

HOIST OPERATING AND MAINTENANCE **MANUAL**

REV. 6, 11/19/13

This manual provides operating and maintenance information for the hoist serial number referenced on the cover. Reference the serial number of the hoist when ordering spare parts. Please read through the entire manual before entering the hoist into regular service.

Warning: It is the responsibility of the user to maintain and use the hoist in a safe manner. Failure to do so can be dangerous and result in severe bodily injury, fatality or property damage. All use and maintenance shall conform to OSHA, ANSI, ASME, Local, State, Federal, Manufacturer and any other regulatory agency requirements. An inspection and maintenance log shall be kept and complied with.

Warranty

We warrant that our equipment is free from defect. Our liability is limited to the repair, or, at our option, supply of a replacement, f.o.b. our factory, of any parts which proved to be defective due to faulty material or workmanship within twelve months after shipment of the equipment from our factory at Clifton, New Jersey. Normal wear and the consequence of improper use or application are not covered by this warranty.

This warranty is expressly in lieu of any other express or implied warranties including any implied warranty of merchantability or fitness and or any other obligation on the part of the seller

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*Note: Information is included on these items only if applicable to this hoist.

Section I. Installation of Hoist

A. Mounting of Hoist

1. Hoists with Trolleys

Hoists with Trolleys are defined as hoists supplied within a frame with trolleys attached. Note the trolleys must be located as shown in the Outline Drawing supplied in this service manual.

This hoist has been designed to fit only the track designated on the customer's order to Electro Lift. This track size is noted on the Outline Drawing included in this manual. Do not attempt to install this hoist on any other size track. Contact Electro Lift if you find your track size is different than indicated on the Outline Drawing.

Your hoist has been shipped with the trolleys attached to the hoist frame with the proper size mounting bolts and nuts. The trolleys are correctly located according to the Outline Drawing to support the hoist load. The mounting bolts are sized also to support the hoist load and should not be replaced with any other fastener.

The hoist may be installed on the track in one of two manners:

a. At end of track:

Raise the hoist with trolleys attached to the height of the track. Slide trolley wheels horizontally into the track so the trolley wheels rest on the inside of the bottom track flange.

b. In the middle of the track:

Remove the trolley side plates at the point where the bolts join the bottom of the side plate to the trolley yoke. Note the trolley wheels will remain attached to the side plates. Raise the hoist and position the hoist under the track. Place the wheels inside the track flanges. Reattach the side plates to the trolley yokes. Note the trolley yokes are attached to the hoist with the Mounting Bolts.

2. Stationary Hoists without Trolleys

Stationary Hoists without Trolleys are defined as hoists within a frame without trolleys attached. They may also be overhead or floor mounted hoists supported without a frame on either brackets or steel base plates.

Refer to the Outline Drawing supplied in this manual for the number and size of mounting holes. The customer is responsible for determining and providing all attachment fasteners.

Section I

B. Electrical

All Wiring must conform to National Electric Code Standards, in addition to any state and local requirements.

1. Requirements:

The voltage supplied to this hoist must match the specification on the customer's order to Electro Lift. If Electro Lift has supplied any controls on this hoist, a Wiring Diagram has been supplied in this service manual. The horsepower and full load amps are stamped on the hoist motor. If you suspect any problems with the electrical supply, have a qualified electrician conduct an evaluation.

2. Connection:

a. Hoists without circuit breakers:

At the closest upstream breaker box, disconnect power lines L1, L2, and L3. Attach L1, L2, and L3 to the corresponding terminal strips located in the control box. Reattach L1, L2 and L3 in the breaker box. This sequence must be followed to ensure a safe installation.

b. Hoists with Trolleys:

Electrification for Hoists with trolleys is supplied through either festooning or a collector electrification system. Note that Electro Lift can provide mounting for the bottom entry collectors.

c. Stationary Hoists:

Stationary Hoists can be wired with multi-conductor electrical cable or individual wire within conduit.

3. Testing Electrical Connections for Correct Directional Control:

First identify your type of motor from one of the three types listed below. This information can be found stamped on the side of the motor. Proceed as indicated to test for proper electrical connection

a. 3-Phase AC Motor:

Push the DOWN button on the push button station. The hook block should move down and the wire rope unwrap from the drum. Push the UP button and the hook block should move up and the wire rope wrap around the grooving in the drum. If the hoist moves in the wrong direction shut off incoming power to the hoist. Switch any (2) of the incoming power lines, L1, L2, or L3.

b. Single-Phase AC Motor:

Test to see if the hoist moves up or down when pressing the corresponding buttons on the push button station. If the hoist moves in the wrong direction shut off incoming power to the hoist. Switch wires connected to terminals 5 and 8 in the control box.

c. DC Motor:

Test to see if the hoist moves up or down when pressing the corresponding buttons on the push button station. If the hoist moves in the wrong direction shut off incoming power to the hoist. Switch the two wires at the main power connection or the two wires at the motor terminal box.

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C. Wire Rope Dead Ending

1. One Part Single Reeved Hoists:
Hoists reeved single-line do not require the wire rope to be dead-ended.
2. Hoists with Frames:
Hoists provided from Electro Lift within a frame with hook block(s) are dead-ended at our factory. The forged wire rope clips at the dead-ending must be re-tightened to the recommended torque as shown in Table 1, Forged Clip Information Table.
3. OverHead or FloorMounted Hoists (supported on brackets or a single plate):
These hoists are not provided within a steel frame and therefore the wire rope cannot be dead-ended by our factory.

The following must be performed after these hoists have been secured in their fixed location.

Wire Rope: Important: The Wire Rope must be secured to the dead ending of the system in the field. The length of the wire rope must be trimmed when the hoist is in the full "UP" position, the drums are completely filled with cable, and there is no over-wrapping. If the drum grooves are not filled to the greatest capacity with cable, the wire rope angle created may result in an unsafe condition. It is pertinent this procedure is precisely followed.

To dead end the wire rope:

First review Table 1: Forged Clip Information on the next page. Your hoist has been shipped with a Clamp and Thimble Kit. It will have the proper size and number of clamps for your hoist's dead-ending and the correct size thimbles as well. Identify your wire rope size and match it to the clip size the table

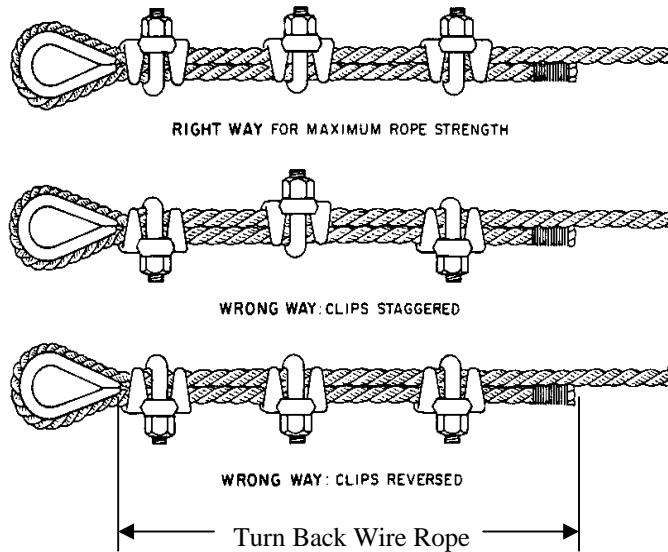
- a. Insert the proper sized thimble at the dead-ending location. Turn back the specified amount of rope from the thimble or loop. Reference Table 1 on the next page to determine the amount of wire rope to turn back. Apply the first forged clip one base width from the dead end of the rope. Apply U-Bolt over the dead end of wire rope. The live end will rest in the saddle of the U-Bolt. Tighten all nuts evenly; alternate from one nut to the other until reaching the recommended torque.
- b. Apply the second clip as near to the loop or thimble as possible. Tighten all nuts evenly, alternating until the recommended torque.
- c. Apply the third clip (if applicable) spaced evenly between the first and the second clip. Take up rope slack & tighten all nuts evenly, alternating until the recommended torque.

