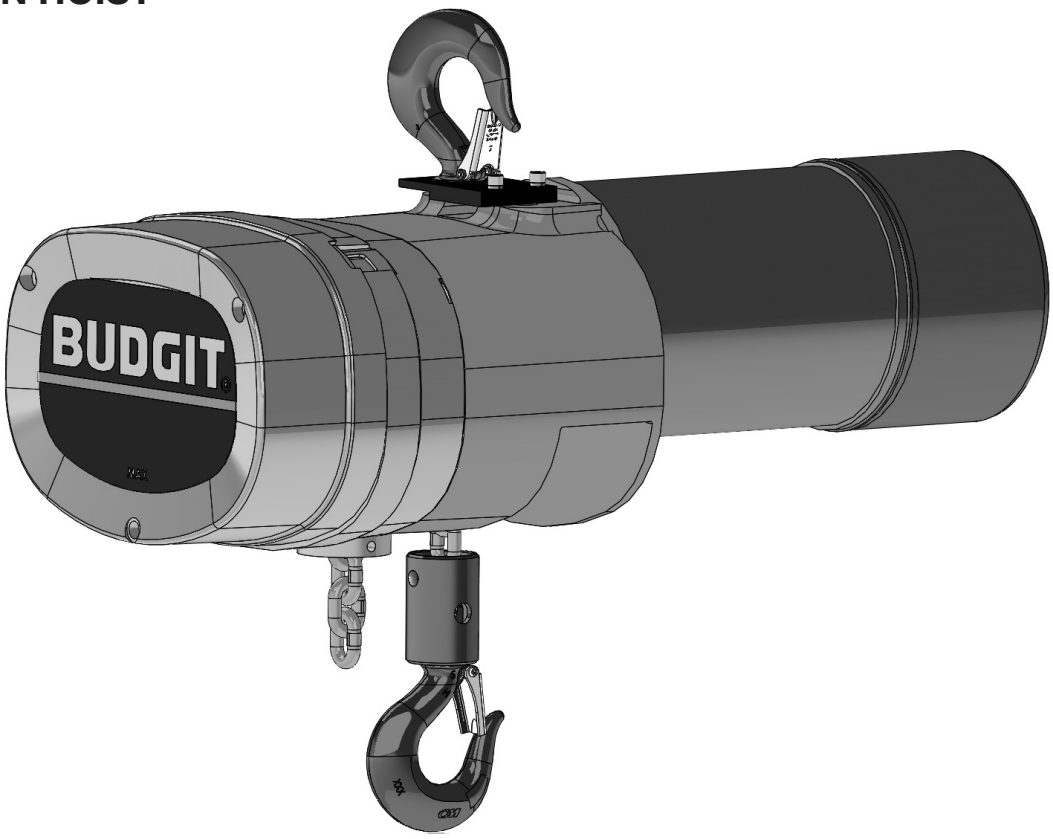
# OPERATING, MAINTENANCE & PARTS MANUAL

## ELECTRIC CHAIN HOIST




# BUDGIT MAN GUARD™

**Before installing hoist, fill in the information below.**

Model Number _____

Serial No. _____

Purchase Date _____

Voltage _____

Rated Load _____

### RATED LOADS 1/4 TO 3 TONS
### 250 KG TO 3000 KG

**Follow all instructions and warning for inspecting, maintaining and operating this hoist.**

The use of any hoist presents some risk of personal injury or property damage. That risk is greatly increased if proper instructions and warnings are not followed. Before using this hoist, each operator should become thoroughly familiar with all warnings, instructions and recommendations in this manual. **Retain this manual for future reference and use.**

Forward this manual to operator. Failure to operate equipment as directed in manual may cause injury.

**P/N: 11353530 REV AA** January 2017

## BUDGIT HOIST PARTS AND SERVICES ARE AVAILABLE IN THE UNITED STATES AND IN CANADA

**As a Budgit Hoist and Trolley user you are assured of reliable repair and parts services through a network of Master Parts Depots and Service Centers that are strategically located in the United States and Canada. These facilities have been selected on the basis of their demonstrated ability to handle all parts and repair requirements promptly and efficiently. To quickly obtain the name of the Master Parts Depot or Service Center located nearest you, call (800) 888-0985. Fax: (716) 689-5644.**

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# FOREWORD

This book contains important information to help you install, operate, maintain and service your new Electric Hoist. We recommend that you study its content thoroughly before putting your hoist into use. Then, through proper installation, application of correct operating procedures, and by practicing the recommended maintenance suggestions you will be assured maximum lifting service from the hoist.

Complete inspection, maintenance and overhaul service is available for Budgit™ Electric Hoists at Authorized Repair Stations. All are staffed by qualified factory-trained service men; have authorized testing equipment; and stock a complete inventory of factory approved Budgit replacement parts.

Complete replacement parts information is given in Section IX. It will likely be a long time before parts information is needed, therefore, after you completely familiarize yourself with operation and preventive maintenance procedures, we suggest that this instruction and parts manual be carefully filed for future reference.

**Notice:** Use only factory approved Budgit replacement parts, available from Authorized Repair Stations or Budgit Hoist Distributors.

The "Accident Prevention Manual for Industrial Operations' (8th Edition) by the National Safety Council states:

"Employees who work near cranes or assist in hooking on or arranging loads should be instructed to keep out from under loads. Supervisors should watch closely to see that this rule is strictly followed.

From a safety standpoint, one factor is paramount: conduct all lifting operations in such a manner that if there were an equipment failure, no personnel would be injured. This means keep out from under raised loads!"

**THE INFORMATION CONTAINED IN THIS MANUAL IS FOR INFORMATIONAL PURPOSES ONLY AND Budgit HOISTS DOES NOT WARRANT OR OTHERWISE GUARANTEE (IMPLIEDLY OR EXPRESSLY) ANYTHING OTHER THAN THE COMPONENTS THAT Budgit MANUFACTURES AND ASSUMES NO LEGAL RESPONSIBILITY (INCLUDING, BUT NOT LIMITED TO CONSEQUENTIAL DAMAGES) FOR INFORMATION CONTAINED IN THIS MANUAL.**

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**Notice:** Information contained in this book is subject to change without notice.

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**Figure 1-1. Typical Budgit Electric Hoist**

# SECTION I - GENERAL DESCRIPTION

## 1-1. GENERAL.

**Budgit** Portable Electric Hoists are precision built chain type hoists ranging in five rated load sizes from 1/4 ton through 3 tons with various lifting speeds and electrical power supplies. In addition to the capacities, there are model variations with hook or lug type suspension, and single or variable speed.

## 1-2. HOIST SERVICE CLASSIFICATION

a. **Budgit** electric hoists at the time of manufacture comply with our interpretation of applicable sections of ANSI B30.16 “Overhead Hoists”, National Electric Code ANSI/ NFPA 70 and Occupational Safety and Health Act, 1992.

b. OSHA places the burden of compliance for hoist installations on the user. The user must install the equipment in accordance with the National Electric Code ANSI/NFPA 70 as well as other federal, state and local regulations which apply to the installation and application in your particular area.

c. These hoists meet ANSI/ASME HST-1M “Performance Standard for Electric Chain Hoists” hoist duty class ratings as outlined in the sales bulletin.

**⚠ WARNING**

**Equipment covered herein is not designed or suitable as a power source for lifting or lowering persons. Do not use as an elevator.**

## 1-3. BASIC CONSTRUCTION.

All sizes and models of these Budgit Electric Hoists are of the same basic designs, having many common and interchangeable parts. They consist primarily of an aluminum alloy frame and gear case cover which houses the gear train. An electric driving motor and external motor brake are mounted on the rear of the frame, Electrical control components are mounted on front of the gear case cover and encased by aluminum alloy end cover. An upper hook or lug bracket for suspending the hoist is attached to the top of the frame. A high strength low alloy coil load chain with lower block assembly is employed to raise and lower loads. Hoist operation is controlled by a pendant push button station.

## 1-4. DIFFERENCES BETWEEN MODELS AND SIZES.

The main differences between hoist models are in the service classification, type of load chain and the suspension employed. These are described in paragraphs (a) through (c), below. The differences between sizes of hoists are in the number of gear reductions used and the reeving of the load chain. Two-reduction gearing is used for 1/4 through 1/2 ton rated load hoists; three-reduction gearing for 1, 2 and 3 ton rated hoists. On 1/4 through 1 ton rated load hoists, the load chain is single reeved (one part of chain); on 2 ton rated loads, the chain is double reeved (two parts of chain); on three ton rated loads, the chain is triple reeved (three parts of chain).

d. Coil type chain is full-flexing electric welded link chain. It is especially designed for use with your Budgit Electric Hoists and only factory approved chain of the correct size, pitch, hardness, and strength can be used with these hoists.

e. Suspension differences include a conventional hook type mounting and a lug type mounting. Hook suspension allows portability permitting hoist to be easily moved from job to job. Lug suspension permits hoist to be rigidly mounted to overhead structure or attached to Budgit Rigid Mount Trolleys, affording unusual headroom advantage.

## 1-5. BUDGIT OVERLOAD CLUTCH.

Budgit Electric Hoists having a MAN GUARD label are equipped with an overload clutch that is designed to help guard against excessive overloads. It is a cone-friction clutch that connects the first reduction gear to the clutch pinion shaft. A belleville disc spring provides clutch pressure between the gear and its cone shaped gear center. An excessive overload causes the gear to rotate without turning the gear center and pinion shaft. See paragraph 3-5 for operation.

**⚠ WARNING**

**The Budgit overload clutch is a protective device that will permit operation of your hoist within its rated load and will prevent lifting of excessive overloads which can cause permanent deformation or weakening of a properly maintained hoist and/or its suspension.**

# SECTION II - INSTALLATION

## 2-1. GENERAL.

Budgit Electric Hoists are completely lubricated and load tested under their own power before being shipped from the factory. To place hoist in service, attach to suitable overhead suspension (par. 2-2) in area to be used; make pre-installation check (par. 2-3); and connect to the proper power supply (par 2-4).

## 2-2. INSTALLATION.

**NOTICE**

**Lubricate load chain before operating hoist. See paragraph 4.3**

a. On hook suspended hoists, select a suitable overhead support in area hoist is to be used (one capable of holding weight of hoist and its rated load) and hang up hoist. Be certain upper hook is firmly seated in center of hook saddle. Upper hook is equipped with a spring type hook latch; it may be necessary to remove latch to attach hook to support. Replace latch after hoist is installed.

b. On lug suspended hoists, select a suitable overhead support in area hoist is to be used (one capable of holding weight of hoist and its rated load). Mount hoist using through bolts, of appropriate size, to fit mounting holes in suspension lug at top of hoist frame. (See table below.) The structure used to suspend hoist must be of sufficient strength to withstand reasonable forces to which hoist and support may be subjected. Hoist must be aligned with load to avoid side pulls.

c. On lug suspended hoists, the suspension lug is factory oriented to cross mount the hoist. This is the recommended orientation. To rotate the lug 90° for parallel mounting, follow instructions below:

1. On 1/4 through 1 ton hoists, remove the two screws securing the anti-rotation bracket and remove the bracket. Rotate the suspension lug in 90° increments. Reinstall the anti-rotation bracket and secure with two screws and lock washers.
2. On 2 ton hoists, remove hex socket head screw in lower lock plate. Remove lower lock plate. Rotate suspension lug to selected position and replace lock plate and hex socket head screw.
3. On 3 ton hoists, the hanger bracket must first be removed from the hoist to provide access to suspension nut. With bolt removed lift lug from hanger and reposition as desired. The lug is located and prevented from turning by integral lugs on adjacent surfaces of the lug and the hanger. Reinstall suspension bolt, spherical washers and nut. Align hole in nut and suspension bolt. Reassemble hanger bracket to hoist.

d. On rigid mount trolley suspended hoists, the trolley side plates must be properly spaced so trolley will fit I-beam on which hoist will operate. Adjustment for various I-beam sizes is accomplished by rearrangement of spacer washers on through bolts which connect trolley side plates to suspension lug on hoist. Refer to instruction sheet furnished with Budgit Rigid Mount Trolleys for complete instructions.

### SUSPENSION LUG BOLT SIZES AND SPACING

| Hoist Rated Load (tons) | Bolt Diameter (in) | Distance Between Holes (in) |
|---|---|---|
| 1/4, 1/2 &1 | 5/8 | 3-1/8 |
| 2 | 1 | 5 |
| 3 | 1-1/4 | 6 |

## 2-3. PRE-INSTALLATION CHECK.

### CHECK OIL LEVEL (FIG. 4-1).

The gear case has been filled with oil, to the proper level at the factory. However, the oil level should be checked before hoist is operated. Remove pipe plug from oil filler on side of hoist frame. Replace with supplied oil hole cover. Check oil level by removing oil level plug (side of frame). Observe if oil level is even with bottom of tapped hole. If it is not, add oil, as specified in paragraph 4-2c. Also check load chain. Be sure it is properly lubricated. See para. 4-3.

### CHECK LIMIT STOPS:

Paddle limit equipped. Make sure the actuator on the tail chain side is securely connected to the proper link. (See chart on page 30). On single part hoists, make sure steel actuator is connected to the first chain link above the lower block. Multiple part reeved hoists do not have an actuator on the lower block side.

## 2-4. CONNECTING HOIST TO ELECTRICAL SERVICE.

a. All hoists are equipped with a flexible power cable extending from the hoist. A grounding type male plug or permanent connection in an outlet box may be used for connecting hoist to power supply. See table (fig. 2-1) for branch circuit conductor sizes.

| H.P. | Power Supply | AWG Wire Size | | | | | |
|---|---|---|---|---|---|---|---|
| | | #16 | #14 | #12 | #10 | #8 | #6 |
| 1/4 | 115-1-60 | 80 | 130 | 210 | 330 | | |
| | 230-1-60 | 230 | 330 | 835 | | | |
| | 230-3-60 | 465 | 740 | 1180 | | | |
| | 460-3-60 | 1440 | 2390 | | | | |
| 1/2 | 115-1-60 | 45 | 75 | 120 | 190 | 310 | 490 |
| | 230-1-60 | 195 | 305 | 490 | 775 | 1235 | |
| | 230-3-60 | 280 | 450 | 715 | 1135 | | |
| | 460-3-60 | 860 | 1440 | | | | |
| 1 | 115-1-60 | * | 45 | 75 | 120 | 190 | 300 |
| | 230-1-60 | 120 | 190 | 300 | 475 | 720 | |
| | 230-3-60 | 180 | 290 | 460 | 730 | | |
| | 460, 575-3-60 | 560 | 900 | | | | |
| 2½ | 230-3-60 | 60 | 100 | 150 | 250 | | |
| | 460, 60 | 260 | 420 | | | | |

*Do not use

**Figure 2-1.**

Branch Circuit Conductor Size. Maximum length in feet for wire size based on horsepower and power supply. Wire size for entire length of branch circuit and permanent wiring to main feeder. Power supply measured at hoist, while running and with normal load, must not vary more than ±5% of voltage on motor nameplate.

b. Follow local & National Electrical Codes when providing electrical service to hoist. Connect power wires in accordance with appropriate wiring diagram. Power supply must be the same voltage, frequency and phase as specified on the hoist nameplate.

**⚠ WARNING**

**The green wire provided in the power supply cable is a grounding wire and must be connected to a proper ground. (Follow local code requirements and/or National Electrical Code Article 250).**

c. Dual voltage hoists with reconnectable 230/460 volts, 3 phase, 60 hertz are (unless otherwise specified on customer's order) shipped from factory pre-connected for operation on 230 volts. If hoist is to be operated on 460 volts convert wiring by changing connections on terminal board. With hoist disconnected from power source, remove electrical compartment cover and reconnect terminal board leads. Refer to Wiring Diagram.

d. Dual voltage hoists with reconnectable 115/230 volts, 1 phase, 60 hertz are (unless otherwise specified on customer's order) shipped from factory pre-connected for operation on 115 volts. If hoists are to be operated on 230 volts convert wiring by changing connections on terminal board. With hoist disconnected from power source, remove electrical compartment cover and reconnect terminal board leads. Also refer to Wiring Diagram.

**⚠ WARNING**

**On electrically operated hoists it is possible to have "Reverse Phasing" causing the lower block to raise when the down button is depressed. When this condition exists, the block operated limit switches will not function properly. Serious damage to the hoist can occur with resulting hazard to operator and load. Hoists must be properly phased each time they are installed or moved to a new power source, or when service is performed on mainline (power source).**

# SECTION III - OPERATION

## 3-1. GENERAL.

Operation of Budgit Electric Hoists are controlled by a push button station suspended from the hoist electrical compartment. The station has a built-in mechanical interlock to prevent depressing both buttons simultaneously.

## 3-2. OPERATING HOIST.

a. Depress push button marked “h” to raise load.

b. Depress push button marked “i” to lower loads.

c. Jogging the push buttons will give “hairline” load movement. The quickness of the depressing motion will determine the amount of movement. Excessive use of this “jogging” feature will cause premature burning of contact points, motor overheating, and rapid motor brake wear.

## 3-3. PULLING AND ROTATING HOIST AND LOAD.

a. The push button station conductor cable has a built-in strain cable suitable for pulling trolley suspended hoists when not loaded. Do not use for pulling bridge cranes. Push on load or load chain or use a hand geared or motor driven type trolley to traverse loaded hoists.

b. To rotate hoist and load, push on one corner of load. The lower hook will pivot through 360 degrees to permit load to be swung to the desired position. The upper hook (hook suspension models) is also designed to rotate so that side pulls will swing hoist to face load, thus reducing side thrust.

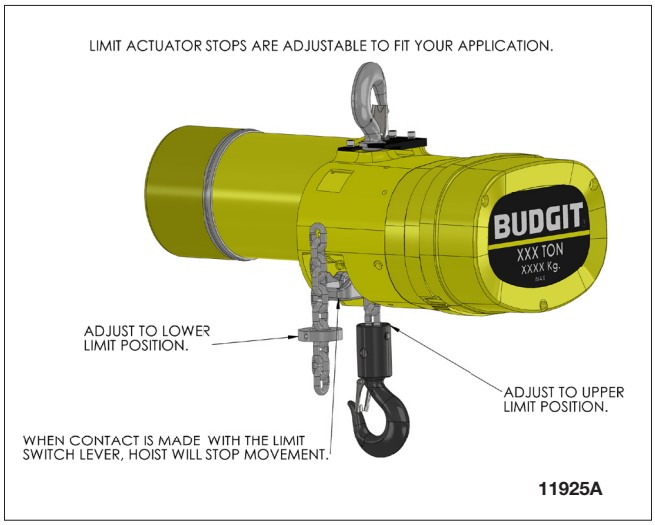



**Figure 3-1. Limit Switch Illustration**

## 3-4 UPPER AND LOWER LIMITS.

Budgit Electric Hoists are equipped with a paddle type limit switch, operated by the lower block in the up direction and an actuator attached to the chain in the lowering direction.

## 3-4A. UPPER AND LOWER LIMIT STOPS (PADDLE LIMIT).

A lower block and chain operated limit stop is provided to guard against over-travel of load in either raising or lowering direction, which can cause damage to hoist. When highest position is reached a limit actuator on the load chain, above the lower block, trips the limit lever (fig. 3-1). When lowest position is reached, a limit actuator on the tail end of load chain trips the limit lever (fig. 3-1). The limit lever is connected to a limit switch that automatically stops the hoist motor. This is intended as a safety device and is not to be used on a routine basis to stop travel of lower block or shut off hoist.

## 3-5. OVERLOAD CLUTCH OPERATION.

The overload clutch is factory preset at assembly so that the hoist will lift its full rated load but will refuse to lift overloads within a range of 150 percent rated load to 200 percent rated load. If the load to be lifted exceeds the clutch factory setting, the motor will continue to run and will rotate the clutch gear without lifting the load. Whenever this occurs, immediately release the “h” push button to prevent overheating of the clutch friction surfaces and motor, and reduce the load to rated hoist capacity. Should it be impractical to reduce the load, replace the hoist with one of suitable rated capacity.

**NOTE: Always know the load to be lifted. Budgit Hoists does not recommend lifting loads greater than the rated load of your hoist.**

## 3-6. OPERATING PRECAUTIONS.

**⚠ WARNING**

**Equipment covered herein is not designed or suitable as a power source for lifting or lowering persons. Do not use as an elevator.**

Safe operation of an overhead hoist is the operator’s responsibility. The following are some basic rules that can make an operator aware of dangerous practices to avoid and precautions to take for his own safety and the safety of others. Observance of these rules in addition to frequent examinations and periodic inspection of the equipment may save injury to personnel and damage to equipment.

a. **DO** read ANSI B30.16 Safety Standard for Overhead Hoists and the Operation, Service and Parts Manual

b. **DO** be familiar with hoist operating controls, procedures and warnings.

c. **DO** make sure hook travel is in the same direction as shown on controls.

d. **DO** make sure hoist limit switches function properly.

e. **DO** maintain firm footing when operating hoist.

f. **DO** make sure that load slings or other approved single attachments are properly sized and seated in the hook saddle.

g. **DO** make sure that the hook latch, is closed and not supporting any part of the load.

h. **DO** make sure that load is free to move and will clear all obstructions.

i. **DO** take up slack carefully, check load balance, lift a few inches and check load holding action before continuing.

j. **DO** avoid swinging of load or load hook.

k. **DO** make sure that all persons stay clear of the suspended load.

l. **DO** warn personnel of an approaching load.

m. **DO** protect load chain from weld splatter or other damaging contaminants.

n. **DO** promptly report any malfunction, unusual performance, or damage of the hoist.

o. **DO** inspect hoist regularly, replace damaged or worn parts, and keep appropriate records of maintenance.

p. **DO** use the hoist manufacturer’s recommended parts when repairing a hoist.

q. **DO** use hook latches wherever possible.

r. **DO** apply lubricant to load chain as recommended.

s. **DO NOT** lift more than rated load.

t. **DO NOT** use the hoist load limiting device to measure the load.

u. **DO NOT** use damaged hoist or hoist that is not working correctly.

v. **DO NOT** use the hoist with twisted, kinked, damaged

or worn chain.

w. **DO NOT** lift a load unless chain is properly seated in chain wheel(s) or sprocket(s).

x. **DO NOT** use load chain as a sling or wrap chain around the load.

y. **DO NOT** lift a load if any binding prevents equal loading on all supporting chains.

z. **DO NOT** apply the load to the tip of the hook.

aa. **DO NOT** operate unless load is centered under hoist.

ab. **DO NOT** allow your attention to be diverted from operating the hoist.

ac. **DO NOT** operate the hoist beyond limits of load chain travel.

ad. **DO NOT** use limit switches as routine operating stops. They are emergency devices only.

ae. **DO NOT** use hoist to lift, support or transport people.

af. **DO NOT** lift loads over people.

ag. **DO NOT** leave a suspended load unattended unless specific precautions have been taken.

ah. **DO NOT** allow sharp contact between two hoists or between hoist and obstructions.

ai. **DO NOT** allow the chain or hook to be used as a ground for welding.

aj. **DO NOT** allow the chain or hook to be touched by a live welding electrode.

ak. **DO NOT** remove or obscure the warnings on the hoist.

al. **DO NOT** adjust or repair a hoist unless qualified to perform hoist maintenance.

am. **DO NOT** attempt to lengthen the load chain or repair damaged load chain.

an. **DO NOT** allow personnel not physically fit or properly qualified to operate the hoist.

ao. **DO NOT** operate hoist unless upper and lower limit switch stops are operating properly.

ap. **DO** always be sure there is no twist in coil load chain. On 2 & 3 ton coil chain hoists, check to see that lower block is not capsized between strands of chain.

aq. **DO** avoid operating hoist when hook is not centered under hoist. Be sure that hoist trolley or other support mechanism is correctly positioned for handling the load before lifting.

ar. **DO** operate hoist within recommended duty cycle and **do not** "jog" unnecessarily.

as. **DO** conduct regular visual inspections for signs of damage or wear.

at. **DO NOT** operate hoist with hooks that have opened up. See Figures 5-5 and 5-6.

au. **DO** provide supporting structure or anchoring means that has a load rating at least equal to that of the hoist.

av. **DO NOT** use hoists in locations that will not allow operator movement to be free of the load.

aw. **DO** when starting to lift or pull, move the load a few inches at which time the hoist should be checked for proper load holding action. The operation shall be continued only after the operator is assured that the hoist is operating properly.

ax. **DO NOT** leave a loaded hoist unattended at the end of a work shift or for extended periods during the work shift. Where operations are such that this condition cannot be avoided the operator must be assured that the condition **does not** create a hazard to personnel or property.

ay. **DO** use common sense and best judgement whenever operating a hoist. Observe American National Standard Safety standard, ANSI B30.16, latest issue.

# SECTION IV - LUBRICATION

## 4-1. GENERAL.

The lubrication services outlined in paragraphs 4-2 through 4-5 should be performed at regular intervals to maintain top hoist performance and insure long life. The frequency for lubrication services will depend on the type of hoisting service that hoist is subjected to and should coincide with periodic preventive maintenance inspection. See Section V-Maintenance.

## 4-2. CHANGE GEAR CASE OIL (FIG. 4-1).

a. Remove drain plug from bottom of hoist frame and drain oil from gear case. Replace plug.

b. Remove oil level plug from side of hoist.

c. Refill gearcase through oil filler to proper level (bottom of oil level plug hole) using Automatic Transmission Fluid - DEXRON Type. This is an all-weather oil available from all major oil companies. 1-1/2 pints of oil are required.

d. Reinstall oil level plug and breather.

## 4-3. LUBRICATE LOAD CHAIN.

A small amount of lubricant will greatly increase load chain life, therefore, chain should not be allowed to run without lubricant. Chain should be cleaned and lubricated as directed in paragraph a below. User should set up a regular schedule for chain lubrication after observing operating conditions for a few days. Use Bar and Chain Oil (LUBRIPLATE or equal) on load chain.

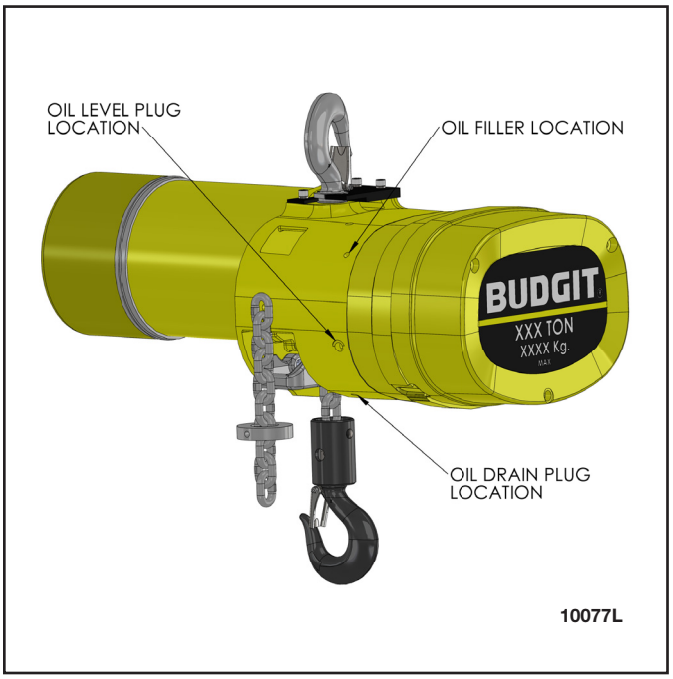



**Figure 4-1. Location of Oil Filler and Plugs**

a. Coil Chain. Under ordinary conditions only weekly attention will be necessary. Under hot and dirty conditions it may be necessary to clean chain at least once a day and lubricate it several times between cleanings. Thoroughly clean chain with an oil solvent and re-lubricate by coating it lightly with oil. Make sure that lubricant coats wear surfaces between links. Zinc plated load chain should be cleaned and lubricated daily.

## 4-4. LUBRICATE UPPER HOOK AND LOWER BLOCK ASSEMBLY.

a. Apply a few drops of Bar and Chain Oil on shank of upper hook where it enters frame.

b. Apply a few drops of Bar and Chain Oil on shank of lower hook where it enters lower block. Hook rotation bearing may be removed for cleaning and re-lubricating if necessary. See section 7-5.

c. On lower block assemblies of 2 and 3 ton capacity hoists, also apply heavy duty lithium soap grease with EP additives through pressure fitting in end of sprocket pin to lubricate bearing in chain sprocket.

d. On 3 ton model lubricate sprocket in hanger bracket with a few drops of Bar and Chain Oil in hole provided in center of sprocket hub.

## 4-5. LUBRICATE LIMIT LEVER CONTROL SHAFT AND GEARS.

Apply a few drops of Bar and Chain Oil on limit lever shaft at bearing points.

**⚠ WARNING**

**Before performing any internal work on hoist, be certain power is shut off. Lock main service switch in the open position.**

# SECTION V - MAINTENANCE

## 5-1. GENERAL.

Preventive maintenance services required on Budgit Electric Hoists are for the most part, simple periodic inspection procedures to determine condition of hoist components. Below are suggested inspection procedures, based on daily average hoist usage.

## 5-2. THIRTY-DAY INSPECTION.

Hoist may be left suspended.

### A. INSPECT LOAD CHAIN.

**LOAD CHAIN**

Chain should feed smoothly into and away from the hoist or hook block. If chain binds, jumps or is noisy, first clean and lubricate it (see below). If trouble persists, inspect chain and mating parts for wear, distortion or other damage.

**CHAIN INSPECTION**

First clean chain with a non-caustic/non-acid type solvent and make a link by link inspection for nicks, gouges, twisted links, weld splatter, corrosion pits, striations (minute parallel lines), cracks in weld areas, wear and stretching. Chain with any one of these defects must be replaced.

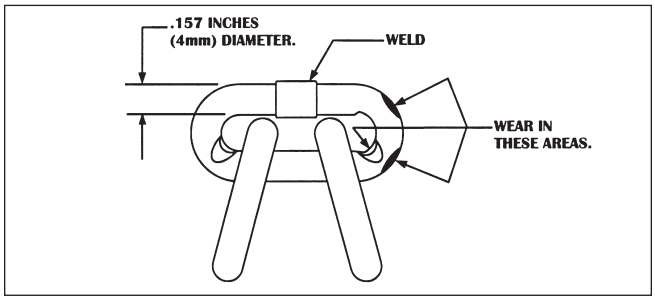



**Figure 15. Chain Wear Areas**

Slack the portion if the chain that normally passes over the liftwheel. Examine the interlink area for the point of maximum wear (polishing, see Figure 15). Measure and record the stock diameter at this point of the link. Then measure stock diameter in the same area on a link that does not pass over the liftwheel (use the link adjacent to the loose end link for this purpose). Compare these two measurements. If the stock diameter of the worn link is 0.005 inches (0.254 mm), or more, less than the stock diameter of the unworn link, the chain must be replaced. On double reeved units, repeat this examination of the chain that passes through the hook block.

Also check chain for stretch using a vernier caliper as shown in Figure 16. Select an unused, unstretched section of chain (usually at the loose end) and measure and record the length over 11 chain links (pitches). Measure and record the same length on a worn section of the chain. Obtain the amount of stretch and wear by subtracting the measurement of the worn section. If the result (amount of stretch and wear) is greater than 0.145 inch (3.7mm), the chain must be replaced.

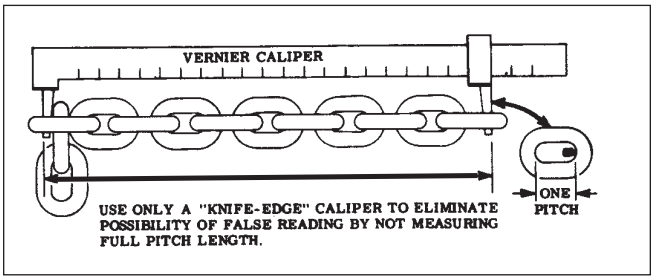



**Figure 16. Chain Inspection**

Use only a “Knife-edge” caliper to eliminate possibility of false reading by not measuring full pitch length. Note that worn chain can be an indication of worn hoist components. For this reason, the hoist’s chain guide, hook block and liftwheel should be examined for wear and replaced as necessary when replacing worn chain.

