

# OPERATION, SERVICE & PARTS MANUAL



***BUDGIT***<sup>®</sup>  
***Hoists***

**MAN & GUARD**<sup>™</sup>  
**electric hoists**

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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.

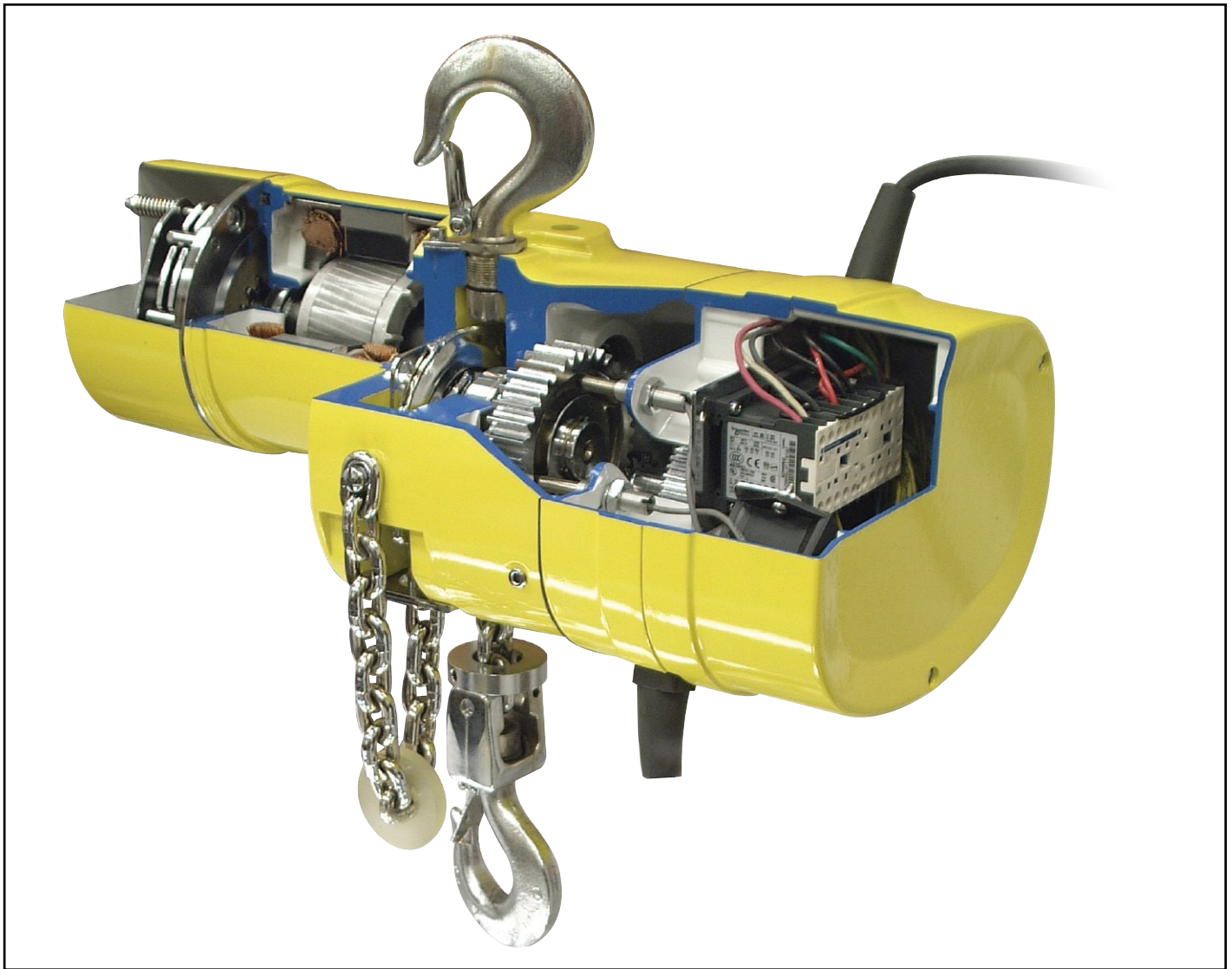


Figure 1-1. Cutaway View Of Typical Budgit Electric Hoist

## SECTION I - GENERAL DESCRIPTION

1-1. GENERAL. **Budgit** Portable Electric Hoists are precision built chain type hoists ranging in six 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 two speed. In addition to standard models, there are four rated load sizes of Budgit Electric Hoists ranging from 1/4 ton through 2 tons suitable for plating hoist service with various lifting speeds and electrical power.

### 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.

## **⚠ WARNING**

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

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

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).


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

b. 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.

c. Some hoists are adaptations of standard model hoists to permit use in some mildly corrosive atmospheres, high ambient temperatures and high duty cycle operation. They are available in either hook or lug suspension. Construction variations from standard models are as follows:

- (1) Load chain is zinc plated for corrosion resistance.
- (2) All exposed aluminum parts are prime painted with corrosion resistant paint.
- (3) Aluminum castings are specially treated.

1-5. **MAN-GUARD OVERLOAD CLUTCH.** **Budgit** Electric Hoists having a **MAN-GUARD** label on the sides of the electrical compartment cover 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.

 <b>WARNING</b>
<p><b>THE MAN-GUARD 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.</b></p>

## 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.

<b>NOTICE</b>
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 per Section VII, par. 7-2. a. (4) and figures 7-2 and 7-3. To remove lug bolt, follow instructions in Section VII, par. 7-3. b. (3). 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 pinned to the proper link. (See chart on page 30). On single part hoists, make sure steel actuator is pinned to the first chain link above the lower block. Multiple part reeved hoists do not have an actuator on the lower block side.

**Electronic limit switch equipped.** Make sure the stop on the tail chain side is securely fastened to the proper link. (See chart on page 30). There is no stop 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			
	200, 230-3-60	465	740	1180			
	460, 575-3-60	1440	2390				
1/2	115-1-60	45	75	120	190	310	490
	230-1-60	195	305	490	775	1235	
	200, 230-3-60	280	450	715	1135		
	460, 575-3-60	860	1440				
1	115-1-60	*	45	75	120	190	300
	230-1-60	120	190	300	475	720	
	200, 230-3-60	180	290	460	730		
	460, 575-3-60	560	900				
2 1/2	200, 230-3-60	60	100	150	250		
	460, 575-3-60	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 460 volts. If hoist is 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. 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 230 volts. If hoists are to be operated on 115 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).**

e. To properly phase the hoist follow these steps:

- (1) Temporarily connect hoist to power source.
- (2) Operate "↑" button briefly to determine direction of travel.
- (3) If hook raises, phase is correct and temporary connections should be made permanent.
- (4) **IF HOOK LOWERS, HOIST IS "REVERSE PHASED" AND MUST BE CORRECTED BY INTERCHANGING ANY TWO LEADS AT POWER SOURCE CONNECTION. DO NOT CHANGE INTERNAL WIRING OF HOIST.**

f. For connecting hoist to a motor driven trolley, refer to instructions furnished in trolley manual.

2-5. ELECTRONIC ADJUSTABLE LIMIT SWITCH (if equipped).

The limit switch arrangement consists of two sensors which protrude into the gear case at the sprocket gear, and a control module. The control module has two buttons for programming set points, an UP and DOWN green LED, and a red ALERT LED.

The electronic adjustable limit switch is factory set to the extreme upper and lower limits to allow for testing. The limits may be left as they are, or can be reset according to the following procedure:

When power is first applied to the hoist, one or both of the green LED's should be on, and the red ALERT light should be off. The hoist will operate between the points set at the factory. If red ALERT light is on and both green lights are off, the hoist will not operate, the limits need to be set.



## SECTION III - OPERATION

To set limits:

(1) Press both SET buttons simultaneously. Both green LED's should come on, and the red ALERT LED should flash. Hoist can now be operated through full range of lift.

(2) Raise or lower hook to desired set point. It does not matter whether upper or lower limit is set first. Press the set button that corresponds to UP if the upper limit is to be set first, or DOWN if the lower limit is to be set first. The corresponding green LED should go out.

(3) Move hook to desired upper limit if the lower limit was previously set, or to the lower limit if the upper limit was previously set. The LED corresponding to the limit just set will come back on, indicating the hoist is no longer at that limit. Press the set button that corresponds to UP if the upper limit is being set, or DOWN if the lower limit is being set. The corresponding green LED should go out. The red ALERT light should also go out.

(4) The upper and lower limits are now set. Operate the hoist to confirm the settings are at the desired limits.

Tips for setting limits:

For the initial setting, both limits must be set. If one setting is more critical, that one should be set first. For example, if the position at the lower limit is more important than the position at the upper limit, the lower limit should be set first.

Once the upper and lower limits are set, they can be changed without having to do both *if the new limit is within the previously set limits*. For example, if the lower limit is set too low, stop the hook at the desired position and press the DOWN set button. The hook will now stop at the new limit.

When positioning the hook to set a limit, stop the hook in the same manner as it is likely to be stopped during normal operation. If it is likely that the limit will be reached when the hoist is traveling at full speed, then position the hook by pressing the pushbutton and releasing when the hook is at the desired position, without jogs. If jogs are used to position the hook for setting the limit, the hook may drift past the limit if tripped at full speed.

**Note:** The limit switch has a setting increment of 1/4 revolution of the sprocket gear. This applies when setting the limits. The hoist may stop up to a maximum of 1-1/2 inches before the desired position for 5/16 chain, or 1-1/4 inches for 1/4" chain. Once set, the hoist will repeatedly stop at the same location.

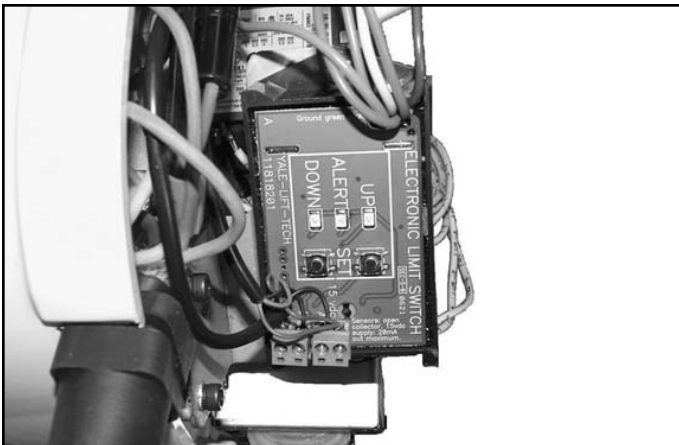


Figure 2-2.

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 “↑” to raise load.

b. Depress push button marked “↓” 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.

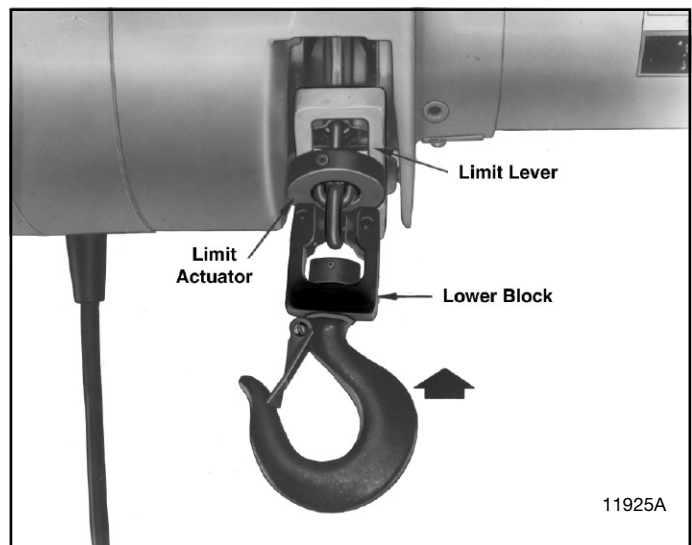


Figure 3-1a. Limit Lever Being Tripped By Actuator Above Lower Block on Single Line Hoist (paddle limit)

3-4 UPPER AND LOWER LIMITS. Budgit Electric Hoists are equipped with either 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, or an electronic limit switch which relies on proximity switches mounted in the gear case cover. Refer to the appropriate section below:

3-4a. UPPER AND LOWER LIMIT STOPS (paddle limit). A lower block and chain operated limit stop is provided to guard against overtravel 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. 3-1a). When lowest position is reached, a limit actuator on the tail end of load chain trips the limit lever (fig. 3-1b). 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.

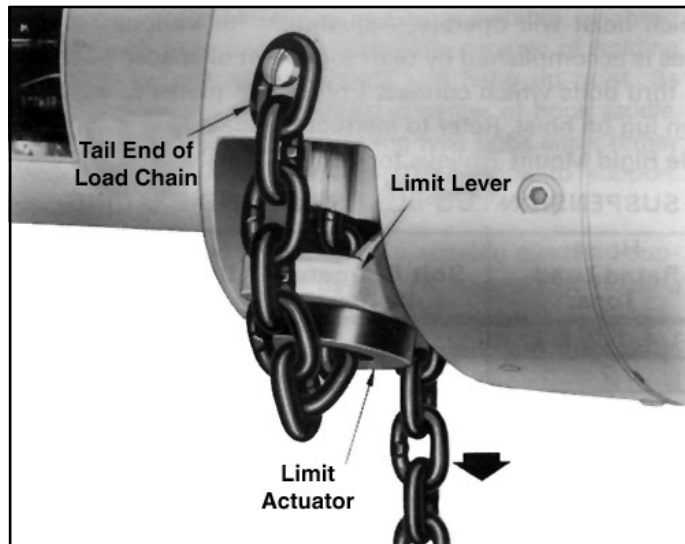


Figure 3-1b. Limit Lever Being Tripped By Actuator on Tail End of a Load Chain (paddle limit)

3-4b. UPPER AND LOWER LIMIT STOPS (electronic limit switch). Upper and lower limit stops are provided to guard against overtravel of load in either raising or lowering direction, which can cause damage to hoist. When highest position is reached, the lower block will cause the overload clutch to slip (fig. 3-1c). When the lowest block position is reached, the tail chain stop will cause the overload clutch to slip (fig. 3-1d). Limit stops are intended as safety devices and are not to be used on a routine basis to stop block travel. Lowering full rated capacity load at full rated speed into the limit stop is an especially severe condition and must be avoided at all times.

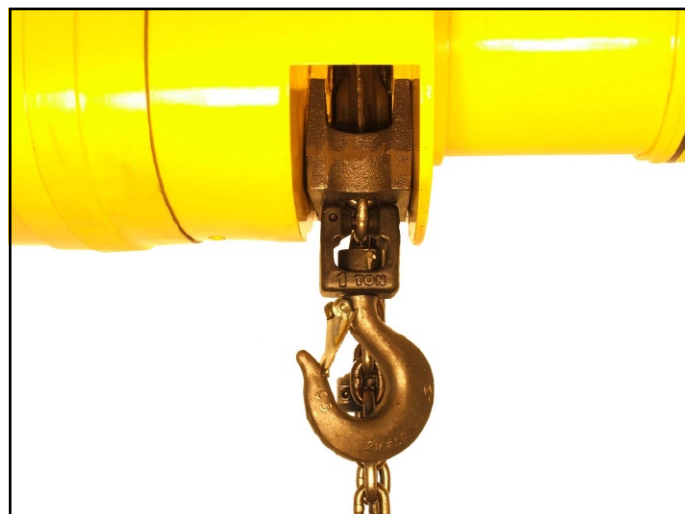


Figure 3-1c. Lower Block Contacting Stop Shoe at Upper Limit of Travel (electronic limit switch)



Figure 3-1d. Chain Stop Contacting Stop Shoe Tail Chain End of Load Chain (electronic limit switch)

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 “↑” 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 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. 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. DO NOT lift more than rated load.**
- s. **DO NOT use the hoist load limiting device to measure the load.**
- t. **DO NOT use damaged hoist or hoist that is not working correctly.**
- u. **DO NOT use the hoist with twisted, kinked, damaged or worn chain.**
- v. **DO NOT lift a load unless chain is properly seated in chain wheel(s) or sprocket(s).**
- w. **DO NOT use load chain as a sling or wrap chain around the load.**
- x. **DO NOT lift a load if any binding prevents equal loading on all supporting chains.**
- y. **DO NOT apply the load to the tip of the hook.**
- z. **DO NOT operate unless load is centered under hoist.**
  - aa. **DO NOT allow your attention to be diverted from operating the hoist.**
  - ab. **DO NOT operate the hoist beyond limits of load chain travel.**
  - ac. **DO NOT use limit switches as routine operating stops. They are emergency devices only.**
  - ad. **DO NOT use hoist to lift, support or transport people.**
  - ae. **DO NOT lift loads over people.**
  - af. **DO NOT leave a suspended load unattended unless specific precautions have been taken.**
  - ag. **DO NOT allow sharp contact between two hoists or between hoist and obstructions.**
  - ah. **DO NOT allow the chain or hook to be used as a ground for welding.**
  - ai. **DO NOT allow the chain or hook to be touched by a live welding electrode.**
  - aj. **DO NOT remove or obscure the warnings on the hoist.**
  - ak. **DO NOT adjust or repair a hoist unless qualified to perform hoist maintenance.**
  - al. **DO NOT attempt to lengthen the load chain or repair damaged load chain.**
  - am. **DO NOT allow personnel not physically fit or properly qualified to operate the hoist.**
  - an. **DO NOT operate hoist unless upper and lower limit switch stops are operating properly.**
  - ao. **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.**
  - ap. **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.**
  - aq. **DO operate hoist within recommended duty cycle and do not "jog" unnecessarily.**
  - ar. **DO conduct regular visual inspections for signs of damage or wear.**
  - as. **DO NOT operate hoist with hooks that have opened up. See Figures 5-5 and 5-6.**
  - at. **DO provide supporting structure or anchoring means that has a load rating at least equal to that of the hoist.**
  - au. **DO NOT use hoists in locations that will not allow operator movement to be free of the load.**
  - av. **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.**
  - aw. **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.**
  - ax. **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).

- Remove drain plug from bottom of hoist frame and drain oil from gear case. Replace plug.
- Remove oil level plug from side of hoist.
- 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.
- 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.

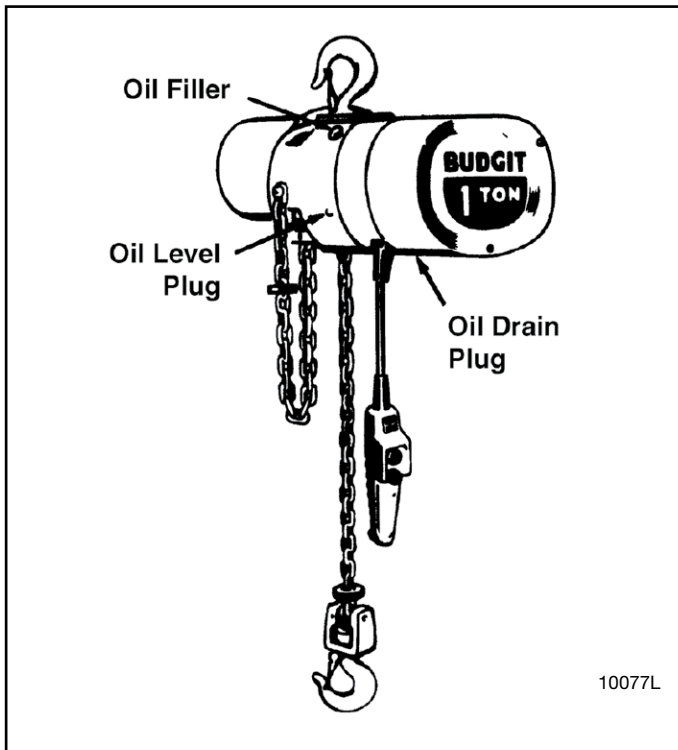


Figure 4-1. Location of Oil Filler and Plugs

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.

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

(1) Operate hoist under load and observe operation of chain over sprocket in both directions of chain travel. Chain should feed smoothly into and away from the sprocket. If chain binds, jumps or is noisy, first see that it is clean and properly lubricated. If trouble persists, inspect chain as outlined below.

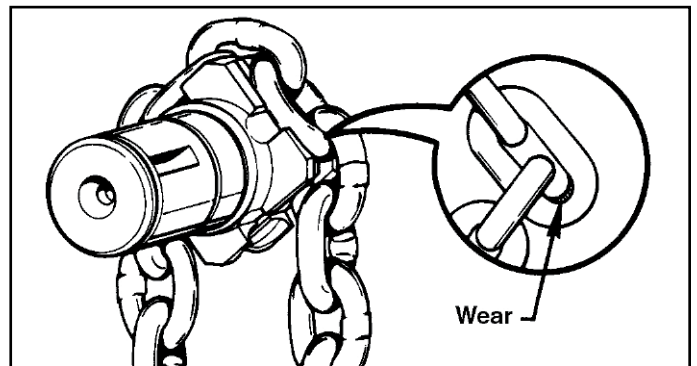


Figure 5-1. Check Chain Wear at Bearing Surfaces Between Links

(2) **Coil Type Load Chain.** Clean chain for inspection. Examine visually for gouges, nicks, weld spatter, corrosion or distorted links. Slacken chain and check bearing surfaces between links

for wear, fig. 5-1. Greatest wear will often occur at sprocket at high or low point of lift, particularly when hoist is subjected to repetitive lifting cycles. Case hardness of chain is about 015" deep. Chain must be replaced before the case is worn through. Also check chain for elongation using a vernier caliper (fig. 5-2). Select an unworn, unstretched section of chain (usually at slack or tail end) and measure and record the length over the number of chain links (pitches) indicated in figure 5-2. Measure and record the same length of a worn section in the load side of the chain. Obtain the amount of wear by subtracting the measurement of the unworn section from the measurement of the worn section. If the result (amount of wear) is greater than the amount specified in the "ALLOWABLE CHAIN WEAR" table, the chain has elongated beyond the maximum allowable length and must be replaced. Chain with excessively pitted, corroded, nicked, gouged, twisted or worn links should be replaced using only factory approved chain. Never weld or attempt to repair coil chain.

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.

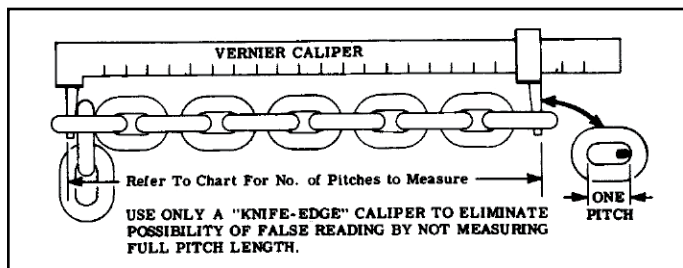


Figure 5-2. Check Coil Chain Using Vernier Caliper

**ALLOWABLE CHAIN WEAR - ELONGATION**

Hoist Rated Load (tons)	Chain Size (wire dia.)	No. of Pitches to Measure	Maximum Wear Limit
1/4 & 1/2	1/4"	13	.145"
1 thru 3	5/16"	11	.142"

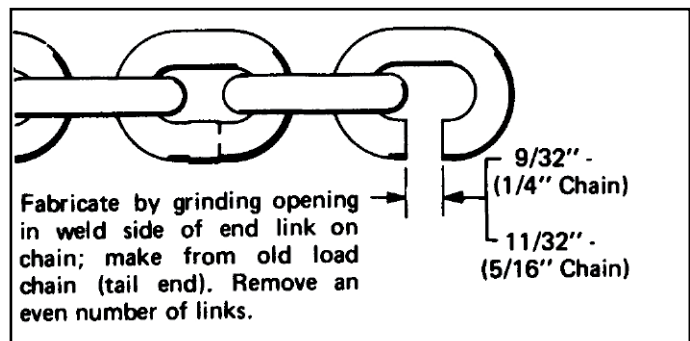


Figure 5-3. Open "C" Link for Removing and Installing Coil Load Chain



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

**⚠ 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.

**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.

**NOTE:** See table on page 30 for location of tail chain limit stop.

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.

(3) 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

**NOTE:** In the event the old chain is to be removed from hoist and reinstalled, a short length of chain (about 18" long) must be run into hoist when the old chain is removed. This short length can then be used in the same manner as shown in paragraph 5-2. a.(3). Be sure to use the proper number of open "C" links in order to correctly position end link on tail end of chain to fit anchor at side of hoist frame.

**NOTICE**

To avoid serious internal damage to hoist, when installing coil load chain do not attempt to hand feed chain into hoist, or use a piece of wire in place of the method described herein. To do so may result in serious internal damage to hoist, as coil chain links must be properly seated in chain sprocket before chain is run into hoist. Install chain only as described in this manual.

**CAUTION**

Keep fingers clear of chain sprocket when replacing load chain.

(4) Check connection of chain to lower block on 1/4 through 1 and 3 ton hoists. Replace parts showing evidence of damage, twisting or elongation.

(5) Check connection of chain to anchor inside hoist frame on double-reeved, 2-ton hoists. Replace parts showing evidence of damage, twisting or elongation. (Also see Sec. VII, par. 7-2. a. (2)).

(6) Lubricate load chain before using hoist. See paragraph 4-3, Section IV.

**b. Inspect Lower Block.**

(1) Check for bent or distorted hook. If hook is opened beyond the dimension given in figure 5-5, it must be replaced. Also check to see that hook swivels and is free to pivot. Lubricate these points if necessary.

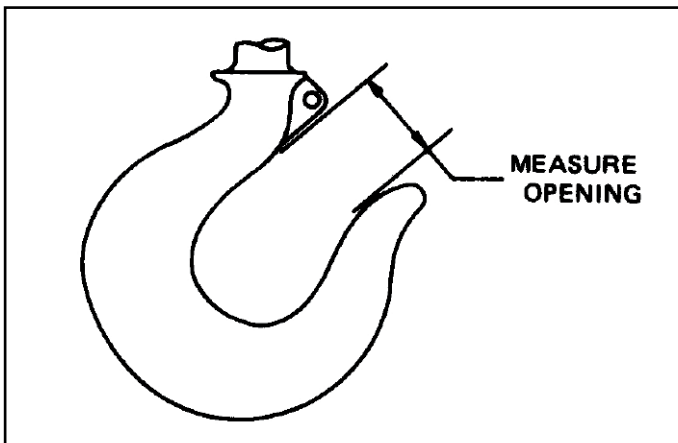


Figure 5-5. Lower Hook Opening (Shown with latch removed for clarity.)

Hoist Rated Load (tons)	Hook Throat Opening	
	Normal Opening	Replace Hook if Opening is Greater Than
1/4 & 1/2	1-1/8	1-1/4
1	1-1/4	1-7/16
2	1-3/8	1-9/16
3	1-1/2	1-11/16

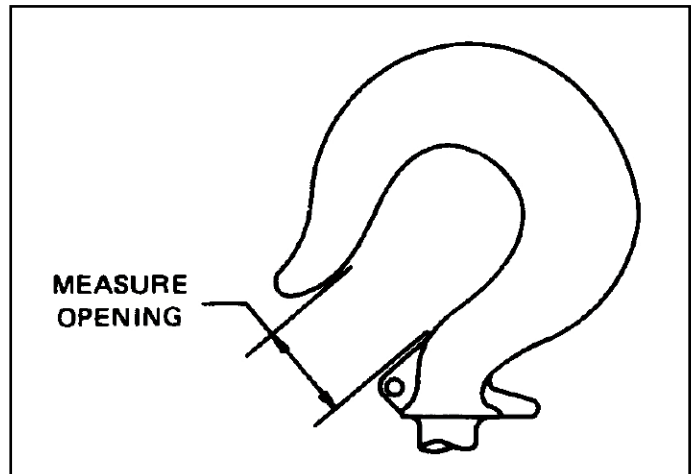
(2) On 2 through 3 ton hoists, check sprockets and bearings in lower block for freedom of movement and signs of damage. Lubricate if necessary. Replace damaged parts.

(3) Check hook latches. Replace damaged or bent latches or broken springs.

**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	Replace Hook if Opening is Greater Than
1/4 & 1/2	1-1/8	1-1/4
1	1-1/4	1-7/16
2	1-3/8	1-9/16
3	1-1/2	1-11/16

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

**c. Inspect Upper Suspension.**

(1) On hook suspended models, check for bent or distorted hook. If hook is opened beyond the dimension given in figure 5-6, it must be replaced. Also check to see that hook pivots. Lubricate if necessary.

(2) 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).

(3) 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.

(4) Check hook latch. Replace damaged or broken parts.

(5) 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.

**d. 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.

**e. 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. Two speed hoists with a 2-1/4 horsepower motor have an externally mounted counterweight at the electrical compartment cover.

(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.

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

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

**c. 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.** Follow procedure outlined in Section VII, paragraph 7-2.

**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 Budget Hoist Repair Station to be rebuilt and properly adjusted to factory specifications.

**d. Inspect 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 Cause	Remedy
6-1. Hoist Will Not Operate.	<p>a. No power to hoist.</p> <p>b. Wrong voltage.</p> <p>c. No control voltage.</p> <p>d. Loose or broken wire connections in hoist electrical system.</p> <p>e. Contactor assembly not functioning.</p> <p>f. Starting switch burned out (single phase motor).</p> <p>g. Motor burned out.</p> <p>h. Electronic Limit Switch not set.</p>	<p>a. Check switches, circuit breakers and connections in power supply lines. Check power collectors.</p> <p>b. Check voltage required on motor data plate against power supply.</p> <p>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.</p> <p>d. Shut off power supply, remove electrical cover from hoist and check wiring connections. Also check connections in push button station and limit switches.</p> <p>e. Check for burned out solenoid coil. See that the necessary jumper wires are properly installed.</p> <p>f. Replace burned out parts.</p> <p>g. Replace motor. On single-phase motors the starting switch may be burned out.</p> <p>h. Adjust electronic Limit Switch. See section 2-5.</p>
6-2. Hook Moves in Wrong Direction.	<p>a. Reverse phasing on three-phase hoists.</p> <p>b. Hoist wired wrong.</p> <p>c. Starting switch not working correctly (single phase motor).</p>	<p>a. Interchange any two of the three power supply line leads. Do not change green ground lead. Refer to Section II, par. 2-4.</p> <p>b. Check wiring connections with appropriate wiring diagram.</p> <p>c. Check for correct starting switch part number and function. Replace if necessary.</p>
6-3. Hook Will Raise But Not Lower.	<p>a. "DOWN" electrical circuit open.</p> <p>b. Contactor assembly not functioning.</p> <p>c. Push Button Inoperative.</p> <p>d. Load Brake locked up and overload clutch slipping.</p>	<p>a. Check for loose connections. See that necessary jumper wires are properly installed on contactor. Check limit switch condition and electrical connections.</p> <p>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.</p> <p>c. Check push button contacts and wires.</p> <p>d. Consult Authorized <b>Budgit</b> Hoist Repair Station.</p>
6-4. Hook Will Lower But Not Raise (continued on next page).	<p>a. Excessive load, causing overload clutch to slip.</p> <p>b. Overload clutch out of adjustment.</p> <p>c. "UP" electrical circuit open.</p>	<p>a. Reduce loading to rated load of hoist, as shown on nameplate.</p> <p>b. Test hoist and replace clutch if hoist will not lift rated load.</p> <p>c. Check for loose connections. See that necessary jumper wires are properly installed on contactor. Check limit switch condition and electrical connections.</p>



## SECTION VI - TROUBLE SHOOTING (Continued)

Trouble	Probable Cause	Remedy
6-4. Hook Will Lower But Not Raise (continued).	d. Contactor assembly not functioning.  e. Push button inoperative.	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. Check push button contacts and wires.
6-5. Hoist Will Not Lift Rated Load.	a. Low voltage  b. Overload clutch out of adjustment.  c. Motor brake not releasing.	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. Remove and replace clutch assembly. Refer to Section IV, par. 7-2 and 7-4.  c. Check brake components. Refer to Section VII, par 7-2.d, 7-2.e.
6-6. Excessive Drift When Stopping.	a. Excessive load.  b. Motor brake not holding.  c. Motor brake not setting due to insufficient plunger air gap.  d. Load brake not holding.	a. Reduce loading to rated load, shown on nameplate.  b. Check brake components. Refer to Section VII, par. 7-2.d.  c. Adjust air gap. Refer to Section VII, par. 7-11.c.  d. Remove load brake and inspect parts. Refer to Section V, par. 5-4.
6-7. Hoist motor overheats.	a. Excessive load.  b. Excessive duty-cycle.  c. Excessive "jogging."  d. Wrong voltage.  e. Starting switch on single-phase motors not opening starting winding.  f. Damaged motor or worn bearings in motor or hoist frame.  g. Motor brake not releasing.	a. Reduce loading to rated load of hoist, shown on nameplate  b. Reduce frequency of lift.  c. Reduce frequency of jogs.  d. Check voltage rating on motor data plate against power supply.  e. Refer to Section VII, par. 7-9.b. (3) (b). Inspect Switch.  f. Disassemble hoist and inspect for worn or damaged parts.  g. Check brake components. Refer to Section VII, par. 7-2.d.