Section I

Table 1: Forged Clip Information

Clip Size (inches)	Minimum No. of Clips	Amount of Wire Rope To turn back (inches)	Torque (ft./lbs.)
1/4	2	4-3/4	15
5/16	2	5-1/4	30
3/8	2	6-1/2	45
7/16	2	7	65
1/2	3	11-1/2	65
9/16	3	12	95
5/8	3	12	95
3/4	4	18	130
7/8	4	19	225
1	5	26	225

- d. Note: Below is a typical depiction of cable clip configuration and the number of clips may or may not be correct for this hoist. Hoists with greater or smaller cable diameters may require more or less clips.



- e. The cable clips need to be re-torqued to specifications after the hoist is load tested or lifts its first load near hoist capacity. All clips need to be re-torqued before the hoist enters regular service.

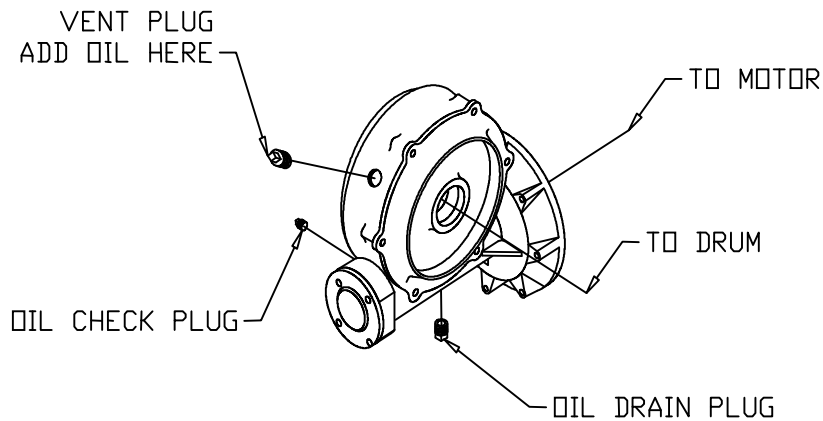
Section I

D. Gear Case Venting:

The Gear Case must be vented to decrease internal air pressure when the hoist is operating.

Locate the solid pipe plug inserted near the topside of the Gear Case. Note the “top side” is defined as the vertically higher side, regardless of how the hoist is mounted. Remove the solid pipe plug. Insert the vented pipe plug supplied with the hoist. Note the Vented pipe plug is “tagged” to the solid pipe plug. The solid pipe plug can now be discarded.

Your gear case may look slightly different. All plugs will be in the same or similar location.



Section I

E. Paddle Limit Switches:

The Paddle Limit Switch is considered standard equipment on all Electro Lift Hoists. This switch prevents the hoist from lifting the load up too far. It is set to activate after achieving a preset degree of rotation. Instructions to adjust the point of activation are included in this section. Twin Hook Hoists can be supplied with either (1) or (2) paddle limit switches.

How the Switches Work:

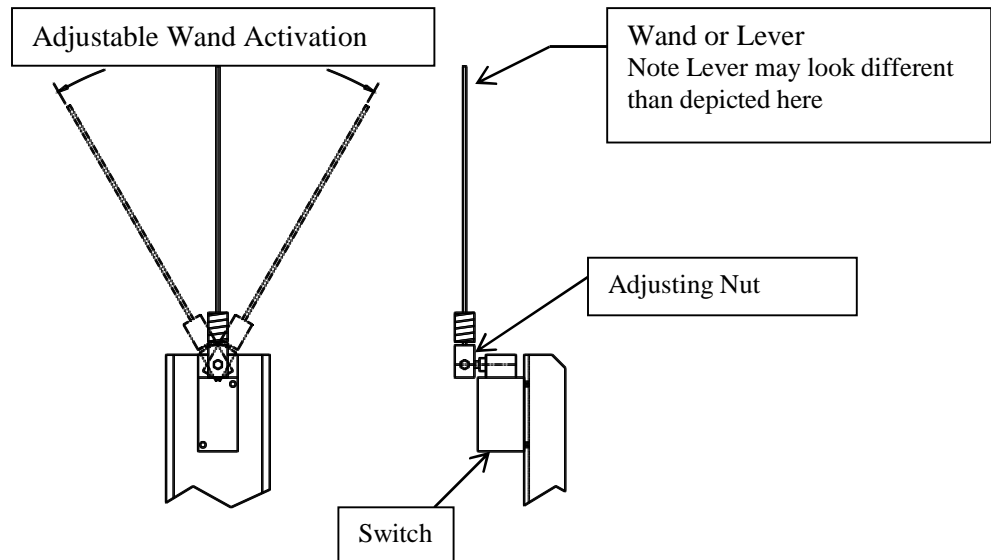
Most hoists are fitted with hook block(s). The wire rope pays off the drum down to the hook block(s) that is attached to the load. When the load is raised to its highest point, the hook block will hit the paddle limit switch lever and activate the switch. The hoist will then stop.

1. Hoists with Frames:

The paddle limit switch on hoists within steel frames are set at the factory and no further attention is required at installation

2. OverHead or FloorMounted Hoists:

A paddle limit switch will be provided with your hoist unless otherwise indicated on your order. The switch must be located and mounted at installation to prevent the load from ascending too far. The Limit Switches are adjustable; the point where the switch is activated may be set and altered as necessary. There is an adjusting nut perpendicular to the rotating axis of the wand. Loosen this nut and rotate the wand to find the desired point of actuation. A “click” will be felt where the switch will stop the hoist from moving. Tighten the nut to lock this position.



If the paddle limit switch has been activated, the hoist will stop. Press the DOWN button on the push button station to lower the hook block or load. During this descent, the wand or lever will resume its normal position and the switch will automatically reset. No further action is required and normal operation may continue.