Also, these chains are specially heat treated and hardened and should never be repaired

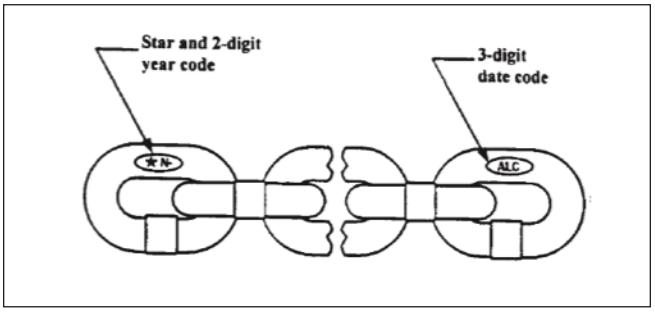



**Figure 17. Chain Embossing**
**Use only Star (*) grade load chain and original replacement parts. Use of other chain and parts may be dangerous and voids factory warranty.**

Chain Embossing Use only Star (*) grade load chain and original replacement parts. Use of other chain and parts may be dangerous and voids factory warranty.

**⚠ WARNING**

**Use of commercial or other manufactures’ chain and parts to repair Lodestar Hoists may cause load loss.**

**TO AVOID INJURY:**

**Use only factory supplied replacement load chain and parts. Chain and parts may look alike, but factory original chain and parts are made of specific materials or processed to achieve specific properties. See Figure 17.**

**IMPORTANT:** Do not use replaced chain for other purposes such as lifting or pulling. Load chain may break suddenly without visual deformation. For this reason, cut replaced chain into short lengths to prevent use after disposal.

## ⚠ WARNING

**Do not assume that load chain is safe because it measures below replacement points given herein. Other factors, such as those mentioned in visual checks above, may render chain unsafe or ready for replacement long before elongation replacement is necessary.**

## ⚠ WARNING

**To avoid serious personal injury from a dropped load caused by chain breakage, when replacing coil load chain, use only factory approved chain conforming to Budgit hoist specifications for material, hardness, strength and link dimensions. Chain not conforming to factory Specifications may be dangerous as it will not fit in the load sprocket and chain guide correctly, causing serious internal damage to hoist and it will wear prematurely, deform and eventually break.**

**REMOVING AND REPLACING COIL LOAD CHAIN.**

a. Replacement Coil load chain is installed by attaching it to tail end of old chain, after disconnecting old chain from side of hoist frame and removing limit actuator. New chain is then run into hoist as old chain is run out. Use open “C” links, figures 5-3 and 5-4, for attaching chains. Links must be identical in size to hoist chain - 1/4" wire size with .745" pitch length for 1/4 through 1/2 ton models, 5/16" wire size with .858" pitch for 1 through 3 ton models. Be certain that all welds on links of replacement chain face away from center of load sprocket.

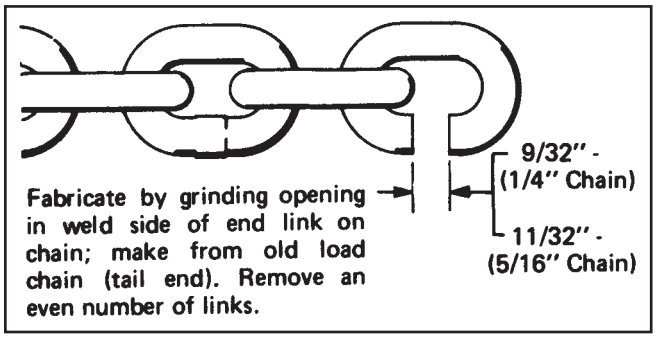



**Figure 5-3. Open "C" Link for Removing and Installing Coil Load Chain**

**Figure 5-4. Installing Coil Load Chain Using Two "C" Links (1/4, 1/2 & 1 ton hoists)**

b. Remove lower block assembly and actuator from old chain and attach them to replacement chain at end which was just run through hoist. Install limit actuator (as noted below) on other end of chain and anchor chain to side of hoist frame.

## NOTICE

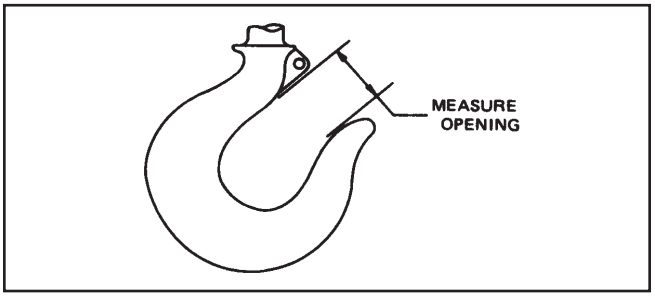
**Use one or two "C" links to orient chain for chain anchor screw. Position first link of new chain to be flat against hoist housing without twisting the chain.**

On 2 ton double reeved models, also connect opposite end of chain (from lower block) to load chain anchor inside of frame. On 3 ton triple reeved models, the opposite end of the chain is attached to the lower block connecting link.

**B. INSPECT LOWER BLOCK.**

Hooks shall be removed from service if damage such as the following is visible and shall only be returned to service when approved by a qualified person:

1. Missing or illegible hook manufacturer's identification or secondary manufacturer's identification.
2. Missing or illegible rated load identification.
3. Excessive pitting or corrosion.
4. Cracks, nicks, or gouges.
5. Wear – any wear exceeding 10% (or as recommended by the manufacturer) of the original section dimension of the hook or its load pin.
6. Deformation – any visibly apparent bend or twist from the plane of the unbent hook.
7. Throat Opening – any distortion causing an increase in throat opening of 5% not to exceed 1/4" in. (6 mm) (or as recommended by the manufacturer).
8. Inability to Lock – any self-locking hook that does not lock.
9. Inoperative Latch (if provided) – any damaged latch or malfunctioning latch that does not close the hook's throat.
10. Damaged, missing or malfunctioning hook attachment and securing means.



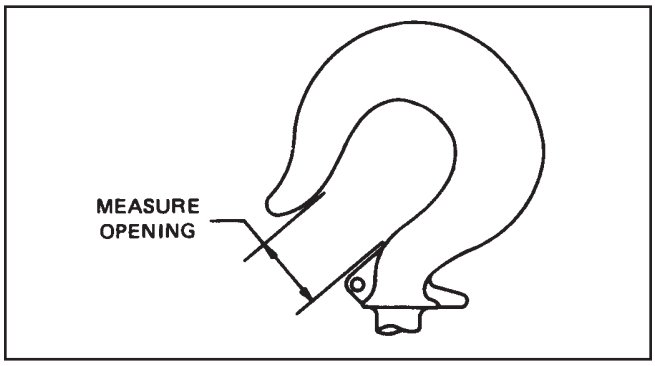

| Hoist Rated Load (tons) | Hook Throat Opening |
|---|---|
| | Normal Opening |
| 1/4 & 1/2 | 1-1/8 |
| 1 | 1-1/4 |
| 2 | 1-3/8 |
| 3 | 1-1/2 |

**Figure 5-5. Lower Hook Opening (Shown with latch removed for clarity.)**

## ⚠ WARNING

**Hooks, upper or lower, damaged from chemicals, deformation or cracks or having more than 15 percent in excess of normal throat opening or more that 10 degrees twist from the plane of the unbent hook, or opened, allowing the hook latch to bypass hook tip must be replaced.**

**Any hook that is twisted or has excessive throat opening indicates abuse or overloading of the hoist. Other load bearing components of the hoist should be inspected for damage. (See Section V. Par. 5-2. d. (2) below).**




| Hoist Rated Load (tons) | Hook Throat Opening |
|---|---|
| | Normal Opening |
| 1/4 & 1/2 | 1-1/8 |
| 1 | 1-1/4 |
| 2 | 1-3/8 |
| 3 | 1-1/2 |

**Figure 5-6. Upper Hook Opening (Shown with latch removed for clarity.)**

11. Thread wear, damage, or corrosion.
12. Evidence of excessive heat exposure or unauthorized welding.
13. Evidence of unauthorized alterations such as drilling, machining, grinding or other modifications.
14. On lug suspended models, check condition of suspension lug. Replace lug if damaged or cracked. Check to see that lock plate is in place on lug and screw holding it is tight. (All capacities see figure 7-20).
15. On 2-ton hoists, check to see that upper lock plate securing hook or lug bushing is in place and screws holding it are tight. Lubricate hook shank.
16. Check hook latch. Replace damaged or broken parts.
17. Inspect threaded upper suspension bushing. Verify keeper is in place against flat of suspension bushing, and securing screw and lock washer are in place and tight.

### C. INSPECT MOTOR, FRAME AND ELECTRICAL COMPARTMENT COVER.

1. Check to see that bolts securing motor to frame are tight. Also check for any visible damage to motor, such as a cracked end bell or dented stator housing. Replace damaged parts.
2. Check hoist frame for signs of visible damage. If frame shows evidence of fracture, the hoist should be disassembled and inspected for further signs of damage from possible overloading. Replace damaged parts.
3. Check for possible damage to electrical compartment cover. Be sure screws holding cover are tight.

### D. CHECK OIL LEVEL.

Remove oil level plug (fig. 4-1). If oil level is not even with bottom of tapped hole, add Automatic Transmission Fluid, DEXRON Type, to bring to proper level.

## 5-3. SIX-MONTH INSPECTION OR 500-750 HOURS OF OPERATION.

Hoist may be left suspended. Same as thirty day inspection plus the following:

a. **Inspect Electrical Controls.** Shut off power supply to hoist and remove electrical compartment cover from hoist. Use caution as some covers contain counterweights.

   1. Check all wiring and terminals. Insulation should be sound and terminals securely crimped to wires. Terminal screws should be tight and plug-type terminals completely mated. Replace terminals or wires as necessary.
   2. Check control circuit transformer for evidence of overheating. Replace if necessary.
   3. Check limit switch to see that wires are securely attached and mounting screws are tight.
   4. Check contactor solenoid coils and replace coils if they show evidence of overheating.
   5. Check control cable wire strain reliever to see that it is in good condition and securely attached to gear case cover. Replace rubber strain reliever grommets if damaged.

b. **Change Gear Case Oil.** See Section IV, paragraph 4-2.

c. **Relubricate Load Chain**. See Section IV, paragraph 4-3.

d. **Lubricate Upper Hook and Lower Block.** See Section IV, paragraph 4-4.

## 5-4. INSPECTION: 5000 HOURS “ON” TIME OR 5 YEARS ELAPSED TIME.

Hoist must be removed from overhead suspension.

a. **Disassemble Hoist into Subassemblies.** See Budgit Repair Center.

b. Motor shaft oil seal, sprocket shaft bearing, seal and all gaskets should be replaced.

c. **Inspect Load Brake and Overload Clutch.** Disassemble load brake (if equipped) and clutch assembly as outlined in paragraph 7-4. Friction discs should be discarded and replaced with new discs. Check load brake friction surfaces on flange, ratchet assembly and gear clutch cone. Replace parts if badly scored or worn. Check condition of pawl and ratchet assembly. If pawl, ratchet teeth or pawl spring are broken, damaged or badly worn, replace complete assembly. Check contact faces of load brake cam and gear clutch cone. Brake gear and pinion teeth should be inspected for wear or broken teeth. Clean parts thoroughly with an oil solvent before reassembly.

**NOTE: The overload clutch assembly should not be disassembled as it is preset at the factory to provide proper clutch pressure for a specific hoist capacity range. If there is evidence of the clutch slipping or wear or damage to the clutch components, the complete clutch assembly should be replaced or sent to an authorized Budgit Hoist Repair Station to be rebuilt and properly adjusted to factory specifications.**

d. I**nspect Sprocket and Intermediate Gears.**

   1. On 1 through 3 ton hoists, check condition of gear teeth on intermediate gear and pinion shaft assembly. Replace worn or damaged parts.
   2. Check condition of pockets on chain sprocket (all capacities). Replace worn or damaged parts.

**e.** **Inspect Motor Brake.** Check braking surfaces for wear and scoring. Replace badly worn or scored parts. Check spring studs and guide pins to make sure they are not bent or loose. Check coil shock mounts for deterioration and damage. Check air gap adjustment. (See 7-11c)

f. **Reassemble and Test Hoist.** Reassemble hoist from subassemblies following procedure outlined in paragraph 7-11. After assembly is complete, test hoist as outlined in paragraphs 7-12 and 7-13.

# SECTION VI - TROUBLE SHOOTING

| TROUBLE | PROBABLE CASE | REMEDY |
|---|---|---|
| **6-1. Hoist Will Not Operate.** | a. No power to hoist. | a. Check switches, circuit breakers and connections in power supply lines. Check power collectors. |
| | b. Wrong voltage. | b. Check voltage required on motor data plate against power supply. |
| | c. No control voltage. | c. Check transformer fuse. If blown, check for grounding and/or short in the pushbutton station. Check the transformer coil for signs of overheating. Replace transformer if burned out. Verify the transformer secondary is the same voltage as the coils to which it is connected. |
| | d. Loose or broken wire connections in hoist electrical system. | d. Shut off power supply, remove electrical cover from hoist and check wiring connections Also check connections in push button station and limit switches. |
| | e. Contactor assembly not functioning. | e. Check for burned out solenoid coil. See that the necessary jumper wires are properly installed. |
| | f. Starting switch burned out (single phase motor). | f. Replace burned out parts. |
| | g. Motor burned out. | g. Replace motor. On single-phase motors the starting switch may be burned out. |
| **6-2. Hook Moves in Wrong Direction.** | a. Reverse phasing on three-phase hoists. | a. Interchange any two of the three power supply line leads. Do not change green ground lead. Refer to Section II, par. 2-4. |
| | b. Hoist wired wrong. | b. Check wiring connections with appropriate wiring diagram. |
| | c. Starting switch not working correctly (single phase motor). | c. Check for correct starting switch part number and function. Replace if necessary. |
| **6-3. Hook Will Raise But Not Lower.** | a. "DOWN" electrical circuit open | a. Check for loose connections. See that necessary jumper wires are properly installed on contactor. Check limit switch condition and electrical connections. |
| | b. Contactor assembly not functioning. | b. See that necessary jumper wires are properly installed. Verify that the contactor armatures are free to move. If binding occurs replace contactor. Check for burned out contactor coils. |
| | c. Push Button Inoperative. | c. Check push button contacts and wires. |
| | d. Load Brake locked up and overload clutch slipping. | d. Consult Authorized Budgit Hoist Repair Station. |
| **6-4. Hook Will Lower But Not Raise.** (continues on next page) | a. Excessive load, causing overload clutch to slip. | a. Reduce loading to rated load of hoist, as shown on nameplate. |
| | b. Overload clutch out of adjustment. | b. Test hoist and replace clutch if hoist will not lift rated load. |
| | c. "UP" electrical circuit open. | c. Check for loose connections. See that necessary jumper wires are properly installed on contactor. Check limit switch condition and electrical connections. |

# SECTION VI - TROUBLE SHOOTING

| TROUBLE | PROBABLE CASE | REMEDY |
|---|---|---|
| **6-4. Hook Will Lower But Not Raise.** (continued) | d. Contactor assembly not functioning. | d. See that necessary jumper wires are properly installed. Verify that the contactor armatures are free to move. If binding occurs replace contactor. Check for burned out contactor coils. |
| | e. Push button inoperative. | e. Check push button contacts and wires. |
| **6-5. Hoist Will Not Lift Rated Load.** | a. Low voltage. | a. See that power supply is same voltage listed on motor data plate. Check size of power supply lines. Refer to fig. 2-1. |
| | b. Overload clutch out of adjustment. | b. Remove and replace clutch assembly. Refer to Section IV, par. 7-2 and 7-4. |
| | c. Motor brake not releasing. | c. Check brake components. Refer to Section VII, par 7-2.d, 7-2.e. |
| **6-6. Excessive Drift When Stopping.** | a. Excessive load. | a. Reduce loading to rated load, shown on nameplate. |
| | b. Motor brake not holding. | b. Check brake components. Refer to Section VII, par. 7-2.d. |
| | c. Motor brake not setting due to insufficient plunger air gap. | c. Adjust air gap. Refer to Section VII, par. 7-11.c. |
| | d. Load brake not holding. | d. Remove load brake and inspect parts. Refer to Section V, par. 5-4. |
| **6-7. Hoist Motor Overheats.** | a. Excessive load. | a. Reduce loading to rated load of hoist, shown on nameplate. |
| | b. Excessive duty-cycle. | b. Reduce frequency of lift. |
| | c. Excessive "jogging." | c. Reduce frequency of jogs. |
| | d. Wrong voltage. | d. Check voltage rating on motor data plate against power supply. |
| | e. Starting switch on single-phase motors not opening starting winding. | e. Refer to Section VII, par. 7-9.b. (3) (b). Inspect Switch. |
| | f. Damaged motor or worn bearings in motor or hoist frame. | f. Disassemble hoist and inspect for worn or damaged parts. |
| | g. Motor brake not releasing. | g. Check brake components. Refer to Section VII, par. 7-2.d. |

# SECTION VII - LOAD BRAKE AND OVER LOAD CLUTCH

## 7-1. REBUILD OF LOAD BRAKE AND OVERLOAD CLUTCH ASSEMBLY.

(If hoist is equipped with overload clutch less load brake, see 7-1A.)

### A. DISASSEMBLY.

1. Place load brake and clutch assembly, flange up, in a vise equipped with brass or copper jaw plates to protect pinion gear teeth. Remove snap ring of load brake shaft (fig. 7-21).

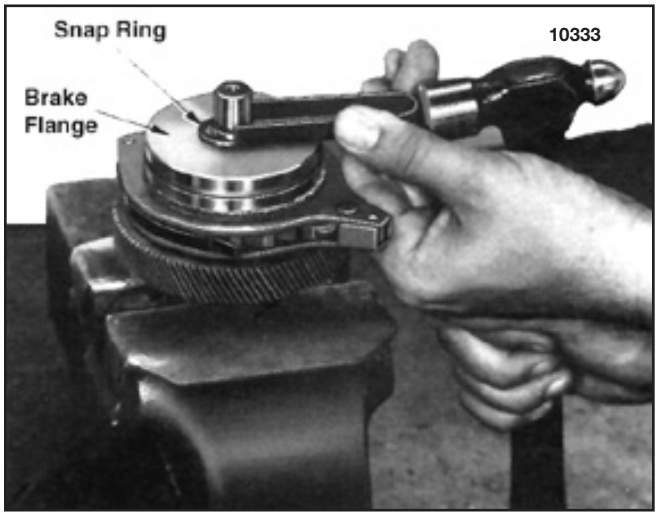



**Figure 7-21. Removing Snap Ring from Load Brake Shaft**

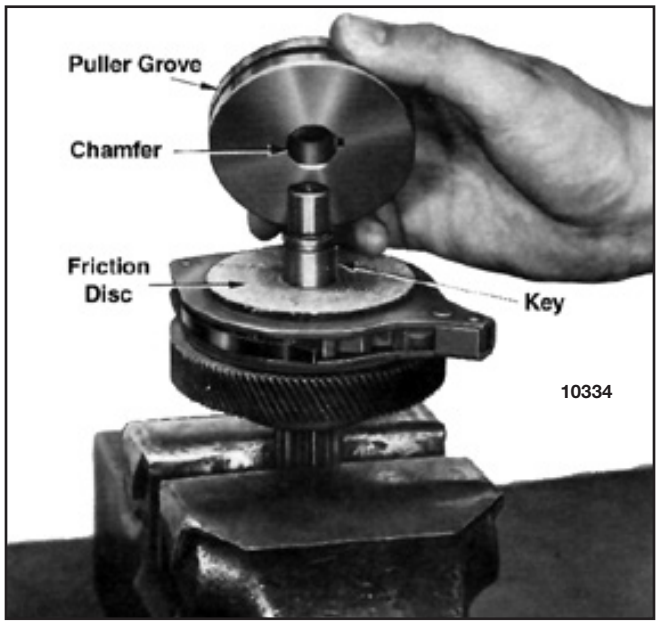



**Figure 7-22. View Showing Load Brake Flange Removed**

2. Using a puller tool, remove brake flange from shaft. A groove is provided around outer diameter for this purpose. See figure 7-22. Remove key from shaft and lift off 2 friction discs, and the pawl and ratchet assembly (fig. 7-23).

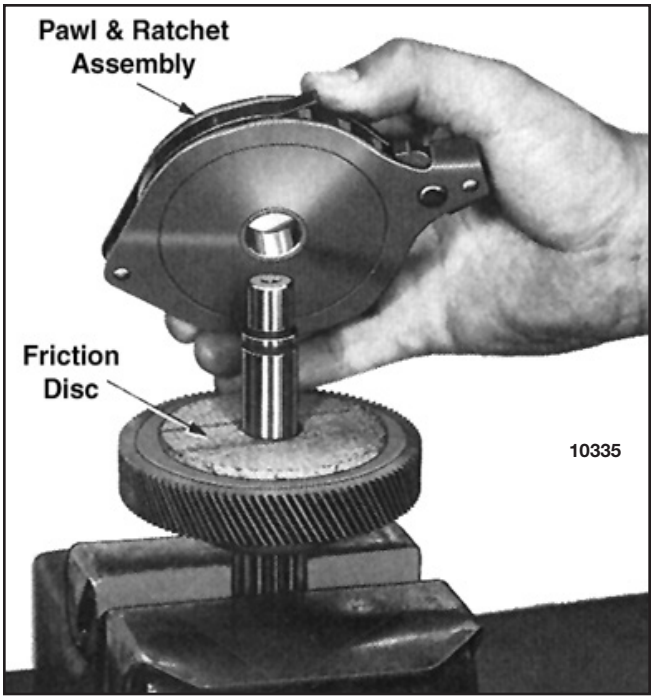



**Figure 7-23. Removing Pawl and Ratchet Assembly from Load Brake Shaft**

3. Remove load brake gear and overload clutch assembly from output pinion shaft. Pull the spring from its recess in clutch cone (fig. 7-24) but do not further disassemble gear and clutch assembly. See "NOTE" below.

**NOTE: Disassembly of the load brake gear and overload clutch assembly (fig. 7-24) is not recommended. Clutch pressure is preset by the factory at assembly to provide the correct torque to allow the clutch to refuse loads within a specified range (150% of rated load to 200% rated load). It is suggested whenever there is a need to repair or readjust the gear and clutch assembly that it be sent to an authorized Budgit Hoist Repair Station where adequate tools, fixtures and appropriate test equipment is available.**

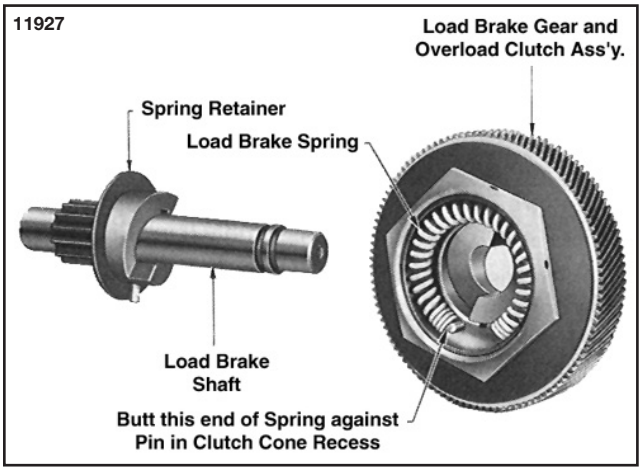



**Figure 7-24. Load Brake Gear and Overload Clutch Assembly Removed from Load Brake Shaft Showing Brake Spring Installed in Clutch Cone**

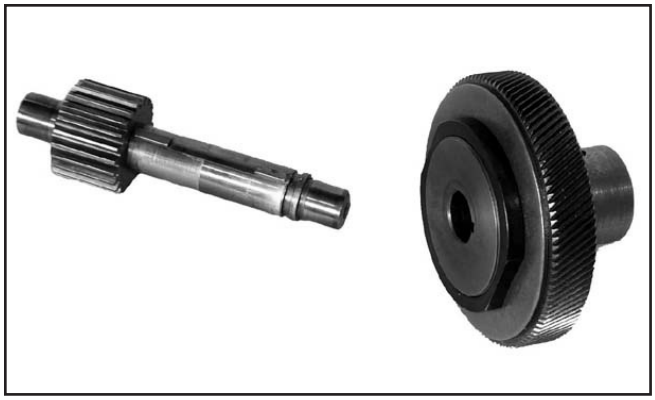


**Figure 7-24a.**

4. The load brake pawl and ratchet is a riveted assembly and is not to be disassembled.

### B. REASSEMBLY.

1. Before assembly, all parts should be cleaned and inspected to determine their serviceability. Replace parts that are worn or damaged.
2. Reassemble load brake parts following a reverse procedure of the disassembly steps listed above, observing the assembly steps (3) through (6) below.
3. Before installing spring in its recess in center of clutch cone (fig. 7-24) apply a good grade of ball bearing grease to inside of recess. Spring must be positioned exactly as illustrated, abutted against pin.
4. When installing pawl and ratchet assembly on load brake shaft, be certain that teeth on ratchet face are in the same direction as shown in fig. 7-23. The ratchet assembly should rotate freely when turned counterclockwise and the pawl should engage ratchet teeth when unit is turned clockwise.
5. When installing brake flange position it with chamfer facing friction disc, figure 7-22.
6. The brake spring must be pre-loaded at assembly to a torque of from 6 to 10 lb. ft. when used with yellow (color code) spring and a torque of 10 to 14 lb. ft. when used with plain (no color code) spring. (See Section IX for proper spring). This is accomplished using a plumber's strap wrench to wind (rotate) load brake gear to set up spring (fig. 7-25) while pressing brake flange into place using an arbor press. Clamp pinion end of shaft into a portable vice to keep brake from rotating in press. Use brass or copper jaw plates on vise to protect pinion gear teeth. Wind gear counterclockwise (viewing brake from flange end) with strap wrench and press down on flange until snap ring groove in shaft is exposed allowing snap ring to be installed. Use extreme care not to over wind spring as yield will result and final spring torque will be reduced. Do not wind gear beyond point necessary to install snap ring in groove.

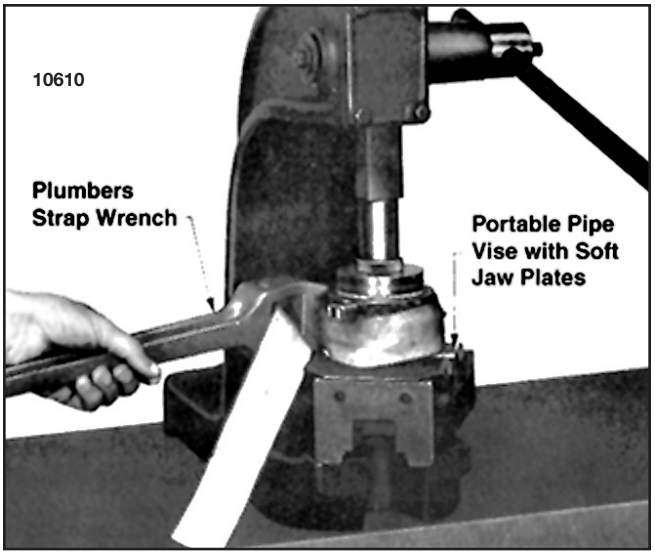



**Figure 7-25. Winding Load Brake Gear Using a Strap Wrench to Set Up Load Brake Spring**

## 7-1A. OVERLOAD CLUTCH WITHOUT LOAD BRAKE.

Disassembly of the clutch gear and overload clutch assembly (fig 7-24a) is not recommended. Clutch pressure is preset at the factory at assembly to provide the correct torque to allow the clutch to refuse loads within a specified range (predetermined range set by the manufacturer). It is suggested whenever there is a need to repair or readjust the overload clutch assembly that it be sent to an authorized Budgit Hoist Repair Station where adequate tools, fixtures, and appropriate test equipment is available.

**⚠ WARNING**

**TESTING OF MECHANICAL OVERLOAD PROTECTION**

**Before using, all altered, repaired or used hoists that have not been operated for the previous 12 months shall be tested by the user for proper operation. First test the unit without a load and then with a light load of 22.7 kg. (50 lb.) times the number of load supporting parts of load chain to be sure that the hoist operates properly and that the brake holds the load when the control is released. Next test with a load of *125% of rated capacity. In addition, hoists in which load sustaining parts have been replaced should be tested with *125% of rated capacity by or under the direction of an appointed person and written report prepared for record purposes. After this test, check that the Load-limiter functions.**

***If Load-limiter prevents lifting of a load of 125% of rated capacity, reduce load to rated capacity and continue test.**

**NOTE: For additional information on inspection and testing, refer to Code B30.16 "Overhead Hoists" obtainable from ASME Order Department, 22 Law Drive, Box 2300, Fairfield, NY 07007-2300, U.S.A.**

## 7-2. AIR GAP ADJUSTMENT.

Brake air gaps are factory adjusted to .100". As friction discs wear the air gap will increase. When the gap reaches .200" it will need to be readjusted to .100".

1. Loosen jam nut (10N).
2. Turn adjusting screw (10) CW until .100" gap is reached (see Fig. 1).
3. Retighten jamb nut.
4. Check air gap again.

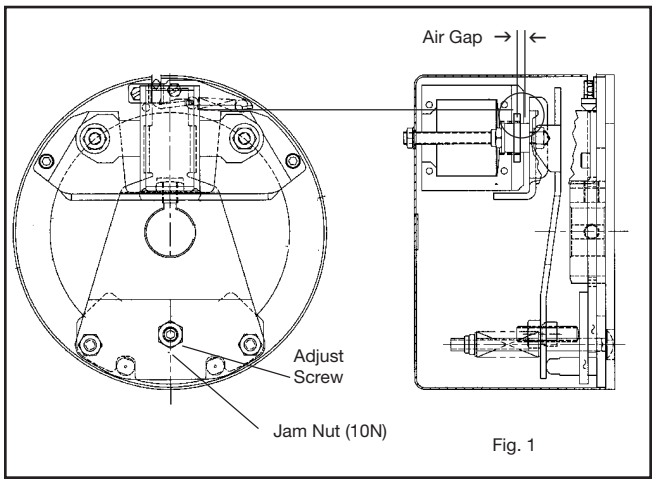
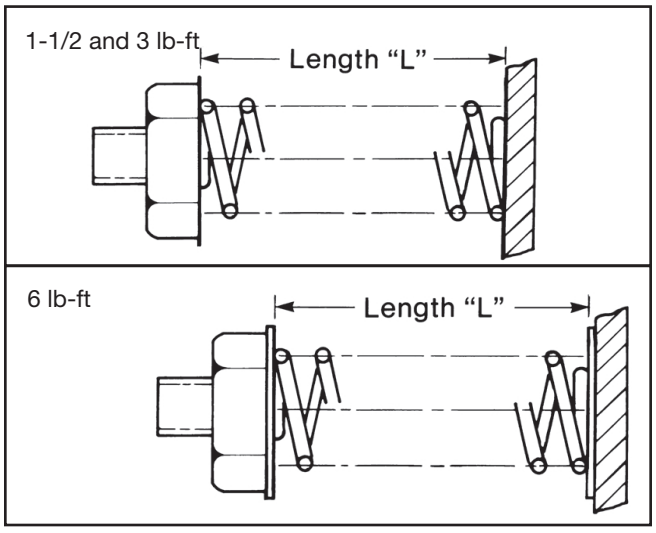


Fig. 1

### TORQUE ADJUSTMENT

The brake is factory set for nominal rated torque. No further adjustment to increase torque may be made. The approximate compressed torque spring height is shown below. Torque reduction may not exceed 1 full turn in the CCW direction (1.5 lb-ft brake cannot be reduced). Note that the spring measurement for the 6 lb-ft spring is from inside the shoulder washer.

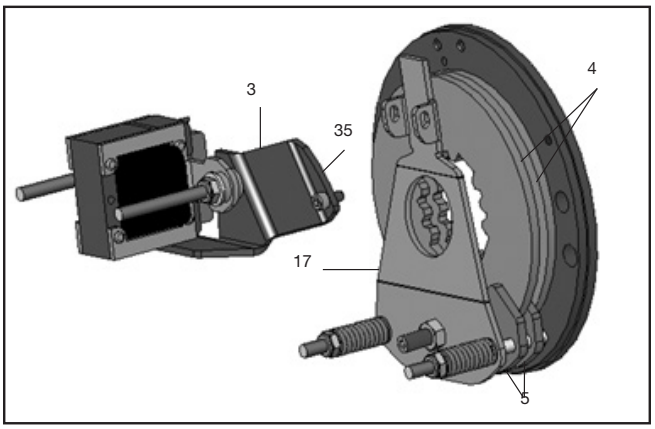
| Brake Torque (lb-ft) | Length "L" (in.) | Max Torque Reduction (ccw turn of torque nut) | % Reduction |
|---|---|---|---|
| 1.5 | 1.102 | 0 | 0 |
| 3 | .954 | 1 | 15 |
| 6 | 1.286 | 1 | 25 |




### FRICTION DISC REPLACEMENT

Friction disc(s) should be replaced when the wear area is 3/32" thick or less.

