EFFECTIVE: June 13, 2014

Owner's Manual

AIR POWERED CHAIN HOIST

AL SERIES

¼ Ton through 5 Ton Capacity

Code Number and Serial Number

⚠ WARNING

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

HARRINGTON
HOISTS AND CRANES

Table of Contents

Section **Page Number**

Section **Page Number**

1.0 Important Information and Warnings

1.1 Terms and Summary

This manual provides important information for personnel involved with the installation, operation and maintenance of this product. Although you may be familiar with this or similar equipment, it is strongly recommended that you read this manual before installing, operating or maintaining the product.

Danger, Warning, Caution and Notice - Throughout this manual there are steps and procedures that can present hazardous situations. The following signal words are used to identify the degree or level of hazard seriousness.

⚠ DANGER Danger indicates an imminently hazardous situation which, if not avoided, ***will*** result in ***death or serious injury***, and property damage.

⚠ WARNING Warning indicates an imminently hazardous situation which, if not avoided, ***could*** result in ***death or serious injury***, and property damage.

⚠ CAUTION Caution indicates a potentially hazardous situation which, if not avoided, ***may*** result ***minor or moderate injury*** or property damage.

NOTICE Notice is used to notify people of installation, operation, or maintenance information which is important but not directly hazard-related.

⚠ 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. For systems using the equipment covered by this manual, the supplier and owner of the system are responsible for the system's compliance with all applicable industry standards, and with all applicable federal, state and local regulations/codes.

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 your hoist's Code and 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 Harrington authorized replacement parts in the service and maintenance of this hoist.

⚠ WARNING

Equipment described herein is not designed for and **MUST NOT** be used for lifting, supporting, or transporting people or for lifting or supporting loads over people.

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.

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 and 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 ANSI/ASME B30.17, "Safety Standard for Top-Running Single Girder Cranes"; ANSI/ASME B30.2 "Safety Standard for Top-Running Double-Girder Cranes"; and ANSI/ASME B30.11 "Safety Standard for Underhung Cranes and Monorails".

If a below-the-hook lifting device or sling is used with a hoist, refer to ANSI/ASME B30.9, "Safety Standard for Slings" or ANSI/ASME B30.20, "Safety Standard for Below-the-Hook Lifting Devices".

Hoists, trolleys 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".

Special Conditions for using the hoist in a potentially explosive environment according to its ATEX rating:

- Non-compliance with any of these "Special Conditions" could result in ignition of potentially explosive atmospheres.
- The hoist must be used according to the operating conditions recommended in Section 2 of this manual. Exceeding the recommended temperatures or air pressure could result in increased surface temperatures and the hoist can become an ignition source.
- Ensure the hoist is grounded to the equipotential bonding system of the workspace (for example, through accessories such as hoses and air-pressure connections) to prevent ignition hazards from electrostatic discharge.
- Do not allow hard contact of the bottom block, hook, load chain or pendant against other objects. The impact of any hoist component beyond normal use may cause an ignition hazard from sparks.
- If the hoist is installed with a trolley or part of other equipment, ensure that the entire equipment complies with the ATEX requirements needed for the application.
- To maintain the ATEX rating it is very important that hoist inspection and maintenance is performed regularly. That includes checking the hoist for correct operation, and where appropriate, repairs as necessary, to maintain proper material coatings (plating and lubrication), to ensure protection from corrosion, wear, resistance, electrical conductivity, impact strength, ageing resistance and effects of temperature variation. (Examples: material plating loss due to wear will remove resistance to corrosion, spark resistance; lack of bearing lubrication could lead to increased operating temperatures, reducing spark resistance).
- If elevated temperatures or elevated vibration levels are detected, shut the hoist off and discontinue its use until it can be inspected and/or repaired.
- See paragraph 2.1.3 for more ATEX related information.

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

⚠ DANGER

HAZARDOUS AIR PRESSURE IS PRESENT IN THE HOIST, IN THE SUPPLY OF COMPRESSED AIR TO THE HOIST, AND IN THE CONNECTIONS BETWEEN COMPONENTS.

Before performing ANY maintenance on the equipment, de-energize the supply of compressed air to the equipment, and lock and tag the supply device in the de-energized position. Refer to ANSI Z244.1, "Personnel Protection - Lockout/Tagout of Energy Sources."

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 ANSI/ASME B30.16, "Safety Standard for Overhead Hoists", OSHA Regulations. 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 ANSI/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 ANSI/ASME B30.16, "Safety Standard for Overhead Hoists" and OSHA Regulations. If the hoist is installed as part of a total lifting system, such as an overhead crane, the applicable ANSI/ASME B30 volume that addresses that type of equipment must also be read by all personnel.

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

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

1.2 Warning Tags and Labels

The warning tag illustrated below in Figure 1-1 is supplied with each hoist shipped from the factory. If the tag is not attached to your hoist (for pendant control, the warning tag is attached to the pendant hose; for the pull cord control, the warning tag is attached to the up cord), order a tag from your dealer and install it. See parts list in the parts section of this manual. Read and obey all warnings attached to this hoist. Tag is not shown actual size.

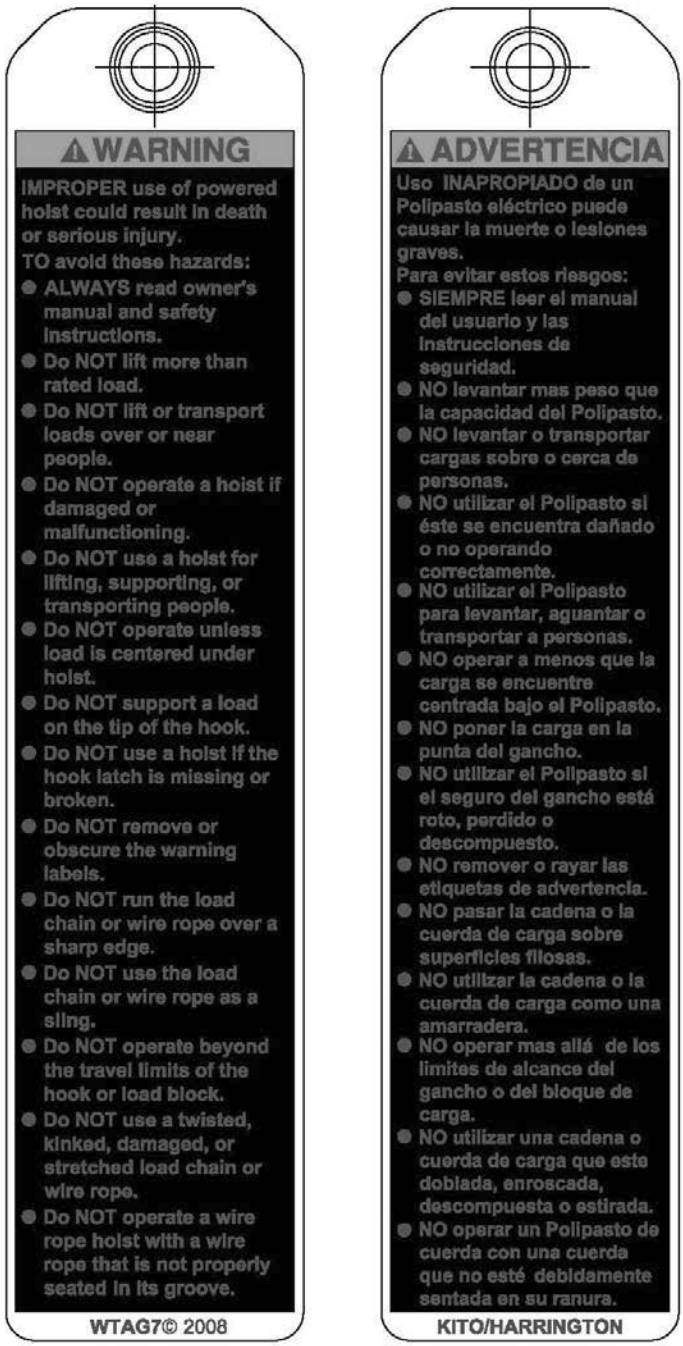

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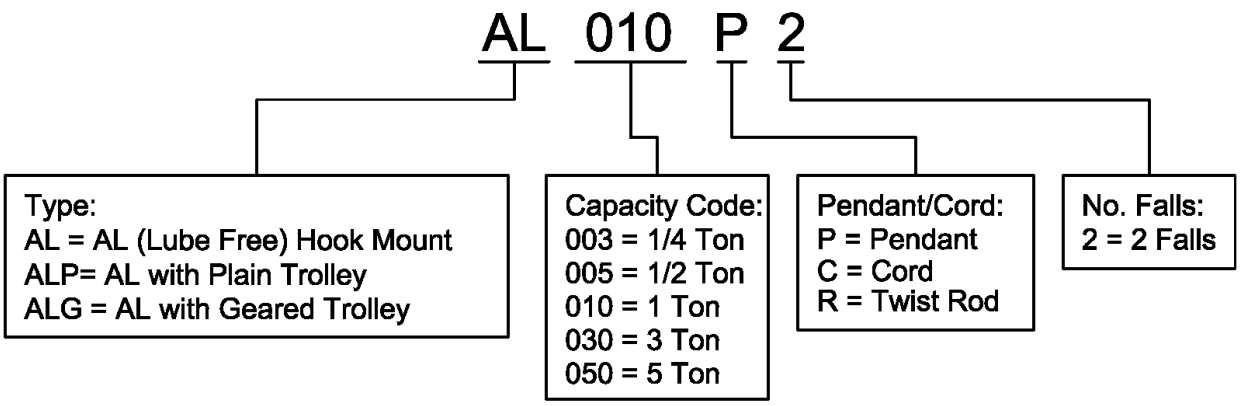
Figure 1-1 Warning Tag Attached to Hoist

2.0 Technical Information

2.1 Specifications

2.1.1 Product Code



2.1.2 Operating Conditions and Environment

Temperature range:	+14°F/-10°C to +104°F/+40°C (+160°F/+70°C for non ATEX applications)
Relative Humidity:	85% or less
Altitude:	6,000 ft. (1,830 m) or less
Noise Level:	83 dba maximum @ 1 meter when lifting rated load 83 dba maximum @ 1 meter when lowering rated load
Supply Air Pressure:	90 pounds per square inch
Air Consumption:	64 to 102 cubic feet minute
Air Filtration Requirements:	Maximum 15 micron air filter
Load Limiter:	Adjustable; Factory set to 100% of rated capacity

	Table 2-1 Hoist Specifications										
	Cap. (Tons)	Product Code	Standard Lift (ft)	Push Button Hose /Cord /Twist Rod L (ft)	Up/Down Speeds (ft/min @ 90 psi)		Up/Down Air Consumption Rates (cubic ft/min @ 90 psi)		Load Chain Diameter (mm) x Chain Fall Lines	Net Weight (lbs)	Weight for Additional One Foot of Lift (lbs)
					No Load	w/Full Load	No Load	w/Full Load			
Pendant Model	1/4	AL003P	10	7.5	85 / 66	61/ 105	98 / 64	78 / 72	6.5x1	39	0.6
	1/2	AL005P			78 / 49	41 / 72	102 / 68	81 / 74	6.5x1	39	0.6
	1	AL010P2			39 / 25	21 / 36	102 / 68	81 / 74	6.5x2	55	0.6
	3	AL030P			20 / 18	10 / 20	102 / 76	85 / 81	11.5x1	123	1.9
	5	AL050P2		8.6	9.8 / 8.9	5.2 / 9.8	102 / 76	85 / 81	11.5x2	234	1.9
Cord Model	1/4	AL003C	10	7.5	85 / 66	61/ 105	98 / 64	78 / 72	6.5x1	37.5	0.6
	1/2	AL005C			78 / 49	41 / 72	102 / 68	81 / 74	6.5x1	37.5	0.6
	1	AL010C2			39 / 25	21 / 36	102 / 68	81 / 74	6.5x2	53	0.6
	3	AL030C			20 / 18	10 / 20	102 / 76	85 / 81	11.5x1	121	1.9
	5	AL050C2		8.6	9.8 / 8.9	5.2 / 9.8	102 / 76	85 / 81	11.5x2	232	1.9
Twist Rod Model	1/4	AL003R	10	3.5 to 6.5	85 / 66	61/ 105	98 / 64	78 / 72	6.5x1	39	0.6
	1/2	AL005R			78 / 49	41 / 72	102 / 68	81 / 74	6.5x1	39	0.6
	1	AL010R2			39 / 25	21 / 36	102 / 68	81 / 74	6.5x2	54	0.6
	3	AL030R			20 / 18	10 / 20	102 / 76	85 / 81	11.5x1	123	1.9
	5	AL050R2		3.5 to 6.5	9.8 / 8.9	5.2 / 9.8	102 / 76	85 / 81	11.5x2	234	1.9

2.1.3 Explanation of ATEX Directive and Markings

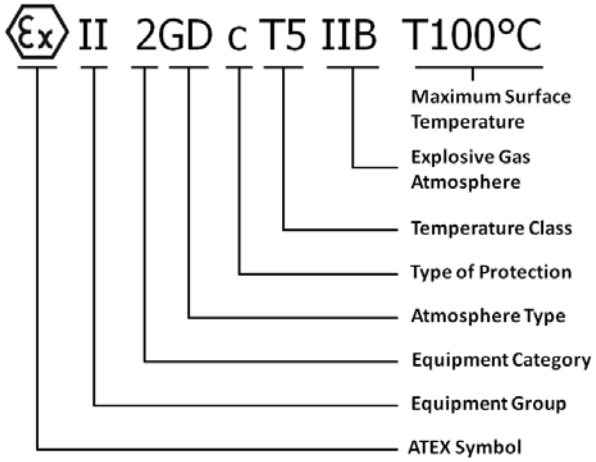
Hoists intended for use in potentially explosive atmospheres require measures to reduce the risk of explosions. Requirements for such measures come from the European Directive 94/9/EC, commonly referred to as the ATEX Directive (ATEX is from the French ATmospheres EXplosibles), and its supporting standards.

The explosion protection and prevention measures for non-electrical equipment such as air hoists differ from those applied to electrical equipment. Requirements for non-electrical equipment are provided in the EN 13463 series of standards. Air hoists that meet the appropriate requirements of the EN 13463 standards satisfy the ATEX Directive and can be used in potentially explosive atmospheres.

Harrington Hoist and Crane's (HHI) AL hoists use the "constructional safety" type of protection in accordance with EN 13463-5 *Non-electrical equipment intended for use in potentially explosive atmospheres - Part 5: Protection by constructional safety 'c'*. This standard defines constructional safety as ignition protection in which constructional measures are applied so as to protect against the possibility of ignition from hot surfaces, sparks and adiabatic compression generated by moving parts. Constructional measures that satisfy EN 13463-5 include use of materials that reduce or eliminate the risk of sparks produced by impact or friction. This can generally be considered equivalent to the term "spark-resistant features."

The ATEX Directive and the EN 13463 standards require detailed markings to assure the hoists are used correctly. These markings define the applications, the type and duration of the potentially explosive atmospheres, the type of protection, and the maximum surface temperature.

Table 2-2 ATEX Rating Explanation

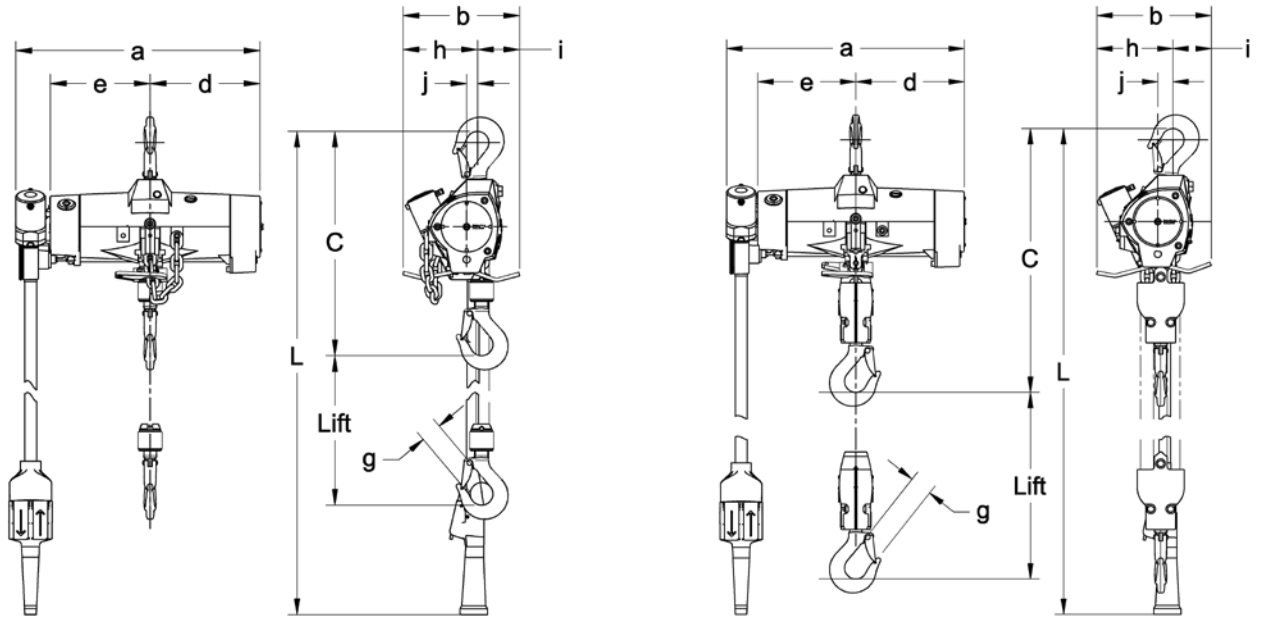


Marking	Definition	AL Hoist
ATEX Symbol	Equipment suitable for potentially explosive atmospheres in accordance with the ATEX Directive.	Ex
Equipment Group	'I' means suitable for use in mines susceptible to firedamp and/or coal dust. 'II' means suitable for non-mine locations that could be endangered by potentially explosive atmospheres.	II
Equipment Category	'1' means for use in areas where an explosive atmosphere is present continuously, for long periods, or frequently. '2' means for use in areas where an explosive atmosphere is likely to occur in normal operation. '3' means for use in areas where an explosive atmosphere is unlikely to occur in normal operation.	2
Atmosphere Type	'G' means suitable for Gas. 'D' means suitable for Dust.	GD
Type of Protection	This letter indicates the type of protection method used. There are several. "c" means constructional safety.	c
Temperature Class	Designation that indicates the maximum surface temperature the hoist will have during normal operation. There are several designations. T5 = 100°C	T5
Explosive Gas Atmosphere	Designation that indicates the type of gases, vapors and mists the hoist is suitable for. Designations applicable to Equipment Group II: 'IIA' means atmosphere containing methane, propane, or similar gases. 'IIB' means atmosphere containing ethylene or similar gases. 'IIC' means atmospheres containing hydrogen, acetylene, or similar gases.	IIB
Maximum Surface Temperature	The maximum surface temperature the hoist will have during normal operation.	T100°C

Actual AL Nameplate Marking: Ⓔx II 2GD c T5 IIB T100°C

2.2 Dimensions

Table 2-3 AL with Pendant Control Dimensions										
Cap. (Tons)	**Product Code**	**Headroom C (in)**	**a (in)**	**b (in)**	**d (in)**	**e (in)**	**g (in)**	**h (in)**	**i (in)**	**j (in)**
1/4	AL003P	14.8	15.9	7.7	7.2	6.6	1.1	4.8	2.9	0.7
1/2	AL005P	14.8	15.9	7.7	7.2	6.6	1.1	5.1	2.6	1.0
1	AL010P2	17.5	15.9	7.7	7.2	6.6	1.1	5.1	2.6	1.0
3	AL030P	22.6	22.0	13.7	10.4	9.6	2.0	7.8	5.9	1.5
5	AL050P2	30.9	22.0	13.7	10.4	9.6	2.4	8.9	4.7	2.7

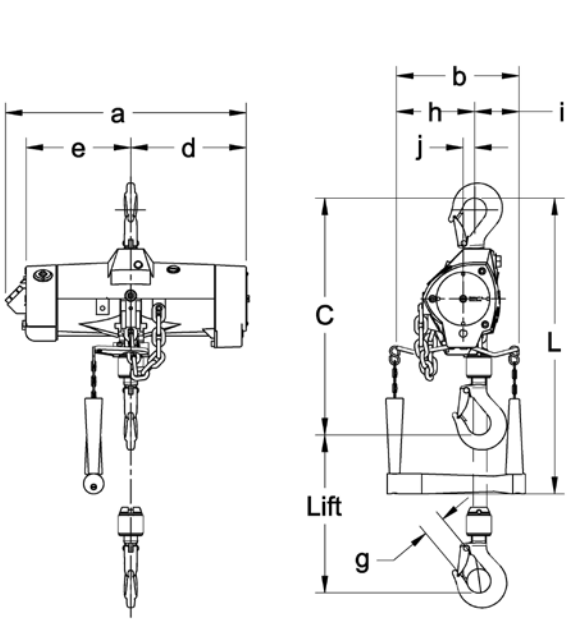


Single Fall Hoist

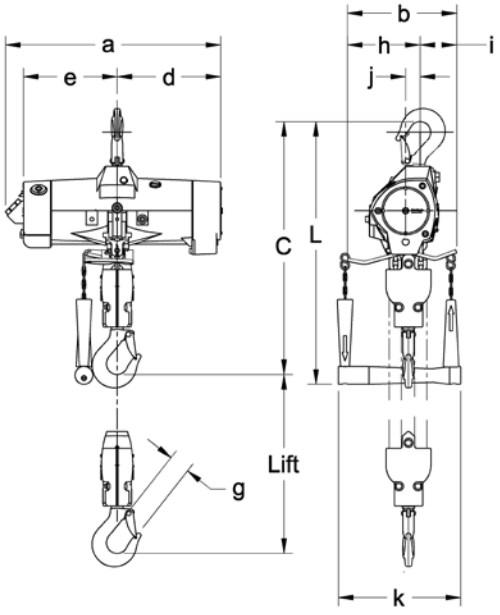
Double Fall Hoist

Figure 2-1 Pendant Model AL (See Table 2-3)