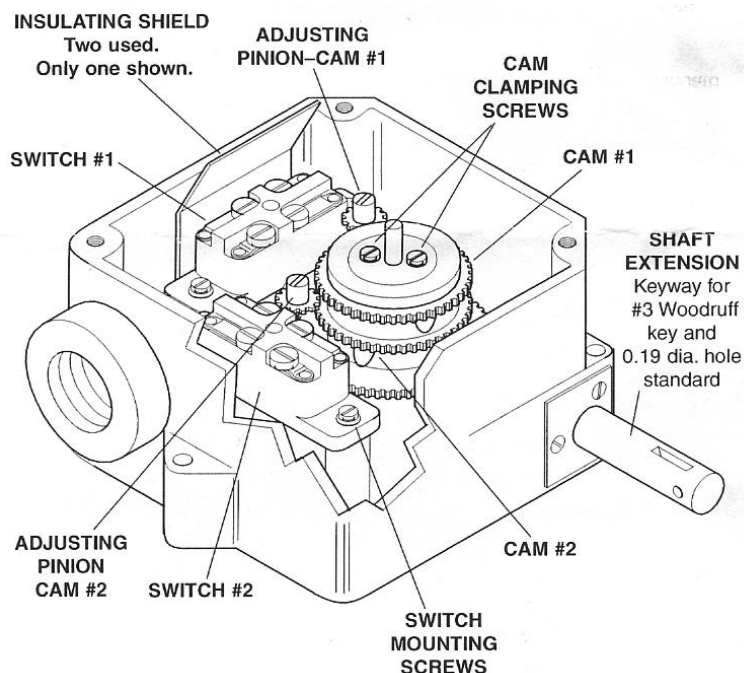
Section I

F. Geared Limit Switch

Refer to the Outline Drawing in this manual to determine if a Geared Limit Switch has been provided with this hoist. Geared Limit Switches are factory set, but may need adjustment at installation. When the switch is set at its lowest level, the drum MUST have at LEAST 2 turns of wire rope on the drum from the cable's anchoring hole. Hot Metal Applications must have 3 turns of wire rope on the drum. The following instructions apply to Gleason/Hubbell and Ametek switches only. Other manufacturer's geared limit switches have different instructions. Each switch is identified by manufacturer name on the inside of the cover.

How to set a Gleason/Hubbell Geared Limit Switch

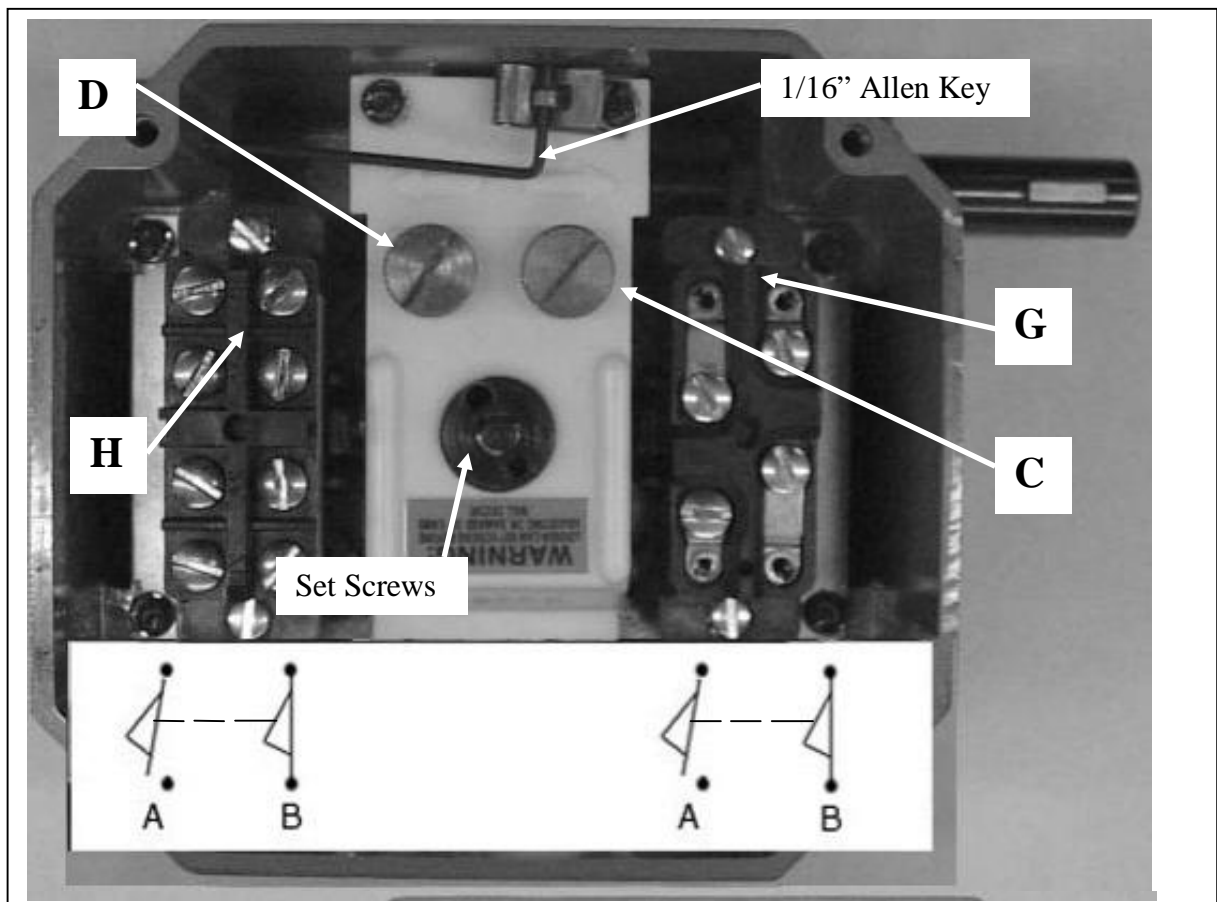
1. On most hoists there are (2) positions to be set, Maximum Up Level and Furthest Down Level. This is called a (2) element switch
2. Move the hoist to the Furthest Down Level
3. Turn the Power to the hoist OFF at the push button station
4. Remove the enclosure cover.
5. Loosen the two Cam Clamping Screws $\frac{1}{2}$ turn each. The Cam Clamping Screws are on top of the cam assembly at the center of the switch.
6. Identify adjusting pinion #1 as noted on the inside cover of the switch. This is the pinion that corresponds to Furthest Down Level.
7. Depress the pinion with a screwdriver and rotate it so the gears mesh with the cam assembly, and the cam assembly continues to rotate in same direction as it did when the hoist position was determined. Note that if the pinion is rotated in the wrong direction, the stopping position may be off and need re-adjustment.
8. Note the white marker on the gear teeth is directly over the cam lobe that trips the switch. Rotate the pinion until the switch trips. A click will be heard and felt. The adjustment is now complete.
9. Retighten the (2) clamping screw at the center of the switch
10. Test the hoist to see if the hoist stops in the desired location. Re-adjust if necessary.
11. Next raise the hoist to the Maximum Up Level and adjust pinion #2 the same way.
12. Replace the cover when done.



How to set an Ametek 2 Element Geared Limit Switch (NEMA 4)

1. On most hoists there are (2) positions to be set, Maximum Up Level and Furthest Down Level. This is called a (2) element switch. For a (4) element switch, see instructions on the next page.
 2. Move the hoist down to Furthest Down Level.
 3. Turn the power to the hoist OFF at the push button station
 4. Remove the enclosure cover. 1/16" Allen key included with switch for adjustment.
 5. Switch 'G' corresponds to the Full Down Level.
To adjust: loosen Red Set Screw with 1/16 Allen key, Turn knob "C" to trip Switch 'G'. A click will be heard and felt.
 6. Tighten Red Set Screw. The adjustment is now complete.
 7. Test the hoist to see if the hoist stops in the desired location.
 8. Raise the hoist to the Maximum Up Level.
 9. Turn the power to the hoist OFF at the push button station.
 10. Switch 'H' corresponds to the Maximum Up Level
To adjust: loosen Blue Set Screw with 1/16 Allen key, Turn knob "D" to trip Switch 'H'. A click will be heard and felt.
 11. Tighten Blue Set Screw. The adjustment is now complete.
 12. Test the hoist to see if the hoist stops in the desired location
 13. Return Allen key to holder.
 14. Replace the cover when done.
- Note: Knobs 'C' and 'D' need to be adjusted in the correct direction (CW or CCW). If the desired position is substantially off after testing, turn the knob in the opposite direction and reset the trip point.