1. Remove the two brake mounting screws and lift the brake assembly from the hub / motor.
2. Remove the two support bracket screws (35), and lift the brake and solenoid assembly (3) off the brake.
3. Lift the lever arm (17) forward and slide the friction disc(s) out of the brake assembly.
4. Insert new friction disc(s) under the stationary disc (5). If brake has two friction discs align the center spline holes with each other.
5. Align the brake and friction disc assembly on the hub (16) and slide onto the motor. Insert and tighten the two brake mounting screws (15-20 lb-ft).

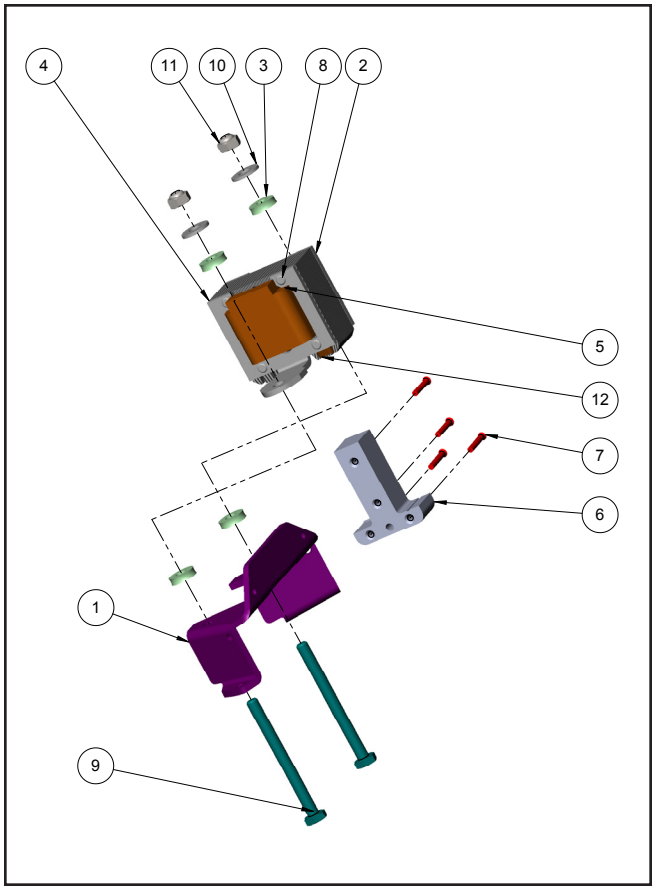



6. Reposition the support bracket assembly (3) on the brake, and retighten the two support bracket screws (35), (52 lb-in).

**Note: Air gap readjustment will be required after disc replacement.**

### COIL REPLACEMENT

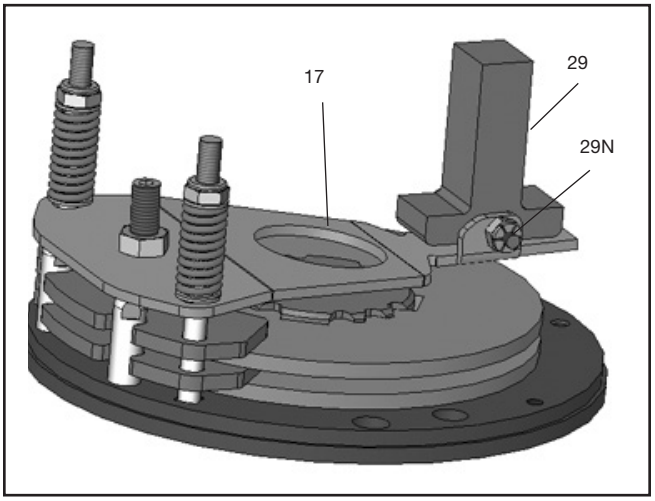
1. Remove the two support bracket screws (35), and lift the bracket and solenoid assembly (3) off the brake.
2. Remove the plunger guide (140) from the inside of the coil.
3. Remove the thru-bolt (160) from the leadwire side of the coil by backing off the lock-nut (210). Slide the bolt, shock mount pads and flat washer out of the way.
4. Remove the coil (12) from the solenoid frame (79) by pushing down on the coil locking tab on the side opposite the leadwires. Push the coil out of the frame.
5. Insert the new coil into the solenoid frame in reverse of the steps of removal. Insert the new plunger guide (140) into the coil, locking tabs first.
6. Position a shock mount pad (150) on both sides of the solenoid mounting bracket, and reinsert the thru-bolt (160) through the shock pads and bracket.
7. Slide a flat washer (170) over the bolt, and tighten the locknut down until the shock pads begin to flatten.
8. Position the solenoid and bracket assembly (3) over the plunger (29) and slide into place. Tighten the bracket mounting screws (35) to 52 in-lb.
9. Reassemble brake motor by following steps 5-7 of the brake mounting procedure.




| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 45097339 | LEVER ARM | 1 |
| 2 | 45097342 | SOLENOID SIDE FRAME | 2 |
| 3 | 45097343 | SHOCK MOUNT PAD | 4 |
| 4 | 45097340 | SOLENOID FRAME | 1 |
| 5 | 45097351 | COIL | 1 |
| 6 | 45097341 | PLUNGER | 1 |
| 7 | 45097344 | PLUNGER PIN | 4 |
| 8 | 45097345 | RIVIT | 4 |
| 9 | 10853807 | HIGH STRENGTH HEX HEAD BOLT | 2 |
| 10 | N0798 | WASHER FLAT | 2 |
| 11 | 10327306 | NUT | 2 |
| 12 | 45097346 | PLUNGER GUIDE | 1 |

## SOLENOID REPLACEMENT

1. Remove the two support bracket screws (35), and lift the bracket assembly (3) off the brake.
2. Remove the plunger guide (140) from the inside of the coil.
3. Remove both thru-bolts (160) from the solenoid assembly (79).
4. Remove the coil (12) from the solenoid frame (79) by pushing down on the coil locking tab on the side opposite the leadwires. Push the coil out of the frame.
5. Insert the coil into the new solenoid frame in reverse of the steps of removal. Insert the new plunger guide (140) into the coil, locking tab first.
6. Position the new shock mount pad (150) on both sides of the solenoid mounting bracket, and reinsert the tap-bolts (160) through the shock pads and bracket.
7. Slide the flat washers (170) over the bolt, and tighten the locknut down until the shock pads begin to flatten.
8. Remove the plunger nut (29N) and screw (29S), and lift plunger (29) from lever arm (17). Install the new plunger to the lever arm using the new screw and nut provided. Tighten to 40 in-lb.
9. Position the solenoid and bracket assembly (3) over the plunger (29) and slide into place. Tighten the bracket mounting screws (35) to 50 in-lb.
10. Reassemble brake to motor by following steps 4-7 of the brake mounting procedure.




| Two Piece Chain Stop | |
|---|---|
| **Chain Size** | **Number of Chain Links From End** |
| 1/4" Wire Dia. | 12 Links (9½") |
| 5/16" Wire Dia. | 10 Links (9") |
| **Paddle Limit Switch** | |
| 1/4" Wire Dia. | 8 Links |
| 5/16" Wire Dia. | 8 Links |

## WIRING HOOK-UP

Before installing hoist, connect wiring to electrical controls in accordance with applicable wiring diagram. Wires are coded and/or numbered to agree with wiring diagrams.

# TROUBLESHOOTING

| Coil Failure | |
|---|---|
| **Supply Voltage Cause** | **Supply Voltage Correction** |
| Line voltage >110% of coil rating | Reduce voltage or replace with proper rated coil |
| Excessive voltage drop during inrush time | Increase current rating of power supply |
| **Wiring Cause** | **Wiring Correction** |
| Leadwires interfering with plunger pull-in | Reroute wiring away from plunger and other moving components |
| Coil leadwire shorted to ground | Replace coil or leadwire and protect with wire sleeving |
| **Solenoid Assembly Cause** | **Solenoid Assembly Correction** |
| Plunger not seating flush against solenoid frame | Loosen solenoid mounting nuts and reposition frame to allow full face contact |
| Excessive solenoid/plunger wear at mating surface | Replace solenoid assembly |
| Broken shading coils | Replace solenoid assembly |
| **Worn Parts Cause** | **Worn Parts Correction** |
| Excessive wear of solenoid link bolt | Replace link bolt; also inspect plunger thru-hole for elongation |
| Plunger guide worn down and interfering with plunger movement | Replace guide |
| **Application Cause** | **Application Correction** |
| Machinery cycle rate is exceeding brake rating | Reduce brake cycle rate or use alternate control method |
| High ambient temperature (>110º F) and thermal load exceeding coil insulation rating | Use Class H rated coil and/or find alternate method of cooling brake |
| Brake coil wired with windings of an inverter motor or other voltage/current limiting device | Wire coil to dedicated power source with instantaneous coil rated voltage |
| **Miscellaneous Cause** | **Miscellaneous Correction** |
| Wrong or over tightened torque springs | Replace with proper spring or refer to installation section for proper spring height |
| Excessive air gap | Reset, refer to Airgap Adjustment |

| Excessive Wear/Overheating | |
|---|---|
| **Air Gap Cause** | **Air Gap Correction** |
| Low solenoid air gap | Reset air gap (refer to Air Gap Adjustment) |
| **Cycle Rate Cause** | **Cycle Rate Correction** |
| Brake "jogging" exceeding coil cycle rate | Reduce cycle rate or consider alternate control method |
| Thermal capacity is being exceeded | Reduce cycle rate, use alternate control method or increase brake size |
| **Alignment Cause** | **Alignment Correction** |
| Brake endplate not concentric to motor C-Face | Motor resister must be within .004" on concentricity |
| Motor shaft runout is excessive | Must be within .002"; runout; consult motor manufacturer |
| **Worn Parts Cause** | **Worn Parts Correction** |
| Friction disc excessively worn (disc can wear to 1/2 original thickness or .093") | Replace friction discs |
| Endplate, stationary disc or pressure plate warped | Replaced warped or worn component |
| Linkages worn | Replace all worn components |
| Motor shaft endfloat excessive | Endfloat must not exceed .020"; consult motor manufacturer |
| **Hub Cause** | **Hub Correction** |
| Burr on hub interfering with disc "float" | File off burr |
| Set screw backed out and interfering with disc | Retighten set screw; use Loctite® 680 to help secure |
| **Miscellaneous** | **Miscellaneous** |
| Wiring is restricting disc pack movement | Reroute wiring |
| Excessive stop time (2 seconds or greater) | Increase brake size/torque or use alternate control method |
| High Ambient temperature (in excess of 110°F) | Reduce cycle rate or use alternate method of cooling |

## 7-3. TESTING HOIST.

a. General. After completion of reassembly and before placing hoist in service, hoist should be tested to insure safe operation. To test: suspend hoist from an overhead supporting member of sufficient strength to carry twice rated load; connect to a power supply of the specified voltage (see data plate attached to motor); and perform the following checks and adjustments.

b. Check For Correct Control Operation. Refer to Section II, paragraph 2-4. d, under “Warning.”

c. Check Upper and Lower Limit Stop Operation (paddle limit). To determine if upper and lower limit stop functions properly, make the following checks while operating hoist with push button control and actuating the limit lever by hand:

1. Depress “H” push button and with chain running in raise direction, pull down on end of limit lever at tail chain side of hoist (left side facing cover end). The “UP” limit switch should cut off power, causing the hoist to stop.
2. Depress “I” push button and with chain running in lowering direction, push up on same end of limit lever. The “DOWN” limit switch should cut off power, causing the hoist to stop.
3. If hoist does not stop in both travel directions, check for improper wiring. Refer to par. 6-2 and appropriate wiring diagram. If wiring is correct, check to see that limit switch is correctly installed.
4. As a final check, operate hoist (no load) in the lowering direction and allow tail chain limit actuator to trip limit lever.

d. Hook should stop. Repeat check in hoisting direction and allow lower block to trip limit lever. Hook should stop.

e. Check Hoist With Rated Load. Attach rated load to lower hook and check hoist operation. If hoist does not lift rated load, refer to par. 7-13.

1. Operate hoist to raise load. When control is released, hoist should instantaneously stop and hold load at that level.
2. Operate hoist to lower load a short distance, then release control. Hoist should stop instantaneously and hold load at that level.
3. If hoist does not stop or hold load refer to Section VI.

## 7-13. TEST PROCEDURE FOR CHECKING OPERATION OF OVERLOAD CLUTCH.

a. General. The overload clutch must be tested using known weights. The following prerequisites (par. (1) through (4)) must be strictly observed in performing this test.

1. A qualified person shall determine before testing, that all structures supporting the hoist are adequately strong to with stand the test load of 200 percent of rated hoist load, whether hoist is tested in installed position or moved to a designated test facility.
2. Loads used for testing must be accurately known.
3. Test shall be made only by a qualified operator thoroughly familiar with the hoist and the purpose of the test.
4. Provide adequate and proper rigging to insure test loads are securely attached, properly balanced, and will lift level.

b. Test Procedure. With the above prerequisites satisfied and hoist properly connected to electrical power, proceed with the test as follows:

1. Using a known load equal to rated load of hoist, operate hoist to lift load. Raise load high enough to be certain the entire load is freely suspended. Clutch should not slip at rated load. If hoist does not lift rated load, clutch requires adjustment. Refer to Section V, par. 5-4. c.
2. Increase load to 200 percent rated load and operate hoist to lift the load. Clutch must slip, causing the hoist to refuse to lift the load. If hoist lifts this overload, the overload clutch is out-of-adjustment and must be readjusted. Refer to Section V, par. 5-4. c.
3. If clutch slips as required in step (2) above, continue to run hoist (clutch slipping-hoist refusing to lift load) for five (5) cycles of one (1) second each.
4. Remove excess weight to return the load to rated hoist load. Lift rated load one final time to be certain that the clutch does not slip and that the hoist lifts the rated load.

**⚠ WARNING**

**DO NOT LIFT MORE THAN RATED LOAD EXCEPT FOR TEST PURPOSES**

**NOTICE**

**THIS EQUIPMENT MUST BE EFFECTIVELY GROUNDED ACCORDING TO THE NATIONAL ELECTRIC CODE, ARTICLE 250, 610-61 AND OTHER APPLICABLE CODES.**

# SECTION XI - REPAIR PARTS LIST

**⚠ WARNING**

Using “Commercial” or other manufacturer’s parts to repair the Budgit Hoists may cause load loss.

**TO AVOID INJURY:**

Use only Budgit supplied replacement parts. Parts may look alike but Budgit parts are made of specific materials or processed to achieve specific properties.

PARTS STAR™
BY COLUMBUS McKINNON

## ORDERING INSTRUCTIONS

The following information must accompany all correspondence orders for replacement parts:

1. Hoist Model Number from identification plate.
2. Serial number of the hoist stamped below identification plate.
3. Voltage, phase, hertz from the identification plate.
4. Length of lift.
5. Part number of part from parts list.
6. Number of parts required.
7. Part name from parts list.

**NOTE: When ordering replacement parts, it is recommended that consideration be given to the need for also ordering such items as gaskets, fasteners, insulators, etc. These items may be damaged or lost during disassembly or just unfit for future use because of deterioration from age or service.**

This section contains complete replacement parts information for your new Budgit Man Guard™ Electric Hoist. The parts are grouped and illustrated in exploded view photos to permit easy identification. Each part in an illustration is keyed by reference number to a corresponding parts table. In the table will be found the part number, description and quantity required.

When ordering replacement parts it will be necessary that you include, with your order, the part number of parts required, plus, hoist catalog number and model number, which will be found on the hoist nameplate attached to hoist. For motors, complete motor nameplate data is required. Complete inspection, maintenance and overhaul service is available for Budgit Man Guard™ Electric Hoists at any of the Authorized Repair Stations. All are staffed by qualified factory-trained servicemen; have authorized testing equipment; and stock a complete inventory of genuine replacement parts.

**The numbers assigned to the parts of our various assemblies in our parts lists are not the part numbers used in manufacturing the part. They are identification numbers, that when given with the hoist serial number, permit us to identify, select or manufacture, and ship the correct part needed for any hoist.**

# 1/4 TO 1 TON WITH LIMITED ROTATION UPPER HOOK SUSPENSION

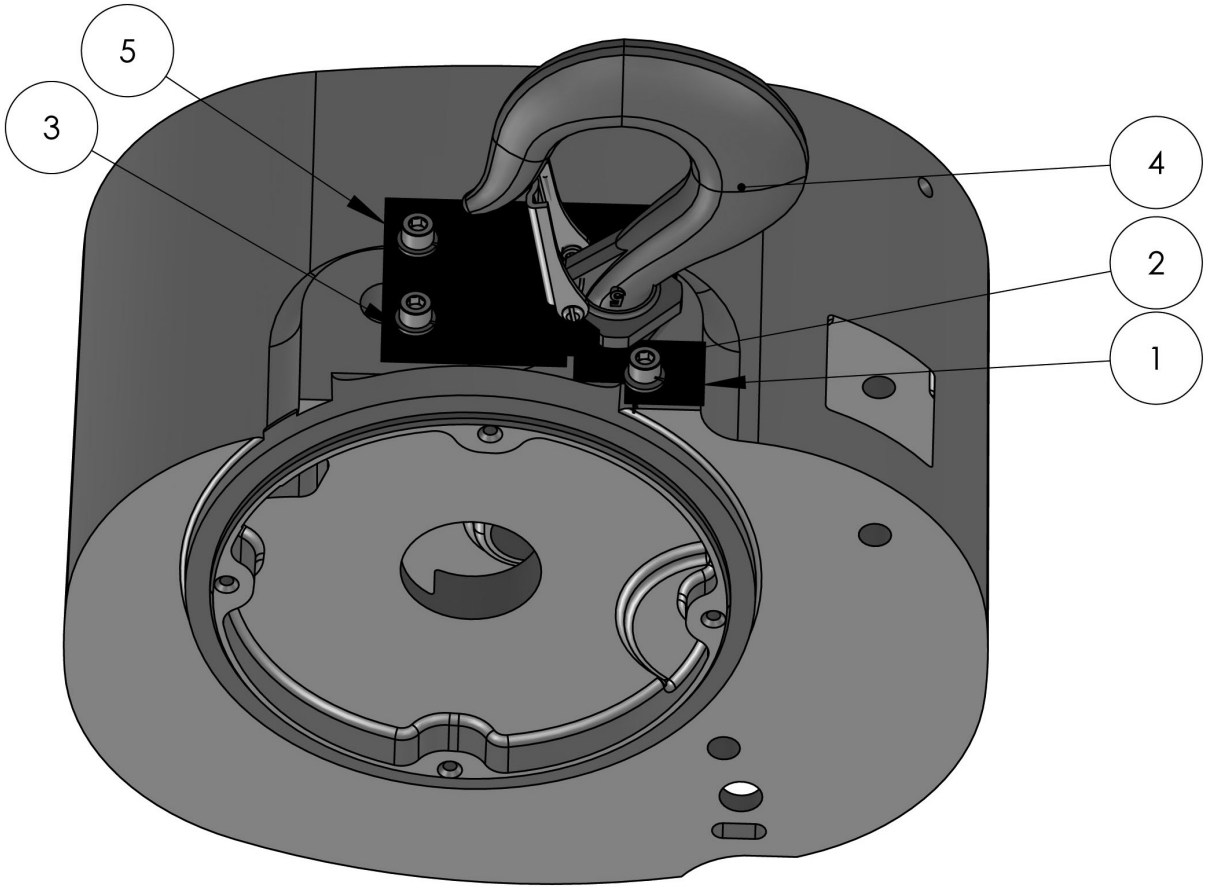



**Figure 9-2A. UPPER SUSPENSION, 1/4 TO 1 TON HOOK**

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 11819702 | "L" KEEPER | 1 |
| 2 | 10392022 | SHCS 1/4-20 X 3/4 | 3 |
| 3 | 10095701 | 1/4 LOCK WASHER | 3 |
| 4 | 22736928 | LIMITED ROTATION UPPER HOOK SUSPENSION | 1 |
| 5 | 11824301 | ANTI-ROTATION BRACKET | 1 |

To enable us to expedite your parts order, always give Model and Catalog Number and Electric Current of Hoist. (See nameplate.)

# 1/4 TO 1 TON LUG SUSPENSION

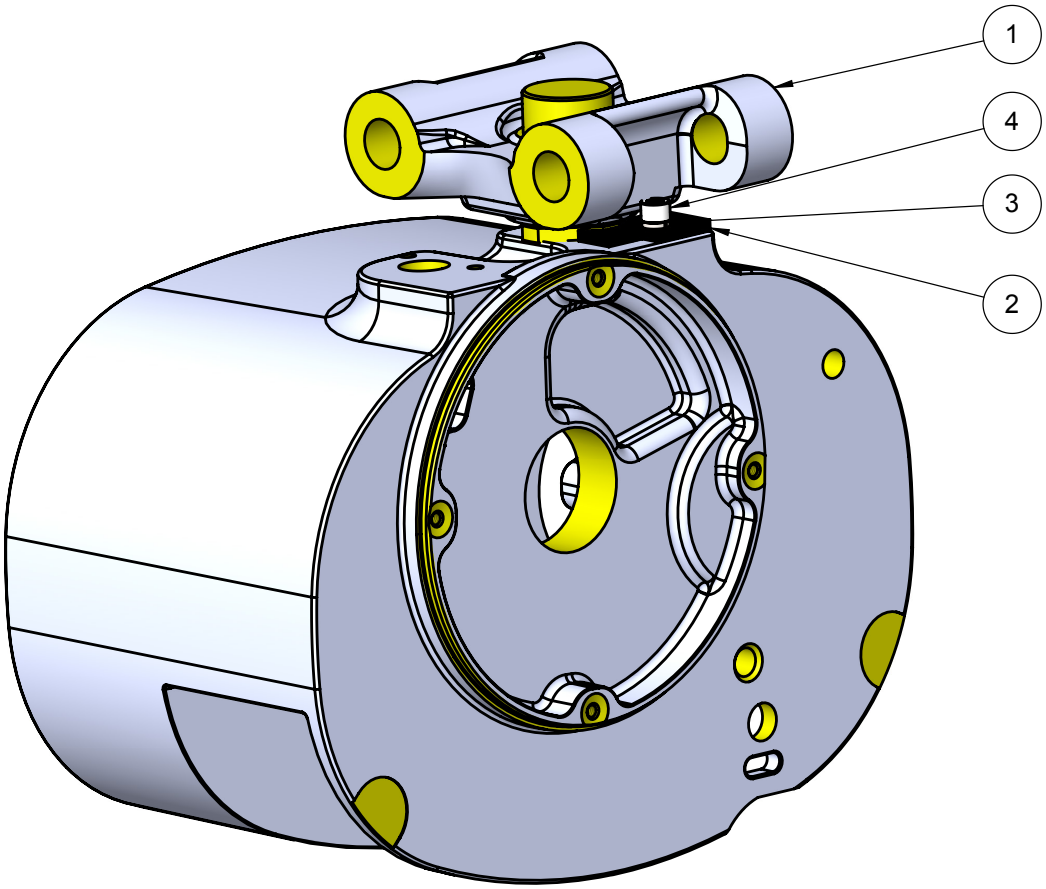



**Figure 9-2B. UPPER SUSPENSION, 1/4 TO 1 TON HOOK**

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 23456903 | LUG SUSPECION ASSY 1/8 1T | 1 |
| 2.0 | 11819702 | L KEEPER | 1 |
| 3.0 | 10095701 | 1/4 LOCK WASHER | 1 |
| 4.0 | 10392022 | SHCS 1/4-20 X 3/4 | 1 |

# 2 TON RIGID HOOK SUSPENSION

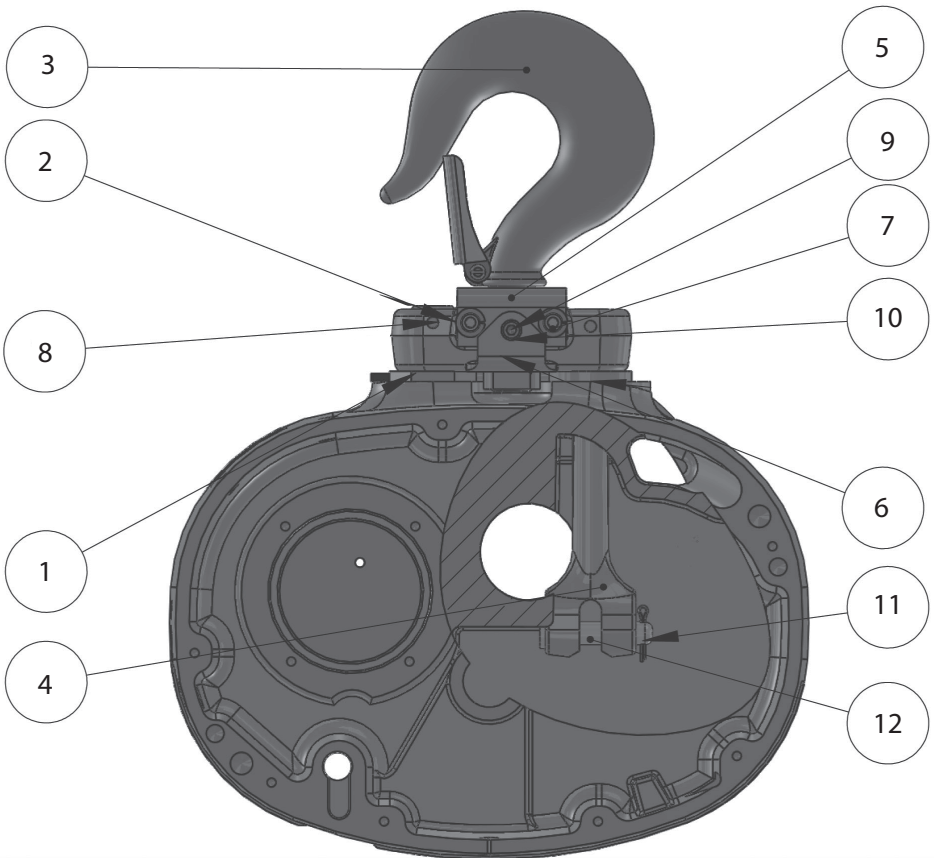



**Figure 9-2C. UPPER SUSPENSION, 2 TON HOOK**

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 11819702 | L KEEPER | 1 |
| 2 | 10095701 | LOCK WASHER | 1 |
| 3 | 21648701 | UPPER HOOK ASSEMBLY | 1 |
| 4 | 33321701 | 2 TON UPPER BLOCK ASSEMBLY | 1 |
| 5 | 10764501 | BUSHING LOCK | 1 |
| 6 | 10764801 | LOCK PLATE | 1 |
| 7 | NO14 | SHCS #10-24 1/2 | 2 |
| 8 | 10763901 | PIN GROOVED STRAIGHT F | 4 |
| 9 | 10381011 | SHCS #10-24 5/16 | 1 |
| 10 | 10404510 | LOCK WASHERS | 3 |
| 11 | 10036205 | COTTER PIN | 1 |
| 12 | 10731901 | PIN 3/8 DIA X 1-7/8 | 1 |
| 13 | 10392022 | SHCS 1/4-20 X 3/4 (NOT SHOWN) | 1 |

To enable us to expedite your parts order, always give Model and Catalog Number and Electric Current of Hoist. (See nameplate.)

# 2 TON LUG SUSPENSION

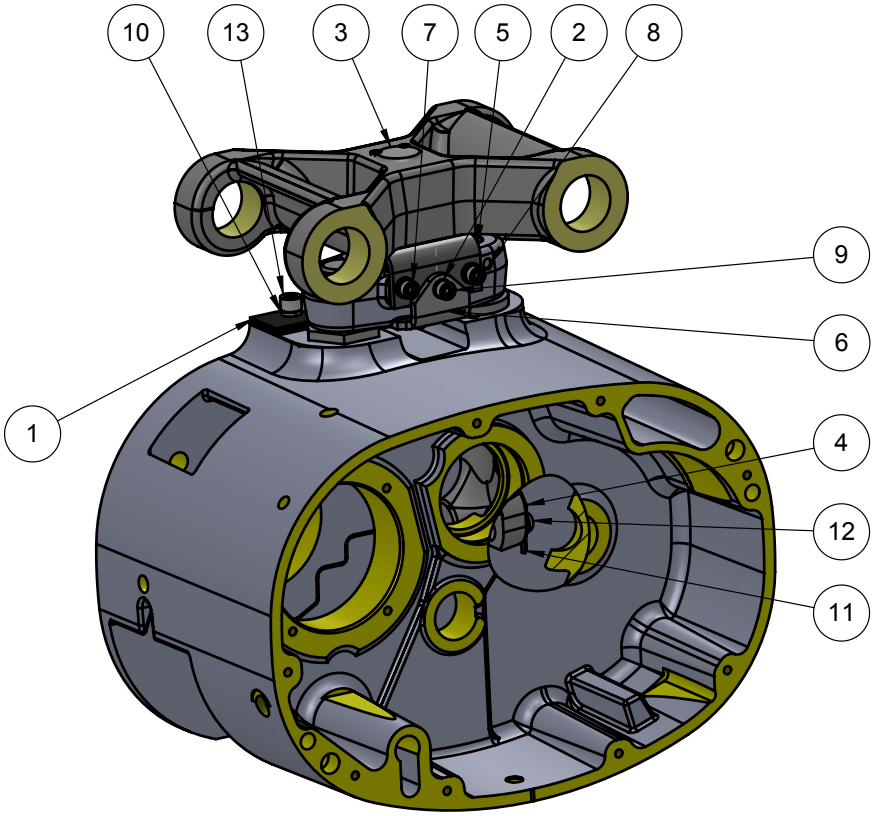



**Figure 9-2D. UPPER SUSPENSION, 2 TON LUG**

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 11819702 | L KEEPER | 1 |
| 2 | 10404510 | LOCK WASHER | 1 |
| 3 | 32560601 | SUSPENSION BRACKET ASSEMBLY | 1 |
| 4 | 33321701 | 2 TON UPPER BLOCK ASSEMBLY | 1 |
| 5 | 10764501 | BUSHING LOCK | 1 |
| 6 | 10764801 | LOCK PLATE | 1 |
| 7 | NO14 | SHCS #10-24 1/2 | 2 |
| 8 | 10763901 | PIN GROOVED STRAIGHT | 4 |
| 9 | 10381011 | HEX SOCKET HEAD | 1 |
| 10 | 10095701 | LOCK WASHERS | 3 |
| 11 | 10036205 | COTTER PIN | 1 |
| 12 | 10731901 | PIN 3/8 DIA X 1-7/8 | 1 |
| 13 | 10392022 | SHCS 1/4-20 X 3/4 (NOT SHOWN) | 1 |

# 3 TON UPPER LIMITED ROTATION HOOK SUSPENSION

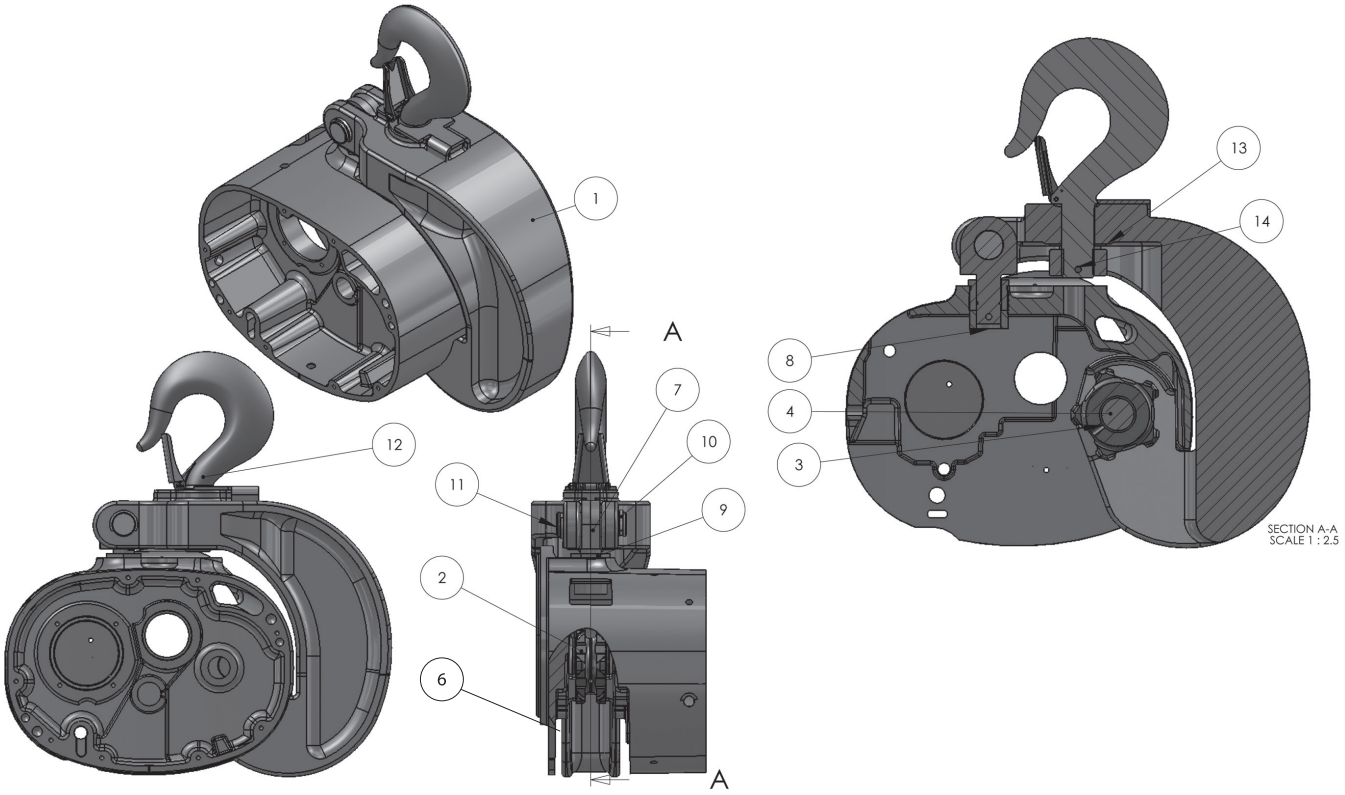



**Figure 9-2E. UPPER SUSPENSION, 3 TON HOOK**

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 42863003 | HANGER BRACKET 3 TON | 1 |
| 2 | 21556502 | SPROCKET | 1 |
| 3 | 10614106 | BUSHING DU | 2 |
| 4 | 11273002 | PIN IDLER SPROCKET | 1 |
| 5 | 10171682 | PIN ROLL SLOTTED SPRINT (NOT SHOWN) | 1 |
| 6 | 10346106 | WASHER FLAT | 2 |
| 7 | 11272602 | CONNECTING ROD | 1 |
| 8 | 11565401 | ROUND NUT | 1 |
| 9 | 10764301 | HEX BUSHING | 1 |
| 10 | N08106 | RETAINING RING EXTERNAL OPEN | 2 |
| 11 | 11272801 | CONNECTING PIN HANGER | 1 |
| 12 | 22502901 | LIMITED ROTATION HOOK AND NUT ASSEMBLY | 1 |
| 13 | 10816508 | BEARING THRUST WASHER DU | 1 |
| 14 | 10099658 | PIN GROOVED STRAIGHT A | 1 |

To enable us to expedite your parts order, always give Model and Catalog Number and Electric Current of Hoist. (See nameplate.)

