



EFFECTIVE: May 24, 2017

OWNER'S MANUAL

THEATRICAL CHAIN HOIST TNER SERIES

1/2 Ton through 2 Ton Capacity

Code, Lot 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
A KITO GROUP COMPANY

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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, Lot 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 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 Metal Casting Industry".

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

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

DANGER

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

Before performing ANY mechanical or electrical maintenance on the equipment, de-energize (disconnect) the main switch supplying power to the equipment; as well as lock and tag the main switch 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 and ANSI/NFPA 70, National Electric Code. If the hoist is installed as part of a total lifting system, such as an overhead crane or monorail, it is also the responsibility of the owner/user to comply with the applicable 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", OSHA Regulations and ANSI/NFPA 70, "National Electric Code". 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.

WARNING

TNER hoists may be supplied with an auxiliary control circuit to be used for individual control while connected to a multiple hoist control system. Always disable the multiple hoist controller when operating the hoist with local pendant control. Failure to do so will cause a potentially hazardous situation. Always use a single control source when operating the hoist.

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 or hoist's pendant (pickle) cord, order a tag from your dealer and install it. Read and obey all warnings attached to this hoist. Tag is not shown actual size.

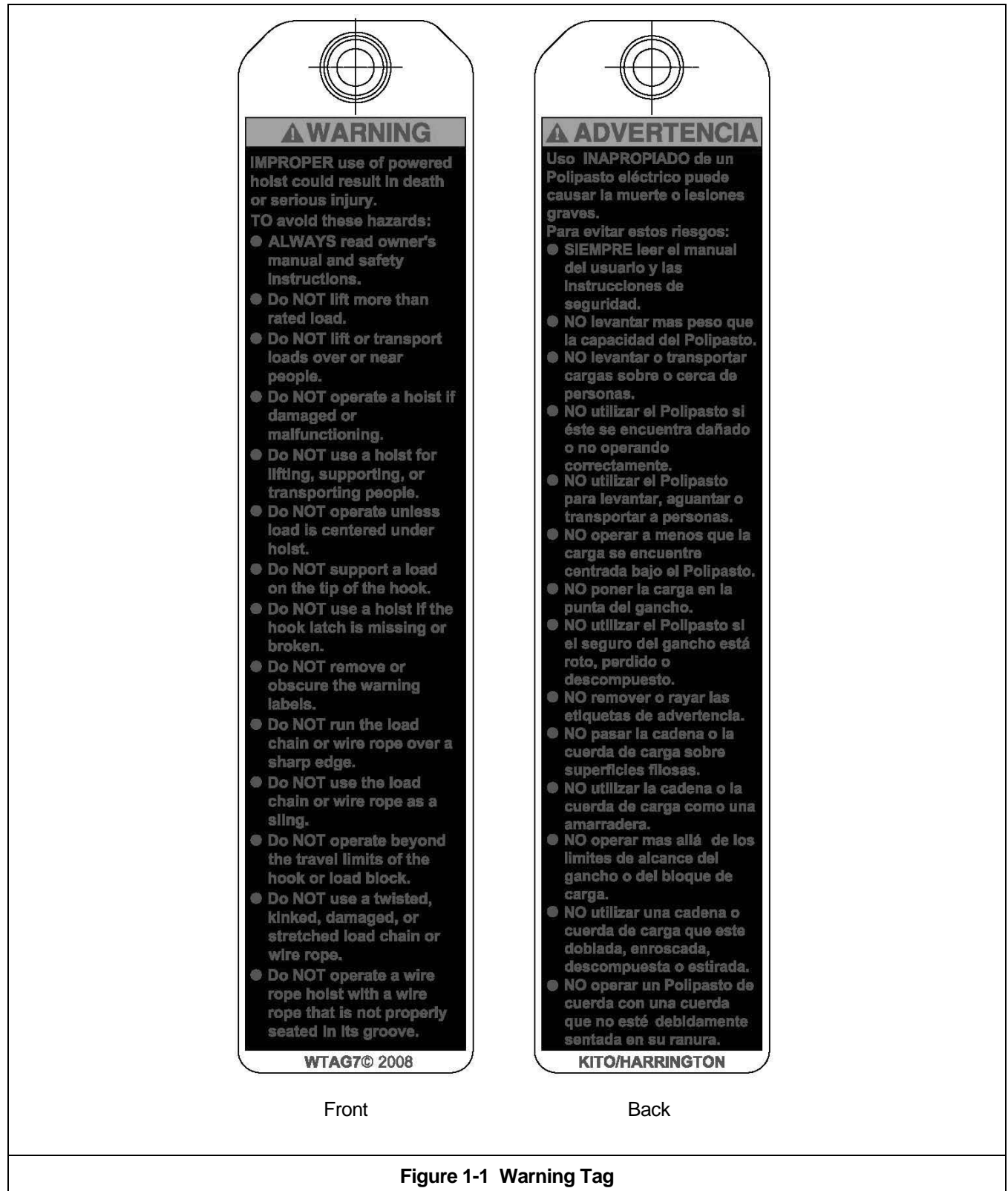
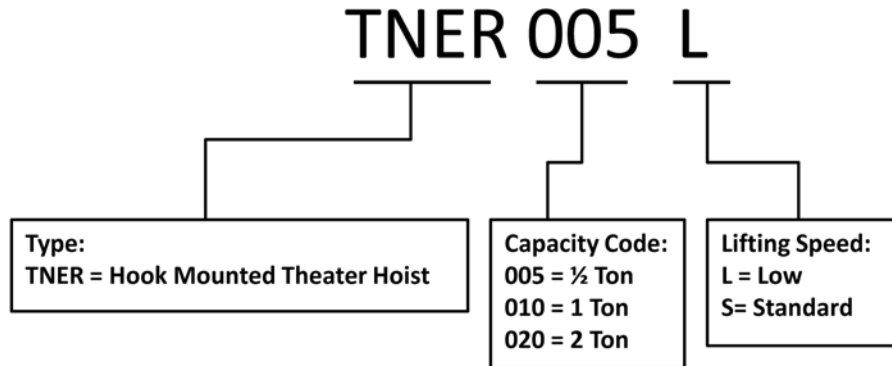


Figure 1-1 Warning Tag

2.0 Technical Information

2.1 Specifications

2.1.1 Product Code



2.1.2 Operating Conditions and Environment

- Temperature range: -4° to +104°F (-20° to +40°C)
- Humidity: 85% or less
- Noise Level: 85 dB or less (A scale: measured 1 meter away from electric chain hoist)
- Enclosure Rating: Hoist Meets IP55, Optional Pendant (Pickle) Meets NEMA 4X
- Supply Voltage: Single Speed Standard: Reconnectable 208/230 & 460V-3-60

	Single Speed
Hoist Duty Rating:	ISO M3; ASME H3
Intermittent Duty Rating:	25% ED 150 starts per hour
Short Time Duty Rating:	30 min.

Table 2-1 Hoist Specifications

Capacity (Ton)	Product Code	Lifting Speed (ft/min)	Motor		Load Chain Wire Diameter (mm) x Chain Fall Lines	Load Sheave Pockets	Net Weight with 60 Feet of Lift (lbs)	Weight for One Addnl. FT. of Lift (lbs)	
			Output (Hp)	Current Draw (amps)					
				208V or 230V					460V
1/2	TNER005L	16	0.65	3.7	1.9	4	104	0.57	
1	TNER010L		1.3	5.6	2.8		8.0 x 1	146	0.93
2	TNER020L	8					8.0 x 2	217	1.9
1	TNER010S	32	2.4	10.4	5.2		8.0 x 1	155	0.93
2	TNER020S	16					8.0 x 2	225	1.9

2.2 Dimensions

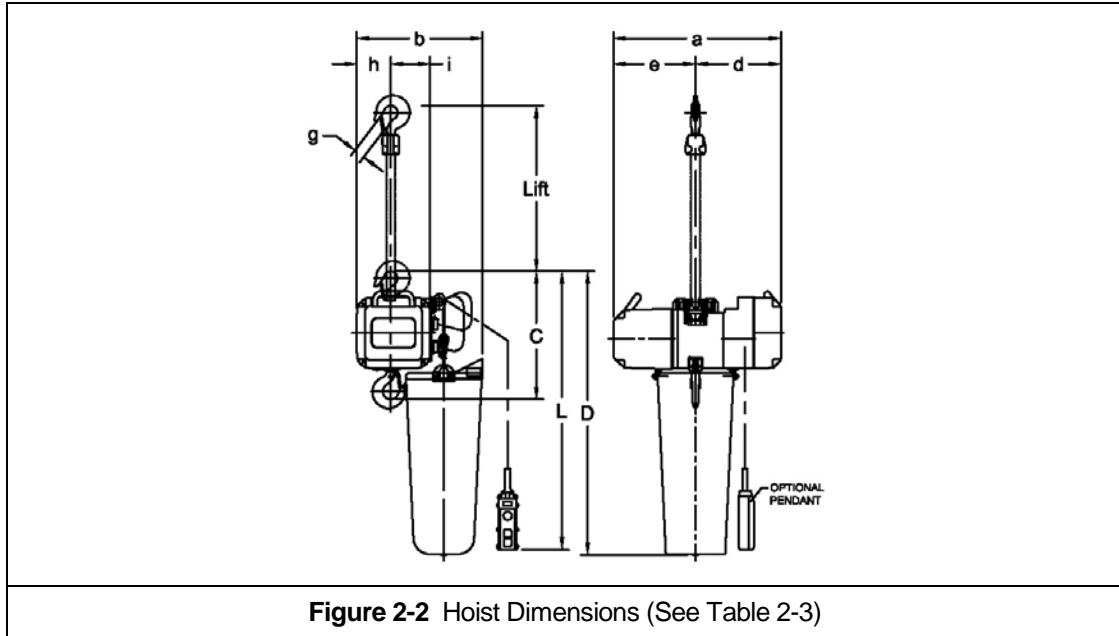
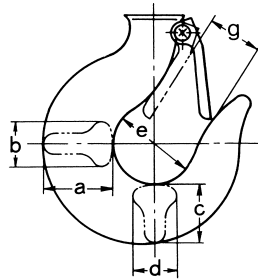


Figure 2-2 Hoist Dimensions (See Table 2-3)

Table 2-2 Hook Dimension*



C = Chain Hook

B = Body Hook

Units = inch

Capacity Code	Hook	a	b	c	d	e	g
005L	C	1.1	0.7	0.9	0.7	1.4	0.9
	B	1.0	0.6	0.9	0.6	1.7	1.1
010L/S	C	1.4	0.9	1.2	0.9	1.7	1.2
	B	1.2	0.8	1.0	0.8	1.9	1.3
020L/S	C	1.9	1.1	1.6	1.1	2.0	1.5
	B	1.6	1.0	1.3	1.0	2.1	1.6

*Refer to Section 5.7 for inspection dimensions and limits.

Table 2-3 Hoist Dimensions

Product Code	Minimum Headroom C (in)	L* (ft)	a (in)	b (in)	d (in)	e (in)	g (in)	h (in)	i (in)	D (in)
TNER005L	13.2	2.5	18.7	14.2	9.6	9.2	0.9	3.9	4.0	35.4
TNER010L	16.1		20.0	15.0	10.2	9.8	1.2	4.1	4.7	37.0
TNER020L	22.8				1.5	48.8				
TNER010S	16.1		8.8	11.2	1.2	37.0				
TNER020S	22.8		1.5	48.8						

*Standard length of control and power cables unless otherwise specified.

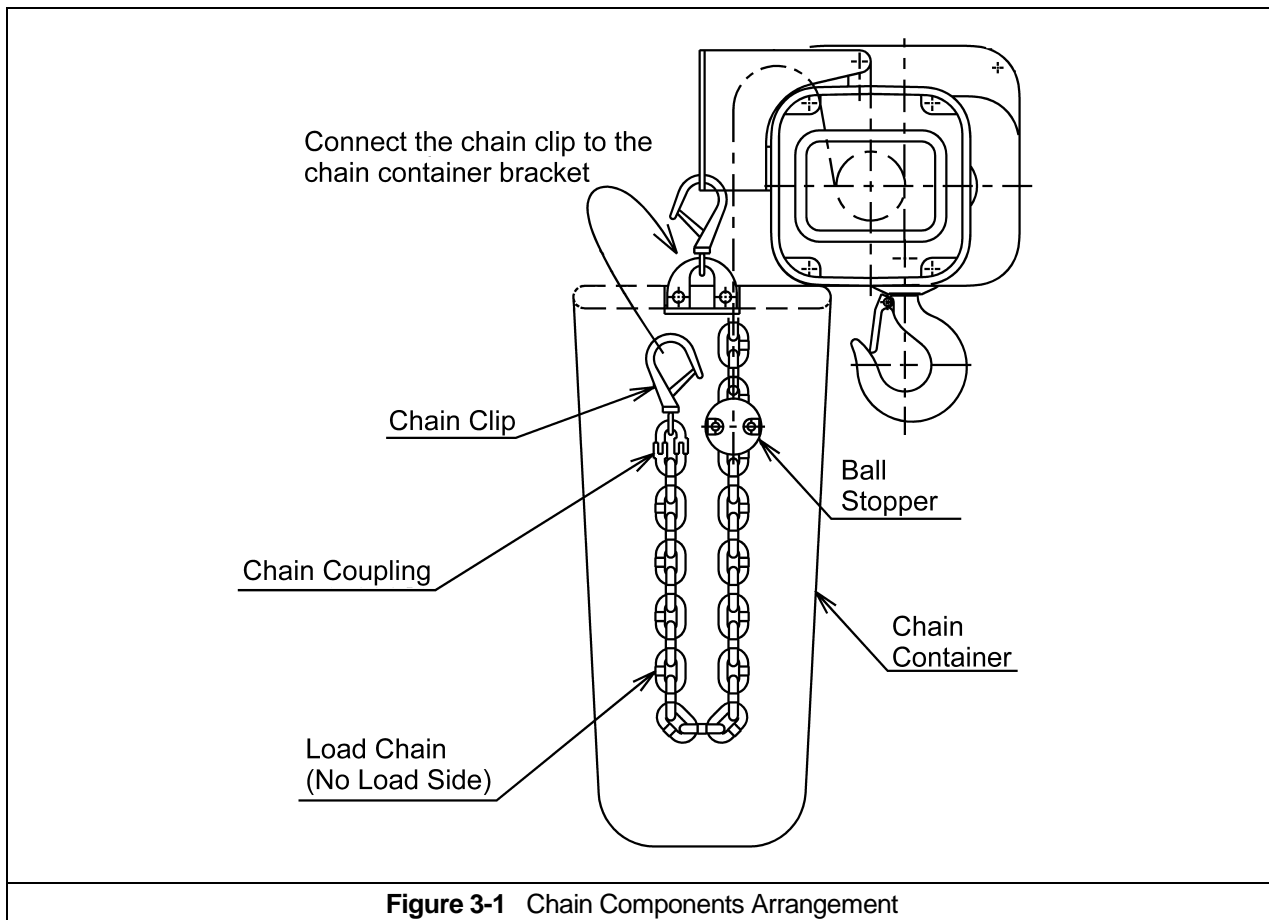
3.0 Preoperational Procedures

3.1 Gearbox

- 3.1.1 The gearbox is filled with the correct amount of grease at the time of shipment.
- 3.1.2 Refer to Section 6.1.3 when replacing the gear grease.
- 3.1.3 Gear grease for TNER is Sumiplex L-Mo No.1 (Part No. SA1BS1855). 3.2 oz. (90 grams) of grease is used to lubricate the gears.