Table 2-4 AL with Cord Control Dimensions											
Cap. (Tons)	**Product Code**	**Headroom C (in)**	**a (in)**	**b (in)**	**d (in)**	**e (in)**	**g (in)**	**h (in)**	**i (in)**	**j (in)**	**k (in)**
1/4	AL003C	14.8	15.4	7.7	7.2	6.7	1.1	4.8	2.9	0.7	8.7
1/2	AL005C	14.8	15.4	7.7	7.2	6.7	1.1	5.1	2.6	1.0	8.7
1	AL010C2	17.5	15.4	7.7	7.2	6.7	1.1	5.1	2.6	1.0	8.7
3	AL030C	22.6	21.5	13.7	10.4	9.6	2.0	7.8	5.9	1.5	8.7
5	AL050C2	30.9	21.5	13.7	10.4	9.6	2.4	8.9	4.7	2.7	8.7



Single Fall Hoist



Double Fall Hoist

Figure 2-2 Cord Model AL (See Table 2-4)

Table 2-5 AL with Twist Rod Control Dimensions										
Cap. (Tons)	**Product Code**	**Headroom C (in)**	**a (in)**	**b (in)**	**d (in)**	**e (in)**	**g (in)**	**h (in)**	**i (in)**	**j (in)**
1/4	AL003R	14.8	15.4	7.7	7.2	6.7	1.1	4.8	2.9	0.7
1/2	AL005R	14.8	15.4	7.7	7.2	6.7	1.1	5.1	2.6	1.0
1	AL010R2	17.5	15.4	7.7	7.2	6.7	1.1	5.1	2.6	1.0
3	AL030R	22.5	21.5	13.7	10.4	9.6	2.0	7.8	5.9	1.5
5	AL050R2	30.9	21.5	13.7	10.4	9.6	2.4	8.9	4.7	2.7

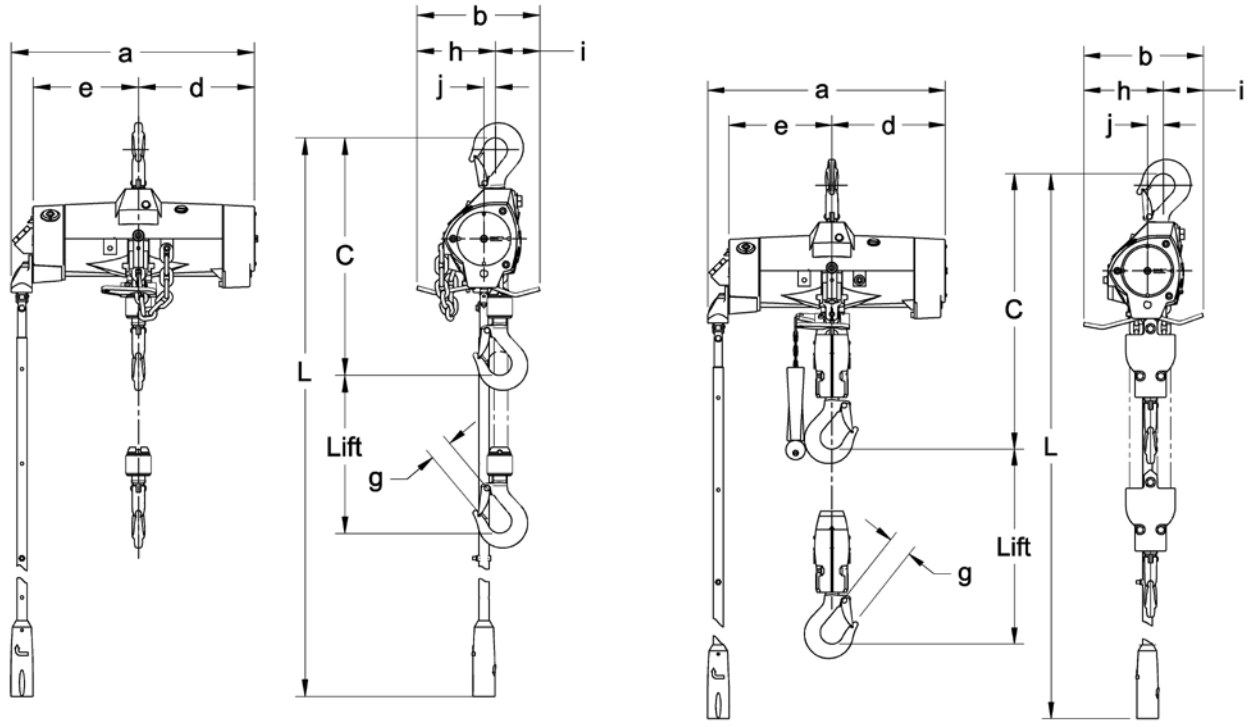
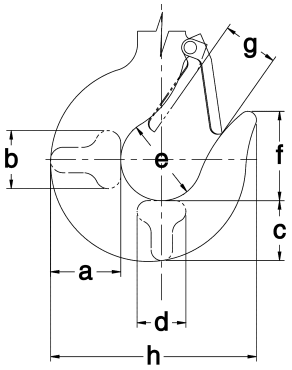


Figure 2-3 Twist Rod Model AL (See Table 2-5)

Table 2-6 Top and Bottom Hook Dimension*



Units = inch

Product Code	a	b	c	d	e	f	g	h
AL003C/P/R	1.02	0.79	1.02	0.79	1.50	1.32	1.14	3.43
AL005C/P/R	1.02	0.79	1.02	0.79	1.50	1.32	1.14	3.43
AL010C2/P2/R2	1.02	0.79	1.02	0.79	1.50	1.32	1.14	3.43
AL030C/P/R	1.65	1.26	1.40	1.10	2.28	2.32	1.97	5.20
AL050C2/P2/R2	1.97	1.57	1.73	1.30	2.76	2.72	2.36	6.30

*Refer to Section 5.7 for inspection dimensions and limits.

3.0 Preoperational Procedures

3.1 Air Supply System Requirements

3.1.1 **NOTICE** Pressure and Flow – Verify that the air supply system has capacity to supply the air hoist with required pressure and flow. Otherwise the hoist may operate poorly or may fail to operate. See Section 3.2.

3.1.2 **⚠ CAUTION** Air Quality – Good air quality is essential to prevent damage to the hoist and to ensure its proper operation. The air must be clean and free of debris such as dirt and rust. Refer to Section 3.4 for filtration requirements. The air must also be dry; free of moisture and water. Refer to Section 3.5.

3.1.3 This hoist is equipped with a lube-free vane motor that does not require lubrication of the supply air for operation. However, if the hoist supply air is lubricated, there is no disadvantage. For further information, see section 3.3

3.2 Air Supply Capacity And Regulation

3.2.1 Capacity – The air supply system must be capable of delivering the required airflow (cfm) to the hoist inlet port. Without the required airflow the hoist will not operate properly or may not operate at all. See Section 2.0 for the hoist air consumption requirements. In determining if the air supply system is capable of supplying the required airflow, consider the following:

- Capacity of compressor(s) and tank
- Other air consuming equipment
- Flow restrictions such as pipes, hoses, valves and fittings

Inadequate capacity will cause a significant drop in pressure when the hoist is operated, and could cause poor performance or failure to operate.

3.2.2 Regulation – The hoist requires a constant supply of air at a pressure of 90 psi to work properly. If the air supply is not regulated or is regulated at a pressure greater than 90 psi, a regulator must be used. The regulator may be located anywhere upline of the lubricator in the air supply to the hoist.

3.3 Lubrication

3.3.1 AL hoists do not require lubrication for safe operation; however if the hoist supply air is lubricated, there is no disadvantage.

3.3.2 If using lubrication, follow the guidelines below for the best results. The lubricator must be located as follows:

1) **Best location** – At the hoist inlet. In this case the lubricator can be either the mist type or drop type.
2) **Second best location** – No more than 15 feet away from the hoist, at the same elevation or above the hoist inlet. In this case the mist type lubricator must be used.
3) **Third best location** – No more than 15 feet away below the hoist. In this case the mist type lubricator must be used.

3.3.2 **⚠ CAUTION** The lubricator must be set to deliver the equivalent of 6 to 10 drops of oil per minute (0.1 to 0.2 cc/minute). The hoist's exhaust will emit a fine oil mist when properly lubricated.

3.4 Filtration

3.4.1 **⚠ CAUTION** The air entering the hoist inlet must not contain any particulate greater than 15 microns in size. Therefore, the hoist must have a 15 micron filter in its air supply. If using a lubricator, the filter must be upstream.

3.4.2 The filter servicing the hoist can also service other hoists and air consuming equipment. In this case, the air filter must be in sized for the total air consumption of the equipment it is servicing.

3.4.3 It is recommended to use a filter with automatic draining capability, to prevent excessive moisture accumulation.

3.5 Air Dryer – **⚠ CAUTION** To prevent corrosion and hoist malfunction, employ an air dryer in the air supply system to ensure that dry air is supplied to the hoist. If there is moisture in the air supplied to the hoist, this moisture will cause corrosion on internal hoist components during periods when the hoist is idle leading to hoist malfunction.

3.6 Piping, Hoses And Fittings

3.6.1 **⚠ CAUTION** System Configuration – The system should be configured as shown in Figure 3-1. Since moisture tends to accumulate in compressed air systems, corrosion may result if the system is not periodically drained.

- Arrange for a drain in the air supply piping at the lowest point in the piping, and
- Periodically drain the system to remove moisture/water from the system and to prevent corrosion.
- Filter (auto draining model), regulator (if equipped), and lubricator must be arranged in the order shown in Figure 3-2.

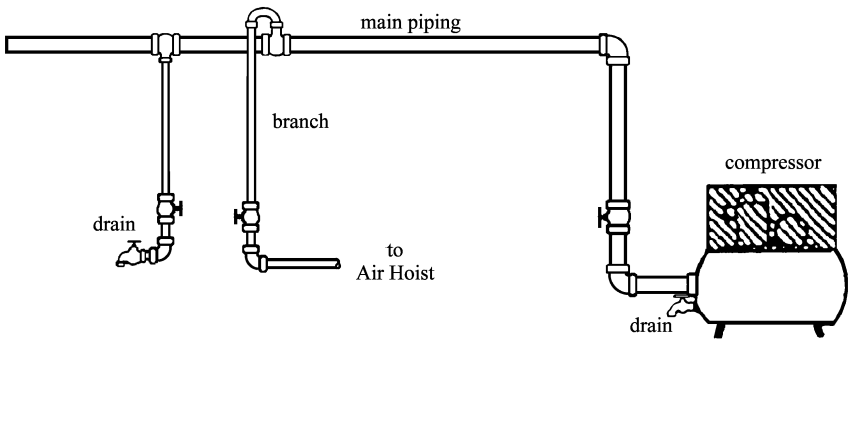


Figure 3-1 Diagram of Air Supply Configuration (Typical)

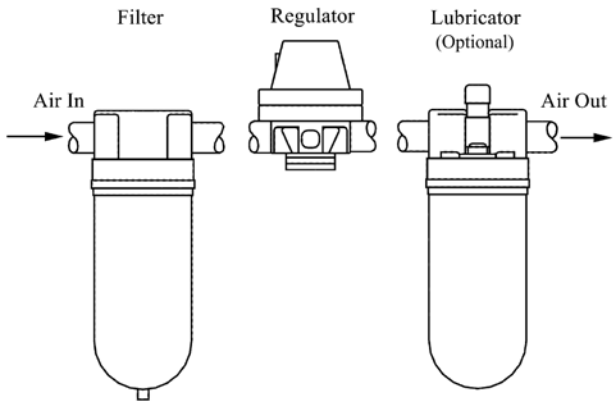


Figure 3-2 Typical Air Supply Filter with auto drain, Regulator and Lubricator.

3.6.2 **NOTICE** Piping – Pipe should be sized to accommodate the hoist airflow requirements. Table 3-1 gives recommended pipe sizes.

Table 3-1 Air Supply Pipe and Hose Sizes

Model	Diameter of Supply Pipe	Diameter of Supply Hose
AL003, AL005, AL010, AL030, AL050	Inside diameter 0.75 inch or larger	Inside diameter 0.5 inch or larger

3.6.3 **NOTICE** Hoses – The connection from the air supply system piping to the hoist must be made with a flexible pressure hose. Due to normal line losses in air supply lines:

- Do not use hose smaller than specified in Table 3-1, and
- Limit the length of the hose to that specified in Figure 3-3.

If your application exceeds these requirements consult factory.

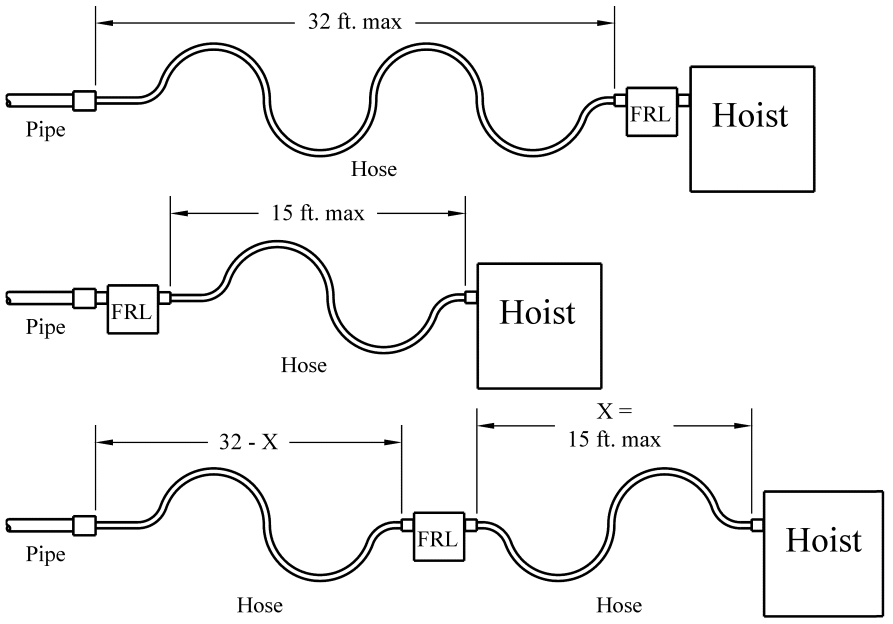


Figure 3-3 Typical Arrangements of Filter, Regulator and Lubricator and Maximum Air Supply Hose Lengths

3.6.4 **⚠ CAUTION** Fittings - Important considerations regarding fittings in the hoist's air supply include:

- When connecting air supply components, remove all dirt or debris from the connecting surfaces of the hoses, pipes, fittings, or threaded fasteners to prevent contaminants from entering the hoist.
- Keep airflow restrictions such as quick disconnect fittings, bends, elbows, and adapters to a minimum.

3.6.5 **⚠ CAUTION** Before connecting the hoist to its air supply line; perform the proper draining and purging procedures to prevent contaminants or moisture from entering the hoist.

3.7 Mounting Location

3.7.1 **⚠ WARNING** Prior to mounting the hoist ensure that the suspension and it supporting structure are adequate to support the hoist and its loads. If necessary consult a professional that is qualified to evaluate the adequacy of the suspension location and its supporting structure.

3.7.2 **NOTICE** See Section 7.8 for outdoor installation considerations.

3.8 Connecting Hoist to Air Supply

3.8.1 **⚠ WARNING** **HAZARDOUS AIR PRESSURE IS PRESENT IN THE HOIST, IN THE SUPPLY OF COMPRESSED AIR TO THE HOIST, AND IN THE CONNECTIONS BETWEEN COMPONENTS.**

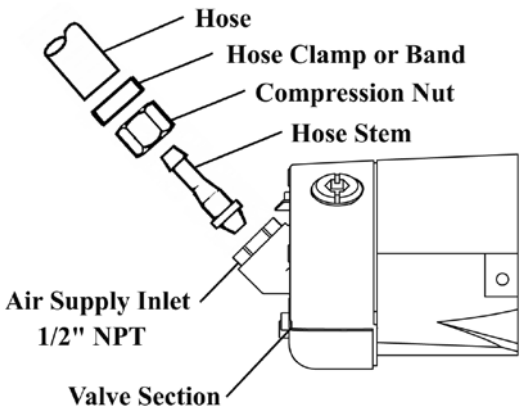


Figure 3-4 Typical Air Supply Connection

3.8.2 Shut off the air supply and stop the airflow completely. Lock out and tag out in accordance with ANSI Z244.1 "Personnel Protection -Lockout/Tagout of Energy Sources".

3.8.3 **⚠ CAUTION** Before connecting the air supply hose to the hoist, always purge the air hose to clear any debris and water.

3.8.4 Make connections to air supply; reference **Figure 3-4**. Use a reducing adapter at the hoist valve section for hose sizes larger than 1/2 inch.

3.8.5 **NOTICE** Where conditions dictate, the installation sequence can be reversed by mounting the hoist first (Section 3.9) followed by connecting the air supply (Section 3.8).

3.9 Mounting the Hoist

3.9.1 Manual Trolley - Follow instructions in Owner's Manual provided with the trolley.

3.9.2 Motorized Trolley - Follow instructions in Owner's Manual provided with the trolley.

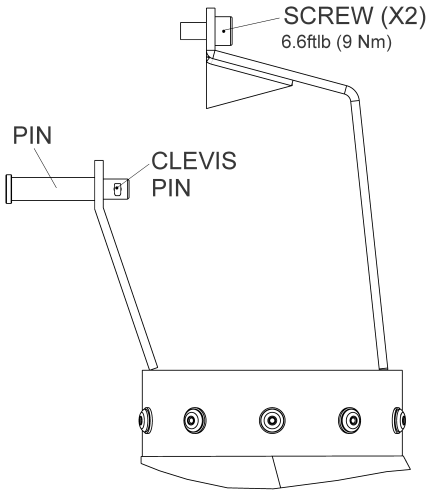
3.9.3 Hook Mounted to a Fixed Location - Attach the hoist's top hook to the fixed suspension point.

3.9.4 **⚠ WARNING** Ensure that the fixed suspension point rests on the center of the hook's saddle and that the hook's latch is engaged .

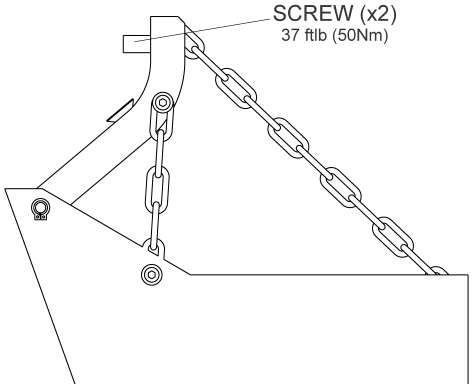
3.10 Optional Chain Container

3.10.1 For installation of the optional chain container refer to **Figure 3-5** and perform the following:

- Torque all fasteners to the values shown.
- Feed the chain into the chain container beginning with the free end. Take care to avoid twisting or tangling the chain.
- Do not use the chain container if any parts are damaged or if any fastener/hardware is missing.



For AL003, 005, 010



For AL030, AL050

Figure 3-5 Optional Chain Container Installation

3.11 Non-Stationary Application

3.11.1 For applications such as rental fleets or construction sites where the hoist is moved from place-to-place, a filter may be appropriate. Consult factory for recommended methods.

3.11.2 Connections and fittings must be kept clean and care taken to prevent dirt, debris and moisture from entering the hoist.

3.11.3 Recommended practice for removing the hoist from an installation:

- Verify the hoist operates correctly (note any malfunctions or abnormal noises)
- Shut off the air supply to the hoist, bleed off any pressure in the system
- Disconnect the air supply line
- Inject a small quantity (approximately 20 drops) of turbine oil (see Section6.0) into the hoist's inlet port
- Plug the inlet port

3.12 Preoperational Checks and Trial Operation

3.12.1 **⚠ CAUTION** Check for the availability of required operating air pressure of 90 PSI at the hoist's inlet port before trying to operate the hoist.

3.12.2 **⚠ WARNING** Verify that the load chain is not twisted or tangled and that the bottom hook is not capsized prior to operating the hoist. Correct all chain irregularities before conducting the first hoist operation. See Figures 3-6 and 3-7.

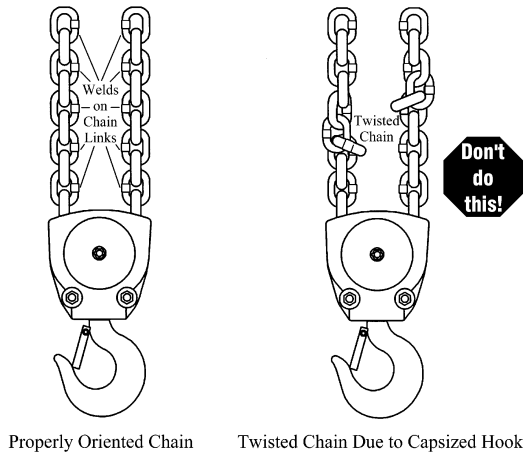


Figure 3-6 Twist in Load Chain

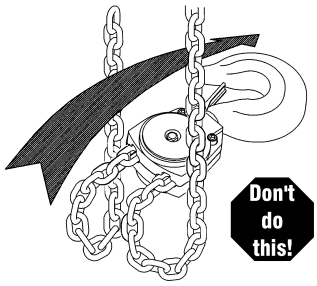


Figure 3-7 Capsized Hook and Chain

3.12.3 **⚠WARNING** Confirm the adequacy of the rated capacity for all slings, chains, wire ropes and all other lifting attachments before use. Inspect all load suspension members for damage prior to use and replace or repair all damaged parts.