# UT UPPER LUG SUSPENSION

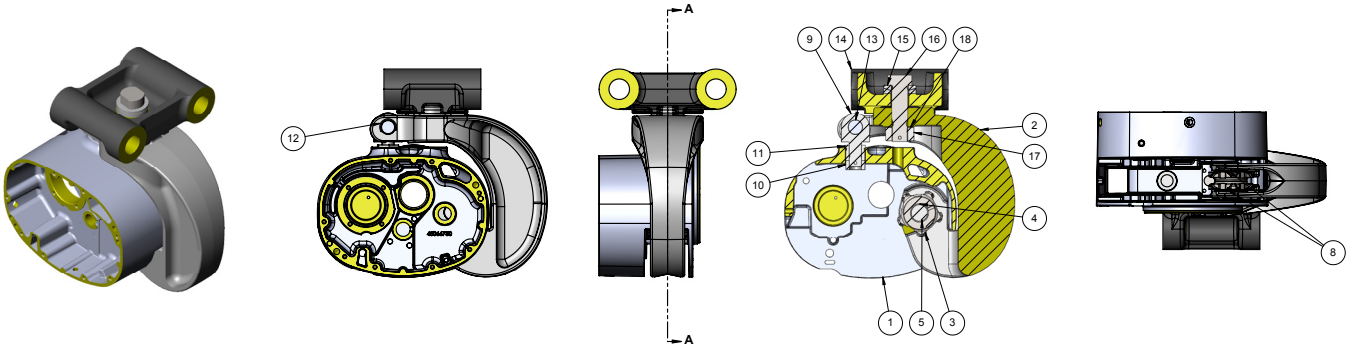



**Figure 9-2F. UPPER LUG SUSPENSION**

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 45142650 | BUDGIT/CM MAN GUARD | 1 |
| 2 | 42863003 | HANGER BKT BEH 3 TON | 1 |
| 3 | 21556502 | SPROCKET | 1 |
| 4 | 10614101 | BUSHING DU | 2 |
| 5 | 11273002 | PIN IDLER SPROCKET | 1 |
| 6 | 10171682 | PIN ROLL SLOTTED SPRING (NOT SHOWN) | 1 |
| 7 | 10099658 | GROOVE PIN | 1 |
| 8 | 10346106 | WASHER FLAT | 2 |
| 9 | 11272602 | CONNECTING ROD | 1 |
| 10 | 11565401 | NUT-ROUND 3/4" | 1 |
| 11 | 10764301 | BUSHING | 1 |
| 12 | N08106 | RETAINING RING EXTERNAL OPEN | 2 |
| 13 | 11272801 | CONNECTING PIN HANGER | 1 |
| 14 | 42863102 | SUSPENSION LUG (NO PAINT) | 1 |
| 15 | 11275001 | SPHERICAL WASHER | 1 |
| 16 | 11272701 | ROUND NUT | 1 |
| 17 | 22429803 | ROUND NUT | 1 |
| 18 | 10231001 | WASHER FLAT | 1 |

# 1/4 TO 1 TON LOWER BLOCK ASSEMBLY

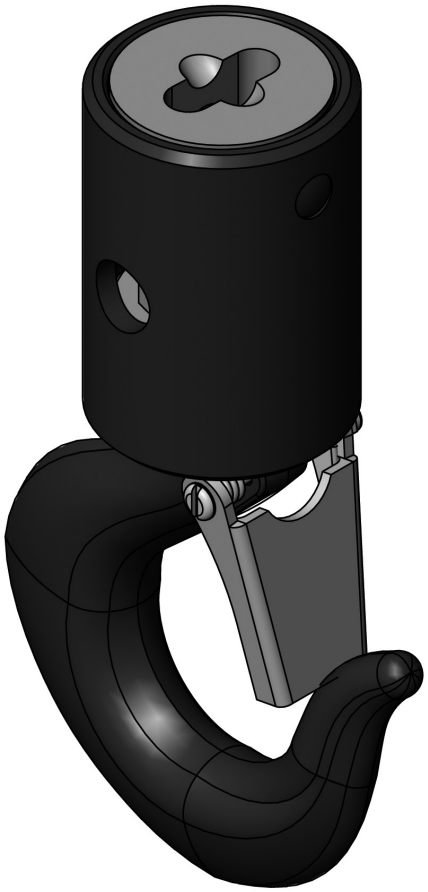


**Figure 9-3G. LOWER HOOK BLOCK ASSEMBLY 1/4 TO 1 TON**

| ITEM NO. | 1/4 TON CODE | 1/2 TON CODE | 1 TON CODE | DESCRIPTION | QTY. |
|---|---|---|---|---|---|
| 1 | 28683 | 28683 | 35651 | LOWER BLOCK ASSEMBLY | 1 |

# 2 TON LOWER HOOK BLOCK ASSEMBLY

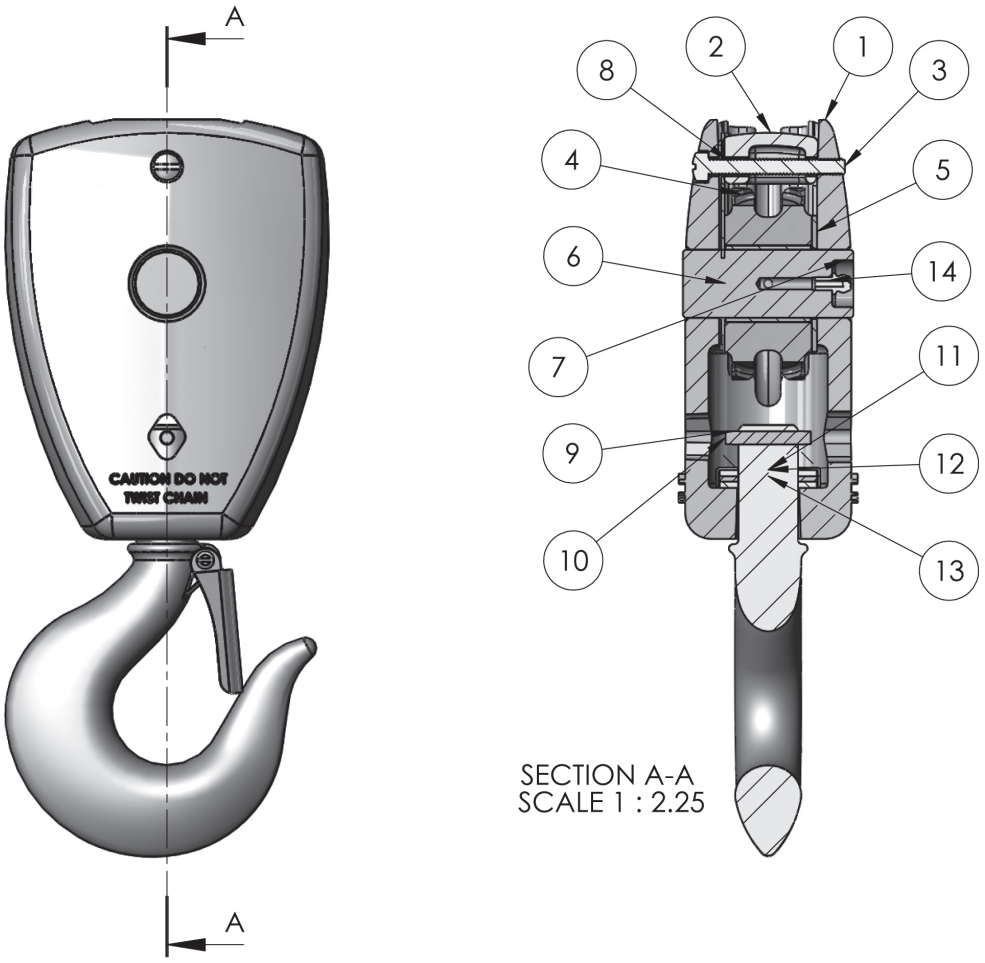



**Figure 9-3H. LOWER HOOK BLOCK ASSEMBLY 2 TON**

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 21556698 | 2 TON LOWER BODY BLOCK | |
| 1 (optional) | 21556640 | 2 Ton Lower Body Block Anodized | 1 |
| 1 (optional) | 21556640PZ | 2 Ton Lower Body Block Zinc Plated | |
| 2 | 21556701 | CENTER GUIDE | 1 |
| 3 | 10694301 | SCREW FILLISTER HEAD SLOTTED | 1 |
| 4 | 21556501 | SPROCKET | 1 |
| 5 | 10346105 | WASHER FLAT | 1 |
| 6 | 10755701 | BUSHING | 1 |
| 7 | 10732101 | PIN | 1 |
| 8 | 10732201 | LOCK PIN | 1 |
| 9 | 21251901 | HOOK AND NUT ASSEMBLY | |
| 9 (optional) | 21251905 | Hook and Nut Assembly Zinc Plated | 1 |
| 9 (optional) | 21251946 | Bullard Hook and Nut Assembly | |
| 10 | 10763901 | PIN GROOVED SAIGHT F | 1 |
| 11 | 21655803 | SHIELD | 1 |
| 12 | 10436012 | THRUST WASHER | 2 |
| 13 | 10409104 | THRUST BEARING | 1 |
| 14 | NO6099 | LUBRICATION FITTING 1/16" DRIVE | 1 |

To enable us to expedite your parts order, always give Model and Catalog Number and Electric Current of Hoist. (See nameplate.)

# 3 TON LOWER BLOCK ASSEMBLY

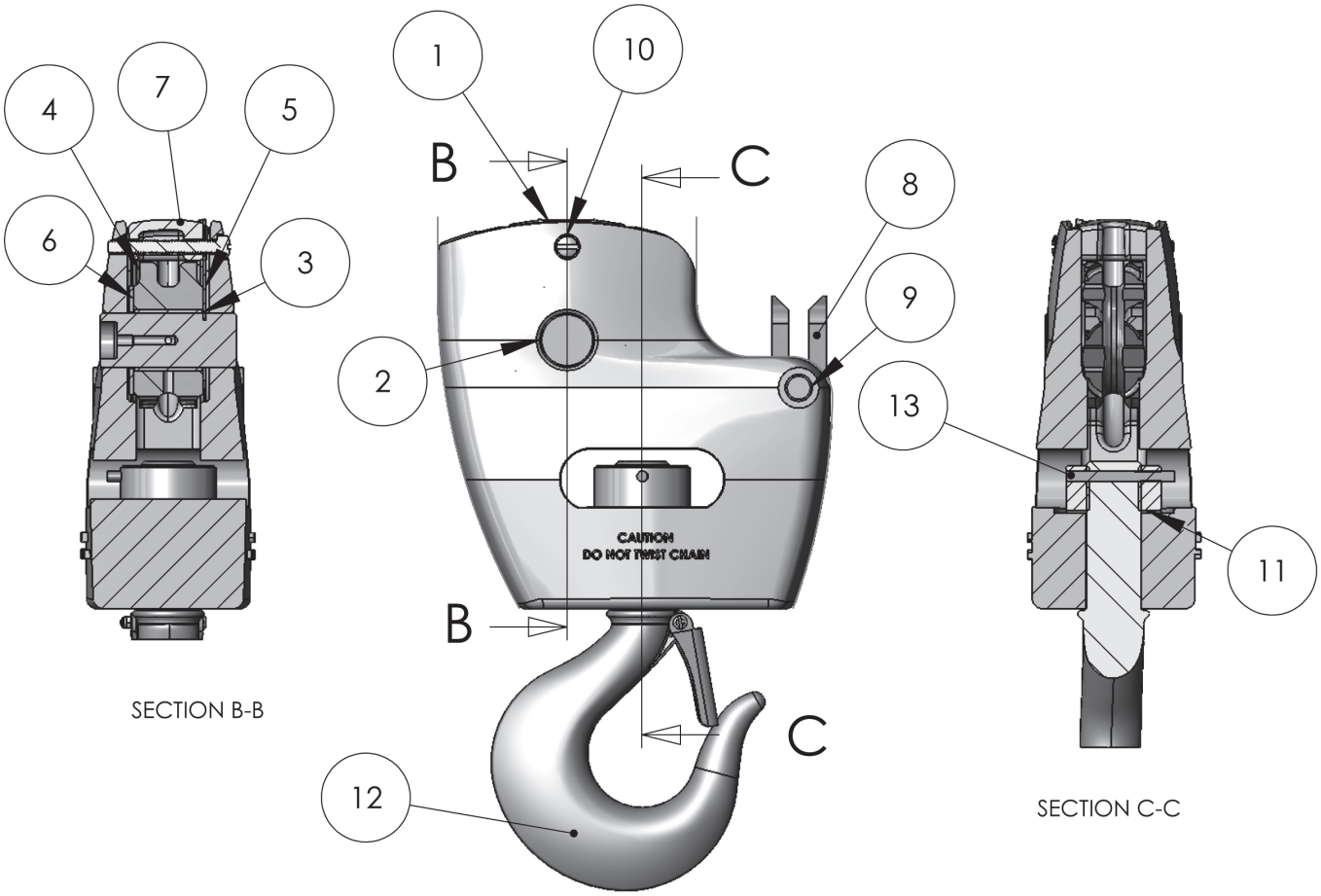
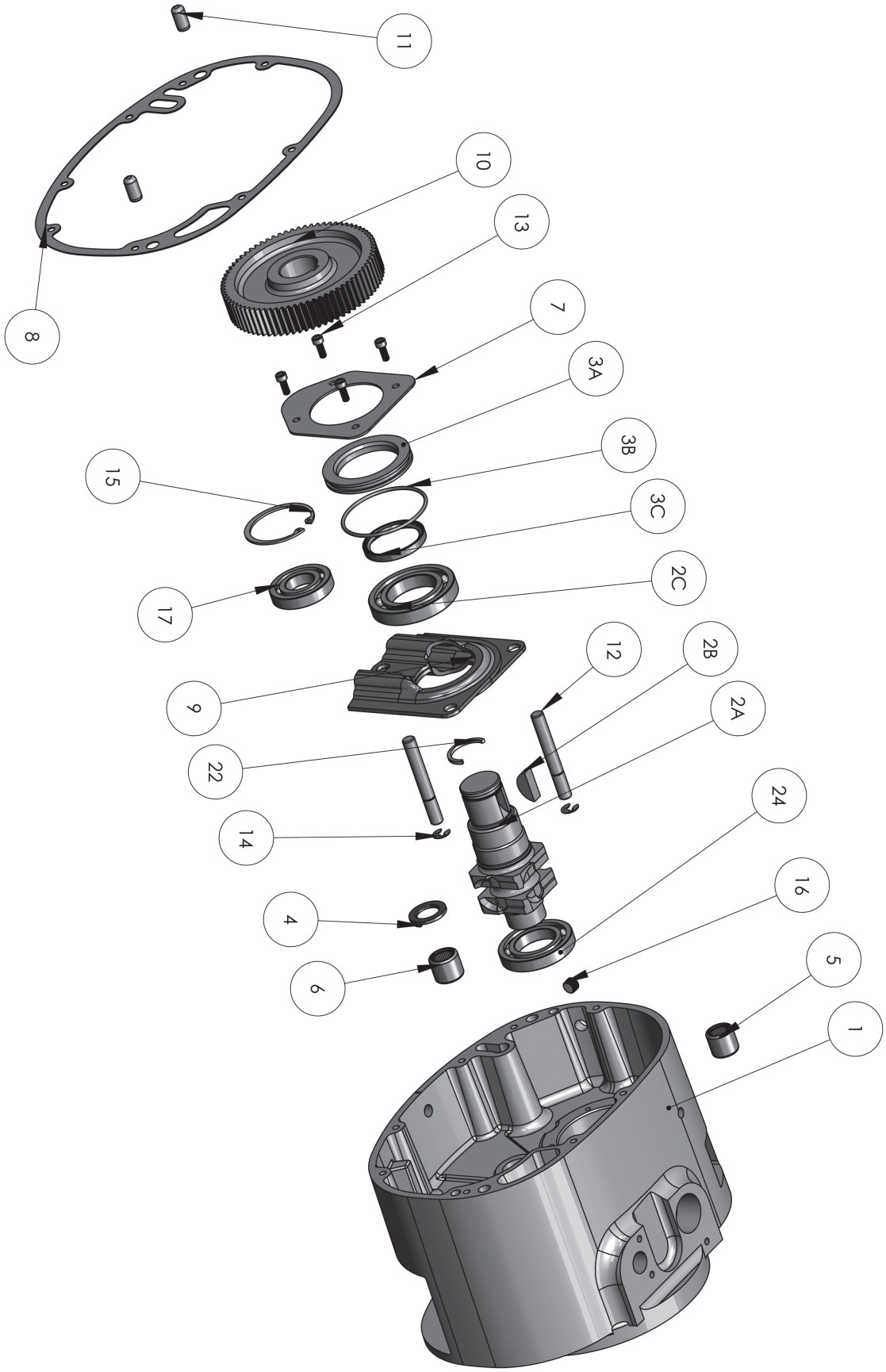



**Figure 9-3I. LOWER HOOK BLOCK ASSEMBLY 3 TON**

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 32584410 | 3 TON HOOK BLOCK | 1 |
| 1 (optional) | 32584411 | 3 Ton Hook Block Anodized | |
| 2 | 10732101 | PIN | 1 |
| 3 | 10755701 | BUSHING DU | 1 |
| 4 | 21556501 | HOOK BLOCK SPROCKET | 1 |
| 5 | 10732201 | LOCK PIN | 1 |
| 6 | 10346106 | WASHER FLAT | 1 |
| 7 | 21556701 | CENTER GUIDE | 1 |
| 8 | 11272901 | CONNECTING LINK | 1 |
| 9 | 10770002 | PIN DOWEL | 1 |
| 10 | 10694301 | SCREW | 1 |
| 11 | 10816508 | BEARING THRUST WASHER | 1 |
| 12 | 22459401 | HOOK AND NUT ASSEMBLY | 1 |
| 12 (optional) | 22511601 | Bullard Hook and Nut Assembly | |
| 12 (optional) | 22459404 | Hook and Nut Assembly Bronze | |
| 13 | 10099658 | PIN | 1 |

# GEARCASE ASSEMBLY EXPLODED VIEW

**Figure 9-4. GEARCASE ASSEMBLY**



# GEARCASE ASSEMBLY

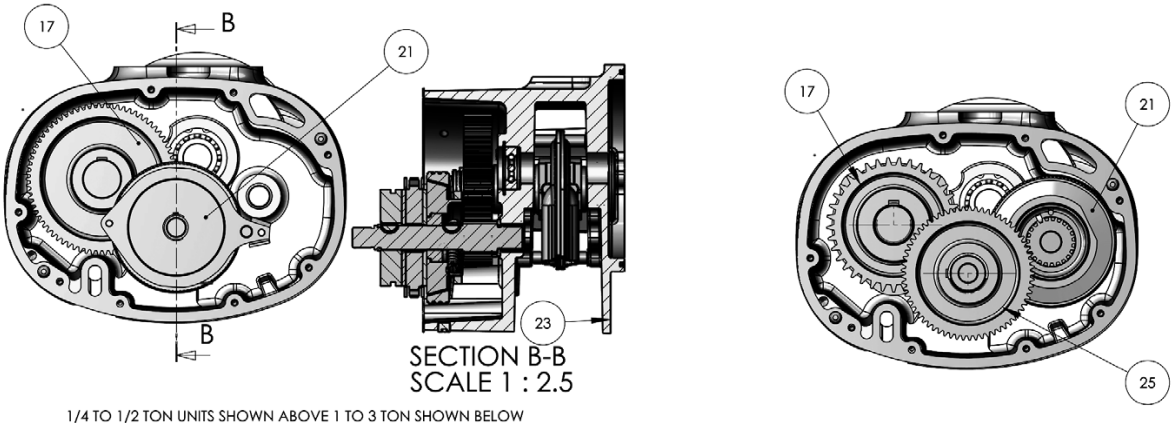



**FIGURE 9-4. GEARCASE ASSEMBLY, CONTINUED**

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 45142650 | DIE-CASE FRAME (CASTING) | 1 |
| 2 A, B & C | 22952903 | SPROCKET ASSEMBLY 1/4 AND 1/2 TON UNITS ONLY | 1 |
| 2 A, B & C | 22952901 | SPROCKET ASSEMBLY 1, 2 AND 3 TON UNITS ONLY | 1 |
| 3 A, B & C | 23247801 | SPROCKET BEARING AND SEAL ASSEMBLY | 1 |
| 4 | 10817301 | BEARING THRUST WASHER | 1 |
| 5 | 10380509 | BEARING NEEDLE CLOSED | 1 |
| 6 | 10380513 | BEARING NEEDLE CLOSED | 1 |
| 7 | 21552350 | BEARING RETAINER | 1 |
| 8 | 31177210 | GASKET | 1 |
| 9 | 21555601 | Chain Guide (1/4-1/2 Ton) | 1 |
| 9 | 21555801 | Chain Guide (1-3 Ton) | 1 |
| 10 | 21416903 | 1/4 TON 16 FPM, 1/2 TON 16 FPM SPROCKET GEAR | 1 |
| 10 | 21417003 | 1/4 TON 32 FPM, 1/2 TON 32 FPM SPROCKET GEAR | |
| 10 | 21988103 | 1 TON 16 FPM, 1 TON 32 FPM, 2 TON 8 FPM, 2 TON 16 FPM, 3 TON 5 FPM AND 3 TON 10 FPM SPROCKET GEAR | |
| 11 | 10770007 | DOWEL PIN | 2 |
| 12 | 11823201 | CHAIN GUIDE PIN | 2 |
| 13 | 10392007 | #10-24 X 1/2 | 4 |
| 14 | 1410261104 | RETAINING RING | 2 |
| 15 | 10008301 | RETAINING RING | 3 |
| 16 | 11619107 | PIPE PLUG HEX SOCKET | 2 |
| 17 | 10377306 | BEARING | 1 |
| 18 | SEE BELOW | MAN GUARD LOAD PROTECTOR SINGLE SPEED UNITS ONLY (NOT SHOWN) | 1 |
| 18 | 23456134 | 1/4 TON 16 FPM | |
| 19 | 23456135 | 1/4 32 FPM | |
| 20 | 23456132 | 1/2 TON 32 FPM, 1 TON 16 FPM, 1 TON 32 FPM, 2 TON 8 FPM, 2 TON 16 FPM, 3 TON 10 FPM AND 3 TON 5 FPM | |
| 20 | 23456131 | 1/2 TON 16 FPM | |
| 21 | SEE BELOW | LOAD-BRAKE/MAN GUARD VARIABLE SPEED UNITS | 1 |
| 21 | 51659034 | 1/4 TON 16 FPM | |
| 21 | 51659035 | 1/4 43 FPM | |
| 21 | 51659032 | 1/2 TON 32 FPM, 1 TON 6 FPM, 1 TON 32 FPM, 2 TON 8 FPM, 2 TON 16 FPM, 3 TON 10 FPM AND 3 TON 5 FPM | |
| 21 | 51659031 | 1/2 TON 16 FPM | |
| 22 | 10417701 | C-CLIP | 1 |
| 23 | 10402823 | SLEEVE BEARING | 1 |
| 24 | NO3042 | BEARING | 1 |
| 60 | 44468913 | SHAFT INTERMEDIATE ASSEMBLY 1 TO 3 TON UNITS ONLY | 1 |

For Item No. 1, please specify color: Y - Budgit Yellow, C - CM Orange.

# SINGLE SPEED GEARCASE COVER WITH PADDLE LIMIT SWITCH 3 PHASE UNITS 24V CONTROL 115V/230V 1PH 60HZ

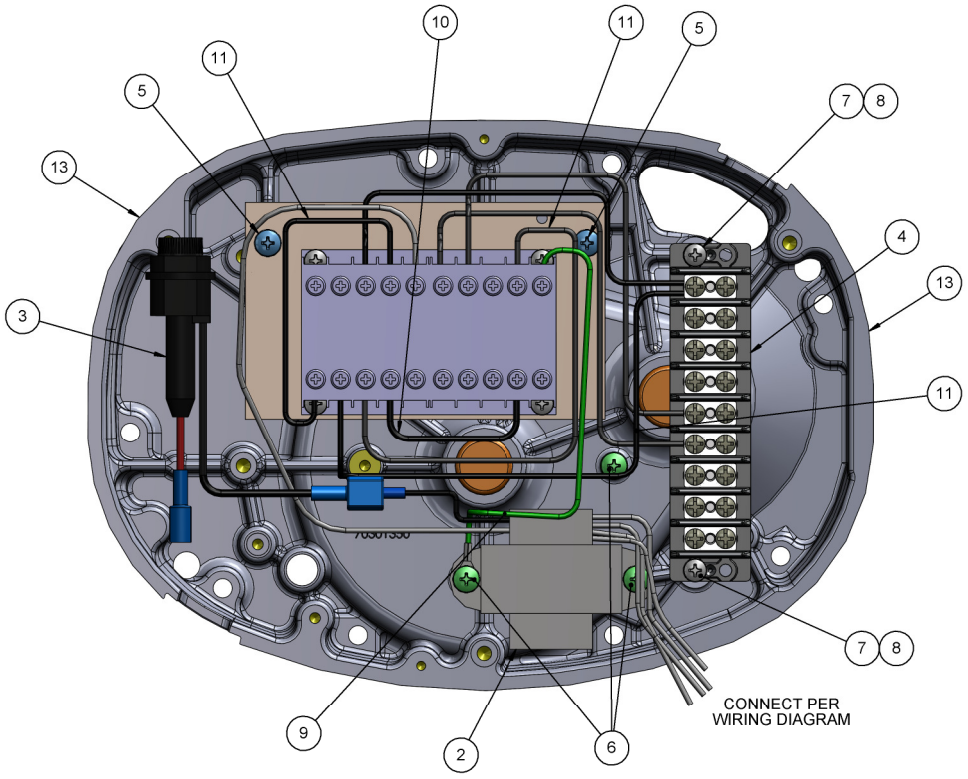



**Figure 9-5A. WIRING DIAGRAM 33325103 OR 3325104**

| ITEM NO. | PART NUMBER | DESCRIPTION | 45130061 24V CONTROL 115V/230V 1PH 60HZ | 45130061Y 24V CONTROL 115V/230V 1PH 60HZ |
|---|---|---|---|---|
| 1 | 22845703 | CONTACTOR REVERSING 1EC 12A 110V 4NO W/MOUNTING PLATE | - | - |
| | 22845704 | CONTACTOR REVERSING 1EC 12A 24V 4NO W/MOUNTING PLATE | 1 | 1 |
| 2 | 20991909 | TRANSFORMER | - | - |
| | 22827202 | TRANSFORMER 115V/230V 24V 20VA | 1 | 1 |
| 3 | 23515203 | Fuse Holder Assm | - | - |
| | 23515204 | Fuse Holder Assm | 1 | 1 |
| 4 | 11741009 | TERMINAL STRIP | 1 | 1 |
| 5 | N07093 | SCREW PAN HEAD PHILLIP SEMS | 2 | 2 |
| 6 | 10017807 | 10-24 1/4 PAN HEAD SELF TAPPING | 3 | 3 |
| 7 | 10381402 | SCREW ROUND HEAD PHILLIPS #8-32 X 1 PLATED | 2 | 2 |
| 8 | 10755401 | SPACER | 2 | 2 |
| 9 | 20055696 | WIRE JUMPER #16 GAUGE X T' LONG COLOR GREEN | 1 | 1 |
| 10 | 10486615 | WIRE JUMPER #14 GAUGE X 3" LONG COLOR BLACK | 1 | 1 |
| 11 | 22700310 | WIRE JUMPER #16 GA X 7 1/2" LONG COLOR BLACK | 6 | 6 |
| 12 | 20995407 | WIRE ASSEMBLY | - | - |
| 13 | 44485252 | EXTERNAL C'WEIGHT-WITH OUT PAINT | 1 | - |
| | 44485252Y | EXTERNAL C'WEIGHT-POWDER COAT | - | 1 |
| | 44485252C | EXTERNAL C'WEIGHT-POWDER COAT | - | - |