## SECTION VII - DISASSEMBLY AND REASSEMBLY

### 7-1. GENERAL.

a. The following disassembly and reassembly instructions apply to all standard models in the line of **Budgit** Electric Hoists equipped with **MAN-GUARD** overload clutch. Where needed, variations to instructions are provided to cover differences between models (suspensions, rated load sizes and motor voltage ratings), with applicable models specifically noted.

b. A complete teardown procedure is given, however, if only certain parts require repair or replacement, a partial teardown may be performed using the applicable portions of the instructions.

c. For easier handling during disassembly, the following disassembly steps may, where conditions permit, be completed

before hoist is removed from its overhead suspension or disconnected from its power supply: Remove chain container, if hoist is so equipped; remove lower block and load chain assembly, following procedure outlined in paragraph 7-2. a. Drain and discard gear case oil, by removing plug at bottom of frame.

d. These hoists contain precision machined parts and should be handled with care at disassembly and at reassembly. When removing or installing parts with press fits, be careful to apply pressure evenly. On ball bearings, apply pressure to face of inner or outer race, whichever is adjacent to mating part. This will avoid damage to bearing races from brinelling by pressing through bearing balls. Apply a thin film of sealant to parts having a press fit when they are installed.

### 7-2. DISASSEMBLY OF HOIST INTO SUBASSEMBLIES.

### a. Removal of Lower Block and Load Chain Subassembly.

(1) On models with single-reeved load chains (1/4 through 1 ton rated loads) disconnect tail end of load chain from anchor at side of frame. Remove fillister head screw holding end link to frame. Remove grooved pin from the limit actuator and pull it off end of chain. With hoist connected to power supply, run chain out of hoist by operating in “lowering” direction. (See note following paragraph (2) below and note in Sec. V, par. 5-2. a. (3) for inserting short length of chain.)

(2) On models with double-reeved load chains (2 ton hoists) disconnect tail end of load chain from anchor at side of hoist frame and remove limit actuator as in (1) above, run chain out of hoist by operating it in “lowering” direction, and disconnect opposite end of load chain from anchor inside hoist frame. To disconnect this end of chain, remove cotter pin from end of anchor pin, press pin from anchor and withdraw chain. The drive pin securing threaded end of anchor in upper block assembly (at top of frame) must be removed in order to rotate the anchor.

**NOTE:** If hoist is inoperative and **not** equipped with a load brake, chain can be pulled through by hand by first manually releasing motor brake. If hoist is equipped with a load brake it will be necessary to wait until after load brake is removed (paragraph. c., below), then the chain can be pulled through the hoist by hand.

(3) On triple-reeved 3 ton hoists, remove retaining ring and connecting link pin as shown in figures 7-30 and 7-31. Remove connecting link with chain from lower block.

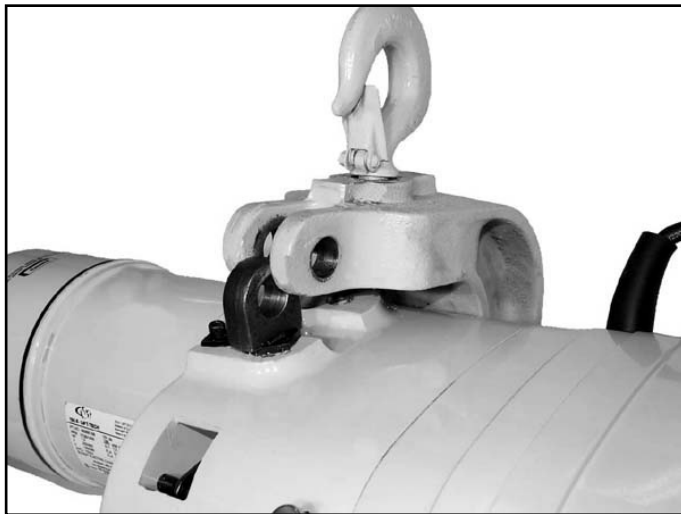


Figure 7-2. 3 Ton Hanger Bracket Connection Pin Removed

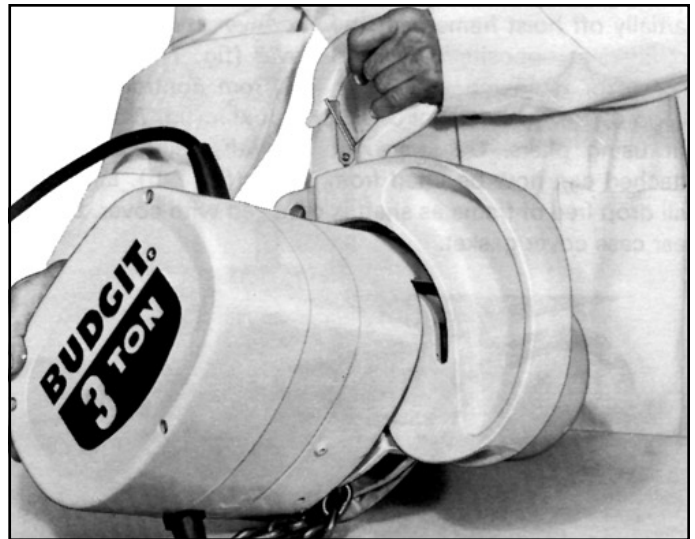


Figure 7-3. Removing 3 Ton Hanger Bracket from Hoist Frame

To remove connecting link from chain, take out cotter key and push anchor pin from connecting link. Chain can now be pulled through hanger bracket and lower block. Unfasten tail chain from hoist frame, remove limit actuator, and if power is available, operate hoist in lowering direction to remove chain. (See note in Sec. V, par. 5-2. a. (3) for inserting short length of chain). If hoist is inoperative see note below but be sure to install short length of chain into hoist before removing load chain.

**NOTE:** If hoist is inoperative and **not** equipped with a load brake, chain can be pulled through by hand by first manually releasing motor brake. If hoist is equipped with a load brake it will be necessary to remove load brake (paragraph. c., below) so chain can be pulled through the hoist by hand.

(4) To remove 3 ton hanger bracket from hoist, remove retaining ring and connecting rod pin (see fig. 7-2). Rotate hoist approximately 45° (see fig. 7-3) and hanger will slip free from hoist frame.

### b. Removal of Electrical Compartment Cover, Electrical Controls and Gear Case Subassembly.

(1) Disconnect hoist from power source. Remove three cover retaining screws and lift off cover (fig. 9-1). Cover screws have retaining rings which hold them in cover. Use caution as some covers contain counterweights. Two speed hoists with a 2-1/4 horsepower motor have an externally mounted counterweight at the electrical compartment cover.

(2) Disconnect push button conductor cable leads at plug-in type connectors that can be pulled apart. Remove screw and washer securing strain reliever (fig. 9-8) and pull the cable and grommet from its slot in gear case cover.

(3) Disconnect power supply flexible cable leads from terminals of contactor. Remove screw attaching ground leads to gear case cover and pull flexible cable and grommet from slot in cover.

(4) Disconnect motor leads from electrical control units. Number of leads depends on type of motor. (See wiring diagrams in accompanying this manual).

(5) Remove eight hex socket head screws and lockwashers securing gear case cover to hoist frame. Pry gear case cover off hoist frame using screw driver at special notches provided at opposite corners of cover (fig. 7-4). Discard gear case cover gasket.

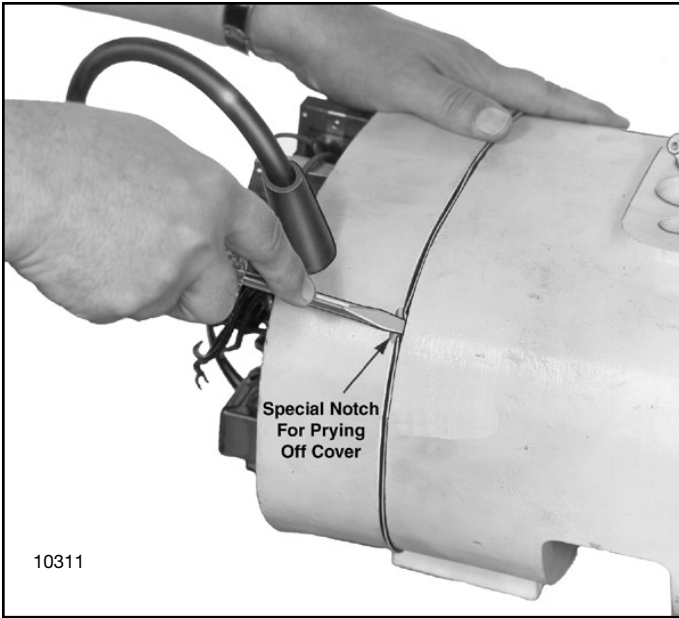


Figure 7-4. Prying Gear Case Cover from Hoist Frame

No Figure 7-5.

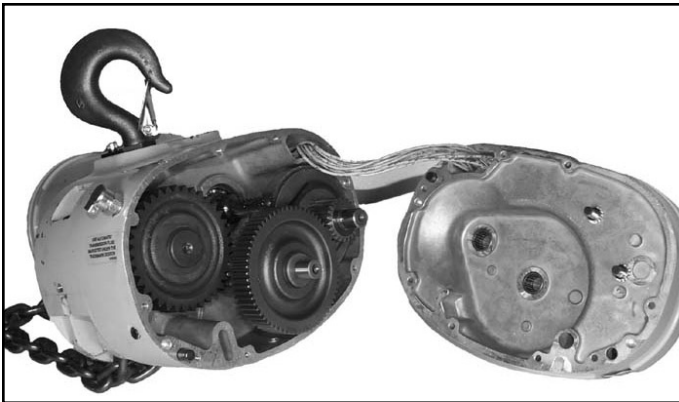


Figure 7-6. Gear Case Cover with Electrical Controls Removed from Frame

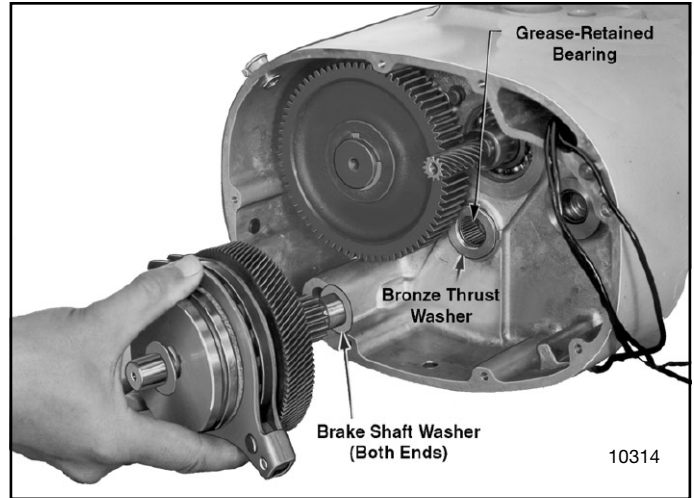


Figure 7-7. Removing Load Brake and Clutch Assembly (1/4 & 1/2 Ton Hoists)

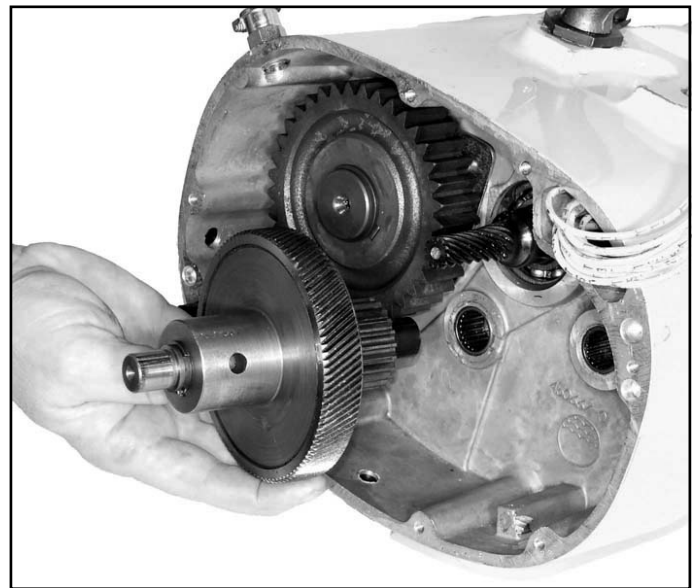


Figure 7-7a.

**c. Removal of Load Brake and Clutch Assembly and Intermediate Gear Subassembly.**

(1) On 1/4 through 1/2 ton hoists, pull load brake/clutch assembly if equipped or overload clutch assembly and the shaft washers from inside hoist frame (fig. 7-7). Caution: Grease-retained bearing has 36 rollers (all capacities) and may be reinstalled unless rollers are broken or missing or cup is damaged.

(2) On 1 through 3 ton hoists, pull load brake or clutch assembly and intermediate gear assembly, including the thrust washers for each unit, from hoist frame (fig. 7-8).

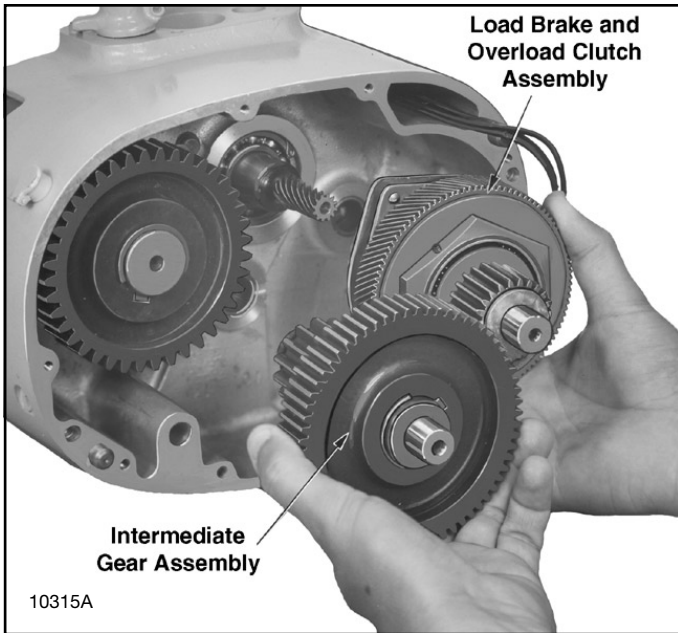


Figure 7-8. Removing Load Brake and Clutch and Intermediate Gear Subassemblies (1 through 3 Ton Hoists)

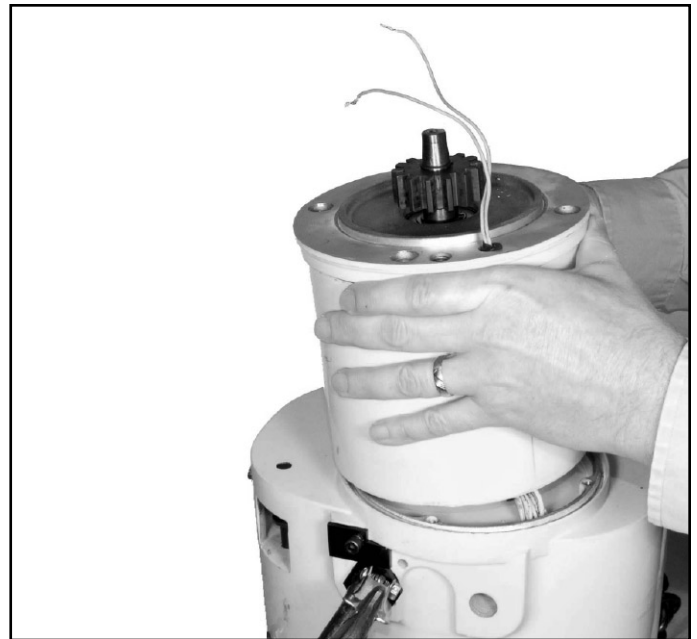


Figure 7-9. Removing Motor Assembly

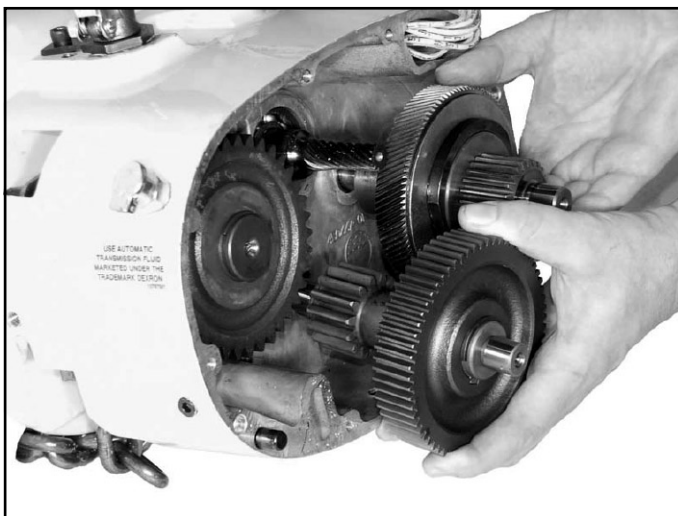


Figure 7-8a.

**d. Removal of Motor Brake.**

(1) Remove acorn nuts holding brake cover and remove brake cover (fig. 7-11).

(2) Disconnect wire nuts on brake coil leads.

(3) Remove brake mounting plate screws (fig. 7-11) and lift brake assembly off to gain access to the motor mounting bolts.

**e. Removal of Motor Assembly.**

(1) Place hoist frame on wood blocks to protect intergal gear on motor shaft. Loosen four motor mounting bolts and lift motor assembly from frame (fig. 7-9). Guide motor leads through wire passage to avoid damage.

**7-3. REBUILD OF HOIST FRAME, SPROCKET GEAR, SPROCKET SHAFT AND CHAIN GUIDE.**

**a. Disassembly of Sprocket Gear, Shaft and Chain Guide.**

(1) Remove retaining ring from end of sprocket shaft and pull off sprocket gear using a common puller (fig. 7-10). Remove Woodruff key from shaft.

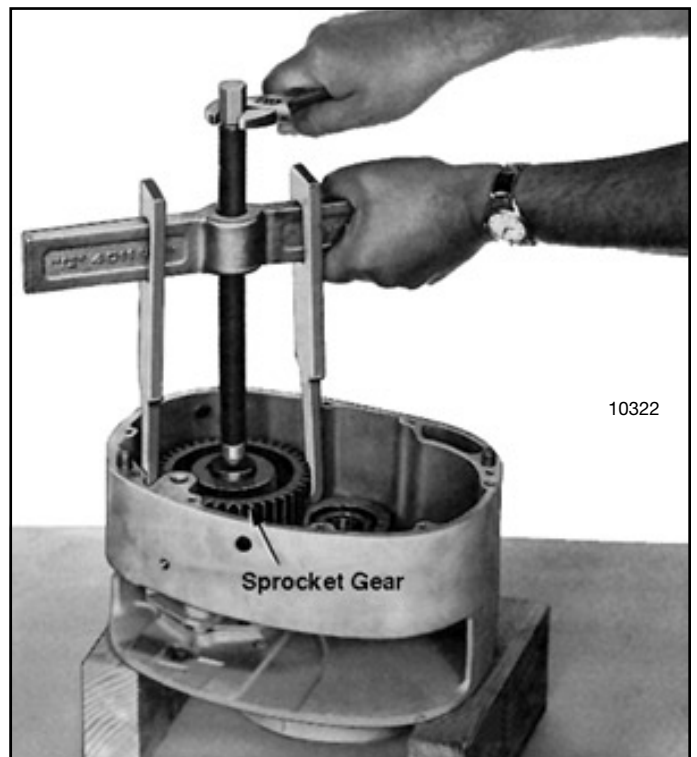


Figure 7-10. Pulling Sprocket Gear from Sprocket Shaft using Common Puller

(2) Unscrew four fillister head machine screws securing sprocket bearing retaining plate and remove plate (fig. 7-11). Remove and discard ring gasket from groove around bearing.

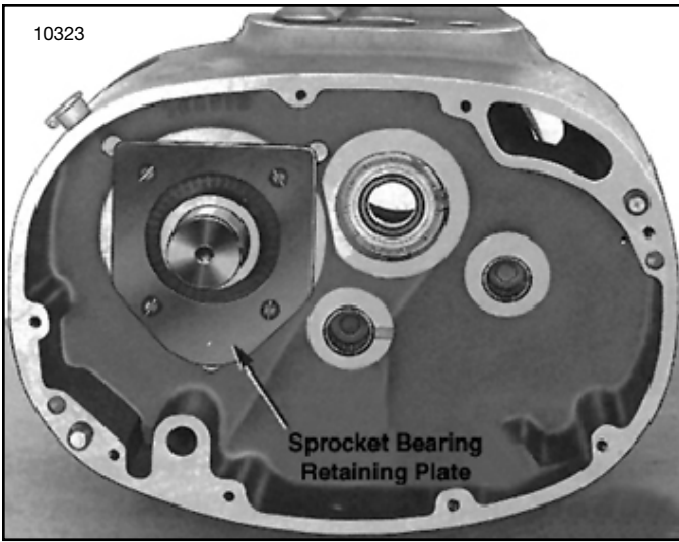


Figure 7-11. View of Sprocket Bearing Retaining Plate

(3) Remove "C" clips holding chain guide pins in place. Pull guide pins out from motor side of frame. (Fig 7-13)



Figure 7-13. Removing Chain Guide Support Pins

(4) Remove sprocket shaft and front ball bearings assembly from frame by lifting up on end of shaft while prying up on sprocket as illustrated in figure 7-14. The chain guide will need to be repositioned in frame as sprocket shaft is raised to allow the sprocket to pass through hole of guide (fig. 7-15).

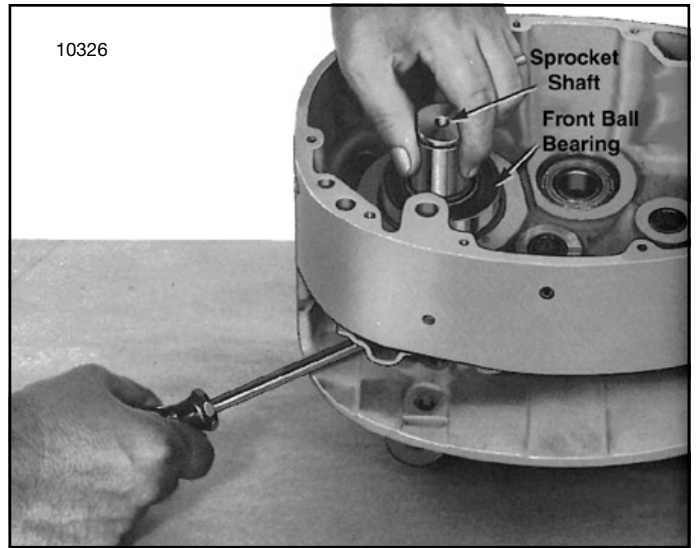


Figure 7-14. Removing Sprocket Shaft and Front Bearing

**NOTE:** Do not remove oil seal, ball bearings, and needle bearings from their bores in the frame unless they show evidence of wear or damage and require replacement. When replacing rear sprocket ball bearing pack bearing 1/2 full with NLGI No. 2 grease.

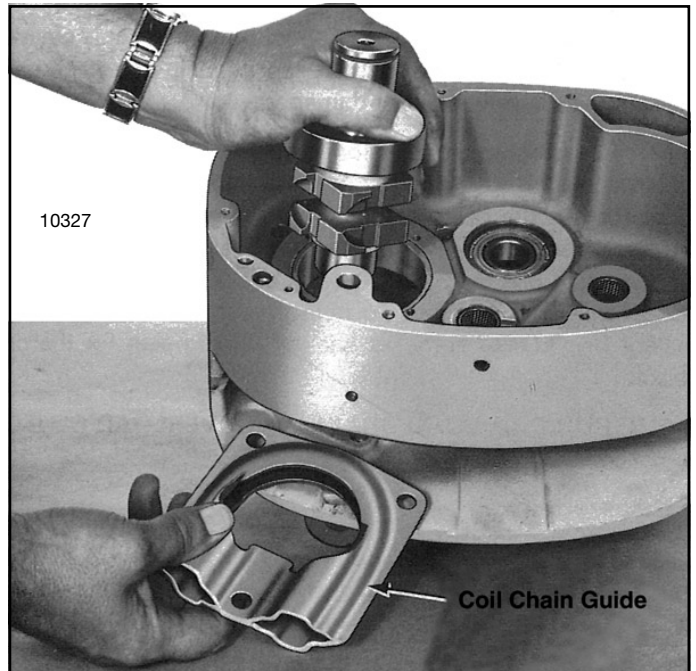


Figure 7-15. Chain Guide Being Removed from Frame as Sprocket Shaft is Lifted Out



### b. Disassembly of Upper Hook. (Hook Suspension Models)

(1) On 1/4 through 1 ton models, remove screw securing suspension bushing keeper. Unscrew suspension bushing from frame to remove hook.



Figure 7-18. Removing Upper Hook and Hook Nut from Hoist Frame (1/4 through 1 Ton Models)

(2) On 2 ton models, unscrew two hex socket head screws holding suspension bushing lock assembly to upper block (fig. 7-19) and remove lock. Unscrew suspension bushing from block to remove hook. To disassemble block from frame, remove screw securing suspension bushing keeper. Remove drive pin securing threaded end of chain anchor in block and unscrew anchor. Unscrew suspension bushing to remove block.



Figure 7-19. View of Upper Hook Assembled to Hoist Frame (2 Ton Models)

**NOTE:** Hook and bushing assembly is not to be further disassembled as nut securing bushing to hook shank is welded in place at the factory. Only the assembly is available for replacement.

(3) On 3 ton models, remove retaining ring from connecting rod pin and push connecting rod pin through bracket and connecting rod, releasing hanger (see fig. 7-2). Raise hanger above hoist frame to provide access to hook nut. Rotate hook until grooved pin in nut is visible from end of hanger frame. Using a drift punch,

drive grooved pin through hook nut until it hits hanger pocket. Remove drift far enough to hold nut from turning and unscrew hook from nut. Thrust washer will fall free.

(4) To remove connecting rod (fig 7-2) on 3 ton hoist, remove screw securing suspension bushing keeper. Unscrew suspension bushing to remove connecting rod from frame.

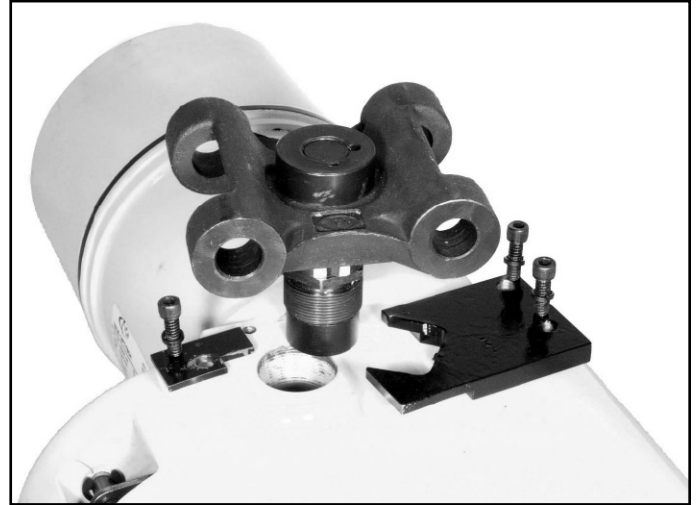


Figure 7-20. Removing Suspension Lug (1/4 through 1 Ton Models)

### c. Disassembly of Suspension Lug (Lug Suspension Models).

(1) On 1/4 through 1 ton models, remove two screws securing anti-rotation bracket and remove bracket. Remove screw securing suspension bushing keeper, and remove keeper. Remove suspension lug using an extra thin 1-1/4" open end wrench to unscrew suspension bushing from frame. (See fig. 7-20).

(2) On 2 ton models, remove three hex socket head screws securing the two lock plates to block at top of frame and pull out locks. Remove suspension lug, using an extra thin 1-1/4" open end wrench to unscrew suspension bushing from block. Instructions for removing block from frame are given in paragraph b. (2).

**NOTE:** The suspension lug is not to be further disassembled, as nut securing suspension bolt and bushing to lug is permanently secured in place at the factory. Only the suspension lug assembly is available for replacement.

(3) On 3 ton models lug bolt is removed in same manner as hook. See paragraph 7-3. b. (3).

### d. Reassembly.

(1) Before assembly, all parts should be thoroughly cleaned and inspected to determine their serviceability. Replace parts that are excessively worn or damaged.

(2) Reassemble suspension hook or lug, chain guide, sprocket shaft and sprocket gear to frame following a reverse procedure of the disassembly steps listed in paragraphs (a.) through (c.), above. If ball bearing is to be reinstalled on sprocket be certain to position it so that the seal side of bearing faces out, away from sprocket. To help prevent oil seepage, apply sealant on O.D. of sprocket bearing and in seat for the ring gasket.

7-4. REBUILD OF LOAD BRAKE AND OVERLOAD CLUTCH ASSEMBLY. (If hoist is equipped with overload clutch less load brake, see 7-4A.)

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).

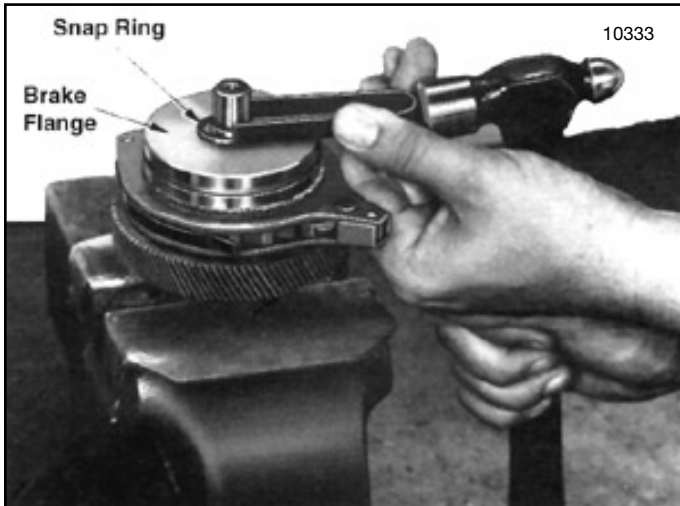


Figure 7-21. Removing Snap Ring from Load Brake Shaft

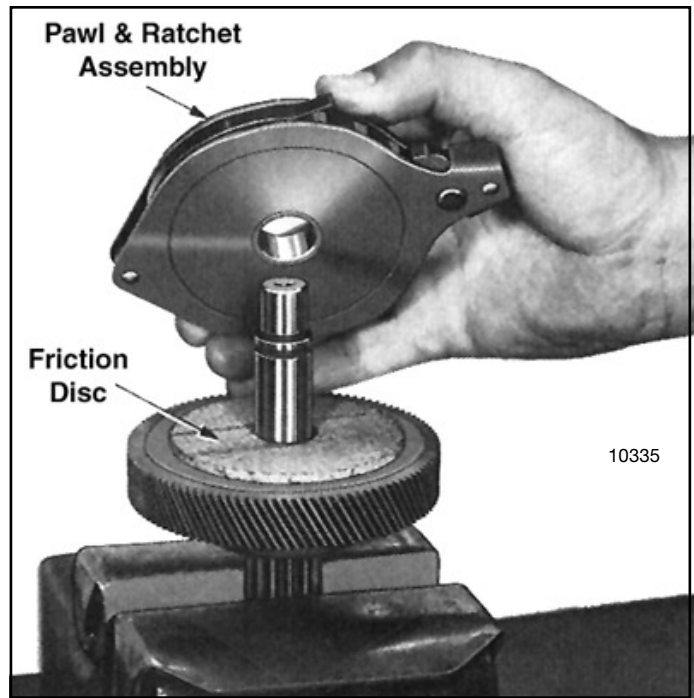


Figure 7-23. Removing Pawl and Ratchet Assembly from Load Brake Shaft

(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.