3.12.4 **⚠WARNING** Verify the Chain/Limit Lever is operational and can move freely in both the up and down directions. For reference see Figure 3-8.

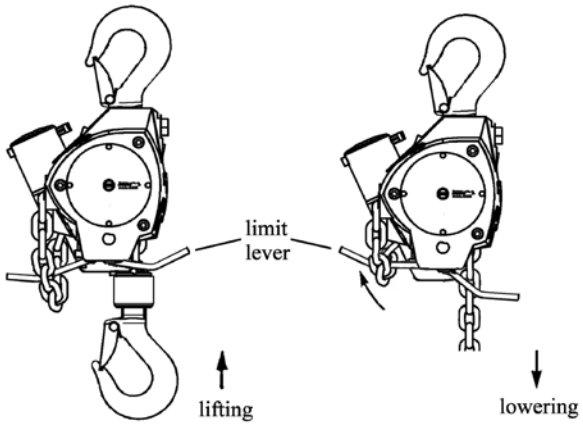


Figure 3-8 Limit Switch Components

3.12.5 Measure and record the “K” dimension of all hooks on hoist. See Table 5-6 under Section 5, “Inspection”. Always use the same side of the hook to measure and record the "K" dimension.

3.12.6 Record the hoist Code Number and Serial Number (from the nameplate on the hoist – see Section 10) in the space provided on the cover of this manual.

3.12.7 Ensure that the hoist is properly installed to either a fixed point, or trolley, whichever applies.

3.12.8 If hoist is installed on a trolley, ensure that

- trolley is properly installed on the beam, and
- stops for the trolley are correctly positioned and securely installed on the beam.

3.12.9 Ensure that all nuts, bolts and split (cotter) pins are sufficiently fastened.

3.12.10 For hoists with pendant controls, ensure that the pendant's exterior flexible hose is intact and is properly attached to the hoist. Also ensure that the air tubing and strain relief cord inside the pendant hose are properly attached to the hoist. See Section 7.4.

3.12.11 **⚠ CAUTION** Check Air Supply - Check air supply before everyday use. Ensure proper air quality and air pressure.

3.12.12 **NOTICE** If using an air lubricator, check the lubricator for proper function and adequate oil level.

3.12.13 Confirm proper operation.

- Before operating read and become familiar with Section 4 - Operation.
- Before operating ensure that the hoist (and trolley) meets the Inspection, Testing and Maintenance requirements of ANSI/ASME B30.16.
- Before operating ensure that nothing will interfere with the full range of the hoist’s (and trolley’s) operation.

3.12.14 Proceed with trial operation to confirm proper operation.

- **⚠ CAUTION** Make sure hook travel is in the same direction as shown on controls.
- Initially operate slowly under no load in both directions. Verify that the controls agree with the hoist direction.
- Perform inspections per Section 5.3, “Frequent Inspections”.

4.0 Operation

4.1 Introduction

⚠ DANGER

DO NOT WALK UNDER A SUSPENDED LOAD

⚠ 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 SECTIONS OF ANSI/ASME B30.16 and ANSI/ASME B30.10. THE OPERATOR SHALL ALSO BE REQUIRED 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 FOR 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** HAVE A HISTORY OF OR BE PRONE 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 TO 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.

NOTICE

- Read ANSI/ASME B30.16 and ANSI/ASME B30.10.
- Read the hoist manufacturer's Operating and Maintenance Instructions.
- Read all labels attached to equipment.

The operation of an overhead hoist involves more than activating the hoist's controls. Per the ANSI/ASME B30 standards, the use of an overhead hoist is subject to certain hazards that cannot be mitigated by engineered features, but only by the exercise of intelligence, care, common sense, and experience in anticipating the effects and results of activating the hoist's controls. Use this guidance in conjunction with other warnings, cautions, and notices in this manual to govern the operation and use of your overhead hoist.

4.2 Shall's and Shall Not's for Operation

⚠ WARNING

Improper operation of a hoist can create a potentially hazardous situation which, if not avoided, could result in death or serious injury, and substantial property damage. To avoid such a potentially hazardous situation **THE OPERATOR SHALL:**

- **NOT** lift more than rated load for the hoist.
- **NOT** operate unless load is centered under hoist.
- **NOT** use damaged hoist or hoist that is not working properly.
- **NOT** use hoist with twisted, kinked, damaged, or worn chain.
- **NOT** use hoist if the bottom hook is capsized (double fall hoists - see **Section 3.12**).
- **NOT** use the hoist to lift, support, or transport people.
- **NOT** lift loads over people.
- **NOT** apply load unless load chain is properly seated in the load sheave (and idle sheave for hoist with two chain falls).
- **NOT** use the hoist in such a way that could result in shock or impact loads being applied to the hoist.
- **NOT** attempt to lengthen the load chain or repair damaged load chain.
- **NOT** operate hoist when it is restricted from forming a straight line from hook to hook in the direction of loading.
- **NOT** use load chain as a sling or wrap load chain around load.
- **NOT** apply the load to the tip of the hook or to the hook latch.
- **NOT** apply load if binding prevents equal loading on all load supporting chains.
- **NOT** operate beyond the limits of the load chain travel.
- **NOT** operate hoist with missing/damaged chain springs, shock absorbers, stoppers, striker plates or limit locks.
- **NOT** leave load supported by the hoist unattended unless specific precautions have been taken.
- **NOT** allow the chain, or hook to be used as an electrical or welding ground.
- **NOT** allow the chain, or hook to be touched by a live welding electrode.
- **NOT** remove or obscure the warnings on the hoist.
- Be familiar with operating controls, procedures, and warnings.
- Make sure the unit is securely attached to a suitable support before applying load.
- Make sure load slings or other approved single attachments are properly sized, rigged, and seated in the hook saddle.
- Take up slack carefully - make sure load is balanced and load-holding action is secure before continuing.
- Make sure all persons stay clear of the supported load.
- Protect the hoist's load chain from weld splatter or other damaging contaminants.
- Report malfunctions or unusual performances (including unusual noises) of the hoist and remove the hoist from service until the malfunction or unusual performance is resolved.
- Make sure hoist limit switches function properly.
- Warn personnel before lifting or moving a load.
- Warn personnel of an approaching load.

⚠ CAUTION

Improper operation of a hoist can create a potentially hazardous situation which, if not avoided, could result in minor or moderate injury, or property damage. To avoid such a potentially hazardous situation **THE OPERATOR SHALL:**

- Maintain a firm footing or be otherwise secured when operating the hoist.
- Check brake function by tensioning the hoist prior to each lift operation.
- Use hook latches. Latches are to retain slings, chains, etc. under slack conditions only.
- Make sure the hook latches are closed and not supporting any parts of the load.
- Make sure the load is free to move and will clear all obstructions.
- Avoid swinging the load or hook.
- Make sure hook travel is in the same direction as shown on controls.
- Inspect the hoist regularly, replace damaged or worn parts, and keep appropriate records of maintenance.
- Use the hoist manufacturer's recommended parts when repairing the unit.
- Lubricate load chain per hoist manufacturer's recommendations.
- **NOT** use the hoist load limiting or warning device to measure load.
- **NOT** use limit switches as routine operating stops. They are emergency devices only.
- **NOT** allow your attention to be diverted from operating the hoist.
- **NOT** allow the hoist to be subjected to sharp contact with other hoists, structures, or objects through misuse.
- **NOT** adjust or repair the hoist unless qualified to perform such adjustments or repairs.

4.3 Hoist Controls

4.3.1 For hoists mounted to motorized trolleys follow the control instruction included in the trolley's Owner's Manual.

4.3.2 Pendant Control - When using the pendant control depress the up lever to raise the hoist or the down lever to lower the hoist as shown in Figure 4-1 below. To stop motion release the lever switches.

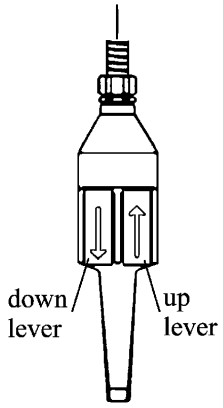


Figure 4-1 Pendant Control

4.3.3 Cord Control - When using a hoist with cord control, pull down on the appropriate directional arrow to raise or lower the hoist. White indicates the raise control and red indicates lowering control. Release the cords to stop the hoist. To adjust operation speed, pull the cord handle in the intended direction harder to achieve a higher speed, and lower for a slower speed. Refer to Figure 4-2 below.

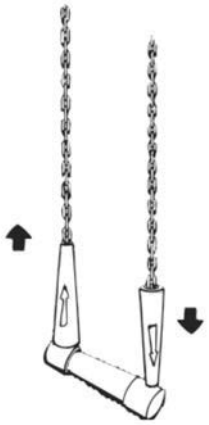


Figure 4-2 Cord Control

4.3.4 Twist Rod Control – When operating a hoist with twist rod control, rotate (twist) the control rod in the direction corresponding with the arrows on the twist rod handle.

Figure 4-3 Twist Rod Control

4.3.5 **⚠ CAUTION** Make sure the motor completely stops before reversing direction.

4.4 Adjusting the Controls

4.4.1 For pendant control, the speed can be adjusted by the amount the lever is depressed. As shown below in Figure 4-4, by depressing the lever slightly, you will be able control the hoist's motions slowly and with more precision. By depressing the lever further, the speed of the hoist will be increased until the lever is fully depressed.

4.4.2 By adjusting the set screw in the pendant, the control can be adjusted to suit the user's needs. Adjusting the screw does not affect the speed of the hoist; it simply changes the feel or stiffness of the lever control. Adjusting the screw sets the position of a small spring plunger and this affects how the plunger interacts with the lever.

- Turning the screw in causes the spring plunger to be in contact with the lever for more of the lever's travel, resulting in more stiffness and better feel for finer control of hoist motions.
- Turning the screw out reduces the effect that the spring plunger has on the lever control. This makes it easier to depress the lever, which is usually preferred for coarse control (more on/off than variable) of hoist motions.

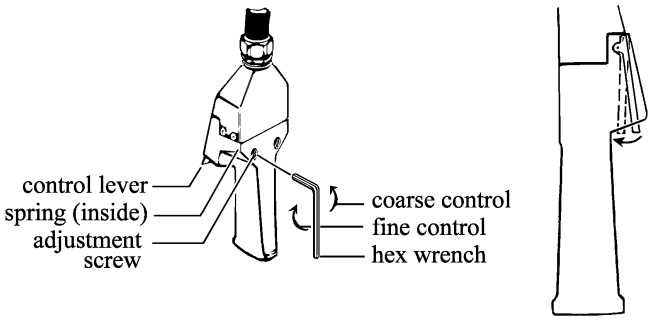


Figure 4-4 Pendant Control Adjustment

4.4.3 For the cord type control, adjust the speed by varying the amount of pull on the cord. Refer to Figure 4-5.

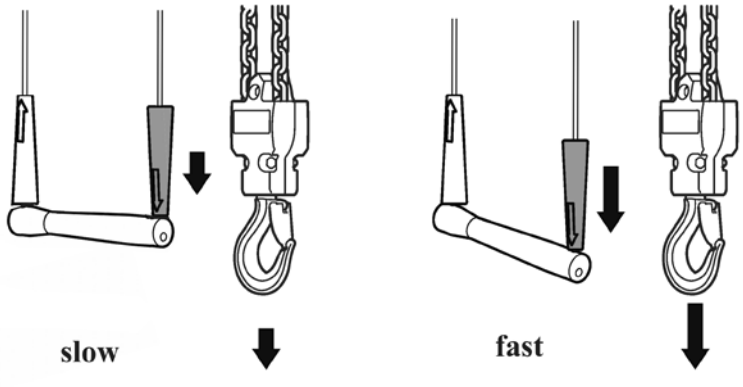


Figure 4-5 Cord Control Speed Adjustment

4.4.4 For twist rod control, adjust the speed by rotating (twisting) the control rod more for faster speed or less for slower speed in the direction corresponding with the arrows on the twist rod handle.

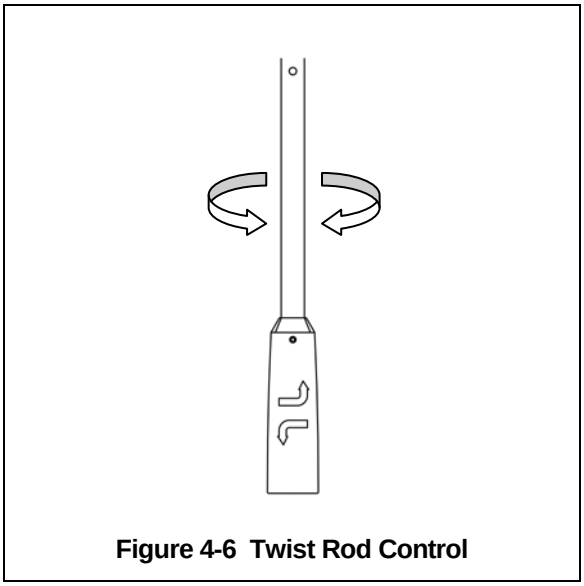


Figure 4-6 Twist Rod Control

4.4.5 The twist rod control length can be adjusted by removing the bolt and locknut that lock the telescoping shafts together. Adjust the length of the twist rod to the desired length by sliding the two shafts to the desired position. Align the adjustment holes in both shafts and reinstall the bolt and lock nut to secure the shafts.

4.5 Operation of the Load Limiter (Option)

4.5.1 If equipped with the optional load limiter, and a hoist is used to lift a load that exceeds the hoists rated capacity, the load limiter will cause the hoist to automatically stop lifting.

4.5.2 If the hoist stops lifting automatically, lower and remove the load from the hoist.

4.5.3 If the load is at or below the hoist's capacity rating and the hoist stops lifting automatically, the load limiter may need adjustment.

- Check air line pressure to ensure adequate pressure at the hoist.
- If pressure is adequate, adjust the load limiter. For load limiter adjustment, refer to Section 7.

5.0 Inspection

⚠WARNING To maintain the ATEX rating it is very important that hoist maintenance and inspection be performed regularly. That includes checking the hoist for correct operation, and where appropriate, repairs as necessary, to maintain proper material coatings; plating and lubrication, to insure protection from corrosion, wear, resistance, electrical conductivity, impact strength, ageing resistance and effects of temperature variation.

5.1 General

5.1.1 The inspection procedure herein is based on ANSI/ASME B30.16. The following definitions are from ANSI/ASME B30.16 and pertain to the inspection procedure below.

- **Designated Person** – a person selected or assigned as being competent to perform the specific duties to which he/she is assigned.
- **Qualified Person** – a person who, by possession of a recognized degree or certificate of professional standing, or who, by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work.
- **Normal Service** – that distributed service which involves operation 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.
- **Heavy Service** – that service which involves operation within the rated load limit which exceeds normal service.
- **Severe Service** – that service which involves normal or heavy service with abnormal operating conditions.

5.2 Inspection Classification

5.2.1 Initial Inspection - prior to initial use, all new, altered, or modified hoists shall be inspected by a designated person to ensure compliance with the applicable provisions of this manual.

5.2.2 Inspection Classification - the inspection procedure for hoists in regular service is divided into two general classifications based upon the intervals at which inspection should be performed. The intervals in turn are dependent upon the nature of the critical components of the hoist and the degree of their exposure to wear, deterioration, or malfunction. The two general classifications are herein designated as FREQUENT and PERIODIC, with respective intervals between inspections as defined below.

5.2.3 FREQUENT Inspection - visual examinations by the operator or other designated personnel with intervals per the following criteria:

- Normal service - monthly
- Heavy service - weekly to monthly
- Severe service - daily to weekly
- Special or infrequent service - as recommended by a qualified person before and after each occurrence.

5.2.4 PERIODIC Inspection - visual inspection by a designated person with intervals per the following criteria:

- Normal service - yearly
- Heavy service - semiannually
- Severe service - quarterly
- Special or infrequent service - as recommended by a qualified person before the first such occurrence and as directed by the qualified person for any subsequent occurrences.

5.3 Frequent Inspection

5.3.1 Inspections should be made on a FREQUENT basis in accordance with Table 5-1, "Frequent Inspection." Included in these FREQUENT Inspections are observations made during operation for any defects or damage that might appear between Periodic Inspections. Evaluation and resolution of the results of FREQUENT Inspections shall be made by a designated person such that the hoist is maintained in safe working condition.

Table 5-1 Frequent Inspection
All functional operating mechanisms for maladjustment and unusual sounds.
Operation of limit switch and associated components
Hoist braking system for proper operation
Hooks in accordance with ANSI/ASME B30.10
Hook latch operation
Load chain in accordance with Section **5.7**
Load chain reeving for compliance with Section **3.12** and **7.3**
Air valves and components for leakage or damage

5.4 Periodic Inspection

5.4.1 Inspections should be made on a PERIODIC basis in accordance with Table 5-2, "Periodic Inspection." Evaluation and resolution of the results of PERIODIC Inspections shall be made by a designated person such that the hoist is maintained in safe working condition.

5.4.2 For inspections where load suspension parts of the hoist are disassembled, a load test per ANSI/ASME B30.16 must be performed on the hoist after it is re-assembled and prior to its return to service.

Table 5-2 Periodic Inspection
Requirements of frequent inspection.
Evidence of loose bolts, nuts, or rivets.
Evidence of worn, corroded, cracked, or distorted parts such as load blocks, suspension housing, chain attachments, clevises, yokes, suspension bolts, shafts, gears, bearings and pins.
Evidence of damage to hook retaining nuts or collars and pins, and welds or rivets used to secure the retaining members.
Evidence of damage or excessive wear of load and idler sheaves.
Evidence of excessive wear on motor vanes or on load brake.
Evidence of damage of supporting structure or trolley, if used.
Function labels on pendant control stations for legibility.
Warning label properly attached to the hoist and legible (see Section 1.2).
End connections of load chain.

5.5 Occasionally Used Hoists

5.5.1 Hoists that are used infrequently shall be inspected as follows prior to placing in service:

- Hoist Idle More Than 1 Month, Less Than 1 Year: Inspect per FREQUENT Inspection criteria of Section 5.3 above.
- Hoist Idle More Than 1 Year: Inspect per PERIODIC Inspection criteria of Section 5.4 above.

5.6 Inspection Records

5.6.1 Dated inspection reports and records should be maintained at time intervals corresponding to those that apply for the hoist's PERIODIC interval per Section 5.2.4. These records should be stored where they are available to personnel involved with the inspection, maintenance, or operation of the hoist.

5.6.2 A long range chain inspection program should be established and should include records of examination of chains removed from service so a relationship can be established between visual observation and actual condition of the chain.

5.7 Inspection Methods and Criteria

5.7.1 This section covers the inspection of specific items. The list of items in this section is based on those listed in ANSI/ASME B30.16 for the Frequent and Periodic Inspection. In accordance with ANSI/ASME B30.16, these inspections are not intended to involve disassembly of the hoist. Rather, disassembly for further inspection would be required if frequent or periodic inspection results so indicate. Such disassembly and further inspection should only be performed by a qualified person trained in the disassembly and re-assembly of the hoist.

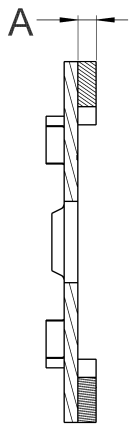
Table 5-3 Hoist Inspection Methods and Criteria

Item	Method	Criteria	Action
Functional operating mechanisms.	Visual, Auditory	Mechanisms should be properly adjusted and should not produce unusual sounds when operated.	Repair or replace as required.
Limit Switch	Function	Proper operation. Actuation of limit switch should stop hoist.	Repair or replace as required.
Chain Lever/Limit Lever Assembly	Visual, Function	Lever should not be bent or significantly worn and should be able to move freely.	Replace.
Braking System	Function	Braking distance should not exceed approximately five chain links.	Repair or replace as required.
Hooks - Surface Condition	Visual	Should be free of significant rust, weld splatter, deep nicks, or gouges.	Replace.
Hooks - Fretting wear	Measure	The “u” dimension should not be less than minimum value listed in Table 5-6**.**	Replace.
Hooks - Stretch	Measure	The “K” dimension should not exceed 1.10 times the measured values in Table 5-6, or the discard dimensions listed. The “U” dimension should not be less than 0.95 the initial measured values in Table 5-6, or the discard dimensions listed.	Replace.
Hooks - Bent Shank or Neck	Visual	Shank and neck portions of hook should be free of deformations	Replace.
Hooks - Yoke Assembly	Visual	Should be free of significant rust, weld splatter, nicks, gouges. Holes should not be elongated, fasteners should not be loose, and there should be no gap between mating parts.	Clean/Lubricate, or replace as required.
Hooks - Swivel Bearing	Visual, Function	Bearing parts and surfaces should not show significant wear, and should be free of dirt, grime and deformations. Hook should rotate freely with no roughness.	Clean/lubricate, or replace as required.