# SINGLE SPEED GEARCASE COVER WITH PADDLE LIMIT SWITCH 3 PHASE UNITS 115V CONTROL 115V/230V 1PH 60HZ

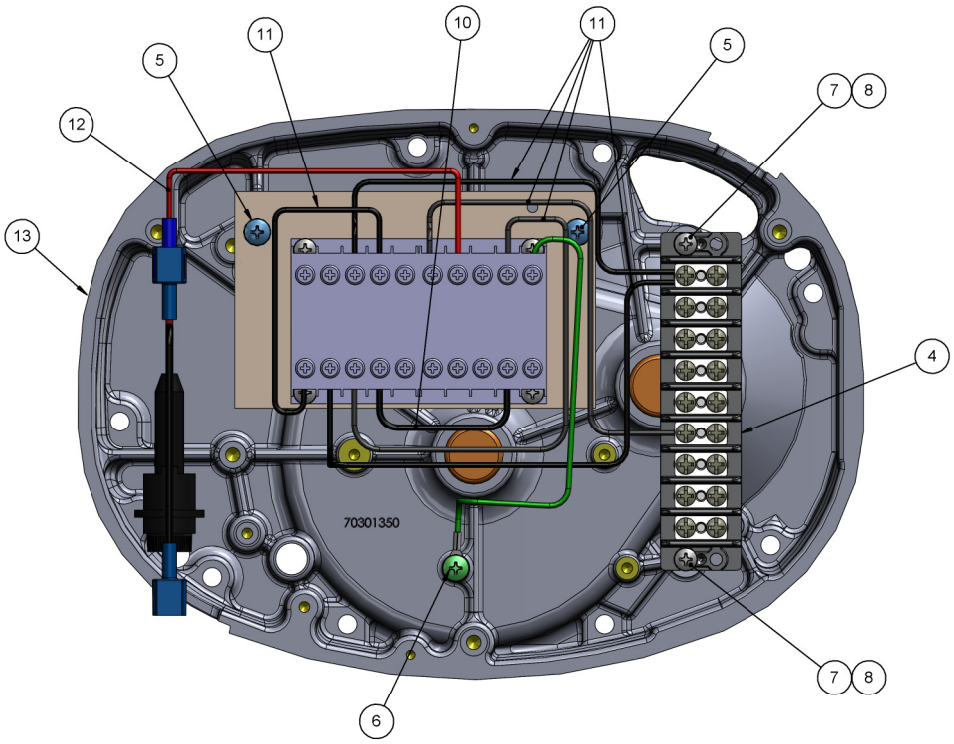



**Figure 9-5B. WIRING DIAGRAM 33325101 OR 3325102**

| ITEM NO. | PART NUMBER | DESCRIPTION | 45130060 115V CONTROL 115V/230V 1PH 60HZ | 45130060Y 115V CONTROL 115V/230V 1PH 60HZ |
|---|---|---|---|---|
| 1 | 22845703 | CONTACTOR REVERSING 1EC 12A 110V 4NO W/MOUNTING PLATE | 1 | 1 |
| | 22845704 | CONTACTOR REVERSING 1EC 12A 24V 4NO W/MOUNTING PLATE | - | - |
| 2 | 20991909 | TRANSFORMER | - | - |
| | 22827202 | TRANSFORMER 115V/230V 24V 20VA | - | - |
| 3 | 23515203 | Fuse Holder Assm | 1 | 1 |
| | 23515204 | Fuse Holder Assm | - | - |
| 4 | 11741009 | TERMINAL STRIP | 1 | 1 |
| 5 | N07093 | SCREW PAN HEAD PHILLIP SEMS | 2 | 2 |
| 6 | 10017807 | 10-24 1/4 PAN HEAD SELF TAPPING | 1 | 1 |
| 7 | 10381402 | SCREW ROUND HEAD PHILLIPS #8-32 X 1 PLATED | 2 | 2 |
| 8 | 10755401 | SPACER | 2 | 2 |
| 9 | 20055696 | WIRE JUMPER #16 GAUGE X T' LONG COLOR GREEN | 1 | 1 |
| 10 | 10486615 | WIRE JUMPER #14 GAUGE X 3" LONG COLOR BLACK | 1 | 1 |
| 11 | 22700310 | WIRE JUMPER #16 GA X 7 1/2" LONG COLOR BLACK | 5 | 5 |
| 12 | 20995407 | WIRE ASSEMBLY | 1 | 1 |
| 13 | 44485252 | EXTERNAL C'WEIGHT-WITH OUT PAINT | 1 | - |
| | 44485252Y | EXTERNAL C'WEIGHT-POWDER COAT | - | 1 |
| | 44485252C | EXTERNAL C'WEIGHT-POWDER COAT | - | - |

# SINGLE SPEED GEARCASE COVER WITH PADDLE LIMIT SWITCH
# 3 PHASE UNITS 115V CONTROL 115V/230V 3PH 60HZ

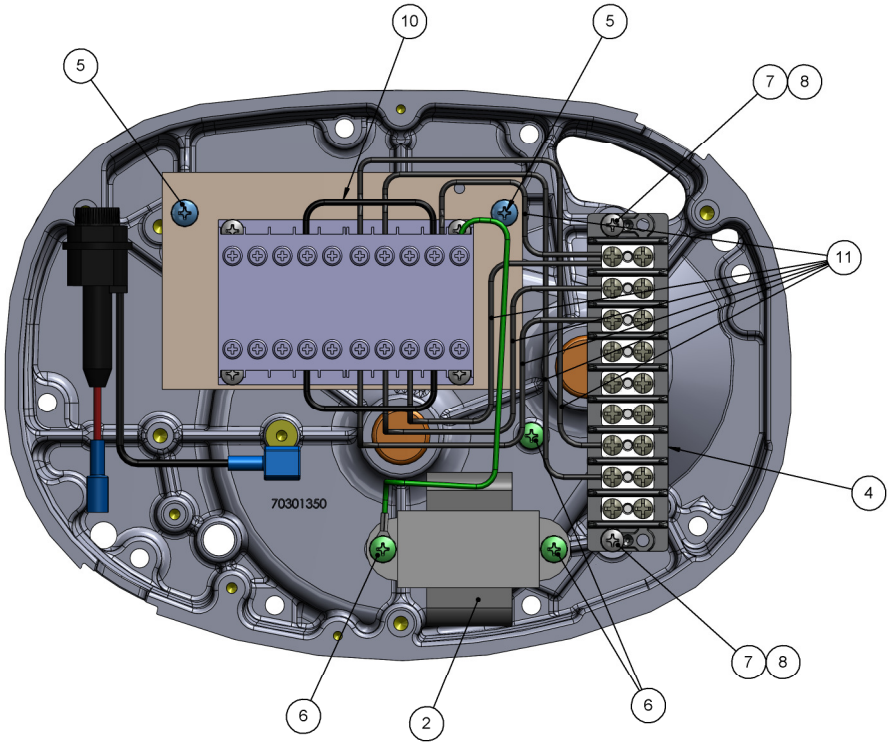



**Figure 9-5C. WIRING DIAGRAM 33325001 OR 3325002**

| ITEM NO. | PART NUMBER | DESCRIPTION | 45130062 | 45130062Y | 45130062C |
|---|---|---|---|---|---|
| | | | 115V CONTROL 230V/460V 3PH 60HZ | 115V CONTROL 230V/460V 3PH 60HZ | 115V CONTROL 230V/460V 3PH 60HZ |
| 1 | 22845703 | CONTACTOR REVERSING 1EC 12A 110V 4NO W/MOUNTING PLATE | 1 | 1 | 1 |
| | 22845704 | CONTACTOR REVERSING 1EC 12A 24V 4NO W/MOUNTING PLATE | - | - | |
| 2 | 20991909 | TRANSFORMER | 1 | 1 | 1 |
| | 22827202 | TRANSFORMER 115V/230V 24V 20VA | - | - | |
| 3 | 23515203 | Fuse Holder Assm | 1 | 1 | 1 |
| | 23515204 | Fuse Holder Assm | - | - | |
| 4 | 11741009 | TERMINAL STRIP | 1 | 1 | 1 |
| 5 | N07093 | SCREW PAN HEAD PHILLIP SEMS | 2 | 2 | 2 |
| 6 | 10017807 | 10-24 1/4 PAN HEAD SELF TAPPING | 3 | 3 | 3 |
| 7 | 10381402 | SCREW ROUND HEAD PHILLIPS #8-32 X 1 PLATED | 2 | 2 | 2 |
| 8 | 10755401 | SPACER | 2 | 2 | 2 |
| 9 | 20055696 | WIRE JUMPER #16 GAUGE X T' LONG COLOR GREEN | 1 | 1 | 1 |
| 10 | 10486615 | WIRE JUMPER #14 GAUGE X 3" LONG COLOR BLACK | 2 | 2 | 2 |
| 11 | 22700310 | WIRE JUMPER #16 GA X 7 1/2" LONG COLOR BLACK | 6 | 6 | 6 |
| 12 | 20995407 | WIRE ASSEMBLY | - | - | |
| 13 | 44485252 | EXTERNAL C'WEIGHT-WITH OUT PAINT | 1 | - | |
| | 44485252Y | EXTERNAL C'WEIGHT-POWDER COAT | - | - | |
| | 44485252C | EXTERNAL C'WEIGHT-POWDER COAT | - | 1 | 1 |

# SINGLE SPEED GEARCASE COVER WITH CONTROLS
# 3 PHASE UNITS 115V CONTROL 575V 3PH 60HZ

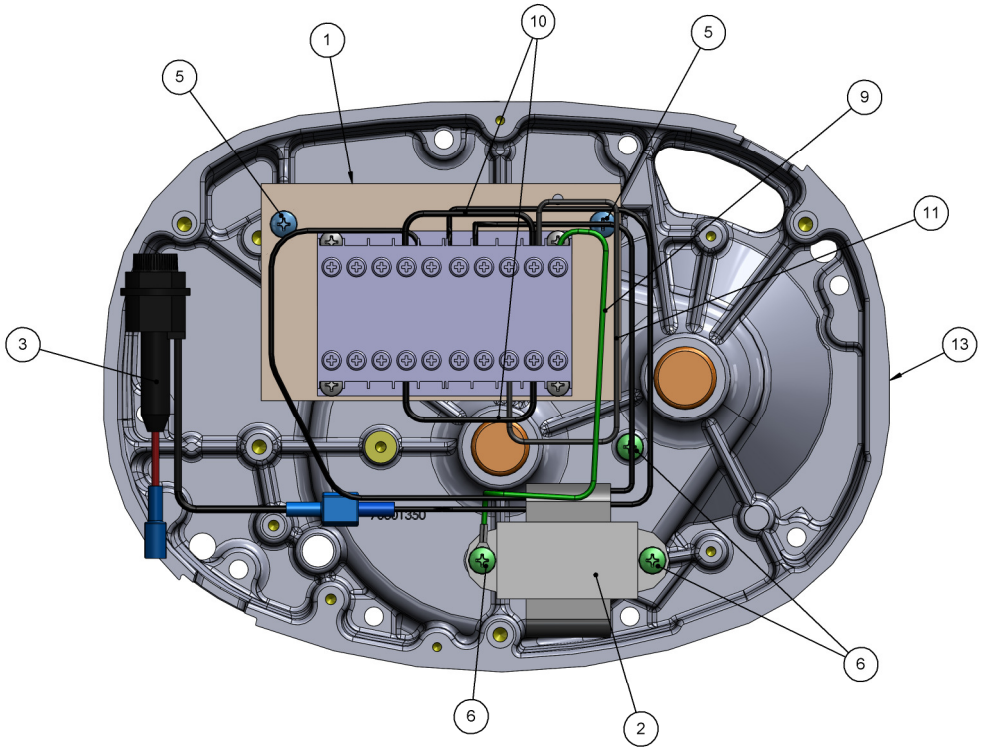



**Figure 9-5D. WIRING DIAGRAM 33325003**

| ITEM NO. | PART NUMBER | DESCRIPTION | 45130063 115V CONTROL 575V 3PH 60HZ | 45130063Y 115V CONTROL 575V 3PH 60HZ | 45130063C 115V CONTROL 575V 3PH 60HZ |
|---|---|---|---|---|---|
| 1 | 22845703 | CONTACTOR REVERSING 1EC 12A 110V 4NO W/MOUNTING PLATE | 1 | 1 | 1 |
| 2 | 22827201 | TRANSFORMER 115V/230V 115V 20VA | - | - | - |
| | 20991910 | TRANSFORMER 575V 115V 20VA | 1 | 1 | 1 |
| 3 | 23515203 | Fuse Holder Assm | 1 | 1 | 1 |
| 4 | 11741009 | TERMINAL STRIP | - | - | - |
| 5 | N07093 | SCREW PAN HEAD PHILLIP SEMS | 2 | 2 | 2 |
| 6 | 10017807 | 10-24 1/4 PAN HEAD SELF TAPPING | 3 | 3 | 3 |
| 7 | 10381402 | SCREW ROUND HEAD PHILLIPS #8-32 X 1 PLATED | - | - | - |
| 8 | 10755401 | SPACER | - | - | - |
| 9 | 20055696 | WIRE JUMPER #16 GAUGE X T' LONG COLOR GREEN | 1 | 1 | 1 |
| 10 | 10486615 | WIRE JUMPER #14 GAUGE X 3" LONG COLOR BLACK | 2 | 2 | 2 |
| 11 | 22700310 | WIRE JUMPER #16 GA X 7 1/2" LONG COLOR BLACK | 1 | 1 | 1 |
| 12 | 20995407 | WIRE ASSEMBLY | - | - | - |
| 13 | 44485252 | EXTERNAL C'WEIGHT-WITH OUT PAINT | 1 | - | - |
| | 44485252Y | EXTERNAL C'WEIGHT-POWDER COAT | - | 1 | - |
| | 44485252C | EXTERNAL C'WEIGHT-POWDER COAT | - | - | 1 |

# ELECTRICAL VFD
# 230-3-60

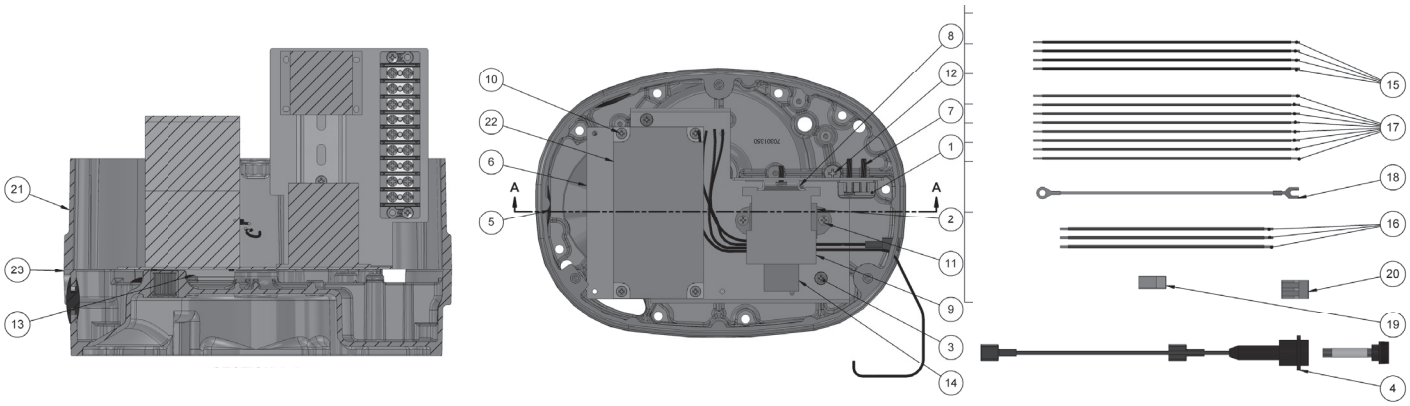



**Figure 9-5G. Section A-A**

| ITEM NO. | PART NUMBER | DESCRIPTION | 45130070C VFD ASSEMBLY 230-3-60 1/2hp | 45130070Y VFD ASSEMBLY 230-3-60 1/2hp | 45130071C VFD ASSEMBLY 230-3-60 1hp | 45130071Y VFD ASSEMBLY 230-3-60 1hp | 45130072C VFD ASSEMBLY 230-3-60 2hp | 45130072Y VFD ASSEMBLY 230-3-60 2hp |
|---|---|---|---|---|---|---|---|---|
| 1 | 11741009 | Terminal Strip | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 20991909 | TRANSFORMER 230/460V 115V 20VA | 1 | 1 | 1 | 1 | 1 | 1 |
| 3 | N07093 | SCREW PAN HEAD PHILLIP SEMS | 3 | 3 | 3 | 3 | 3 | 3 |
| 4 | 23515203 | Fuse Holder Assm | 1 | 1 | 1 | 1 | 1 | 1 |
| 5 | 10734601 | GROMMET | 2 | 2 | 2 | 2 | 2 | 2 |
| 6 | 45226901 | MOUNTING BRACKET VFC | 1 | 1 | 1 | 1 | 1 | 1 |
| 7 | 11050706 | 8-32 x 1 PHILLIPS PAN HEAD SEM | 2 | 2 | 2 | 2 | 2 | 2 |
| 8 | 29009 | DIN-RAIL 4.50" LONG | 1 | 1 | 1 | 1 | 1 | 1 |
| 9 | 33310931 | CONTACTOR , MINI NON-REVERSING | 1 | 1 | 1 | 1 | 1 | 1 |
| 10 | 11050712 | 8-32X1/2 PAN HEAD PHILLIPS SEM | 4 | 4 | 4 | 4 | 4 | 4 |
| 11 | 11050704 | SCREW PAN HEAD PHILLIPS | 4 | 4 | 4 | 4 | 4 | 4 |
| 12 | N08102 | 1/4-20X1/2 PHILLIP HEAD SEMS | 1 | 1 | 1 | 1 | 1 | 1 |
| 13 | 10017807 | 10-24 1/4 PAN HEAD SELF TAPPING | 1 | 1 | 1 | 1 | 1 | 1 |
| 14 | 33311996 | SUPPRESSOR MODULE W/ LED | 1 | 1 | 1 | 1 | 1 | 1 |
| 15 | 22700310 | WIRE #16 GAUGE BLACK | 4 | 4 | 4 | 4 | 4 | 4 |
| 16 | 10486614 | WIRE JUMPER #14 MTW 10" BLACK SOLDER DIP | 3 | 3 | 3 | 3 | 3 | 3 |
| 17 | 10486619 | WIRE JUMPER #18 GA X 13 1/2" LONG COLOR RED | 8 | 8 | 8 | 8 | 8 | 8 |
| 18 | 20055698 | WIRE ASSEMBLY GROUNDED WIRING | 1 | 1 | 1 | 1 | 1 | 1 |
| 19 | 11782702 | CONNECTOR PUSHWIRE YELLOW | 1 | 1 | 1 | 1 | 1 | 1 |
| 20 | 11782704 | CONNECTOR PUSHWIRE ORANGE | 1 | 1 | 1 | 1 | 1 | 1 |
| 21 | 33179001 | ELECTRICAL COVER EXTNESION | 1 | 1 | 1 | 1 | 1 | 1 |
| 22 | 45199721 | VARIABLE FREQUENCY G+ MINI | 1 | 1 | - | - | - | - |
| | 45199722 | VARIABLE FREQUENCY G+ MINI | - | - | 1 | 1 | - | - |
| | 45199724 | VARIABLE FREQUENCY G+ MINI | - | - | - | - | 1 | 1 |
| 23 | 44485160 | WEATHER RESISTANT-W/O PAINT | - | - | - | - | - | - |
| | 44485160C | WEATHER RESISTANT-POWDER COAT | 1 | - | 1 | - | 1 | - |
| | 44485160Y | WEATHER RESISTANT-POWDER COAT | - | 1 | - | 1 | - | 1 |

# ELECTRICAL VFD
# 460-3-60

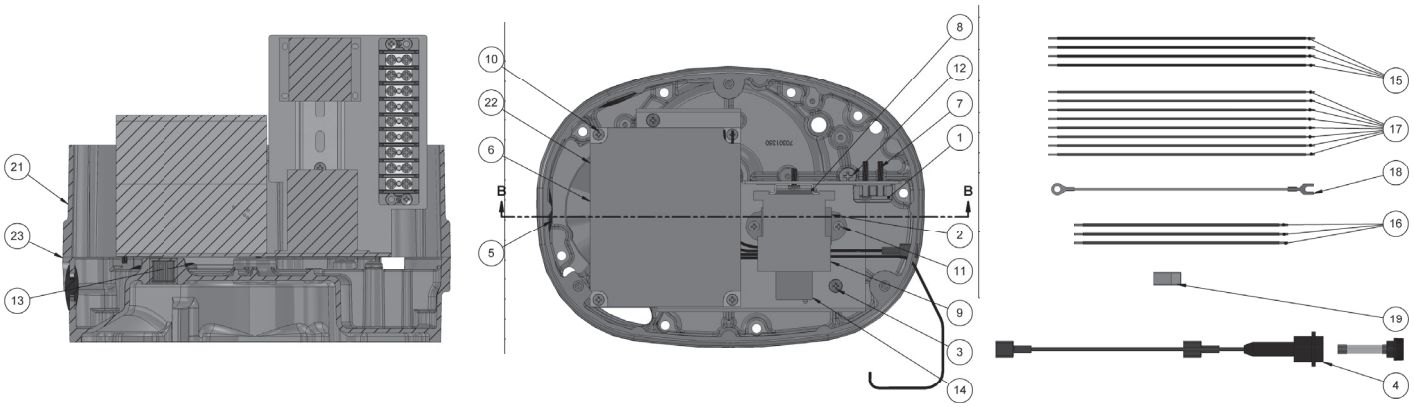



**Figure 9-5H. Section B-B**

| ITEM NO. | PART NUMBER | DESCRIPTION | 45130073C VFD ASSEMBLY 460-3-60 1/2 HP | 45130073Y VFD ASSEMBLY 460-3-60 1/2hp | 45130074C VFD ASSEMBLY 460-3-60 1hp | 45130074Y VFD ASSEMBLY 460-3-60 1hp | 45130075C VFD ASSEMBLY 460-3-60 2hp | 45130075Y VFD ASSEMBLY 460-3-60 2hp |
|---|---|---|---|---|---|---|---|---|
| 1 | 11741009 | Terminal Strip | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 20991909 | TRANSFORMER 230/460V 115V 20VA | 3 | 3 | 3 | 3 | 3 | 3 |
| 3 | N07093 | SCREW PAN HEAD PHILLIP SEMS | 1 | 1 | 1 | 1 | 1 | 1 |
| 4 | 23515203 | Fuse Holder Assm | 2 | 2 | 2 | 2 | 2 | 2 |
| 5 | 10734601 | GROMMET | 1 | 1 | 1 | 1 | 1 | 1 |
| 6 | 45226901 | MOUNTING BRACKET VFC | 2 | 2 | 2 | 2 | 2 | 2 |
| 7 | 11050706 | 8-32 x 1 PHILLIPS PAN HEAD SEM | 1 | 1 | 1 | 1 | 1 | 1 |
| 8 | 29009 | DIN-RAIL 4.50" LONG | 1 | 1 | 1 | 1 | 1 | 1 |
| 9 | 33310931 | CONTACTOR , MINI NON-REVERSING | 4 | 4 | 4 | 4 | 4 | 4 |
| 10 | 11050712 | 8-32X1/2 PAN HEAD PHILLIPS SEM | 4 | 4 | 4 | 4 | 4 | 4 |
| 11 | 11050704 | SCREW PAN HEAD PHILLIPS | 1 | 1 | 1 | 1 | 1 | 1 |
| 12 | N08102 | 1/4-20X1/2 PHILLIP HEAD SEMS | 1 | 1 | 1 | 1 | 1 | 1 |
| 13 | 10017807 | 10-24 1/4 PAN HEAD SELF TAPPING | 1 | 1 | 1 | 1 | 1 | 1 |
| 14 | 33311996 | SUPPRESSOR MODULE W/ LED | 4 | 4 | 4 | 4 | 4 | 4 |
| 15 | 22700310 | WIRE #16 GAUGE BLACK | 3 | 3 | 3 | 3 | 3 | 3 |
| 16 | 10486614 | WIRE JUMPER #14 MTW 10" BLACK SOLDER DIP | 8 | 8 | 8 | 8 | 8 | 8 |
| 17 | 10486619 | WIRE JUMPER #18 GA X 13 1/2" LONG COLOR RED | 1 | 1 | 1 | 1 | 1 | 1 |
| 18 | 20055698 | WIRE ASSEMBLY GROUNDED WIRING | 1 | 1 | 1 | 1 | 1 | 1 |
| 19 | 11782702 | CONNECTOR PUSHWIRE YELLOW | - | - | - | - | - | - |
| 20 | 11782704 | CONNECTOR PUSHWIRE ORANGE | 1 | 1 | 1 | 1 | 1 | 1 |
| 21 | 33179001 | ELECTRICAL COVER EXTNESION | 1 | 1 | - | - | - | - |
| 22 | 45199741 | VARIABLE FREQUENCY G+ MINI | - | - | 1 | 1 | - | - |
| | 45199742 | VARIABLE FREQUENCY G+ MINI | - | - | - | - | 1 | 1 |
| | 45199743 | VARIABLE FREQUENCY G+ MINI | - | - | - | - | - | - |
| 23 | 44485160 | WEATHER RESISTANT-W/O PAINT | 1 | - | 1 | - | 1 | - |
| | 44485160C | WEATHER RESISTANT-POWDER COAT | - | 1 | - | 1 | - | 1 |
| | 44485160Y | WEATHER RESISTANT-POWDER COAT | | | | | | |

# SINGLE SPEED GEARCASE COVER WITH CONTROLS
# 3 PHASE UNITS WEATHER/CORROSION RESISTANT 575V 1PH 60HZ

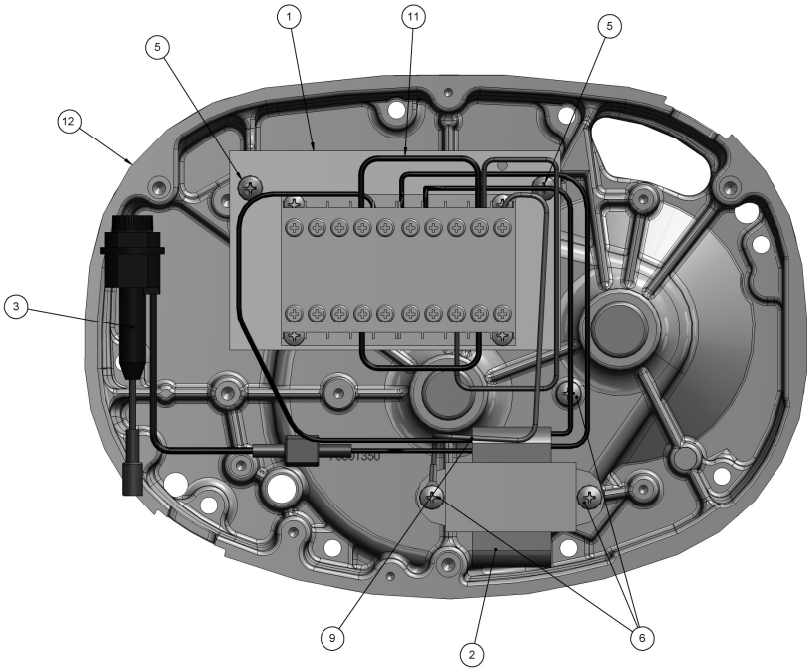



**Figure 9-5I. WIRING DIAGRAM 33325003**

| ITEM NO. | PART NUMBER | DESCRIPTION | 45130081 | 45130081Y | 45130083 | 45130083Y | 45130085 | 45130085Y | 45130087 | 45130087Y |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 115V CONTROL 575V 3PH 60HZ | 115V CONTROL 575V 3PH 60HZ | 24V CONTROL 575V 3PH 60HZ | 24V CONTROL 575V 3PH 60HZ | 115V CONTROL 575V 3PH 60HZ | 115V CONTROL 575V 3PH 60HZ | 24V CONTROL 575V 3PH 60HZ | 24V CONTROL 575V 3PH 60HZ |
| 1 | 22845703 | CONTACTOR REVERSING 1EC 12A 110V 4NO W/MOUNTING PLATE | 1 | 1 | - | - | 1 | 1 | - | - |
| | 22845704 | CONTACTOR REVERSING 1EC 12A 24V 4NO W/ MOUNTING PLATE | - | - | 1 | 1 | - | - | 1 | 1 |
| 2 | 20991903 | TRANSFORMER 575V 24V 20VA | - | - | 1 | 1 | - | - | 1 | 1 |
| | 20991908 | TRANSFORMER 230/460V 24V 20VA | - | - | - | - | - | - | - | - |
| | 20991909 | TRANSFORMER 230/460V 115V 20VA | - | - | - | - | - | - | - | - |
| | 20991910 | TRANSFORMER 575V 115V 20VA | 1 | 1 | - | - | 1 | 1 | - | - |
| 3 | 23515203 | Fuse Holder Assm | 1 | 1 | - | - | 1 | 1 | - | - |
| | 23515204 | Fuse Holder Assm | - | - | 1 | 1 | - | - | 1 | 1 |
| 4 | 11741009 | TERMINAL STRIP | - | - | - | - | - | - | - | - |
| 5 | N07093 | SCREW PAN HEAD PHILLIP SEMS | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 6 | 10017807 | 10-24 1/4 PAN HEAD SELF TAPPING | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 7 | 10381402 | SCREW ROUND HEAD PHILLIPS #8-32 X 1 PLATED | - | - | - | - | - | - | - | - |
| 8 | 10755401 | SPACER | - | - | - | - | - | - | - | - |
| 9 | 20055696 | WIRE JUMPER #16 GAUGE X T' LONG COLOR GREEN | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 10 | 10486615 | WIRE JUMPER #14 GA X 3" LONG COLOR BLACK | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 11 | 22700310 | WIRE JUMPER #16 GA X 7 1/2" LONG COLOR BLACK | - | - | 1 | 1 | 1 | 1 | 1 | 1 |
| 12 | 44485252 | EXTERNAL C'WEIGHT-WITH OUT PAINT | 1 | - | - | - | - | - | - | - |
| | 44485252Y | EXTERNAL C'WEIGHT-POWDER COAT | - | 1 | - | 1 | - | - | - | - |
| | 44485161 | EXTERNAL C'WEIGHT-WITHOUT PAINT | - | - | 1 | - | - | - | - | - |
| | 44485160 | WEATHER RESISTANT W/0 PAINT | - | - | - | - | 1 | - | 1 | - |
| | 44485160Y | WEATHER RESISTANT-POWDER COAT | - | - | - | - | - | 1 | - | 1 |
| | 44485160C | WEATHER RESISTANT-POWDER COAT | - | - | - | - | - | - | - | - |

# SINGLE SPEED GEARCASE COVER WITH CONTROLS
# 3 PHASE UNITS WEATHER/CORROSION RESISTANT 115V CONTROL
# 115V/230V 1PH 60HZ

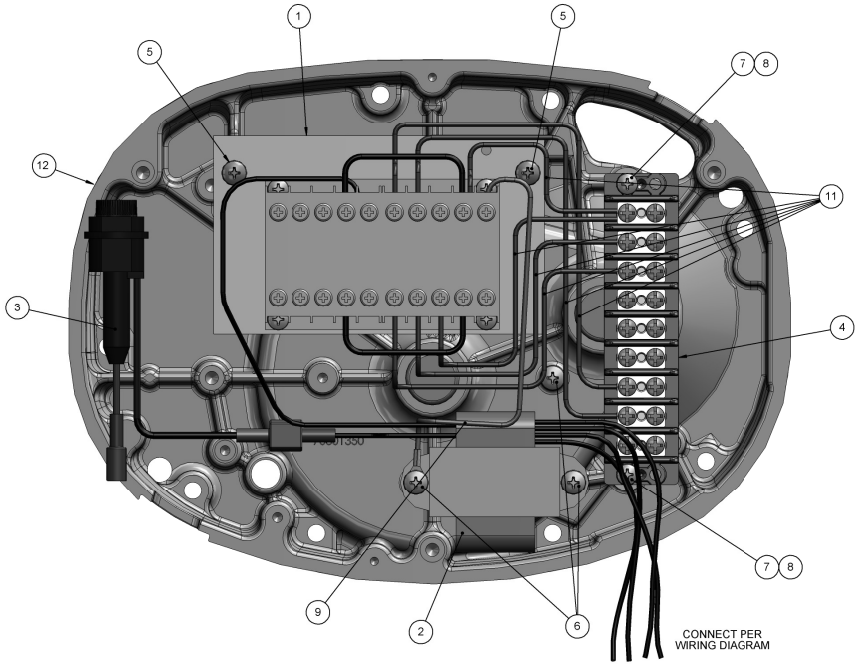



**Figure 9-5J. WIRING DIAGRAM 33325001 OR 33325002**

| ITEM NO. | PART NUMBER | DESCRIPTION | 45130080 115V CONTROL 230V/460V 3PH 60HZ | 45130080Y 115V CONTROL 230V/460V 3PH 60HZ | 45130082 24V CONTROL 230V/460V 3PH 60HZ | 45130082Y 24V CONTROL 230V/460V 3PH 60HZ | 45130084 115V CONTROL 230V/460V 3PH 60HZ | 45130084Y 115V CONTROL 230V/460V 3PH 60HZ | 45130084C 115V CONTROL 230V/460V 3PH 60HZ | 45130086 24V CONTROL 230V/460V 3PH 60HZ | 45130086Y 24V CONTROL 230V/460V 3PH 60HZ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 22845703 | CONTACTOR REVERSING 1EC 12A 110V 4NO W/MOUNTING PLATE | 1 | 1 | - | - | 1 | 1 | 1 | - | - |
| | 22845704 | CONTACTOR REVERSING 1EC 12A 24V 4NO W/MOUNTING PLATE | - | - | 1 | 1 | - | - | - | 1 | 1 |
| 2 | 20991903 | TRANSFORMER 575V 24V 20VA | - | - | - | - | - | - | - | - | - |
| | 20991908 | TRANSFORMER 230/460V 24V 20VA | - | - | 1 | 1 | - | - | - | 1 | 1 |
| | 20991909 | TRANSFORMER 230/460V 115V 20VA | 1 | 1 | - | - | 1 | 1 | 1 | - | - |
| | 20991910 | TRANSFORMER 575V 115V 20VA | - | - | - | - | - | - | - | - | - |
| 3 | 23515203 | Fuse Holder Assm | 1 | 1 | - | - | 1 | 1 | 1 | - | - |
| | 23515204 | Fuse Holder Assm | - | - | 1 | 1 | - | - | - | 1 | 1 |
| 4 | 11741009 | TERMINAL STRIP | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 5 | N07093 | SCREW PAN HEAD PHILLIP SEMS | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 6 | 10017807 | 10-24 1/4 PAN HEAD SELF TAPPING | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 7 | 10381402 | SCREW ROUND HEAD PHILLIPS #8-32 X 1 PLATED | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 8 | 10755401 | SPACER | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 9 | 20055696 | WIRE JUMPER #16 GAUGE X T' LONG COLOR GREEN | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 10 | 10486615 | WIRE JUMPER #14 GA X 3" LONG COLOR BLACK | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 11 | 22700310 | WIRE JUMPER #16 GA X 7 1/2" LONG COLOR BLACK | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 12 | 44485252 | EXTERNAL C'WEIGHT-WITH OUT PAINT | 1 | - | 1 | - | - | - | - | - | - |
| | 44485252Y | EXTERNAL C'WEIGHT-POWDER COAT | - | 1 | - | 1 | - | - | - | - | - |
| | 44485161 | EXTERNAL C'WEIGHT-WITHOUT PAINT | - | - | - | - | - | - | - | - | - |
| | 44485160 | WEATHER RESISTANT W/O PAINT | - | - | - | - | 1 | - | - | 1 | - |
| | 44485160Y | WEATHER RESISTANT-POWDER COAT | - | - | - | - | - | 1 | - | - | 1 |
| | 44485160C | WEATHER RESISTANT-POWDER COAT | - | - | - | - | - | - | 1 | - | - |