3.2 Chain

- 3.2.1 The chain components include Ball Stopper, Chain Coupling, Chain Clip and Chain Container Assembly. Never operate the hoist with incorrect, missing, or damaged chain components. Ensure that all chain components are in the correct location and properly installed as shown in Figure 3-1.



- 3.2.2 The Ball Stopper must be installed at least 40 inches away from the no load end of the chain. Tightening torque for the Ball Stopper Bolt is 10 N-m (7 lb-ft).
- 3.2.3 The Chain Coupling and the Chain Clip are installed at the no load end of the chain.
- 3.2.4 Canvas Chain Container - fully unfold and install it on the hoist body as shown in Figure 3-2. Be sure to mount the chain container in the orientation where the hook guard is away from the hoist body as shown in Figure 3.1. The no load end of the chain is attached to the chain container bracket by the Chain Clip as shown in Figure 3.1. To place the chain into the chain container, feed the no load end of the chain into the container gradually. Take care to avoid twisting or tangling the chain. NEVER put all the chain into the container at once.

3.2.5 When running chain through the hoist without a load, check for knots in the chain prior to use. TNERs are typically chained with long lift lengths which makes knotting of the chain easier to occur and more difficult to detect. Always monitor the chain while operating the hoist to verify that there are no knots and that the chain is being fed into the hoist in-line with the outer chain guide and axis of rotation of the load sheave. Knots in the load chain may cause the paddle limit switch to operate improperly.

3.2.6 **⚠ WARNING** Operating this hoist without the correct Harrington chain container may create a potentially hazardous situation. To avoid this potentially hazardous situation, always operate this hoist with the correct chain container installed.

3.2.7 **⚠ DANGER** Each chain container indicates the maximum length of the load chain that can be stored in the container. The amount of chain the container must hold is equal to the lift on the hoist. For 2 Ton models, twice the length of chain is needed to achieve the same lift length. **DO NOT** use a chain container with a storage capacity less than the lift length on the hoist, or twice the lift length for 2 Ton models. If all of the chain cannot be stored in the container, excess chain can fall from the container and cause bodily injury or death.

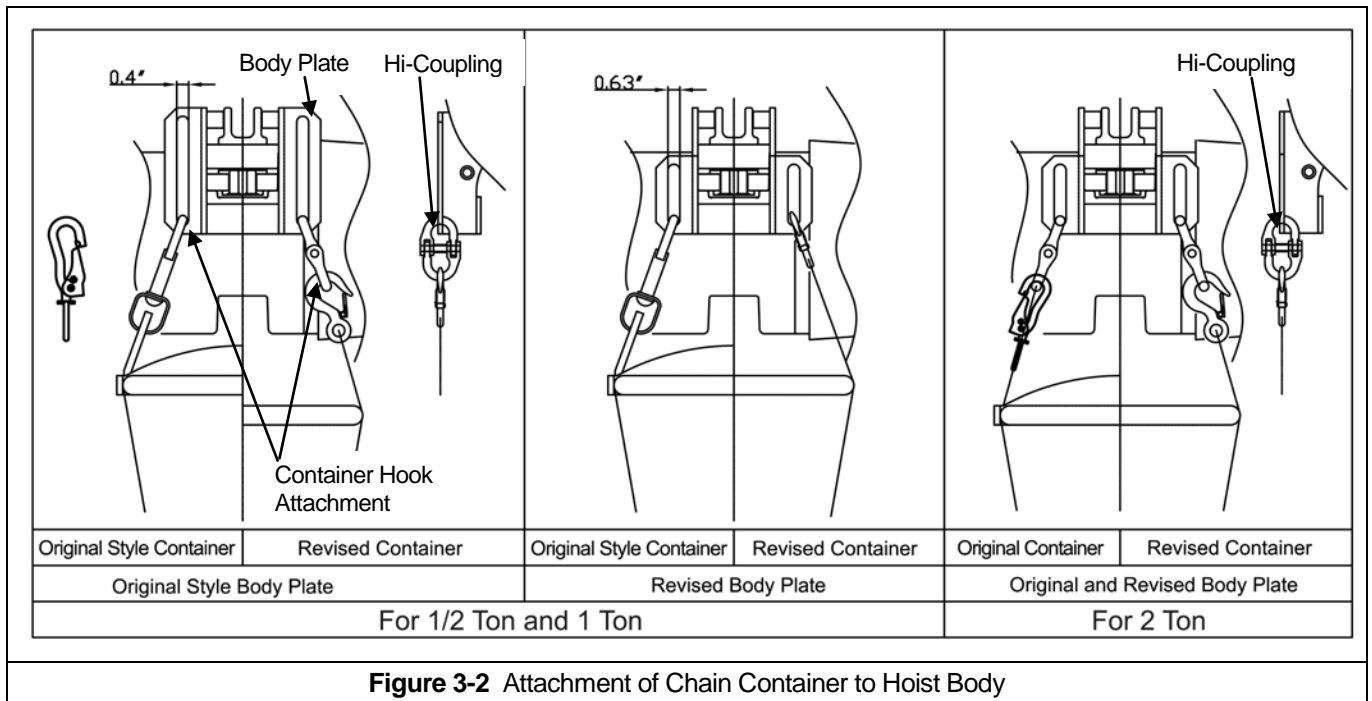
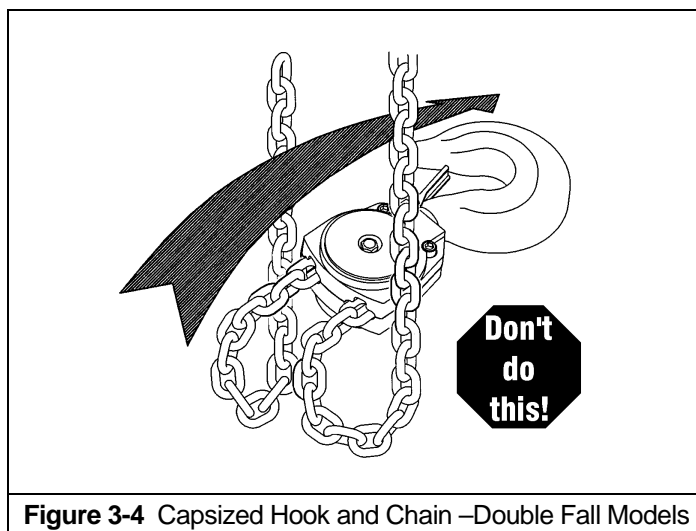
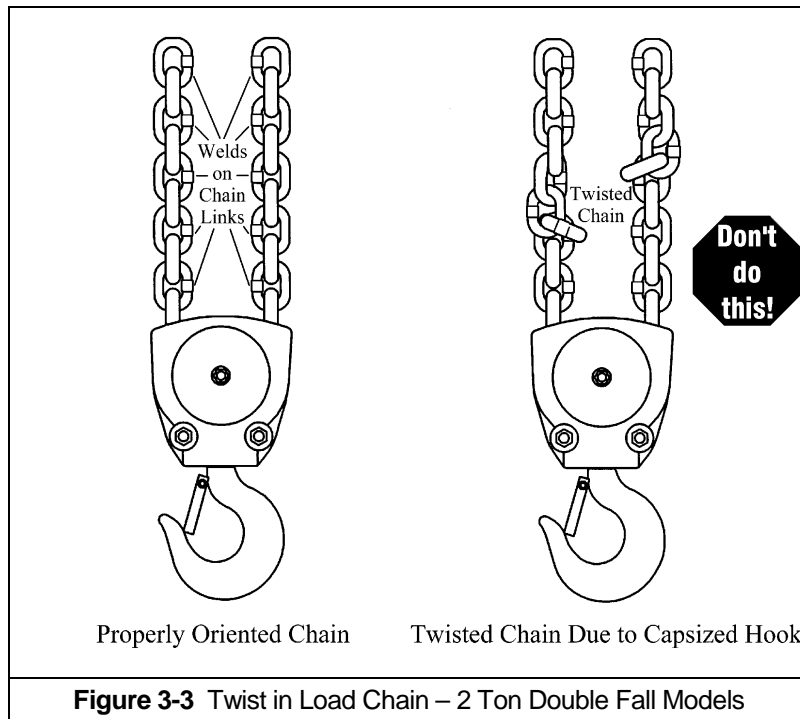


Figure 3-2 Attachment of Chain Container to Hoist Body

- 3.2.8 **⚠️WARNING** Verify that the load chain is not twisted or tangled prior to operating the hoist. Make sure the chain hook on 2 Ton double fall models is not capsized. See Figures 3-3 and 3-4. Correct all chain irregularities before conducting the first hoist operation.



3.3 Mounting Location

- 3.3.1 **⚠️WARNING** Prior to mounting the hoist ensure that the suspension and the 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.
- 3.3.2 **NOTICE** See Section 6.6 for outdoor installation considerations.

3.4 Mounting the Hoist

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

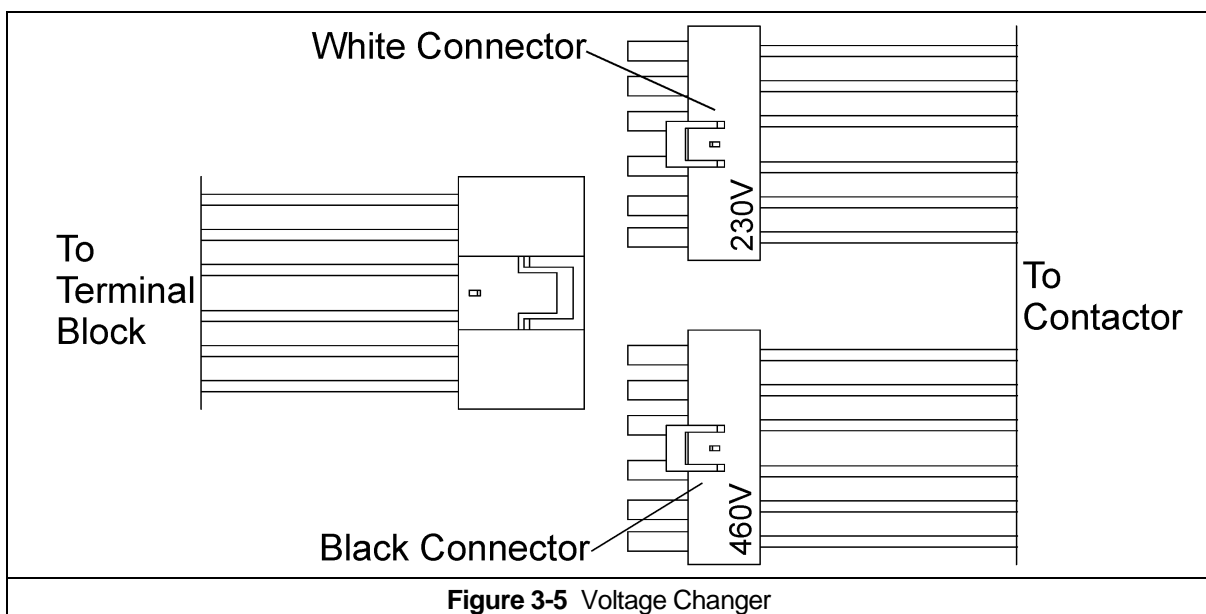
3.4.2 The hoist may be mounted by the chain hook or the body hook to a fixed suspension point.

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

3.5 Electrical Connections

3.5.1 **⚠ WARNING** Supplying this hoist with the incorrect power source can lead to serious damage and/or injury. This hoist is reconnectable and is equipped with a quick voltage change device. Check to make sure the power source matches the voltage configuration of the hoist before supplying power to the hoist.

3.5.2 The hoist is equipped with a quick voltage changer inside the controller cover. To configure the hoist to proper voltage configuration, connect the plug from the terminal block to one of the plugs from the contactor marked with the desired voltage configuration.