Table 5-3 Hoist Inspection Methods and Criteria			
Item	**Method**	**Criteria**	**Action**
Hooks - Idle Sheave and Axle (Bottom Hook on Double Fall Hoist)	Visual, Function	Pockets of Idle Sheave should be free of significant wear. Idle Sheave surfaces should be free of nicks, gouges, dirt and grime. Bearing parts and surfaces of Idle Sheave and Axle should not show significant wear. Idle Sheave should rotate freely with no roughness or significant free play.	Clean/lubricate, or replace as required.
Hooks - Hook Latches	Visual, Function	Latch should not be deformed. Attachment of latch to hook should not be loose. Latch spring should not be missing and should not be weak. Latch movement should not be stiff - when depressed and released latch should snap smartly to its closed position.	Replace.
Load Chain - Surface Condition	Visual	Should be free of rust, nicks, gouges, dents and weld splatter. Links should not be deformed, and should not show signs of abrasion. Surfaces where links bear on one another should be free of significant wear.	Replace.
Load Chain - Pitch	Measure	The “L” dimension should not be greater than maximum value listed in Table 5-7.	Replace, inspect Load Sheave (and Idle Sheave for double fall hoist).
Load Chain - Lubrication	Visual, Auditory	Entire surface of each chain link should be coated with lubricant and should be free of dirt and grime. Chain should not emit cracking noise when hoisting a load.	Clean/lubricate (see Sections 6.0).
Load Chain - Reeving	Visual	Chain should be reeved properly through Load Sheave (and Idle Sheave for double fall hoist) - refer to Section 3.12. Chain should be installed properly - refer to Section 7.3.2.	Reeve/Install chain properly.
Chain Container	Visual	Container should not be damaged. Brackets should not be deformed or missing	Replace
Bolts, Nuts and Rivets	Visual, Check with Proper Tool	Bolts, nuts and rivets should not be loose.	Tighten or replace as required.
Housing and Mechanical Components	Visual, Auditory, Vibration, Function	Hoist components including load blocks, suspension housing, chain attachments, clevises, yokes, suspension bolts, shafts, gears, bearings, pins and rollers should be free of cracks, distortion, significant wear and corrosion. Evidence of same can be detected visually or via detection of unusual sounds or vibration during operation.	Replace
Chain Separator	Visual	The Chain Separator should be free of cracks, distortion, significant wear and corrosion. Inspect for excessive wear.	Replace

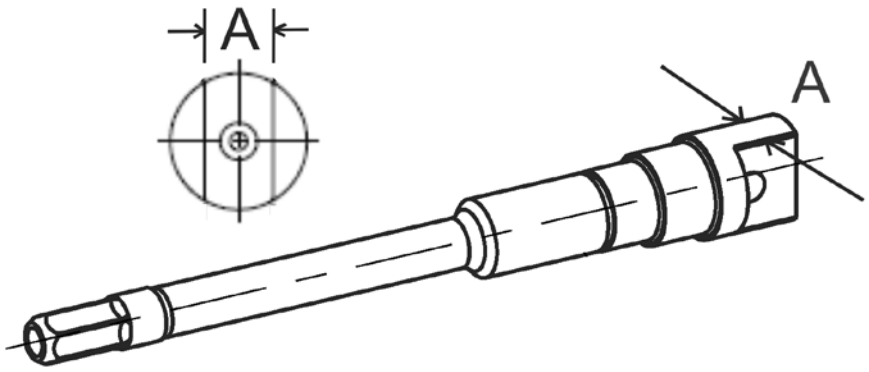
Table 5-3 Hoist Inspection Methods and Criteria			
Item	**Method**	**Criteria**	**Action**
Motor Brake	Measure, Visual	Motor brake component dimensions should be within the allowable limits of Table 5-4 and Table 5-5. See Section 7.2 for gaining access to motor brake. Braking surfaces should be clean, free of grease/oil and should not be glazed. Springs should not be worn or damaged.	Replace
Load Sheave	Visual	Pockets of Load Sheave should be free of significant wear. See Section 7.5 to gain visual access to the load sheave.	Replace.
Pendant Control Levers	Visual, Function	Depressing and releasing pendant control levers should cause hoist to operate.	Repair or replace as necessary.
Pendant - Housing	Visual	Pendant housing should be free of cracks and mating surfaces of parts should seal without gaps.	Replace.
Pendant - Tubing	Visual, auditory	Tubing to pendant control switches should not be loose or be leaking air.	Repair or replace as necessary.
Pendant - Labels	Visual	Labels denoting functions should be legible.	Replace.
Warning Labels	Visual	Warning Labels should be affixed to the hoist (see Section 1.2) and they should be legible.	Replace
Hoist Capacity Label	Visual	The label that indicates the capacity of the hoist should be legible and securely attached to the hoist.	Replace.
Vane Motor - Vanes	Visual, Measure	Vane height must be a minimum of 18mm	Replace. (Note: if replacement is necessary, all vanes should be replaced)
Vane Motor Cylinder	Visual	Check that the cylinder is not severely scored. A few coarse scorings at the neutral slot is allowed. (Avoid heavy machining or polishing on the cylinder inside. Machining can result in higher risk for decreased tool performance.)	Replace
Air filter	Visual	Check for solid particles greater than 15 micron and excessive water.	Remove particles and drain water. Blow out hose before reconnecting

Table 5-4 Brake Pad Dimension



Hoists	"A" Dimension Inch (mm)	
	Standard	Discard
AL003, AL005, AL010, AL030, AL050	T = 0.157 (4)	T = 0.039 (1)

Table 5-5 Brake Shaft Dimension



Hoists	"A" Dimension Inch (mm)	
	Standard	Discard
AL003, AL005, AL010, AL030, AL050	T = 0.309 (7.84)	T = 0.276 (7)

Table 5-6 Top Hook & Bottom Hook Dimensions

Dimensions K and U should be measured and recorded below prior to any use when the hook is first placed into service.

"K" Measured When New:

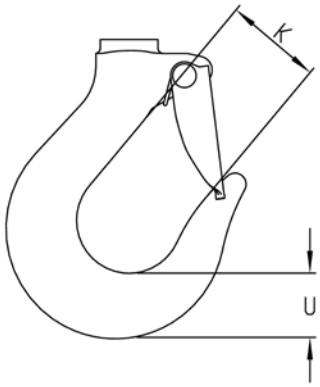
Top: _____

Bottom: _____

"U" Measured When New:

Top: _____

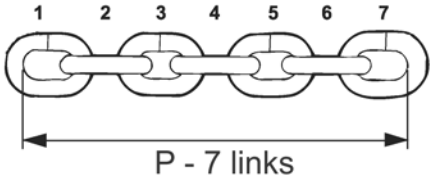
Bottom: _____



Hoists	Nominal "K" Dimension* in (mm)		Nominal "U" Dimension* in (mm)	
	Standard	Discard	Standard	Discard
AL003, AL005, AL010	K = 1.14 (29)	K = 1.26 (32)	U = 0.93 (24)	U = 0.88 (22)
AL030	K = 1.97 (50)	K = 2.17 (55)	U = 1.42 (36)	U = 1.35 (34)
AL050	K = 2.4 (61)	K = 2.64 (67)	U = 1.73 (44)	U = 1.65 (42)

*These values are nominal since the dimension is not controlled to a tolerance. The **"K"** and **"U"** dimensions should be measured when the hook is new - this becomes a reference measurement. Subsequent measurements are compared to this reference measurement in order to determine hook deformation/stretch. See Table 5-3, "Hooks - Stretch".

Table 5-7 Chain Dimensions



Capacity Code	"P" Dimension Inch (mm)	
	Standard	Discard
AL003, AL005, AL010	129.5	131.6
AL030, AL050	231	232.8

6.0 Lubrication

6.1 Air Hoist Lubrication

6.1.1 AL air hoists do not require lubrication. However, if the hoist supply air is lubricated, there is no disadvantage.

6.1.2 See Section 3.0 for lubrication requirements.

6.1.3 If one chooses to lubricate the air motor, oil will be provided primarily by the air supply lubricator. The recommended amount is 6-10 drops/minute (.09 to 0.15/min.). Refer to Table 6-1 below for the approved lubricant for use with your air hoist.

6.1.4 Additional lubrication to the reduction gears is not necessary. When disassembling the hoist for service or repair, change the gear grease before reassembling the hoist. The amount of grease needed is listed below for each model; half of this amount should be applied in the space between the gear rims and housing.

Model	Amount of Grease needed
AL003, AL005, AL010	5oz ($150cm^3$)
AL030, AL050	10oz ($300cm^3$)

6.2 Load Chain Lubrication

6.2.1 **⚠WARNING** Load chain is not properly lubricated for use upon delivery. For longer life, regularly lubricate the load chain in an unloaded condition with machine or gear oil that is ISO VG 46-58 or equivalent. Ensure that the oil is applied to the bearing surfaces of the load chain links.

6.2.2 The load chain lubrication should be accomplished after cleaning the load chain with acid free cleaning solution. Use approved lubricant in Table 6-1 or equivalent.

6.2.3 For dusty environments, it is acceptable to substitute a dry lubricant.

6.3 Hooks and Suspension Components

6.3.1 Hooks - Bearings (balls) and races should be cleaned and lubricated at least once per year for normal usage. Clean and lubricate more frequently for heavier usage or severe conditions.

Table 6-1 Table of Approved Lubricants

	Part		
Brand	**Bearings**	**Gears**	**Air Lubrication (Optional)**
Harrington		AL4320067500	
Exxon	Beacon EP2		Arox EP46
Mobil	Mobilegrease XHP 222	Mobilith SHC 007	Almo Oil 525
Shell	Alvania EP2	Tivela GL 100	Torcula 32
Texaco	Multifak EP2		Aries 32
Molycote	BR2 Plus		

7.0 Maintenance and Handling

7.1 Load Limiter

⚠WARNING Regularly check the function of the overload protection device to insure it is not obstructed, for instance due to blockage of the hose. If obstructed, there is a risk of the setting nut gradually working loose and jeopardizing the safety of the load. Ensure that the load is directly below the hoist and is not being side-pulled.

7.1.1 The purpose of the load limiter is to prevent using the hoist in an overload situation. When lifting, the hoist will stop automatically if the load is above the rated capacity of the hoist.

7.1.2 The adjustment is factory set to actuate at the rated capacity (based on supply air pressure of 90 psi). Note: the load limiter may need adjustment to compensate for air supply pressures significantly less than 90 psi.

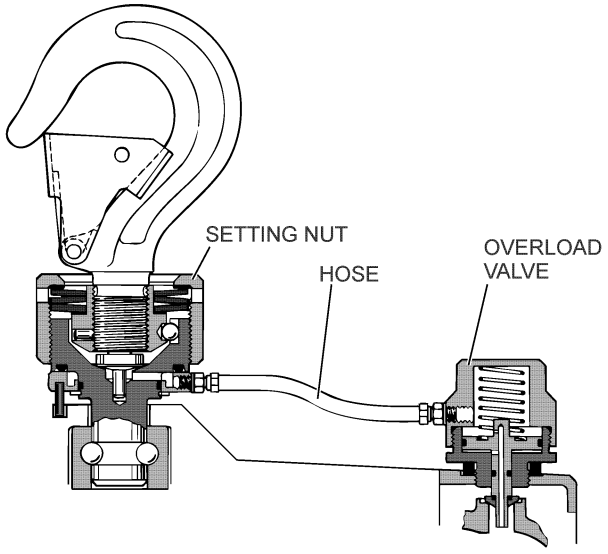


Figure 7-1 Load Limiter screw adjustment location

7.1.3 Adjustment Procedure

1) Before proceeding with the load limiter adjustment, note the following:

a. **⚠WARNING** Adjusting the load limiter involves operating the hoist. Personnel involved in the adjustment procedure should read, understand, and follow Section 4, "Operation".

b. For the adjustment procedure, the hoist should be connected to an air supply (see Section 3.1) and it should initially be without a load on its hook.

c. Start this procedure with an unloaded hoist. All adjustments to the load limiter should be made with the load in a resting position so that the load chain is not tensioned.

d. The pressure of the air supply at the hoist's inlet port (90 psi) affects the performance of your air hoist, including the actuation point of the load limiter. Therefore, ensure that during the adjustment procedure the air pressure at the hoist's inlet port is the same as that which the

hoist will experience in normal operation. The relationship between air supply pressure and load limiter actuation is: for a given load limiter setting, as pressure decreases, the actuation point increases.

e. When the load limiter is adjusted and working properly, the hoist will operate and lift the load a short distance before the load limiter automatically stops lifting.

2) Place a load equal to the desired actuation point on the hoist's hook (do not exceed the hoist's rated capacity). However, this load must be 80% of the rated load at 90psi. If a still lower releasing limit is required the air pressure has to be decreased below 90psi (caps or lower case, need to be consistent).

3) Using the hook wrench provided, loosen the setting nut (R) so that the load cannot be lifted. Then tighten the nut so much that the load can be lifted again.

⚠ CAUTION The setting nut (R) must not be screwed out so far that it can work loose unintentionally.

4) Check that the overload protection device trips in response to a violent movement of the control. After a time lag of approx. 0.5 – 1.0 second the air hoist should gently accelerate to full speed. If necessary, adjust with the setting nut. Loosen the nut if the protection device does not trip and tighten it if full speed is not obtained

7.2 Brake

7.2.1 The disc brake of the air hoist is correctly adjusted upon delivery. If readjustment is necessary, proceed in accordance with the following instructions (reference **Fig 7-2**):

1) Remove the load. Turn the setting screw (23) counterclockwise approximately 1 turn

2) Connect the hoist to the air supply and run it without load very slowly in the lifting direction. Screw in the setting screw (23) until the hoist stops or clearly slows down

3) Turn the setting screw (23) counterclockwise about 1/8 of a turn so that the hoist rotates easily again.

NOTICE If the brake cannot be adjusted in accordance with these directions, the brake shoes and brake disc should be cleaned with a grease solvent

4) If there are doubts concerning the brake adjustment, check that the brake is not adjusted too tight by operating the hoist unloaded at 14.5psi (1 bar) air pressure. The hoist should start easily without influence from the brake

5) Before using the hoist again, load and lift the intended load – or rated load if possible – a few inches (cm) and check that the brake holds the load in position. Readjust if necessary.

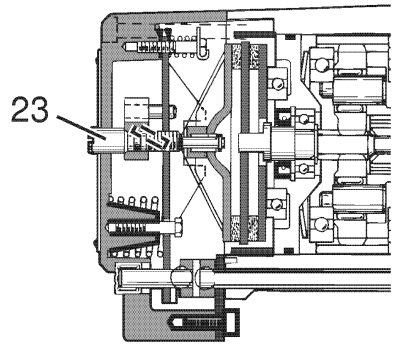


Figure 7-2 Brake Adjustment

7.2.2 Inspect the brake pad in accordance with Section 5.7, **Table 5-3**.

7.2.3 The following is the hoist brake inspection procedure. Refer to **Figure 7-3** to **7-5**.

1) **⚠WARNING** HAZARDOUS AIR PRESSURE IS PRESENT IN THE HOIST, IN THE SUPPLY OF COMPRESSED AIR TO THE HOIST, AND IN THE CONNECTIONS BETWEEN COMPONENTS. Shut off the air supply and stop the airflow completely. Lock out and tag out in accordance with ANSI Z244.1 “Personnel Protection -Lockout/Tagout of Energy Sources”.

2) Remove the screw on the cover (A), the screws from the brake housing assembly (B), and the brake housing assembly (C) from the housing.

3) Remove the key (D), the washer (E), and the cover (F) from the control shaft. Remove the four balls (G) from the key.

4) Remove the brake disc (H) and the pressure plate (I). Note: the extra pressure plate (I) is not applicable to AL003.

5) Inspect and measure brake components according to "Motor Brake" in **Table 5-3**, "Hoist Inspection Methods and Criteria".

6) Prior to reassembly, clean all surfaces of debris, dirt and loose paint. The brake disc and pressure plates must be cleaned with trichloroethylene or any “brake cleaner” product.

7) Reassemble in reverse order. Apply a thin layer of grease to the four balls (G), and Loctite on the screw threads. Torque all mounting hardware evenly during the reassembly process. Tighten brake housing assembly screws (B) with a torque value of 10Nm (7.4 lb-ft) and cover screw (C) with a value of 6Nm (4.4 lb-ft).

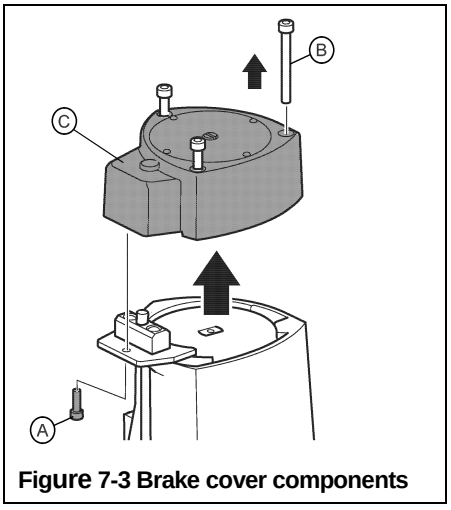


Figure 7-3 Brake cover components

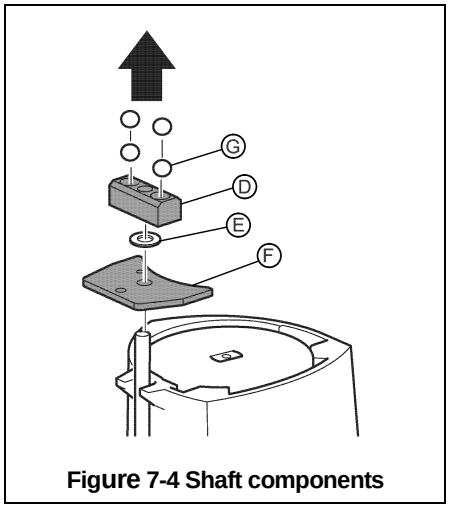


Figure 7-4 Shaft components

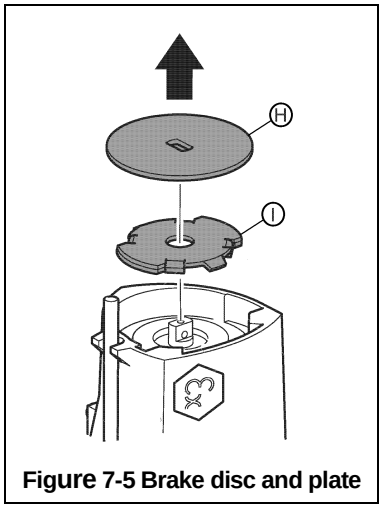


Figure 7-5 Brake disc and plate

7.3 Load Chain

7.3.1 Lubrication and Cleaning

- Clean the chain with an acid-free cleaning solution. The load chain should be kept clean and lubricated.
- Lubrication - Clean and lubricate the load chain per Section 6 at least once every 3 months for normal usage. Clean and lubricate more frequently for heavier usage or severe conditions.

7.3.2 Replacement

⚠ CAUTION An air supply line must be connected to the hoist in order to perform the following procedures. To avoid damages to the hoist, reduce the air pressure to 14.5psi (1 bar).

⚠ WARNING Be certain that the replacement chain is obtained from Harrington and is the exact size, grade and construction as the original chain.

7.3.2.1 Removing Chain

1) Loosen the ends of the chain from the hoist by removing the screw on the hoist body. For AL010 and AL050, also remove the locking pin and pull out the pin. (See **Figure 7-6**)

2) Remove chain by running the hoist in the down direction (see **Figure 7-7**).

⚠ CAUTION When replacing load chain, check for wear on mating parts, i.e. Load Sheave, Chain Guides and Idler Wheels, and replace parts if necessary. Remove hook set assemblies, stoppers and end connections from the chain for reuse on new chain. If the load chain is being replaced due to damage or wear out, prevent its reuse by destroying the old chain.

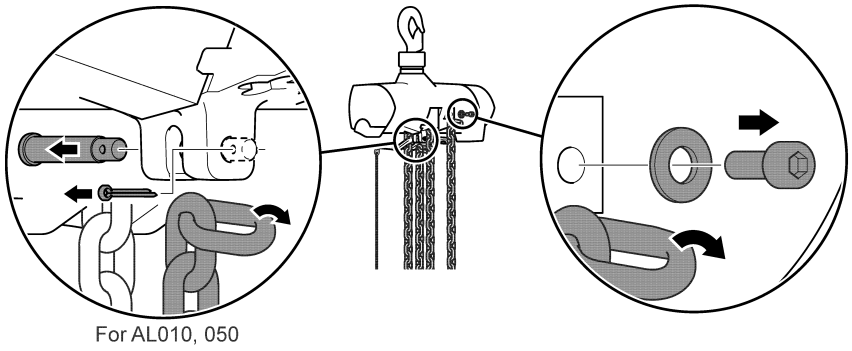


Figure 7-6

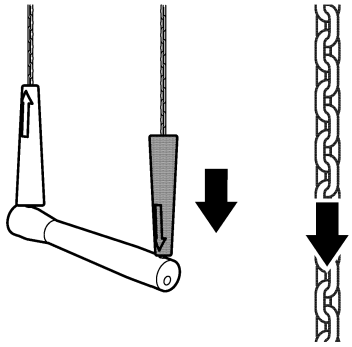


Figure 7-7

7.3.2.2 Installing Chain

1) Attach the end link of the chain to the accompanying steel wire. Pull the link chain into the chain casing; by means of the steel wire (see **Figure 7-8**).

NOTICE Make sure that the first link is flat in relation to the chain wheel and that the subsequent standing links have the weld facing outwards from the center of the load sheave.

2) Pull the steel wire and run the air hoist slowly in the lowering direction (see **Figure 7-9**).

⚠ CAUTION Do not operate the hoist in the lifting direction at this stage (jamming risk).

NOTICE Make sure the first link of the chain drops into an indentation of the chain wheel

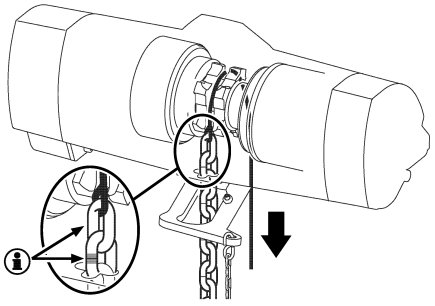


Figure 7-8

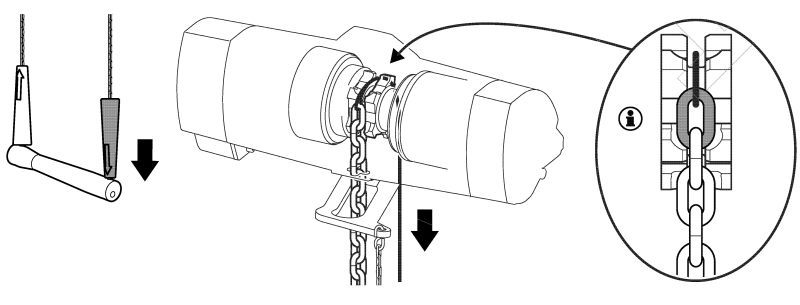


Figure 7-9

3) When the first link is set in the chain wheel, move it slowly in the lifting direction, while continuing to pull the steel wire (see **Figure 7-10**).
4) Run the chain through the control yoke. Secure the end link with the screw and washer, without twisting the chain (see **Figure 7-11**).
5) For AL010 and AL050, pull the chain through the hook using the wire (see **Figure 7-12**). For single fall models, properly fasten the chain end to the hook.