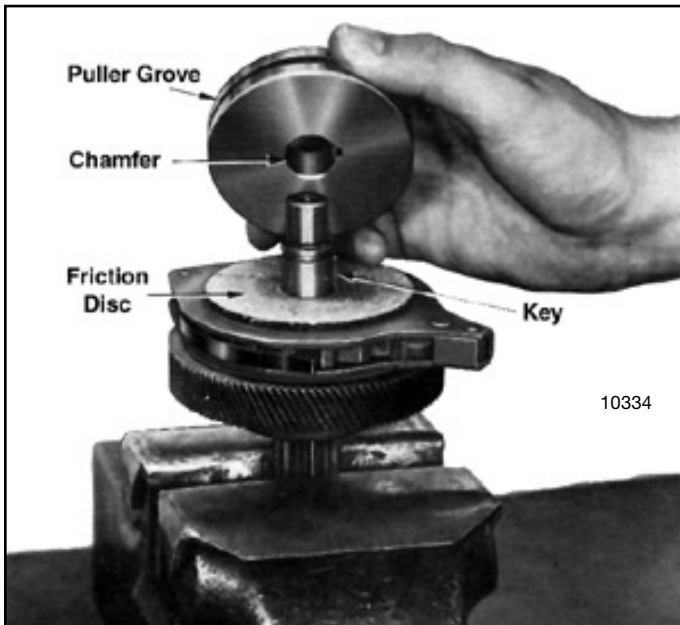


Figure 7-22. View Showing Load Brake Flange Removed

(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).

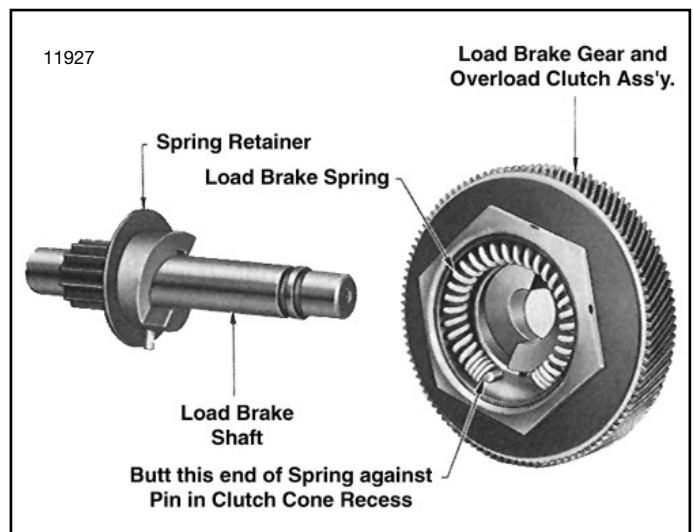


Figure 7-24. Load Brake Gear and Overload Clutch Assembly Removed from Load Brake Shaft Showing Brake Spring Installed in Clutch Cone

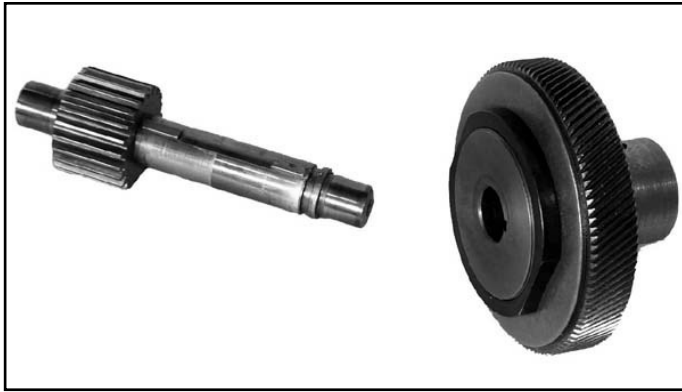


Figure 7-24a.

(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.

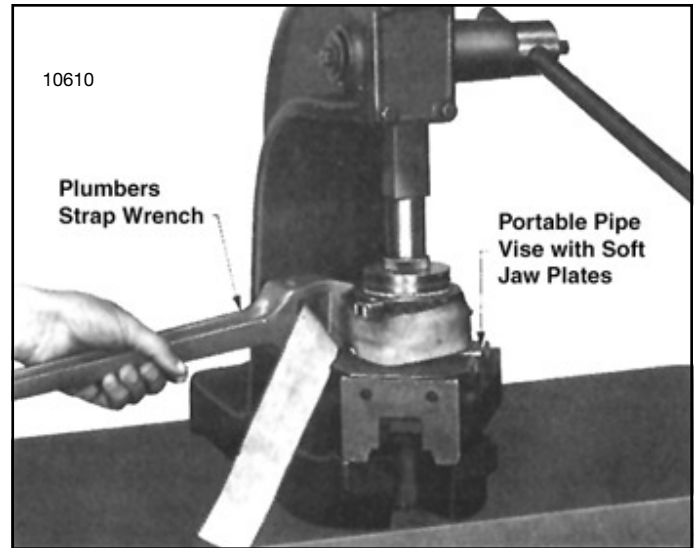


Figure 7-25. Winding Load Brake Gear Using a Strap Wrench to Set Up Load Brake Spring

#### 7-4A. 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 (150% of rated load to 200% rated load). It is suggested whenever there is a need to repair or readjust the overload clutch assembly that it be sent to an authorized Budget Hoist Repair Station where adequate tools, fixtures, and appropriate test equipment is available.

#### 7-5. REBUILD OF LOWER BLOCK AND LOAD CHAIN ASSEMBLY.

##### a. Disassembly (1/4 through 1-ton, single reeved models).

(1) Separate load chain from lower block assembly. Drive out small roll pin securing lower block pin in lower block yoke and push lower block pin from yoke to release chain.

(2) Drive grooved pin from limit actuator and pull actuator from end of chain.

(3) Lower blocks are of a pinned construction, permitting replacement of body, thrust bearing, or hook and nut assembly. To disassemble, drive spring pin from hook nut (fig. 7-26). With pin removed, hold hook nut from turning with drift punch and rotate hook to unscrew it from nut.



Figure 7-26. Removing Roll Pin Securing Hook Nut to Hook Shank

(4) Separate hook, bearing shield, needle bearings and two thrust washers from body. Hook and nut are drilled at assembly and are replaced only as an assembly.

**b. Disassembly** (2-ton, double reeved models).

(1) Remove fillister head screw securing center guide in top of lower block body and lift out guide (fig. 7-27) and sprocket pin lock (fig. 7-28). Press sprocket pin from body and pull out chain, sprocket and washer (fig. 7-29). Do not remove bushing type bearing from sprocket or pressure lube fitting from sprocket pin unless replacement is necessary.

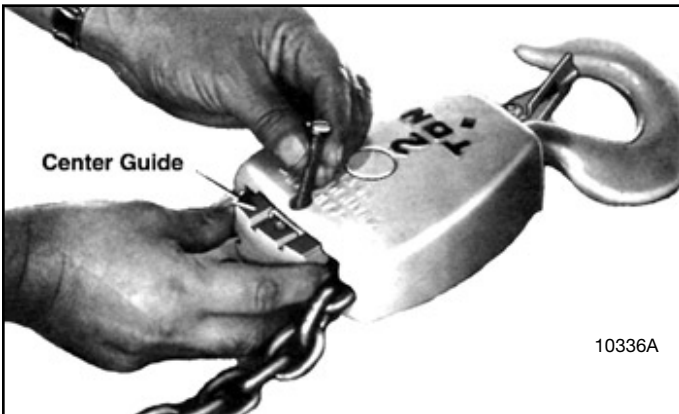


Figure 7-27. Removing Chain Center Guide from 2 through 5 Ton Lower Block Assembly



Figure 7-28. Removing Sprocket Pin Lock on 2 through 5 Ton Lower Block Assembly



Figure 7-29. Removing Coil Chain and Sprocket on 2 through 5 Ton Lower Block Assembly (Link Chain Model)

(2) To disassemble hook and nut, drive groove pin from hook nut with drift punch. With pin removed, hold hook nut from turning with drift punch and rotate hook to unscrew it from nut. Separate hook, nut, bearing shield, needle bearing and two thrust washers from body. Hook and nut are drilled at assembly and are replaced only as an assembly.

**c. Disassembly** (3-ton, triple reeved models).

(1) Remove chain sprocket from lower block following procedure for 2-ton link chain models described in paragraph 7-5. b. (2) above.

(2) To disconnect end of chain anchored to lower block, remove retaining ring from pin bore (fig. 7-30). Push connecting link pin from bore by pressing through hole provided in opposite side of block (fig. 7-31). Chain connecting link is now free and can be further disassembled for inspection.

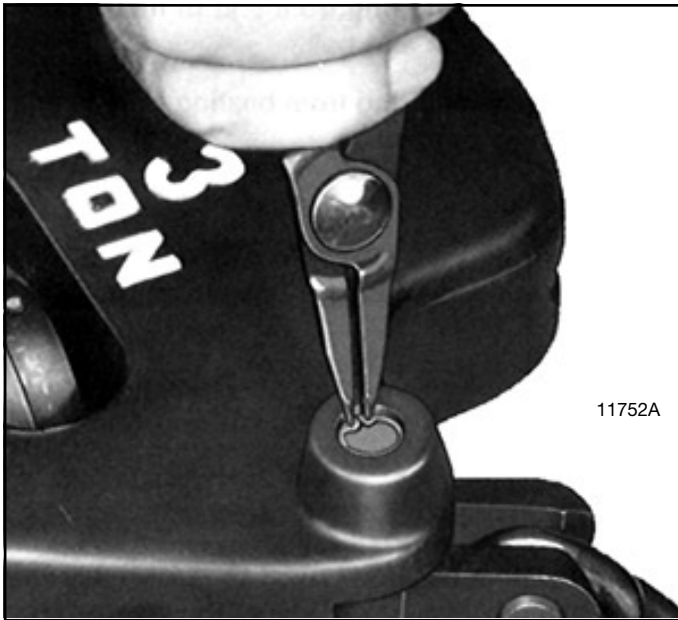


Figure 7-30. Removing Retaining Ring from Bore of Connecting Link Pin - 3 Ton Lower Block Assembly

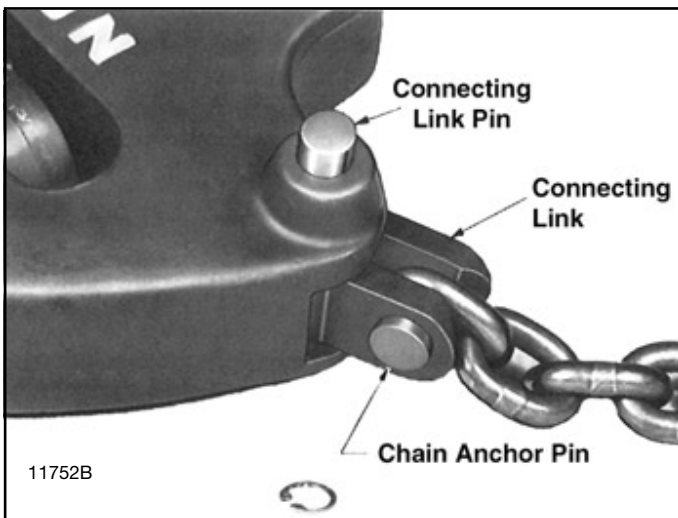


Figure 7-31. Removing Connecting Link Pin from 3 Ton Lower Block Assembly

(3) To remove hook from lower block body, first drive grooved pin from hook nut. Then hold nut from turning using drift punch and rotate hook to unscrew it from nut. Separate hook, shroud and thrust washer from body. Note that bearing surface of washer faces nut.

(4) To remove chain sprocket from upper suspension hanger, first remove hanger as outlined in paragraph 7-2. a. (4). With hanger removed, push sprocket pin from hanger and sprocket. **NOTE:** Sprocket pin must be removed toward side having small anti-rotation pin slot in hanger.

#### d. Reassembly of Lower Blocks.

(1) Clean, inspect and replace worn or damaged parts.

(2) Lubricate and reassemble following a reverse procedure of the disassembly steps above.

## 7-6. REBUILD OF ELECTRICAL CONTROLS AND GEAR CASE COVER SUBASSEMBLY.

### a. Disassembly.

(1) Disconnect two limit switch leads from contactor. Also, if hoist has a transformer, disconnect transformer leads at the contactor or terminal board.

(2) Remove reconnectable terminal board if so equipped.

(3) Remove two screws and lift transformer from gear case cover if hoist is so equipped.

(4) Remove two screws attaching contactor assembly to cover and lift off contactor. Refer to paragraph 7-8 for instructions for rebuild of contactor assembly.

(5) Remove two hex socket head screws and lockwashers securing limit switch assembly to gear case cover and pull limit switch assembly and control shaft from cover.

(6) Loosen two nuts and screws holding limit switches to retainer bracket and remove.

(7) Remove self-locking nut from end of control shaft and pull off washer, switch activator, centering lever, spring, spacer tube, retainer bracket and washer.

**NOTE:** Do not remove needle bearings from gear case cover unless they show evidence of wear or damage and require replacement.

### b. Reassembly.

(1) Before assembly, all parts should be thoroughly cleaned and inspected to determine their serviceability. Replace parts that are worn or damaged.

(2) Reassemble parts to gear case cover in reverse of the disassembly steps above. Ends of centering spring must straddle centering levers. Lubricate contact segments of limit switch with small amount of graphite grease.

## 7-7. REBUILD OF PUSH BUTTON STATION AND CONDUCTOR CABLE ASSEMBLY.

### a. Disassembly.

(1) Remove seven pan head machine screws and lockwashers from back of push button station and lift off rear cover.

(2) Loosen three terminal screws and remove strain cable screw, lockwasher and plain washer.

(3) Remove two pan head machine screws and lockwashers from housing cap and remove cap, grommet and cable assembly.

(4) Remove two pan head screws, contact assembly and button assembly.

### b. Reassembly.

(1) Before assembly, all parts should be thoroughly cleaned and inspected to determine their serviceability. Replace all parts that are worn or damaged.

(2) Reassemble push button station and conductor cable following a reverse procedure of the disassembly steps listed above.



**NOTE:** Do not attempt to shorten or lengthen push button conductor cable. Odd length conductor cable assemblies for other than standard 10 ft. lift hoists can be procured from the factory.

#### 7-8. REBUILD OF CONTACTOR ASSEMBLY.

**a. General.** Wear or damage to contactor parts requires replacement of complete contactor assembly.

#### 7-9. REBUILD OF SINGLE PHASE MOTOR ASSEMBLY.

##### **a. Disassembly.**

(1) To inspect capacitor, remove two cover mounting screws and lift off capacitor cover. Do not disconnect wires at capacitor unless capacitor must be replaced.

(2) Remove external retaining ring from end of shaft and press shaft out of bearing in end bell.

(3) Remove motor end bell from stator assembly. If necessary loosen it by tapping with soft mallet.

(4) Remove internal retaining ring from bearing bore in end bell and press out bearing assembly.

##### **b. Reassembly.**

(1) Before assembly, all parts should be cleaned and inspected to determine their serviceability. Replace all parts that are worn or damaged.

(2) Reassemble motor following a reverse procedure of the disassembly steps listed above.

(3) After reinstalling hoist motor, connect hoist to power supply and carefully complete both checks (a) and (b) below:

(a) To check direction of rotation, briefly operate "↑" button. If hook lowers, interchange motor lead "T1" with "T4" at the contactor or controller. Hook must raise when the "↑" push button is operated.

(b) To check the starting winding switch, connect ammeter (minimum 10 ampere) to motor lead "T5". Amperes must drop to zero in approximately one second when operating hoist in both "↑" and "↓" directions. If ampere reading does not drop to zero, interchange motor leads "T7" and "T8". If, after above checks were made with motor having been run in both directions, the ammeter reading still does not return to zero, the motor switch is not functioning properly and should be replaced.

### **⚠ WARNING**

**Do not change circuit wiring. Severe damage and malfunction of hoist may result.**

#### 7-10. REBUILD OF THREE PHASE MOTOR ASSEMBLY.

##### **a. Disassembly.**

(1) Pull four motor mounting bolts from motor and separate stator assembly from the end bell and rotor shaft assembly.

(2) Remove external retaining ring from end of motor shaft and press shaft from bearing in end bell.

(3) Remove internal retaining ring from bearing bore in end bell and press out bearing assembly.

##### **b. Reassembly.**

(1) Before assembly, all parts should be cleaned and inspected to determine their serviceability. Replace all parts that are worn or damaged.

(2) Reassemble motor following a reverse procedure of the disassembly steps listed above.

#### 7-11. REASSEMBLY OF HOIST FROM SUBASSEMBLIES.

**a. General.** The procedure to be followed to reassemble the hoist from subassemblies is in reverse order of the disassembly steps outlined in paragraph 7-2. Listed below are special assembly precautions which should be observed to assure proper assembly.

**NOTE:** Grease retained bearings (see Section VII, par. 7-2.

c. (1) and fig. 7-7) have loose rollers. When reassembling hoist, make certain the correct number of rollers are held in roller cup with grease before assembling load brake shaft to hoist.

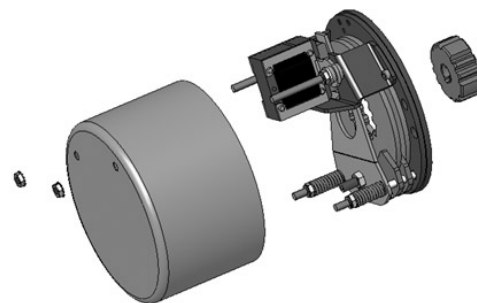
**b. Assembly of Load Brake Thrust Washers.** When reinstalling load brake assembly be certain thrust washers are properly installed at both ends of load brake shaft, as noted below.

(1) A bronze thrust washer with a lug on one side belongs on pinion end of shaft and must be installed so that its lug engages the special slot located on spotface surrounding bearing bore inside hoist frame or gearcase cover. Use heavy grease to hold washer in proper position in frame or cover (depending upon hoist capacity) during assembly.

(2) A 5/8" I.D. steel thrust washer is to be installed on the brake flange end (end opposite pinion) of load brake assembly.

**c. Motor Brake.** Check brake adjustment after first 30 days of service and regularly thereafter during the six-month inspection procedure.

### **Installation and Service Instructions for 54,000 Series (rev. A) Manual Adjust Brakes.**



**Important** - Please read these instructions carefully before installing, operating, or servicing. Failure to comply with these instructions could cause injury to personnel and/or damage to property if the brake is installed or operated incorrectly.

### Caution

1. Installation and servicing must be made in compliance with all local safety codes including Occupational Safety and Health Act (OSHA). All wiring and electrical connections must comply with the National Electric Code (NEC) and local electric codes in effect.

2. To prevent an electrical hazard, disconnect power source before working on the brake. Lock disconnect in the off position and tag to prevent accidental application of power.

3. Be certain power source conforms to the requirements specified on the brake nameplate.

4. Be careful when touching the exterior of an operating brake. Allow sufficient time for brake to cool before disassembly. Surfaces may be hot enough to be painful or cause injury.

5. Do not operate brake with housing removed. All moving parts should be guarded.

6. After usage, the brake interior will contain burnt and degraded friction material dust. This dust must be removed before servicing or adjusting the brake.

DO NOT BLOW OFF DUST using an air hose. It is important to avoid dispersing dust into the air or inhaling it, as this may be dangerous to your health.

- a) Wear a filtered mask or a respirator while removing dust from the inside of a brake.
- b) Use a vacuum cleaner or a soft brush to remove dust from the brake. When brushing, avoid causing the dust to become airborne. Collect the dust in a container, such as a bag, which can be sealed off.

**General Description** - This series brake is spring set, electrically released. These brakes will contain one or two friction discs driven by a hub mounted on the motor.

**Operating Principle** - When the brake coil is energized the lever arm retracts the spring force from the disc pack, allowing the friction disc to rotate with the hub and motor shaft. When power is removed the lever arm pushes down on the stationary disc and friction discs. The hub is held from rotating, and the load is held in place.

▲ WARNING
<p><b>Do not release brake if there is a suspended load on the hoist hook.</b></p> <p><b>Manually releasing the brake will allow a suspended load to fall, possibly causing damage, injury or death.</b></p> <p><b>Weight of load chain may be sufficient to cause entire chain to run through hoist if brake is released. Be sure chain is secured.</b></p> <p><b>Always be certain any suspended load (which includes below the hook devices or attachments) are removed before servicing, adjusting or removing brake.</b></p> <p><b>If chain is moved causing rotation of the sprocket without the electronic limit switch powered, check upper and lower limit settings before resuming normal operation.</b></p>

### NOTES

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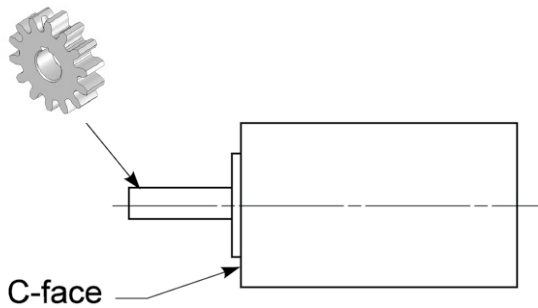
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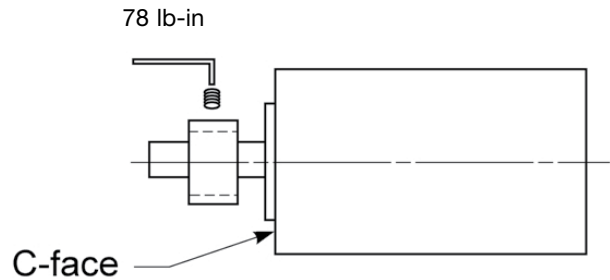
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# BRAKE MOUNTING PROCEDURE

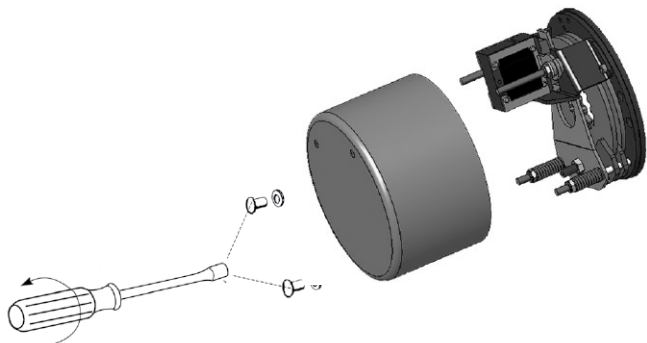
- ① Place hub on motor shaft.



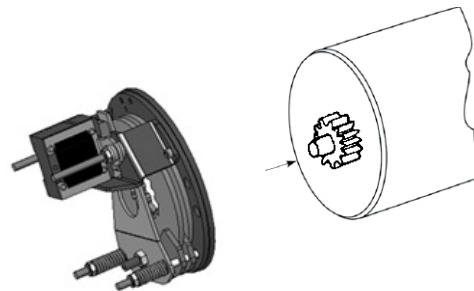
- ② Apply Loctite 680 to set screws. Tighten set screws on motor shaft.



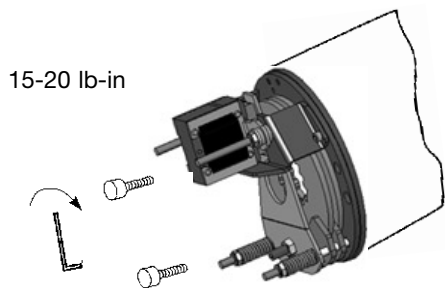
- ③ Remove brake housing and gasket.



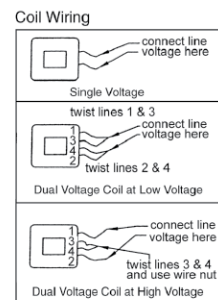
- ④ Align friction disc with splined hub and slide brake against motor face.



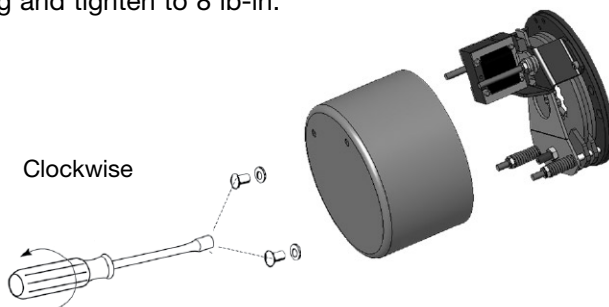
- ⑤ Insert mounting screws and tighten.



- ⑥ Connect coil leadwires to power supply. Refer to nameplate for voltage rating.\*  
**Caution:** Keep wiring away from pinch points and moving components.



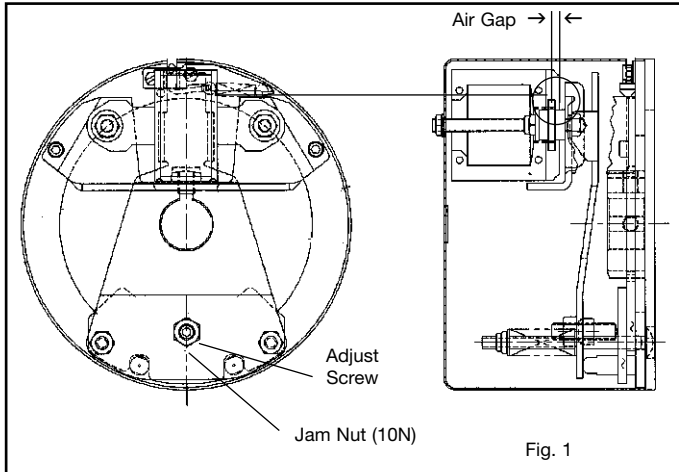
- ⑦ Replace brake housing and tighten to 8 lb-in.



## 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".

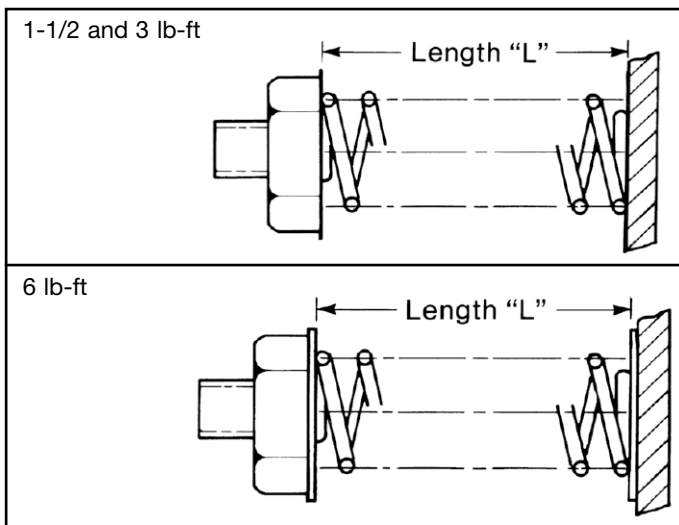
1. Loosen jam nut (10N).
2. Turn adjusting screw (10) CW until .100" gap is reached (see Fig. 1).
3. Retighten jamb nut.
4. Check air gap again.



## 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

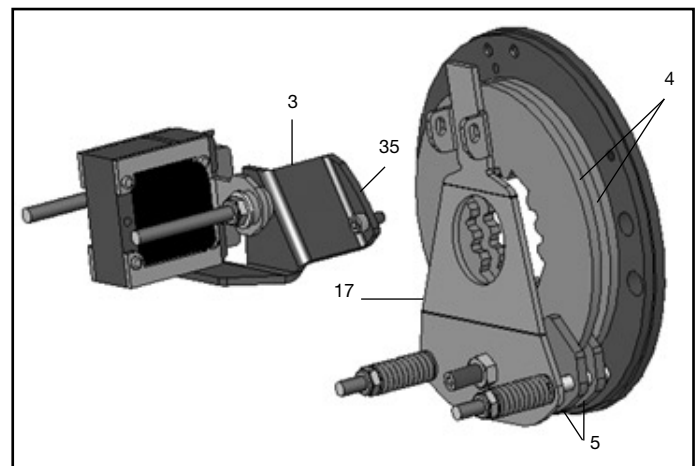


## Friction Disc Replacement

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.

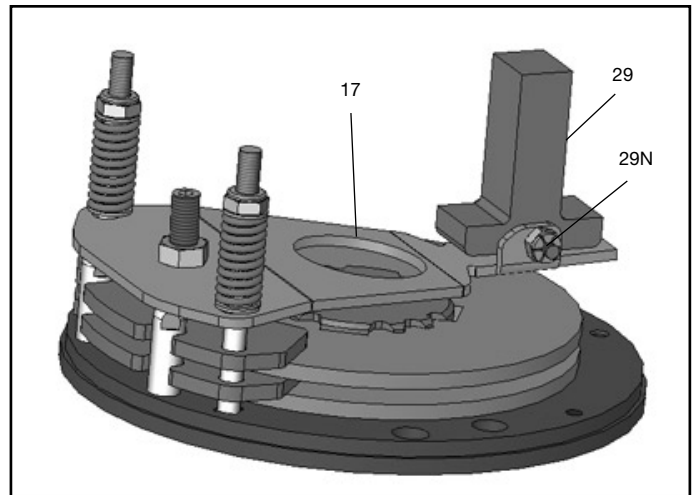
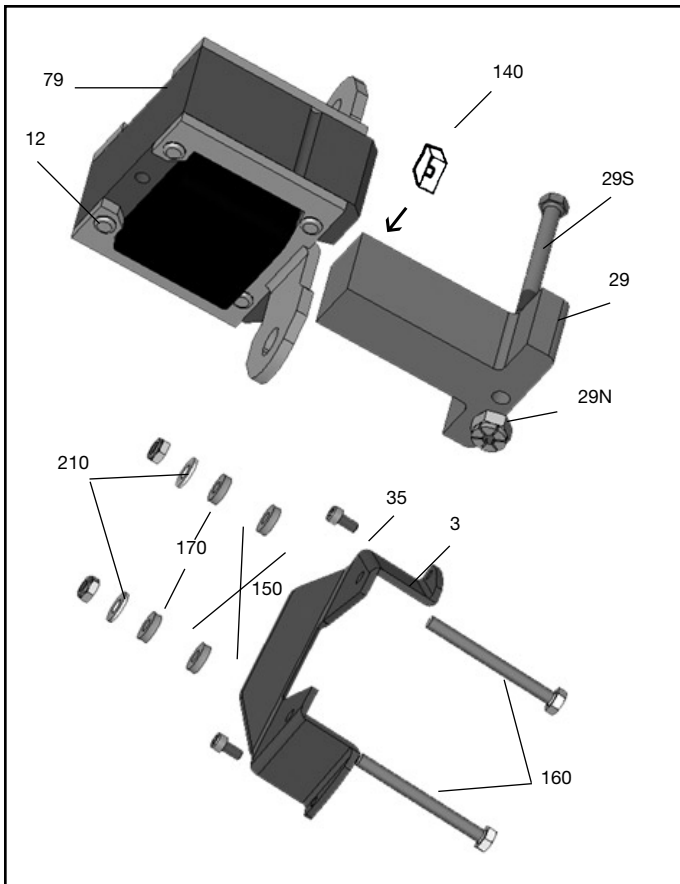


## Coil Replacement

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.

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 5-8 of the brake mounting procedure.