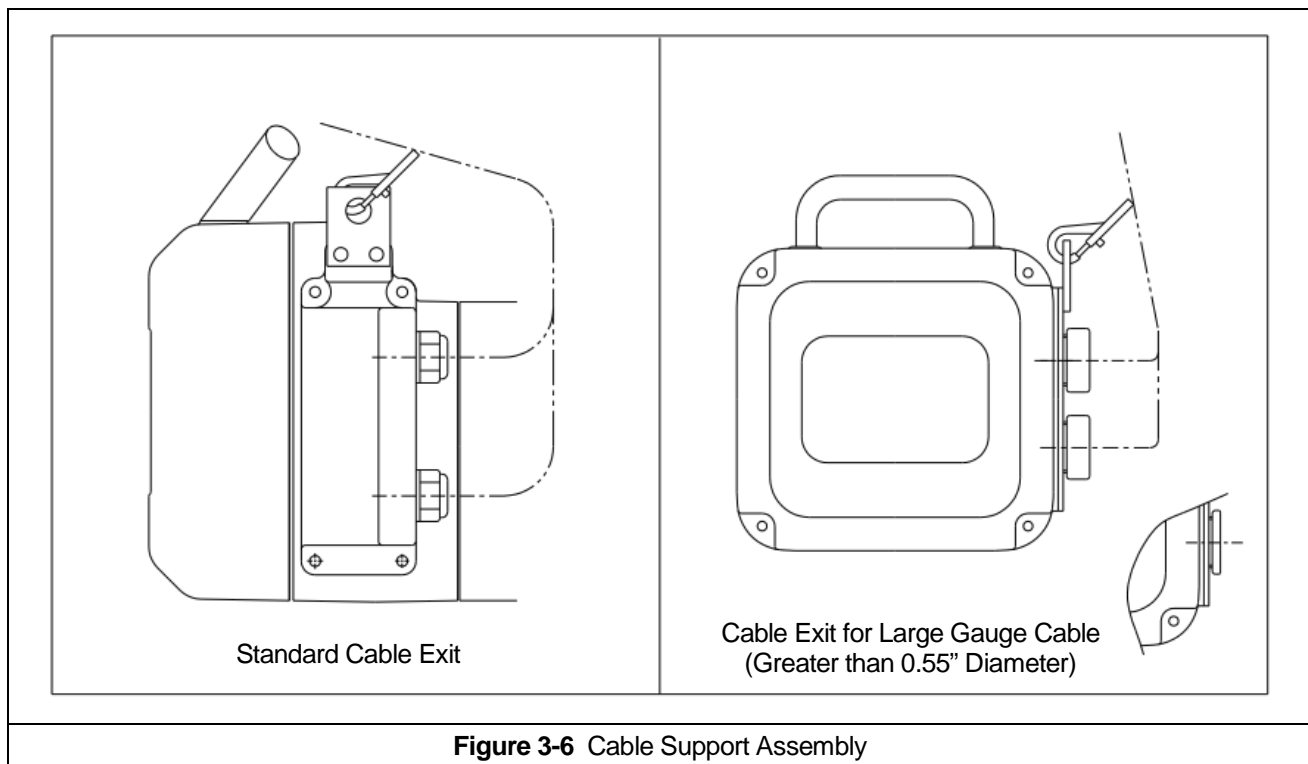
3.5.3 **⚠ CAUTION** Do NOT apply electronic soft-start control or voltage varying controls to the TNER hoist. Use of such devices may cause the motor brake and other electrical components to malfunction.

3.5.4 **⚠ DANGER** Before proceeding, ensure that the electrical supply for the hoist has been de-energized (disconnected). Lock out and tag out in accordance with ANSI Z244.1 "Personnel Protection -Lockout/Tagout of Energy Sources".

3.5.5 The hoist is supplied with 2.5 feet of power supply cable and 2.5 feet of control cable in a standard configuration. The power supply cable and control cable are directly wired into the hoist.

3.5.6 A pendant (pickle) is optional. In a case where an optional pendant is used, the hoist is controlled by a pendant with two push buttons – one for raising and one for lowering.

3.5.7 Ensure that the power supply cable and the control cord are supported by the Cable Support Assembly and connected to the Socket Holder as shown in Figure 3-6. Use care to avoid twisting or kinking the cables.



- 3.5.8 Connection to Electrical Power Source - The red, blue and black wires of the Power Supply Cable should be connected to an Electric Power Disconnect Switch or Circuit Breaker. This connection should be made so that the hoist is phased properly. Refer to Section 3.6.10 for instructions on how to check for correct power supply phase connection.
- 3.5.9 Fuse/Breaker Capacity -The hoist's power supply should be equipped with current overload protection such as fuses, which should be selected for 110% to 120% of total listed full load amperage, and should be dual element time-delay fuses. Refer to the motor nameplate for the full load amperage draw.
- 3.5.10 **⚠ DANGER** Grounding - An improper or insufficient ground connection creates an electrical shock hazard when touching any part of the hoist or trolley. In the Power Supply Cable the ground wire will be either Green with Yellow stripe or solid Green. It should always be connected to a suitable ground connection.

3.6 Preoperational Checks and Trial Operation

- 3.6.1 **⚠️ 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.
- 3.6.2 **⚠️ WARNING** Verify and correct all chain irregularities prior to operating the hoist. Refer to Section 3.2.
- 3.6.3 Measure and record the “k” dimension of all hooks on hoist. See Table 5-4 under Section 5, “Inspection”.
- 3.6.4 Record the hoist’s Code, Lot and Serial Number (from the name plate on the hoist) in the space provided on the cover of this manual.
- 3.6.5 Ensure that the hoist is properly installed to a fixed point.
- 3.6.6 Ensure that all nuts, bolts and split pins (cotter pins) are sufficiently fastened.
- 3.6.7 If applicable, pull down on the Pendant (Pickle) and ensure that the Cord Strain Relief Cable takes the force, not the Pendant Cord.
- 3.6.8 **⚠️ CAUTION** Check supply voltage before everyday use. If the voltage varies more than 10% of the rated value, electrical devices may not function normally.
- 3.6.9 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 operation.
- 3.6.10 **⚠️ WARNING** The hoist must be connected to the power source such that its direction of operation corresponds to the up-and-down commands issued from the pendant (pickle) control; i.e. pushing the UP button must cause the hoist to lift the hook. If the hoist does not operate correctly, shut off and lockout /tagout the main power source to the hoist. Disconnect and switch any two of the three input power leads at the power source to correct the hoist’s motor phasing.

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** operate a damaged, malfunctioning or unusually performing hoist.
- **NOT** operate a hoist until you have thoroughly read and understood Manufacturer's Operating and Maintenance Instructions or Manuals.
- Be familiar with operating controls, procedures, and warnings.
- **NOT** operate a hoist that has been modified without the manufacturer's approval or without certification that it is in conformity with ANSI/ASME B30 volumes.
- **NOT** lift more than rated load for the hoist.
- **NOT** use hoist with twisted, kinked, damaged, or worn load chain.
- **NOT** use the hoist to lift, support, or transport people.
- **NOT** lift loads over people.
- **NOT** operate a hoist unless all persons are and remain clear of the supported load.
- **NOT** operate unless load is centered under hoist.
- **NOT** attempt to lengthen the load chain or repair damaged load chain.
- Protect the hoist's load chain from weld splatter or other damaging contaminants.
- **NOT** operate hoist when it is restricted from forming a straight line from hook to support 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 unless the load chain is properly seated in its grooves.
- **NOT** apply load if bearing prevents equal loading on all load-supporting chain.
- **NOT** operate beyond the limits of the load chain travel.
- **NOT** leave load supported by the hoist unattended unless specific precautions have been taken.
- **NOT** allow the load chain or hook to be used as an electrical or welding ground.
- **NOT** allow the load chain or hook to be touched by a live welding electrode.
- **NOT** remove or obscure the warnings on the hoist.
- **NOT** operate a hoist on which the safety placards or decals are missing or illegible
- **NOT** operate a hoist unless it has been securely attached to a suitable support.
- **NOT** operate a hoist unless load slings or other approved single attachments are properly sized, and seated in the hook saddle.
- **NOT** use the hoist in such a way that could result in shock or impact loads being applied to the hoist.
- Take up slack carefully – make sure load is balanced and load-holding action is secure before continuing.
- Shut down a hoist that malfunctions or performs unusually and report such malfunction.
- 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:**

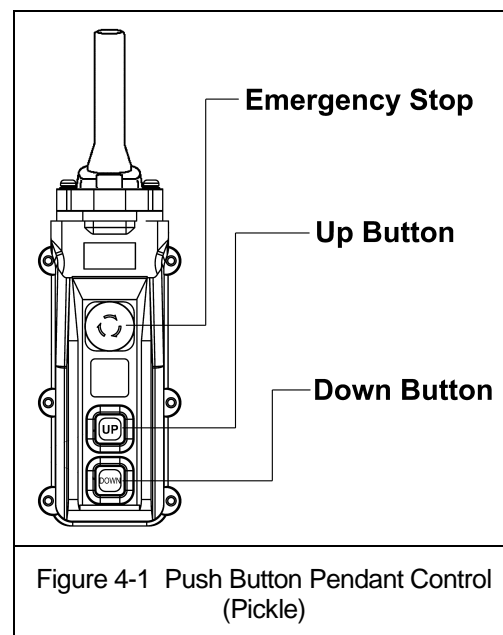
- Maintain a firm footing or be otherwise secured when operating the hoist.
- Check brake function by tensioning the hoist prior to each lift operation.
- Use hook latches. Latches are to retain slings, chains, etc. under slack conditions only.
- Make sure the hook latches are closed and not supporting 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 Emergency Stop Button – On hoists equipped with Emergency Stop functionality, press the Emergency Stop Button to perform an emergency stop and lock-out of hoist motion controls. Turn the Emergency Stop Button clockwise to unlock the controls and allow hoist operation.

4.3.2 When using the pendant control (pickle) depress the UP button to raise the hoist load chain/hook or the DOWN button to lower the hoist load chain/hook as shown in Figure 4-1. To stop motion release the buttons.

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



5.0 Inspection

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. An additional definition from ANSI PLASA E1.6-2 is included for Rental Service.
- **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.
 - **Rental Service** – that service which involves an irregular schedule determined by rental use.

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
 - Rental service – prior to next use or rental
 - 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
 - Rental service – prior to next use or rental
 - 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 3.2 and 6.3

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, pins and rollers.
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 or load brake.
Electrical apparatus for signs of pitting or any deterioration of visible controller contacts.
Evidence of damage of supporting structure or trolley, if used.
Function labels on pendant control stations (pickles) 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 in Section 5.3.
- Hoist Idle More Than 1 Year: Inspect per PERIODIC Inspection criteria in Section 5.4.
- Rental Service Hoists – Inspect per FREQUENT Inspection criteria in Section 5.3 prior to next use or rental.

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.
Limit Lever Assembly	Visual, Function	Lever should not be bent or significantly worn and should be able to move freely.	Replace.
Braking System Operation	Function	Braking distance with rated capacity should not exceed 3% of the lifting speed (approximately two 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" and "t" dimensions should not be less than discard value listed in Table 5-4	Replace.
Hooks - Stretch	Measure	The "k" dimension should not be greater than 1.15 times that measured and recorded at the time of purchase (See Section 3.6). If recorded "k" values are not available for hooks when new, use nominal "k" values from Table 5-4 .	Replace.
Hooks - Bent Shank or Neck	Visual	Shank and neck portions of hook should be free of deformations.	Replace.

Table 5-3 Hoist Inspection Methods and Criteria			
Item	Method	Criteria	Action
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.	Tighten 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.
Hooks - Idle Sheave and Axle (Chain 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 and Wire Diameter	Measure	The "P" dimension should not be greater than maximum value listed in Table 5-5 . The "d" dimension should not be less than minimum value listed in Table 5-5 .	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 Section 6.0).
Load Chain - Reeving	Visual	Chain should be reeved properly through Load Sheave (and Idle Sheave for double fall hoist) - refer to Section 6.3 . Chain, Chain Coupling, Chain Clip and Ball Stopper should be installed properly - refer to Section 3.2 .	Reeve/Install chain properly.
Chain Container	Visual	Container should not be damaged. Brackets should not be deformed or missing.	Replace.
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.