# SINGLE SPEED GEARCASE COVER WITH CONTROLS
# 3 PHASE UNITS WEATHER/CORROSION RESISTANT 115V CONTROL 115V/230V 1PH 60HZ

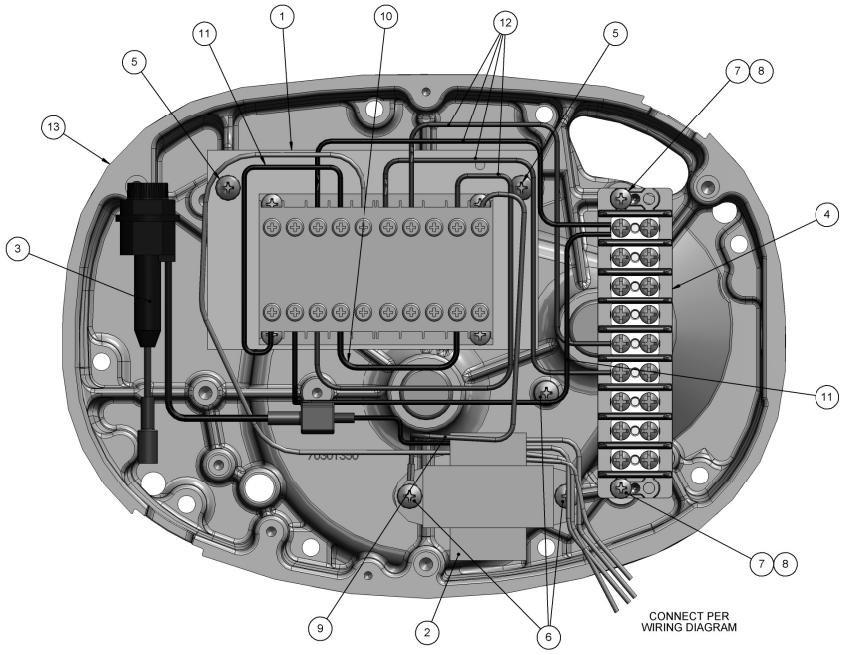



**Figure 9-5K. WIRING DIAGRAM 33325103 OR 33325104**

| ITEM NO. | PART NUMBER | DESCRIPTION | 45130088 | 45130088Y | 45130088C | 45130089 | 45130089Y |
|---|---|---|---|---|---|---|---|
| | | | 115V CONTROL 115V/230V 1PH 60HZ | 115V CONTROL 115V/230V 1PH 60HZ | 115V CONTROL 115V/230V 1PH 60HZ | 24V CONTROL 115V/230V 1PH 60HZ | 24V CONTROL 115V/230V 1PH 60HZ |
| 1 | 22845703 | CONTACTOR REVERSING 1EC 12A 110V 4NO W/MOUNTING PLATE | 1 | 1 | 1 | - | - |
| | 22845704 | CONTACTOR REVERSING 1EC 12A 24V 4NO W/MOUNTING PLATE | - | - | - | 1 | 1 |
| 2 | 22828202 | TRANSFORMER 575V 24V 20VA | - | - | - | 1 | 1 |
| 3 | 23515203 | Fuse Holder Assm | 1 | 1 | 1 | - | - |
| | 23515204 | Fuse Holder Assm | - | - | - | 1 | 1 |
| 4 | 11741009 | TERMINAL STRIP | 1 | 1 | 1 | 1 | 1 |
| 5 | N07093 | SCREW PAN HEAD PHILLIP SEMS | 2 | 2 | 2 | 2 | 2 |
| 6 | 10017807 | 10-24 1/4 PAN HEAD SELF TAPPING | 1 | 1 | 1 | 3 | 3 |
| 7 | 10381402 | SCREW ROUND HEAD PHILLIPS #8-32 X 1 PLATED | 2 | 2 | 2 | 2 | 2 |
| 8 | 10755401 | SPACER | 2 | 2 | 2 | 2 | 2 |
| 9 | 20055696 | WIRE JUMPER #16 GAUGE X T' LONG COLOR GREEN | 1 | 1 | 1 | 1 | 1 |
| 10 | 10486615 | WIRE JUMPER #14 GA X 3" LONG COLOR BLACK | 1 | 1 | 1 | 1 | 1 |
| 11 | 22700310 | WIRE JUMPER #16 GA X 7 1/2" LONG COLOR BLACK | 5 | 5 | 5 | 6 | 6 |
| 12 | 20995407 | WIRE ASSEMBLY | 1 | 1 | 1 | - | - |
| 13 | 44485160 | WEATHER RESISTANT W/0 PAINT | 1 | - | - | 1 | - |
| | 44485160Y | WEATHER RESISTANT-POWDER COAT | - | 1 | - | - | 1 |
| | 44485160C | WEATHER RESISTANT-POWDER COAT | - | - | 1 | - | - |

# SINGLE SPEED GEARCASE COVER WITH CONTROLS
# 3 PHASE UNITS WEATHER/CORROSION RESISTANT 115V CONTROL
# 115V/230V 1PH 60HZ

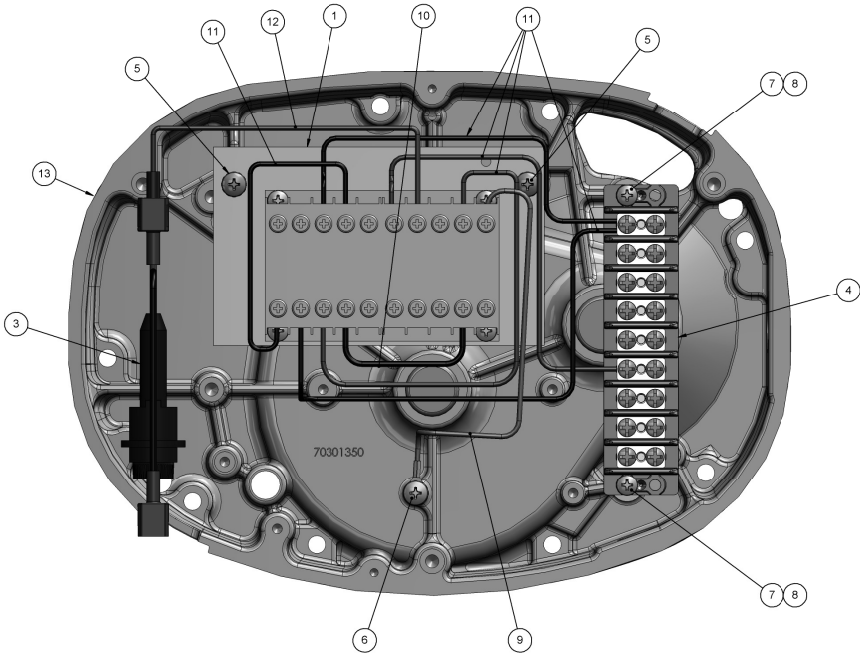



**Figure 9-5L. WIRING DIAGRAM 33325101 OR 33325102**

| ITEM NO. | PART NUMBER | DESCRIPTION | 45130088 115V CONTROL 115V/230V 1PH 60HZ | 45130088Y 115V CONTROL 115V/230V 1PH 60HZ | 45130088C 115V CONTROL 115V/230V 1PH 60HZ |
|---|---|---|---|---|---|
| 1 | 22845703 | CONTACTOR REVERSING 1EC 12A 110V 4NO W/MOUNTING PLATE | 1 | 1 | 1 |
| | 22845704 | CONTACTOR REVERSING 1EC 12A 24V 4NO W/MOUNTING PLATE | - | - | - |
| 2 | 22828202 | TRANSFORMER 575V 24V 20VA | - | - | - |
| 3 | 23515203 | Fuse Holder Assm | 1 | 1 | 1 |
| | 23515204 | Fuse Holder Assm | - | - | - |
| 4 | 11741009 | TERMINAL STRIP | 1 | 1 | 1 |
| 5 | N07093 | SCREW PAN HEAD PHILLIP SEMS | 2 | 2 | 2 |
| 6 | 10017807 | 10-24 1/4 PAN HEAD SELF TAPPING | 1 | 1 | 1 |
| 7 | 10381402 | SCREW ROUND HEAD PHILLIPS #8-32 X 1 PLATED | 2 | 2 | 2 |
| 8 | 10755401 | SPACER | 2 | 2 | 2 |
| 9 | 20055696 | WIRE JUMPER #16 GAUGE X T' LONG COLOR GREEN | 1 | 1 | 1 |
| 10 | 10486615 | WIRE JUMPER #14 GA X 3" LONG COLOR BLACK | 1 | 1 | 1 |
| 11 | 22700310 | WIRE JUMPER #16 GA X 7 1/2" LONG COLOR BLACK | 5 | 5 | 5 |
| 12 | 20995407 | WIRE ASSEMBLY | 1 | 1 | 1 |
| 13 | 44485160 | WEATHER RESISTANT W/0 PAINT | 1 | - | - |
| | 44485160Y | WEATHER RESISTANT-POWDER COAT | - | 1 | - |
| | 44485160C | WEATHER RESISTANT-POWDER COAT | - | - | 1 |

# TWO SPEED GEARCASE COVER WITH CONTROLS
# 3 PHASE UNITS
# 200, 230, 460 OR 575V 3PH 60HZ

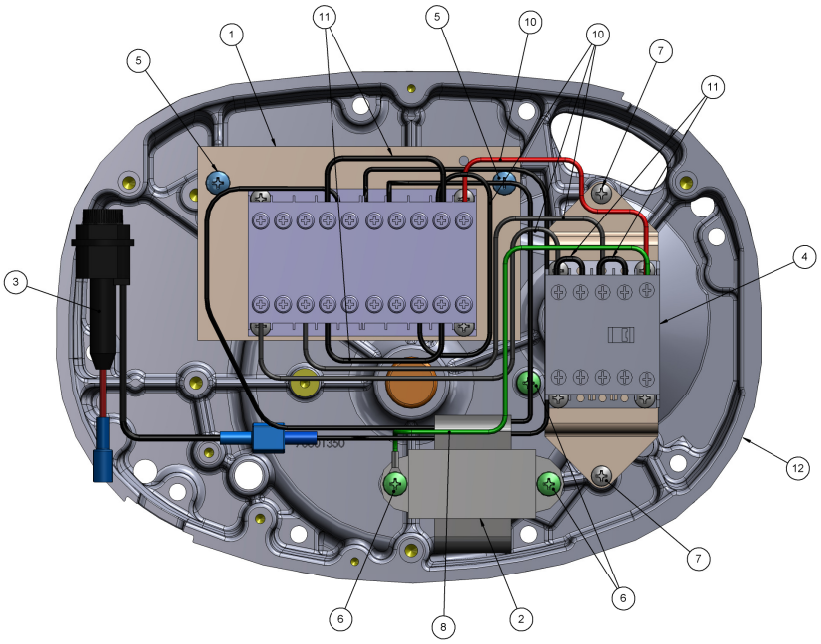



**Figure 9-5M. WIRING DIAGRAM 33325004**

| ITEM NO. | PART NUMBER | DESCRIPTION | 45130170 | 45130170Y | 45130171 | 45130171Y | 45130172 | 45130172Y |
|---|---|---|---|---|---|---|---|---|
| | | | 115V CONTROL 230V 3PH 60HZ | 115V CONTROL 230V 3PH 60HZ | 115V CONTROL 460V 3PH 60HZ | 115V CONTROL 460V 3PH 60HZ | 115V CONTROL 575V 3PH 60HZ | 115V CONTROL 575V 3PH 60HZ |
| 1 | 22845703 | CONTACTOR REVERSING 1EC 12A 110V 4NO W/ MOUNTING PLATE | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 20991905 | TRANSFORMER 230V 115V 20VA | 1 | 1 | - | - | - | - |
| | 20991906 | TRANSFORMER 460V 115V 20VA | - | - | 1 | 1 | - | - |
| | 20991910 | TRANSFORMER 575V 115V 20VA | - | - | - | - | 1 | 1 |
| 3 | 23515203 | Fuse Holder Assm | 1 | 1 | 1 | 1 | 1 | 1 |
| 4 | 22845731 | CONTACTOR AND MOUNTING PLATE | 1 | 1 | 1 | 1 | 1 | 1 |
| 5 | N07093 | SCREW PAN HEAD PHILLIP SEMS | 2 | 2 | 2 | 2 | 2 | 2 |
| 6 | 10017807 | 10-24 1/4 PAN HEAD SELF TAPPING | 3 | 3 | 3 | 3 | 3 | 3 |
| 7 | 11050712 | 8-32X1/2 PAN HEAD PHILLIPS SEM | 2 | 2 | 2 | 2 | 2 | 2 |
| 8 | 20055696 | WIRE JUMPER #16 GAUGE X T' LONG COLOR GREEN | 1 | 1 | 1 | 1 | 1 | 1 |
| 9 | 22700310 | WIRE JUMPER #16 GA X 7 1/2" LONG COLOR BLACK | 3 | 3 | 3 | 3 | 3 | 3 |
| 10 | 22700311 | WIRE JUMPER #16 GA x 5" LONG | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 | 10486615 | WIRE JUMPER #14 GA X 3" LONG COLOR BLACK | 4 | 4 | 4 | 4 | 4 | 4 |
| 12 | 44485252Y (PH) EXTERNAL C'WEIGHT-POWDER COAT | EXTERNAL C'WEIGHT-POWDER COAT EXTERNAL C'WEIGHT-WITH OUT PAINT | - | 1 | - | 1 | - | 1 |
| | 44485252 (PH) EXTERNAL C'WEIGHT-WITH OUT PAINT 1 | EXTERNAL C'WEIGHT-WITH OUT PAINT | 1 | - | 1 | - | 1 | - |

# TWO SPEED GEARCASE COVER WITH CONTROLS
# 3 PHASE UNITS
# 200, 230, 460 OR 575V 3PH 60HZ

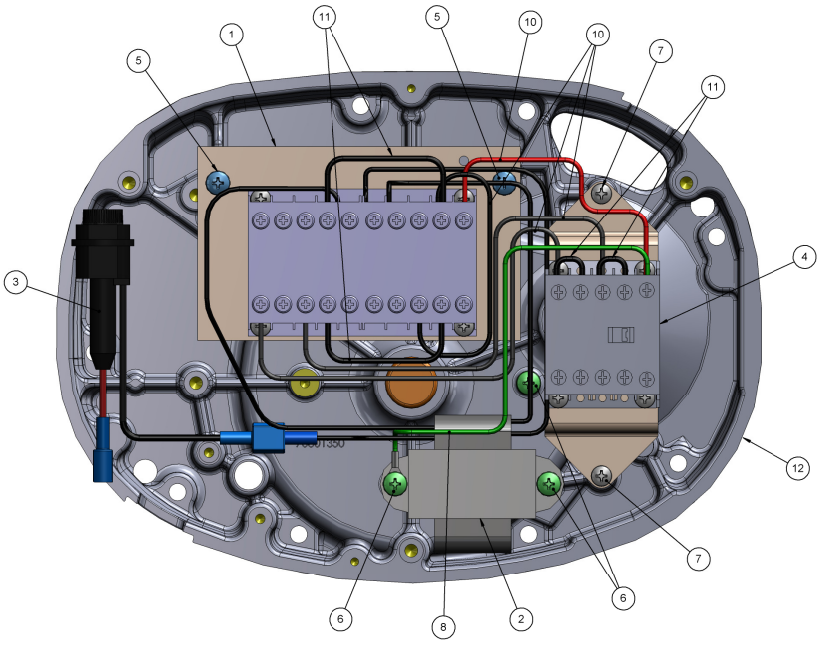



**Figure 9-5M. WIRING DIAGRAM 33325004**

| ITEM NO. | PART NUMBER | DESCRIPTION | 45130173 | 45130173Y | 45130174 | 45130174Y | 45130175 | 45130175Y |
|---|---|---|---|---|---|---|---|---|
| | | | 24V CONTROL 230V 3PH 60HZ | 24V CONTROL 230V 3PH 60HZ | 24V CONTROL 460V 3PH 60HZ | 24V CONTROL 460V 3PH 60HZ | 24V CONTROL 575V 3PH 60HZ | 24xV CONTROL 575V 3PH 60HZ |
| 1 | 22845704 | CONTACTOR REVERSING 1EC 12A 24V 4NO W/ MOUNTING PLATE | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 20991901 | TRANSFORMER 230V 24V 20VA | 1 | 1 | - | - | - | - |
| | 20991902 | TRANSFORMER 460V 24V 20VA | - | - | 1 | 1 | - | - |
| | 20991903 | TRANSFORMER 575V 24V 20VA | - | - | - | - | 1 | 1 |
| 3 | 23515204 | Fuse Holder Assm | 1 | 1 | 1 | 1 | 1 | 1 |
| 4 | 22845732 | CONTACTOR AND MOUNTING PLATE | 1 | 1 | 1 | 1 | 1 | 1 |
| 5 | N07093 | SCREW PAN HEAD PHILLIP SEMS | 2 | 2 | 2 | 2 | 2 | 2 |
| 6 | 10017807 | 10-24 114 PAN HEAD SELF TAPPING | 3 | 3 | 3 | 3 | 3 | 3 |
| 7 | 11050712 | 8-32X1/2 PAN HEAD PHILLIPS SEM | 2 | 2 | 2 | 2 | 2 | 2 |
| 8 | 20055696 | WIRE JUMPER #16 GAUGE X T' LONG COLOR GREEN | 1 | 1 | 1 | 1 | 1 | 1 |
| 9 | 22700310 | WIRE JUMPER #16 GA X 7112" LONG COLOR BLACK | 3 | 3 | 3 | 3 | 3 | 3 |
| 10 | 22700311 | WIRE JUMPER #16 GA x 5" LONG | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 | 10486615 | WIRE JUMPER #14 GA X 3" LONG COLOR BLACK | 4 | 4 | 4 | 4 | 4 | 4 |
| 12 | 44485252Y (PH) EXTERNAL C'WEIGHT-POWDER COAT | EXTERNAL C'WEIGHT-POWDER COAT EXTERNAL C'WEIGHT-WITH OUT PAINT | 1 | - | 1 | - | 1 | - |
| | 44485252 (PH) EXTERNAL C'WEIGHT-WITH OUT PAINT 1 | EXTERNAL C'WEIGHT-WITH OUT PAINT | - | 1 | - | 1 | - | 1 |

# TWO SPEED GEARCASE COVER WITH CONTROLS
# 3 PHASE UNITS WEATHER/CORROSION RESISTANT
# 200, 230, 460 OR 575V 3PH 60HZ

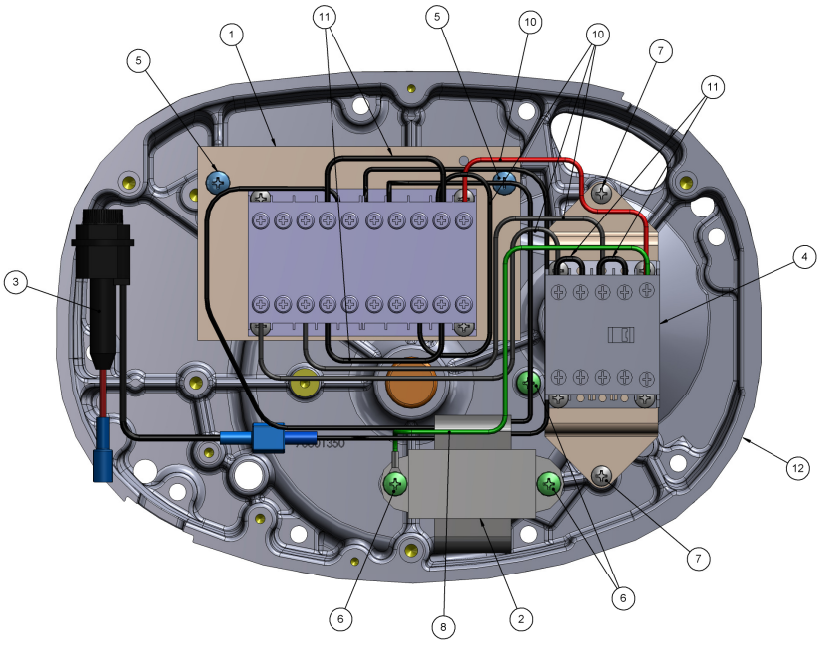



**Figure 9-5N. WIRING DIAGRAM 33325004**

| ITEM NO. | PART NUMBER | DESCRIPTION | 45130176 | 45130176Y | 45130177 | 45130177Y | 45130178 | 45130178Y |
|---|---|---|---|---|---|---|---|---|
| | | | 115V CONTROL 230V 3PH 60HZ | 115V CONTROL 230V 3PH 60HZ | 115V CONTROL 460V 3PH 60HZ | 115V CONTROL 460V 3PH 60HZ | 115V CONTROL 575V 3PH 60HZ | 115V CONTROL 575V 3PH 60HZ |
| 1 | 22845703 | CONTACTOR REVERSING 1EC 12A 110V 4NO W/ MOUNTING PLATE | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 20991905 | TRANSFORMER 230V 115V 20VA | 1 | 1 | - | - | - | - |
| | 20991906 | TRANSFORMER 460V 115V 20VA | - | - | 1 | 1 | - | - |
| | 20991910 | TRANSFORMER 575V 115V 20VA | - | - | - | - | 1 | 1 |
| 3 | 23515203 | Fuse Holder Assm | 1 | 1 | 1 | 1 | 1 | 1 |
| 4 | 22845731 | CONTACTOR AND MOUNTING PLATE | 1 | 1 | 1 | 1 | 1 | 1 |
| 5 | N07093 | SCREW PAN HEAD PHILLIP SEMS | 2 | 2 | 2 | 2 | 2 | 2 |
| 6 | 10017807 | 10-24 114 PAN HEAD SELF TAPPING | 3 | 3 | 3 | 3 | 3 | 3 |
| 7 | 11050712 | 8-32X1/2 PAN HEAD PHILLIPS SEM | 2 | 2 | 2 | 2 | 2 | 2 |
| 8 | 20055696 | WIRE JUMPER #16 GAUGE X T' LONG COLOR GREEN | 1 | 1 | 1 | 1 | 1 | 1 |
| 9 | 22700310 | WIRE JUMPER #16 GA X 7112" LONG COLOR BLACK | 3 | 3 | 3 | 3 | 3 | 3 |
| 10 | 22700311 | WIRE JUMPER #16 GA x 5" LONG | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 | 10486615 | WIRE JUMPER #14 GA X 3" LONG COLOR BLACK | 4 | 4 | 4 | 4 | 4 | 4 |
| 12 | 44485160Y | WEATHER RESISTANT-POWDER COAT | - | 1 | - | 1 | - | 1 |
| | 44485160 | WEATHER RESISTANT W/O PAINT | 1 | - | 1 | - | 1 | - |

# TWO SPEED GEARCASE COVER WITH CONTROLS
# 3 PHASE UNITS WEATHER/CORROSION RESISTANT
# 200, 230, 460 OR 575V 3PH 60HZ

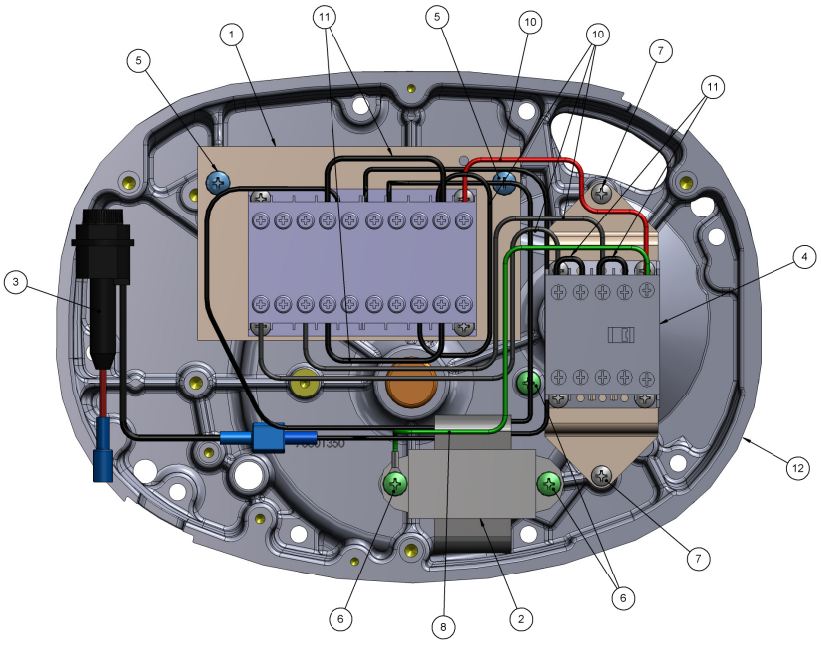



**Figure 9-5N. WIRING DIAGRAM 33325004**

| ITEM NO. | PART NUMBER | DESCRIPTION | 45130179 | 45130179Y | 45130180 | 45130180Y | 45130181 | 45130181Y |
|---|---|---|---|---|---|---|---|---|
| | | | 24V CONTROL 230V 3PH 60HZ | 24V CONTROL 230V 3PH 60HZ | 24V CONTROL 460V 3PH 60HZ | 24V CONTROL 460V 3PH 60HZ | 24V CONTROL 575V 3PH 60HZ | 24V CONTROL 575V 3PH 60HZ |
| 1 | 22845704 | CONTACTOR REVERSING 1EC 12A 24V 4NO W/ MOUNTING PLATE | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 20991901 | TRANSFORMER 230V 24V 20VA | 1 | 1 | - | - | - | - |
| | 20991902 | TRANSFORMER 460V 24V 20VA | - | - | 1 | 1 | - | - |
| | 20991903 | TRANSFORMER 575V 24V 20VA | - | - | - | - | 1 | 1 |
| 3 | 23515204 | Fuse Holder Assm | 1 | 1 | 1 | 1 | 1 | 1 |
| 4 | 22845732 | CONTACTOR AND MOUNTING PLATE | 1 | 1 | 1 | 1 | 1 | 1 |
| 5 | N07093 | SCREW PAN HEAD PHILLIP SEMS | 2 | 2 | 2 | 2 | 2 | 2 |
| 6 | 10017807 | 10-24 114 PAN HEAD SELF TAPPING | 3 | 3 | 3 | 3 | 3 | 3 |
| 7 | 11050712 | 8-32X1/2 PAN HEAD PHILLIPS SEM | 2 | 2 | 2 | 2 | 2 | 2 |
| 8 | 20055696 | WIRE JUMPER #16 GAUGE X T' LONG COLOR GREEN | 1 | 1 | 1 | 1 | 1 | 1 |
| 9 | 22700310 | WIRE JUMPER #16 GA X 7112" LONG COLOR BLACK | 3 | 3 | 3 | 3 | 3 | 3 |
| 10 | 22700311 | WIRE JUMPER #16 GA x 5" LONG | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 | 10486615 | WIRE JUMPER #14 GA X 3" LONG COLOR BLACK | 4 | 4 | 4 | 4 | 4 | 4 |
| 12 | 44485160 | WEATHER RESISTANT-W/O PAINT | 1 | - | 1 | - | 1 | - |
| | 44485160Y | WEATHER RESISTANT POWDER COAT | - | 1 | - | 1 | - | 1 |

# TWO SPEED GEARCASE COVER WITH CONTROLS
# 3 PHASE UNITS WEATHER/CORROSION RESISTANT 575V 3PH 60HZ

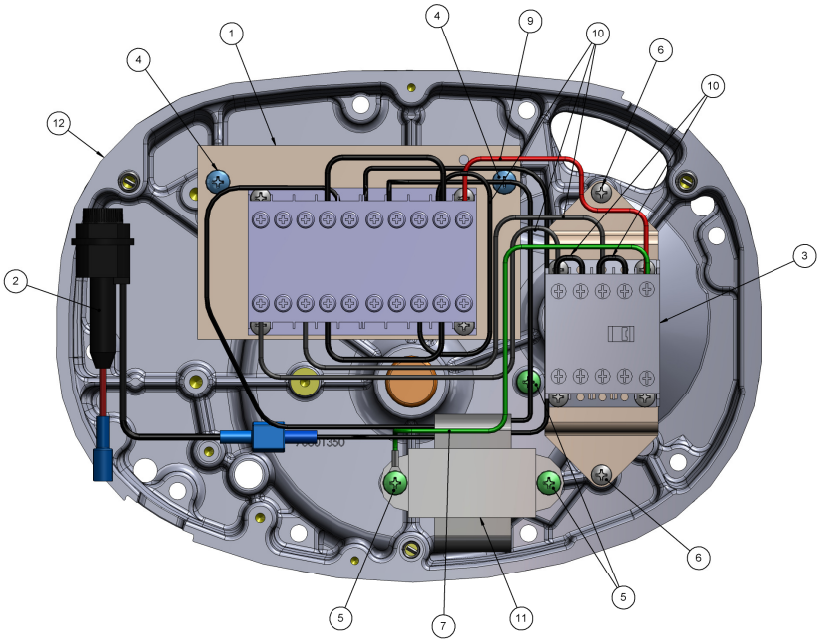



**Figure 9-5O. WIRING DIAGRAM 33325004**

| ITEM NO. | PART NUMBER | DESCRIPTION | 45130182C 115V CONTROL 575V 3 PH 60HZ | 45130182C 115V CONTROL 575V 3 PH 60HZ |
|---|---|---|---|---|
| 1 | 22845703 | CONTACTOR, REVERSING, 1EC 12A 10V 4NO W/ MOUNTING PLATE | 1 | 1 |
| 2 | 23515203 | FUSE HOLDER ASSY | 1 | 1 |
| 3 | 22845731 | CONTACTOR AND MOUNTING PLATE | 1 | 1 |
| 4 | N07093 | SCREW PAN HEAD PHILLIPS SEM | 2 | 2 |
| 5 | 10017807 | 10-24 1/4 OAN HEAD SELF TAPPING | 3 | 3 |
| 6 | 11050712 | 8-32 X 1/2 PAN HEAD PHILLIPS SEM | 2 | 2 |
| 7 | 20055696 | WIRE JUMPER #16 GUAGE X 7" LONG COLOR GREEN | 1 | 1 |
| 8 | 22700310 | WIRE JUMPER #16 GUAGE X 7.5" LONG COLOR BLACK | 3 | 3 |
| 9 | 22700311 | WIRE JUMPER #16 GUAGE X 5" LONG | 1 | 1 |
| 10 | 10486615 | WIRE JUMPER #14 GUAGE X 7" LONG COLOR BLACK | 4 | 4 |
| 11 | 20991910 | TRANSFORMER 575V 115V 20VA | 1 | 1 |
| 12 | 44485161C | WEATHER RESISTANT POWDER COAT | 1 | - |
| | 44485160C | WEATHER RESISTANT POWDER COAT | - | 1 |