### 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.



TROUBLESHOOTING			
<b>Coil Failure</b>		<b>Excessive Wear/Overheating</b>	
<b>Supply Voltage Cause</b>	<b>Supply Voltage Correction</b>	<b>Air Gap Cause</b>	<b>Air Gap Correction</b>
Line voltage >110% of coil rating	Reduce voltage or replace with proper rated coil	Low solenoid air gap	Reset air gap (refer to Air Gap Adjustment)
Excessive voltage drop during inrush time	Increase current rating of power supply	<b>Cycle Rate Cause</b>	<b>Cycle Rate Correction</b>
<b>Wiring Cause</b>	<b>Wiring Correction</b>	Brake "jogging" exceeding coil cycle rate	Reduce cycle rate or consider alternate control method
Leadwires interfering with plunger pull-in	Reroute wiring away from plunger and other moving components	Thermal capacity is being exceeded	Reduce cycle rate, use alternate control method or increase brake size
Coil leadwire shorted to ground	Replace coil or leadwire and protect with wire sleeving	<b>Alignment Cause</b>	<b>Alignment Correction</b>
<b>Solenoid Assembly Cause</b>	<b>Solenoid Assembly Correction</b>	Brake endplate not concentric to motor C-Face	Motor resister must be within .004" on concentricity
Plunger not seating flush against solenoid frame	Loosen solenoid mounting nuts and reposition frame to allow full face contact	Motor shaft runout is excessive	Must be within .002"; runout; consult motor manufacturer
Excessive solenoid/plunger wear at mating surface	Replace solenoid assembly	<b>Worn Parts Cause</b>	<b>Worn Parts Correction</b>
Broken shading coils	Replace solenoid assembly	Friction disc excessively worn (disc can wear to 1/2 original thickness or .093")	Replace friction discs
<b>Worn Parts Cause</b>	<b>Worn Parts Correction</b>	Endplate, stationary disc or pressure plate warped	Replaced warped or worn component
Excessive wear of solenoid link bolt	Replace link bolt; also inspect plunger thru-hole for elongation	Linkages worn	Replace all worn components
Plunger guide worn down and interfering with plunger movement	Replace guide	Motor shaft endfloat excessive	Endfloat must not exceed .020"; consult motor manufacturer
<b>Application Cause</b>	<b>Application Correction</b>	<b>Hub Cause</b>	<b>Hub Correction</b>
Machinery cycle rate is exceeding brake rating	Reduce brake cycle rate or use alternate control method	Burr on hub interfering with disc "float"	File off burr
High ambient temperature (>110° F) and thermal load exceeding coil insulation rating	Use Class H rated coil and/or find alternate method of cooling brake	Set screw backed out and interfering with disc	Retighten set screw; use Loctite® 680 to help secure
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	<b>Miscellaneous</b>	<b>Miscellaneous</b>
<b>Miscellaneous Cause</b>	<b>Miscellaneous Correction</b>	Wiring is restricting disc pack movement	Reroute wiring
Wrong or over tightened torque springs	Replace with proper spring or refer to installation section for proper spring height	Excessive stop time (2 seconds or greater)	Increase brake size/torque or use alternate control method
Excessive air gap	Reset, refer to Airgap Adjustment	High Ambient temperature (in excess of 110°F)	Reduce cycle rate or use alternate method of cooling

**d. Assembly of Load Chain.**

**NOTE:** Coil chain must be installed so welds on vertical links face away from the load sprocket.

(1) Install load chain over sprocket before load brake assembly is installed. Insert anchor end of chain (end opposite lower block on single reeved models) into chain guide opening on far side of hoist (viewing frame from anchor screw side). Rotate sprocket gear by hand counterclockwise as chain is fed into opening. When sufficient chain has been run into hoist to reach anchor position, plus a slack loop, install limit stop on anchor end of load chain (see (2)) and attach end of chain to frame with special fillister head screw. Be certain chain is not twisted.

**NOTE:** The spring clip connecting link must be attached to anchor end of roller load chain before chain is run into hoist. Failure to do so may result in damage to chain or hoist.

(2) When installing limit stop on anchor end of load chain attach it at link. See Figure 3-1b.

**Two Piece Chain Stop (electronic limit switch)**

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

e. **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.

f. **Proximity Switch Replacement/Adjustment.** The proximity switches are adjusted at the factory to have a gap of 1-2mm between the end of the sensor and the face of the sprocket gear. If the sprocket and/or sprocket gear are not being replaced, there should be no need to adjust the proximity switches. If the sprocket gear or sprocket have been replaced, or a proximity switch needs replacing, use the following procedure:

(1) The proximity switch needs to be set with an air gap of 1-2mm between the sensor end and the face of the sprocket gear. With the proximity switch removed, use a flashlight to look through the mounting hole to verify that a gear surface is directly below the mounting hole.

**CAUTION**

Failure to line the proximity switch up with a gear surface could result in the proximity switch being inserted too far. This will result in damage to the proximity switch and possibly gear case cover if the hoist is operated.

(2) Thread the proximity switch in until it bottoms out on the gear face. Do not over tighten. Back out one full turn. This will leave a gap of approximately 1mm.

(3) Tighten lock nut to secure proximity switch.

Proximity switches are equipped with a red LED that lights when it is sensing the presence of metal. An optional method for setting the proximity switch air gap would be to use a proximity sensor tester suitable for use with a 15v proximity switch. This is connected directly to the proximity switch, and lights the LED when a surface is sensed.

**WARNING**

**If the hoist loses power during operation or if chain is moved causing rotation of the sprocket without the electronic limit switch powered the limits may have shifted. Check upper and lower limit settings before resuming normal operation.**

The hoist electronic limit switch requires power while the chain is in motion to maintain the limits at the desired position. If the gearing rotates while power is removed from the unit, the limits will have to be reset. A common example of a situation causing such gear movement would be during replacement of the motor or brake.

If the hoist loses power during operation, the upper and lower limits will have shifted and need to be reset. The distance between limits will remain the same, but the entire range will have shifted up or down accordingly. Operation of the electronic limit switch is to be checked daily per ASTM/ANSI.B30.16.

**g. Lubricate Hoist. Lubricate hoist as outlined in Section IV.**

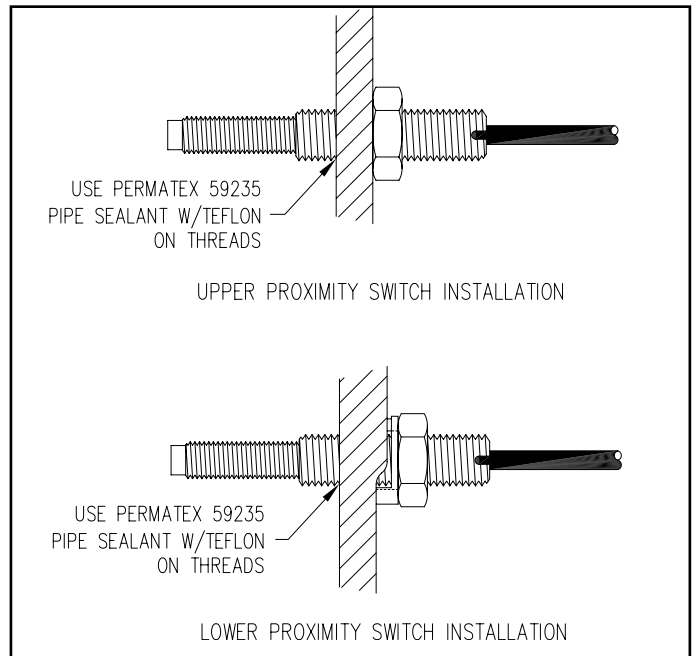


Figure 7-32.

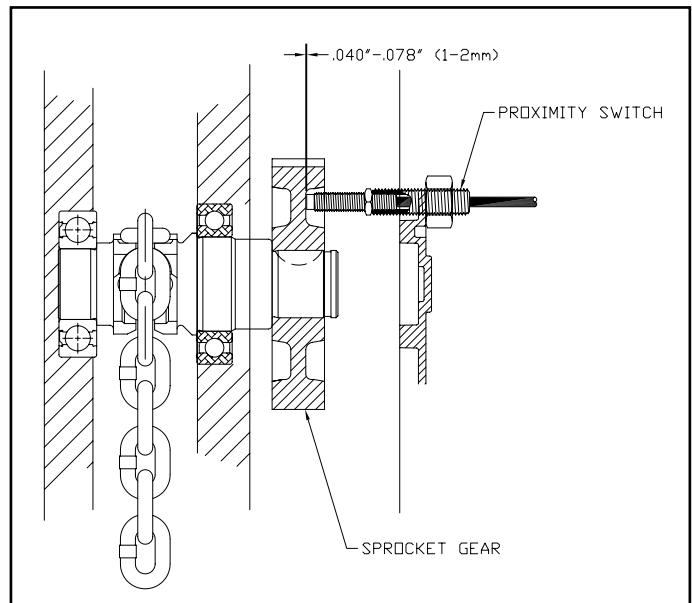


Figure 7-33.

## 7-12. 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 "↑" 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 "↓" 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.

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

d. **Check Upper and Lower Limit Stop Operation (electronic limit switch).** 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) Press up push button and verify operation of electronic limit switch upper limit. Reset as necessary.

(2) Press down push button and verify operation of electronic limit switch lower limit. Reset as necessary.

(3) If hoist does not stop at one or both of the set limits, check for improper wiring. Refer to paragraph 6-2 and appropriate wiring diagram. If wiring is correct, check to see that proximity switches are correctly installed and sensing properly, paragraph 7-11.f.

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 withstand 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 IX - REPLACEMENT PARTS

This section contains complete replacement parts information for your new **Budgit** 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 BH part number, description and quantity required.

authorized testing equipment; and stock a complete inventory of genuine replacement parts.

**NOTICE:** Information herein is subject to change without notice. Parts must be ordered from an Authorized **Budgit** Repair Station or from a **Budgit** Hoist Distributor.

When ordering replacement parts it will be necessary that you include, with your order, the BH 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** Electric Hoists at any of the Authorized Repair Stations. All are staffed by qualified factory-trained servicemen; have

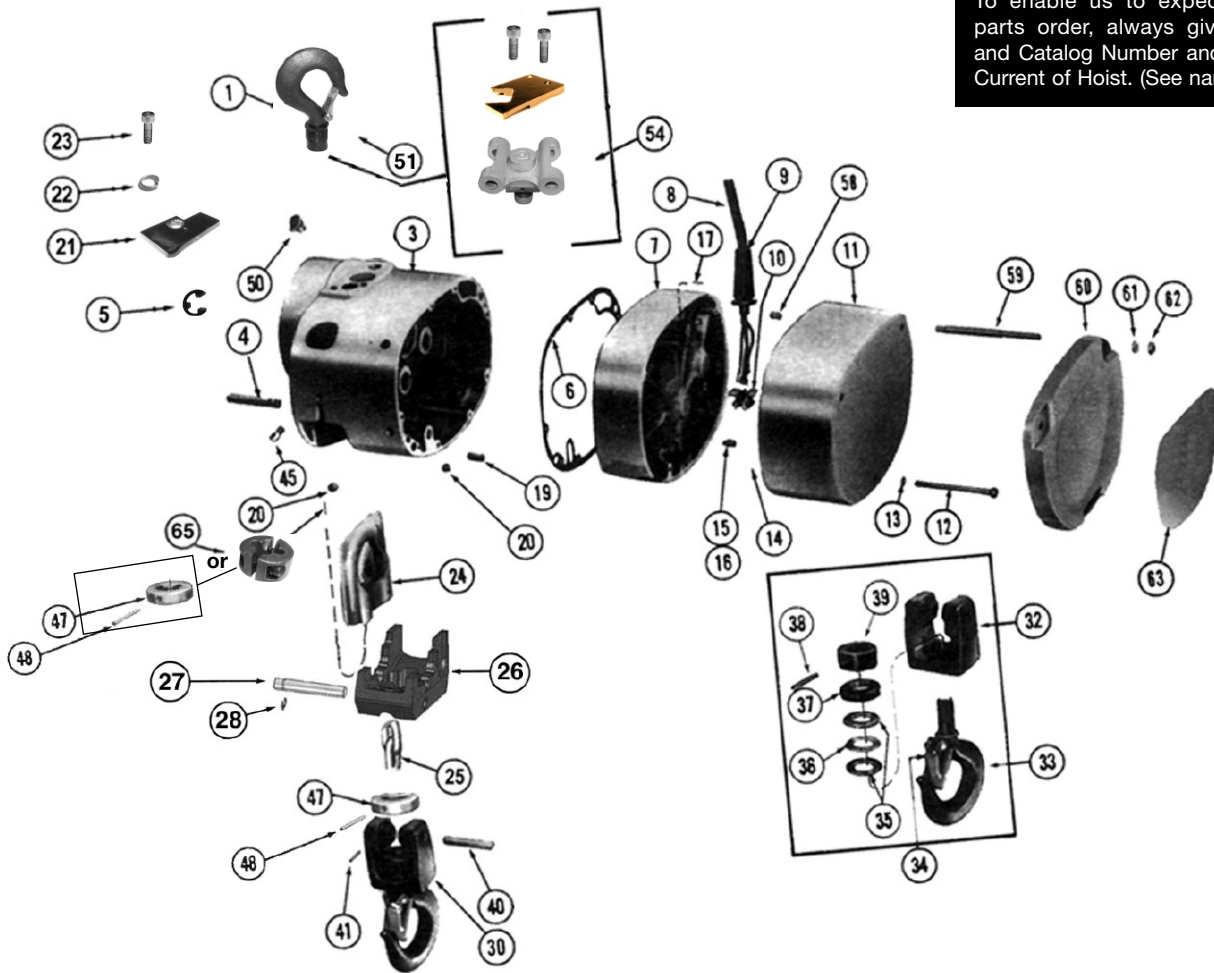
**The numbers assigned to the parts of our various assemblies in our parts lists are not the part numbers used in manufacturing the part. They are identification numbers, that when given with the hoist serial number, permit us to identify, select or manufacture, and ship the correct part needed for any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

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#### **ELECTRICAL CONTROL UNITS (Three phase Single Speed Hoists, Electronic Limit Switch)**

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



**Figure 9-1. FRAME AND EXTERNAL PARTS**  
**Standard and Plating Service Hoists**  
**(Except 2 through 3 Ton Model Upper Suspension, Load Chain and Lower Block)**

Ref. No.	Part Number	Description	Qty. Req'd
1	BH4007A	Hook Assembly-Upper with Latch (Includes Item 51) (Thru 1 ton)	1*
	BH-5027	Hook Assembly-Upper with Latch (Includes Item 51) (Thru 1 ton) Plated	1*
2	—	<i>This reference number is not used in the figure</i>	
3	***	Frame Assembly	1
4	BH-5009	Pin-Support, chain guide	2
5	BH-4008	Retaining Clip, Chain Guide Pin	2
6	BH-1007	Gasket-Gearcase	1
7	***	Cover Assembly-Gearcase	
8	BH-1010	Cable Assembly-Flexible, 5' (Incl. Items 9 & 10) 115 volt, 1 phase, 60 hertz hoists 230 volt, 1 phase, 60 hertz hoists 200/230/460/575 volt, 3 phase, 60 hertz hoists	1 1 1 1
9	BH-1096	Grommet-Flexible Cable-3 phase Grommet-Flexible Cable-1 phase	1 1
10	BH-1014	Clamp-Flexible Cable	1
11		Cover-Electrical Compartment	1
	BH-1168	Without internal counterweight	1
	BH-1169	With internal counterweight	
		Capacity Label (Not Shown)	1

(Continued on following page)

Figure 9-1. FRAME AND EXTERNAL PARTS - Continued

Ref. No.	Part Number	Description	Qty. Req'd
11a	BH-1190	1/4 Ton	
	BH-1191	1/2 Ton	
	BH-1192	1 Ton	
	BH-1193	2 Ton	
	BH-1194	3 Ton	
12	BH-1020	Screw-Fillister Head Machine	3
13	BH-1021	Hi-Collar Helical Spring Lock Washer (1/4)	3
14	BH-1022	Ring-Retaining	8
15	BH-1023	Regular Helical Spring Lock Washer (#10 Pltd.)	8
16	BH-1024	Hex Socket Head Cap Screw (#10-24 x 3/4)	2
17	BH-1025	Grooved Pin (Type D 1/8 x 1/2 Pltd.)	1
18	BH-1026	Grommet-(Motor Driven Trolley Models)-Not Shown	2
19	BH-1027	Dowel Pin (3/8 x 3/4)	2
20	BH-1028	Hex Socket Pipe Plug (1/8)	1
21	BH-5023	Suspension Bushing Keeper	1
22	BH-4016	Lock Washer	1
23	BH-4017	Hex Socket Cap Screw	
24		Guide Assembly-Coil Load Chain	1
	BH-1031	1/4 & 1/2 ton Hoists	
	BH-1032	1 through 3 ton Hoists	
25	***	Chain Assembly-Coil, load	1*
	BH-1033	1/4" Dia.-1/4 & 1/2 ton Hoists	
	BH-1034	5/16" Dia.-1 ton Hoists	
	BH-1080	1/4" Dia.-1/4 & 1/2 ton Hoists - Zinc Plated	
	BH-1086	5/16" Dia.-1 ton Hoists - Zinc Plated	
26	BH-5020	Stop Shoe (Electronic Limit Equipped Only)	1
27	BH-5021	Support Pin	1
28	BH-5022	Retaining Ring	1
29	—	<i>This reference number is not used in the figure</i>	
30		Block Assembly-Lower, (Incl. items 32 through 39)	1*
	BH-5028	For 1/4 ton Hoists	
	BH-1035	For 1/4 ton Hoists Plated	
	BH-1035A	For 1/2 ton Hoists	
	BH-5029	For 1/2 ton Hoists Plated	
	BH-5046	For 1 ton Hoists	
	BH-5030	For 1 ton Hoists Plated	
		Note: Lower block assemblies do not include attaching pins. Order separately.	
31	—	<i>This reference number is not used in the figure</i>	
32		Body-Lower Block	1*
	BH-1174	1/4 ton Hoists	
	BH-5031	1/4 ton Hoists Plated	
	BH-1174A	1/2 ton Hoists	
	BH-5032	1/2 ton Hoists Plated	
	BH-1175	1 ton Hoists	
	BH-5033	1 ton Hoists Plated	
33		Hook, Nut and Latch Assembly-Lower Block	1
	BH-5047	1/4 thru 1 ton Hoists	
	BH-5034	1/4 thru 1 ton Hoists Plated	
34		Latch Kit-Hook, lower	1
	BH-5035	1/4 thru 1 ton Hoists	
35	BH-1178	Washer-Thrust, needle bearing	2
36	BH-1179	Bearing Assembly-Needle, thrust	1
37	BH-1180	Shield-Bearing	1
38	BH-1181	Grooved Pin (Type F 5/32 x 1-1/8 Pltd.)	1
39	**	Nut-Hook	1
40		Pin-Connecting, lower block	1
	BH-1037	1/4 and 1/2 ton Hoists	
	BH-1038	1 ton Hoists	

(Continued on following page)



**Figure 9-1. FRAME AND EXTERNAL PARTS - Continued**

<b>Ref. No.</b>	<b>Part Number</b>	<b>Description</b>	<b>Qty. Req'd</b>
41	BH-1045	Slotted Spring Pin (3/32 x 3/4 Pltd.)	1
42-44	—	<i>These reference numbers are not used in the figure</i>	
45	BH-5048	Hex Flange Screw, Self-Locking	1
46	—	<i>This reference number is not used in the figure</i>	
47		Limit Stop (Paddle Limit Switch)	2
	BH-1098	1/4" Coil Chain	
	BH-1099	5/16" Coil Chain	
48	BH-1184	Grooved Pin (Limit Stop BH-1098) (Type F 7/32 x 2 Pltd.)	2
	BH-1185	Grooved Pin (Limit Stop BH-1099) (Type F 1/4 x 2 Pltd.)	2
49	—	<i>This reference number is not used in the figure</i>	
50	BH-4010	Filler Assembly-Oil	1
51	BH-1183	Latch Kit-Hook (upper) 1/4 through 1 ton	1
52-53	—	<i>These reference numbers are not used in the figure</i>	
54	BH-5025	Lug Suspension Assembly	1*
		The following items are for two speed hoists with 2-1/4 horsepower motor only:	
55-57	—	<i>These reference numbers are not used in the figure</i>	
58	BH-1158	Insert-Coil	3
59		Support Stud	
	BH-1159	Top	2
	BH-1160	Bottom	1
60	BH-1161	Counterweight	1
61	BH-1162	Plain Washer (Type W 1/4 Pltd.)	3
62	BH-1163	Heavy Hex Self-Locking Nut (1/4 - 20)	3
63		Capacity Label	1
	BH-1164	1 Ton	
	BH-1165	2 Ton	
	BH-1166	3 Ton	
65		Chain Stop Assembly (Electronic Limit Switch)	
	BH-5010	For 5/16" Coil Chain	1
	BH-5011	For 1/4" Coil Chain	1

\* Refer to Figure 9-2 for 2 Ton Model Upper Suspension, Load Chain and Lower Block Parts.  
Refer to Figure 9-3 for 3 Ton Model Upper Suspension, Load Chain and Lower Block Parts.

\*\* Hook and suspension bolt nuts are not serviced separately. They are available only with hook or bolt as assemblies.

\*\*\* For frame assembly or gearcase cover assembly, please consult factory. Be sure to have serial number available.

## REPLACEMENT CHAIN

<b>TYPE CHAIN</b>	<b>BULK</b>
Coil (1/4" Dia.)	BH-1066
Coil (5/16" Dia.)	BH-1069
Coil (1/4" Dia. Zinc Plate)	BH-1083
Coil (5/16" Dia. Zinc Plate)	BH-1093

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

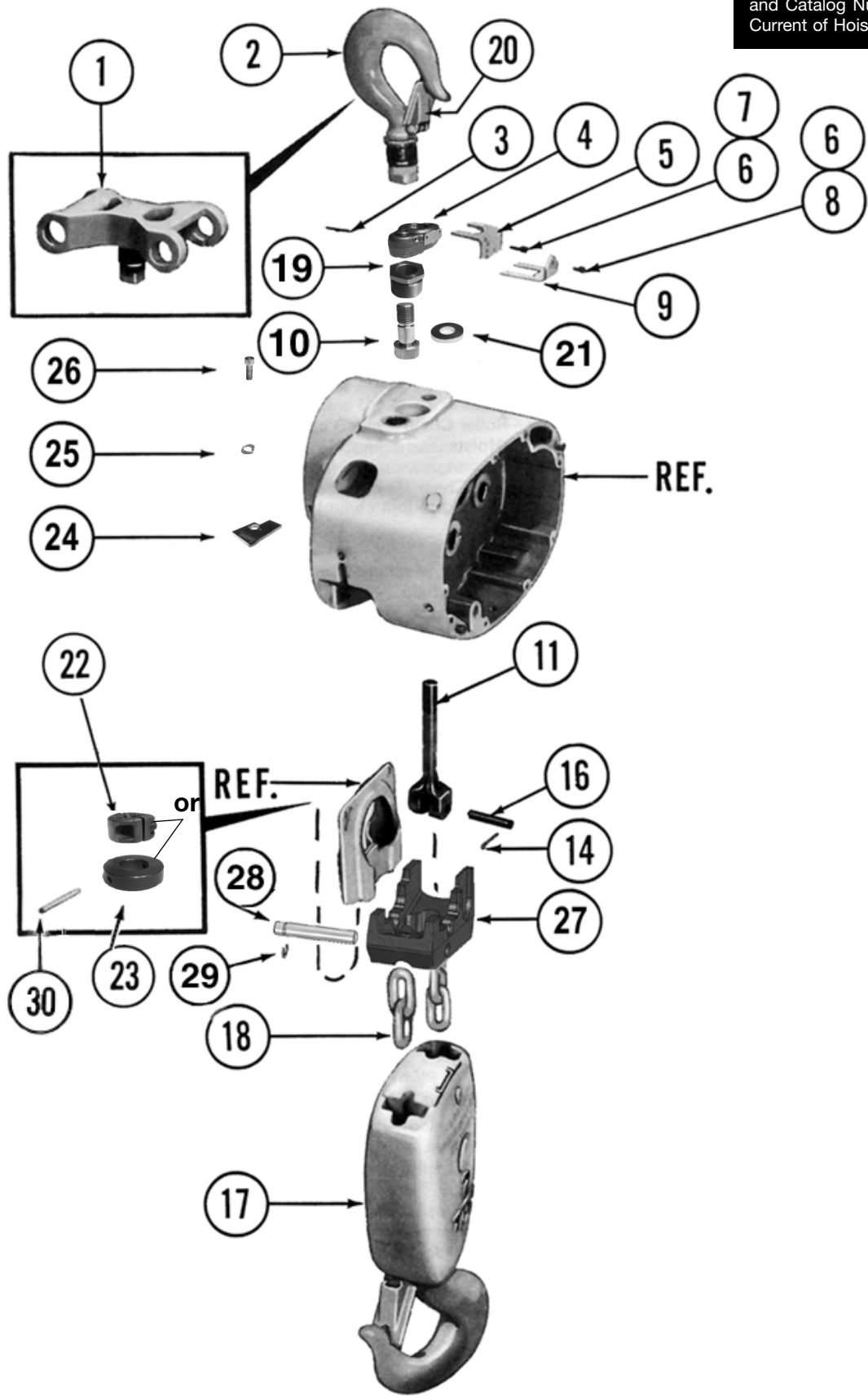


Figure 9-2. UPPER SUSPENSION, LOAD CHAIN AND LOWER BLOCK PARTS  
(2 Ton Hoists)

10251B

**Figure 9-2. UPPER SUSPENSION, LOAD CHAIN AND LOWER BLOCK PARTS - Continued**

<b>Ref. No.</b>	<b>Part Number</b>	<b>Description</b>	<b>Qty. Req'd</b>
1	905422	Bracket Assembly Kit- Lug Suspension (Coil Chain Model Only. Includes Items 6, 8 and 9).	1
2	BH-1102	Hook Assembly-Upper (Includes Items 5, 6, 7 and 20).	1
	BH-5036	Hook Assembly-Upper (Includes Items 5, 6, 7 and 20) Plated	
3	BH-1030	Grooved Pin (Type F 3/16 x 1-1/4 Pltd.)	2
4		Block Assembly-Upper	1
	BH-4013	Coil Chain Models, Includes Items 3, 10, 11, 14, 16, 19 and 21	
5	BH-1106	Lock Assembly-Suspension Bushing	1
6	BH-1107	Regular Helical Spring Lock Washer (#10 Pltd.)	3
7	BH-1108	Hex, Socket Head Cap Screw (#10-24 x 1/2)	2
8	BH-1109	Hex, Socket Head Cap Screw (#10-24 x 3/8)	1
9	BH-1061	Plate - Lock (Coil Chain Lug Suspension Models Only)	1
10	*	Lug Suspension Stud	1
11	*	Anchor - Coil Load Chain	1
14	BH-1111	Cotter Pin (3/32 x 3/4)	1
16	BH-1113	Pin-Coil Chain Anchor	1
17	(See Fig. 9-4)	Block Assembly-Lower	1
18**	BH-1114	Chain Assembly	1
	BH-1115	Chain Assembly (Zinc Plated)	1
19	*	Suspension Bushing	1
20	BH-2213	Latch Kit-Hook	1
21	BH-4012	Spacer Washer	1
22	BH-5010	Chain Stop (Electronic Limit Switch)	1
23	BH-1099	Actuator (Paddle Limit Switch)	1
24	BH-5023	Suspension Bushing Keeper	1
25	BH-4016	Lock Washer	1
26	BH-4017	Hex Socket Head Cap Screw	1
27	BH-5020	Stop Shoe (Electronic Limit Equipped)	1
28	BH-5021	Support Pin	1
29	BH-5022	Snap Ring	1
30	BH-1185	Grooved Pin (Type F 1/4 x 2 Pltd.)	1

\* Not available as individual parts. Order upper block assembly, Item 4.

\*\* Load Chain Assemblies listed are for hoists with standard 10 ft. lists. Bulk chain is available in 1 ft. increments and 50 ft. lengths as follows:

<b>Type Chain</b>	<b>50' Lengths</b>	<b>Bulk</b>
Link (5/16" Dia.)	Not Available	BH-1069
Link (5/16" Dia. Zinc Plate)	Not Available	BH-1093

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

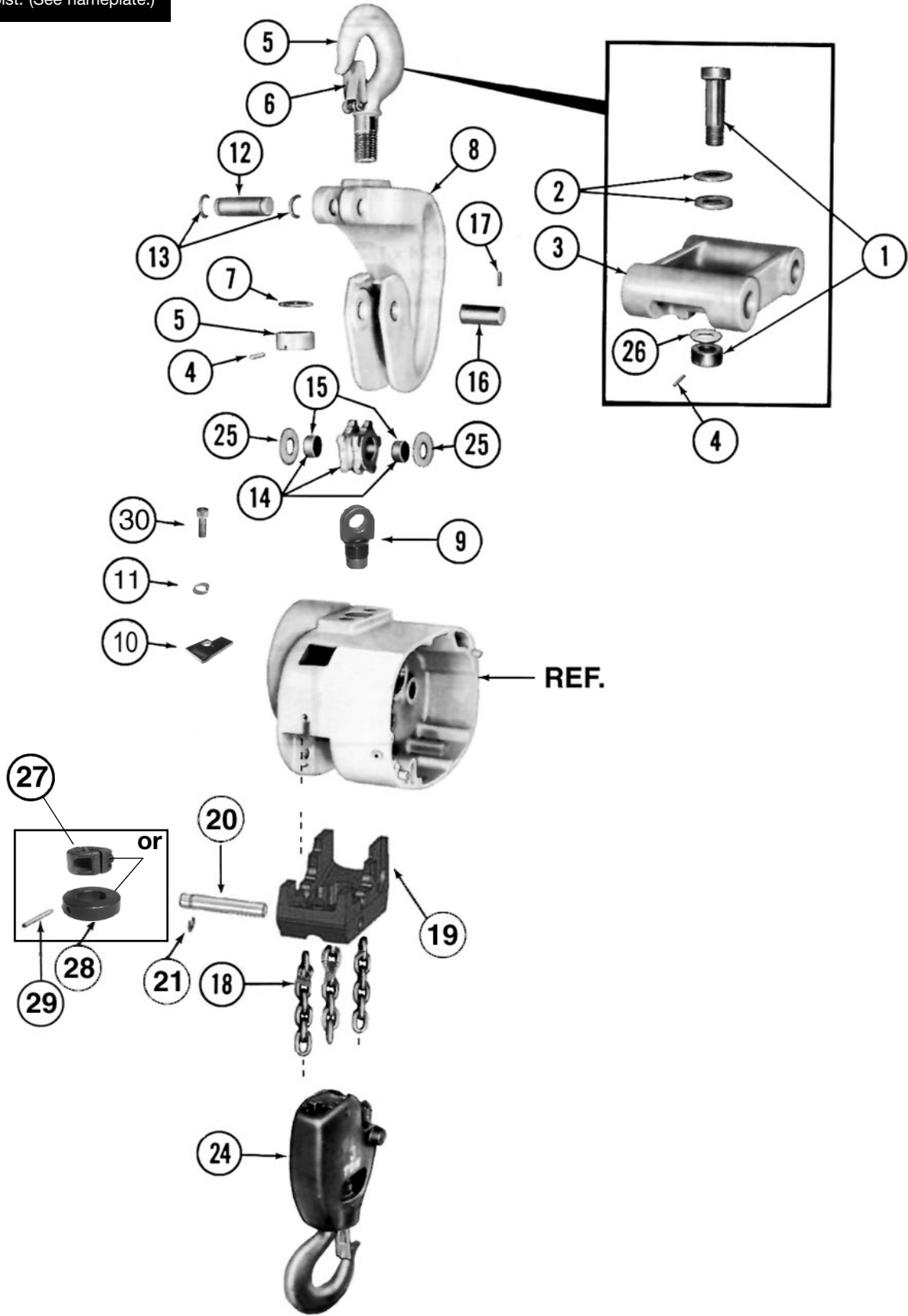


Figure 9-3. UPPER SUSPENSION, LOAD CHAIN AND LOWER BLOCK PARTS  
(3 Ton Hoists)

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**Figure 9-3. UPPER SUSPENSION, LOAD CHAIN AND LOWER BLOCK PARTS - Continued**

Ref. No.	Part Number	Description	Qty. Req'd
1	BH-1131	Suspension Pin and Nut Assembly	1
2	BH-1132	Spherical Washer	1 Pr.
3	905424	Suspension Lug Kit (Includes Items 1, 2, 4 and 26)	1
4	BH-1134	Pin - Grooved (Type A 3/16 x 2 Pltd.)	1
5	BH-1135	Hook/Latch and Nut (Includes Item 6)	1
6	BH-5037	Hook/Latch and Nut (Includes Item 6) Plated	1
7	BH-2214	Latch Kit, Hook	1
8	BH-2217	Washer, Thrust	1
9	BH-1138	Hanger	1
10	BH-4018	Connecting Rod Assembly	1
11	BH-5023	Suspension Bushing Keeper	1
12	BH-4016	Lock Washer	1
13	BH-1142	Pin, Connection	1
14	BH-1143	Ring, Retaining	2
15	BH-1144	Sprocket & Bushing Assembly (Includes Item 15)	1
16	BH-1145	Bushing	2
17	BH-5019	Pin, Sprocket	1
18	BH-1147	Grooved Pin (Type A 3/16 x 3/8 Pltd.)	1
19	BH-1148	Chain Assembly, Coil Load	1
20	BH-5045	Chain Assembly, Coil Load Plated	1
21	BH-5020	Stop Shoe (Electronic Limit Equipped)	1
22	BH-5021	Support Pin	1
23	BH-5022	Snap Ring	1
24	See Fig. 9-4	Block Assembly, Lower, Coil Chain	
25	BH-2210	Washer, Thrust	2
26	BH-1154	Washer	1
27	BH-5010	Chain Stop Assembly (Electronic Limit Equipped)	1
28	BH-1099	Actuator (Paddle Limit Equipped)	
29	BH-1185	Grooved Pin (Type F 1/4 x 2 Pltd.)	
30	BH-4017	Hex Socket Head Cap Screw	2

**NOTICE**

Always insist on factory approved **Budgit** Hoist replacement parts when servicing this equipment. Parts are available from your local Authorized Repair Station.