NOTICE Make sure that the standing links have the weld facing outwards from the center of the chain wheel and that the chain is not twisted.

6) For AL010 and AL050, fasten the chain end to the hoist by inserting the pin through the end link of the chain and lock the pin with the clevis pin (see **Figure 7-13**).
7) Make sure that the chain runs correctly.
8) After installation has been completed, perform steps outlined in Section 3.12 "Preoperational Checks and Trial Operation".

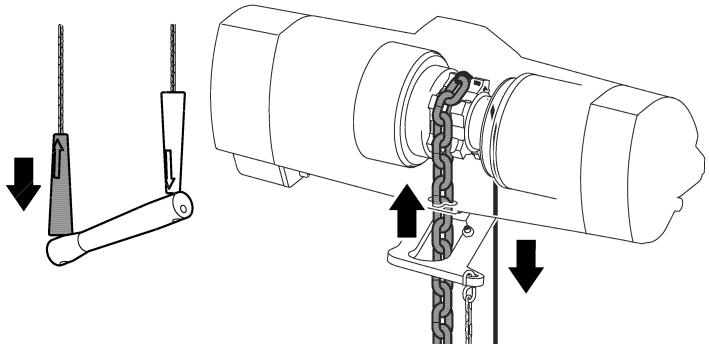


Figure 7-10

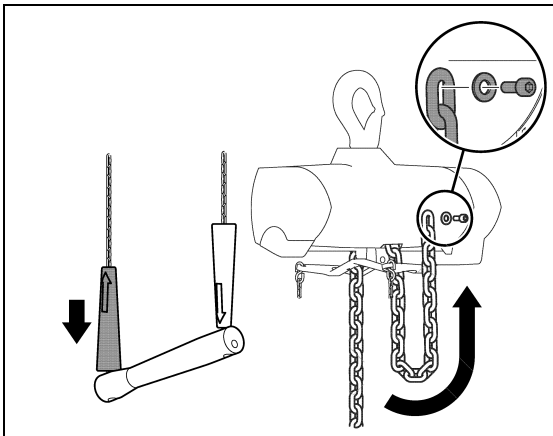


Figure 7-11

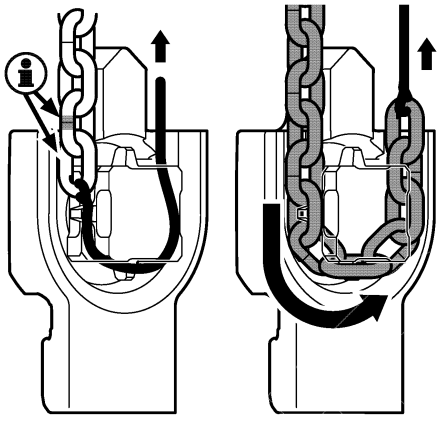


Figure 7-12

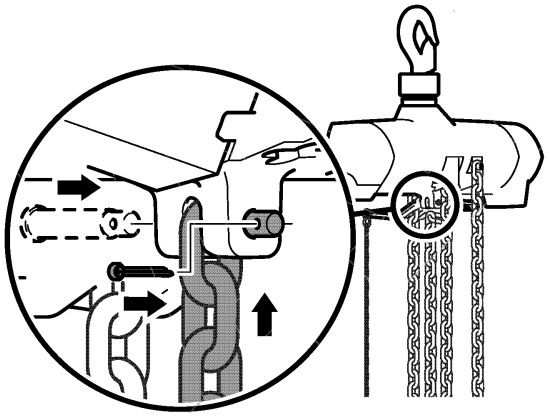


Figure 7-13

7.4 Pendant

7.4.1 The following procedure covers the installation of a pendant control station.

1) Remove the two SCREWS and the VALVE COVER on the valve assembly. Also remove the SCREW on the side of the supply air port (see **Figure 7-14**). Fit the nipple provided at the side of the supply air port where the screw was removed.

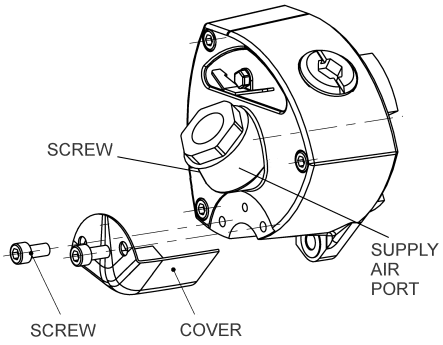


Figure 7-14 Valve Cover Removal

2) Remove the cover from the actuator assembly and secure the actuator assembly with the same two SCREWS that previously secured the VALVE COVER (See **Figure 7-15**).

3) Fit the HOSE BIB underneath the actuator assembly. Attach the PENDANT HOSE to the HOSE BIB with the fitting provided.

4) Using **Figure 7-15** as a guide, run the YELLOW TUBE, BLACK TUBE, and GRAY TUBE through the channel in the actuator assembly and attach each tube to the nipple at the designated locations. Run the STRAIN RELIEF through the cutout and tie a knot.

5) Re-secure the actuator assembly cover.

6) **NOTICE** When attaching tubes take care not to bend or kink tubing. This will result in the air flow being restricted and poor response to the pendant controls.

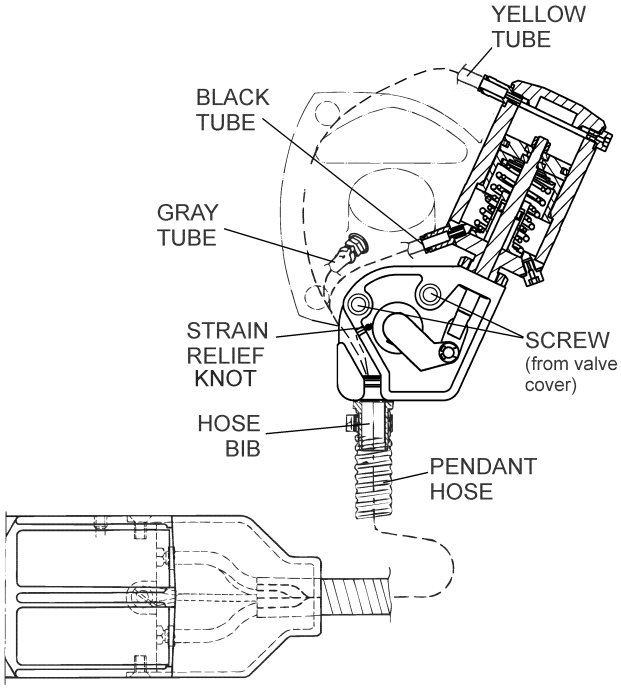


Figure 7-15 Pendant & Actuator Install

7.5 Load Sheave Inspection

7.5.1 Perform this inspection by removing the chain separator and viewing the load sheave while operating the hoist slowly, with no load, and in accordance with Section 4 “Operation”.

For AL003, 005, 010

1) After removing the chain container, the chain, and the brake housing, remove the screws from the control yoke. Remove the control shaft and the control yoke (see **Figure 7-16**).
2) Remove the screw and washer from the side of the hoist body (see **Figure 7-17**).
3) Remove the chain separator (see **Figure 7-18**).

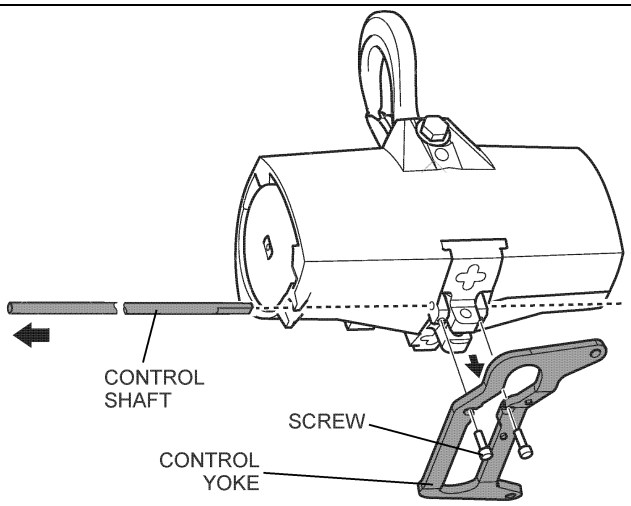


Figure 7-16 Control Yoke Removal

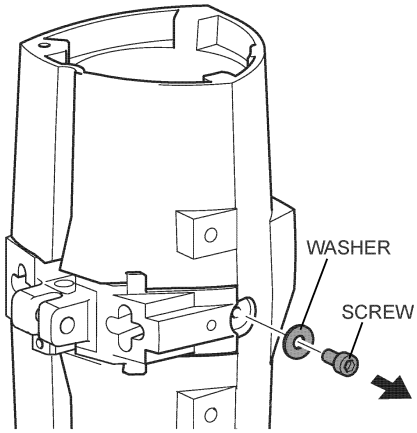


Figure 7-17 Chain Separator Disassembly

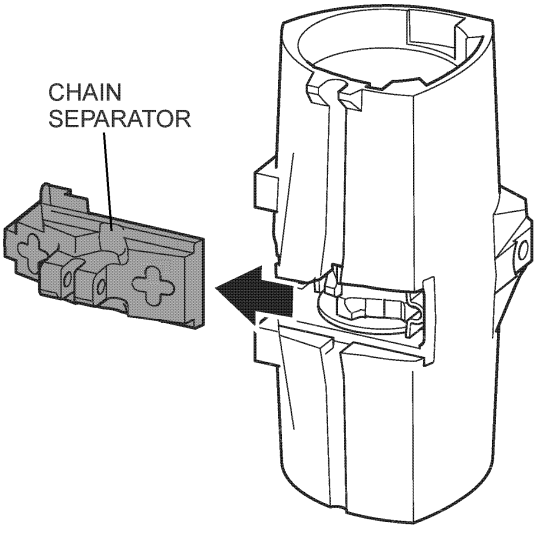


Figure 7-18 Chain Separator Removal

For AL030, 050

1) After removing the chain container and removing the chain, remove the screws and bracket from the chain separator (see Figure 7-19).

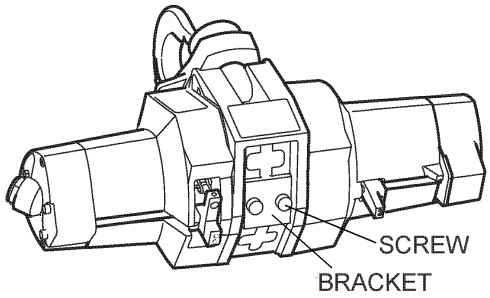


Figure 7-19 Chain Separator Bracket Removal

7.6 Operational Environment

7.6.1 Non-conforming environment – A non-conforming environment is defined as one with any or all of the following.

- Explosive gases or vapor beyond the ATEX rating of the hoist. Reference Section 2.1.3.
- Organic solvents or volatile powder
- Excessive amounts of powder and dust of general substances
- Excessive amount of acids or salts.
- Refer to Section 2.1.2 for allowable environmental conditions.

7.7 Storage

7.6.1 The storage location should be clean and dry.

7.6.2 Whenever the hoist is to be placed into storage, make certain that no debris, dirt or moisture is allowed to enter the air hoist through air inlet opening during preparations for storage.

7.8 Outdoor Installation

7.7.1 For hoist installations that are outdoors, the hoist MUST be covered and protected from the weather at all times.

7.7.2 Avoid hoist oxidation by using suitable treatment and lubricating all mechanisms.

7.7.3 Possibility of corrosion on components of the hoist increases for installations where salt air and high humidity are present. The hoist may require more frequent lubrication. Make regular inspections of the unit's condition and operation.

7.7.4 In order to prevent internal corrosion from occurring, the hoist must be operated using proper quality air at least once per week by raising and lowering the hoist one full cycle. Note: the possibility of corrosion in the valve section of the hoist increases for areas where salt air and high humidity are present. For such situations you may need to operate your hoist more often than once per week.

7.7.5 For hoist installations where temperature variations introduce condensation into the hoist additional inspection and more frequent lubrication may be required.

7.7.6 Refer to Section 2.1.2 for allowable environmental conditions.

8.0 Troubleshooting

⚠ WARNING

HAZARDOUS AIR PRESSURE IS PRESENT IN THE HOIST, IN THE SUPPLY OF COMPRESSED AIR TO THE HOIST, AND IN CONNECTIONS BETWEEN COMPONENTS.

Before performing ANY maintenance on the equipment, de-energize the supply of compressed air to the equipment, and lock and tag the supply device in the de-energized position. Refer to ANSI Z244.1, "Personnel Protection - Lockout/Tagout of Energy Sources."

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

Table 8-1 Troubleshooting Guide

Symptom	Cause	Remedy
Does not operate	Lack of air pressure or loss of air supply.	Repair or adjust air supply or filters. Check for air line obstruction.
	Seizure of Valve Spool, or Air Motor.	Repair at service facility.
	Seizure of brake or brake mechanism fails to release.	Repair at service facility.
	Bending or crimping of pendant hose or control tubes	Correct or repair bend or crimp in hose and/or tubes
	Hoist is overloaded	Reduce the load to the rated capacity of hoist.
Lifting speed slow or insufficient lifting capacity	Low air pressure at hoist inlet port.	Repair or adjust air supply or filters. Check for air line obstruction.
	Air supply hose or piping is too small.	Replace hose or piping sizes with recommended sizes in Section 3.0.
	Hoist is overloaded.	Reduce the load to the rated capacity of hoist.
	Vane motor seizing	Repair at service facility.
	Brake incorrectly set.	Adjust brake according to Section 7-2.
	Inlet strainer clogged	Unscrew adapter and clean strainer.
	Exhaust Silencer clogged	Clean or replace.
	Control yoke movement limitation incorrect	Adjust control yoke.
	Bending or crimping of pendant hoses or control tubes	Correct or repair the bend or crimp in hose and/or control tubes
	Air flow capacity of compressed air system insufficient	Increase air flow capacity of compressed air system to requirements in Section 2.0.
	Air motor vanes or bearings worn	Repair at service facility.
	Air supply to hoist contains dirt or debris	Filter the air supply to the hoist in accordance with the requirements in Section 3.0.
Unable to lift rated load	Lack of air pressure or loss of air supply.	Repair or adjust air supply or filters.
	Improper adjustment of load limiter.	Adjust Load Limiter. See Section 7.1.

Table 8-1 Troubleshooting Guide		
Symptom	**Cause**	**Remedy**
Hoist moving in wrong direction (pendant control)	Pendant control tubes are terminated to incorrect ports on hoist body.	Connect the control tubes in accordance with Section 7.4.
Hoist lowers but will not lift	Hoist is overloaded.	Reduce load to hoist rated capacity.
	Faulty pendant control or control tube(s)	Repair or replace pendant control or control tube(s)
	Lack of air pressure or partial loss of or leakage in air supply.	Repair or adjust air supply or filters.
Hoist drifts excessively when hoist is stopped	Brake requires adjustment.	Adjust brake according to Section 7-2.
	Oil or grease on brake parts	Dismantle brake and clean all parts. Check thickness of brake linings according to Table 5-3
Control system fails to return to neutral position	Control yoke resting against chain guide	Adjust position of control yoke
	Control shaft bent	Change control shaft
	Valve spool seizing	Clean and lubricate valve spool. Also check fitting of valve spool liner
	Valve Spool spring broken	Repair at service facility
	Valve in Pendant Handle stuck	Repair at service facility

9.0 Warranty

All products sold by Harrington Hoists, Inc. are warranted to be free from defects in material and workmanship from date of shipment by Harrington for the following periods:

1 year – Electric and Air Powered Hoists (excluding (N)ER2 Enhanced Features Models), Powered Trolleys, Powered Tiger Track Jibs and Gantries, Crane Components, Sling Chain, Spare / Replacement Parts

2 years – Manual Hoists & Trolleys, Beam Clamps

3 years – (N)ER2 Enhanced Features Model Hoists

5 years – Manual Tiger Track Jibs and Gantries, TNER Pull - Rotor Motor Brake

10 years – (N)ER2 "The Guardian" Smart Brake

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 Harrington Hoist's inspection of the product, Harrington Hoists, Inc. agrees, at its discretion, either to replace (not including installation) or repair the part or product free of charge and deliver said item F.O.B. Harrington Hoists, Inc. place of business to customer.

Customer must obtain a Return Goods Authorization as directed by Harrington or Harrington's 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 Harrington's warranty, the customer will be responsible for the costs of returning the product.

Harrington Hoists, Inc. disclaims any and all other warranties of any kind expressed or implied as to the product's merchantability or fitness for a particular application. Harrington 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 inability whatever, regardless of whether damage, loss or expense results from any act or failure to act by Harrington, whether negligent or willful, or from any other reason.

10.0 Parts List

When ordering Parts, please provide the Hoist product number and serial number located on the Hoist nameplate (see fig. below).
Reminder: Per **Sections 1.1** and **3.9.1** to aid in ordering Parts and Product Support, record the Hoist product number and serial number in the space provided on the cover of this manual.

The parts list is arranged into the following sections:

10.1 Hoist Body

AL003, AL005, AL010

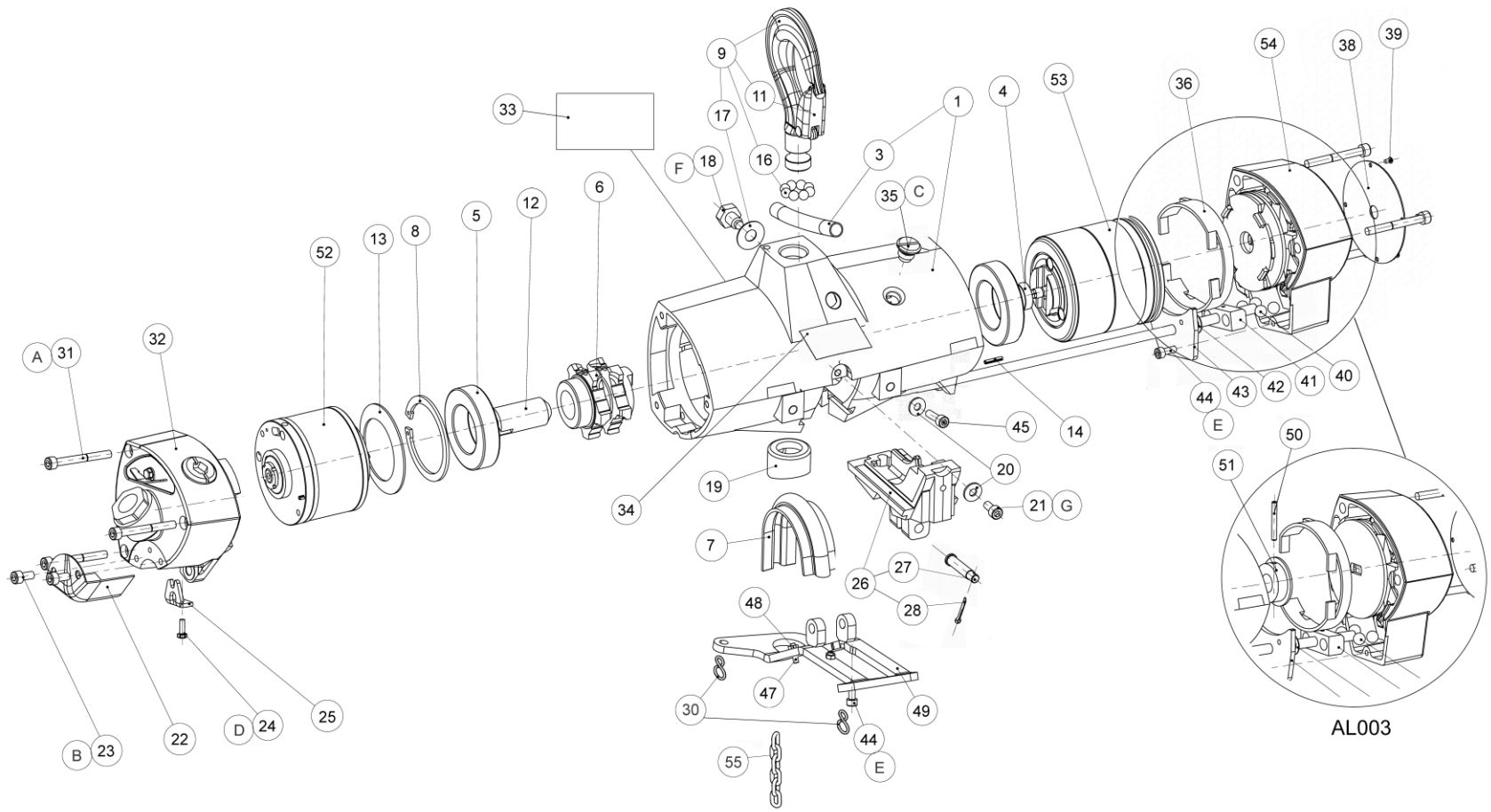


Figure 10-1 Small hoist body

Figure No.	Part Name	Parts Per Hoist	AL003	AL005	AL010
1	Casing Assembly	1	AL4320066190		
3	Tube	1	AL4320229000		
4	Bearing	1	AL4320065802		
5	Bearing	2	AL4320062900		
6	Load sheave	1	AL4320066700		
7	Chain guide	1	AL4320066600		
8	Snap ring[7]	1	AL0335215500		
9	Hook Assembly with	1	AL4320200091		
11	Latch Assembly	1	AL4320200190		
16	Ball[1]	8	AL4320 2170 90		
17	Lock washer[1]	1			
12	Coupling	1	AL4320070400		
13	Coned disc spring	1	AL4320067600		
14	Spring Pin[4]	1	AL0108119400		
18	Screw	1	AL4320066500		
19	Hook holder	1	AL4320066300	AL43200738	
20	Washer	2	AL0300027620		
21	Screw	1	AL0211124400		
22	Cover	1	AL4320073000		
23	Screw	2	AL0211124400		
24	Screw	1	AL0147117103		
25	Angle piece	1	AL4320072700		
26	Guide Assembly	1	AL4320068890		
27	Pin[5]	1	AL4320107300		
28	Cotter pin[5]	1	AL0111125200		