# AC BRAKE

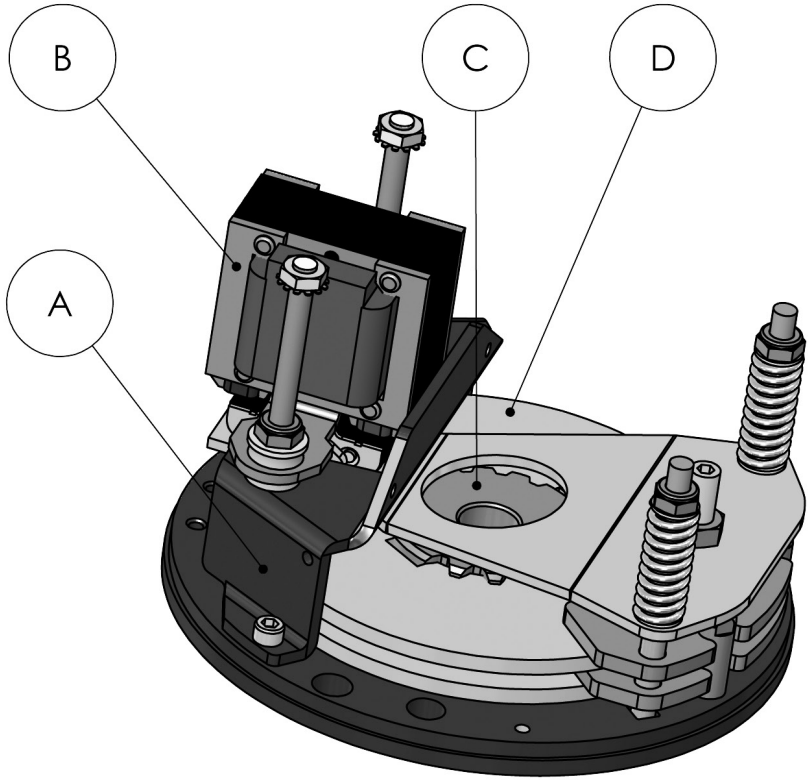



**Figure 9-6. BRAKES**

| ITEM NO. | PART NUMBER | VOLTAGE | HOIST MODEL XXYY WHERE XX = CAPACITY, YY = SPEED (FPM) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2518 | 2532 | 5016 | 5032 | 0116 | 0132 | 0216 | 0310 | 0208 | 0305 |
| A | 45097301 | 230/460-1-60 | X | | | | | | | | | |
| | 45097303 | 575-1-60 | X | | | | | | | | | |
| | 45097304 | 115/208-230-1-60 | X | | | | | | | | | |
| | 45097307 | 230/460-1-60 | | X | X | | | | | | | |
| | 45097309 | 575-1-60 | | X | X | | | | | | | |
| | 45097310 | 115/208-230-1-60 | | X | X | | | | | | | |
| | 45097313 | 230/460-1-60 | | | | X | X | X | X | X | | |
| | 45097315 | 575-1-60 | | | | X | X | X | X | X | | |
| | 45097316 | 115/208-230-1-60 | | | | X | X | | | | X | X |
| B | 45097396 | SOLENOID KIT | | | | | | | | | | |
| C | 450997399 | BRAKE HUB | | | | | | | | | | |
| D | 450997350 | BRAKE DISC (SPECIFY QTY. SOME BRAKE ASSEMBLIES USE 2) | | | | | | | | | | |
| E | 45097397B | BRAKE COVER (NOT SHOWN) | | | | | | | | | | |
| F | 45097395 | HARDWARE KIT FOR BRAKE COVER AND HUB (NOT SHOWN)<br>CONSISTING OF 2 NUTS & LOCKWASHERS FOR COVER, 2 SET SCREWS FOR BRAKE HUB, AND 1 WOODRUFF KEY | | | | | | | | | | |
| G | 10095703 | 3/8 LOCKWASHER FOR BRAKE MOUNTING (NOT SHOWN) | | | | | | | | | | |
| H | 10119413 | RETAINING RING FOR BRAKE HUB (NOT SHOWN) | | | | | | | | | | |
| I | NO2112 | SHCS 3/8 FOR BRAKE MOUNTING (NOT SHOWN) | | | | | | | | | | |

# MOTORS

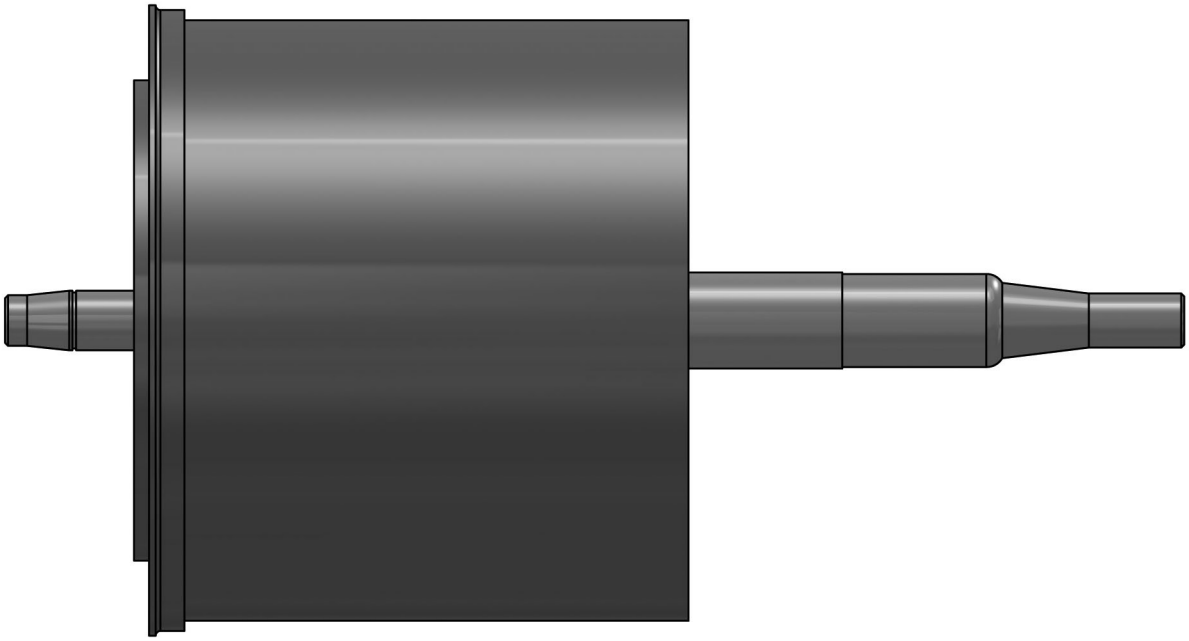


**Figure 9-7. MOTORS**

| PART NUMBER | VOLTAGE | HOIST MODEL XXYY WHERE XX = CAPACITY, YY = SPEED (FPM) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2518 | 2532 | 5016 | 5032 | 0116 | 0132 | 0216 | 0310 | 0208 | 0305 |
| 45089072B | 115/230V 56 .25 HP 1800 RPM | X | | | | | | | | | |
| 45089074B | 115/230V 56 .5 HP 1800 RPM | | X | X | | | | | | | |
| 45089076B | 115/230V 56 1 HP 1800 RPM | | | | X | X | | | | X | X |
| 45089102B | 230/460C 190/380V 56 .25 HP 1800 RPM | X | | | | | | | | | |
| 45089103B | 575V 56 .25 HP 1800 RPM | X | | | | | | | | | |
| 45089105B | 230/460V 190/380V 56 .5 HP 1800 RPM | | X | X | | | | | | | |
| 45089106B | 575 V 56 .5 HP 1800 RPM | | X | X | | | | | | | |
| 45089108B | 230/460V 190/380V 56 1 HP 1800 RPM | | | | X | X | | | | | |
| 45089109B | 575 56 1 HP 1800 RPM | | | | X | X | | | | | |
| 45089122B | 230/460V 190/380 56 2/5 HP 3600 RPM | | | | | | X | X | X | | |
| 45089123B | 575V 56 2.5 HP 3600 RPM | | | | | | X | | | X | X |
| 45089204B | 2 SPEED 575V 56 2.5-7.5 HP 3600/1200 RPM | | | | | | X | X | X | | |
| 45089212B | 2 SPEED 575V 56 .5-.17 HP 1800/600 RPM | X | X | X | | | | | | | |
| 45089216B | 2 SPEED 575V 56 1-.33 HP 3600/1200 RPM | | | | X | X | | | | | |

# CHAIN WITH LIMIT SWITCH

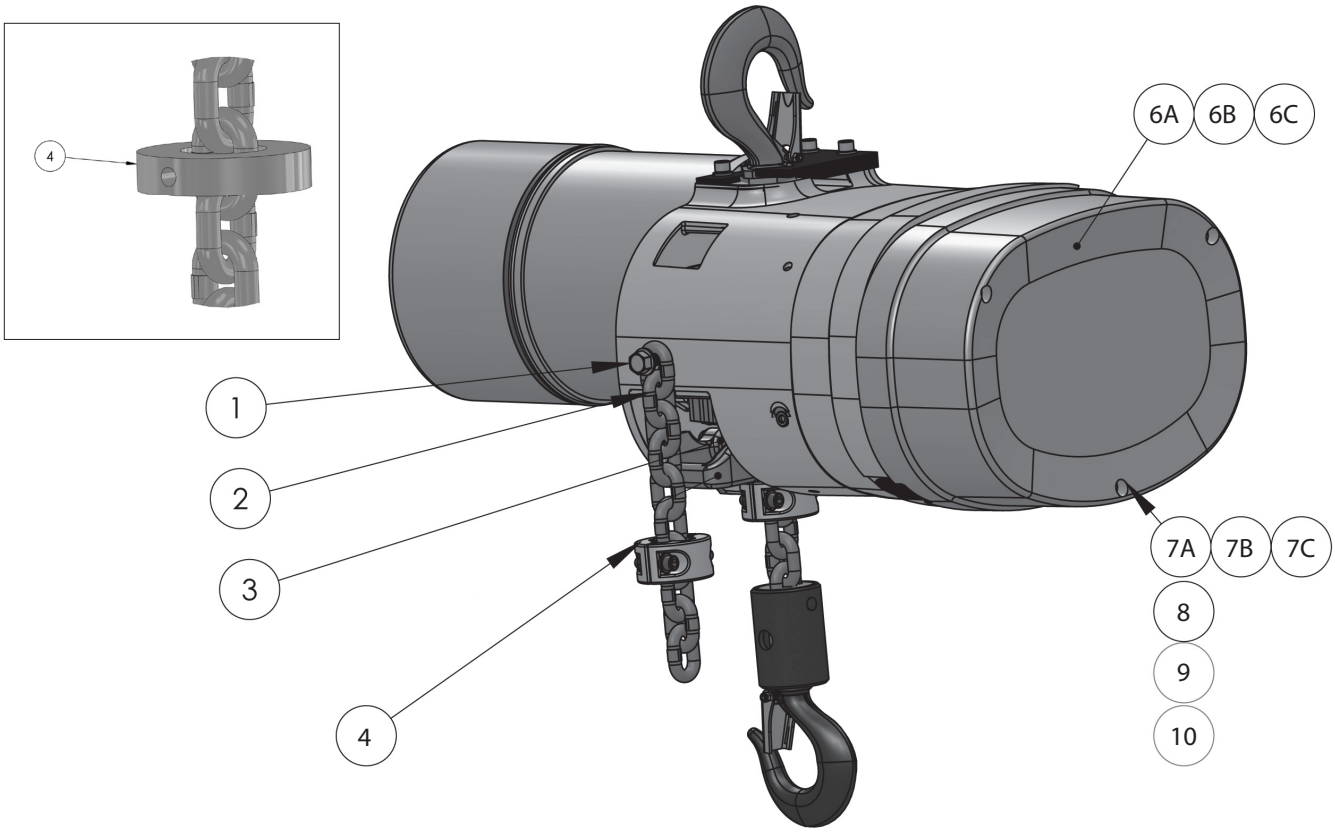


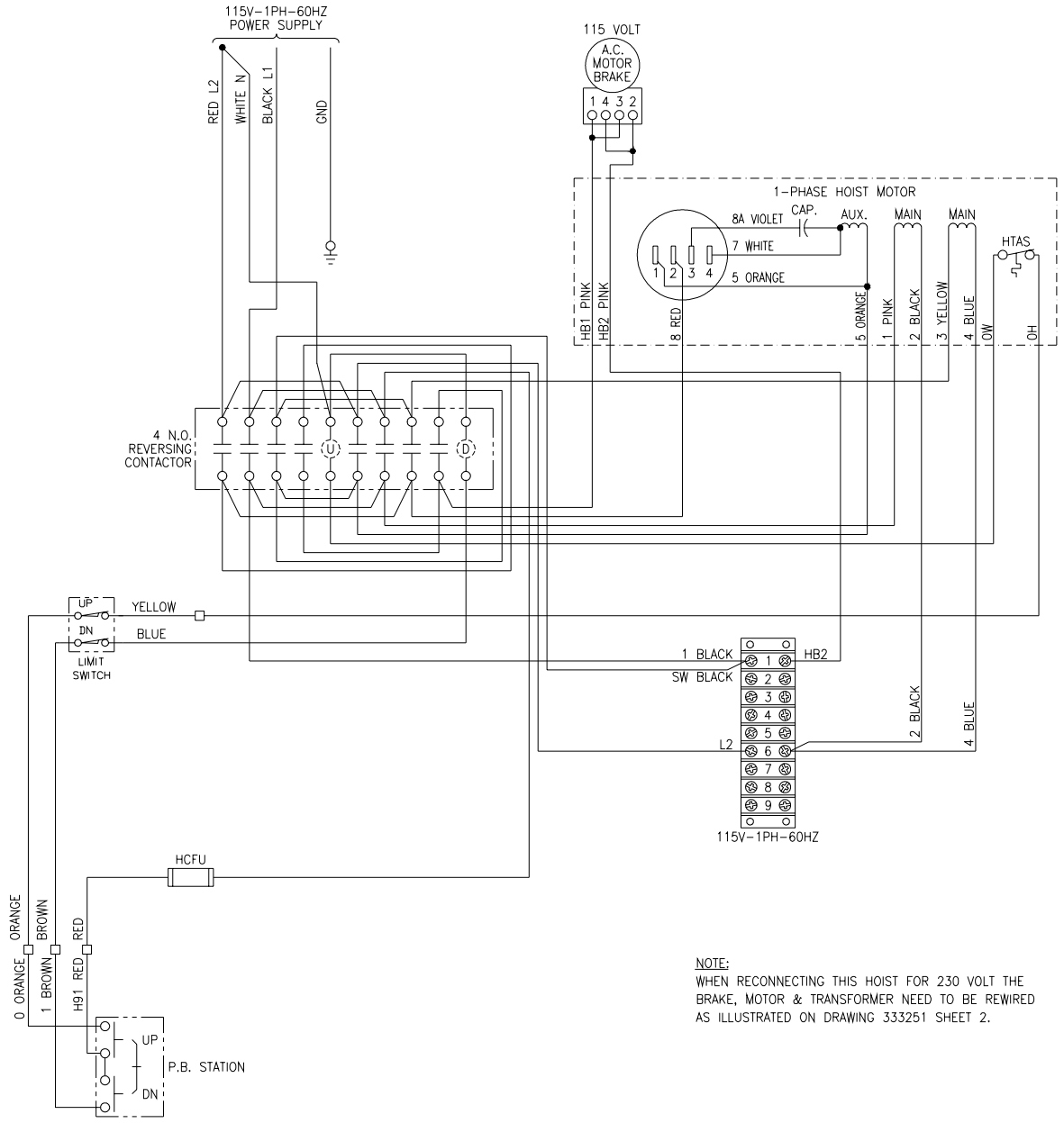

**Figure 9-8. LIMIT SWITCH ASSEMBLY WITH STOPS AND CHAIN**

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | 11829201 | HEX FLANGE HEAD BOLT | 1 |
| 2 | 22716301 | LIMIT SWITCH ASSEMBLY | 1 |
| 3 | 33215901 | LIMIT LEVER | 1 |
| 4 | 24016K | CHAIN STOP ASSEMBLY | 1 |
| 4 | 11344201 | ACTUATOR | 1 |
| 5 | 10450808 | LIMIT SWITCH KEY (NOT SHOWN) | 1 |
| 6A | 11820501C | END COVER (STANDARD & VFD) | 1 |
| 6B | 10878506C | END COVER (INTERNAL C'WEIGHT) | 1 |
| 6C | 33179020C | EXTENSION FRAME 9VFD ONLY) | 1 |
| 7A | 10777101 | END COVER SCREWS (STANDARD & INTERNAL C'WEIGHT) | 3 |
| 7B | 10777102 | END COVER SCREWS (VFD ONLY) | 3 |
| 7C | 22725901/01 | EXTERNAL C'WEIGHT COVER SCREWS (ONLY) | 2/1 |
| 8 | 10095701 | END COVER LOCK WASHERS | 3 |
| 9 | 10409702 | C-CLIP SCREW RETAINERS FOR ITEMS 8A, B OR C | 3 |
| 10 | 10327306 | NUT EXTERNAL C'WEIGHT (NOT SHOWN) | 3 |
| 11 | 21910601 | INTERNAL C'WEIGHT (NOT SHOWN) | 1 |
| 12 | 10439102 | INTERNAL C'WEIGHT SCREWS (NOT SHOWN) | 2 |
| 13 | 43945901C | EXTERNAL C'WEIGHT (NOT SHOWN) | 1 |
| 14 | 10422705 | VENT PLUG 1/4-18NPT (NOT SHOWN) | 1 |

* Chain Quantity = ((DROP) + (1.75')) for 1/4 to 1 ton hoist.
(((DROP) X (2)) + 3.25') for 2 ton Hoist and
(((DROP) X (3)) + 4.75') for 3 ton hoist.

# 1 PHASE, 115/230 VOLT RECEONNECTABLE, SINGLE SPEED HOIST (PADDLE LIMIT SWITCH)

## 115V CONNECTIONS, 1 PHASE




⚠WARNING:
UNLESS HOOK RAISES WHEN "UP" BUTTON IS PRESSED SEVERE HOIST DAMAGE AND A DROPPED LOAD MAY RESULT.
CORRECT IMPROPER HOOK DIRECTION BY INTERCHANGING MOTOR LEADS ORANGE (5) AND RED (8).
DO NOT CHANGE PUSHBUTTON WIRING.

⚠WARNING:
THIS EQUIPMENT MUST BE EFFECTIVELY GROUNDED ACCORDING TO APPLICABLE CODES.

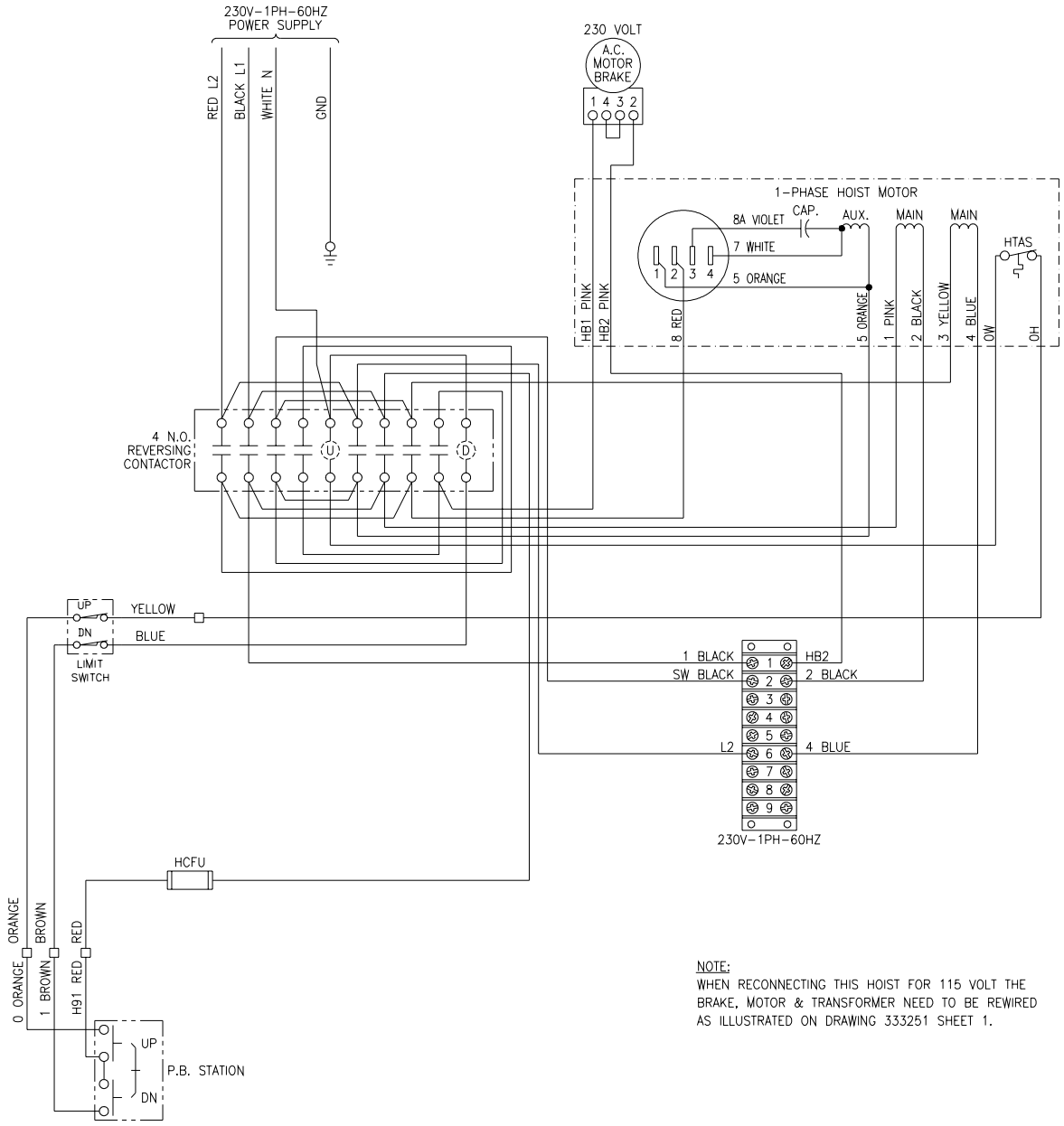
⚠AVERTISSEMENT:
CET EQUIPMENT DOIT ETRE MIS A'LA TERRE EN ACCORDANCE AVEC LES NORMES EN VIGUEUR.

1

**Figure 9-9a. WIRING DIAGRAMS**

# 1 PHASE, 115/230 VOLT RECEONNECTABLE, SINGLE SPEED HOIST (PADDLE LIMIT SWITCH)

## 230V CONNECTIONS, 1 PHASE




⚠WARNING:

UNLESS HOOK RAISES WHEN "UP" BUTTON IS PRESSED SEVERE HOIST DAMAGE AND A DROPPED LOAD MAY RESULT.

CORRECT IMPROPER HOOK DIRECTION BY INTERCHANGING MOTOR LEADS ORANGE (5) AND RED (8).
DO NOT CHANGE PUSHBUTTON WIRING.

⚠WARNING:

THIS EQUIPMENT MUST BE EFFECTIVELY GROUNDED ACCORDING TO APPLICABLE CODES.

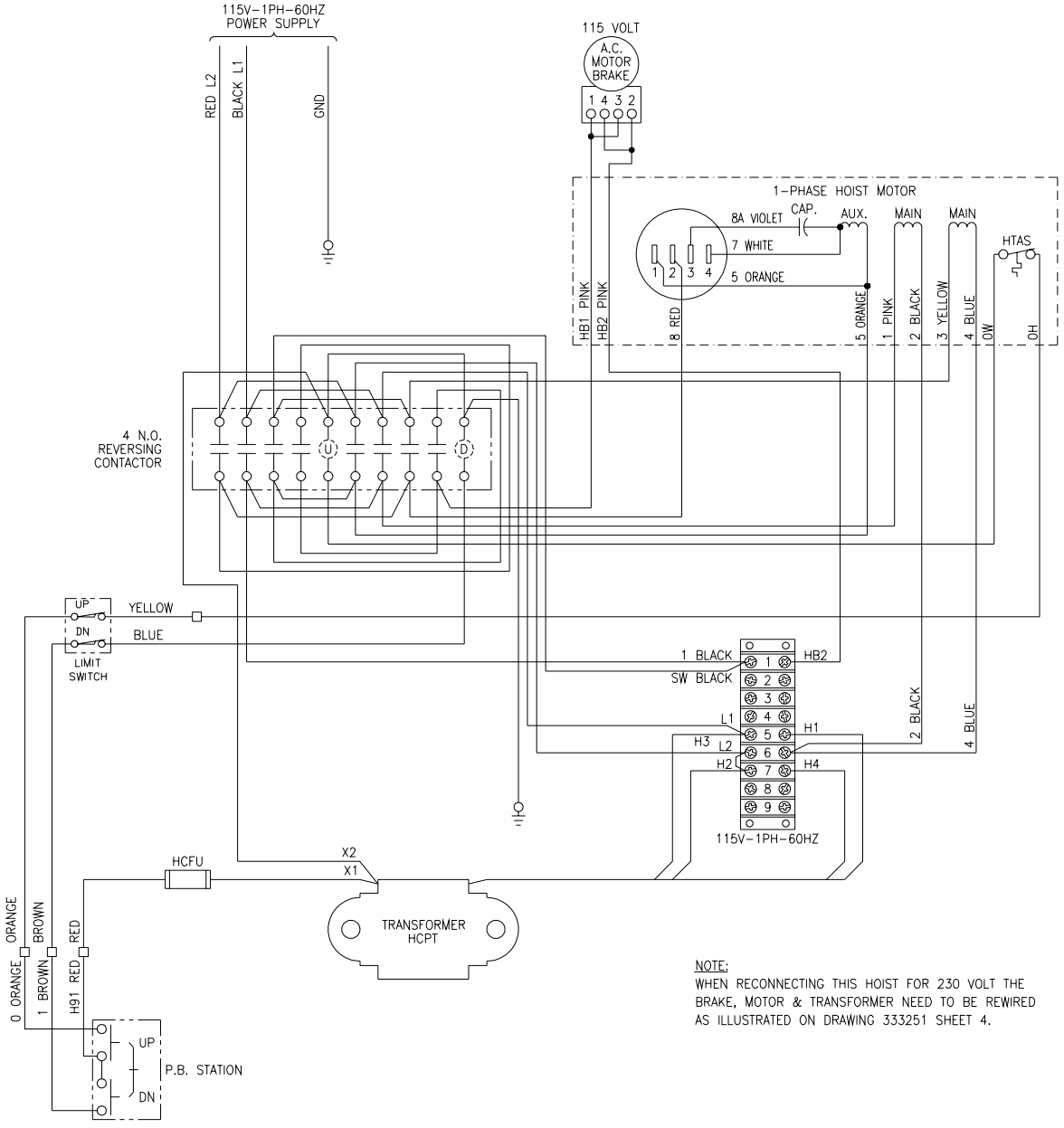
⚠AVERTISSEMENT:

CET EQUIPMENT DOIT ETRE MIS A'LA TERRE EN ACCORDANCE AVEC LES NORMES EN VIGUEUR.

**Figure 9-9b. WIRING DIAGRAMS**

# 1 PHASE, 115/230 VOLT RECEONNECTABLE, SINGLE SPEED HOIST WITH TRANSFORMER (PADDLE LIMIT SWITCH)

## 115V CONNECTIONS, 1 PHASE




⚠ WARNING:
UNLESS HOOK RAISES WHEN "UP" BUTTON IS PRESSED SEVERE HOIST DAMAGE AND A DROPPED LOAD MAY RESULT.
CORRECT IMPROPER HOOK DIRECTION BY INTERCHANGING MOTOR LEADS ORANGE (5) AND RED (8).
DO NOT CHANGE PUSHBUTTON WIRING.

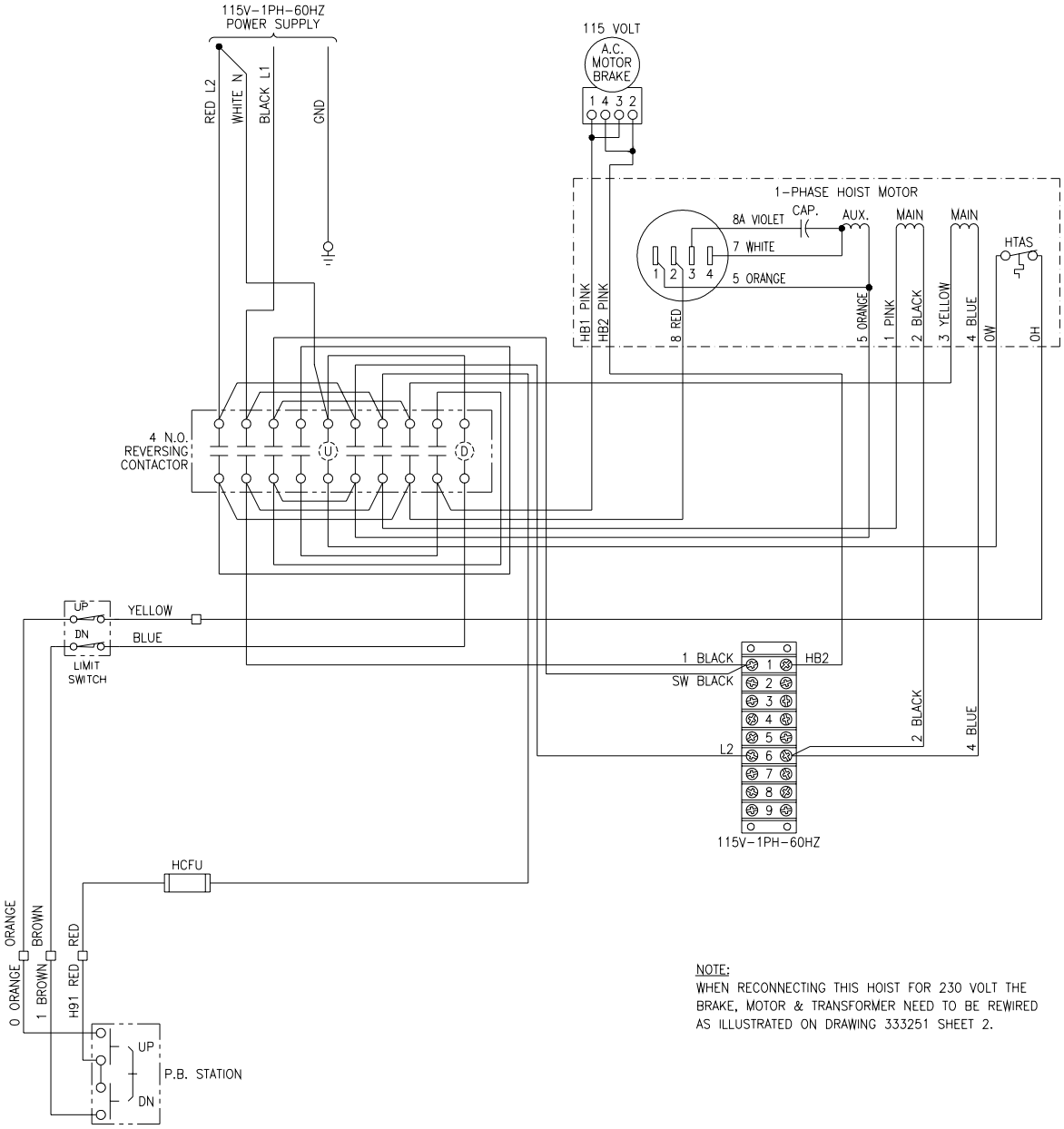
⚠ WARNING:
THIS EQUIPMENT MUST BE EFFECTIVELY GROUNDED ACCORDING TO APPLICABLE CODES.

⚠ AVERTISSEMENT:
CET EQUIPMENT DOIT ETRE MIS A'LA TERRE EN ACCORDANCE AVEC LES NORMES EN VIGUEUR.

**Figure 9-9c. WIRING DIAGRAMS**

# 1 PHASE, 115/230 VOLT RECEONNECTABLE, SINGLE SPEED HOIST WITH TRANSFORMER (PADDLE LIMIT SWITCH)

## 230V CONNECTIONS, 1 PHASE




NOTE:
WHEN RECONNECTING THIS HOIST FOR 230 VOLT THE BRAKE, MOTOR & TRANSFORMER NEED TO BE REWIRED AS ILLUSTRATED ON DRAWING 333251 SHEET 2.