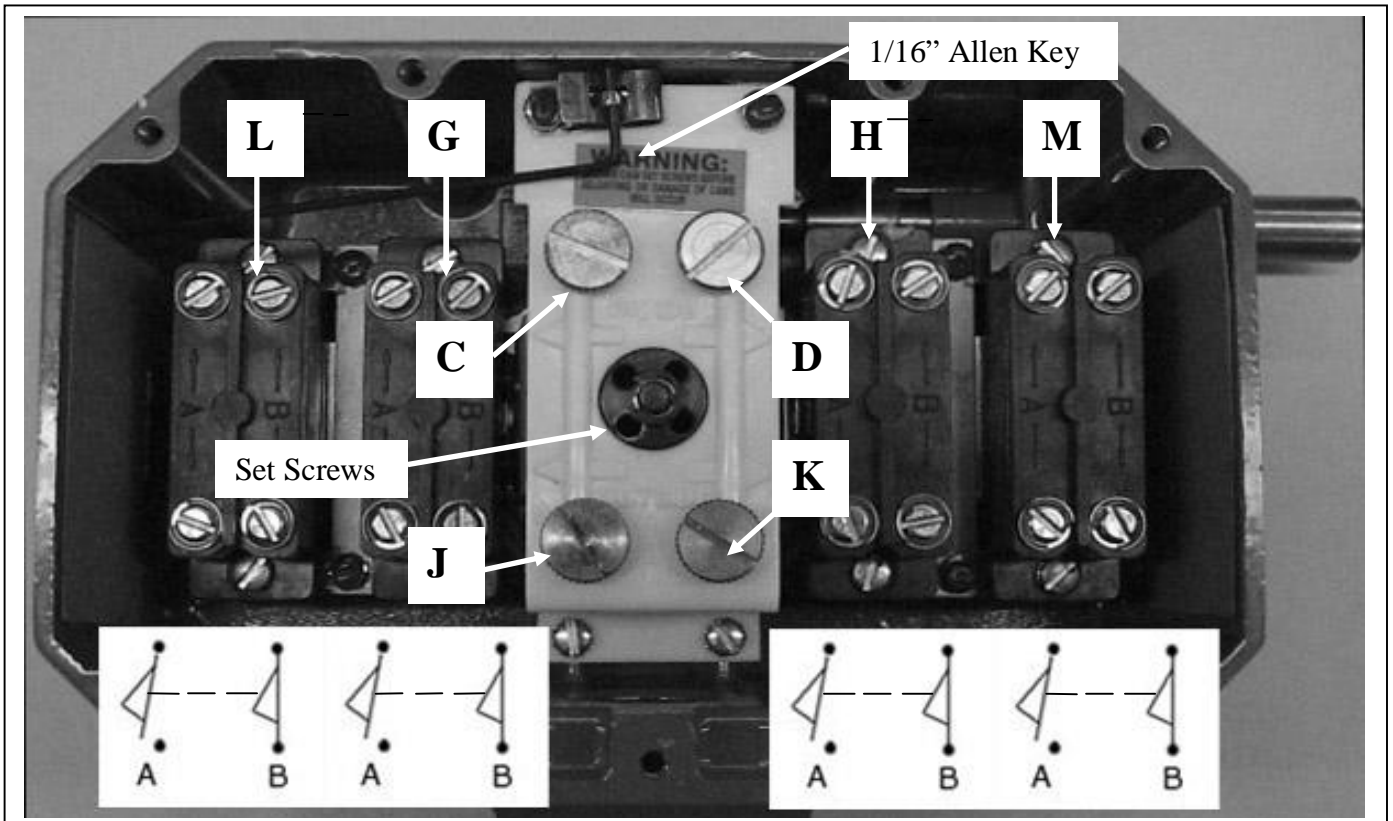
Ametek 2 Element Geared Limit Switch with Cover Removed



How to set an Ametek 4 Element Geared Limit Switch (NEMA 4)

1. Move the hoist down to Furthest Down Level.
 2. Turn the Power to the hoist OFF at the push button station
 3. Remove the enclosure cover. 1/16" Allen key included with switch for adjustment.
 4. Switch 'G' corresponds to the Full Down Level.
To adjust: loosen Yellow Set Screw with 1/16 Allen key, Turn knob "C" to trip Switch 'G'. A click will be heard and felt.
 5. Tighten Yellow Set Screw. The adjustment is now complete.
 6. Test the hoist to see if the hoist stops in the desired location.
 7. Raise the hoist to the Maximum Up Level.
 8. Turn the power to the hoist OFF at the push button station.
 9. Switch 'H' corresponds to the Maximum Up Level
To adjust: loosen Green Set Screw with 1/16 Allen key, Turn knob "D" to trip Switch 'H'. A click will be heard and felt.
 10. Tighten Green Set Screw. The adjustment is now complete.
 11. Test the hoist to see if the hoist stops in the desired location
 12. To adjust switch 'M': loosen Red Set Screw with 1/16 Allen key, Turn knob "K" to trip Switch 'M'. A click will be heard and felt.
 13. Tighten Red Set Screw. The adjustment is now complete.
 14. To adjust switch 'L': loosen Blue Set Screw with 1/16 Allen key, Turn knob "J" to trip Switch 'L'. A click will be heard and felt.
 15. Tighten Blue Set Screw. The adjustment is now complete.
 16. Return Allen key to holder.
 17. Replace the cover when done.
- Note: Knobs 'C', 'D', 'K', and 'J' need to be adjusted in the correct direction (CW or CCW). If the desired position is substantially off after testing, turn the knob in the opposite direction and reset trip point.

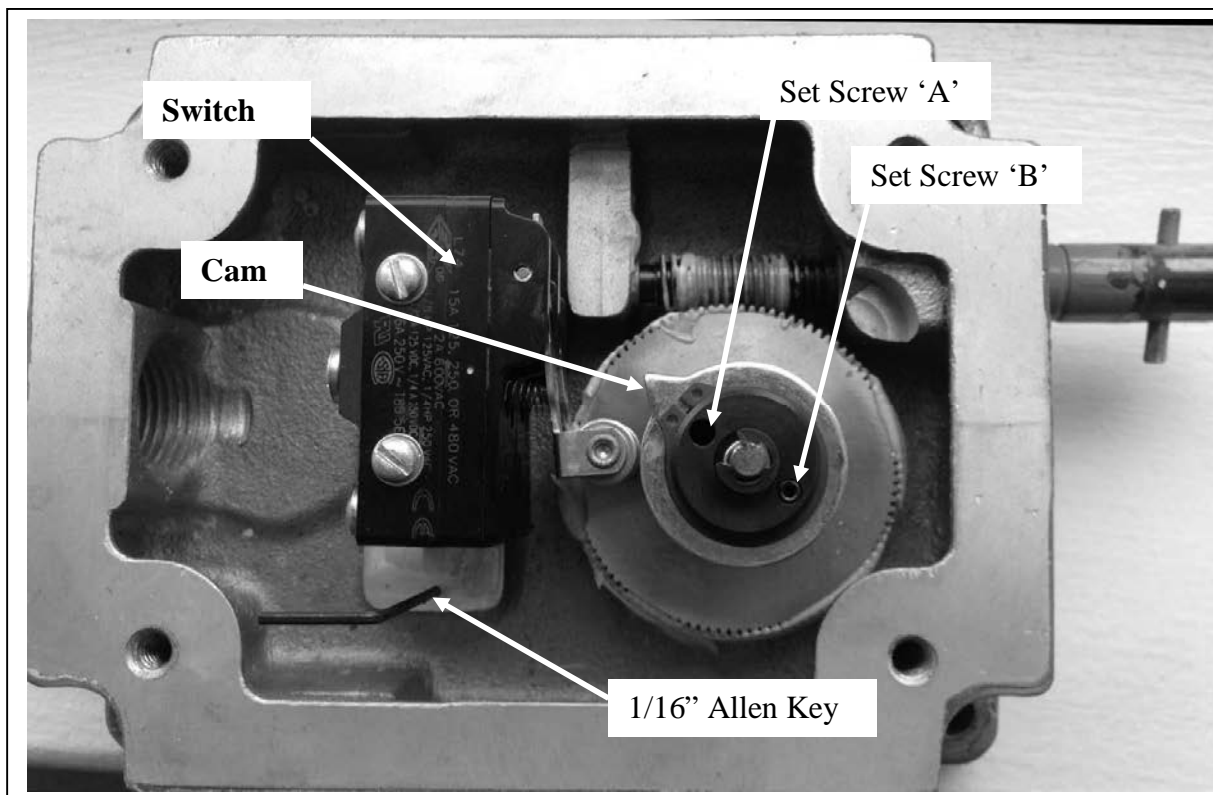
Ametek 4 Element Geared Limit Switch with Cover Removed