Figure No.	Part Name	Parts Per Hoist	AL003	AL005	AL010
30	S-Hook[6]	2	AL4320075200		
31	Screw[8]	6	AL5541708500		
32	Valve housing complete	1	See 9.6 Control Valve Unit Parts		
33	Capacity nameplate	1	AL43202159	AL43202158	AL43102157
34	Logo nameplate	1	AL0690110103		
35	Screw	1	AL4310067400		
36	Spacer	1	AL4320068500		
38	Nameplate	1	AL4320216004		
39	Rivet	8	AL0244416300		
40	Ball[2]	4	AL0517111600		
41	Shaft compl.	1	AL4320070190		
42	Washer [2,3]	1	AL4320072600		
43	Cover	1	AL4310230600		
44	Screw [2,3]	2	AL0211120701		
45	Screw[7]	1	AL0211124701		
47	Screw[7]	2	AL0196155302		
48	Nut[7]	2	AL0266210600		
49	Yoke	1	AL4320070300		
50	Pin[8]	1	AL0108324600		
51	Ring	1	AL4320083400		
52	Motor assembly	1	See 9.5 Motor Unit Parts		
53	Gear unit assembly	1	See 9.3 Gear Unit Parts		
54	Brake unit assembly	1	See 9.4 Brake Unit parts		
55	Chain	FT	LCAL005		

Part Notes:

1) Included in Hook Service Kit AL4320 2170 90
2) Included in Brake Service Kit AL4320 0684 90
3) Included in Valve Service Kit AL4320 0714 90
4) Included in Motor Service Kit AL4320 0884 97
5) Parts come with all models, but only need to be installed on 1 ton double fall models
6) Only for cord models
7) Included in Hoist body/Hook Small Parts Kit AL4320 0788 90
8) Included in Brake Small Parts Kit AL4320078990

Service Notes:

Note	Tightening Torque	Loctite
A	7.4 ft-lb (10Nm)	483
B	4.4 ft-lb (6Nm)	-
C	11.1 ft-lb (15Nm)	483
D	2.2 ft-lb (3Nm)	483
E	4.4 ft-lb (6Nm)	483
F	7.4 ft-lb (10Nm)	483
G	5.9 ft-lb (8Nm)	483

10.1 Hoist body

AL030, AL050*

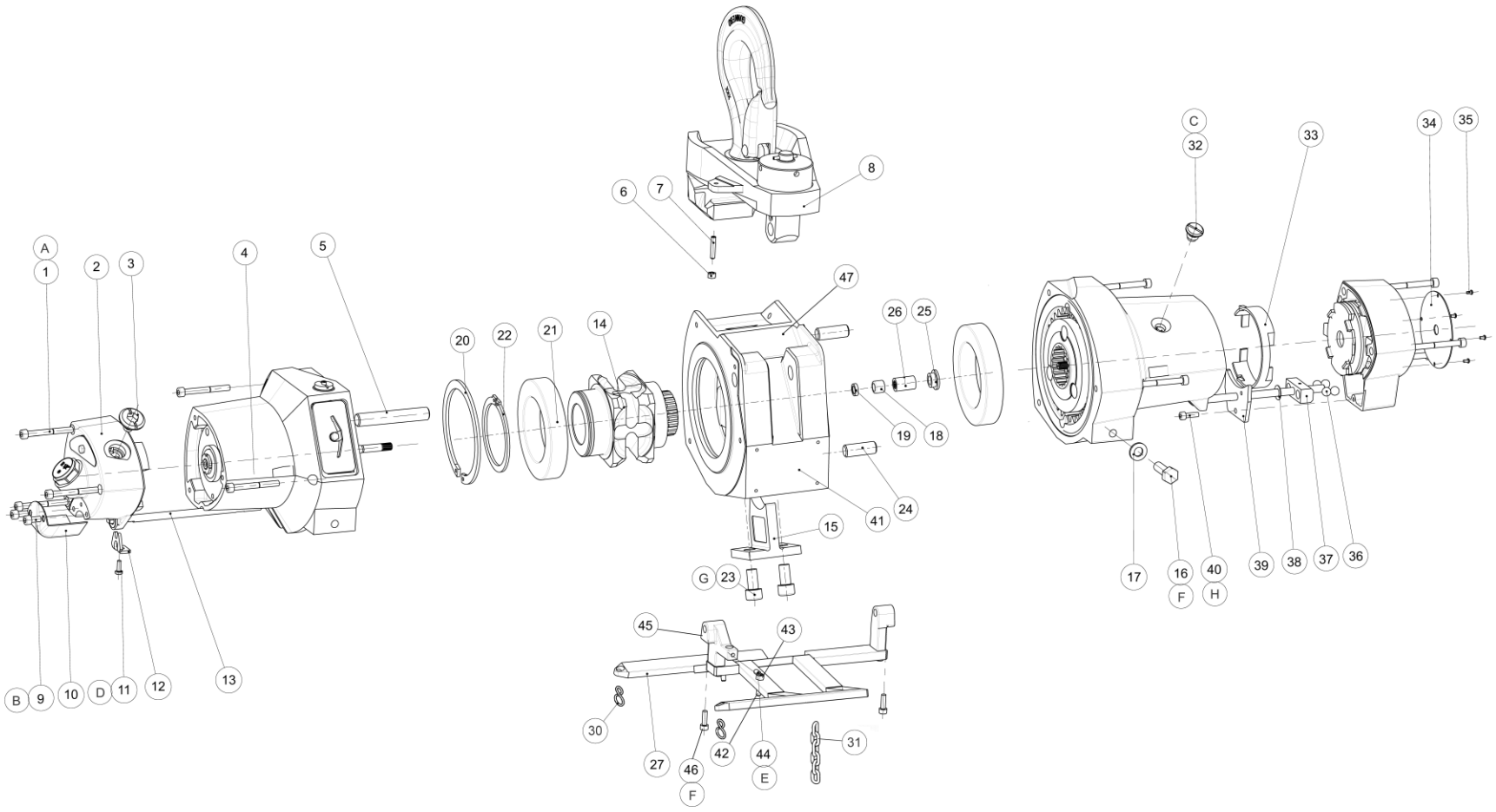


Figure 10-2 Large hoist body

10.1 Hoist Body

Figure No.	Part Name	Parts Per Hoist	AL030	AL050
1	Screw[4]	12	AL5541708500	
2	Valve Housing, Compl	1	See 9.6 Control Valve Unit Parts	
3	Plug	1	AL4320078500	
4	Motor Housing	1	See 9.5 Motor and 9.7 Quick Lowering	
5	Pin	1	AL4320206400	
6	Nut	1	AL0266210700	
7	Set screw	1	AL0190121000	
8	Load Carry unit	1	See 9.2 Load Carrying Unit Parts	
9	Screw	2	AL0211124400	
10	Cover	1	AL4320073000	
11	Screw	1	AL0147117103	
12	Angle piece	1	AL4320072700	
13	Shaft	1	AL4320204800	
14	Load Sheave	1	AL4320202800	
15	Stripper	1	AL4320202000	
16	Screw	1	AL0147136303	
17	Washer	1	AL0301234400	
18	Needle bearing	1	AL0516401300	
19	Seal ring	1	AL0666800405	
20	Snap ring	1	AL0335216900	
21	Ball bearing	2	AL4320063901	
22	Snap ring	1	AL0335115400	
23	Screw	2	-	
24	Pin	2	AL4310207700	
25	Bushing	1	AL4310203000	
26	Coupling sleeve, compl	1	AL4320202980	
27	Yoke	1	AL4320202600	AL4320202700

Parts Notes:

1) Only for cord models
2) Included in Brake Service Kit AL4320068490
3) Included in Valve Service Kit AL4320071490
4) Included in Hoist body Small Parts Kit AAL4320078990

Figure No.	Part Name	Parts Per Hoist	AL030	AL050
30	S-Hook[1]	2	AL4310075200	
31	Chain	FT	LCAL030	
32	Screw	1	AL4310067400	
33	Spacer	1	AL4310068500	
34	Nameplate	1	AL4310216005	
35	Rivet	12	AL0244416300	
36	Ball	4	AL0517111600	
37	Shaft, compl	1	AL4310204780	
38	Washer[2,3]	1	AL4310072600	
39	Cover	1	AL4310230600	
40	Screw[2,3]	3	AL0211120700	
41	Nameplate	1	AL4310216301	
42	Screw	2	AL0190121000	
43	Nut	2	AL0266210700	
44	Set screw	1	AL0196120300	
45	Bracket	1	AL4310202100	
46	Screw	4	AL0211120700	
47	Casing	1	AL4320201500	

Service notes:

Note	Tightening Torque	Loctite
A	7.4 ft-lb (10Nm)	483
B	4.4 ft-lb (6Nm)	-
C	11.1 ft-lb (15Nm)	483
D	2.2 ft-lb (3Nm)	483
E	5.2 ft-lb (7Nm)	483
F	6.6 ft-lb (9Nm)	483
G	52-63 ft-lb (70-85Nm)	-
H	4.4 ft-lb (6Nm)	483

10.2 Load Carrying Unit

AL030, AL050

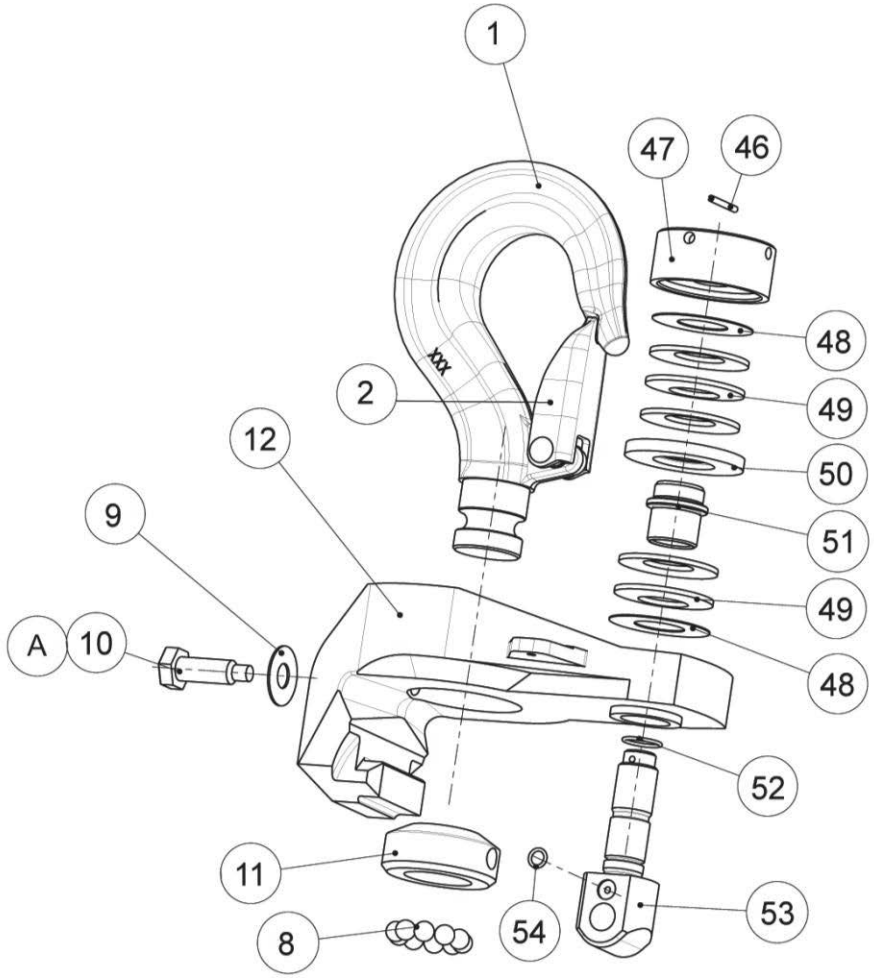


Figure 10-3 AL030 and AL050 Load Carrying Unit

Figure No.	Part Name	Parts Per Hoist	AL030	AL050
1	Hook Assembly with Bearings	1	AL4320211692	AL4320211792
2	Latch Assembly	1	AL4320215290	AL4320215690
8	Ball[1]	10 (13)[2]		
9	Lock washer[1]	1		
10	Screw	1	AL4310205900	AL4310206000
11	Bearing ring	1	AL4310205700	AL4310205800
12	Hook holder	1	AL4310205500	AL4310205600
46	Pin	1	AL4320060000	
47	Nut	1	AL4310209300	
48	Washer	2	AL4310207500	
49	Cup spring	5	AL4310079600	
50	Washer	1	AL4310209200	
51	Sleeve	1	AL4310209100	
52	O-ring	1	AL4320062400	
53	Eye bolt	1	AL4310209500	
54	O-ring	1	AL4320061400	

Part Notes:

1) Included in Hook Service Kit AL4320217190 (for AL030); Hook Service Kit AL4320 2172 90 (for AL050)
2) Qty in parenthesis () is for AL050.
3) Parts come with both models, but only need to be installed on the 5 ton double fall model
4) Only for cord models

Service Notes:

Note	Tightening Torque	Loctite
A	7.4 ft-lbs (10 Nm)	483

10.3 Gear Unit

AL003, AL005, AL010

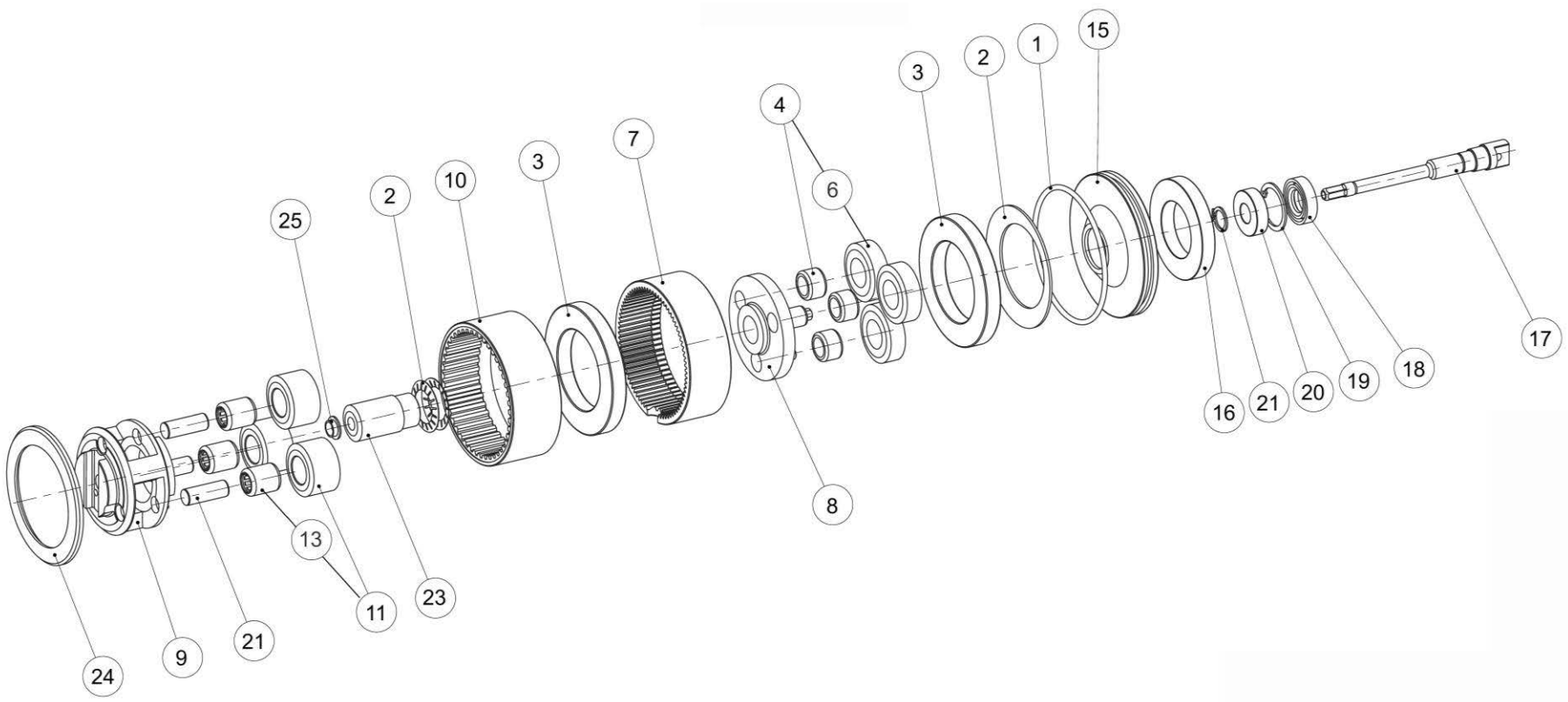


Figure 10-4 Gear Unit, Small body

10.3 Gear Unit

Figure No.	Part Name	Parts Per Hoist	AL003	AL005	AL010
1	O-ring[1, 2]	1	AL4320064000		
2	Coned disc spring	1	AL4320067700		
3	Bearing	3	AL4230061000		
4	Gear set	1	AL4320067790		
6	Needle Bearing[2]	3	AL0516402000		
7	Gear rim	1	AL4310067900		
8	Planet shaft	1	AL4310067500		
9	Planet shaft	1	AL4310067002		
10	Gear rim	1	AL4310066900		
11	Gear set	1	AL4320202390		
13	Needle Bearing[2]	3	AL4310211000		
14	Axle	3	AL4310067300		
15	Cover	1	AL4320068100		
16	Bearing			AL4320060700	
17	Shaft	1	AL4320068000		
18	Seal ring[1, 2]	1	AL0666608200		
19	Snap Ring[1, 2]	1	AL0335213000		
20	Ball bearing[2]	1	AL0502120900		
21	Snap Ring[1, 2]	1	AL0335111400		
23	Gear wheel	1	AL4310067800		
24	Washer	1	AL4310066800		
25	Bushing	1	AL4320067100		
26	Lock screw	1	AL4310067400		

Notes:

1) Included in Gear Unit Service Kit AL4320217390
2) Included in Gear Unit Small Parts Kit AL4320079190

10.3 Gear Unit

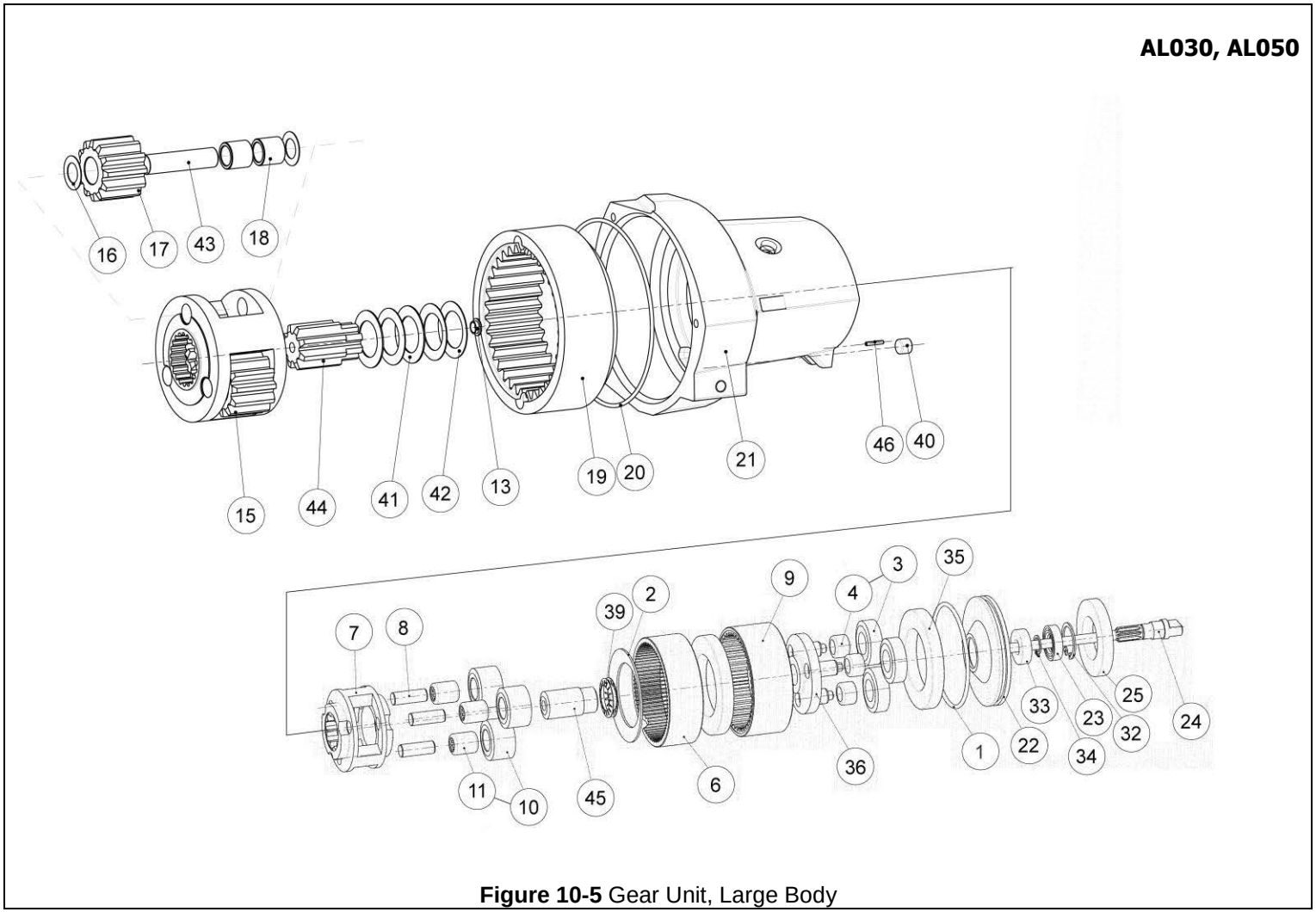


Figure 10-5 Gear Unit, Large Body

Figure No.	Part Name	Parts Per Hoist	AL030	AL050
1	O-ring[1,2]	1	AL4320064000	
2	Coned disc spring	1	AL4320067600	
3	Gear set	1	AL4320067790	
4	Needle Bearing	3	AL0516402000	
6	Gear rim	1	AL4320067900	
7	Planet shaft	1	AL4320203600	
8	Axle	3	AL4320067300	
9	Gear rim	1	AL4320066900	
10	Gear set	1	AL4310202390	
11	Needle Bearing	3	AL4310211000	
13	Bushing	1	AL4320067100	
15	Planet shaft	1	AL4310203500	
16	End washer	6	AL0517528001	
17	Gear	3	AL4310203200	
18	Bearing	6	AL0515011800	
19	Gear rim	1	AL4310203400	
20	O-ring	1	AL4320067400	
21	Gear casing	1	AL4310205408	
22	Cover	1	AL4320068100	
23	Seal ring[1, 2]	1	AL0666608200	
24	Shaft	1	AL4320202400	
25	Bearing	1	AL4320060700	
32	Snap ring[1, 2]	1	AL0335213000	
33	Bearing[2]	1	AL0502120900	
34	Snap ring[1, 2]	1	AL0335111400	
35	Bearing	2	AL4320061000	
36	Planet shaft	1	AL4310067500	
39	Coned disc spring	2	AL4320067700	
40	Bearing	1	AL0516421200	
41	Washer	2	AL0517530001	
42	Coned disc spring	3	AL4320211200	
43	Shaft	3	AL4310203300	
44	Gear	1	AL4310203100	
45	Gear	1	AL4310067800	