**NOTES**

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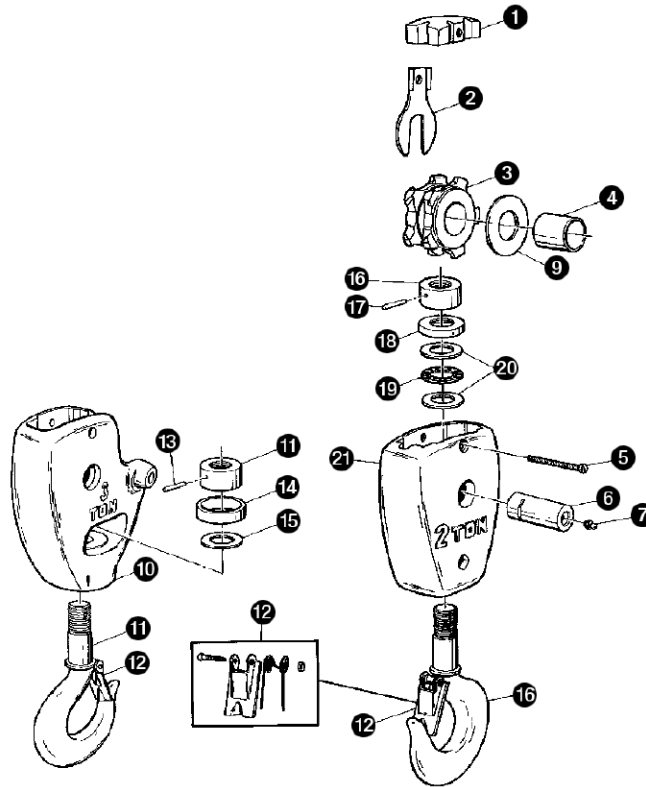


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To enable us to expedite your parts order, always give Model and Catalog Number and Electric Current of Hoist. (See nameplate.)



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Figure 9-4. 2 and 3 TON LOWER BLOCK ASSEMBLIES

Ref. No.	Part Number	Description	Quantity Required	
			2 Ton	3 Ton
1	BH-2219	Block Assembly-Lower Complete	1	—
	BH-5038	Block Assembly-Lower Complete Plated	1	—
	BH-2218	Block Assembly-Lower Complete	—	1
	BH-5039	Block Assembly-Lower Complete Plated	—	1
	BH-2202	Guide-Center	1	1
	BH-5042	Guide-Center Anodized	1	1
	BH-2203	Lock-Sprocket Pin	1	1
	BH-2204	Sprocket-Coil Chain	1	1
	BH-2205	Bushing-Sprocket	1	1
	BH-2206	Screw-Fillister Head, Self locking	1	1
	BH-2207	Pin-Sprocket	1	1
	BH-2208	Fitting-Hydraulic Drive	1	1
	BH-2210	Washer, Thrust	1	1
	BH-2211	Body Assembly-Lower Block	—	1
	BH-5040	Body Assembly-Lower Block Anodized	—	1
	BH-2212	Hook/Latch and Nut (Includes Items 12, 13 and 15)	—	1
	BH-5044	Hook/Latch and Nut (Includes Items 12, 13 and 15) Plated	—	1
	BH-2213	Latch Kit, Hook	1	—
	BH-2214	Latch Kit, Hook	—	1
	BH-2215	Pin, Grooved	—	1
	BH-2216	Shroud	—	1
BH-2217	Washer, Thrust	—	1	
BH-2220	Hook/Latch and Nut (Includes Items 12 and 17)	1	—	
BH-5043	Hook/Latch and Nut (Includes Items 12 and 17) Plated	1	—	
BH-2221	Pin, Grooved	1	—	
BH-2222	Shield, Bearing	1	—	
BH-2223	Bearing Assembly-Needle, Thrust	1	—	
BH-2224	Washer, Thrust	2	—	
BH-2225	Body-Lower Block	1	—	
BH-5041	Body-Lower Block Anodized	1	—	



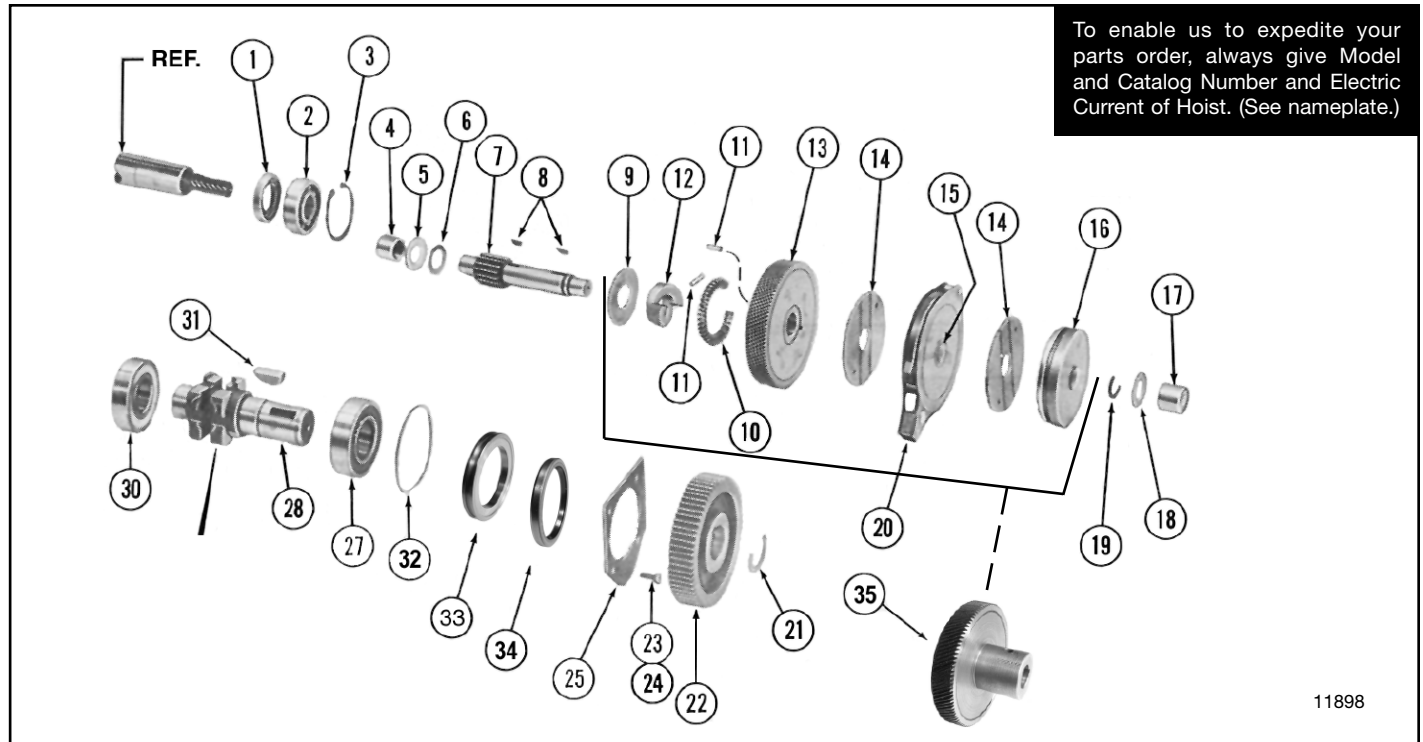


Figure 9-5. GEARING AND LOAD BRAKE PARTS (1/4 and 1/2 Ton Hoists)

Ref. No.	Part Number	Description	Qty. Req'd
1	BH-1201	Seal-Oil, motor shaft	1
2	BH-1202	Bearing Assembly-Ball, motor shaft	1
3	BH-1203	Ring-Retaining, Internal	1
4	BH-1237	Bearing Assembly-Needle, 11/16" I.D. (36 rollers, grease retained)	1
5	BH-1205	Bearing-Thrust, bronze	1
6	BH-1206	Washer-Thrust, 11/16" I. D. (Used with 14 tooth Pinion Load Brake Shaft-13H-1207 below)	1
7		Shaft & Integral Pinion-load brake,	
	BH-1207	14 teeth	1
	BH-1208	23 teeth	
	BH-1209	36 teeth	
8	BH-1210	Key-Woodruff	2
9	BH-1239	Retainer-Spring, load brake	1
10	BH-1212	Spring-load brake (Plain-no color code)	1
	BH-1213	Spring-load brake (Yellow color code)	1
11	BH-1214	Pin-Grooved	2
12	BH-1216	Cam-load brake	1
13		Gear & Clutch Assembly-load brake	1
	BH-1240	For use with 1/4 H.P. Motor	
	BH-1241	For use with 1/2 H.P. Motor	
	BH-1242	For use with 1 H.P. Motor	
14	BH-1218	Disc-Friction, load brake	2
15	BH-1238	Bushing—Ratchet	2
16	BH-1219	Flange—load brake	1
17	BH-1220	Bearing Assembly-Needle, 5/8" I.D.	1
18	BH-1221	Washer-Thrust, 5/8" I.D.	1
19	BH-1222	Ring-Snap, brake flange	1
20	BH-1223	Pawl & Ratchet Assembly-load brake (includes item 15)	1
21	BH-1224	Ring-Snap, sprocket gear	1
22		Gear-Sprocket	
	BH-1225	74 teeth	1
	BH-1226	65 teeth	
	BH-1227	52 teeth	

(Continued on following page)

**Figure 9-5. GEARING AND LOAD BRAKE PARTS - Continued**

<b>Ref. No.</b>	<b>Part Number</b>	<b>Description</b>	<b>Qty. Req'd</b>
23	BH-1059	Screw Hex Socket Head Cap	4
24	BH-1229	Lockwasher- Spring Type	4
25	BH-1230	Plate - Retainer, Sprocket Bearing	1
27	BH-1232	Bearing Assembly- Ball, Sprocket	1
	BH-1318	Ball Bearing On Later Model Hoists	1
28	BH-1311	Sprocket-Coil Chain (1/4" Dia. Wire)	1
30	BH-1235	Bearing Assembly - Ball, Sprocket	1
31	BH-1236	Key - Woodruff	1
32	BH-1315	O-Ring	1
33	BH-1316	Seal Disk	1
34	BH-1317	Seal - Oil	1
35**	BH-4019	Clutch Assembly - 1/4 hp	1
	BH-4020	1/2 hp	
	BH-4021	1 hp	

\*\* This gear and clutch assembly should not be field disassembled.  
 Replace assembly only as clutch pressure is preset at factory based on hoist capacity and motor H.P.  
 Replaces items 9-16 on non-load brake equipped models

**NOTES**

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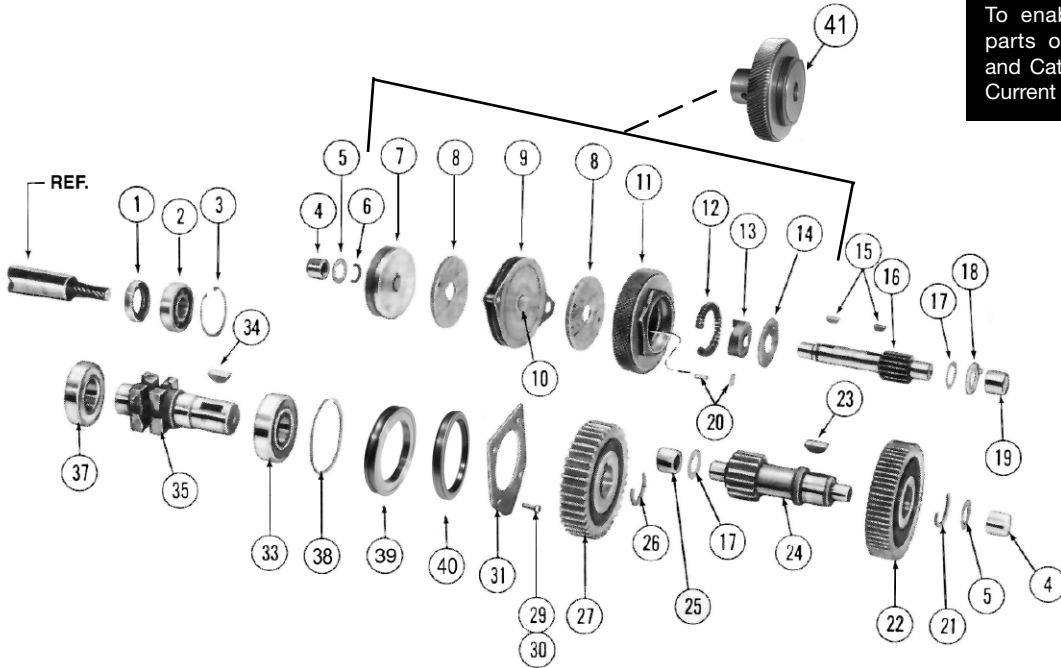
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To enable us to expedite your parts order, always give Model and Catalog Number and Electric Current of Hoist. (See nameplate.)



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Figure 9-6. GEARING AND LOAD BRAKE PARTS (1 thru 3 Ton Hoists)

Ref. No.	Part Number	Description	Qty. Req'd
1	BH-1201	Seal-Oil, motor shaft	1
2	BH-1202	Bearing Assembly-Ball, motor shaft	1
3	BH-1203	Ring-Retaining, Internal	1
4	BH-1220	Bearing Assembly-Needle, 5/8" I.D.	2
5	BH-1221	Washer-Thrust, 5/8" I.D.	2
6	BH-1222	Ring-Snap, brake flange	1
7	BH-1219	Flange-Load Brake	1
8	BH-1218	Disc-Friction, load brake	2
9	BH-1223	Pawl and Ratchet Assembly-Load Brake (includes item 15)	1
10	BH-1238	Bushing-Ratchet	1
11	BH-1241	Gear and Clutch Assembly-Load Brake For use with 1/2 H.P. Motor	1
	BH-1242	For use with 1 and 2-1/2 H.P. Motors	
12	BH-1212	Spring-Load Brake (Plain-no color code)	1
13	BH-1216	Cam-Load Brake	1
14	BH-1239	Retainer-Spring, Load Brake	1
15	BH-1210	Key-Woodruff	2
16	BH-1207	Shaft and Integral Pinion-Load Brake 14 teeth	1
	BH-1208	23 teeth	
17***	BH-1206	Washer-Thrust, 11/16" I.D.	2
18	BH-1205	Bearing-Thrust, bronze	1
19	BH-1204	Bearing Assembly-Needle, 11/16" I.D.	1
20	BH-1214	Pin-Grooved	2
21	BH-1224	Ring-Snap, intermediate gear	1
22	BH-1225	Gear-Intermediate 74 teeth	1
	BH-1226	65 teeth	
23	BH-1236	Key-Woodruff	1
24	BH-1304	Shaft and Integral Pinion-Intermediate	1
25	BH-1237	Bearing Assembly-Needle, 11/16" I.D.	1
26	BH-1305	Ring-Snap, sprocket gear	1
27	BH-1306	Gear-Sprocket	1
28	—	<i>This reference number is not used in the figure</i>	
29	BH-1228	Screw-Fillister Head Machine	4

(Continued on following page)

**Figure 9-6. GEARING AND LOAD BRAKE PARTS - Continued**

<b>Ref. No.</b>	<b>Part Number</b>	<b>Description</b>	<b>Qty. Req'd</b>
30	BH-1229	Lockwasher - Spring Type	4
31	BH-1230	Plate - Retainer, Sprocket Bearing	1
32	—	<i>This reference number is not used in the figure</i>	
33	BH-1232	Bearing Assembly - Ball, Sprocket	1
	BH-1318	Ball Bearing On Later Model Hoists	1
34	BH-1308	Key -Woodruff, Sprocket	1
35		Sprocket - Coil Chain	
	BH-1311	1/4" Dia. Wire	1
	BH-1312	5/16" Dia. Wire	1
36	—	<i>This reference number is not used in the figure</i>	
37	BH-1235	Bearing Assembly - Ball, Sprocket	1
38	BH-1315	O-Ring	1
39	BH-1316	Seal Disk	1
40	BH-1317	Seal - Oil	1
41**	BH-4020	Clutch Assembly 1/2	
	BH-4021	Clutch Assembly 1 & 2-1/2	

\*\* This gear and clutch assembly should not be field disassembled.  
 Replace assembly only as clutch pressure is preset at factory based on hoist capacity and motor H.P.  
 Ref. No. 41 is replaced by Ref. Nos. 7 thru 14 on non-load brake equipped hoists.

\*\*\* Ref. No. 17 occurs next to Ref. No. 16 for 14 tooth pinion shaft only.

### NOTES

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

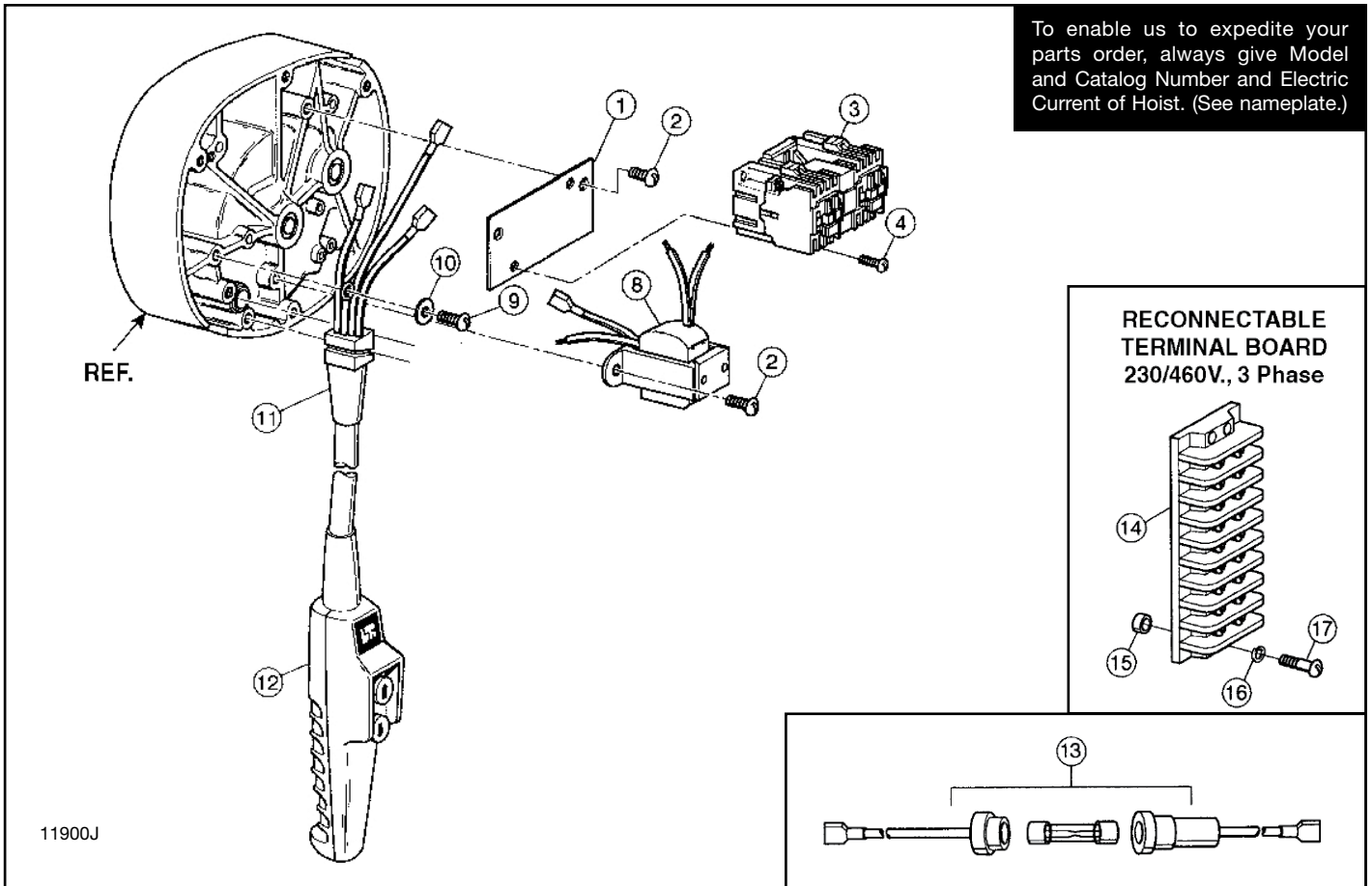


Figure 9-7a. ELECTRICAL CONTROL UNITS (Three phase Single Speed Hoists, Paddle Limit)

Ref. No.	Part Number	Description	Qty. Req'd
		Contactor and Mounting Plate Assembly (Includes Ref. Nos. 1, 3 and 4)	1
	BH-3800	Three Phase 24V Control	
	BH-3801	Three Phase 115V Control	
1	BH-3802	Mounting Plate - Contactor	1
2	BH-2155	Sems Round Head Machine Screw with External Lock Washer (#10-24 x 3/8)	5
3		Contactor Assembly	1
	BH-3803	Three Phase 24V Control	
	BH-3804	Three Phase 115V Control	
4	BH-2189	Pan Head Self Tapping Screw (#8-32 x 1/2)	2
5	—	<i>This reference number is not used in the figure</i>	
6	—	<i>This reference number is not used in the figure</i>	
7	See Fig. 9-11	Limit Switch and Shaft Assembly	1
8		Transformer	1
	BH-2166	Three Phase 208V/24V	
	BH-3805	Three Phase 230V/460V/24V	
	BH-2168	Three Phase 575V/24V	
	BH-2169	Three Phase 208V/115V	
	BH-3806	Three Phase 230V/460V/115V	
	BH-2172	Three Phase 575V/115V	

(Continued on following page)

**Figure 9-7a. ELECTRICAL CONTROL UNITS - Continued**

<b>Ref. No.</b>	<b>Part Number</b>	<b>Description</b>	<b>Qty. Req'd</b>
9	BH-2173	Sems Round Head Machine Screw with External Lock Washer (1/4-20 x 5/8)	1
10	BH-2174	Plain Washer (Type N 1/4)	2
11	BH-2175	Grommet	1
12	See Fig. 9-12	Push Button Station and Conductor Cable Assembly	1
13		Fuse, Fuse Holder and Wire Assembly	1
	BH-2176	3A/250V	1
	BH-2177	1/2A/250V	
		Fuse Only	1
	BH-2178	3A/250V Rating	
	BH-2179	1/2A/250V Rating	
14	BH-3807	Block-Terminal	1
15	BH-2181	Spacer-Terminal Block	2
16	BH-2182	Regular Helical Spring Lock Washer (#8 Pltd.)	2
17	BH-3808	Round Head Machine Screw (#8-32 x 1 Pltd.)	2
18	—	<i>This reference number is not used in the figure</i>	

**Note:** Replacement fuses are standard automotive type and may be purchased locally.

**NOTES**

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

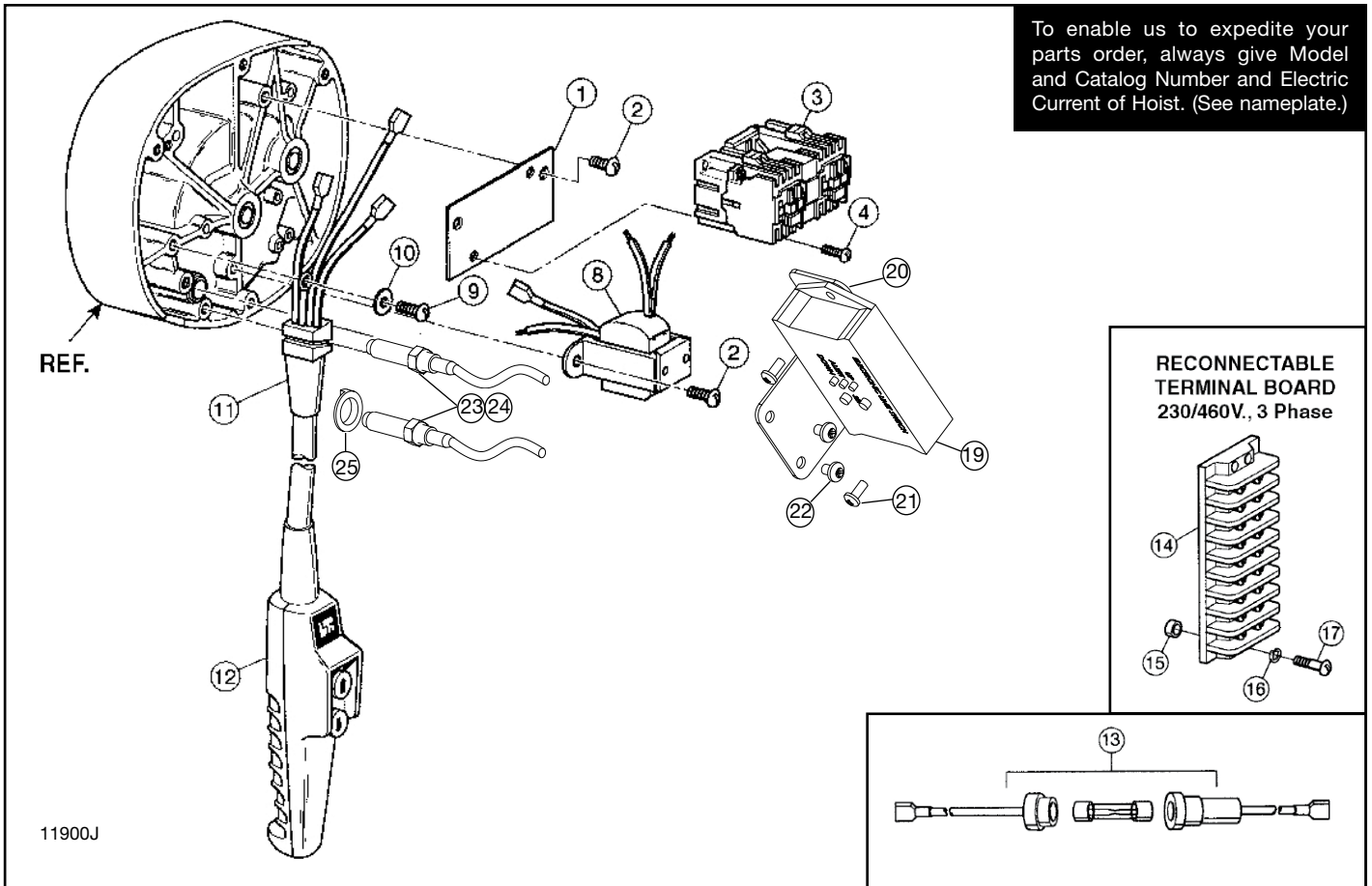


Figure 9-7b. ELECTRICAL CONTROL UNITS (Three phase Single Speed Hoists, Electronic Limit Switch)

Ref. No.	Part Number	Description	Qty. Req'd
1	BH-3800	Contactor and Mounting Plate Assembly (Includes Ref. Nos. 1, 3 and 4)	1
	BH-3801	Three Phase 24V Control	
	BH-3802	Three Phase 115V Control	
2	BH-3802	Mounting Plate - Contactor	1
2	BH-2155	Sems Round Head Machine Screw with External Lock Washer (#10-24 x 3/8)	5
3		Contactor Assembly	1
4	BH-3803	Three Phase 24V Control	
	BH-3804	Three Phase 115V Control	
4	BH-2189	Pan Head Self Tapping Screw (#8-32 x 1/2)	2
8		Transformer	1
9	BH-2166	Three Phase 208V/24V	
	BH-3805	Three Phase 230V/460V/24V	
	BH-2168	Three Phase 575V/24V	
	BH-2169	Three Phase 208V/115V	
	BH-3806	Three Phase 230V/460V/115V	
	BH-2172	Three Phase 575V/115V	
9	BH-2173	Sems Round Head Machine Screw with External Lock Washer (1/4-20 x 5/8)	1
10	BH-2174	Plain Washer (Type N 1/4)	2
11	BH-2175	Grommet	1
12	See Fig. 9-12	Push Button Station and Conductor Cable Assembly	1
13		Fuse, Fuse Holder and Wire Assembly	1
	BH-2176	3A/250V	1
	BH-2177	1/2A/250V	1
		Fuse Only	1
	BH-2178	3A/250V Rating	
	BH-2179	1/2A/250V Rating	

(Continued on following page)

**Figure 9-7b. ELECTRICAL CONTROL UNITS - Continued**

<b>Ref. No.</b>	<b>Part Number</b>	<b>Description</b>	<b>Qty. Req'd</b>
14	BH-3807	Block-Terminal	1
15	BH-2181	Spacer-Terminal Block	2
16	BH-2182	Regular Helical Spring Lock Washer (#8 Pltd.)	2
17	BH-3808	Round Head Machine Screw (#8-32 x 1 Pltd.)	2
19	BH-4022	Electronic Limit Switch Controller	1
20	BH-4023	Controller Mounting Bracket	1
21	BH-2189	Self Tapping Screws	2
22	BH-2155	Sems Round Head Machine Screw with External Lock Washer (#10-24 x 3/8)	2
23	BH-4024	Proximity Sensor	2
24	BH-4025	Jam Nut-Plated - 7/16-20	2
25	BH-4026	Spacer Washer - Proximity Sensor	1

**Note:** Replacement fuses are standard automotive type and may be purchased locally.

### NOTES

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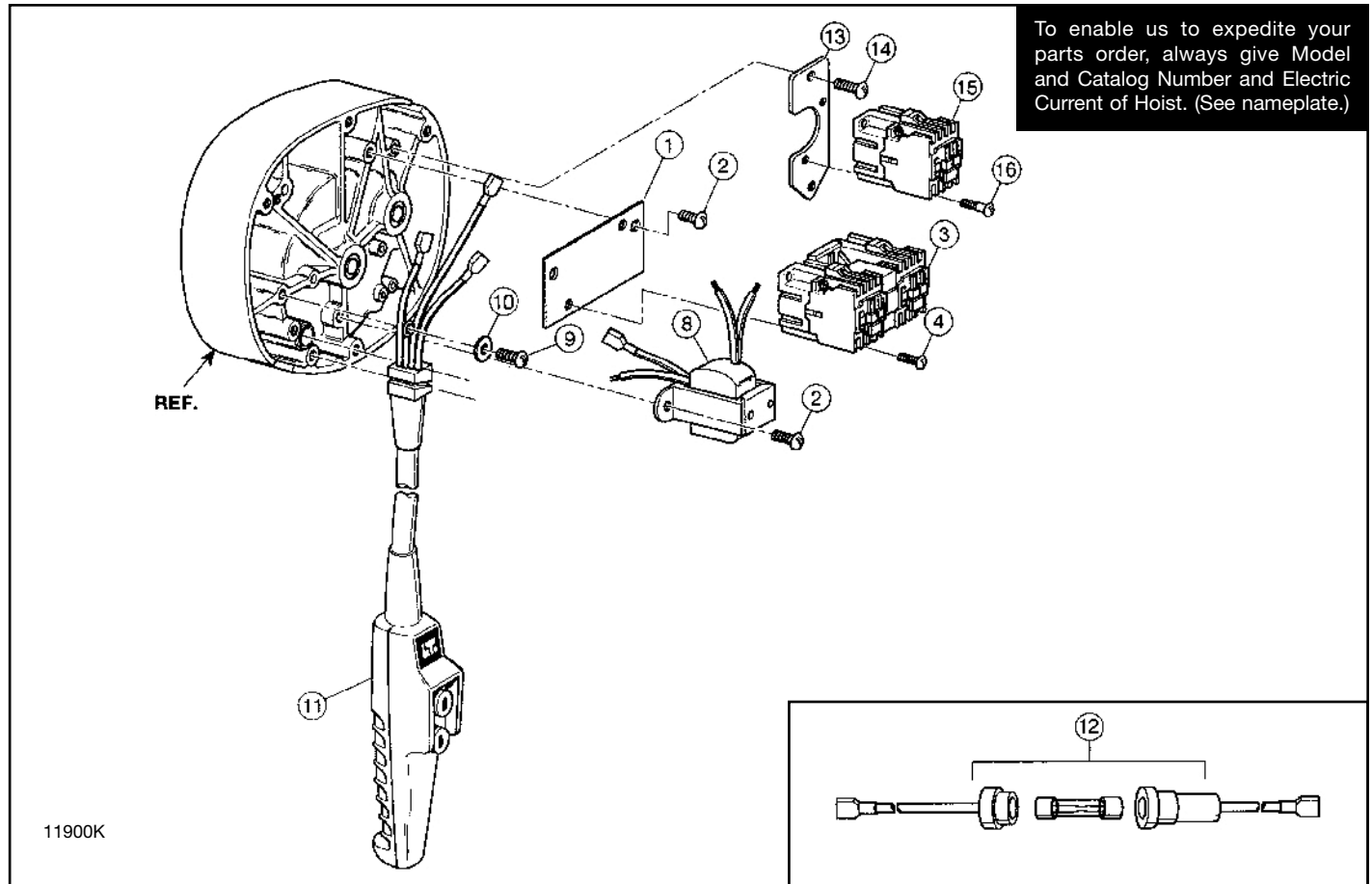