How to set an Ametek 2 Element Geared Limit Switch (NEMA 7&9)

1. Move the hoist down to Furthest Down Level.
2. Turn the Power to the hoist OFF at the push button station
3. Remove the enclosure cover. 1/16" Allen key included with switch for adjustment.
4. The lower cam corresponds to the Full Down Level.
To adjust: Loosen set screw "A" and rotate lower cam until the switch trips. A click will be heard and felt.
5. Tighten set screw "A". The adjustment is now complete.
6. Test the hoist to see if the hoist stops in the desired location.
7. Raise the hoist to the Maximum Up Level.
8. Turn the power to the hoist OFF at the push button station.
9. The upper cam corresponds to the Full Up Level.
To adjust: Loosen set screw "B" and rotate lower cam until the switch trips. A click will be heard and felt.
10. Tighten set screw "B". The adjustment is now complete.
11. Test the hoist to see if the hoist stops in the desired location
12. Return Allen key to holder.
13. Replace the cover when done.

Note: The cams need to be adjusted in the correct direction (CW or CCW). If the desired position is substantially off after testing, turn the knob in the opposite direction and reset trip point.



Section I

Power Paddle Limit Switch

Your hoist may have been provided with a Power Paddle Limit Switch instead of a standard Paddle Limit Switch. Power Paddle Limit Switches are line-voltage operated and typically an option for hoists in a frame. They are set at the factory to prevent the hook block from ascending too far up.

If the power paddle is activated, the hoist will stop and the following procedure must be followed:

1. Shut off the incoming power to the hoist.
2. Jumper both legs from inside the power paddle housing.
3. Turn on the incoming power to the hoist.
4. Press the DOWN button on the push button station so the Hook Block descends. Keep pressing the DOWN button until the lever arm on the power paddle is free.
5. Shut off the incoming power to the hoist.
6. Remove the jumper wires.
7. Turn on the incoming power to the hoist and resume normal operation.

H. Other Switches:

Slack Cable Limit Switches and Overload Switches are also optional switches that may be on your hoist. They are typically factory set and do not need to be re-adjusted at installation.

Section II Operation of Hoist

Electro Lift, Inc. recommends following the guidelines listed in Section II to properly operate your hoist. These items are only a guide presented by Electro Lift. The Hoist Operator **MUST** be instructed in the safe and proper operation of hoists and should cross-reference ANSI B30.16-1998, OSHA 1910.179, and the Hoist Operator's Manual published by the Hoist Manufacturers Institute. The Hoist Operator must follow comply with all OSHA, ANSI, ASME, local, state, federal, and any other regulatory agency requirements. Please review the following Safe Hoisting Practices before using any Electro Lift Hoist. These practices **MUST** be employed during operation of the hoist.

A. Safe Hoist Practices

Hand operated and electric hoists and trolleys of all types are designed with the safety of the operating personnel first in mind. Your own safety and that of your fellow workers will be assured when overhead materials handling equipment is used as recommended by the manufacturer. Disregarding such recommendations endangers life and property. Following are the basic safety rules worthy of your careful consideration and attention.

1. *Do not load beyond the rated capacity.*
2. *Do not use any overhead materials handling equipment for personnel.*
3. *Conduct a periodic visual inspection for signs of damage or wear.* Particular attention should be paid to the cable and hook. If the cable shows signs of wear or damage, or if the hook is distorted or opened, call this to the attention of the safety engineers before loading the hoist.
4. *Do not use hoisting cables as a substitute for slings -- Use slings only.* Cable or chain slings should be of proper size and type for load handling -- never use slings showing physical damage of any degree.
5. *Whenever the hoist is lowered in such a manner as to take the load off the wire rope, the operator should determine, before again making a lift, if the wire rope is properly reeved, on the drum.*
6. *Stand Clear of all loads* – If you must travel a load over the heads of other personnel, give ample warning of your intention before you move.
7. *Always “inch” the hoist into the load.* Running into the load at full hoist speed imposes excessive overloads on the hoist and could result in failure of parts and/or supporting structures. This is particularly true with high hoisting speeds.
8. *Limit Switches are for emergency use only and should not be tripped during normal operation.* If it is necessary to travel to the limit, use extreme caution and approach the limit in slow speed or by “inching.” Do not leave the hook block in contact with the limit switch at the end of the hoist operation.
9. *Be sure the hoist raises and lowers properly when the corresponding push buttons or control ropes are operated.* A reversal of direction indicates a phase reversal in the current conductor, the reversal of the rope on the drum, or an interchange of wires on a push button – any of which would cause the limit switch to be inoperative. Do not under any circumstances operate the equipment until the trouble has been found and corrected.
10. *Center the hoist over the load before lifting.* Do not side-pull or end-pull.
11. *Know the hand signals for hoisting, cross travel, and crane travel if working with cab operated hoists or cranes.* Operators should accept the signals of only those persons authorized to give them.

Section II

12. *Do not leave the load suspended in the air unattended.*
13. *Do not jog controls unnecessarily.* Hoist motors are general high torque, high slip types. Each start causes an inrush of current greater than the running current and leads to overheating and heat failure, or burn-out, if continues to excess.

B. Push Button Station

The hoist's motions are controlled at the push button station. Push Button Stations are configured specific to your hoist. There are always hoist UP and DOWN buttons. Other options can include:

1. ON and OFF buttons
2. FORWARD and REVERSE buttons for Trolleys and/or Bridges
3. Emergency STOP Buttons
4. Key-lock Switches.
5. START/STOP for Maintained Push Button Stations Only.

Refer to the Wiring Diagram in this manual to determine the particular configuration for you hoist.

Electro Lift hoists are provided with “momentary” push buttons for motion control. The buttons must be pressed in and held down to continue hoist motion.

Refer to the Wiring Diagram in this manual to determine the particular configuration for you hoist.

This is a sample Push Button Station.

The Push Button Station on your hoist may look different.