Part Notes:

1) Included in Gear Unit Service Kit AL4320217391
2) Included in Gear Unit Small Parts Kit AL4320079190

10.4 Brake Unit

AL003, AL005, AL010, AL030, AL050

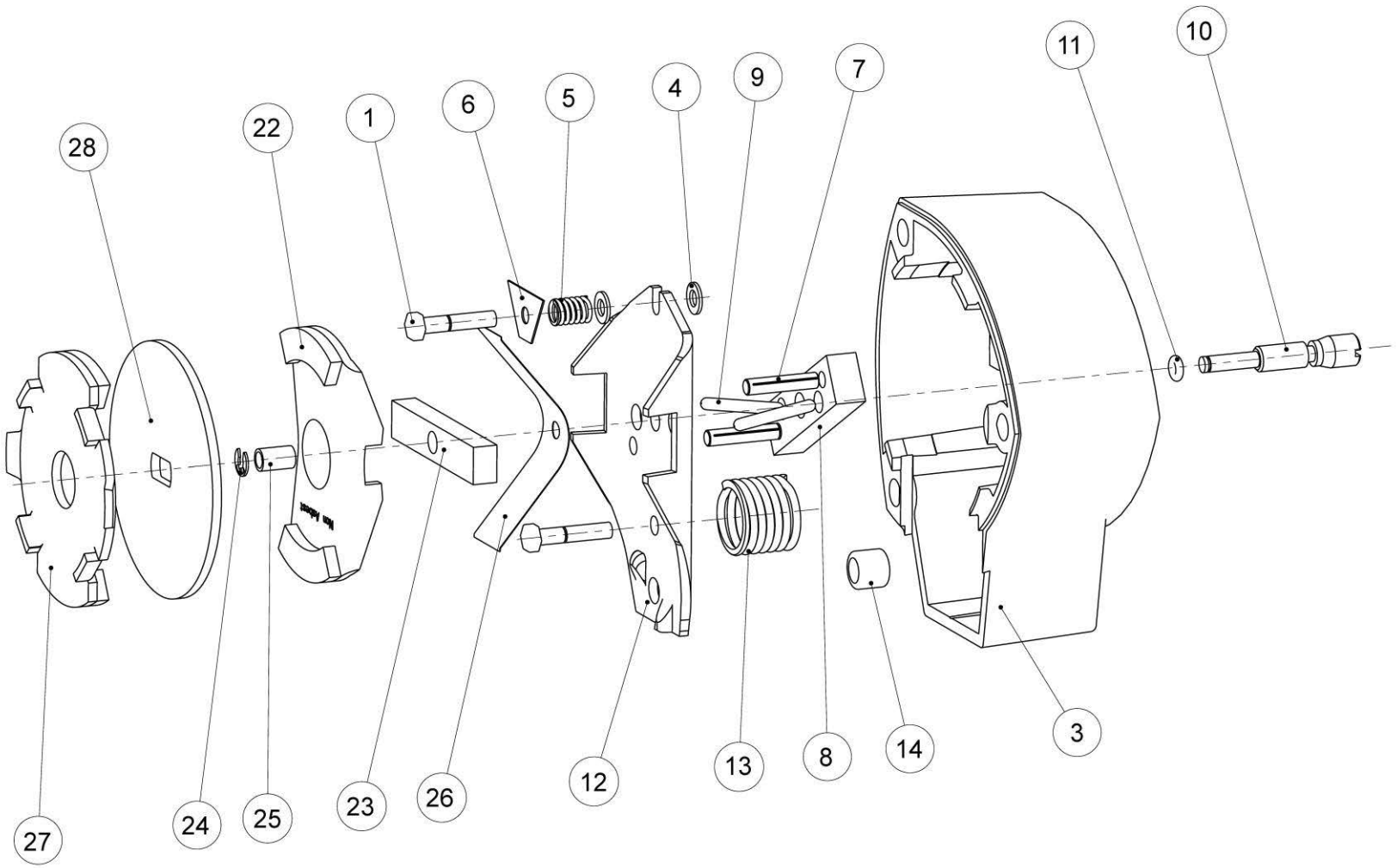


Figure 10-6 Brake Unit Parts

Figure No.	Part Name	Parts Per Hoist	AL003	AL005	AL010	AL030	AL050
1	Screw[2]	2	AL0147121003				
2	Screw	3	AL4320065500				
3	Brake casing	1	AL4310068903				
4	Washer[2]	2	AL0301211800				
5	Spring[2]	1	AL4310069300				
6	Lock washer[2]	1	AL4310074700				
7	Pin[2]	2	AL0106028100				
8	Cross piece	1	AL4310069100				
9	Pin	2	AL4310069500				
10	Adjusting screw	1	AL4320069400				
11	O-ring[2]	1	AL0663211000				
12	Yoke	1	AL4320069200				
13	Spring	1	AL4320069001				
14	Needle bearing[2]	1	AL0516421200				
22	Pressure plate, compl.[1]	1	AL4310069900				
23	Cross piece	1	AL4320069600				
24	Snap ring[1]	1	AL0335310600				
25	Sleeve[2]	1	AL4310069700				
26	Spring[2]	1	AL4310069800				
27	Pressure plate, compl.[1]	1		AL4310068200			
28	Brake disc[1]	1	AL4310068400				

Parts Notes:

1) Included in Brake Unit Service Kit AL4320068490
2) Included in Brake Unit Small Parts Kit AL4320078990

10.5 Motor Unit

AL003, AL005, AL010, AL030, AL050

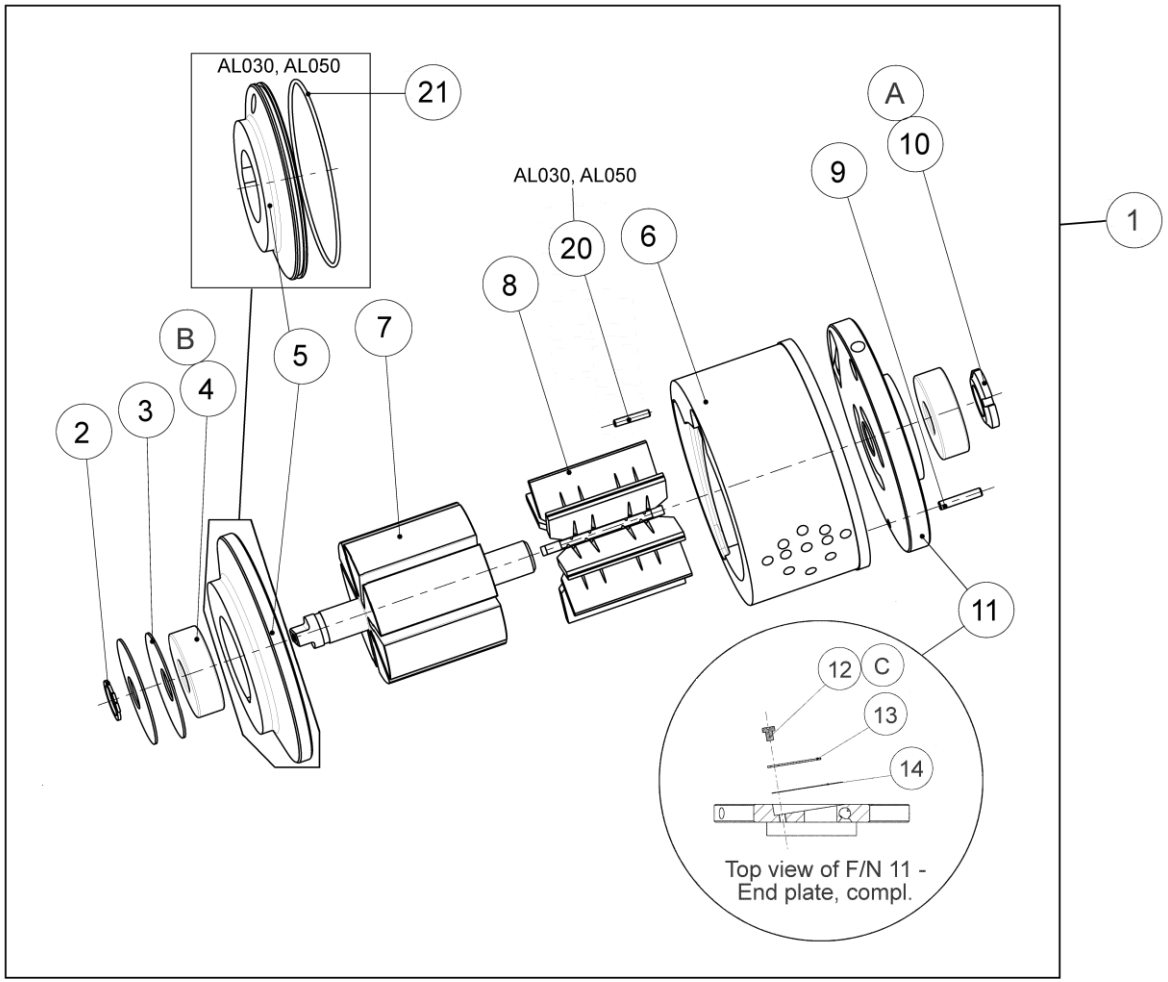


Figure 10-7 Motor Unit Parts

Figure No.	Part Name	Parts Per Hoist	AL003	AL005	AL010	AL030	AL050
1	Motor Assembly	1	AL4320201494	AL4320201493		AL4320201496	
2	Snap ring[1]	1	AL0335111400				
3	Coned disc spring	2	AL4320070700				
4	Ball bearing[1]	2	0502 1092 42				
5	End plate	1	AL4320070500			AL4320205200	
6	Cylinder	1	AL4320076700	AL4320070800			
7	Rotor	1	-				
8	Vane[1]	7					
9	Pin[1]	1	0108 1194 00				
10	Nut [1]	1	AL0295310200				
11	End plate, compl.	1	AL4320088381	AL4320088380			
12	Screw [1]	1	AL0160601800				
13	Support[1]	1	AL4310088600				
14	Valve Plate[1]	1	AL4310088500				
20	Pin	1				0108 1194 00	
21	O-ring	1				0663902200	

Parts Notes:

1) Included in Motor Unit Service Kit AL4320088497

Service Notes:

Note	Loctite
A	638
B	638 (on rotor side)
C	290

10.6 Control Valve Unit

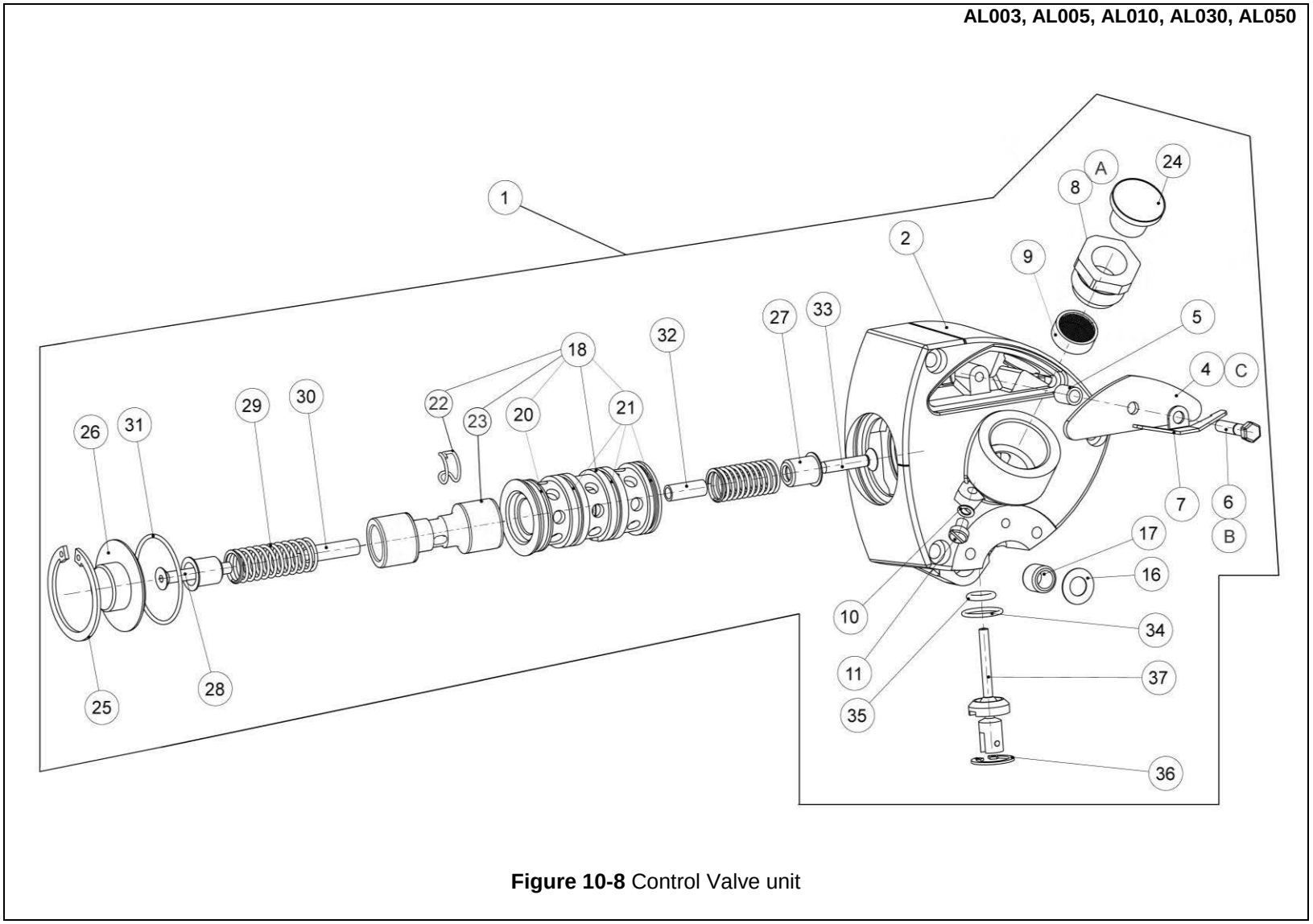


Figure 10-8 Control Valve unit

10.6 Control Valve Unit

Figure No.	Part Name	Parts Per Hoist	AL003	AL005	AL010	AL030	AL050
1	Valve housing assembly	1	AL4320071390			AL4310071382	
2	Valve housing	1	AL4320071300				
3	Screw	3	AL4320065500				
4	Silencer	1	AL4320072900				
	Cover					AL4320207800	
5	Spacer	1	AL4320082800				
6	Screw[5]	1	AL0147121003				
7	Support	1	4310 0830 00				
8	Adapter	1	AL4320067201				
9	Strainer[2,3]	1	AL4170047900				
10	Washer	1	AL4320068500				
11	Screw[5]	1	AL0160605700				
12	Screw[5]	2	AL0211124400				
13	Cover	1	AL4320073000				
14	Angle piece	1	AL4320072700				
15	Screw[1,4]	1	AL0147110746				
16	Washer[1,4]	1	AL4310072600				
17	Needle bearing[5]	1	0516 4013 00				

Figure No.	Part Name	Parts Per Hoist	AL003	AL005	AL010	AL030	AL050
18	Valve Assembly	1	AL4320071482				
20	O-ring[1]	1	AL0663212800				
21	O-ring[1]	3	AL0663612900				
22	Spring[1]	1	AL4310071600				
23	Valve Spool	1					
24	Plug	1	AL4320078500				
25	Snap ring[5]	1	AL0335210512				
26	Cover	1	AL4310072500				
27	Sleeve	2	AL4320072000				
28	Screw[5]	1	AL0216121200				
29	Spring	2	AL4320071700				
30	Spacer	1	AL4320071900				
31	O-ring[1]	1	AL0663613300				
32	Spacer	1	AL4320071800				
33	Screw[5]	1	AL0216121000				
34	O-ring[1]	1	AL0663612200				
35	O-ring[1]	1	AL0663211500				
36	Snap ring[1]	1	AL0335212000				
37	Lever, compl.	1	AL4320072180				

Parts Notes:
1) Included in Control Valve Unit Kit AL4320071490
2) Included in Motor Kit AL4320088497
3) Included in Gear Unit Kit AL4320217390
4) Included in Brake Unit Kit AL4320068490
5) Included in Control Valve Small Parts Kit AL4320079090

Service Notes (see image):

Note	Tightening Torque	Loctite	Other
A	22 ft-lbs (30Nm)		
B	3.7 ft lbs (5Nm)	483	
C			Universal silicone

10.7 Quick Lowering Valve

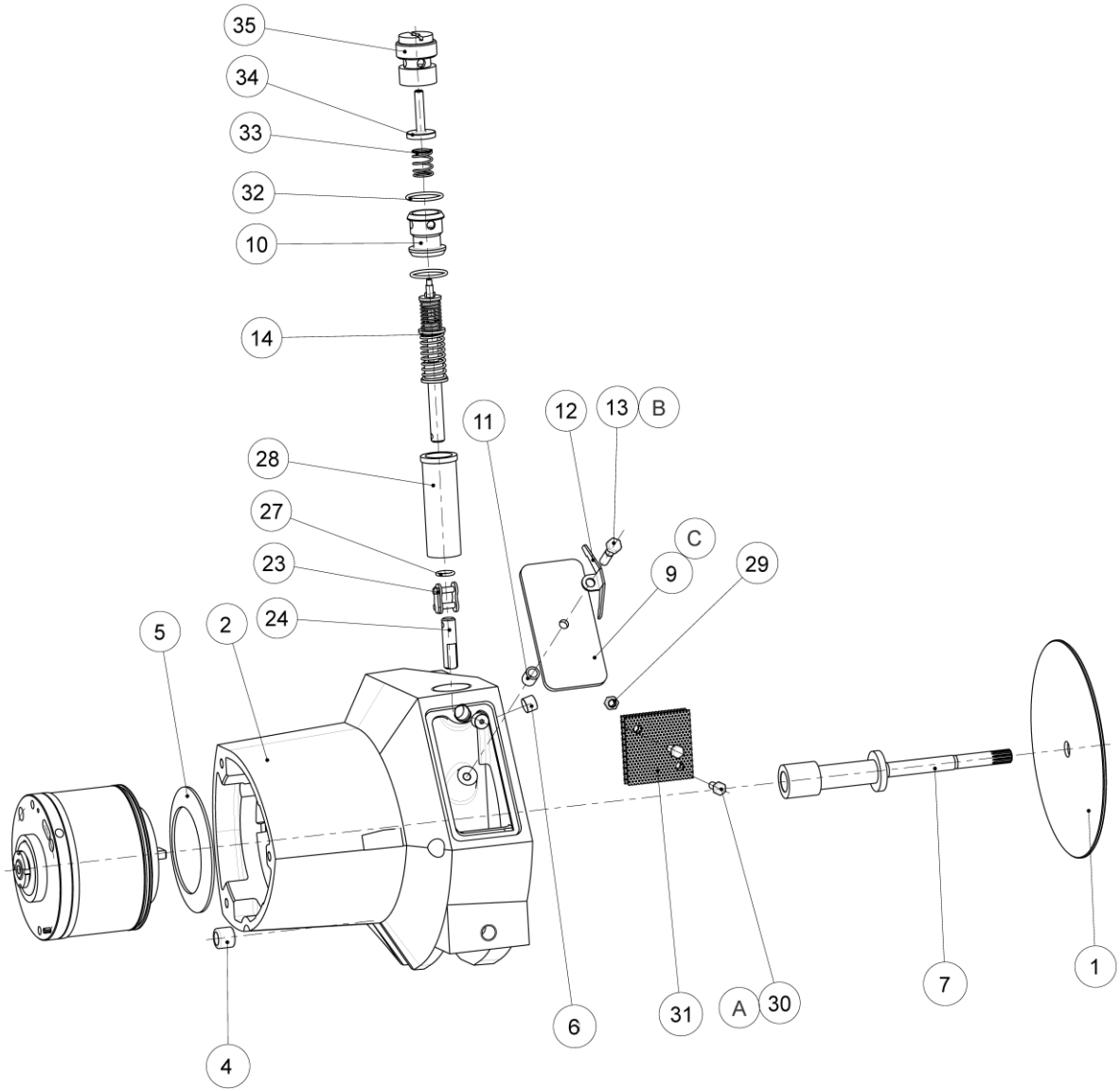


Figure 9-9 Quick Lowering Valve

10.7 Quick Lowering Valve

Figure No.	Part Name	Parts Per Hoist	AL030	AL050
1	Cover	1	AL4310207600	
2	Motor casing	1	AL4310205308	
4	Needle bearing	1	AL0516421200	
5	Cup Spring	1	AL4320067600	
6	Stopper	2	AL4310212600	
7	Shaft, compl	1	AL4310204600	
9	Silencer	1	AL4320208900	
10	Valve seat	1	AL4310204100	
11	Spacer	1	AL4320082800	
12	Support	1	AL4320083000	
13	Screw	1	AL0147121003	
14	Valve assembly	1	AL4320204480	
23	Chain lock	1	AL4320211900	
24	Shaft	1	AL4320202200	
27	O-ring	1	AL0663611500	
28	Sleeve	1	AL4310203700	
29	Nut	2	AL0266110600	
30	Screw	2	AL0147117103	
31	Silencer	2	AL4320202500	
32	O-ring	2	AL4320062600	
33	Spring	1	AL4320205000	
34	Valve plate	1	AL4320204200	
35	Valve seat	1	AL4320204300	

