free of charge. For customers in the U.S., delivery shall be made F.O.B. HHI's place of business. For international customers, delivery shall be made FCA HHI place of business, United States of America (Incoterms 2010).

No warranty claim will be honored without a valid proof of purchase. Customers must obtain a Return Goods Authorization as directed by HHI or its published repair center prior to shipping product for warranty evaluation. An explanation of the complaint must accompany the product. Product must be returned freight prepaid. Upon repair, the product will be covered for the remainder of the original warranty period. Replacement parts installed after the original warranty period will only be eligible for replacement (not including installation) for a period of one year from the installation date. If it is determined there is no defect, or that the defect resulted from causes not within the scope of HHI's warranty, the customer will be responsible for the costs of returning the product.

HHI DISCLAIMS ANY AND ALL OTHER WARRANTIES OF ANY KIND, EXPRESSED OR IMPLIED, AS TO THE PRODUCT'S MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. HHI WILL NOT BE LIABLE FOR DEATH, INJURIES TO PERSONS OR PROPERTY OR FOR INCIDENTAL, CONTINGENT, SPECIAL OR CONSEQUENTIAL DAMAGES, LOSS OR EXPENSE ARISING IN CONNECTION WITH THE USE OR MISUSE OF THE PRODUCTS, REGARDLESS OF WHETHER THE DAMAGE, LOSS OR EXPENSE RESULTS FROM ANY ACT OR FAILURE TO ACT BY HHI, WHETHER NEGLIGENT OR WILLFUL, OR FROM ANY OTHER CAUSE.



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