Section III. Maintenance of Hoists

Electro Lift, Inc. recommends following the guidelines listed in Section III to properly maintain your hoist. These items are only a guide presented by Electro Lift. The end-user should cross-reference ANSI B30.16-1998 and OSHA 1910.179. and must comply with all OSHA, ANSI, ASME, local, state, federal and any other regulatory agency requirements. General service and maintenance must be done by qualified person(s) in accordance to ANSI B30.16-1998. Maintenance logs must be kept and all updated mandatory standards supercede the following information.

A. Gear Cases, Hoist & Trolley:

The Gear Case is filled with the correct amount of oil at the factory. (Note that vertically mounted gear cases must be completely filled with oil.)

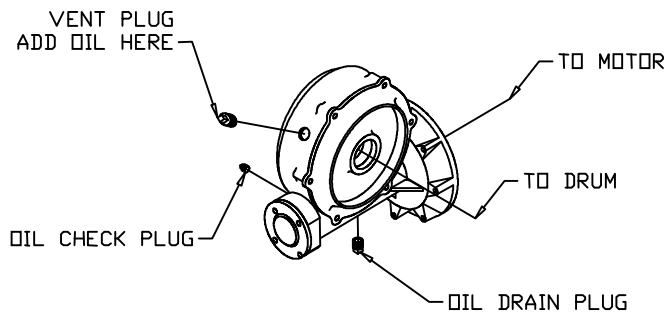
1. Lubrication

- a. Type: Electro Lift has used Exxon Cyclesstic TK680, Electro Lift Part No. DM7146. Only this type oil, or an equivalent, must be used.
DO NOT use and Extreme Pressure (EP) oil. EP oils will damage the bronze worm wheel and create an unsafe condition.
- b. The oil does need to be replaced at recommended intervals. First determine the service duty factor for the hoist. Reference Table 3: Hoist Duty Service Classification under “Inspections” in Part C, Section III. Change the oil as follows:

Class	Oil Change Frequency
H1 – infrequent or standby	3-7 years
H2 – light	3-7 years
H3 – standard	2-5 years
H4 – heavy	1-3 years
H5 – severe	6-12 months

Users must determine the severity of the operating conditions and adjust service intervals accordingly.

- c. The oil level must be checked and maintained.
Inspect the oil level according to the schedule indicated in “Inspections” in Part C of this Section. To check the oil level, locate the oil check plug as indicated below. Remove the check plug. Oil should flow from the gear case. If it oil does not flow from the gear case, add oil at the top vent plug. Continue to add oil until it flows from the gear case at the check plug.



Your gear case may look different. All plugs will be in a similar location.

- d. Initial Volume: The initial volume of gear case oil, as supplied from our factory, is indicated in the note section of the gear case drawing in Section IV of this manual.

Section III

B. Lubrication:

Reference Table 2: Lubrication Chart on the next page for appropriate lubricants

1. **BALL BEARINGS:** These are lubricated for life and require no further maintenance. These bearings are located at:
 - a. End(s) of drum shaft
 - b. Trolley Wheels
2. **HOOK BLOCKS:**
 - a. Bearings pressed in Hook Blocks are pre-lubricated
 - b. If your Hook block has a grease fitting (i.e. high capacity hoists), pump with general-purpose grease whenever regular maintenance is performed.
3. **INNER SHAFT SUPPORT BEARINGS and MISCELLANEOUS GREASE FITTINGS:**
 - a. If your hoist has inner shaft support bearings, (located between gear reducer and cable drums) or parts with Grease Fittings, pump with general-purpose grease whenever regular maintenance is performed.
4. **SPUR GEAR REDUCER UNITS** on “AB” or “BC” hoists only:
 - a. Spur Gears and their bearings are lubricated at the factory with grease. Do not add oil to the Spur Gear Housing.

Table 2: Lubrication Chart

Part	Lubricant	Quantity
Gear Cases: Hoist and Side Driven Trolleys	Electro Lift Part No. DM7146 Exxon Cyclesstic TK680 Oil or equivalent Note: Do not use Extreme Pressure Lubricants; these will damage the bronze worm wheel and create an unsafe condition.	for Trolley, Type "L" & "M": 8 oz for Type "A" & "AB": 14 oz for Type "B" & "BC": 18 oz for Type "C": 100 oz for Type "D": 200 oz
Spur Gear Reducer Units on "AB" or "BC" hoists	Electro Lift Part No. DM7154 Exxon Ronex MP Grease Note: Do not pour oil into Spur Gear Reducer Unit	As required
Wire Rope	Vitalife 400	As required

Section III

C. INSPECTIONS:

The following parts should be inspected in intervals according to the service duty of the hoist. Refer to Table 3: Hoist Duty Service Classification to first determine the class of the hoist. Worn parts must be replaced as needed. Contact Electro Lift for a recommended spare parts list and keep on hand spare parts for heavily used hoists. Provide the serial number of your hoist when contacting Electro Lift to ensure you receive the proper components.

- H-3, Standard Service - Conduct Inspections: Monthly
- H-4, Heavy Service: - Conduct Inspections: Weekly
- H-5, Sever Service: - Conduct Inspections: Daily

Table 3: Hoist Duty Service Classification

Hoist Class	Service Class	Typical Areas of Application
H1	Infrequent or Standby	Powerhouses and utilities, infrequent handling. Hoists used primarily to install & service heavy equipment, where loads frequently approach hoist capacity, with infrequent and widely scattered periods of utilization
H2	Light	Light machine shop and fabrication industries; service and maintenance work, where loads and utilization are randomly distributed with capacity loads infrequently handled, and where total running time of equipment does not exceed 10-15% of the work period.
H3	Standard	General machine shop, fabrication, assembly, storage and warehousing, where loads and utilization are randomly distributed, with total running time of equipment not exceeding 15-25% of the work period.
H4	Heavy	High volume handling in steel warehousing, machine shops, fabrication plants, mills, and foundries. Manual or automatic cycling operations in heat treating and plating operations. Total running time of equipment normally approaches 25-50% of work period, with loads at or near rated capacity frequently handled.
H5	Severe	Bulk handling of material in combination with buckets, magnets, or other heavy attachments, equipment often cab operated. Duty cycles approaching continuous operation are frequently necessary. User must specify exact details of operation, including weight of attachments.

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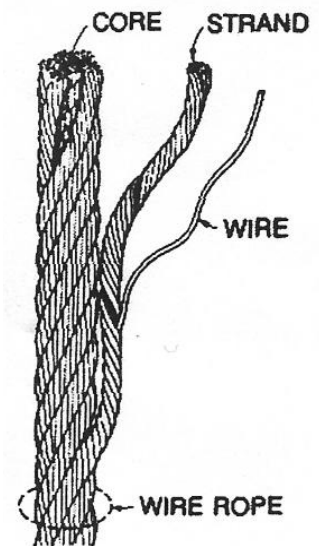
1. WIRE ROPE:

a. Wire Rope Inspection:

Check for any damaged, rusted, and broken strands in accordance to the information that follows. Damaged wire rope reduces the load capacity of the hoist and must be replaced as soon as possible. Wire rope must be purchased from Electro Lift to ensure the proper size and type is used on your hoist. Although typically Electro Lift can promptly ship wire rope from our stock, we recommend you keep a supply for immediate availability when required. Electro Lift is not responsible for, nor will our warranty cover, failed components not provided by Electro Lift.