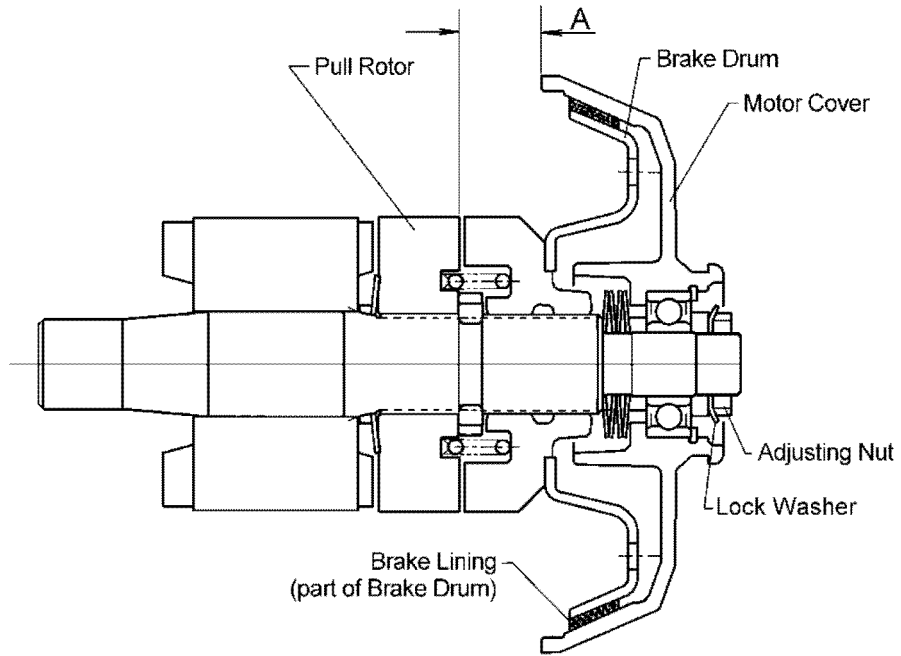
Table 5-3 Hoist Inspection Methods and Criteria			
Item	Method	Criteria	Action
Bolts, Nuts and Rivets	Visual, Check with Proper Tool	Bolts, nuts and rivets should not be loose.	Tighten or replace as required.
Motor Brake	Measure, Visual	Motor brake gap should be adjusted to the distance shown in Table 6-1 before measuring the brake wear. Brake lining dimension "A" should not be less than discard value listed in Table 5-6 . Refer to Section 6.2 for gaining access to motor brake and for adjustment and inspection procedures. Braking surfaces should be clean, free of grease/oil and should not be glazed.	Adjust, Repair or Replace as required.
Contactors Contacts	Visual	Contacts should be free of significant pitting or deterioration.	Replace.
Load Sheave	Visual	Pockets of Load Sheave should be free of significant wear.	Replace.
Pendant (Pickle) – Switches (Optional)	Function	Depressing and releasing push-buttons should make and break contacts in switch contact block and result in corresponding electrical continuity or open circuit. Push-buttons should be interlocked either mechanically or electrically to prevent simultaneous energization of circuits for opposing motions (e.g. up and down).	Repair or replace as necessary.
Pendant (Pickle) - Housing (Optional)	Visual	Pendant housing should be free of cracks and mating surfaces of parts should seal without gaps.	Replace.
Pendant (Pickle) - Wiring (Optional)	Visual	Wire connections to switches in pendant should not be loose or damaged.	Tighten or repair.
Pendant (Pickle) - Cord	Visual, Electrical Continuity	Surface of cord should be free from nicks, gouges, and abrasions. Each conductor in cord should have 100% electrical continuity even when cord is flexed back-and-forth. Pendant Cord Strain Relief Cable should absorb all of the load associated with forces applied to the pendant.	Replace.
Pendant (Pickle) - 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.

Table 5-4 Chain Hook & Bottom Hook Dimensions						
<p>"k" Measured When New:</p> <p>Chain: _____</p> <p>Body: _____</p> <p>C = Chain Hook</p> <p>B = Body Hook</p>						
Capacity Code	Nominal "k" Dimension* inch (mm)	"u" Dimension inch (mm)		"t" Dimension inch (mm)		
		Standard	Discard	Standard	Discard	
005L	C	1.65 (42)	0.93 (23.5)	0.83 (21)	0.69 (17.5)	0.63 (16)
	B	1.92 (48.8)	0.86 (21.8)	0.77 (19.6)	0.63 (16.0)	0.57 (14.4)
010L, 010S	C	1.97 (50)	1.22 (31)	1.10 (28)	0.89 (22.5)	0.79 (20)
	B	2.22 (56.3)	1.04 (26.5)	0.94 (23.9)	0.77 (19.5)	0.69 (17.6)
020L, 020S	C	2.46 (62.5)	1.57 (40)	1.42 (36)	1.14 (29)	1.02 (26)
	B	2.52 (64.1)	1.32 (33.5)	1.19 (30.2)	0.96 (24.3)	0.86 (21.9)

* These values are nominal since the dimension is not controlled to a tolerance. The "k" dimension should be measured when the hook is new - this becomes a reference measurement. Subsequent measurements are compared to this reference to make determinations about hook deformation/stretch. See Section 5.7, "Hooks - Stretch".

Table 5-5 Chain Wear Dimensions				
Capacity Code	"P" Dimension inch (mm)		"d" Dimension inch (mm)	
	Standard	Discard	Standard	Discard
005L	3.76 (95.5)	3.82 (96.9)	0.25 (6.3)	0.22 (5.7)
010L/S, 020L/S	4.76 (121.0)	4.91 (124.6)	0.31 (8.0)	0.28 (7.2)

Table 5-6 Motor Brake Wear Dimensions



NOTICE

Brake must be properly adjusted before measuring "A". See Section 6.3

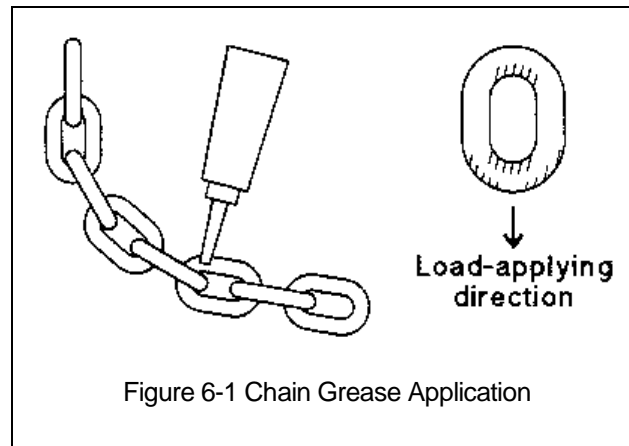
Capacity Code	"A" Dimension - inch (mm)	
	Standard	Discard
005L	0.67 (17)	0.61 (15.5)
010L/S, 020L/S	0.85 (21.5)	0.79 (20)

6.0 Maintenance and Handling

6.1 Lubrication

6.1.1 Load Chain

- For longer life, the load chain should be lubricated.
- The load chain lubrication should be accomplished after cleaning the load chain with an acid free cleaning solution.
- Apply Harrington lubricating grease (Part No. ER1BS1951) or an equivalent to industrial general lithium grease, NLGI No. 0, to the bearing surfaces of the load chain links as indicated by the shaded areas in Figure 6-1. Also apply the grease to the areas of the load chain (shaded areas in Figure 6-1) that contact the load sheave. Insure that the grease is applied to the contact areas in the load sheave pockets.
- Machine or gear oil (grade ISO VG 46 or 68 oil or equivalent) may be used as an alternative lubricant but must be applied more frequently.



- The chain should be lubricated every 3 months (more frequently for heavier usage or severe conditions).
- For dusty environments, it is acceptable to substitute a dry lubricant.

6.1.2 Hooks and Suspension Components:

- Hooks - Bearings should be cleaned and lubricated at least once per year for normal usage. Clean and lubricate more frequently for heavier usage or severe conditions.
- Suspension Pins - Lubricate at least twice per year for normal usage; more frequently for heavier usage or severe conditions.
- Idle Sheave Bearing - Bearings should be cleaned and lubricated at least twice per year for normal usage. Clean and lubricate more frequently for heavier usage or severe conditions.
- Oil Seal (020L/S Hook Yoke) – In order to avoid liquefied grease leaking, make sure to replace the oil seal when replacing the idle sheave assembly.

6.1.3 Gear Box:

- **⚠ WARNING** Using an incorrect type/grade of gearbox grease or the wrong quantity of grease may prevent the friction clutch from working properly and may affect the ability of the hoist to hold the load. Refer to Section 3.1 for the correct grease and quantity.
- If experiencing abnormal noise or unusual gearbox operation, have the gearbox serviced by a qualified individual.
- Always replace the gearbox grease when servicing the gearbox. Gear grease is Sumiplex L-Mo No.1 (Part No. SA1BS1855).

Product Code	Grease Amount
005L, 010L/S, 020L/S	3.2 oz. (90 grams)

- **NOTICE** Dispose of the used grease in accordance with local regulations.

6.2 Motor Brake

6.2.1 To keep your hoist working in optimum condition and prevent possible down time, it is recommended to check your motor brake lining and adjustment at regular intervals.

6.2.2 Motor Brake Unit Removal - Adjustment and inspection of the motor brake requires removal of the motor brake unit from the hoist as an assembly.

- 1) **⚠ CAUTION** Before proceeding disconnect the power supply and make sure the hoist is unloaded. To keep the load chain from moving secure it by tying together the load and no-load sides directly under the hoist using a cord or wire.
- 2) Refer to Figure 6-3.
- 3) Remove the four Frame Cover Bolts (A), Frame Cover (B), Nut (C), Lock Washer (D), and Spacer (E).
- 4) Remove the four Motor Cover Assembly bolts (F) and carefully pull the motor brake unit (G) out of the hoist.

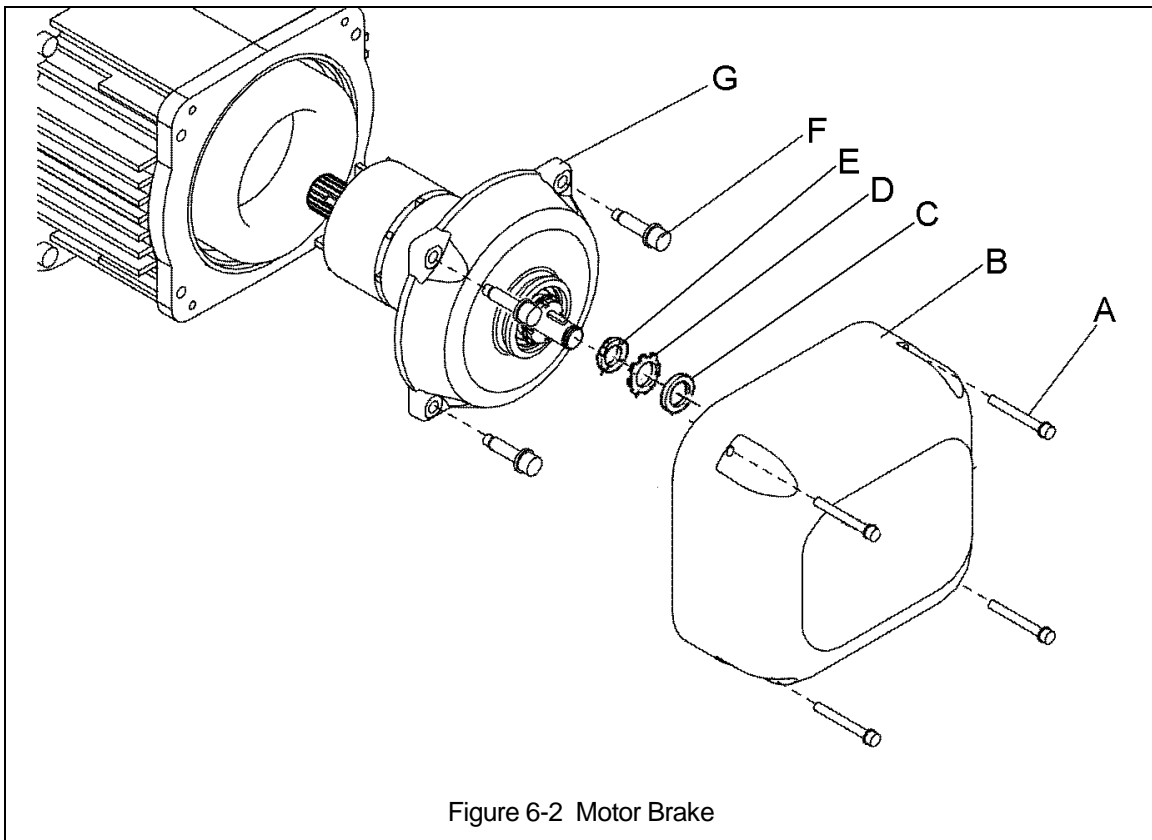


Figure 6-2 Motor Brake

- 6.2.3 Brake Gap (G) - The Brake Gap should be measured between the Brake Drum and Pull Rotor. Adjustment of the Brake Gap is accomplished by turning the Adjusting Nut in the center of the Motor Cover as shown in the figure with Table 6-1. Do this as follows:
- 5) Bend the tab of the Lock Washer away from the Adjusting Nut so that the Adjusting Nut can be rotated.
 - 6) Using a spanner wrench and a feeler gauge, rotate the Adjusting Nut to attain the proper Brake Gap per Table 6-1.
 - 7) After the Brake Gap is set, secure the Adjusting Nut by bending one of the tabs of the Lock Washer into a slot in the Adjusting Nut. If necessary rotate the Adjusting Nut clockwise (tightening) to line up the tab with the slot.
 - 8) If the proper brake adjustment cannot be achieved, disassemble the motor brake and inspect all motor brake parts. Replace the Brake Drum and/or Motor Cover if necessary.

Table 6-1 Motor Brake Gap	
Brake Gap (G) inch (mm)	0.020 (0.5)

6.2.4 Brake Lining Inspection –The brake lining is designed for a long life and should provide years of trouble-free service. If the brake lining is being inspected due to excessive load chain drift during operation (see Section 5.7), disassemble the motor brake and inspect all motor brake parts. Braking surfaces should be clean, free of grease/oil and should not be glazed. Replace the Brake Drum and/or Motor Cover if necessary. For normal inspections, the Brake Lining and Motor Cover wear should be measured as follows.

- 1) Adjust the Brake Gap per Section 6.2.3 before measuring the Brake Lining and Motor Cover wear.
- 2) Refer to Table 5-6.
- 3) Measure the distance "A" using calipers and a straight edge. Place the straight edge across the edge of the motor cover and measure from the straight edge to the face of the Pull Rotor.
- 4) Compare the measurement with the values listed in Table 5-6. Replace the Brake Drum and/or Motor Cover if the "A" measurement is smaller than the discard limit.

6.2.5 Motor Brake Unit Installation - After the brake is properly adjusted and inspected, carefully replace the motor brake unit back into the hoist. Be sure to reseal the Motor Cover to motor frame surface using a small bead of liquid (hi-temperature) sealant. Refer to Section 6.2.2 and reassemble the parts in reverse order of removal.