Service Notes (see image):

Note	Tightening Torque	Other
A	22 ft-lbs (30Nm)	
B	3.7 ft-lbs (5Nm)	
C		Seal with universal silicone

10.8 Bottom Hook

AL003, AL005, AL030

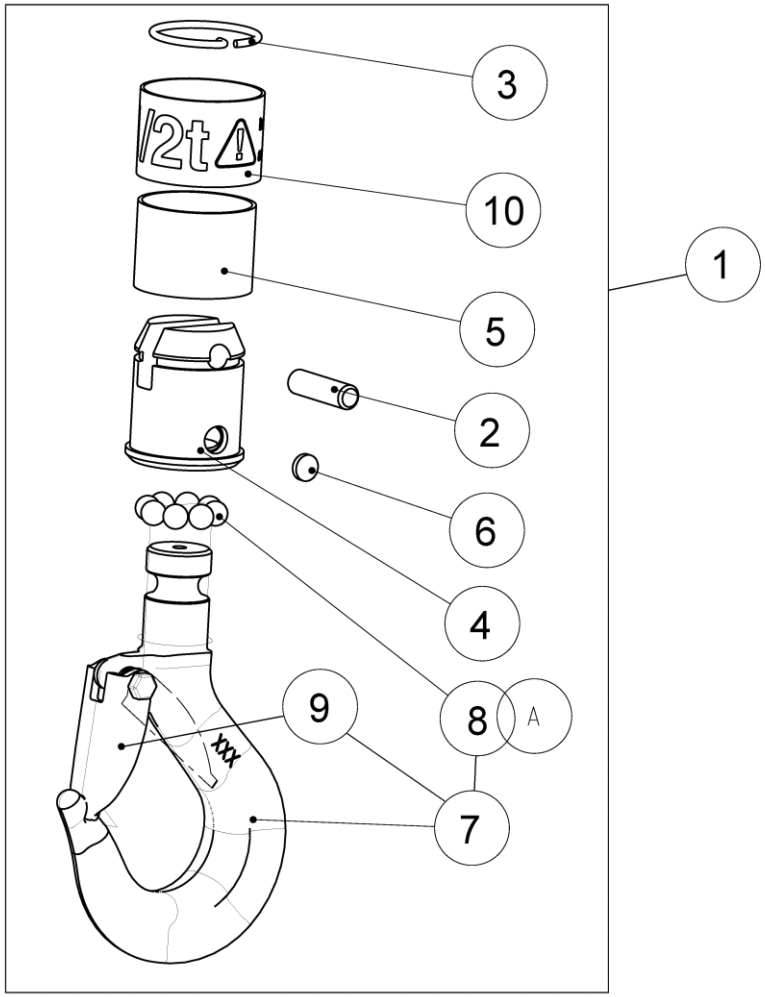


Figure 10-10 Single Fall Bottom Hook

10.8 Bottom Hook

Figure No.	Part Name	Parts Per Hoist	AL003	AL005	AL030
1	Bottom Hook Complete Set	1	AL4320073188	AL4320073189	AL4320207087
2	Pin	1	AL4320223401		AL4320207301
3	Locking ring	1	AL4320078400		AL4320207400
4	Hook holder	1	AL4320073101		AL4310207000
5	Sleeve	1	AL4320073308	AL4320073309	AL4320207206
6	Plug	1	AL4310073200		AL4320207100
7	Hook Assembly with bearings	1	AL4320200091		AL4320211692
8	Ball	8	Included in Service kit AL4320 2170 90		Included in Service kit AL4320 2171 90
9	Latch Assembly	1	AL4320200190		AL4320215290
10	Capacity label	1	AL4320250700	AL4320250600	AL4320250800

Service Notes (see image):

Note	Lubrication
A	Bearing grease

10.8 Bottom hook

AL010, AL050

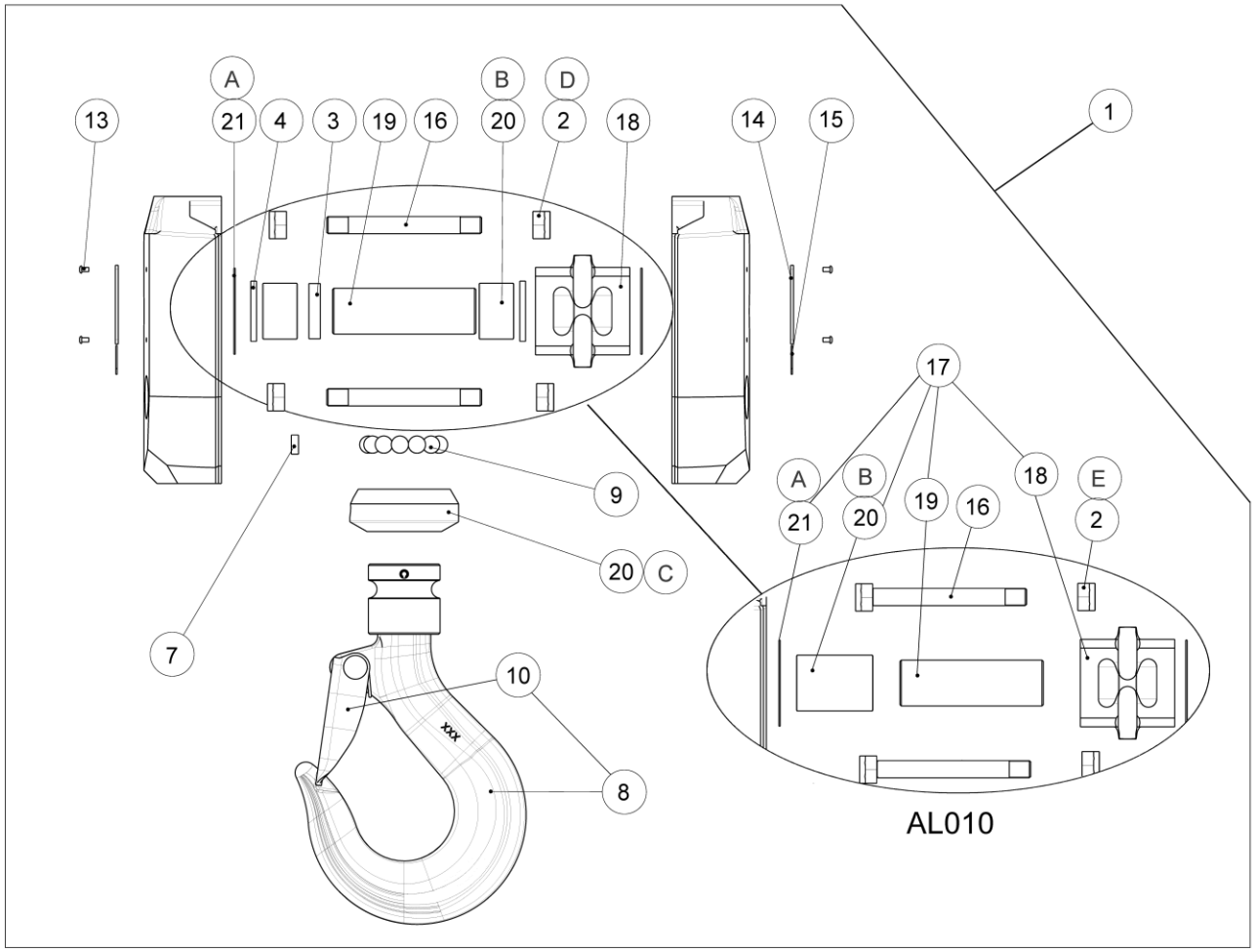


Figure 10-11 Double Fall Bottom Hook

10.8 Bottom Hook

Figure No.	Part Name	Parts Per Hoist	AL010	AL050
1	Bottom Hook Complete Assembly	1	AL4320075385	AL4320206587
2	Lock nut	3	AL4320060800	
		6		AL0291111200
3	Spacer			AL4310206801
4	Sealing ring	2		AL0666800505
7	Washer	1	AL4310073200	AL4310206900
8	Hook Assembly with bearings	1	AL4320200091	AL4320211792
9	Ball[1]	8 (13)		
10	Latch Assembly	1	AL4320200190	AL4310215690
16	Bolt	3	AL4320065103	AL4310208700
17	Idle sheave assy	1	AL4320075593	
18	Idle sheave	1	AL4320075503	AL4310206600
19	Axle	1	AL4310075401	AL4310206700
20	Needle bearing	1	AL4320060040	
		2		AL0516400048
21	Washer	2	AL0517528002	AL4310212200
22	Hook holder	1	AL4320075700	AL4310205800

Notes:
1) Included in Hook Service Kit : For AL010, Kit#=AL4320 2170 90; For AL050, Kit#= AL4320217290. Qty in () is for AL050

Service Notes (see image):

Note	Tightening Torque	Lubrication
A		Bearing grease
B		Bearing grease
C		Bearing grease
D	52-66 ft-lb (70-90Nm)	
E	7.4 ft-lb (10Nm)	

10.9 Control Handles

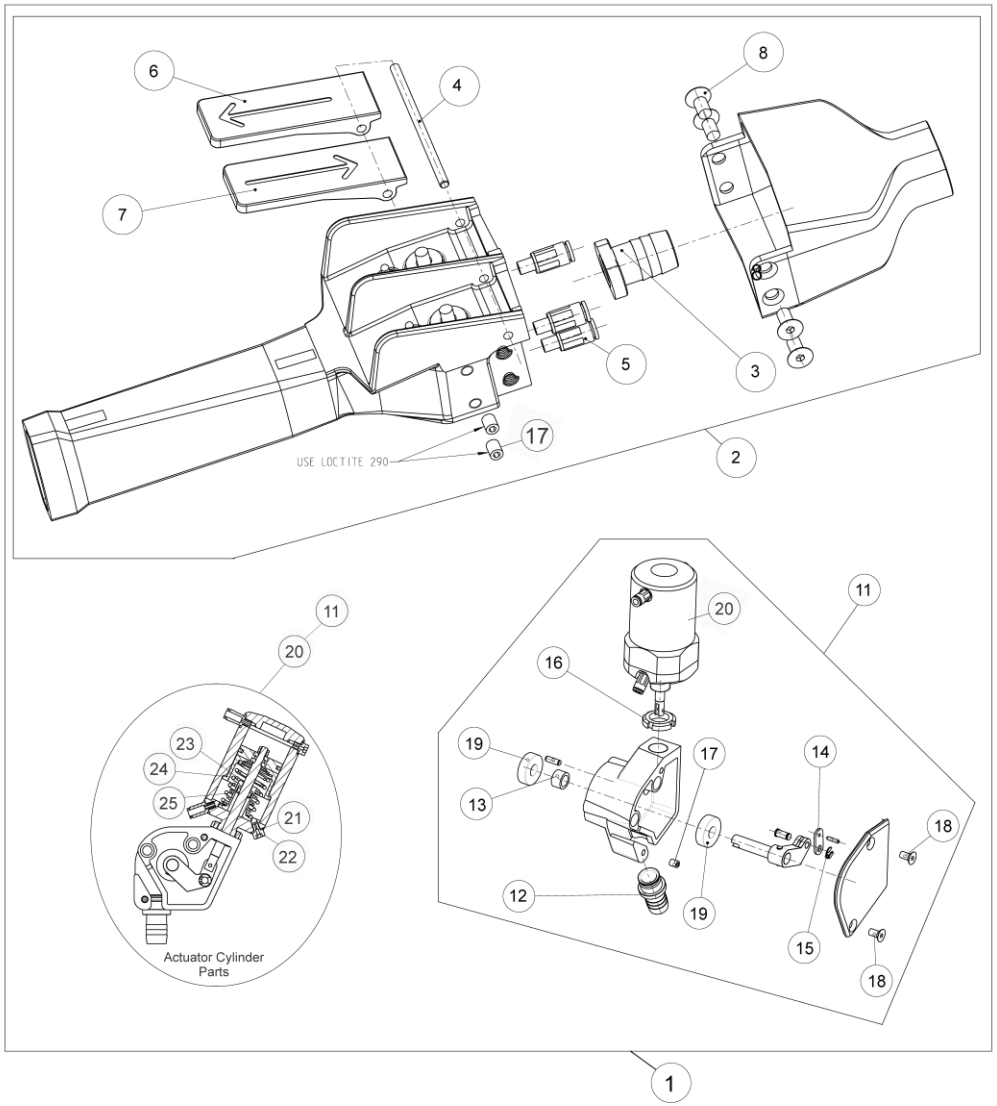


Figure 10-12 Pendant & Actuator Control

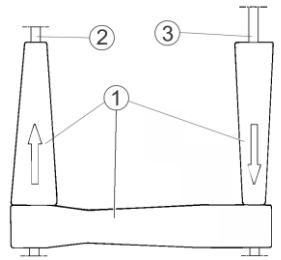


Figure 10-13 Cord Control

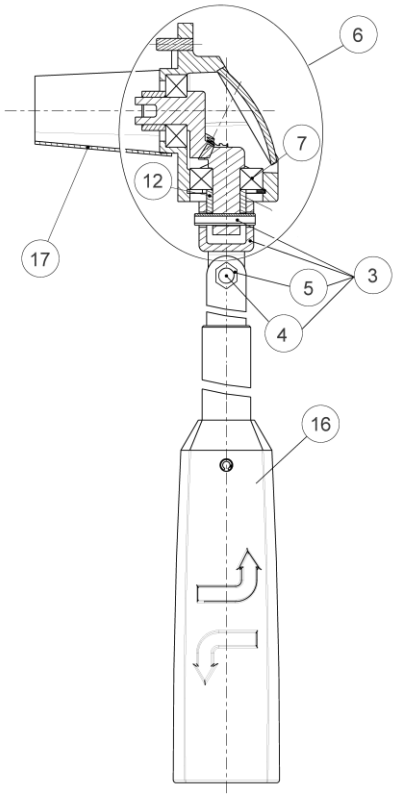


Figure 10-14 Twist rod Control

Pendant and Actuator Control

Figure No.	Part Name	Parts Per Hoist	AL003P	AL005P	AL010P	AL030P	AL050P
1	Pendant & Actuator Assembly	1	AL4320230190			AL4320230290	
2	Pendant Assembly	1	AL4320083564				
3	Adapter	1	AL4320231100				
4	Pin	1	AL4320051100				
5	Coupling	3	AL4320061800				
6	Valve Lever (Up)	1	AL4320050502				
7	Valve Lever (Down)	1	AL4320050501				
8	Screw	4	AL4320061100				
11	Actuator	1	AL4320081490			AL4320081497	
12	Cylinder adapter	1	AL4320230500				
13	Bushing	1	AL4320077700				
14	Link	1	AL4320082500				
15	Retaining ring	1	AL4320061500				
16	Lock nut	1	AL4320061200				
17	Set screw	1	AL4320060900				
18	Screw	2	AL4320061100				
19	Ball bearing	2	AL4320061700				
20	Cylinder complete	1	AL4320082684			AL4320082688	
21	Restrictor screw	2	AL4320230900				
22	Washer	2	AL4320061300				
23	Spring	1	AL4320081900				
24	Spring	1				AL4320082000	
25	Lock ring	1	AL4320061900				

Cord Control

Figure No.	Part Name	Parts Per Hoist	AL003C	AL005C	AL010C	AL030C	AL050C
1	Handle Assembly	1	AL4320208590				
2	White Cord (Up)	FT	9013101				
3	Red Cord (Down)	FT	9013102				

Twist Rod Control

Figure No.	Part Name	Parts Per Hoist	AL003R	AL005R	AL010R	AL030R	AL050R
1	Twist Rod Assemby	1	AL4320077491				
3	Link Set	1	AL4320087691				
4	Screw	2	AL4320062000				
5	Nut	2	AL4320062100				
6	Gear casing, compl	1	AL4320077481				
7	Ball bearing	2	AL4320062300				
12	Bushing	1	AL4320077700				
16	Handle	1	AL4320078100				
17	Cover	1	AL4320083300				

10.10 Service Kits

Description		Qty		AL003	AL005	AL010	AL030	AL050
Grease 180g for gear		**1**		**AL4320067500**				
Hook Service Kit		**1**		**AL4320217090**			**AL4320217190**	**AL4320217290**
	WASHER	1						
	BALL	AL003/ 005/010	8					
		AL030	10					
		AL050	13					
Brake Service Kit		**1**		**AL4320068490**				
	SCREW	1		AL0147110746				
	SCREW	1		AL0211120701				
	SNAP RING	1		AL0335310600				
	PRESSURE PLATE, COMPL	1		AL4310068200				
	BRAKE DISC	1		AL4310068400				
	PRESSURE PLATE, COMPL	1		AL4310069900				
	WASHER	2		AL4310072600				
Control Valve Service Kit		**1**		**AL4320071490**				
	SCREW	1		AL0147110746				
	SCREW	1		AL0211120701				
	SNAP RING	1		AL0335212000				
	O-RING	1		AL0663211500				
	O-RING	1		AL0663212800				
	O-RING	1		AL0663612200				
	O-RING	3		AL0663612900				
	O-RING	1		AL0663613300				
	SPRING	1		AL4310071600				
	WASHER	2		AL4310072600				
Motor Service Kit		**1**		**AL4320088497**				
	NUT	1		AL0295310200				
	SNAP RING	1		AL0335111400				

Description		Qty	AL003	AL005	AL010	AL030	AL050
	VANE	7	AL4310088407				
	STRAINER	1	AL4170047900				
	BALL BEARING	2	AL0502109242				
	PIN	1	AL0108119400				
	SCREW	1	AL0160601800				
	SUPPORT	1	AL4310088600				
	VALVE PLATE	1	AL4310088500				
Gear Service Kit			**AL4320217391**				
	GREASE	2	AL4210225500				
	FETT (SHELL)	0,36	AL0017568945				
	TUBE 180G	2	AL4210225501				
	SNAP RING	1	AL0335111400				
	SNAP RING	1	AL0335213000				
	O-RING	1	AL0663614000				
	SEALING RING	1	AL0666608200				

10.11 Small Parts Kits

Description		Qty	AL003	AL005	AL010	AL030	AL050
Hoist Body Small Parts Kit		**1**	**AL4320078890**				
	SNAP RING	1	AL0335215500				
	SCREW	1	AL0147121103				
	NUT	1	AL0291118503				
	WASHER	2	AL0300027620				
	SCREW	1	AL0211124401				
	SCREW	1	AL0211124700				
	SCREW	2	AL0196155302				
	NUT	2	AL0266210600				
Brake Small Parts Kit		**1**	**AL4320078990**				
	SCREW	3	AL5541708500				
	SCREW	2	AL0147121003				
	WASHER	2	AL0301211800				
	COMPRESSION SPRING	1	AL4310069300				
	LOCK WASHER	1	AL4310074700				
	PIN	2	AL0106028100				
	O-RING	1	AL0663211000				
	BEARING	1	AL0516421200				
	SLEEVE	1	AL4310069700				
	SPRING	1	AL4310069800				
	PIN	1	AL0108324600				
Control Valve Small Parts Kit		**1**	**AL4320079090**				
	SCREW	3	AL5541708500				
	SCREW	1	AL0147121003				
	SCREW	1	AL0160605700				
	SCREW	2	AL0211124401				
	SNAP RING	1	AL0335210512				
	SCREW	1	AL0216121200				
	SCREW	1	AL0216121000				
	BEARING	1	AL0516401300				

Description	Qty	AL003	AL005	AL010	AL030	AL050
Gear Unit Small Parts Kit		**AL4320079190**				
O-RING	1	AL0663614000				
NEEDLE BEARING	3	AL0516402000				
NEEDLE BEARING	3	AL4310211000				
BALL BEARING	1	AL0502120900				
SEALING RING	1	AL0666608200				
SNAP RING	1	AL0335213000				
SNAP RING	1	AL0335111400				
STRAINER	1	AL4170047900				
SILDUK	1	AL4170059200				

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