Check for the following:

- (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, internal or external corrosion, or wear of outer wires.
- (6) Damage from heat.
- (7) Corroded or broken wire at end connections.
- (8) Corroded, cracked, bent, worn, damaged, or improperly applied end connections.
- (9) Wire rope pulls through of end connection.
- (10) Tightening of clamping-type end connections. Checking torque of bolts of end connections for clamps that recommended a specified torque on the clamp bolts.
- (11) Rope lubrication. (Rope lubrication will extend the service life of the wire rope).



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 inspection, such as sections passing over sheave.

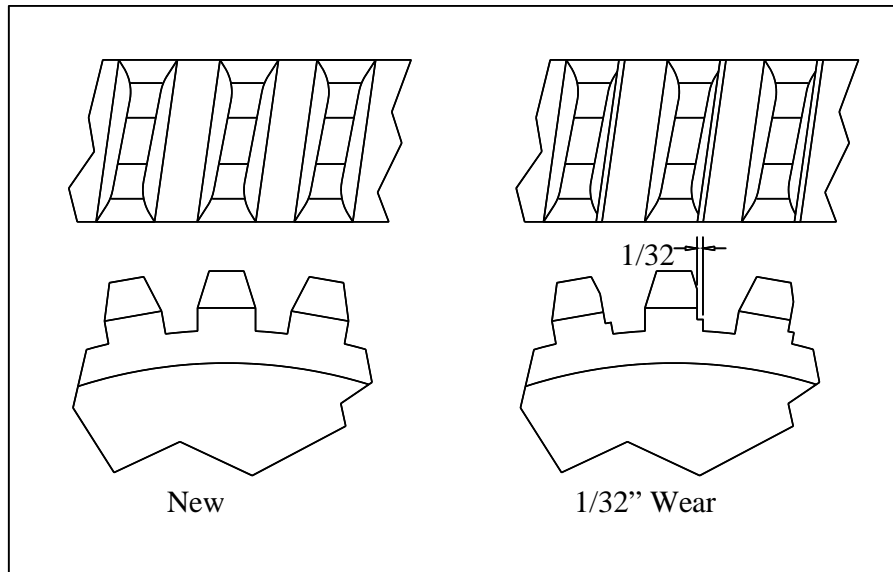
Rope conditions found during the inspection should be recorded in a written report. Amount and type of rope deterioration from one inspection report until the next inspection report should be evaluated for determination if rope replacement is required.

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- b. Wire Rope Replacement: Rope conditions found during an inspection, in addition to review of previous inspection reports, should be the basis for determination as to whether that hoist use should be discontinued and rope replacement is required. Rope conditions requiring replacement of the rope include the following:
- (1) One broken strand.
 - (2) Twelve randomly distributed broken wires in one rope lay.
 - (3) Four broken wires in one strand in one rope lay.
 - (4) 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.
 - (5) Wear of one-third of the original diameter of outside individual wires.
 - (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) Corroded or two broken wires at a socketed or swaged end fitting.
 - (9) Corroded, cracked, bent, damaged, or worn end fitting.
 - (10) Reduction of rope nominal diameter greater than:
 - 1/64 inch (0.4mm) for rope diameters up to and including 5/16 inch (8 mm)
 - 1/32 inch (0.8 mm) for rope diameters over 5/16 inch up to and including 1/2 inch (13 mm).
 - 3/64 inch (1.2mm) for rope diameters over 1/2 inch up to and including 3/4 inch (19 mm).
 - 1/16 inch (1.6mm) for rope diameters over 3/4 inch up to and including 1-1/8 inch (29mm).
 - 3/32 inch (2.4 mm) for rope diameters over 1-1/8 inch up to and including 1-1/2 inch (38 mm).
2. WIRE ROPE CLIPS & THIMBLE:
- a. All clip nuts must be present and tightened to proper torque.
 - b. Thimble must be in place.
3. LIMIT SWITCHES
- a. Check all limit and gear switches for proper function.
4. BRAKE:
- a. Check for proper operation & air gap adjustment.
 - b. Check internal parts (linings, armature plate, coils, etc.).
 - c. Note as the brake linings wear, the hoist will not stop as quickly as when it was new. Adjust the brake according to additional Brake information supplied in this manual.
5. HOOK AND HOOK LATCH:
- a. Check hook for surface cracks or damage.
 - b. Hook latch must be in place and function normally.
6. SHEAVES (HOOK BLOCK AND HOIST FRAME):
- a. Check for uneven wear.
7. DRUMS:
- a. Check for damage or excessive wear.

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8. GEAR CASE:
 - a. Inspect around gear case for oil leakage.
 - b. Check oil seals, check for proper amount of lubricant. Refer to Part A of this Section for instructions on how to check the oil level.
 - c. Check the Worm Wheel for Excessive Wear. If the wear equals $1/2$ the thickness of the gear tooth, then the worm wheel is approaching the end of its service life. Replacement of the gear set should be scheduled.



Drawing No. 1
Worm Wheel Tooth Profile

9. SPUR GEAR REDUCER:
 - a. Check for unusual sounds.
 - b. Check all Bearings.
 - c. Check for lubricant. If the gears do not appear to be coated with grease, add until well lubricated. See Table 2: Lubrication Chart
10. TROLLEYS:
 - a. Check Trolley Wheels, Suspension Bolts, and the (2) hex nuts under each side of the frame. Ensure that the cotter pin is located through these hex nuts.
11. PUSH BUTTON STATION:
 - a. Check for proper operation.
 - b. Check function labels for legibility.
 - c. Check push button cable for damage.
12. CONTACTORS:
 - a. Check the contact elements for damage.
 - b. Check coils for fast/smooth operation.
13. CAPACITY LABELS:
 - a. All capacity markings must be present and legible.
14. OVERALL:
 - a. Check all screws/bolts for tightness.

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D. HOW TO CHANGE THE WIRE ROPE CABLE.

1. Remove any load from the hoist. Note the path of the cable, especially on Hoists reeved 4 Part Single
2. Remove cable where anchored, and remove the hook block.
3. Rotate the drum until the cable is completely removed from the drum and the cable clip is visible through a hole in the drum guard.
4. Seize the cable clip and pull the cable in through the drum until only several feet of cable extend from inside the drum.
5. Butt the end of new cable against old cable and cover this joint with cloth electric tape or equivalent substitute.
6. Ease the cable through the drum until several feet of new cable extend from the outboard end.
7. Fold over last four (4) inches of cable and apply the cable clip. Keep clip as close to the end as possible.
 - a. Malleable clips are used only for anchoring cable in drum.
 - b. Malleable clips are not intended to be load bearing.
 - c. Malleable clips have a smooth silver metallic appearance; forged clips have a dull gray color with a red "U" bolt.
 - d. Malleable clips are to be torqued to values less than indicated on the following table:

MALLEABLE CLIPS TORQUE CHART

<u>Cable Size</u>	<u>Torque to less than:</u>
1/4 "	15 Ft-Lbs.
5/16"	15 Ft-Lbs.
3/8 "	30 Ft-Lbs.
7/16"	40 Ft-Lbs.
1/2"	45 Ft-Lbs.
9/16"	50 Ft-Lbs.