6.3 Load Chain

6.3.1 Lubrication and Cleaning – refer to Section 6.1.

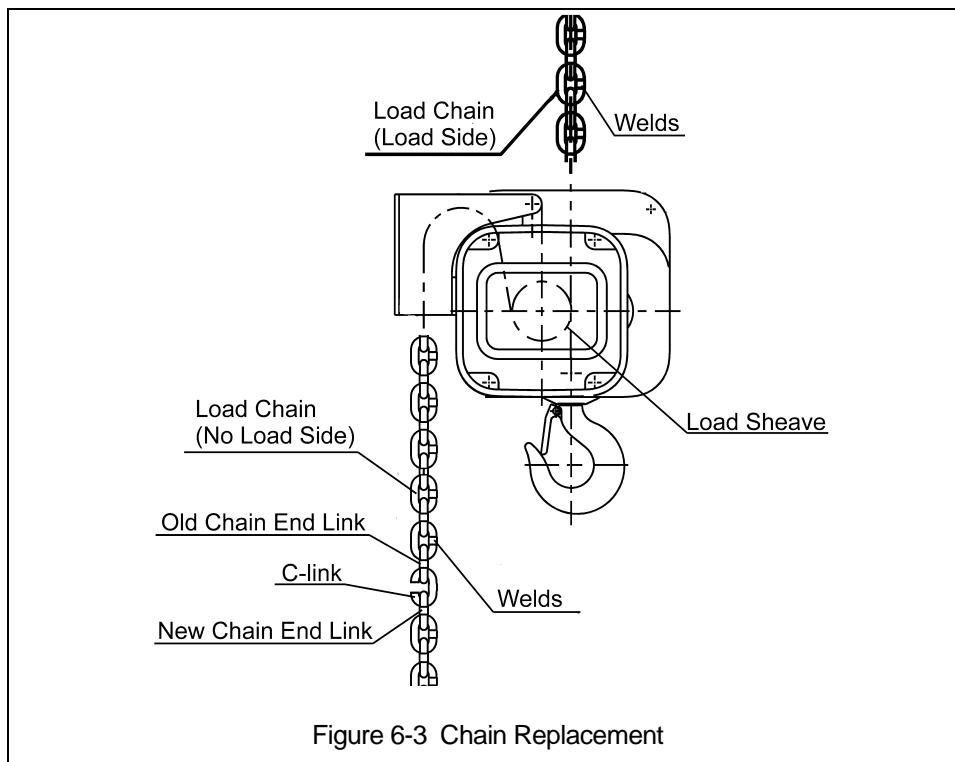
6.3.2 Load Chain Replacement:

- 1) **CAUTION** The hoist must be properly powered and operational in order to perform the following procedures.

6.3.3 **WARNING** Be certain that the replacement chain is obtained from Harrington and is the exact size, grade and construction as the original chain. The new load chain must have an odd number of links so that

both its end links have the same orientation. If the load chain is being replaced due to damage or wear out, destroy the old chain to prevent its reuse.

- 1) **⚠ CAUTION** When replacing load chain, check for wear on mating parts, i.e. Load Sheave, Chain Guides and Idle Sheaves, and replace parts if necessary.
- 2) Remove all chain components including the Chain Hook Set Assembly, Ball Stoppers, Chain Pin, Chain Coupling and Chain Clip from the chain for reuse on new chain. Inspect and replace any damaged or worn parts.
- 3) Using a C-link, attach the new chain to the end link of the old chain on the no-load side. The end link of the new load chain should be connected so that the welded portions of the load chain's standing links are oriented to the outside as they pass over the sheave. Refer to Figure 6-3.
- 4) Operate the hoist down to move the chain through the hoist body. Stop when a sufficient amount of new chain is accumulated on the load side.
- 5) Single fall hoists - Attach the chain components (step 4 above) to the chain. Refer to Section 3.2 for the proper locations.
- 6) Double falls (020L/S) - Feed the end link on the load side of the new chain through the required chain components (step 4 above) and the bottom hook's Idle Sheave. Attach the remaining chain components to the chain referring to Section 3.2 for the proper locations. Connect the end link to the top connection yoke with the chain pin, slotted nut and cotter pin. Ensure that chain remains free of twists. Refer to Figures 3-3 and 3-4.
- 7) **⚠ WARNING** Make sure Ball Stopper, Chain Coupling and Chain Clip are properly installed. Refer to Section 3.2.
- 8) After installation has been completed, perform steps outlined in Section 3.6 "Preoperational Checks and Trial Operation".



6.4 Friction Clutch

6.4.1 Friction Clutch – If abnormal operation or slippage occurs do NOT attempt to disassemble or adjust the Friction Clutch. Replace the worn or malfunctioning Friction Clutch as an assembly with a new, factory adjusted part.

6.5 Storage

6.5.1 The storage location should be clean and dry.

6.6 Outdoor Installation

6.6.1 For hoist installations that are outdoors, the hoist should be covered when not in use.

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

7.0 Troubleshooting

WARNING

HAZARDOUS VOLTAGES ARE PRESENT IN THE HOIST AND IN CONNECTIONS BETWEEN COMPONENTS.

Before performing ANY troubleshooting on the equipment, de-energize the supply of electricity 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 7-1 Troubleshooting Guide

Symptom	Cause	Remedy
Hoist moving in wrong direction	Power supply reversed phased	Switch 2 of the 3 power supply cord wires at the power source.
	Improper electrical connections	Refer to wiring diagram and check all connections.
Hoist will not operate	Loss of power	Check circuit breakers, switches, fuses and connections on power lines/cable.
	Wrong voltage or frequency	Check voltage and frequency of power supply against the rating on the nameplate of the motor.
	Hoist overload	Reduce load to within rated capacity of hoist.
	Motor overheated and thermal overload protector has tripped	See Trouble Shooting Problem "Motor or brake overheating".
	Improper, loose, or broken wire in hoist electrical system	Shut off power supply, check wiring connections on hoist control panel and inside push-button pendant.
	Brake does not release	Check motor brake adjustment for proper clearance.
	Faulty magnetic contactor	Check coil for open or short circuit. Check all connections in the control circuit. Check for open contactors. Replace as needed.
	Defect in control transformer	Check transformer coil for signs of overheating. Disconnect transformer and check for open winding.
	Motor burned out	Replace motor frame/stator, shaft/rotor, and any other damaged parts.

Table 7-1 Troubleshooting Guide

Symptom	Cause	Remedy
Hoist lifts but will not lower	Down circuit open	Check circuit for loose connections. Check down side of limit switch for malfunction.
	Broken conductor in pendant (pickle) cord	Check the continuity for each conductor in the cable. If one is broken, replace entire cable.
	Faulty magnetic contactors	Check coils for open or short circuit. Check all connections on motor circuit. Check for burned contacts. Replace as needed.
	Faulty switch in pendant (pickle)	Check electrical continuity. Check electrical connections. Replace or repair as needed.
Hoist lowers but will not lift	Hoist overloaded	Reduce load to within rated capacity of hoist.
	Low voltage in hoist's power supply	Determine cause of low voltage and bring to within plus or minus 10% of the voltage specified on the motor nameplate. The voltage should be measured at the hoist contactor.
	Up circuit open	Check circuit for loose connections. Check up side of limit switch for malfunction.
	Broken conductor in pendant (pickle) cord	Check the continuity of each conductor in the cable. If one is broken, replace entire cable.
	Faulty magnetic contactor	Check coils for open or short circuit. Check all connections on motor circuit. Check for burned contacts. Replace as needed.
	Faulty switch in pendant (pickle)	Check electrical continuity. Check electrical connections. Replace or repair as needed.
Hoist will not lift rated load or does not have the proper lifting speed	Faulty friction clutch	Replace.
	Hoist overloaded	Reduce load to within rated capacity.
	Low voltage in hoist's power supply	Determine cause of low voltage and bring to within plus or minus 10% of voltage specified on the motor nameplate. The voltage should be measured at the hoist contactor.
	Brake drags	Check motor brake adjustment for proper clearance.
Load drifts excessively when hoist is stopped	Faulty friction clutch	Replace.
	Motor brake not holding	Clean and inspect brake lining. Check brake adjustment for proper clearance.

Table 7-1 Troubleshooting Guide

Symptom	Cause	Remedy
Motor or brake overheating	Excessive load	Reduce load to within rated capacity of hoist.
	Excessive duty cycle	Reduce frequency of lifts.
	Wrong voltage or frequency	Check voltage and frequency of power supply against the rating on the nameplate on the motor.
	Brake drags	Check brake adjustment for proper clearance.
	Extreme external heating	Above an ambient temperature of 140°F, the frequency of hoist operation must be reduced to avoid overheating of the motor. Special provisions should be made to ventilate the hoist or otherwise shield it from the heat.
Hoist operates intermittently	Collectors making poor contact	Check movement of spring loaded arm, weak spring, connections, and shoe. Replace as needed.
	Contactors contacts arcing	Check for burned contacts. Replace as needed.
	Loose connection in circuit	Check all wires and terminals for bad connections. Replace as needed.
	Broken conductor in Pendant (Pickle) Cord	Check for intermittent continuity in each conductor the Pendant Cord. Replace entire Pendant Cord if continuity is not constant.

8.0 Warranty

Warranty explanation and terms.

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, Below the Hook Devices, 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.

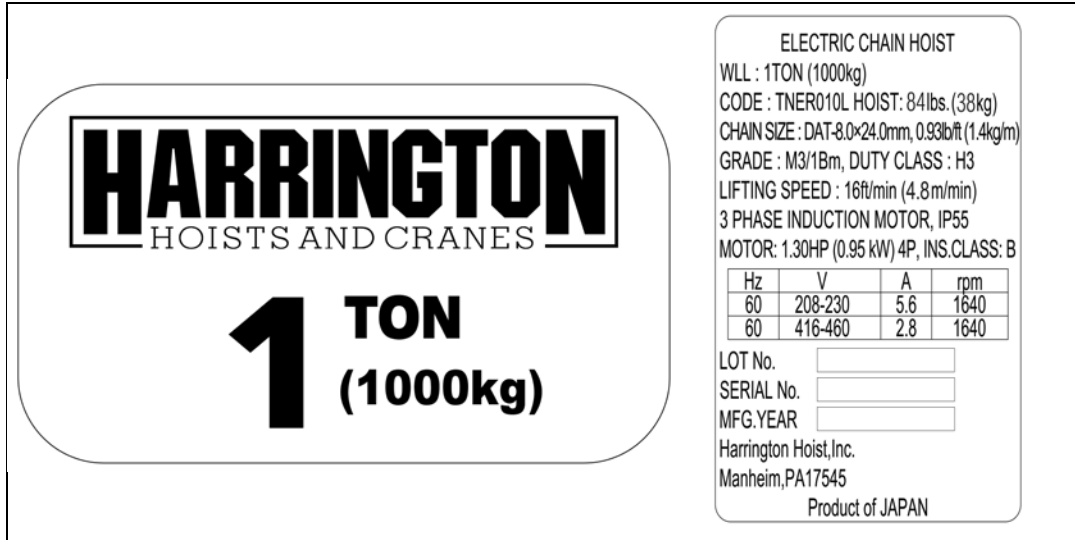
Customer must obtain a Return Goods Authorization as directed by Harrington or Harrington’s published repair center prior to shipping product for warranty evaluation. An explanation of the complaint must accompany the product. Product must be returned freight prepaid. Upon repair, the product will be 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.

9.0 Parts List

When ordering Parts, please provide the Hoist code number, lot number and serial number located on the Hoist nameplate (see fig. below).

Reminder: Per sections 1.1 and 3.6.4 to aid in ordering Parts and Product Support, record the Hoist code number, lot number and serial number in the space provided on the cover of this manual.



The parts list is arranged into the following sections:

	Section	
9.1 Housing and Motor Parts.....		38
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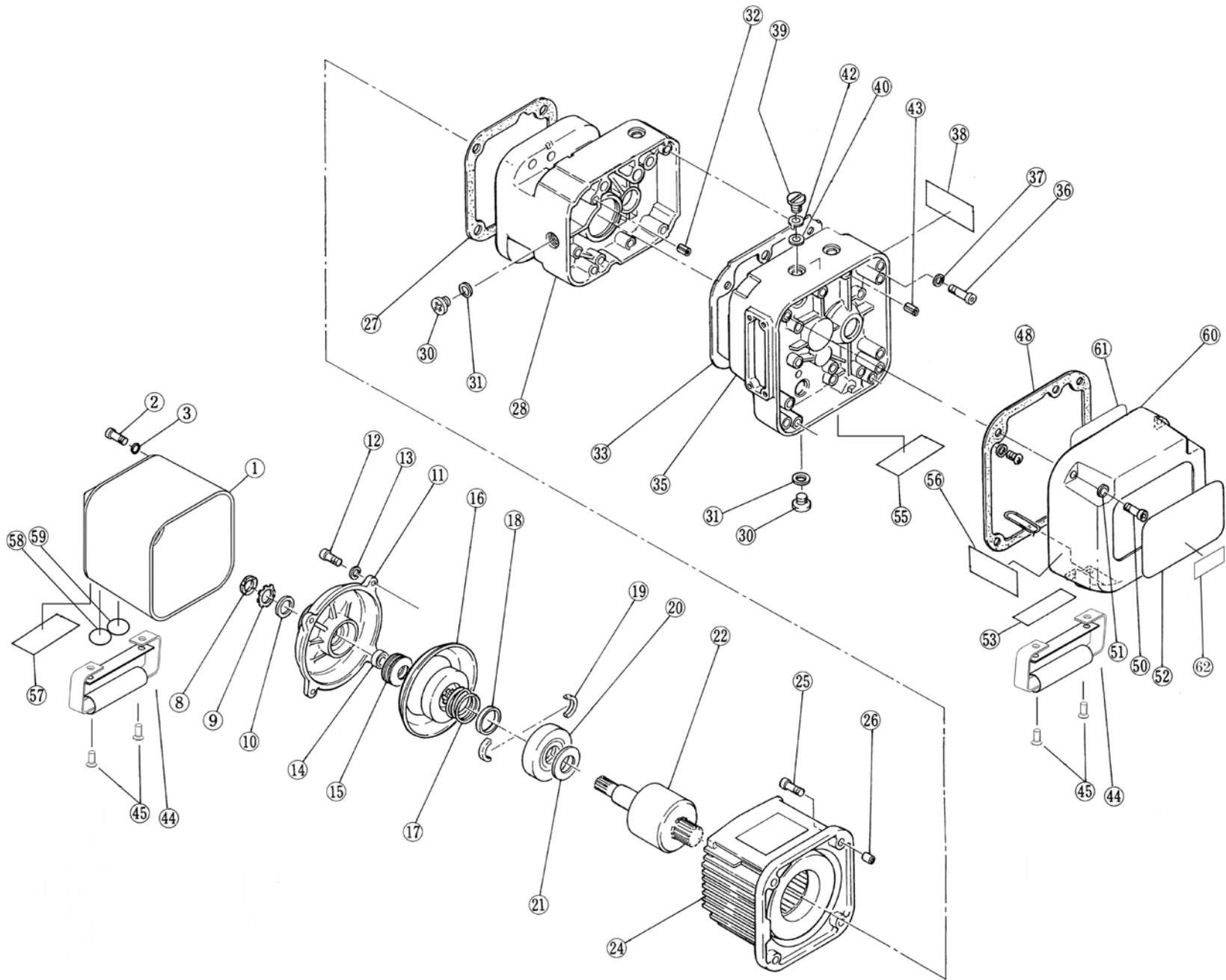