⚠ WARNING:
UNLESS HOOK RAISES WHEN "UP" BUTTON IS PRESSED SEVERE HOIST DAMAGE AND A DROPPED LOAD MAY RESULT.
CORRECT IMPROPER HOOK DIRECTION BY INTERCHANGING MOTOR LEADS ORANGE (5) AND RED (8).
DO NOT CHANGE PUSHBUTTON WIRING.

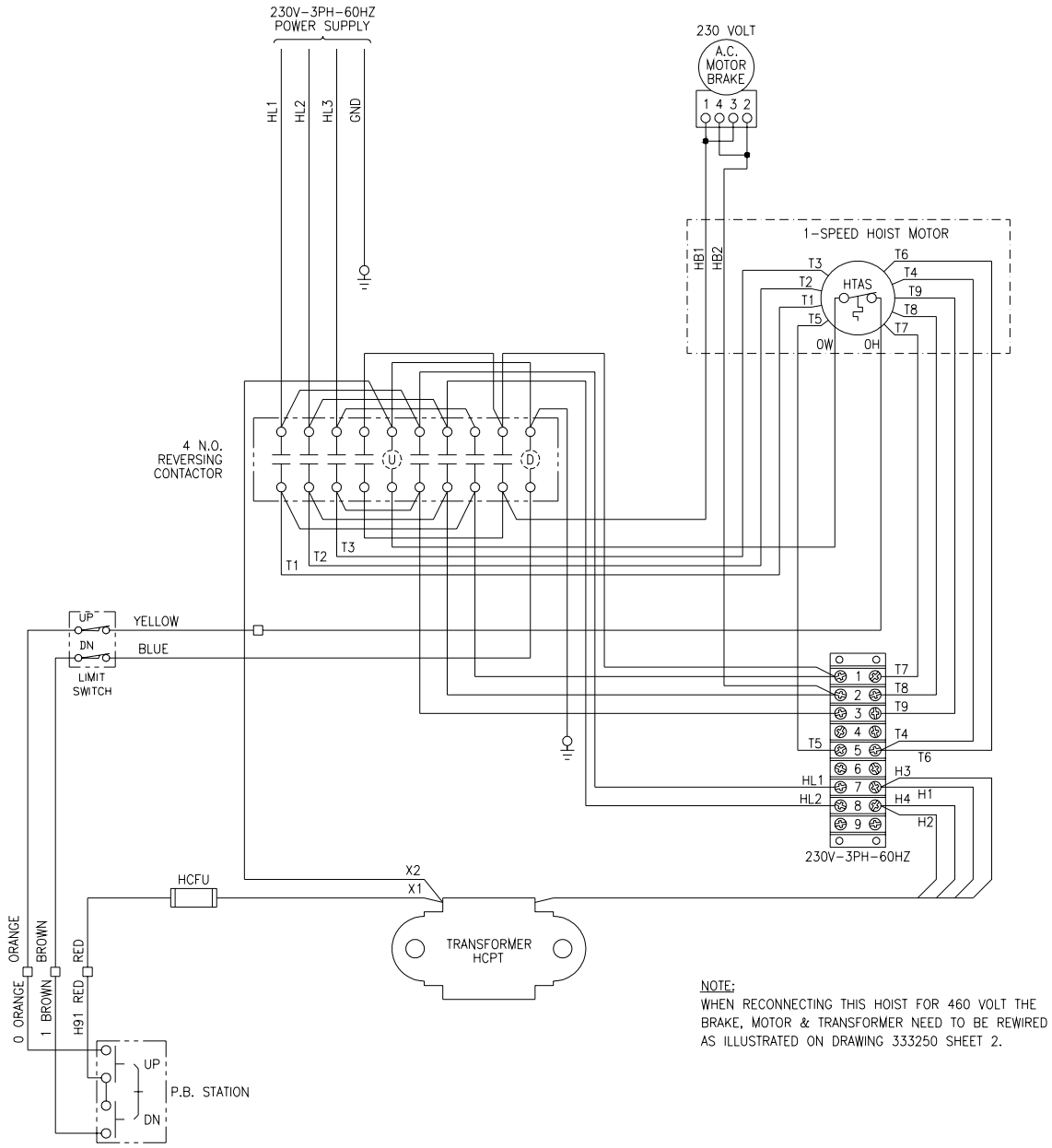
⚠ WARNING:
THIS EQUIPMENT MUST BE EFFECTIVELY GROUNDED ACCORDING TO APPLICABLE CODES.

⚠ AVERTISSEMENT:
CET EQUIPMENT DOIT ETRE MIS A'LA TERRE EN ACCORDANCE AVEC LES NORMES EN VIGUEUR.

**Figure 9-9d. WIRING DIAGRAMS**

# 3 PHASE, 230/460 VOLT RECEONNECTABLE, SINGLE SPEED HOIST (PADDLE LIMIT SWITCH)

## 230V CONNECTIONS, 3 PHASE




⚠WARNING:

UNLESS HOOK RAISES WHEN "UP" BUTTON IS PRESSED SEVERE HOIST DAMAGE AND A DROPPED LOAD MAY RESULT.

CORRECT IMPROPER HOOK DIRECTION BY INTERCHANGING INPUT POWER L1 AND L3 DO NOT CHANGE PUSHBUTTON WIRING.

⚠WARNING:

THIS EQUIPMENT MUST BE EFFECTIVELY GROUNDED ACCORDING TO APPLICABLE CODES.

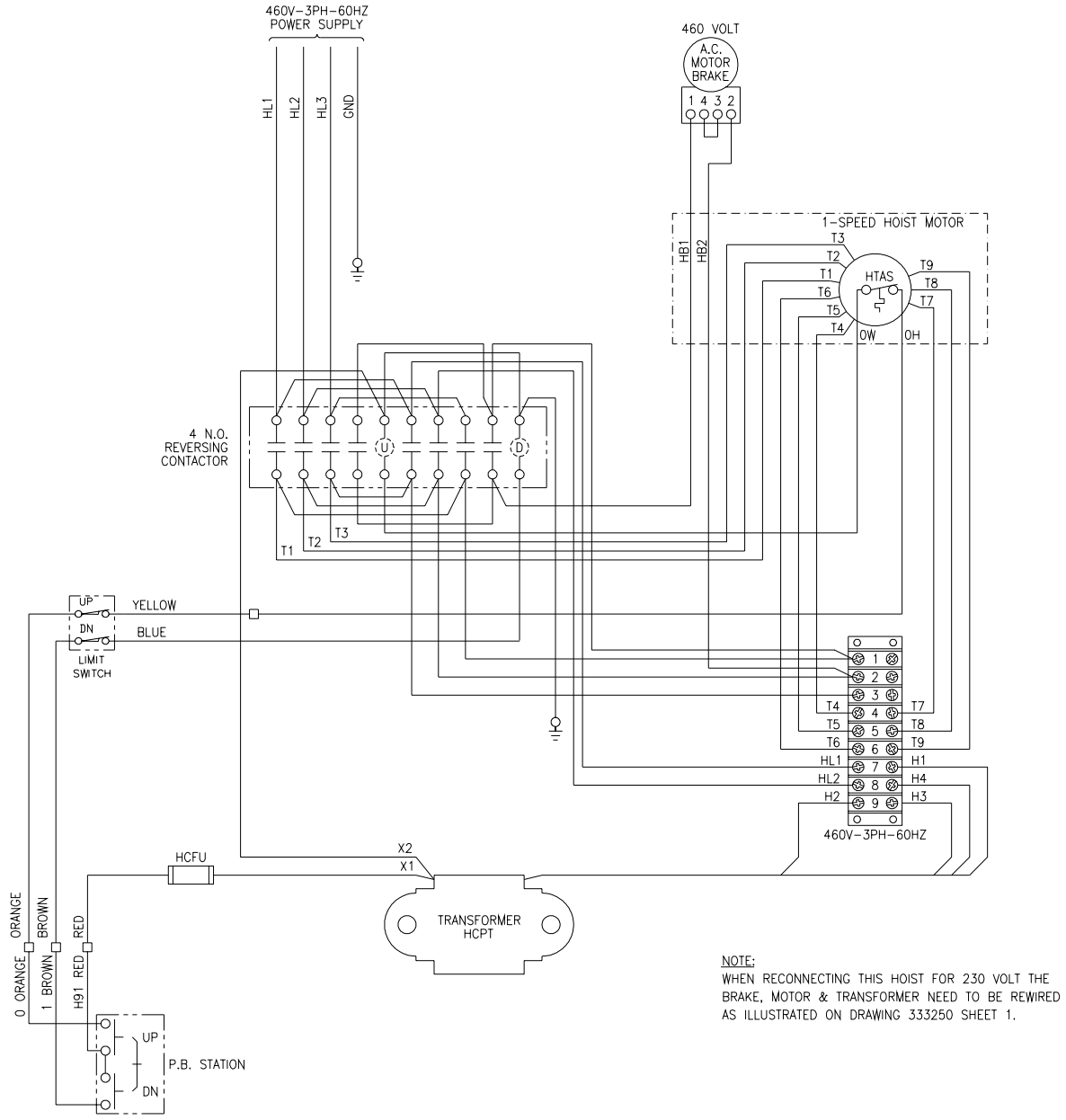
⚠AVERTISSEMENT:

CET EQUIPMENT DOIT ETRE MIS A'LA TERRE EN ACCORDANCE AVEC LES NORMES EN VIGUEUR.

**Figure 9-9e. WIRING DIAGRAMS**

# 3 PHASE, 230/460 VOLT RECEONNECTABLE, SINGLE SPEED HOIST (PADDLE LIMIT SWITCH)

## 460V CONNECTIONS, 3 PHASE




⚠WARNING:

UNLESS HOOK RAISES WHEN "UP" BUTTON IS PRESSED SEVERE HOIST DAMAGE AND A DROPPED LOAD MAY RESULT.

CORRECT IMPROPER HOOK DIRECTION BY INTERCHANGING INPUT POWER L1 AND L3 DO NOT CHANGE PUSHBUTTON WIRING.

⚠WARNING:

THIS EQUIPMENT MUST BE EFFECTIVELY GROUNDED ACCORDING TO APPLICABLE CODES.

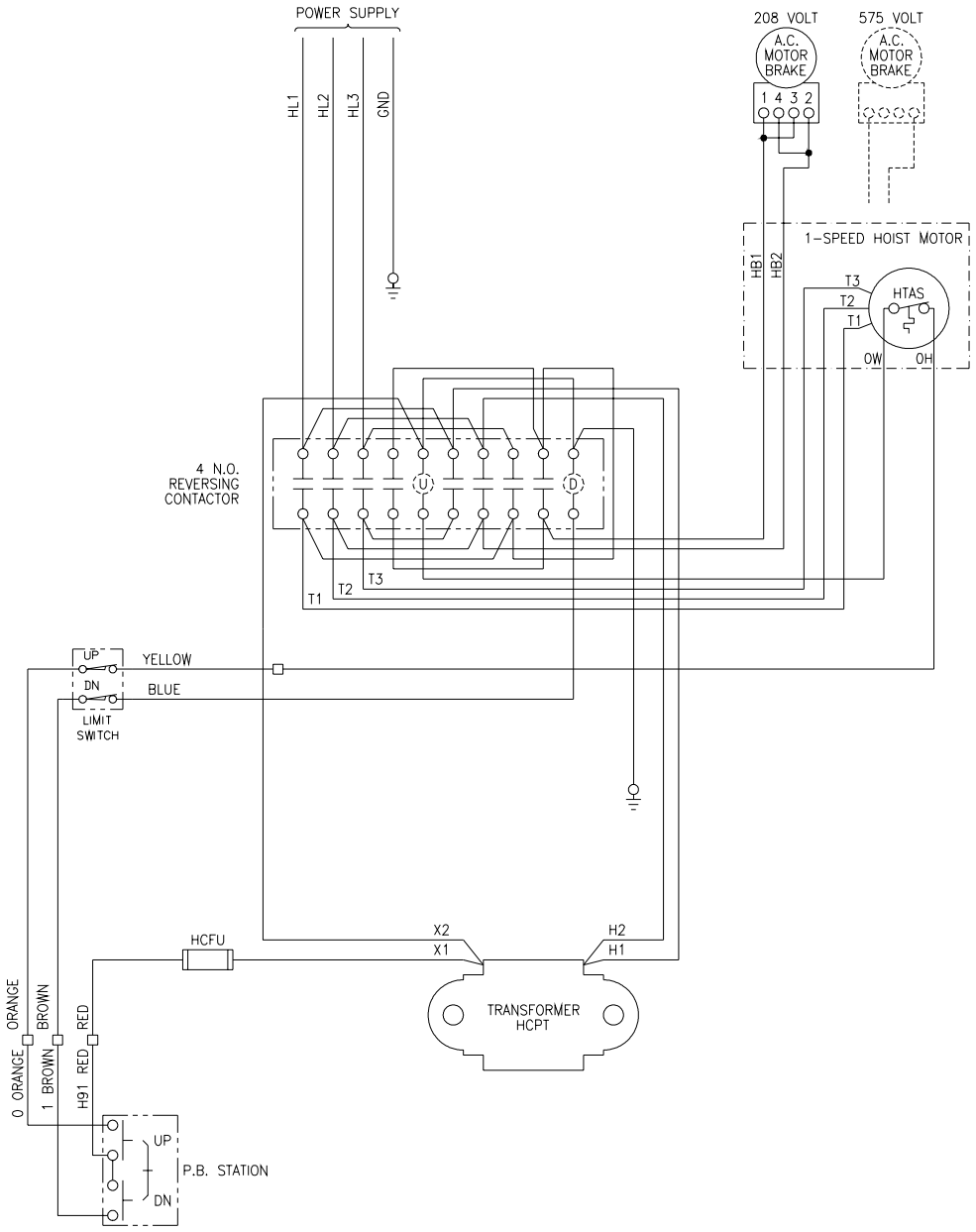
⚠AVERTISSEMENT:

CET EQUIPMENT DOIT ETRE MIS A'LA TERRE EN ACCORDANCE AVEC LES NORMES EN VIGUEUR.

**Figure 9-9F. WIRING DIAGRAMS**

# 3 PHASE, SINGLE VOLTAGE, SINGLE SPEED HOIST (PADDLE LIMIT SWITCH)

## 208V & 575V CONNECTIONS, 3 PHASE



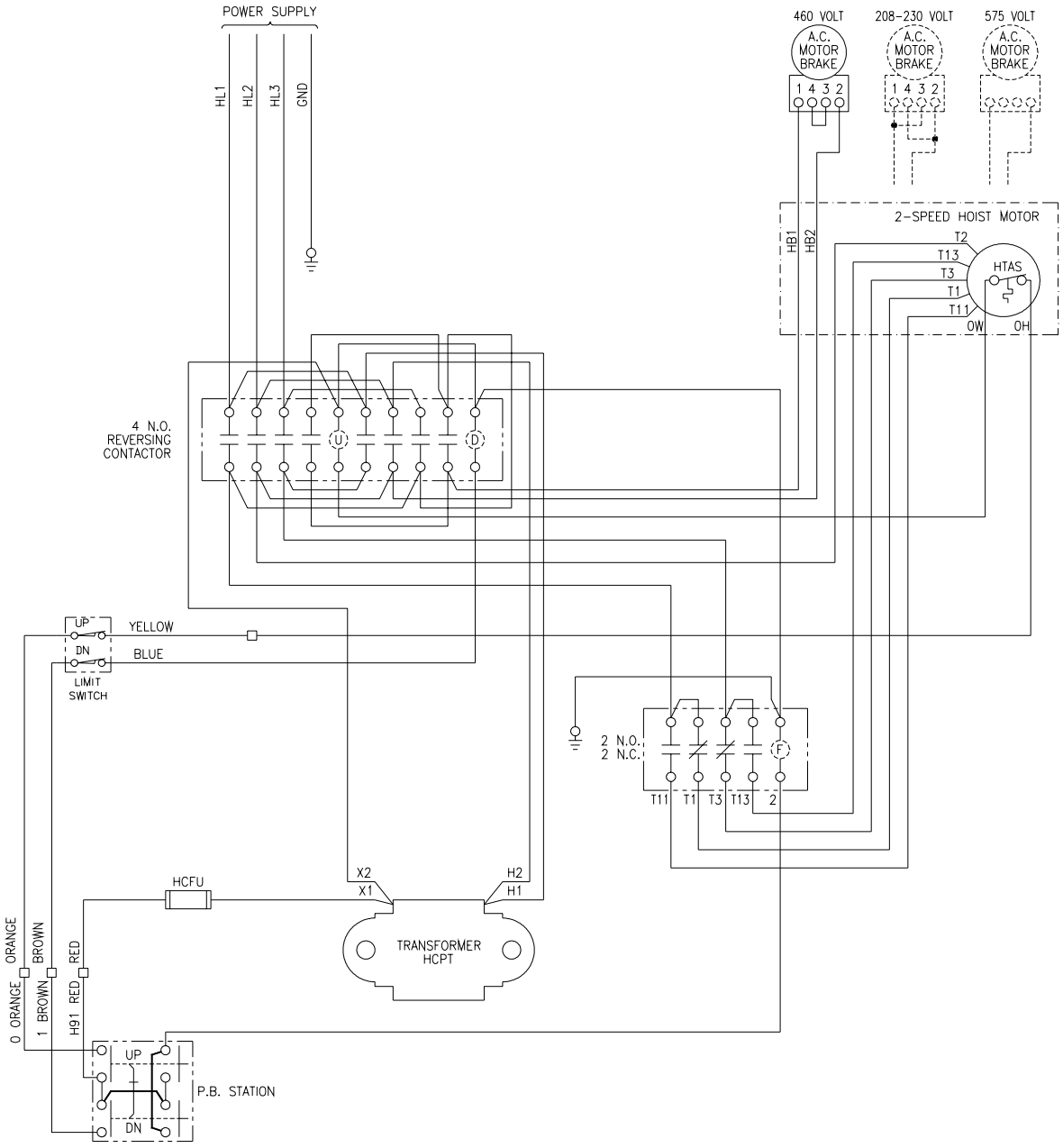

⚠WARNING:
UNLESS HOOK RAISES WHEN "UP" BUTTON IS PRESSED SEVERE HOIST DAMAGE AND A DROPPED LOAD MAY RESULT.
CORRECT IMPROPER HOOK DIRECTION BY INTERCHANGING INPUT POWER L1 AND L3 DO NOT CHANGE PUSHBUTTON WIRING.

⚠WARNING:
THIS EQUIPMENT MUST BE EFFECTIVELY GROUNDED ACCORDING TO APPLICABLE CODES.

⚠AVERTISSEMENT:
CET EQUIPMENT DOIT ETRE MIS A'LA TERRE EN ACCORDANCE AVEC LES NORMES EN VIGUEUR.

**Figure 9-9G. WIRING DIAGRAMS**

# 3 PHASE, SINGLE VOLTAGE, TWO SPEED HOIST (PADDLE LIMIT SWITCH)




⚠WARNING:

UNLESS HOOK RAISES WHEN "UP" BUTTON IS PRESSED SEVERE HOIST DAMAGE AND A DROPPED LOAD MAY RESULT.

CORRECT IMPROPER HOOK DIRECTION BY INTERCHANGING INPUT POWER L1 AND L3 DO NOT CHANGE PUSHBUTTON WIRING.

⚠WARNING:

THIS EQUIPMENT MUST BE EFFECTIVELY GROUNDED ACCORDING TO APPLICABLE CODES.

⚠AVERTISSEMENT:

CET EQUIPMENT DOIT ETRE MIS A'LA TERRE EN ACCORDANCE AVEC LES NORMES EN VIGUEUR.

**Figure 9-9G. WIRING DIAGRAMS**

# PENDANT AND POWER CABLE ASSEMBLIES

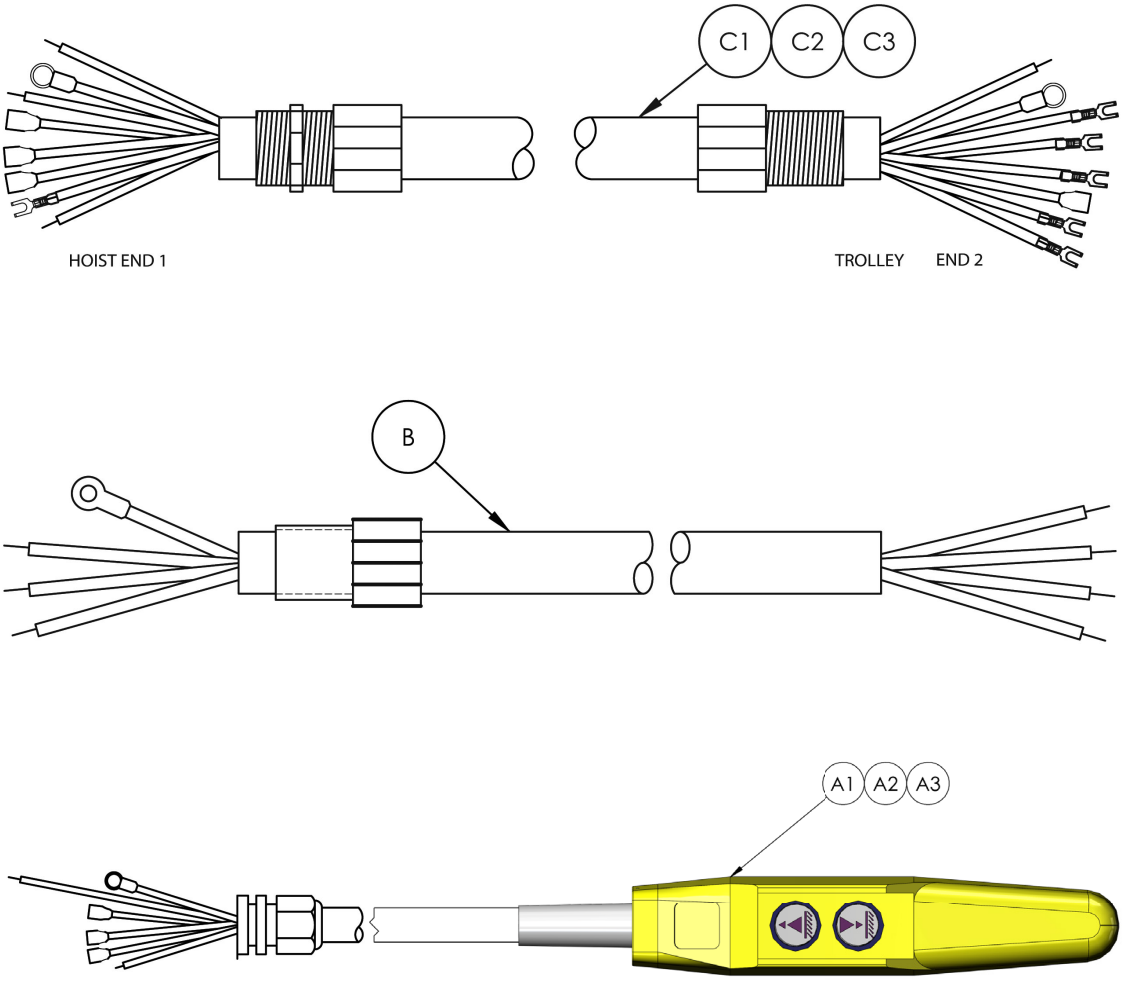



**Figure 9-10. PENDANTS AND CABLES**

| ITEM NO. | PART NUMBER | DESCRIPTION |
|---|---|---|
| A1 | 33211206 | SINGLE SPEED PUSHBUTTON STATION 6 FT. DROP |
| A1 | 33211211 | SINGLE SPEED PUSHBUTTON STATION 11 FT. DROP |
| A1 | 33211216 | SINGLE SPEED PUSHBUTTON STATION 16 FT. DROP |
| A2 | 33091706 | VFD PUSHBUTTON STATION 6 FT. DROP |
| A2 | 33091711 | VFD PUSHBUTTON STATION 11 FT. DROP |
| A2 | 33091716 | VFD PUSHBUTTON STATION 16 FT. DROP |
| A3 | 33091906 | TWO SPEED PUSHBUTTON STATION 6 FT. DROP |
| A3 | 33091911 | TWO SPEED PUSHBUTTON STATION 11 FT. DROP |
| A3 | 33091916 | TWO SPEED PUSHBUTTON STATION 16 FT. DROP |
| B | 23227305 | SHORT POWER CABLE SINGLE OR 3 PHASE |
| C1 | 11568503 | POWER/CONTROL CABLE USED WITH MOTOR DRIVEN TROLLEY |
| C2 | 11564106 | POWER/CONTROL 2 SPEED CABLE USED WITH MOTOR DRIVEN TROLLEYS |
| C3 | 11830007 | POWER/CONTROL VFD CABLE USED WITH MOTOR DRIVEN TROLLEYS |

## RECOMMENDED SPARE PARTS FOR YOUR BUDGIT HOISTS

Certain parts of your hoist will, in time, require replacement under normal wear conditions.
It is suggested that the following parts be purchased for your hoist as spares for future use.

- Set of Gaskets
- Set of Bearings
- Lower Block Assembly
- Load Chain
- Set of Brake Discs for Load Brake
- Set of Brake Discs for Motor Brake
- Push Button Station & Cable Assembly
- Transformer
- Contactor
- Transformer Fuse
- Set of Oil Seals
- Limit Lever
- Limit Switch Assembly

**Note: When ordering parts always furnish Model and Catalog Number of Hoist and lift of hoist on which the parts are to be used.**

Parts for your hoist are available from your local authorized Budgit Hoists repair station.
For the location of your nearest repair station, call or visit:

**WWW.CMWORKS.COM**

# WARRANTY

## LIMITATION OF WARRANTIES, REMEDIES AND DAMAGES

THE WARRANTY STATED BELOW IS GIVEN IN PLACE OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE, NO PROMISE OR AFFIRMATION OF FACT MADE BY ANY AGENT OR REPRESENTATIVE OF SELLER SHALL CONSTITUTE AWARRANTY BY SELLER OR GIVE RISE TO ANY LIABILITY OR OBLIGATION.

Seller warrants that on the date of delivery to carrier the goods are free from defects in workmanship and materials.

SELLER'S SOLE OBLIGATION IN THE EVENT OF BREACH OF WARRANTY OR CONTRACT OR FOR NEGLIGENCE OR OTHERWISE WITH RESPECT TO GOODS SOLD SHALL BE EXCLUSIVELY LIMITED TO REPAIR OR REPLACEMENT, F.O.B. SELLER'S POINT OF SHIPMENT, OF ANY PARTS WHICH SELLER DETERMINES TO HAVE BEEN DEFECTIVE or if Seller determines that such repair or replacement is not feasible, to a refund of the purchase price upon return of the goods to Seller.

Any action against Seller for breach of warranty, negligence or otherwise, must be commenced within one year after such cause of action occurs.

NO CLAIM AGAINST SELLER FOR ANY DEFECT IN THE GOODS SHALL BE VALID OR ENFORCEABLE UNLESS BUYER'S WRITTEN NOTICE THEREOF IS RECEIVED BY SELLER WITHIN ONE YEAR FROM THE DATE OF SHIPMENT. Seller shall not be liable for any damage, injury or loss arising out of the use of the goods if, prior to such damage, injury or loss, such goods are (1) damaged or misused following Seller's delivery to carrier; (2) not maintained, inspected, or used in compliance with applicable law and Seller's written instructions and recommendations; or (3) installed, repaired, altered or modified without compliance with such law, instructions or recommendations.

UNDER NO CIRCUMSTANCES SHALL SELLER BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES AS THOSE TERMS ARE DEFINED IN SECTION 2-715 OF THE UNIFORM COMMERCIAL CODE.

**INDEMNIFICATION AND SAFE OPERATION**

Buyer shall comply with and require its employees to comply with directions set forth in instructions and manuals furnished by Seller and shall use and require its employees to follow such instructions and manuals and to use reasonable care in the use and maintenance of the goods. Buyer shall not remove or permit anyone to remove any warning or instruction signs on the goods. In the event of personal injury or damage to property or business arising from the use of the goods, Buyer shall within 48 hours thereafter give Seller written notice of such injury or damage. Buyer shall cooperate with Seller in investigating any such injury or damage and in the defense of any claims arising therefrom.

If Buyer fails to comply with this section or if any injury or damage is caused, in whole or in part, by Buyer's failure to comply with applicable federal or state safety requirements, Buyer shall indemnify and hold Seller harmless against any claims, loss or expense for injury or damage arising from the use of the goods.

**CMCO Warranty (HOISTS)**

A. Columbus McKinnon Corporation ("Seller") warrants to the original end user ("Buyer") that, for a period of one (1) year from the date of Seller's delivery of the goods (collectively, the "Goods") to the carrier, the Goods will be free from defects in workmanship and materials.

B. IN THE EVENT OF ANY BREACH OF SUCH WARRANTY, SELLER'S SOLE OBLIGATION SHALL BE EXCLUSIVELY LIMITED TO, AT THE OPTION OF SELLER, REPAIR OR REPLACEMENT, F.O.B. SELLER'S POINT OF SHIPMENT, OF ANY GOODS THAT SELLER DETERMINES TO HAVE BEEN DEFECTIVE OR, IF SELLER DETERMINES THAT SUCH REPAIR OR REPLACEMENT IS NOT FEASIBLE, TO A REFUND OF THE PURCHASE PRICE UPON RETURN OF THE GOODS TO SELLER. NO CLAIM AGAINST SELLER FOR ANY BREACH OF (i) SUCH WARRANTY WITH RESPECT TO THE ELECTRICAL COMPONENTS OF ANY GOOD SHALL BE VALID OR ENFORCEABLE UNLESS BUYER'S WRITTEN NOTICE THEREOF IS RECEIVED BY SELLER WITHIN ONE (1) YEAR FROM THE DATE OF SELLER'S DELIVERY TO THE CARRIER AND (ii) SUCH WARRANTY WITH RESPECT TO THE MECHANICAL COMPONENTS OF ANY GOOD SHALL BE VALID OR ENFORCEABLE UNLESS BUYER'S WRITTEN NOTICE THEREOF IS RECEIVED BY SELLER WITHIN ONE (1) YEAR FROM THE DATE THE DATE ANY ALLEGED CLAIM ACCRUES. EXCEPT FOR THE WARRANTY SET FORTH ABOVE, SELLER MAKES NO OTHER WARRANTIES WITH RESPECT TO THE GOODS, WHETHER EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, QUALITY AND/OR THOSE ARISING BY STATUTE OR OTHERWISE BY LAW OR FROM ANY COURSE OF DEALING OR USE OF TRADE, ALL OF WHICH ARE HEREBY EXPRESSLY DISCLAIMED.

C. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER OR ANY THIRD PARTY WITH RESPECT TO ANY GOOD, WHETHER IN CONTRACT, TORT OR OTHER THEORY OF LAW, FOR LOSS OF PROFITS OR LOSS OF USE, OR FOR ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL, DIRECT OR INDIRECT DAMAGES, HOWSOEVER CAUSED. SELLER'S MAXIMUM LIABILITY TO BUYER WITH RESPECT TO THE GOODS SHALL IN NO EVENT EXCEED THE PRICE PAID BY BUYER FOR THE GOODS THAT ARE THE SUBJECT OF THE APPLICABLE CLAIM.

D. Seller shall not be liable for any damage, injury or loss arising out of the use of the Goods if, prior to such damage, injury or loss, such Goods are: (1) damaged or misused following Seller's delivery to the carrier; (2) not maintained, inspected, or used in compliance with applicable law and Seller's written instructions and recommendations; or (3) installed, repaired, altered or modified without compliance with such laws, instructions or recommendations.

E. This warranty is limited and provided only to the original end user. **Each Good must be registered within sixty (60) days of receipt of each product to establish eligibility.** Please register at www.cmworks.com/hoist-warrantyregistration or submit registration card via US mail.

F. Any action against Seller for breach of warranty, negligence or otherwise must be commenced by Buyer within one (1) year after: (a) the date any alleged claim accrues; or (b) the date of delivery of the Goods to Buyer, whichever is earlier.

**⚠ WARNING**

Alterations or modifications of equipment and use of nonfactory repair parts can lead to dangerous operation and injury.

**TO AVOID INJURY:**

- Do not alter or modify equipment.
- Do use only factory replacement parts.

COLUMBUS McKINNON CORPORATION

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