8. Pull the cable back through the drum until the clip is firmly seated in the outboard hub of the drum. The Cable and clip should not extend beyond end of drum and strike drum guard.
9. Wind the cable on the drum. Make sure the first two wraps are tight.
10. Reeve the cables around the sheaves and anchor at the dead ending. Relieve all twist from the cable before anchoring.
 - a. NOTE: Forged clips must be used in all wire rope terminations that are load bearing.
11. Turn back the specified amount of rope from the thimble or loop. Apply the first forged clip one base width from the dead end of the rope. Apply U-Bolt over the dead end of wire rope. The live end will rest in the saddle of the U-Bolt. Tighten all nuts evenly; alternate from one nut to the other until reaching the recommended torque as noted in Table 1: Forge Clip Information on the next page.
12. Apply the second clip as near to the loop or thimble as possible. Tighten all nuts evenly, alternating until the recommended torque.
13. Apply the third clip (if applicable) spaced evenly between the first and the second clip. Take up rope slack & tighten all nuts evenly, alternating until the recommended torque.
14. If the old cable is broken and it is impossible to butt the new cable against it, install cable from the outboard end of drum, using this same principle as described above.

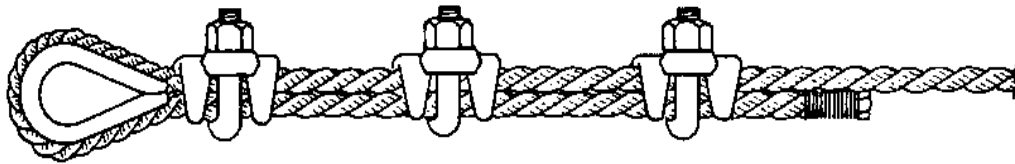
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Table 1: Forged Clip Information

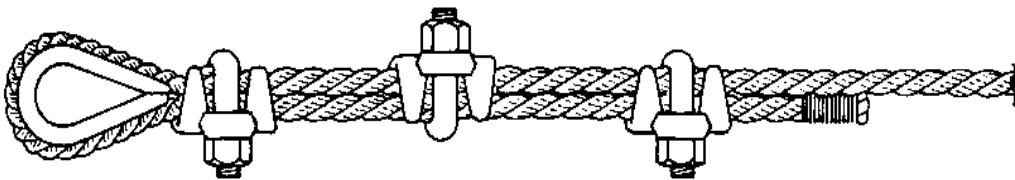
Clip Size (inches)	Minimum No. of Clips	Amount of Wire Rope To turn back (inches)	Torque (ft./lbs.)
1/4	2	4-3/4	15
5/16	2	5-1/4	30
3/8	2	6-1/2	45
7/16	2	7	65
1/2	3	11-1/2	65
9/16	3	12	95
5/8	3	12	95
3/4	4	18	130
7/8	4	19	225
1	5	26	225

Wire Rope Dead-Ending

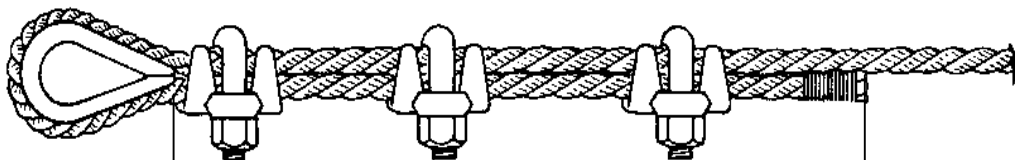
Note: This is a typical depiction of cable clip configuration and the number of clips may or may not be correct for your hoist. Hoists with greater or smaller cable diameters may require more or less clips.



RIGHT WAY FOR MAXIMUM ROPE STRENGTH



WRONG WAY: CLIPS STAGGERED

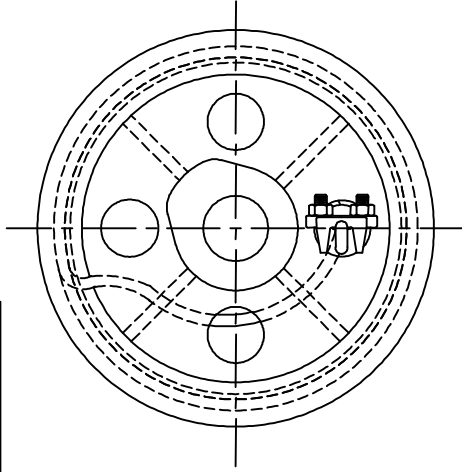
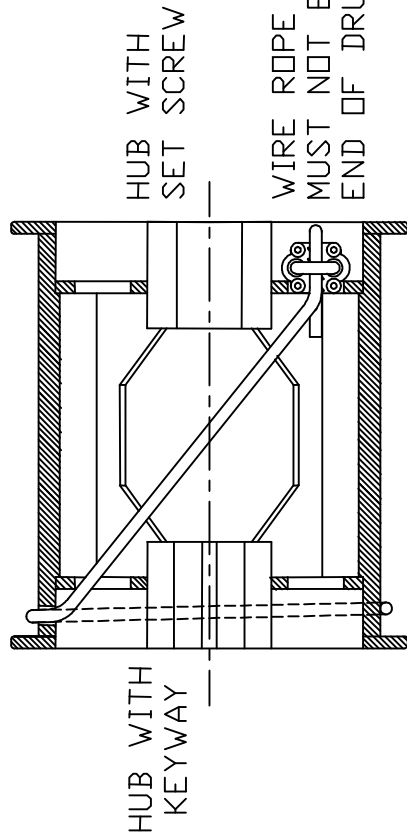


WRONG WAY: CLIPS REVERSED

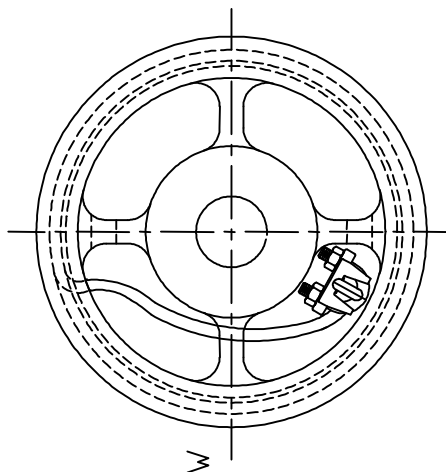
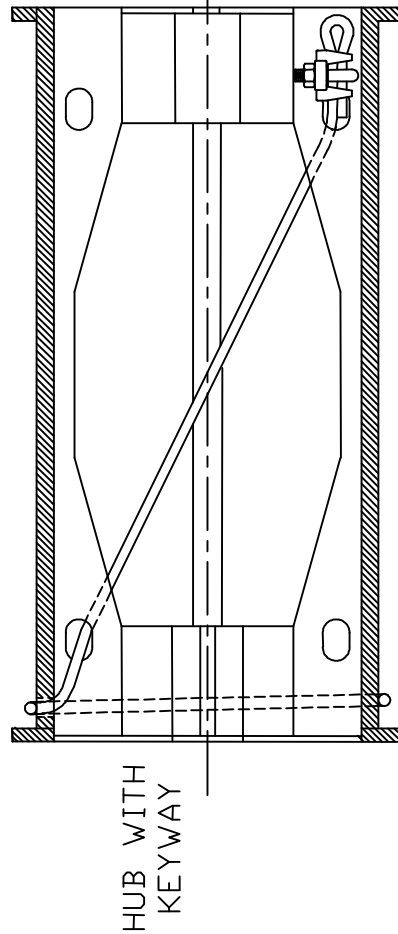
← Turn Back Wire Rope →

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DEAD ENDING OF WIRE ROPE INSIDE ELECTRO LIFT DRUMS.



TYPE 1 DRUM - HOLES AT FLANGED ENDS.



TYPE 2 DRUM - SPOKES AT FLANGED ENDS.

REV. 2, 1/22/04