Figure 9-1 Housing and Motor Parts

Figure No.	Part Name	Parts Per Hoist	005L	010L	020L	010S	020S
1	Frame Cover	1	SA1BL9207	SA1CL9207		SA1CS9207	
2	Socket Bolt	4	9091233				
3	Toothed Lock Washer	4	9679708				
8	Nut	1	ES217005S				
9	Lock Washer	1	ES218005S				
10	Spacer	1	SA1BL9313	ES216S005		SA1BL9313	
11	Motor Cover Assembly	1	ER1BS2106	ER1CS2106			
12	Socket Bolt	4	9091251	9091273			
13	Spring Washer	4	9012709	9012711			
14	Collar M	1	ES192005S				
15	Coned Disc Spring M	4	E3S191005S				
16	Brake Drum Assembly	1	ER1BS5212	ER1CS5212		EP1CS5212	
17	Brake Spring	1	ES214003	ES214005S		SA1CS9214	
18	Thrust Collar	1	ES506003	ES506005S		ES506003	
19	Thrust Disc	2	ES505003	ES505005S		ES505003	
20	Pull Rotor	1	ES503003	ES503005S		ES503003	
21	Coned Disc Spring	1	ES504003	ES504005S		ES504003	
22	Motor Shaft with Rotor	1	SA1BL5502	SA1CL5502		SA1CS5502	
24	Motor Frame with Stator 208-230/460V-3-60	1	SA1DHM05L5A12	SA1DHM010L5A12		SA1DHM10S5A11	
25	Socket Bolt	4	90912138	9091275			
26	Set Pin S	2	ES120003	ES120010S			
27	Packing M	1	ER1BS9118	ER1CS9118			
28	Body B	1	SA1BL9101	SA1CL9101		SA1CS7101	
30	Oil Plug	2	E3S111003				
31	Plug Packing	2	E3S112003				
32	Set Pin S	2	ES1200035				
33	Packing G	1	ER1BS9116	ER1CS9116			
35	Gear Case F	1	SA1BL9103	SA1CL9103			
36	Socket Bolt	4	9091259				
37	Toothed Lock Washer	4	9679709				

Figure No.	Part Name	Parts Per Hoist	005L	010L	020L	010S	020S
38	Name Plate SP	1	SA1DHM05I9B6	SA1DHM10I9B6	SA1DHM10I9B6	SA1DHM20SB6	SA1DHM20S9B6
					80507	80551	
39	Oil Plug B	2	SA1BS9135				
40	Eyebolt Packing	1	ES127005S				
42	Bending Washer	1	SA1BS9983				
43	Spring Pin	1	E3S129005S				
44	Handle Kit	2	SA1BL59631				
45	Hex Bolt	4	J1BK10601515				
48	Packing C	1	ER1BS9117	ER1CS9117			
50	Socket Bolt	4	9091238	9091239			
51	Toothed Lock Washer	4	9679708				
52	Name Plate B	1	SA1DHM05L9A5	SA1DHM10L9A5		SA1DHM20L9A5	
62	Name Plate D	1			80506	80553	
53	Warning Sticker E (Disconnect Power)	1	ER2CS9936				
55	Grease Warning Label	1	80470				
56	Voltage Changer Warning Label	1	80485				
57	TNER Logo Label	1	80483				
58	BGV-D8 Logo Label	1	80486				
59	CE Mark Label	1	80487				
60	Controller Cover	1	SA1BL9104	SA1CL9104		SA1CS9104	
61	Wiring Diagram	1	EWE4A00H1				

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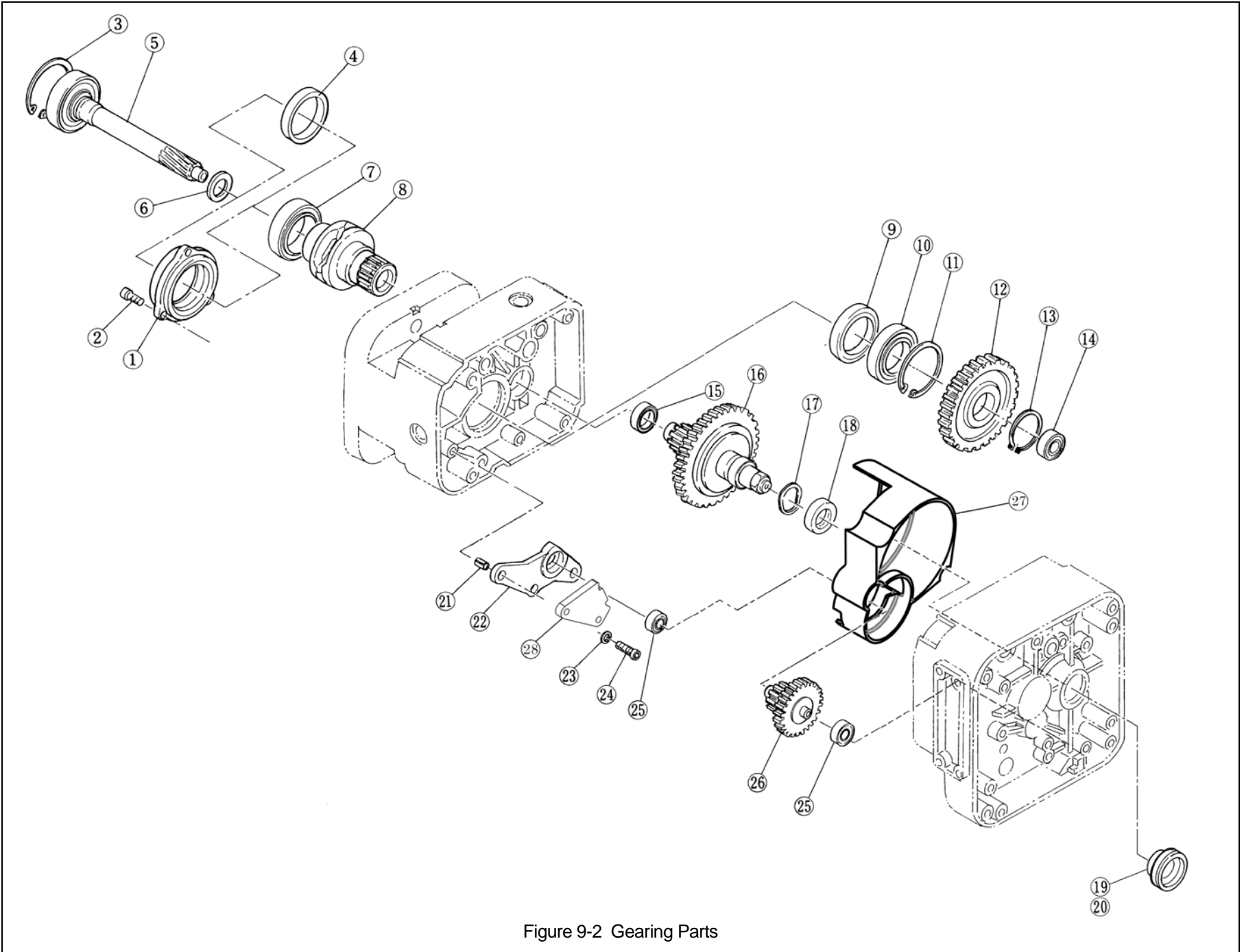


Figure 9-2 Gearing Parts

Figure No.	Part Name	Parts Per Hoist	005L	010L	020L	010S	020S
1	Bearing Holder	1		ER1CS9110			
2	Socket Bolt	3		90912133			
3	Snap Ring	1	9047262	9047262			
4	Collar B	1	ER1BS9111				
5	Pinion Assembly	1	ER1BS5220	SA1CL5220			
6	Oil Seal	1	ES221003	ES221010S			
7	Ball Bearing	1	9000907	9000909			
8*	Load Sheave	1	70985	70986	70987		
9	Oil Seal	1	ES232005S	ES232005S			
10	Ball Bearing	1	9000907				
11	Snap Ring	1	9047262	9047262			
12	Load Gear	1	ER1BL9240	ER1CS9240	SA1CS9240		
13	Snap Ring	1	9047130	9047135			
14	Ball Bearing	1	9001001	9001101			
15	Ball Bearing	1	9000301	9000204			
16	Friction Clutch Set	1	SA1BL1626	SA1CL1626	SA1CS1626		
17	Wavy Washer	1	E1DBX20S9311				
18	Oil Seal	1	ES221005S	E6F235003S			
19	Friction Plug	1	ER1BS9235	ER1CS9235			
20	Nameplate FP	1	ER1BS9892				
21	Set Pin S	2		ES120003			
22	Gear Plate	1		ER1CL9261			
23	Spring Washer	3		9012709			
24	Socket Bolt	3		90912138			
		2		J1BA10604040			
		1		90912138			
25	Ball Bearing	2		9000900			
26	Gear B Assembly	1		SA1CL5262	SA1CS5262		
27	Grease Guard	1		SA1CS9109			
28	Guard Plate	1		SA1CS9656			

*Kit includes Chain Guide A and Chain Guide B, see pages 48 and 49.