Figure 9-8a. ELECTRICAL CONTROL UNITS (Two Speed Hoists Only, Paddle Limit)

Ref. No.	Part Number	Description	Qty. Req'd
		Contractor and Mounting Plate Assembly (Includes Ref. Nos. 1, 3 and 4)	1
1	BH-3800	Three Phase 24V Control	
	BH-3801	Three Phase 115V Control	
	BH-3802	Mounting Plate - Contactor	1
2	BH-2155	Sems Round Head Machine Screw with External Lock	
		Washer (#10-24 x 3/8)	5
3		Contactor Assembly	1
	BH-3803	Three Phase 24V Control	
	BH-3804	Three Phase 115V Control	
4	BH-2189	Pan Head Self Tapping Screw (#8-32 x 1/2)	2
5	BH-2161	Hex Socket Head Cap Screw (#10-24 x 3/8 Pltd.)	2
6	BH-2162	Regular Helical Spring Lock Washer (#10 Pltd.)	2
7	See Fig. 9-11	Limit Switch and Shaft Assembly	1
8		Transformer	1
	BH-2166	Three Phase 208V/24V	
	BH-2164	Three Phase 230V/24V	
	BH-2167	Three Phase 460V/24V	
	BH-2168	Three Phase 575V/24V	
	BH-2169	Three Phase 208/115V	
	BH-2170	Three Phase 230V/115V	
	BH-2171	Three Phase 460V/115V	
	BH-2172	Three Phase 575V/115V	
9	BH-2173	Sems Round Head Machine Screw with External Lock	
		Washer (1/4-20 x 5/8)	1
10	BH-2174	Plain Washer (Type N 1/4)	2
11	See Fig. 9-13	Push Button Station and Conductor Cable Assembly	1

(Continued on following page)

**Figure 9-8a. ELECTRICAL CONTROL UNITS - Continued**

<b>Ref. No.</b>	<b>Part Number</b>	<b>Description</b>	<b>Qty. Req'd</b>
12	BH-2176	Fuse, Fuse Holder and Wire Assembly	1
	BH-2177	3A/250V 1/2A/250V	
	BH-2178	Fuse Only	1
	BH-2179	3A/250V Rating 1/2A/250V Rating	
	BH-3809	Contactor and Mounting Plate Assembly (Includes Ref. Nos. 13, 15 and 16)	1
	BH-3810	Three Phase 24V Control	
13	BH-3811	Three Phase 115V Control	
14	BH-2193	Mounting Plate - Contactor	1
		Sems Round Head Machine Screw with External Lock	
		Washer (#8-32 x 1/2)	2
15		Contactor Assembly	1
	BH-3812	Three Phase 24V Control	
	BH-3813	Three Phase 115V Control	
16	BH-2199	Pan Head Self Tapping Screw (#8-32 x 3/8)	2
17	BH-1422	Flanged Sleeve Bearing	1

**Note:** Replacement fuses are standard automotive type and may be purchased locally.

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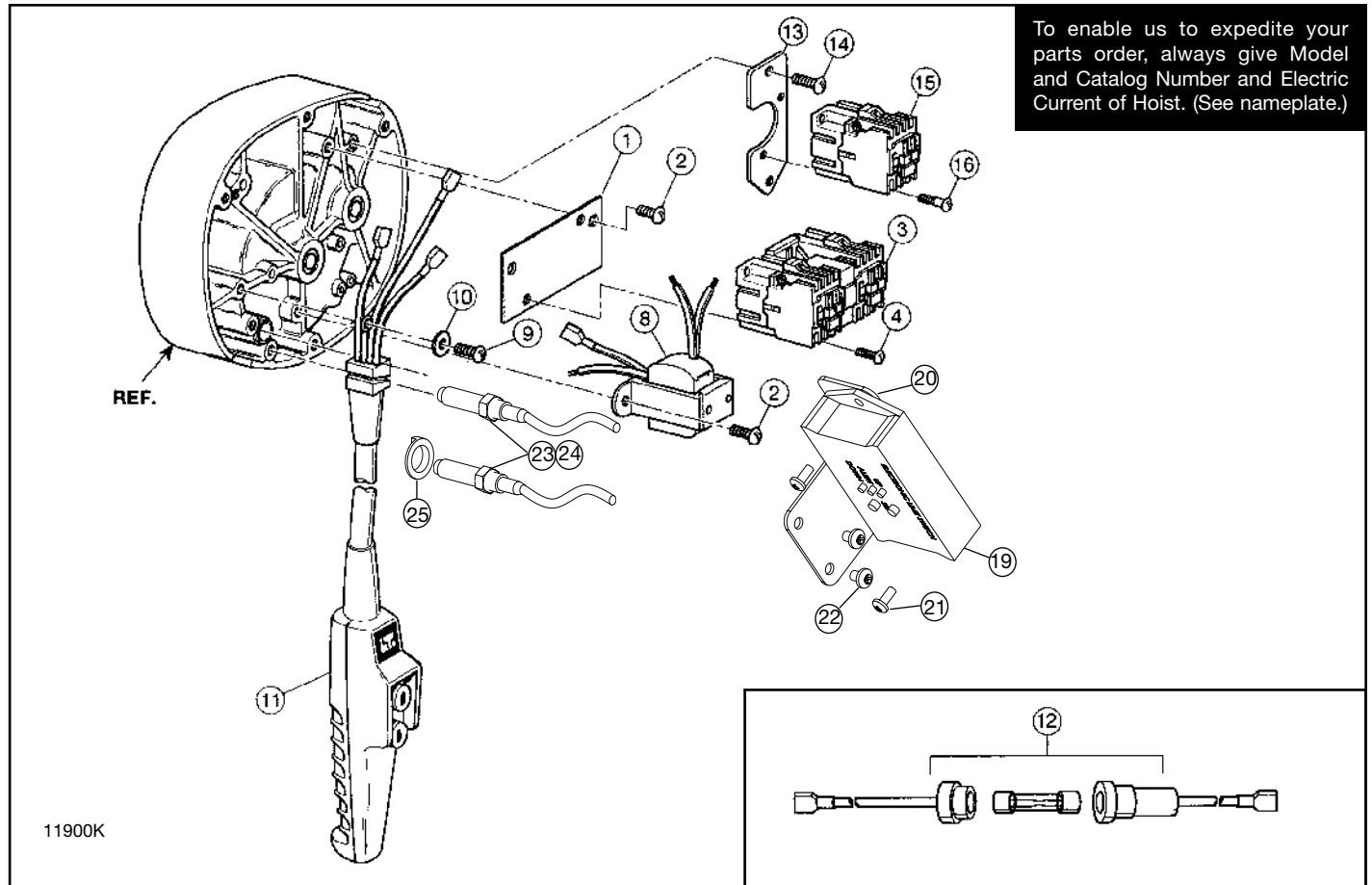


Figure 9-8b. ELECTRICAL CONTROL UNITS (Two Speed Hoists Only, Electronic Limit Switch)

Ref. No.	Part Number	Description	Qty. Req'd	
1	BH-3800	Contractor and Mounting Plate Assembly (Includes Ref. Nos. 1, 3 and 4) Three Phase 24V Control	1	
	BH-3801			Three Phase 115V Control
	BH-3802			Mounting Plate - Contactor
	BH-2155			Sems Round Head Machine Screw with External Lock
2		Washer (#10-24 x 3/8)	5	
	3	Contactor Assembly	1	
4	BH-3803	Three Phase 24V Control	1	
	BH-3804			Three Phase 115V Control
8	BH-2189	Pan Head Self Tapping Screw (#8-32 x 1/2)	2	
9	8	Transformer	1	
	BH-2166	Three Phase 208V/24V		
	BH-2164	Three Phase 230V/24V		
	BH-2167	Three Phase 460V/24V		
	BH-2168	Three Phase 575V/24V		
	BH-2169	Three Phase 208/115V		
	BH-2170	Three Phase 230V/115V		
	BH-2171	Three Phase 460V/115V		
	BH-2172	Three Phase 575V/115V		
	BH-2173	Sems Round Head Machine Screw with External Lock		
10		Washer (1/4-20 x 5/8)		1
	BH-2174	Plain Washer (Type N 1/4)	2	
11	See Fig. 9-13	Push Button Station and Conductor Cable Assembly	1	

(Continued on following page)

**Figure 9-8b. ELECTRICAL CONTROL UNITS - Continued**

<b>Ref. No.</b>	<b>Part Number</b>	<b>Description</b>	<b>Qty. Req'd</b>
12	BH-2176	Fuse, Fuse Holder and Wire Assembly	1
	BH-2177	3A/250V 1/2A/250V	
	BH-2178	Fuse Only	1
	BH-2179	3A/250V Rating 1/2A/250V Rating	
	BH-3809	Contactora and Mounting Plate Assembly (Includes Ref. Nos. 13, 15 and 16)	1
	BH-3810	Three Phase 24V Control	
13	BH-3811	Three Phase 115V Control	
14	BH-2193	Mounting Plate - Contactor	1
		Sems Round Head Machine Screw with External Lock	
		Washer (#8-32 x 1/2)	2
15		Contactora Assembly	1
	BH-3812	Three Phase 24V Control	
	BH-3813	Three Phase 115V Control	
16	BH-2199	Pan Head Self Tapping Screw (#8-32 x 3/8)	2

**Note:** Replacement fuses are standard automotive type and may be purchased locally.

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

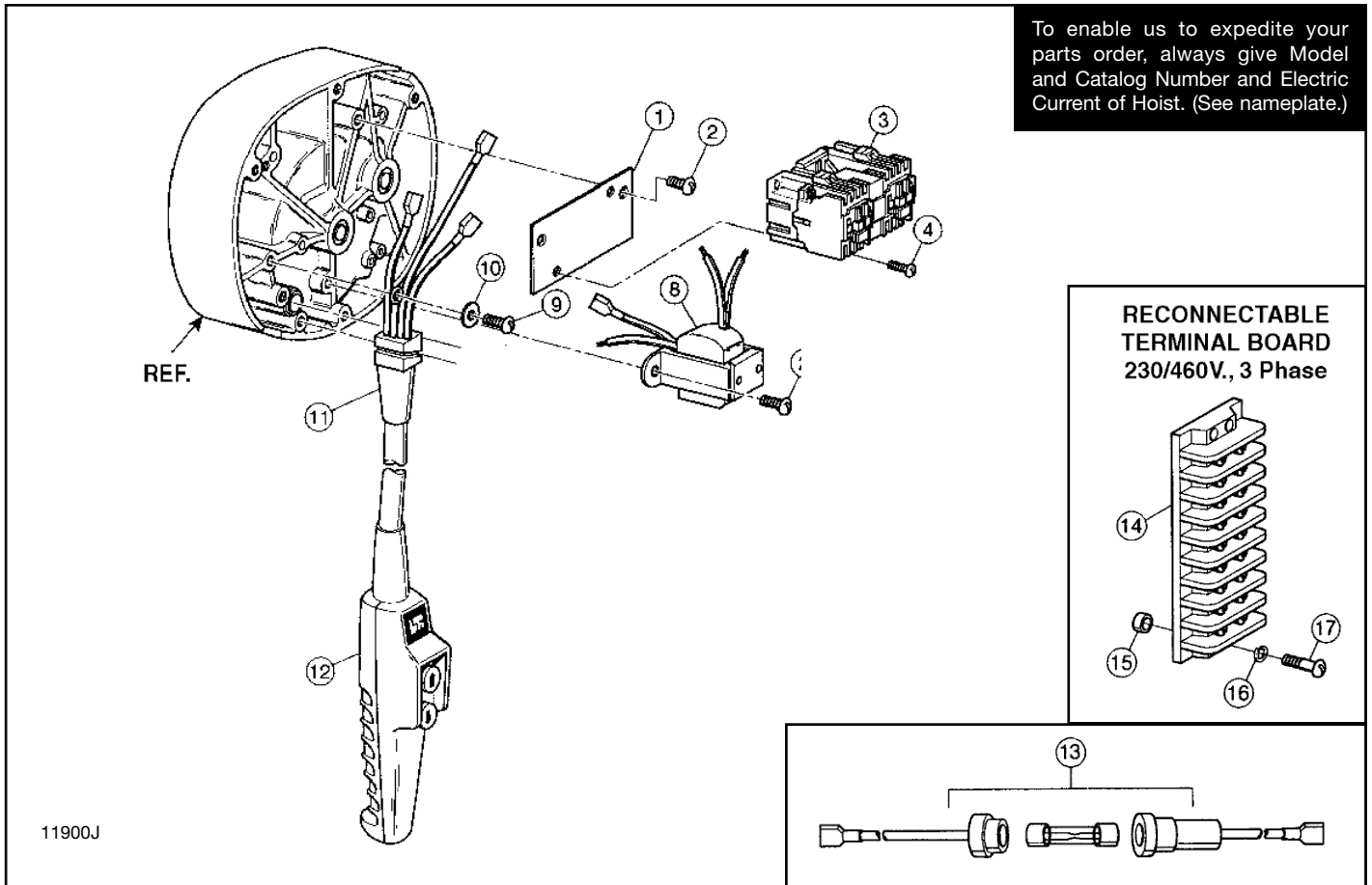


Figure 9-9a. ELECTRICAL CONTROL UNITS (Single Phase Hoists, Paddle Limit)

Ref. No.	Part Number	Description	Qty. Req'd
1	BH-3800	Contractor and Mounting Plate Assembly (Includes Ref. Nos. 1, 3 and 4) 1/4, 1/2 & 1 HP Single Phase 24V Control Single Phase 115V Control 2-1/4 HP Only Single Phase 24V Control Single Phase 115V Control	1
	BH-3801		
	BH-3814		
	BH-3815		
	BH-3802		
	BH-2155		
	BH-3803		
	BH-3804		
	BH-3816		
	BH-3817		
2	BH-2189	Mounting Plate - Contactor	1
	BH-2161		
3	BH-2162	Sems Round Head Machine Screw with External Lock Washer (#10-24 x 3/8)	4
	See Fig. 9-11		
4	BH-2173	Contactor Assembly 1/4, 1/2 & 1 HP Single Phase 24V Control Single Phase 115V Control 2-1/4 HP Only Single Phase 24V Control Single Phase 115V Control	1
	BH-2173		
5	BH-2173	Pan Head Self Tapping Screw (#8-32 x 1/2)	2
	BH-2173		
6	BH-2173	Hex Socket Head Cap screw (#10-24 x 3/8 Pltd.)	2
	BH-2173		
7	BH-2173	Regular Helical Spring Lock Washer (#10 Pltd.)	2
	BH-2173		
8	BH-2173	Limit Switch and Shaft Assembly	1
	BH-2173		
9	BH-2173	Transformer	1
	BH-2173		
9	BH-2173	Single Phase 115V/230V/24V Single Phase 115V/230V/115V	1
	BH-2173		
9	BH-2173	Sems Round Head Machine Screw with External Lock Washer (1/4-20 x 5/8)	1
	BH-2173		

(Continued on following page)

**Figure 9-9a. ELECTRICAL CONTROL UNITS - Continued**

<b>Ref. No.</b>	<b>Part Number</b>	<b>Description</b>	<b>Qty. Req'd</b>
10	BH-2174	Plain Washer (Type N 1/4)	2
11	BH-2175	Grommet	1
12	See Fig. 9-12	Push Button Station and Conductor Cable Assembly	1
13		Fuse, Fuse Holder and Wire Assembly	1
	BH-2176	3A/250V	
	BH-2177	1/2A/250V	
		Fuse Only	1
	BH-2178	3A/250V Rating	
	BH-2179	1/2A/250V Rating	
14	BH-3807	Block-Terminal	1
15	BH-2181	Spacer-Terminal Block	2
16	BH-2182	Regular Helical Spring Lock Washer (#8 Pltd.)	2
17	BH-3820	Pan Head Self Tapping Screw (#8-32 x 5/8 Pltd.)	2
18	BH-1422	Flanged Sleeve Bearing	1

**Note:** Replacement fuses are standard automotive type and may be purchased locally.

### NOTES

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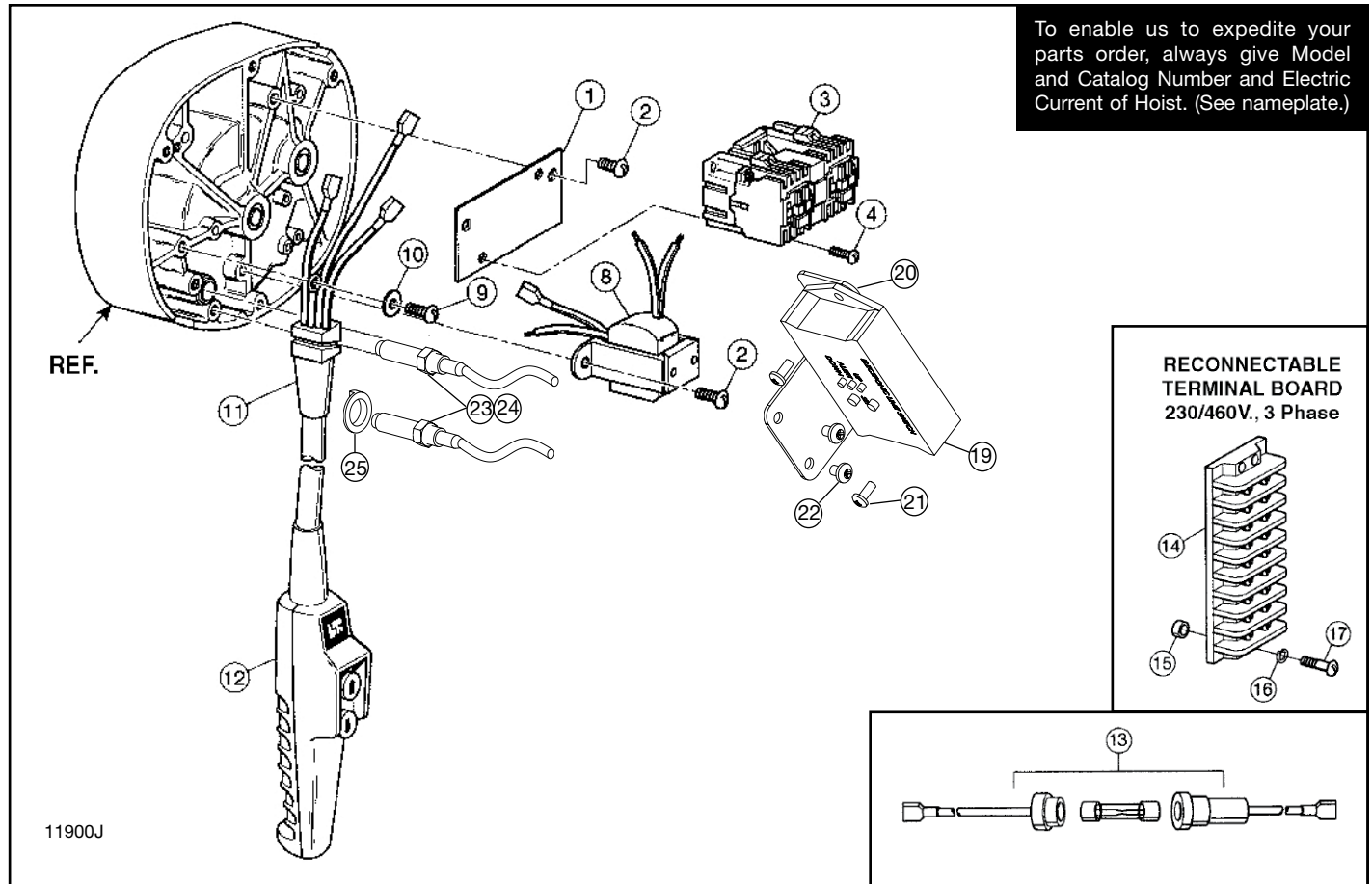


Figure 9-9b. ELECTRICAL CONTROL UNITS (Single Phase Hoists, Electronic Limit Switch)

Ref. No.	Part Number	Description	Qty. Req'd
		Contractor and Mounting Plate Assembly (Includes Ref. Nos. 1, 3 and 4) 1/4, 1/2 & 1 HP	1
	BH-3800	Single Phase 24V Control	
	BH-3801	Single Phase 115V Control	
	BH-3814	2-1/4 HP Only	
	BH-3815	Single Phase 24V Control	
	BH-3815	Single Phase 115V Control	
1	BH-3802	Mounting Plate - Contactor	1
2	BH-2155	Sems Round Head Machine Screw with External Lock	
		Washer (#10-24 x 3/8)	4
3		Contactor Assembly	1
		1/4, 1/2 & 1 HP	
	BH-3803	Single Phase 24V Control	
	BH-3804	Single Phase 115V Control	
	BH-3816	2-1/4 HP Only	
	BH-3817	Single Phase 24V Control	
	BH-3817	Single Phase 115V Control	
4	BH-2189	Pan Head Self Tapping Screw (#8-32 x 1/2)	2
8		Transformer	1
	BH-3818	Single Phase 115V/230V/24V	
	BH-3819	Single Phase 115V/230V/115V	
9	BH-2173	Sems Round Head Machine Screw with External Lock	
		Washer (1/4-20 x 5/8)	1
10	BH-2174	Plain Washer (Type N 1/4)	2
11	BH-2175	Grommet	1
12	See Fig. 9-12	Push Button Station and Conductor Cable Assembly	1

(Continued on following page)

**Figure 9-9b. ELECTRICAL CONTROL UNITS - Continued**

<b>Ref. No.</b>	<b>Part Number</b>	<b>Description</b>	<b>Qty. Req'd</b>
13	BH-2176	Fuse, Fuse Holder and Wire Assembly	1
	BH-2177	3A/250V 1/2A/250V	
	BH-2178	Fuse Only	1
	BH-2179	3A/250V Rating 1/2A/250V Rating	
14	BH-3807	Block-Terminal	1
15	BH-2181	Spacer-Terminal Block	2
16	BH-2182	Regular Helical Spring Lock Washer (#8 Pltd.)	2
17	BH-3820	Pan Head Self Tapping Screw (#8-32 x 5/8 Pltd.)	2

**Note:** Replacement fuses are standard automotive type and may be purchased locally.

**NOTES**

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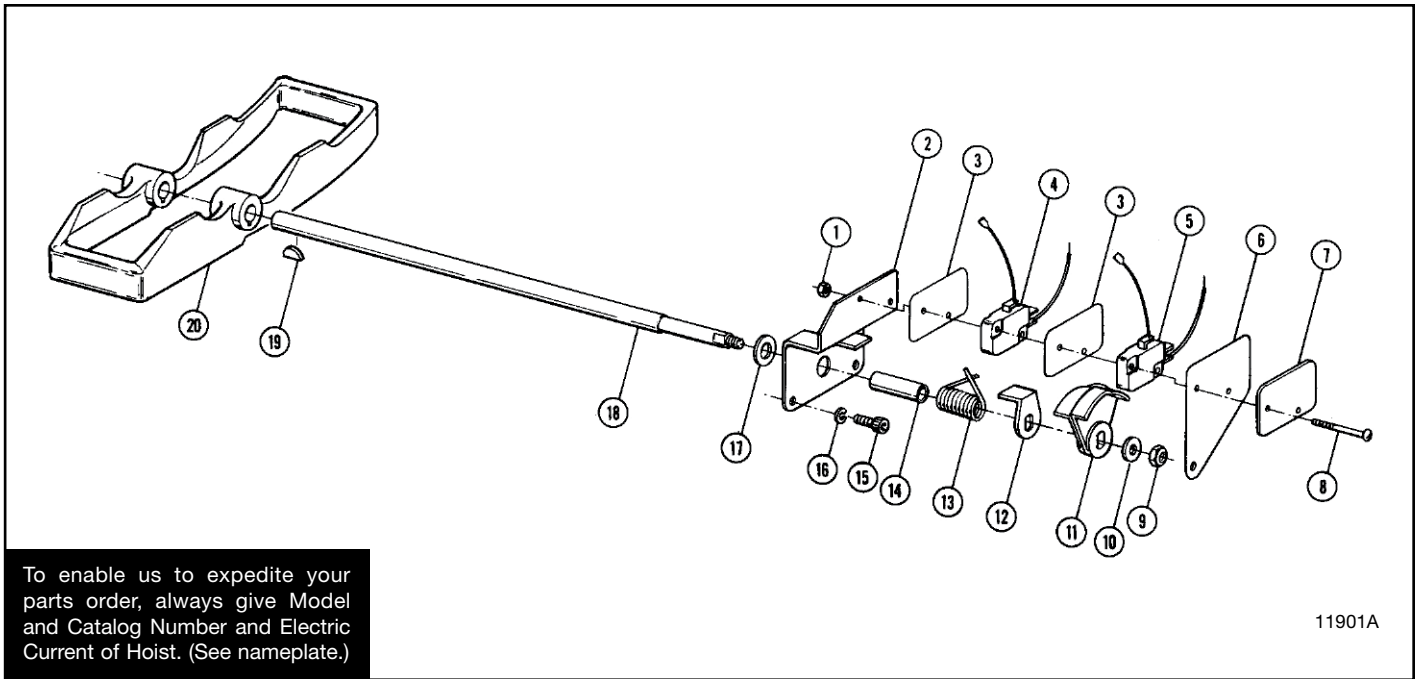
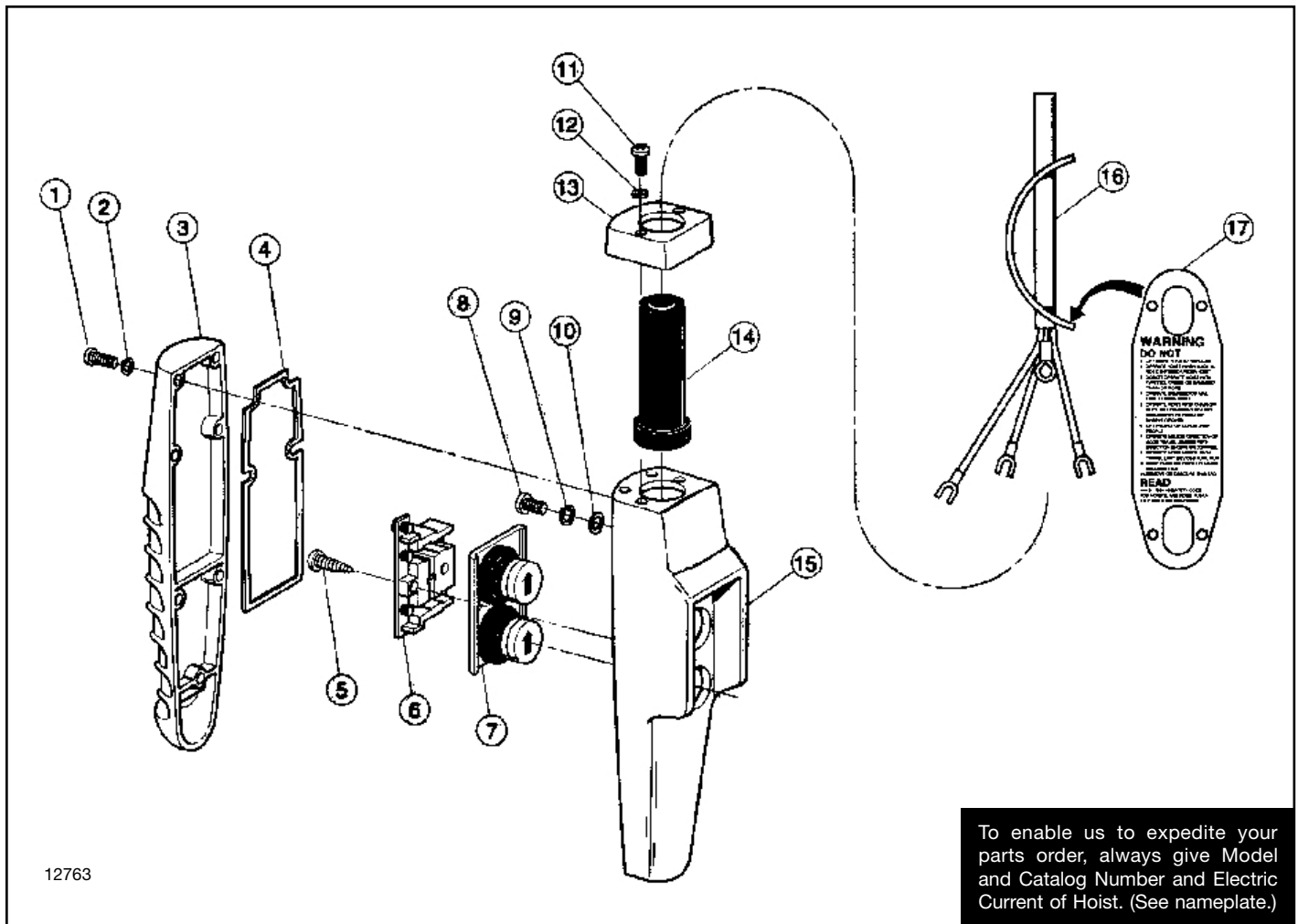


Figure 9-10. LIMIT LEVER AND SWITCH PARTS (If Equipped)

Ref. No.	Part Number	Description	Qty. Req'd
	BH-1850	Limit Switch and Shaft Assembly (Includes Ref. Nos. 1 thru 14 and 17 and 18)	1
1	BH-1851	Light Hex Self-locking Nut (#4-40 Pltd.)	2
2	BH-1852	Retainer	1
3	BH-1853	Insulation	2
4	BH-1854	Limit Switch-Upper	1
5	BH-1855	Limit Switch-Lower	1
6	BH-1856	Insulation	1
7	BH-1857	Plate-Cover	1
8	BH-1858	Round Head Machine Screw (#40-40 x 1-1/8 Pltd.)	2
9	BH-1859	Light Thin Hex Self-locking Nut (#10-24 Pltd.)	1
10	BH-1860	Plain Washer (#10 Pltd.)	1
11	BH-1861	Switch Actuator	1
12	BH-1862	Centering Lever	1
13	BH-1863	Spring-Control	1
14	BH-1864	Spacer	1
15	BH-1865	Hex Socket Head Cap Screw (#10-24 x 3/8 Pltd.)	2
16	BH-1866	Regular Helical Spring Lock Washer (#10 Pltd.)	2
17	BH-1867	Plain Washer (Type N 5/16 Pltd.)	1
18	BH-1868	Control Shaft	1
19	BH-1869	Key-Woodruff	1
20	BH-1870	Limit Lever	1



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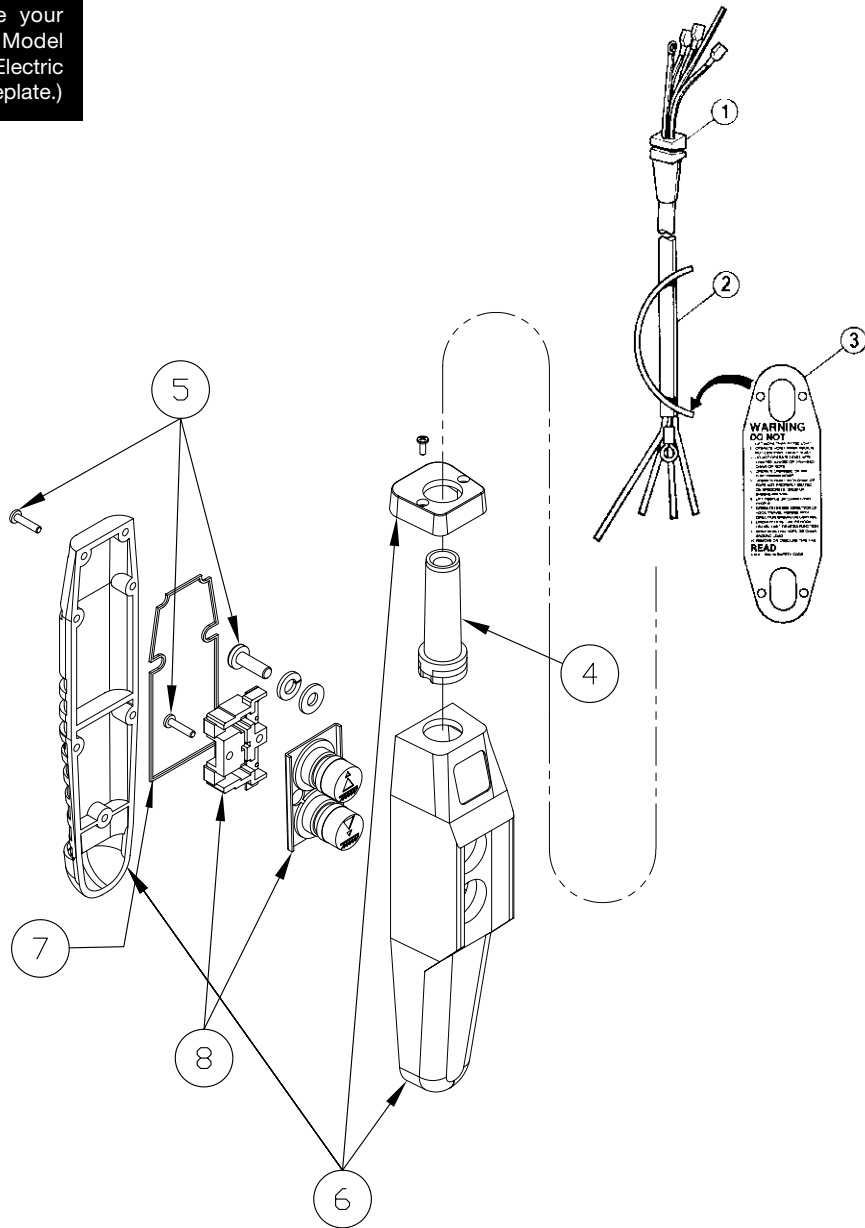
To enable us to expedite your parts order, always give Model and Catalog Number and Electric Current of Hoist. (See nameplate.)