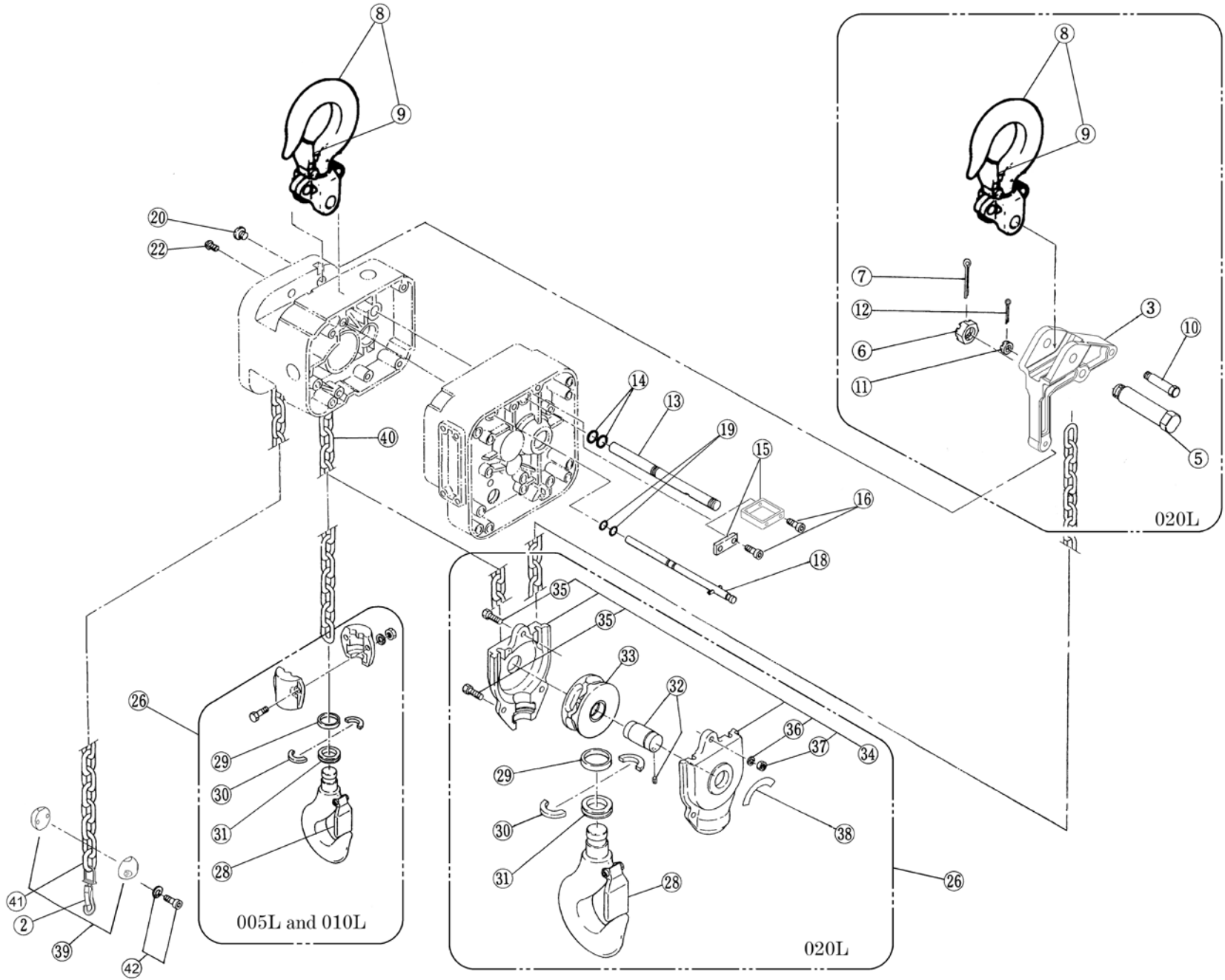


Figure 9-3 Hook Parts

Figure No.	Part Name	Parts Per Hoist	005L	010L	020L	010S	020S
2	Chain Clip	1	SA1BS9422				
3	Suspender D	1			Ver. A: SA1CR90301 Ver. B: SA1CR90302		SA1CR90302
5	Yoke Bolt	1			SA1CR9032		SA1CR9032
6	Slotted Nut	1			ES088020L		ES088020L
7	Split Pin	1			9009436		9009436
8	Body Hook Complete Assembly	1	SA1BS1001	SA1CS1001	SA1CR1001	SA1CS1001	SA1CR1001
9	Hook Latch Assembly	1	CF071010	CF071015	CF071030	CF071015	CF071030
10	Chain Pin	1			Ver. A: M2041010 Ver. B: M2041020		M3041020
11	Slotted Nut	1			Ver. A: M2049010 Ver. B: M2049020		M2049020
12	Split Pin	1			9009412		9009412
13	Connection Shaft	1	ER1BS9121	ER1CS9121			
14	O Ring	2	9013306	9013309			
15	Plate A	1	ER1BS9123			SA1CS9123	
16	Machine Screw w/ Spring Washer	2	J1AP25001212			J1BE10505518	
18	Fixing Shaft Assembly	1	ER1BS1122	ER1CS1122			
19	O Ring	2	9013305				
20	Shaft Plug	1	ER1BS9128	ER1CS9128			
22	Machine Screw	1	9798543				
26	Chain Hook Complete Assembly	1	SA1BL1011	SA1CL1011	SA1CR1011	SA1CL1011	SA1CR1011
28	Hook Latch Assembly	1	ER1BS1002	ER1DS1002	ER1ES1002	ER1DS1002	ER1ES1002
29	Thrust Collar A	1	ES026003	ES026010L			
30	Hook Stopper	2	ES027003	ES027010L			
31	Thrust Bearing	1	ES022003	ES022010L			
32	Bottom Shaft Assembly	1			ER2DR6023		ER2DR6023
33	Idle Sheave Assembly	1			27SH010S1103		27SH010S1103
34	Bottom Yoke Assembly	1			SA1CR2015		SA1CR2015
35	Bolt	3			90931215		90931215
36	Spring Washer	3			9012711		9012711
37	Nut	3			9093424		9093424
38	Name Plate C	1			M3805030		M3805030
39	Ball Stopper Set	1	SA1CS9041	SA1CL9041			
40	Load Chain (Nickel Plated DIN)	1	LCER005NP-DIN	LCER010NP-DIN			
	Load Chain (Black)*	1	LCER005C	LCER010C			
41	Chain Coupling	1	P2HC0051121				
42	Socket Bolt w/ Spring Washer	2	J1BG10602020	J1BG10602525			

*The black load chain is optional. The hoist will not have CE Conformance with the black chain installed.

Fig No	Part Name	Parts Per Hoist	005L	010L	020L	010S	020S
1	Chain Guide A	1	SA1BL9331	SA1CL1331			
3	Guide Roller	1		ER1DS9333			
4	Roller Pin	1		ER1CS9334			
5	Limit Lever S	1	SA1BL9337	SA1CL9337			
10	Chain Guide B	1	ER1BL9332	ER1CL9332			
11	Mach. Screw w/ Spring Washer	4		J1AP25001212			
12	Socket Bolt w/ Spring Washer	4	J1BG10602525	J1BG10603535			
14	Limit Lever Pin Assembly	1	SA1BS1338	SA1CS1338			
17	Split Pin	1	9009410				
18	Chain Container Assembly (S)	1	70679 (49ft)	70679 (32ft)	70679 (16ft)	70679 (32ft)	70679 (16ft)
	Chain Container Assembly (M)		70680 (100ft)	70680 (65ft)	70680 (32ft)	70680 (65ft)	70680 (32ft)
	Chain Container Assembly (L)			70681 (120ft)	70681 (60ft)	70681 (120ft)	70681 (60ft)
21	Body Plate	1	SA1BL99801	SA1CL99801			
22	Socket Bolt	1	901286				
23	Flat Washer	2	9012511				
24	Spring Washer	1	9012709				
25	Nut	1	9093420				
26	Socket Bolt	1	9091262	9091263			
27	Spring Washer	1	9012711				
28	Nut	1	9093424				
29	Chain Guide C	1	SA1BS9962	SA1CL9962			
30	Socket Bolt	2	9091262	9091286			
31	Spring Washer	2	9012709	9012711			
32	Nut	2	9093420	9093424			
33	Hi-Coupling	2*			P3HC0602121		
34	Alternate Chain Container Assembly (M)	1	70947 (100ft)	70947 (65ft)	70947 (32ft)	70947 (65ft)	70947 (32ft)
	Alternate Chain Container Assembly (L)	1		70948 (120ft)	70948 (60ft)	70948 (120ft)	70948 (60ft)

*See Section 3-2 for necessity and use.

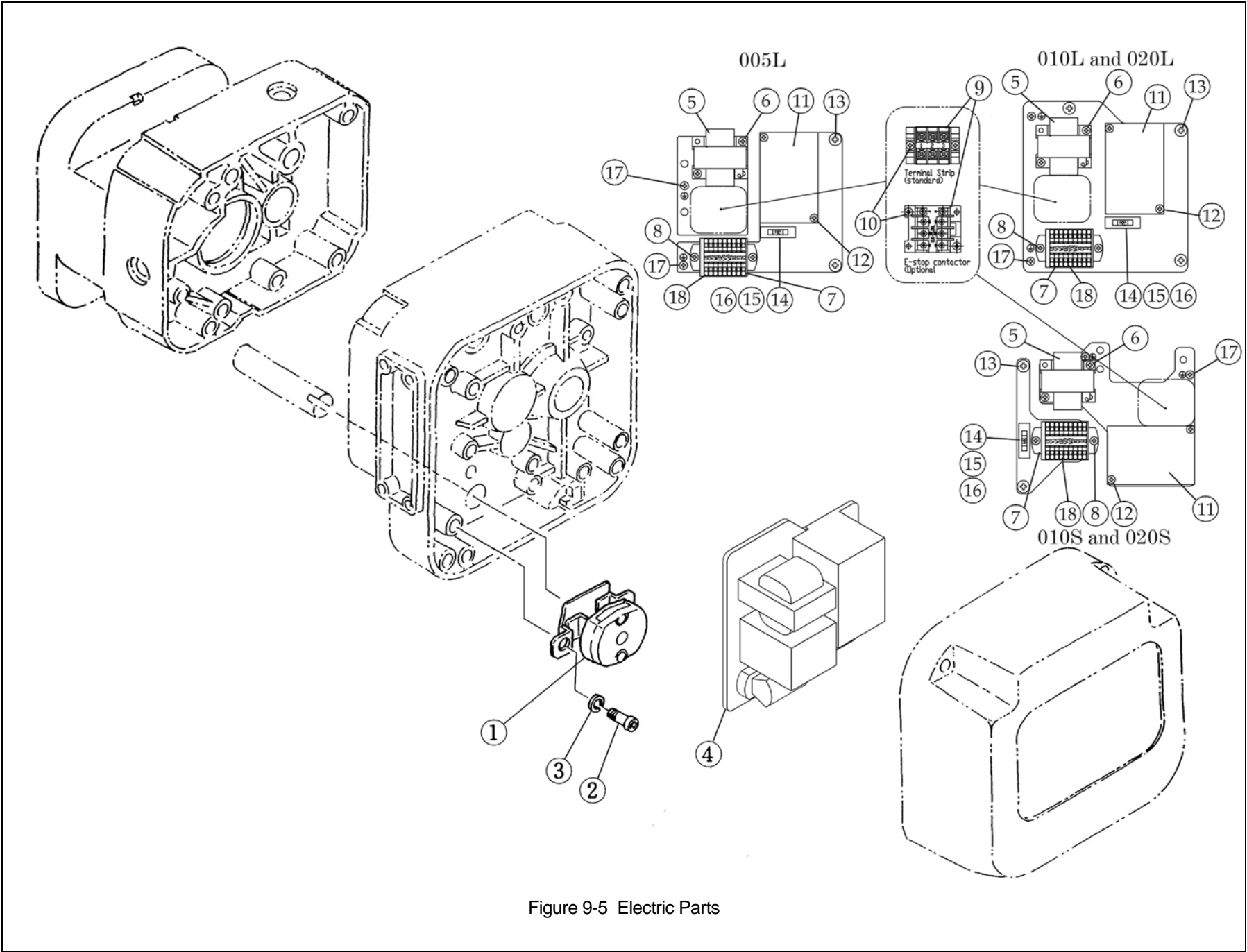
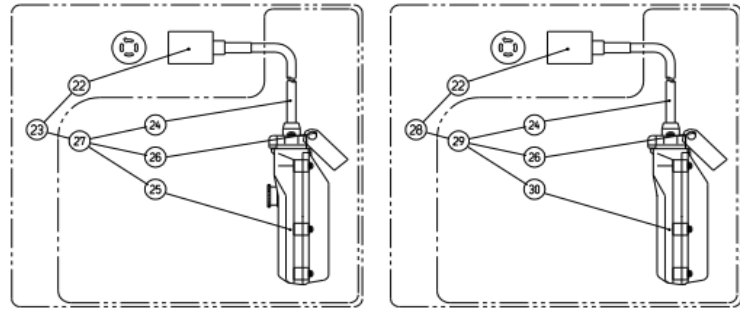
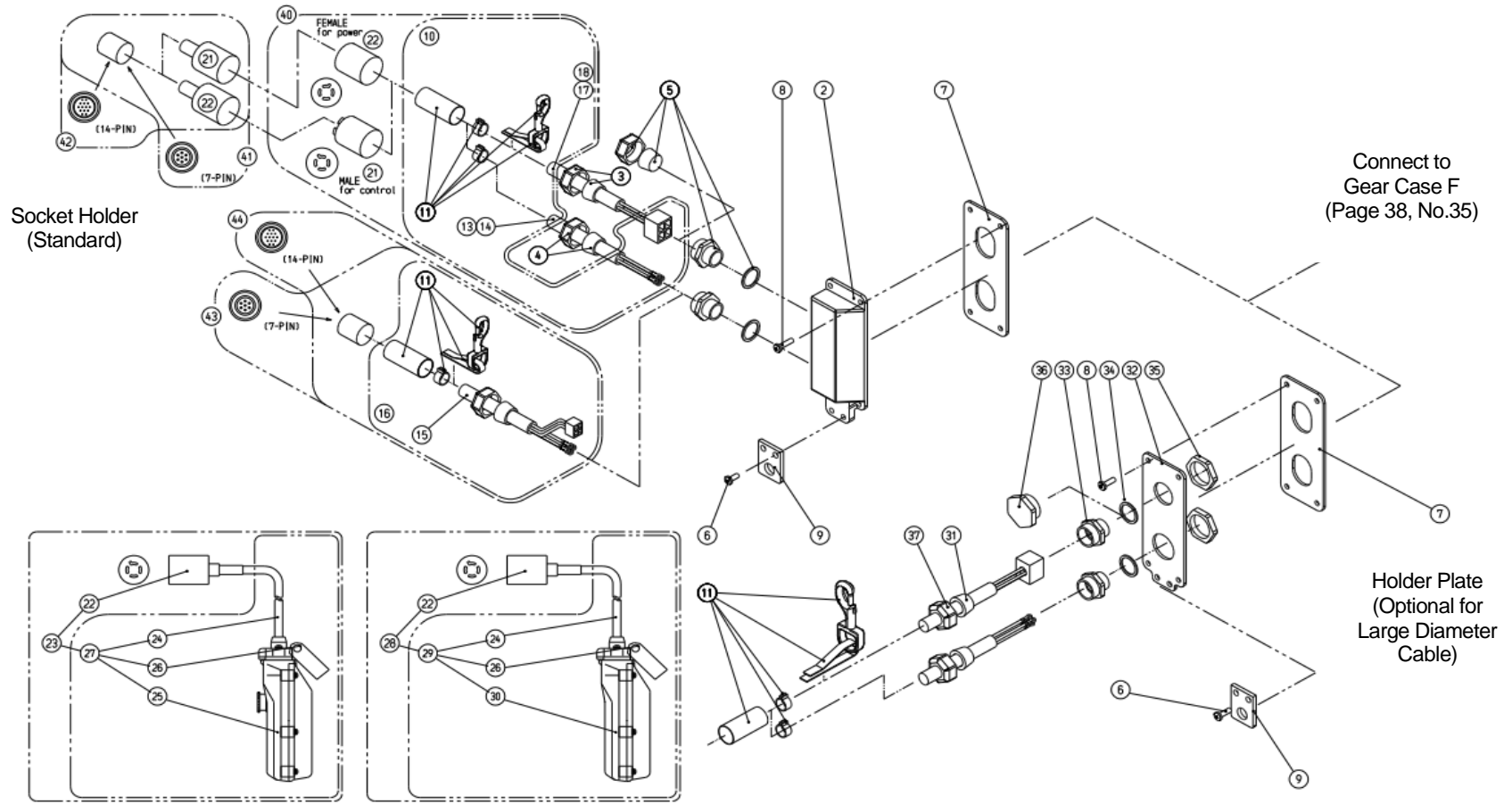


Figure 9-5 Electric Parts

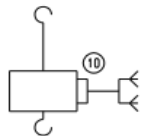
Fig No	Part Name	Parts Per Hoist	005L	010L	020L	010S	020S
1	Limit Switch Assembly	1	SA1BS2551				
2	Socket Bolt	3	9091247			J1BA10601515	
3	Spring Washer	3	9012709				
4	Plate Assembly	1	SA1DHM05L5A2	SA1DHM10L5A2	SA1DHM10S5A2		
5	Transformer	3	TRF62M611				
6	Machine Screw	2	MS555010				
7	Terminal Plate	1	ECP1309AD				
8	Mach. Screw w/ Spring Washer	2	J1AW24001010				
9	Terminal Strip	1	ECP1403AB				
	E-Stop Contactor (Optional)	1	MGC14306C				
10	Mach. Screw w/Spring Washer	2	J1AW2-4001010				
	Machine Screw (for optional E-stop contactor)	2	J1AW2-4001616				
11	Electromagnetic Contactor	1	MGC23406C				
12	Machine Screw	2	J1AP24001212				
13	Plate Screw	2 (3)	ER1BS9445				
14	Fuse	1	ECP91FZ06				
15	Fuse Holder	1	ECP92FZAA				
16	Mach. Screw w /Spring Washer	1	E2D667125				
17	Mach. Screw w /Spring Washer	2	MS555010				
18	Lead Wire Assembly	1	SA1DHM05L9A23	SA1CHM10L9A23			

*Quantities in “()” are for 010L/S and 020L/S hoists.

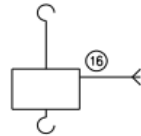


Cable configuration patterns

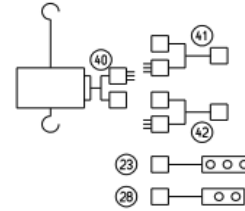
1. Double Pigtail (Standard)



2. Single pigtail (7C)



3. Double Hubbell



4/5. 7pin Socapex/14pin single

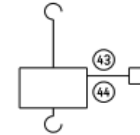


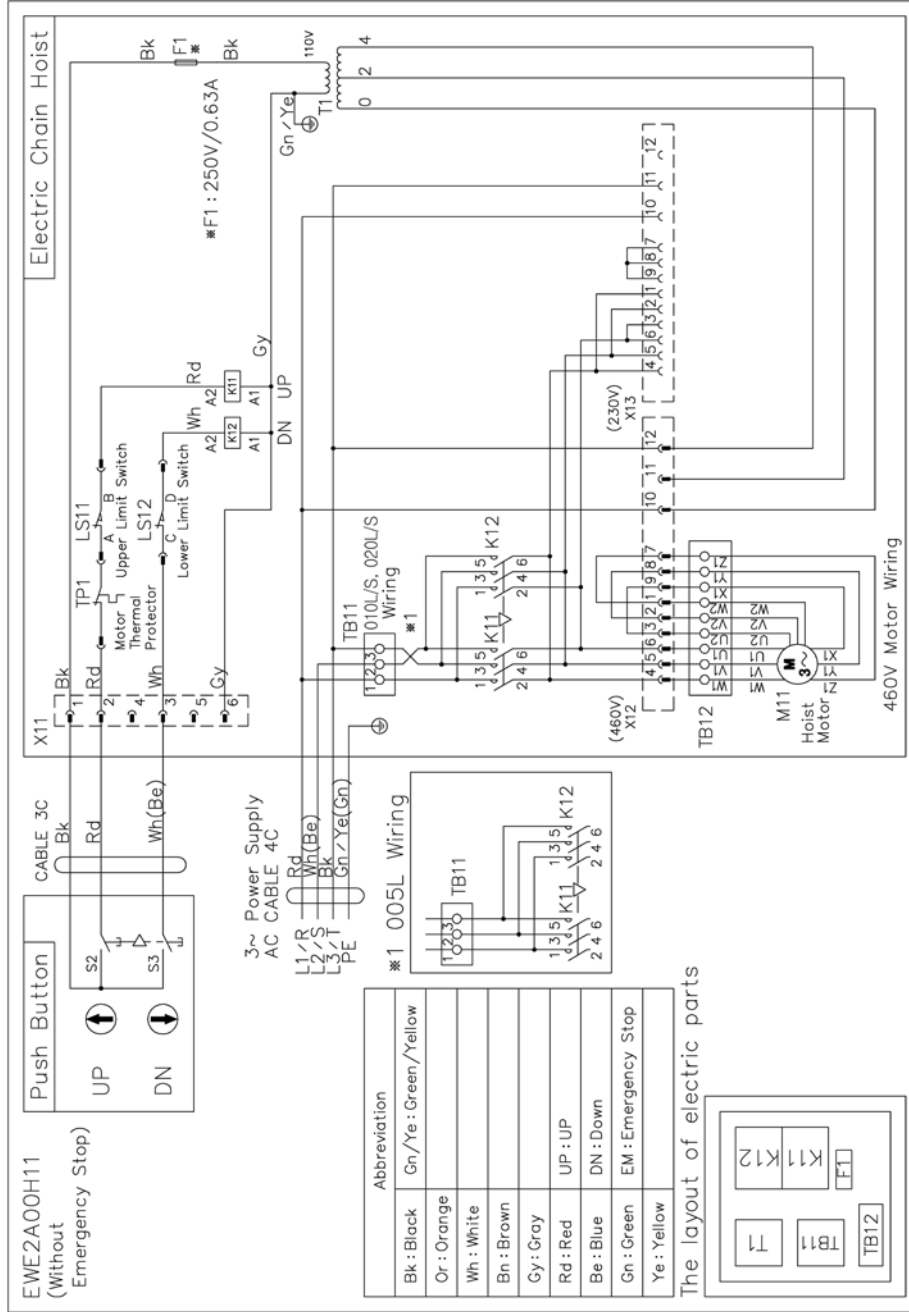
Figure 9-6 Power Supply and Pendant Parts

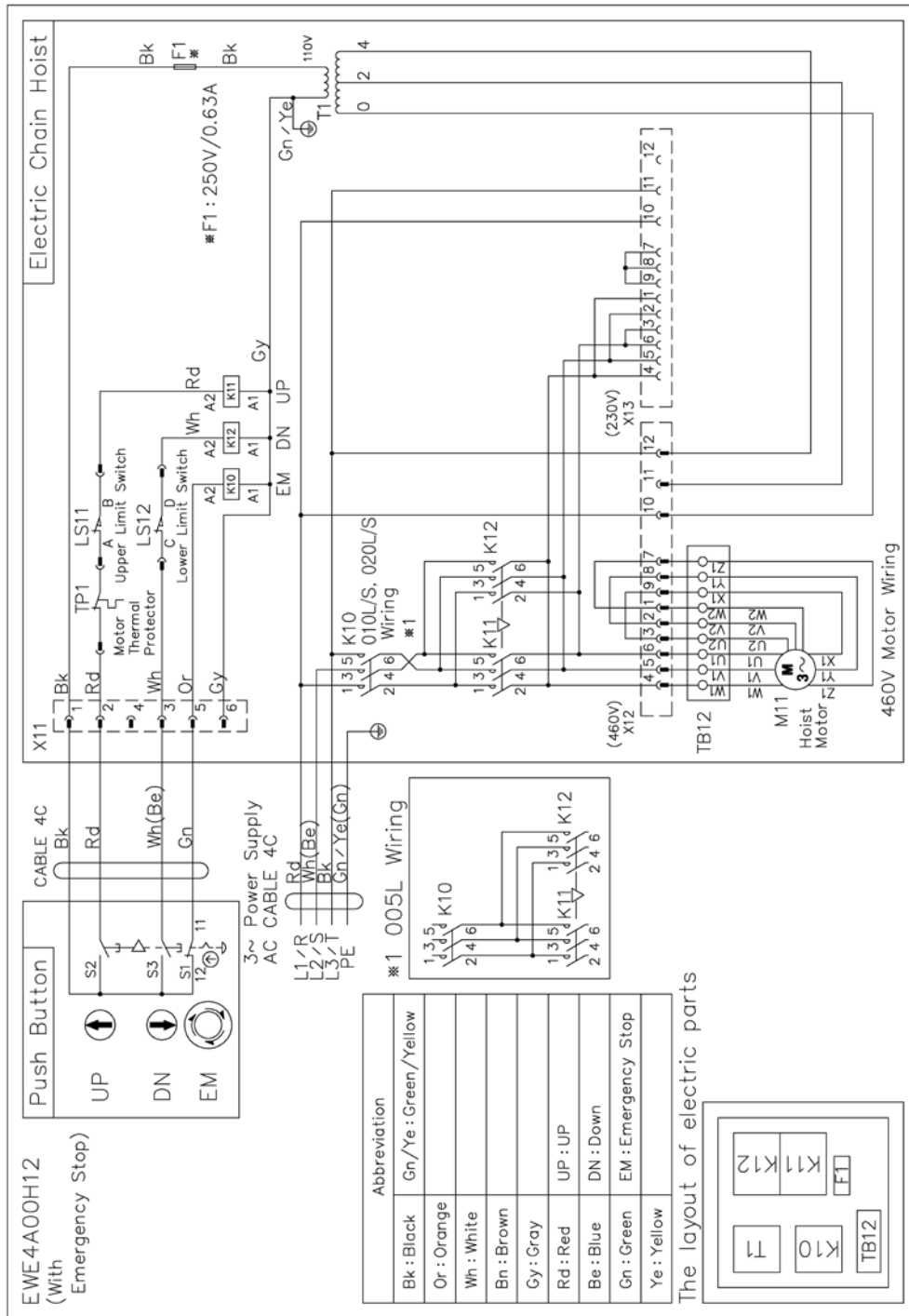
Fig No	Part Name	Parts Per Hoist	005L	010L	020L	010S	020S
1	Socket Holder Assembly	1			SA1BL1511		
2	Socket Holder 27	1			SA1BL9511		
3	Holder 13	1			ECP5913AA		
4	Holder 14	1			ECP5914AA		
6	Machine Screw w/ Spring Washer	2			J1AP26001212		
7	Socket Holder Packing	1			ER1BS9512		
8	Machine Screw w/ Spring Washer	4			MS561010		
9	Cable Support Arm	1			SA1BS9541		
40	Power and Control Cable Complete Assembly with Strain Relief (Double Hubbell)	1			70954		
10	Power and Control Cable Complete Assembly with Strain Relief (Double Pigtail)	1			70955		
11	Strain Relief Snap Assembly kit	1			70956		
-	Strain Relief Swivel Snap Hook	1			9015906		
-	Strain Relief Shrink Tubing	1			9013806		
-	Strain Relief Nylon Strap	1			9015905		
-	Strain Relief Crimp Ring for Power Cable	1			9009902		
-	Strain Relief Crimp Ring for Control Cable	1			9009903		
13	Power Supply Cable 4C Complete Assembly	1			7059395		
14	Power Supply Cable 4C	ft			14/4C		
17	Control Cable 4C Complete Assembly	1			7059495		
18	Control Cable 4C	ft			16/4C		
21	Male Hubbell plug for power	1			HBL2431		
22	Female Hubbell plug for control	1			HBL2433		
23	Pendant with Cord and Hubbell Plug Complete Assembly with Emergency Stop	1			7059095		
27	Pendant with Cord Complete Assembly with Emergency Stop	1			7059195		
24	Pendant Cord	1			16/4C		
25	Pendant Assembly	1			9012877		
26	Warning Tag	1			WTAG7		
22	Female Hubbell plug	1			HBL2433		
28	Pendant with Cord and Hubbell Plug Complete Assembly without Emergency Stop	1			8082095		
27	Pendant with Cord Complete Assembly	1			8082195		
24	Pendant Cord	1			16/4C		
25	Pendant Assembly	1			9012877		
26	Warning Tag	1			WTAG7		
22	Female Hubbell plug	1			HBL2433		

Fig No	Part Name	Parts Per Hoist	005L	010L	020L	010S	020S
* Holder Plate Components (Optional for Large Diameter Cable, more than 0.57" up to 0.87")							
31	Cable Packing	1	Depends on cable diameter – up to 0.87"				
32	Cable Holder Plate	1	SA1CL9511				
33	Holder B	2	ECP5924AB				
34	Holder Packing	2	ECP5924AC				
35	Holder Nut	2	ECP5924AD				
36	Holder Cap	1	ECP5924AE				
37	Holder A	1	ECP5924AA				
** Single Convertible Cable components (Optional for Single socket)							
5	Holder Cap	1	ECP5900EA				
43	Single Convertible Cable Complete Assembly with Strain Relief (7-pin "Socapex")	1	70951				
44	Single Convertible Cable Complete Assembly with Strain Relief (14-pin)	1	70952				
16	Single Convertible Cable Complete Assembly with Strain Relief (Single Pigtail)	1	70953				
11	Strain Relief Snap Assembly kit	1	70956				
15	Convertible Cable 7C		16/7C				
*** Compound Cable components (Optional for Double Hubbell Configuration)							
41	Controller Adapter (Whip) – 7pin "Socapex"	1	7066395				
42	Controller Adapter (Whip) – 14pin	1	7066295				
21	Male Hubbell plug	1	HBL2431				
22	Female Hubbell plug	1	HBL2433				

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Appendix A: Wiring Diagram







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