Figure 9-11. PUSH BUTTON STATION AND CONDUCTOR CABLE ASSEMBLY (Single Speed Hoists)

Ref. No.	Part Number	Description	Qty. Req'd
	BH-3401	Push Button Station and Conductor Cable Assembly (Includes Ref. Nos. 1 thru 17)	1
	BH-3402	Push Button Station (Includes Ref. Nos. 1 thru 15)	1
1	*	Type 1 Pan Head Machine Screw (M3.5 x 0.6 x 12 Pltd.)	7
2	*	Lockwasher (M 3.5 Pltd.)	7
3	*	Rear Cover	1
4	BH-3403	Gasket	1
5	*	Type I Pan Head Thread Cutting Screw (M 4 x 15 Pltd.)	2
6	BH-3404	Contact Assembly	1
7	BH-3405	Button Assembly	1
8	*	Type 1 Pan Head Machine Screw (M 6 x 1 x 12 Pltd.)	1
9	*	Lockwasher (M 6 Pltd.)	1
10	*	Plain Washer (M 6 Pltd.)	1
11	*	Type 1 Pan Head Machine Screw (M 3.5 x 1 x 14 Pltd.)	2
12	*	Lockwasher (M 3.5 Pltd.)	2
13	*	Housing Cap	1
14	BH-3406	Grommet	1
15	*	Housing	1
16	BH-3407	Conductor Cable Assembly	1
17	BH-3408	Plastic Warning Tag	1

\* Not available separately. Order Push Button Station.

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



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**Figure 9-12. PUSH BUTTON STATION AND CONDUCTOR CABLE ASSEMBLY  
(Two Speed Hoists Only)**

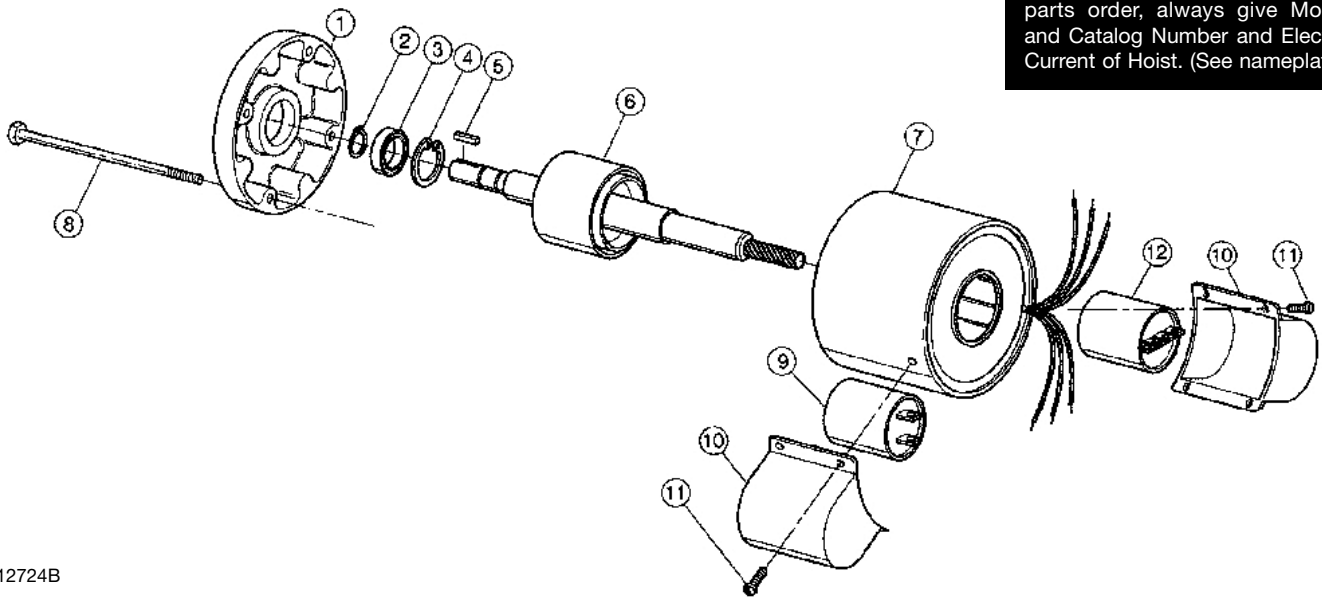
Ref. No.	Part Number	Description	Qty. Req'd
	BH-4027	Push Button Station and Conductor Cable Assembly (Includes Ref. Nos. 1 thru 30)	1
1	BH-1981	Grommet	1
2	BH-1982	Conductor Cable	1
3	BH-1971	Operator Warning Label	1
	BH-4029	Push Button Station (Includes Ref. Nos. 12 thru 30)	1
4	BH-4030	Control Station Grommet	1
5	*	Control Station Hardware	4
6	*	Control Station Housing	4
7	BH-3403	Gasket	1
8	BH-4028	Button and Control Assembly	1
		Contact Block	2
		Contact Block	2

\* Not available separately. Order Push Button Station.

\*\* Not available separately. Order Push Button Assembly.



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



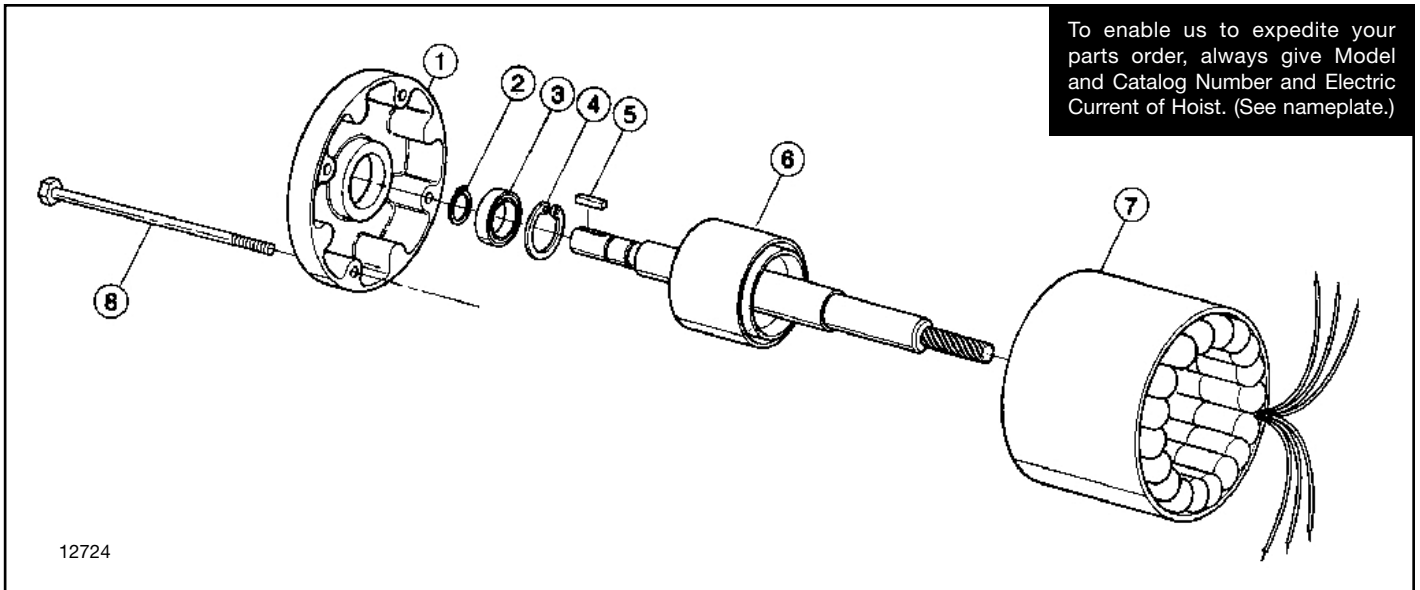
12724B

Figure 9-13. SINGLE PHASE MOTOR ASSEMBLY

Ref. No.	Part Number	Description	Primer	Qty. Req'd
		Motor Assembly (Includes Ref. Nos. 1 thru 12)		1
	BH-4031	1/4 Horsepower - Yellow Powercoat	BH-4034	
	BH-4032	1/2 Horsepower - Yellow Powercoat	BH-4035	
	BH-4033	1 Horsepower - Yellow Powercoat	BH-4036	
	BH-3903	2-1/4 Horsepower		
1	*	Bell - End		1
2	*	Ring - Retaining		1
3	*	Bearing - Ball		1
4	*	Ring - Retaining		1
5	BH-3908	Key - Brake		1
6	*	Rotor and Shaft Assembly		1
7	*	Stator Assembly		1
8		Bolt - Motor Mounting		4
	BH-3909	1/4 Horsepower		
	BH-3910	1/2 Horsepower		
	BH-3911	1 Horsepower		
9		Capacitor Assembly		1
	BH-3913	1/4 Horsepower		
	BH-3914	1/2 Horsepower		
	BH-3915	1 Horsepower		
10		Cover		1
		For Ref. No. 9		
	*	1/4 Horsepower		
	*	1/2 Horsepower		
	*	1 Horsepower		
	BH-3919	For Ref. No. 12		
11	BH-3920	Slotted Hex Head Self Tapping Screw (#8-32 x 5/16)		2
12		Solid State Switch Assembly		1
	BH-3921	1/4, 1/2 & 1 Horsepower		

\* Furnished only as part of motor assembly.

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



12724

Figure 9-14. THREE PHASE MOTOR ASSEMBLY

Ref. No.	Part Number	Description	Primer	Qty. Req'd
		Motor Assembly (Includes Ref. Nos. 1 thru 8)		1
	BH-4037	1/4 Horsepower (1 Speed) - Yellow Powercoat	BH-4050	
	BH-4038	200 Volt	BH-4051	
	BH-4039	230/460 Volt	BH-4052	
		575 Volt		
		1/2 Horsepower (1 Speed) - Yellow Powercoat		
	BH-4053	200 Volt	BH-4056	
	BH-4054	230/460 Volt	BH-4057	
	BH-4055	575 Volt	BH-4058	
		1 Horsepower (1 Speed) - Yellow Powercoat		
	BH-4059	200 Volt	BH-4062	
	BH-4060	230/460 Volt	BH-4063	
	BH-4061	575 Volt	BH-4064	
		2-1/2 Horsepower (1 Speed) - Yellow Powercoat		
	BH-4065	200 Volt	BH-4068	
	BH-4066	230/460 Volt	BH-4069	
	BH-4067	575 Volt	BH-4070	
		1/2-1/6 Horsepower (2 Speed) - Yellow Powercoat		
	BH-4071	200 Volt	BH-4075	
	BH-4072	230 Volt	BH-4076	
	BH-4073	460 Volt	BH-4077	
	BH-4074	575 Volt	BH-4078	
		1-1/3 Horsepower (2 Speed) - Yellow Powercoat		
	BH-4079	200 Volt	BH-4083	
	BH-4080	230 Volt	BH-4084	
	BH-4081	460 Volt	BH-4085	
	BH-4082	575 Volt	BH-4086	
		2-1/4 - 3/4 Horsepower (2 Speed) - Yellow Powercoat		
	BH-4087	200 Volt	BH-4091	
	BH-4088	230 Volt	BH-4092	
	BH-4089	460 Volt	BH-4093	
	BH-4090	575 Volt	BH-4094	
1		Bell - End		1
	*	1 Speed - 1/4, 1/2 and 1 HP		
	*	1 Speed - 2-1/2 HP		
	*	2 Speed		

(Continued on following page)

**Figure 9-14. THREE PHASE MOTOR ASSEMBLY - Continued**

<b>Ref. No.</b>	<b>Part Number</b>	<b>Description</b>	<b>Qty. Req'd</b>
2	*	Ring - Retaining 1 Speed - 1/4, 1/2 and 1 HP	1
	*	1 Speed - 2-1/2 HP	
	*	2 Speed	
3		Bearing - Ball 1 Speed - 1/4, 1/2 and 1 HP	1
	BH-3312	1 Speed - 2-1/2 HP	
	BH-2915	2 Speed	
4		Ring - Retaining 1 Speed - 1/4, 1/2 and 1 HP	1
	*	1 Speed - 2-1/2 HP	
	*	2 Speed	
5		Key - Brake 1 Speed - 1/4, 1/2 and 1 HP	1
	BH-3314	1 Speed - 2-1/2 HP	
	BH-2917	2 Speed	
	BH-2917		
6	*	Rotor and Shaft Assembly	1
7	*	Stator Assembly	1
8		Bolt - Motor Mounting 1 Speed - 1/4, 1/2 and 1 HP	4
	BH-3315	1 Speed - 2-1/2 HP	
	BH-2954	2 Speed	
	BH-2942		

\* Furnished only as part of motor assembly.

**NOTES**

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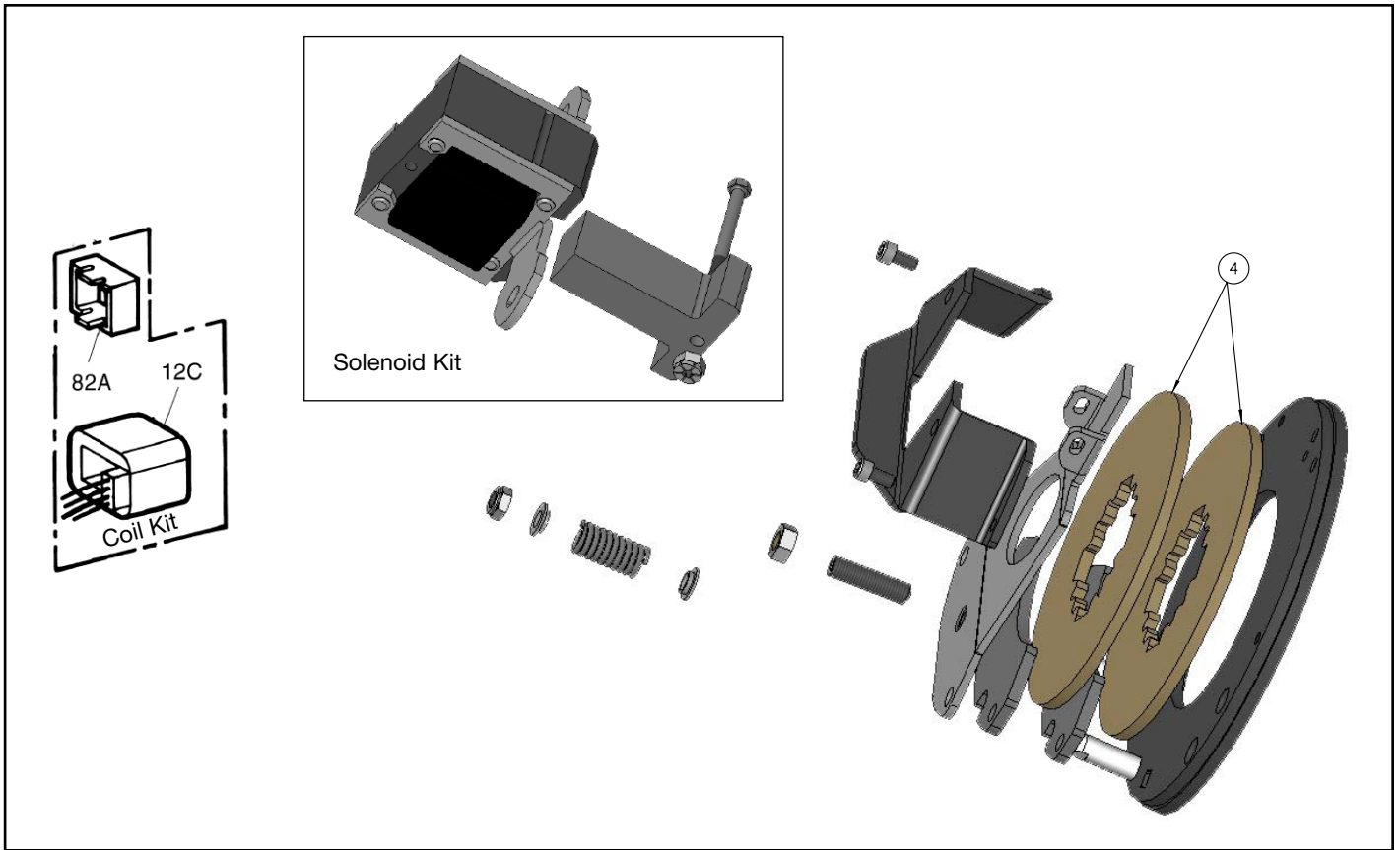


Figure 9-15. HOIST MOTOR BRAKE

Part No.	Motor HP	Motor RPM	Voltage	Coil Kit	Brake Torque ft. - lbs.
BH-4040 BH-4041 BH-4042	1/4	1800	115/230 1Ø 230/460 575	BH-4097 BH-4095 BH-4096	1-1/2
BH-4043 BH-4044 BH-4045	1/2	1800	115/230 1Ø 230/460 575	BH-5000 BH-4098 BH-4099	3
BH-4046 BH-4047 BH-4048	1	1800	115/230 1Ø 230/460 575	BH-5003 BH-5001 BH-5002	6
BH-4043 BH-4044 BH-4045	1	3600	115/230 1Ø 230/460 575	BH-5000 BH-4098 BH-4099	3
BH-4046 BH-4047 BH-4048	2-1/4 2-1/2	3600	115/230 1Ø 230/460 575	BH-5003 BH-5001 BH-5002	6

Ref. No.	Part No.	Description
4	BH-5004	Solenoid Kit
	BH-5005	Friction Disc (1½ & 3 ft. lbs. use 1 disc - 6 ft. lbs. use 2 discs)
	BH-5006	Brake Hub (not shown)
	BH-5007	Brake Cover - Yellow Power Coat (not shown)
	BH-5008	Brake Cover - Primer (not shown)

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

**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, write:

**Phone: (314) 884-8884 • Sales@ErgonomicPartners.com**

# WARRANTY

## WARRANTY AND LIMITATION OF REMEDY AND LIABILITY

A. Seller warrants that its products and parts, when shipped, and its work (including installation, construction and start-up), when performed, will meet applicable specifications, will be of good quality and will be free from defects in material and workmanship. All claims for defective products or parts under this warranty must be made in writing immediately upon discovery and in any event, within one (1) year from shipment of the applicable item unless Seller specifically assumes installation, construction or start-up responsibility. All claims for defective products or parts when Seller specifically assumes installation, construction or start-up responsibility and all claims for defective work must be made in writing immediately upon discovery and in any event, within one (1) year from completion of the applicable work by Seller, provided; however, all claims for defective products and parts must be made in writing no later than eighteen (18) months after shipment. Defective items must be held for Seller's inspection and returned to the original f.o.b. point upon request. **THE FOREGOING IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES WHATSOEVER, EXPRESS, IMPLIED AND STATUTORY, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS.**

B. Upon Buyer's submission of a claim as provided above and its substantiation, Seller shall at its option either (i) repair or replace its

product, part or work at either the original f.o.b. point of delivery or at Seller's authorized service station nearest Buyer or (ii) refund an equitable portion of the purchase price.

C. This warranty is contingent upon Buyer's proper maintenance and care of Seller's products, and does not extend to normal wear and tear. Seller reserves the right to void warranty in event of Buyer's use of inappropriate materials in the course of repair or maintenance, or if Seller's products have been dismantled prior to submission to Seller for warranty inspection.

D. The foregoing is Seller's only obligation and Buyer's exclusive remedy for breach of warranty and is Buyer's exclusive remedy hereunder by way of breach of contract, tort, strict liability or otherwise. In no event shall Buyer be entitled to or Seller liable for incidental or consequential damages. Any action for breach of this warranty must be commenced within one (1) year after the cause of action has accrued.

**BUDGIT®**  
**Hoists**

# BUDGIT®

414 West Broadway Avenue  
P.O. Box 769  
Muskegon, Michigan 49443-0769  
(800) 955-5541 • FAX (800) 742-9270

## INSTALLATION INSTRUCTIONS CHAIN CONTAINERS FOR BUDGIT® ELECTRIC HOISTS AND SERIES 6000 AIR HOISTS COIL CHAIN MODELS

### GENERAL

The BUDGIT Chain Containers listed are designed to fit BUDGIT Push Button Control Electric Hoists, Series 6000 Air Hoists and discontinued Pull Cord Control Model Hoists that are equipped with coil type load chain. Hoists with roller type load chain require different style chain containers.

All parts needed for correct installation are packaged with the container assembly.

### INSTRUCTIONS

The BUDGIT Chain Container is easily installed, following instructions below, and will prove a valuable addition to your BUDGIT Hoist.

Remove small parts from shipping bag (packaged with container) and proceed as follows:

1. Operate hoist and lower load hook to its "Low" position. This shortens the loop at tail chain end of load chain so it will not interfere during installation of container and, at the same time, ensures that chain is correctly fed into the container when installation is completed.
2. Shut off power supply to hoist.
3. Insert hinge pin hanger into hoist frame as shown in Figure 3. Insert hinge pin into hinge tube welded to container. Attach hinge pin to the hanger with flat washer and self-locking hex socket head screw, being sure that the pin is fully inserted into hole in the hanger. Pin and hanger must be positioned as shown in Figure 1. Attach hinge pin to frame with bolt and lockwasher. The hanger must be held tight against hoist frame while tightening this bolt (pin is slotted to permit slight lateral adjustment). On Pull Cord Control model hoists, brake access cover (Figure 4) must be temporarily removed before attaching container and hinge to frame.
4. Place opened split link on one end of support chain and attach to container as shown in Figure 2. Secure by twisting link closed using pliers or adjustable wrenches.
5. Loosen screw anchoring tail chain to hoist frame and install upper hanger bracket. See Figure 4. Hook tab on back of bracket over bottom edge of the access hole in frame. Fit slotted end of bracket behind tail chain link at anchor screw.

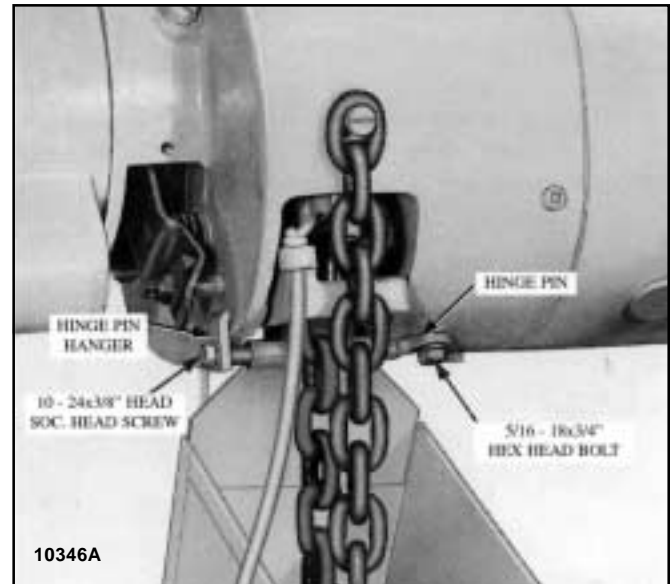


Figure 1. Hinge Pin and Hanger Installation  
(Pull Cord Model Shown)

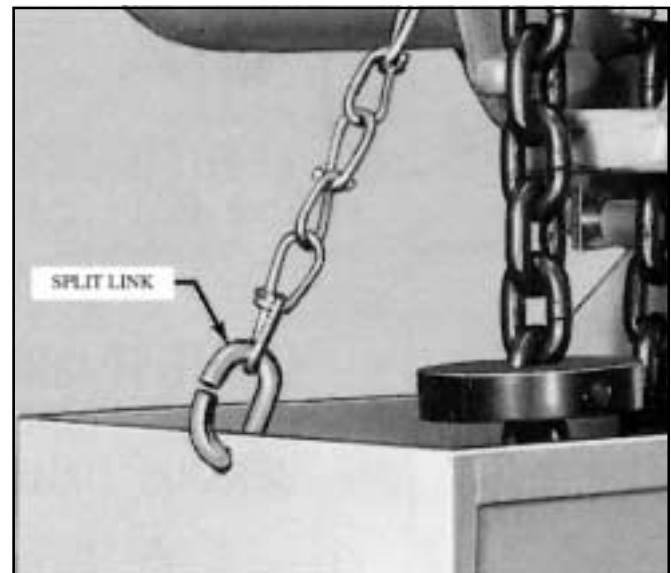


Figure 2. Support Chain Connection at Container

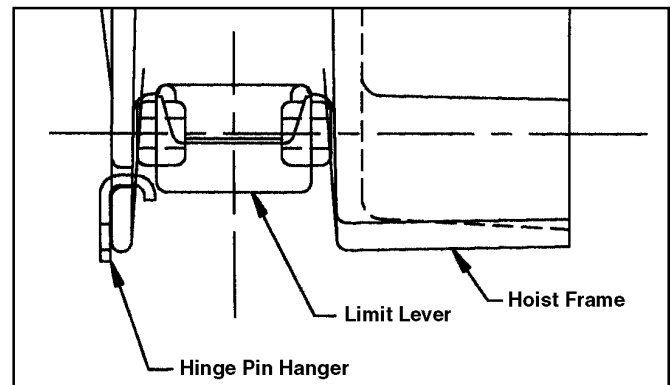


Figure 3.

6. Attach loose end of support chain to upper hanger bracket using round stove head bolt and self-locking nut. See Figure 5. Be certain container hangs parallel to load chain as illustrated in caution label shown in FIGURE 6. Make adjustment in chain at upper hanger bracket if necessary.
7. On Pull Cord Control models, looking at motor end of hoist, remove "Down" control cord from right hand end of limit lever. Install plastic tube over upper foot of cord to prevent chafing of cord on side of container. See Figure 1 on other side. Knot cord at bottom of tube to hold in place. Reattach control cord to limit lever.
8. Power supply to hoist can now be turned on and the hoist operated.

**▲ CAUTION**

Container must hang parallel to load chain. A tilted container will cause piling of chain with possible damage to hoist. If necessary, adjust container support chain. Do not run load into bottom of container. Be sure all split links are twisted closed.

**Read and comply with American National Standard Safety Standard ANSI B30.16 - Latest issues and Hoist Manufacturers Institute "Do's and Do Not's for Electric and Air Powered Hoists."**

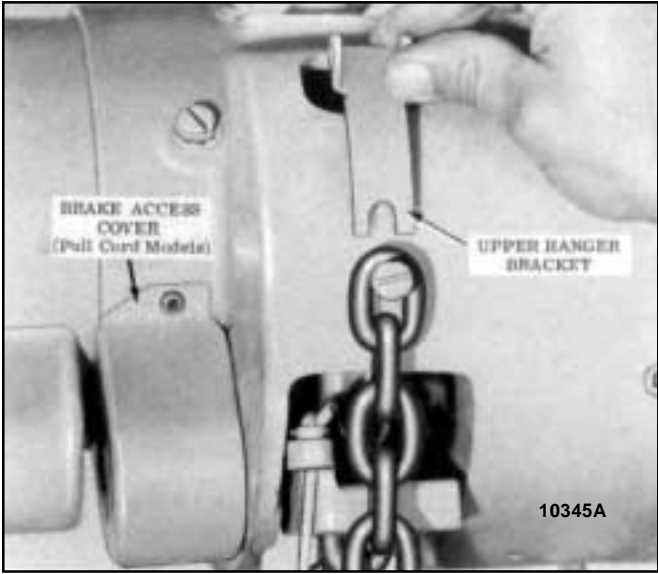


Figure 4. Positioning Upper Hanger Bracket

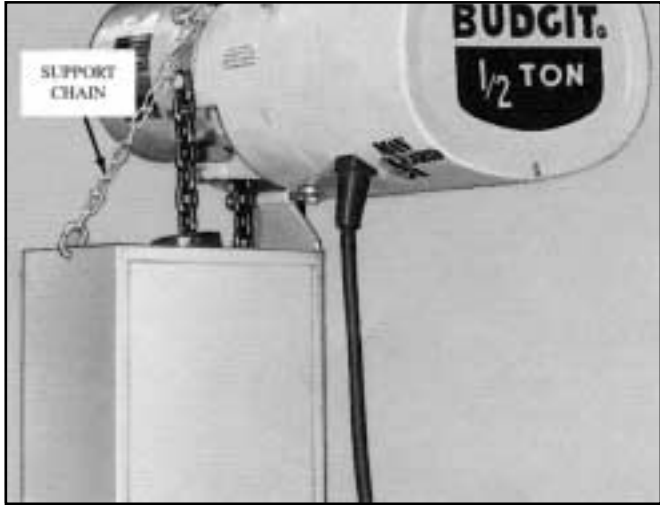


Figure 5. Complete Installation

**CAUTION: CONTAINER TILTED OUT OF PARALLEL CAUSES PILING OF CHAIN WITH POSSIBLE SERIOUS DAMAGE TO HOIST.**

**WHEN ASSEMBLING, ADJUST SUPPORT CHAIN ① UNTIL FRONT OF CONTAINER ② IS PARALLEL WITH HANGER ③. WITH LOAD ON HOIST, FRONT OF CONTAINER MUST BE PARALLEL WITH CHAIN AS SHOWN AT LEFT. READJUST IF REQUIRED. DO NOT RUN LOAD AGAINST BOTTOM OF CONTAINER AS THIS CAN CAUSE TILTING. USE A SLING.**

Length "L"	Catalog	Max. Cap. (ft) Coil Chain	Hoist Length of Lift (ft)			
			1/4 Ton	2 Ton	3 Ton	5 Ton
8"	905434	15	15	Do Not Use		
13"	905435	30	30			
17"	905436	45	45	15	10	
21"	905437	60	60	22	15	
				30	20	
13"	905494	60				12
17"	905495	90				18
21"	905496	120				24

**225501-1**

Figure 6. Installation Caution Label

# BUDGIT®

**Engineering Data  
&  
Quick Reference  
Guide**

**EFFECTIVE DATE OCTOBER 1, 2000**



**Shall and Shall Not's of Hoist Operation**

**Hoist & Trolley Selection**

**Checklist For Ordering Budgit Hoist and Components**

**Engineering Data**

**Terms & Definitions**

**Inspections & Maintenance**

**Basic Trouble Shooting**



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Manufactures of World Famous SHAW-BOX®, BUDGIT®, TUGIT2® Crane Components and Hoists  
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**Yale Lift-Tech** Manufactures all **Budgit/Tugit2** Chain Hoists  
in accordance with our interpretation of applicable sections of:

- ASME/ANSI B30.16 Safety Standards for Overhead Hoists (Underhung)
- ASME/ANSI B30.17 Manually Lever Operated Hoists
- ASME/ANSI B30.10 Hooks
- ASME/ANSI B30.11 Monorails and Underhung Cranes
- ASME/ANSI Performance Standards for Hoists
  - HST-1M Electric Chain Hoist
  - HST-2M Hand Chain Manually Operated Chain Hoist
  - HST-3M Manually Lever Operated Chain Hoist
  - HST-4M Electric Wire Rope Hoists
  - HST-5M Air Chain Hoist
  - HST-6M Air Wire Rope Hoists

All Hoists receive load test to 125% of Rated Capacity in Accordance with these Standards.

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### SOURCES

American National Standard Institute  
ANSI B30.16  
ANSI B30.17  
National Electric Code  
Compressed Air & Gas Institute  
Hoist Manufacturers Institute  
Crane Manufacturers Association of America  
Budgit Repair Manuals  
National Electrical Manufactures Association

# RECOMMENDED PRACTICES FOR POWERED HOISTS

Because the manufacturer has no direct control over the hoist and its operation, conformance with good safety practice is the responsibility of the user and operating personnel. ANSI/ASME B30.16 has been used as a guide in preparing this list of SHALL's and SHALL NOT's. Ask your supervisor for a copy. Each is identified according to ANSI/NEMA Z535.4 with either the signal word CAUTION or WARNING to indicate the degree of seriousness.

## WARNING

**Improper operation of a hoist can create a potentially hazardous situation which, if not avoided, could result in death or serious injury. To avoid such a potentially hazardous situation, the operator shall:**

1. **NOT** operate a damaged, malfunction or unusually performing hoist.
2. **NOT** operate the hoist until you have thoroughly read and understood the manufacturer's Operating and Maintenance Instructions or Manuals.
3. **NOT** operate a hoist which has been modified without the manufacturer's approval or without certification that it is in conformity with ANSI/AMSE B30 volumes.
4. **NOT** lift more than rated load for the hoist.
5. **NOT** use hoist with twisted, kinked, damaged, or worn load chain or wire rope.
6. **NOT** use the hoist to lift, support, or transport people.
7. **NOT** lift loads over people.
8. **NOT** operate a hoist unless all persons are and remain clear of the supported load.
9. **NOT** operate unless load is centered under hoist.
10. **NOT** attempt to lengthen the load wire rope or chain or repair damaged load wire rope or chain.
11. Protect the hoist's load wire rope or chain from weld splatter or other damaging contaminants.
12. **NOT** Operate hoist when it is restricted from forming a straight line from hook to hook in the direction of loading.
13. **NOT** use load wire rope or chain as a sling, or wrap load wire rope or chain around load.
14. **NOT** apply the load to the tip of the hook or to the hook latch.
15. **NOT** apply load unless load chain is properly seated in the chain wheel(s) or sprocket(s) or wire rope is properly seated in its groove(s).
16. **NOT** apply load if bearing prevents equal loading on all load supporting ropes or chains.
17. **NOT** operate beyond the limits of the load wire rope or chain travel.
18. **NOT** leave load supported by the hoist unattended unless specific precautions have been taken.
19. **NOT** allow the load wire rope, chain or hook to be used as an electrical or welding ground.
20. **NOT** allow the load wire rope, chain or hook to be touched by a live welding electrode.
21. **NOT** remove or obscure the warnings on the hoist.
22. **NOT** operate a hoist on which the safety placards or decals are missing or illegible.
23. **NOT** operate a hoist unless it has been securely attached to a suitable support.
24. **NOT** operate a hoist unless load slings or other approved single attachments are properly sized and seated in the hook saddle.
25. Take up slack carefully - make sure load is balanced and load holding action is secure before continuing.
26. Shut down a hoist that malfunctions or performs unusually and report such malfunction.

## CAUTION

Improper operation of a hoist can create a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. To avoid such a potentially hazardous situation, the operator shall:

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

## DISCLAIMER

Under no circumstances does the Hoist Manufacturers Institute (HMI) assume any liability for the use of these voluntary recommendations and no warranty whatsoever is made in connection with them. The recommendations do not take precedence over existing plant safety rules and regulations, OSHA regulations or instructions issued by the Hoist Manufacturer. It is the user's intent to absolve and protect HMI from any and all liability, in tort or otherwise.

# O.S.H.A. COMPLIANCE RECOMMENDATIONS

The equipment listed below is recommended for O.S.H.A. compliance:

## HOIST APPLICATIONS

## \*O.S.H.A. REQUIREMENT

Motorized hoist in fixed location.

Hoist meets O.S.H.A. requirements as standard. Customer must have a readily accessible fused disconnect switch or circuit breaker in power supply to each hoist within view of the operator.

Motorized hoist with push or hand geared trolley operating on a monorail system or jib crane.

Customer must have a fused disconnect switch or circuit breaker in the power supply; if this disconnect means is not readily accessible and within view of the operator, provide a mainline contactor panel (trolley mounted). If more than one hoist will operate on a given monorail system or jib crane (same electrical system), provide a fuse panel (trolley mounted) for each hoist.

Motorized hoist with motorized trolley operating on a monorail system or jib crane.

Provide a fuse panel (trolley mounted) for each hoist/trolley. Customer must have a fused disconnect switch or circuit breaker in the power supply; if this disconnect means is not readily accessible and within view of the operator, provide a mainline contactor panel (trolley mounted).

## CRANE APPLICATIONS WITH MOTORIZED HOIST

ITEM	*O.S.H.A REQUIREMENT		
		MANUAL BRIDGE	MOTORIZED BRIDGE
Pushbutton From Trolley	Motorized Trolley	Fuse panel (trolley mounted). Mainline contactor panel (trolley mounted). Crane disconnect switch (bridge mounted).	Standard bridge control panel meets all requirements for the bridge. (Panel includes fused disconnect switch, mainline contactor, and bridge motor fuses). Also required: Fuse panel (trolley mounted).
	Manual Trolley	Mainline contactor panel (trolley mounted). Crane disconnect switch (bridge mounted).	
Pushbutton From Bridge	Motorized Trolley	Fuse panel (trolley mounted). Mainline contactor and crane disconnect switch (bridge mounted).	
	Manual Trolley	Mainline contactor and crane disconnect switch (bridge mounted).	

\*Requirements are Yale Lift-Tech's recommendations based on standard applications only.

# HOIST & TROLLEY SELECTION

## MANUAL HOISTS

### Hand Chain Hoists:

#### General Use

Anything lifting in the plant, such as one-of-a-kind lifting, maintenance, intermittent or stand-by lifting. General use on construction sites, repair shops and warehouses.

#### Production Lines:

May be used where lift is short, where operator can accomplish lift with one or two pulls of the hand chain. Such as, end of an assembly line, or conveyor.

#### Fine Control Applications:

Where accurate positioning of the load is required, such as installing and removing tools and dies from machinery.

#### Hazardous Areas:

Waterfront construction, ship repair, and where electrical service is hazardous. Hazardous environments where vapor or dust ignition is a concern, such as, petroleum and chemical plants. Optional spark resistant features are available.

### Lever Hoists:

Lever hoists are used in many of the same applications noted above for Hand Chain Hoists. Also, they are the only hoist designed for horizontal pulling in such applications as lineman pulling power cables.

## POWERED HOISTS

### Electrical Hoists:

#### General Use

Electric hoists are used in high volume, production type applications or long lifts where manual hoists are not practical.

#### Production Lines

Electrical hoists are excellent in repetitive lifting operations, where the amount of time to lift loads is critical.

#### Operator Fatigue

Electric hoists saves on operator fatigue and possible injuries. Higher capacity manual hoists requires great amount of effort to lift loads close to capacity over long distances, where on electric hoists a push of a button lifts the load.

### Air Hoists:

#### General Use

Air hoists offers all the advantages noted above for electric hoists. Moreover, they are uniquely suitable for heavy usage and environments that make electrical hoist impractical.

#### Hazardous Locations

Since there is no electrical arcing with the air motors, these hoists are excellent in chemical and petrochemical industries with hazardous environments. Optional spark resistant features are available.

#### Variable Speed Control

On some models the pendant throttle control offers a true variable speed control from creep speed to full speed at the pendant. This feature is excellent when accurate positioning or spotting is required, or when a smooth acceleration in lifting or lowering a load is required.

# HOIST & TROLLEY SELECTION

## Selecting Type of Trolley and Bridge Crane

Better than 90% of all hoists are trolley mounted. Some hoists are stationary and only offer one axis, "Up - Down", motion. Trolleys offer two axis, "Up-Down-Left-Right", motion. Bridge cranes provide the third axis of motion, "Forward and Reverse". Hoists trolley mounted on monorails, jib cranes or bridge cranes provide a greater coverage area offering greater flexibility in lifting and transporting loads.

### Trolley Suspension:

#### Hook Mount

Hook mount trolleys provide portability to the hoist. Hoist can be hooked-on or removed from the trolley easily. Typical use is maintenance applications. Trolleys are installed on monorails through a plant. Hoists are kept in tool stores, installed on a trolley when required, removed once work is completed and returned to stores to await use elsewhere.

#### Lug Mount

Lug or rigid mount trolleys are lug suspended hoists, forms a integral trolley-hoist combination. This arrangement offers closer headroom than hook mount arrangements. This arrangement offers closer headroom than hook mount arrangements. This type of installation is usually a permanent type, and the only time the hoist is removed is for maintenance. Rigid mount is also used on Motor Driven Trolleys due to the electrical connections between the hoist and trolley. Hook suspended hoist are free to rotate and swing on the trolley, which could pull on the electrical connections and cause damage to the equipment.

### Trolley/Crane Types:

#### Push Type

Push type trolleys and cranes are used when loads are light, 2 Ton or less, and the monorail/runway are not more than 20 feet above the finish floor. Also, push types are good when accurate positioning of loads is not required.

#### Hand Geared Type

Hand Geared Trolleys/Cranes are excellent for accurate positioning of loads. They are good for operation on short monorails/runways, under 50 feet, and when trolley operation is infrequent.

#### Motor Driven Type

Motor Driven trolleys/bridges are excellent for moving heavy loads over long distances. Speeds allow for higher cycling and frequent moves, plus eliminates operator fatigue.

### Top Running vs. Underhung Crane:

Top running cranes offers higher hook height than underhung but require higher ceiling height above the runway. Runways are supported by either the building columns, or free standing on their own supports. Loads are generally transmitted through the floor to column footings.

Underhung cranes offer better end approach of the hoist along the bridge girder, because hoists can be positioned underneath or outside of the runway. Runways are generally supported from the ceiling joists, with the loads transmitted through the ceiling, therefore ceiling supports must be adequately sized to handle these loads.

### Type of Beams:

#### Trolleys & Underhung Cranes

Trolleys and end trucks are designed for operation on American Standard S (I-beams) and W section (Wide Flange or H beams). They are adjustable for beam flange widths in a standard range. Wider flange adjustments and patented track wheels are available as options. One must determine the monorail/runway beam size and flange width and apply the proper trolley/End Truck to the application.

#### Top Running Cranes

Top running end trucks for cranes are designed for operation on ASCE rail from 20 to 45 lbs./yard range. This rail is made a high quality grade of steel and resembles railroad track rail.

# CHECKLIST FOR ORDERING BUDGIT HOIST & COMPONENTS

## CHECKLIST FOR MANUAL CHAIN HOIST

Hoist Model Number

Lift Requirements – 8' Standard \*

Hand Chain Drop – 6' - 6" Standard (USA only) 6' - 0" for Hi-Cap 2 aluminum hand chain hoist

Suspension – Hook

Lug – Plain Trolley

Handgeared Trolley – Standard Hand Chain (Drop is 6' - 6")

Spark & Corrosion Resistant

Plated Load Chain

Chain Bucket

Overload Device (Standard on USA Hi-Cap 2 Models)

\* On higher capacity long lift hoists take note on the hand chain overhaul in feet to lift load one foot.

## CHECKLIST FOR LEVER HOIST

Hoist Model Number

Lift Requirements – 5' - 0" Standard

Plated Load Chain

Overload Device – Optional

## CHECKLIST FOR MANUAL TROLLEYS

Trolley Model Number

Suspension – Hook Type

Lug – Plain Trolley

Handgeared Trolley – Standard Hand Chain Drop is 9' - 6"

Spark Resistant Features (if required)

Beam size Trolley is to run on Straight Monorail or Curve (Radius Requirements Needed)

## CHECKLIST FOR ELECTRIC CHAIN HOIST

Hoist Model Number

Lift Requirements – Maximum Recommended Lift (7 x Lift Speed)

Electric Hoists with lifts over 90', a lug mounted trolley is recommended

Lift Speed – Single or Two Speed

Suspension – Hook

Lug – For Plain or Handgeared Trolley

Lug – For Motor Driven Trolley

Voltage – Need to Specify for Two Speed

Indoor Service – Standard

Outdoor Service – Weatherproofing Adder (includes plated chain) or Cover

Pendant Drop – If other than Standard Lift on Hook Mount, Lug Suspension for Plain & Handgeared Trolleys. Hoists with Motorized Trolleys, the Pendant Cable is Added to the Trolley, instead of the Hoist. See Trolley Options.

Type of Trolley – Check Beam Size and Radius Requirements (if any)

Plain

Handgeared – Standard Hand Chain Drop is 9' - 6"

Motorized – Standard Pushbutton Drop is 7'

Indoor – Standard

Outdoor – NEMA 3R, NEMA 4/12

Recommended Adders – Mainline Disconnect panel for Monorail Hoist.

Two speed Hoist require a different trolley from a Single Speed Hoist. When ordering for a Bridge Crane you will need fusing, and Extra Pushbuttons to operate the Crane if the Pushbutton is from the Hoist.

# CHECKLIST FOR ORDERING BUDGIT HOIST & COMPONENTS

## CHECKLIST FOR ELECTRIC CHAIN HOIST (CONTINUED)

Pushbutton deduct is for the hoist with Motorized Trolley only.

Chain Bucket

Electrification for Monorail Hoist

Cord Reel

Retractable Cord

Festooned Conductor System C-track Supported

Festooned Conductor System Wire rope Supported

Conductor Kits figure 8 Bar

Spring type Slide Collectors Required, Collector Pole & Bracket Required on Trolley.

## CHECKLIST FOR AIR CHAIN HOISTS

Hoist Model Number

Lift Requirements – 10' Standard – Maximum lift of 6000 Series Air Hoist is (7 x Lift Speed)

Air chain Hoists with lifts over 90', a lug mounted hoist is recommended.

Lift Speed

Suspension – Check Beam Size and Radius Requirements (if any)

Hook

Lug – Handgeared – 9' - 6" Standard Hand Chain Drop

Push Type

Air Motor Driven Trolley

Pull Cord Drop – Included in Additional Lift Price

Pendant Drop – 6' Standard

2200 Series – Maximum Pendant Drop 72'

6000 Series – Maximum Pendant Drop 36'

Spark Resistant Features

Plated Load Chain Option

Air Motor Driven Trolley – Check Beam Size and Radius Requirements (if any)

Standard Pendant Drop is 6'

Maximum Pendant Drop is 36'

Spark Resistant Features

Chain Container

Air Supply Hose

Air Hose Trolleys

Wire Rope Festoon System

Filter – Recommended

Lubricator – Recommended

Regulator – Recommended if air Supply is over 90 PSI

Recoil Air Hose

Nylon coated Cable Recommended

## CHECKLIST FOR ELECTRIC BRIDGE CRANES

End Trucks – Check runway beam size for underhung bridges

Gear Reducer

Motor

Controls – Indoor – Standard

Outdoor – NEMA 3R NEMA 4/12

**NEMA 4X and 7 available upon request**

Fused Disconnect Switch – Indoor – Standard

Outdoor – NEMA 3R, NEMA 4/12,

**NEMA 4X and 7 available upon request**

Cross Shaft Support

Cross Shaft Coupling

# **CHECKLIST FOR ORDERING BUDGIT HOIST & COMPONENTS**

## **CHECKLIST FOR ELECTRIC BRIDGE CRANES (CONTINUED)**

Bumpers  
Bridge Electrification  
Runway Electrification  
Collector Pole & Bracket  
Main Collectors  
Some Recommended Optional Equipment  
    Electronic Acceleration Control  
    Bridge Brake

## **ITEMS NEEDED TO BE ADDED TO ELECTRIC HOIST FOR ELECTRIC BRIDGE CRANE**

Fuses  
Extra Pushbuttons to Operate Bridge Crane (4 additional buttons needed)  
Tow Arm – Use Catalog Number 931103  
115 Control voltage on Hoist



# HOIST SPECIFICATIONS SHEET

Capacity \_\_\_\_\_  
Lift \_\_\_\_\_  
Lift Speed \_\_\_\_\_  
Voltage \_\_\_\_\_ or Air Supply \_\_\_\_\_

Headroom Requirements \_\_\_\_\_

Type of Suspension

Lug \_\_\_\_\_ Hook \_\_\_\_\_

Spark Resistance (Air/Manual only) \_\_\_\_\_

## OPTIONS

Weatherproofing \_\_\_\_\_

Plated Load Chain \_\_\_\_\_

Chain Bucket \_\_\_\_\_

Monorail Electrification \_\_\_\_\_

Air Host \_\_\_\_\_

Filter & Lubricator \_\_\_\_\_

Special Paint \_\_\_\_\_

## TROLLEY

Type of Trolley

Plain \_\_\_\_\_

Handgeared \_\_\_\_\_

Motorized \_\_\_\_\_

Voltage \_\_\_\_\_ or Air Supply \_\_\_\_\_

Pendant Drop \_\_\_\_\_

Trolley Speed \_\_\_\_\_

Spark Resistance (Air/Manual only) \_\_\_\_\_

Beam Size to Run on \_\_\_\_\_ Beam Radius \_\_\_\_\_

## OPTIONS

2 Speed \_\_\_\_\_

Trolley Brake \_\_\_\_\_

Weatherproofing \_\_\_\_\_

Ballast Resistors \_\_\_\_\_

Electronic Acceleration Control \_\_\_\_\_

Extra Pushbuttons \_\_\_\_\_

Extra Hand Chain Drop \_\_\_\_\_

Wide Flange Adjustment \_\_\_\_\_

Collector Pole & Bracket \_\_\_\_\_

Collectors \_\_\_\_\_

Trolley Locking Clamp \_\_\_\_\_

Special Paint \_\_\_\_\_

Fuses \_\_\_\_\_

Mainline Disconnect Panel \_\_\_\_\_

# BRIDGE CRANE SPECIFICATIONS

Capacity \_\_\_\_\_ (5 ton Max.)  
Span \_\_\_\_\_ (36' - 0" Max.)  
Top-Running \_\_\_\_\_ Runway Rail to Run on \_\_\_\_\_  
Underhung \_\_\_\_\_ Beam to Run on \_\_\_\_\_

## Bridge Movement

Push Pull \_\_\_\_\_  
Handgeared \_\_\_\_\_  
    Hand Chain Drop \_\_\_\_\_  
Motorized \_\_\_\_\_  
    Bridge Speed \_\_\_\_\_  
    Voltage \_\_\_\_\_  
    Control Enclosure (NEMA 1 Standard) \_\_\_\_\_  
    Disconnect Enclosure (NEMA 1 Standard) \_\_\_\_\_

Bridge Electrification \_\_\_\_\_  
Runway Electrification \_\_\_\_\_  
Runway Length \_\_\_\_\_  
Pushbutton From Hoist (Extra Pushbuttons Required) \_\_\_\_\_

## HOIST FOR BRIDGE

Capacity \_\_\_\_\_  
Lift \_\_\_\_\_  
Headroom Requirements \_\_\_\_\_  
Lift Speed \_\_\_\_\_  
Voltage \_\_\_\_\_  
Trolley Type  
    Plain \_\_\_\_\_  
    Handgeared \_\_\_\_\_  
    Motorized \_\_\_\_\_  
    Trolley Speed \_\_\_\_\_

See Hoist Specification Sheet for Hoist & Trolley Options.

## BRIDGE COMPONENTS OPTIONS

Electronic Acceleration Control \_\_\_\_\_  
2 Speed Motors & Controls \_\_\_\_\_  
Ballast Resistors \_\_\_\_\_  
Bridge Brake \_\_\_\_\_  
Motor Protection \_\_\_\_\_  
Weatherproofing \_\_\_\_\_  
Main Collector \_\_\_\_\_  
Wide Flange Adjustment \_\_\_\_\_

# ENGINEERING DATA

## #1 – NEMA CLASSIFICATIONS FOR NONHAZARDOUS LOCATIONS

NEMA 1	General Purpose — Indoor
NEMA 2	Drip proof — Indoor
NEMA 3	Dust tight — Rain tight and Sleet (Ice) Proof — Outdoor
NEMA 3R	Rain proof and Sleet (Ice) Proof — Outdoor
NEMA 3S	Dust tight — Rain tight and Sleet (Ice) Proof — Outdoor
NEMA 4	Water tight, Dust tight — Indoor and Outdoor
NEMA 4X	Water tight, Dust tight and Corrosion Resistant — Indoor and Outdoor
NEMA 5	Supersedes by NEMA 12
NEMA 6	Submersible Water tight, Dust tight and Sleet (Ice) Resistant Indoor and Outdoor
NEMA 7-8 & 9-10	Enclosures for Hazardous Locations (See Attached Hoist Tips for Hazardous Hoist)
NEMA 11	Corrosion Resistant and Drip proof — Oil Immersed — Indoor
NEMA 12	Industrial Use — Dust tight and Drip tight — Indoor
NEMA 13	Oil tight and Dust tight — Indoor

# ENGINEERING DATA

## HOIST DUTY SERVICE CLASSIFICATION

### HOIST CLASS

- H1 (INFREQUENT OR STANDBY)  
Powerhouses & Utilities. Infrequent handling. Hoists used primarily to install & service heavy equipment, where loads frequently approach hoist capacity, with periods of utilization being infrequent and widely scattered.
- H2 (LIGHT)  
Light machine shop and fabricating industries and service and maintenance work, where loads & utilization are randomly distributed with capacity loads infrequently handled, and where total running time of equipment does not exceed 10 - 15% of the work period.
- H3 (STANDARD)  
General Machine Shop, fabricating, assembly, storage and warehousing, where loads and utilization are randomly distributed, with total running time of equipment not exceeding 15 - 25% of the work period.
- H4 (HEAVY)  
High volume handling in steel warehousing, machine shops, fabricating plants, mills and foundries. Manual or automatic cycling operations in heat treating and plating operations. Total running time of equipment normally approaches 25 - 50% of work period, with loads at or near rated capacity frequently handled.
- H5 (SEVERE)  
Bulk handling of material in combination with buckets, magnets, or other heavy attachments. Equipment often cab operated. Duty cycles approaching continuous operation are frequently necessary. User must specify details of operation, including weight of attachments.

# ENGINEERING DATA

## CRANE SERVICE CLASSIFICATION

### **CLASS A**

The class is further divided into two subclasses due to the nature of the loads to be handled.

#### **CLASS A1 (STANDBY SERVICE)**

This service covers cranes used in installations such as; power houses, public utilities, turbine rooms, motor rooms and transformer stations, where precise handling of valuable machinery at slow speeds with long idle periods between lifts required. Capacity loads may be handled for initial installation of machinery and for infrequent maintenance.

#### **CLASS A2 (INFREQUENT USE)**

These cranes will be used in installations such as; small maintenance shops, pump rooms, testing laboratories, and similar operations where the loads are relatively light, the speeds are slow, and a low degree of control accuracy is required. The loads may vary anywhere from no load to full capacity with a frequency of a few lifts per day or month.

### **CLASS B (LIGHT SERVICE)**

This service covers cranes such as used in repair shops, light assembly operations, service buildings, light warehousing etc., where service requirements are light and the speed is slow. Loads vary from no load to full rated with an average load of 50% of capacity with 2 to 5 lifts per hour, averaging 15 feet, not over 50% of the lifts at rated capacity.

### **CLASS C (MODERATE SERVICE)**

This service covers cranes such as used in machine shops, paper mill machine rooms etc., where the service requirements are moderate. In this type of service the crane will handle loads which average 50% of the rated capacity with 5 to 10 lifts per hour, averaging 15 feet, not over 50% of the lift at rated capacity.

### **CLASS D (HEAVY DUTY)**

This service covers cranes, usually cab operated, such as are used in heavy machine shops, foundries, fabricating plants, steel warehouses, lumber mills etc., and standard duty bucket and magnet operation where heavy duty production is required but with no specific cycle of operation. Loads approaching 50% of the rated capacity will be handled constantly during the working period. High speeds are desirable for this type of service with 10 to 20 lifts per hour averaging 15 feet, not over 65% of the lifts at rated capacity.

### **CLASS E (SEVERE DUTY CYCLE SERVICE)**

This type of service requires a heavy duty crane capable of handling the rated load continuously, at high speed, in repetition throughout a stated period per day, in a predetermined cycle of operation. Applications include magnet, bucket, magnet-bucket combinations of cranes for scrap yards, cement mills, lumber mills, fertilizer plants etc., with 20 or more lifts per hour all at rated capacity. The complete cycle of operation should be specified.

### **CLASS F (STEEL MILL AISE SPECIFICATION)**

Cranes in this class are covered by the current issue of The Association of Iron and Steel Engineers' Standard, No. 6 for Electric Overhead Traveling Cranes for Steel Mill Service.

# ENGINEERING DATA

## HOIST/TROLLEY SELECTION

### HOIST CAPACITY

Determine the maximum load to be lifted. If the load falls between standard rated capacities, always go the higher capacity (i.e., for 4,300 lb. maximum load, use 6,000 lb., 3 ton capacity hoists).

### HOIST LIFT

To determine the total lift required measure the distance from the bottom of the beam to the lowest point on the floor to be reached and subtract the hoist "A" dimension shown in the specifications. The remaining distance is the lift required on the hoist. Always select a standard lift equal to or greater than the distance required.

### HOIST SUSPENSION

Hook type suspension allows hoist be to hung up almost anywhere and is used when hoist must be readily moved to other locations. Lug type (Coil chain hoists only) saves headroom and is used with rigid mount trolleys or when hoist is permanently mounted in a fixed location.

### TROLLEY TYPE

There are three standard trolley types that can be used to suspend BUDGIT Hoists.

**Push Trolley** – Recommended for light capacities and lifts less than 20 feet. An economical method for moving loads.

**Hand Gearing Trolley** – Offers most precise control for load spotting. Most favorable for higher capacities and short monorails where this control is desired. Also recommended where lifts are more than 20 feet.

**Motor Driven Trolley** – Most widely used method of suspension, particularly 2 ton capacity and above. Virtually a necessity where long monorails are used.

Supporting structure must be rated at least 100% of the hoist capacity or greater than the hoist rating.

## HOW TO SELECT THE CORRECT BUDGIT MANGUARD™ ELECTRIC HOIST

### FIRST – Determine amount of Travel/Lift Required Per Hour

This can easily be done by taking the distance a load must be lifted and lowered, then multiplying by the number of times this must be done per hour to do the job required. Always use maximums that can be expected to occur. Example: Must lift pipe six feet to rack, then lower empty hook for next load 20 times per hour.

### SECOND – Count Number of "Starts" Needed Per Hour

"Starts" are the actuations of the push buttons. In our example, let's assume under a maximum condition that in the raise cycle the hoist push buttons are actuated six (6) times — in the lowering cycle, five (5) times. The number of starts per hour is calculated per example below:

### THIRD – Calculate Maximum Load and Average Load

Maximum load is the highest load to be lifted and must not exceed the hoist rating. To arrive at an average load weight, take one up and down cycle (the heaviest anticipated), add the load on the hook in the up direction to the load on the hook in the down direction. Divide this sum by two (2) and you will have the average load condition. Using 3300 pounds and a below-the-hook weight of 300 pounds, average load is calculated as follows:

	Travel/Lift	Starts Per Hour	Average Load
up	6'	6	3600 lbs. Max Load
down	6'	5	0
total	12'	11	3600
	x 20	x 20	÷ 2
Cycles/hour	240'	220	1800 lbs. Avg. Load

Be sure to include weight of below-the-hook lifting devices. All BUDGIT Electric Hoist figures are based on the average load not exceeding 65% of the rated capacity of the hoist.

### FOURTH – Select the Basic Hoist

From our calculations, we know that we need a hoist that will lift a maximum load of 3600#, move the load 240' per hour with 220 push button starts, and whose average load is 1800#. From the following table you can select the proper BUDGIT Hoist to do the job:

**Note:** Average load is used in lieu of the correct **Mean Equivalent Load** for simplification: See ANSI/ASME HST-1M "Performance Standard for Electric Chain Hoists."

Hoist Type	BUDGIT HOIST RATINGS		
	Hoist Duty Class	Max. No. Starts Hr.	Max. on Time Min/Hr.
Single Phase	H4	300	30 (50%)
Three Phase (HD)	H4	300	30 (50%)

**Note:** The above chart is for single speed models only. On two-speed hoists the high speed winding is rated for HMI Class H4 heavy duty, the low speed winding is rated for HMI Class H3 standard duty (25% on time) service.

Continuing our example, we have selected a Catalog No. BEH0216 heavy duty hoist (2-ton capacity, 10-foot lift, 16 FPM lifting speed).

	Requirement	BEH0216
Travel/Lift	240'	16 FPM x 30 Min. = 480 Ft.
Starts	220	300
Avg. Load	1800 lbs.	2600
Max. Load	3600 lbs.	4000

If you follow this simple method of hoist application, you will never buy more hoist than you need, can be sure the hoist will perform the required duty, and won't find yourself on the short end of application versus hoist.

The duty rating as described will meet or exceed most industrial applications. Where the duty cycle is anticipated to exceed this duty rating, contact your Yale Lift-Tech field representative or the factory at Muskegon, Michigan, for the hoist to meet your needs.

## TYPICAL MOTOR AMPERAGE DATA

HP/Volts	Three-phase ac squirrel-cage & wound rotor induction type motors				Single-phase ac motors	
	208V	230V	460V	575V	115V	230V
1/4	1.4	1.3	.65	.5	5.8	2.9
1/2	2.2	2.0	1.0	.8	9.8	4.9
3/4	3.1	2.8	1.4	1.1	13.8	6.9
1	4.0	3.6	1.8	1.4	16	8
1.5	5.7	5.2	2.6	2.1	20	10
2	7.5	6.8	3.4	2.7	24	12
3	10.6	9.6	4.8	3.9	34	17
5	16.7	15.2	7.6	6.1	56	28
7.5	24.2	22.0	11.0	9.0	80	40
10	30.8	28.0	14.0	11.0	100	50
15	46.2	42.0	21.0	17.0	—	—
20	59.4	54.0	27.0	22.0	—	—
25	74.8	68.0	34.0	27.0	—	—
30	88.0	80.0	40.0	32.0	—	—
40	114.4	104.0	52.0	41.0	—	—
50	143.0	130.0	65.0	52.0	—	—

Above is a table with typical motor amperage by HP by voltage. This is provided as a guide only. Where exact amperage is required for a specific motor please consult the factory.

# BUDGIT MANGUARD ELECTRIC HOISTS

## MOTOR CURRENTS

### FULL LOAD, LOCKED ROTOR & NO LOAD AMPS

SINGLE SPEED MOTORS				
1/4 HORSEPOWER				
RPM	VOLTS	FLA	LRA	NLA
1800	115/230	4.36/2.18	19.20/9.60	3.60/1.80
	208	1.30	7.10	.094
	230/460	1.10/0.55	6.40/3.20	.085/.043
	575	.045	2.60	.034
1/2 HORSEPOWER				
1800	115/230	6.30/3.15	32.80/16.40	4.20/2.10
	208	2.20	11.70	1.80
	230/460	2.00/1.00	10.60/5.30	1.60/0.80
	575	0.80	4.30	0.64
1 HORSEPOWER				
1800	115/230	11.20/5.60	53.40/26.70	6.00/3.00
	208	3.30	18.10	1.90
	230/460	3.00/1.50	16.00/8.00	1.70/0.852
	575	1.30	6.60	0.68
2 1/2 HORSEPOWER				
3600	115/230	24.20/12.10	121.20/60.60	13.60/6.80
	208	7.50	38.00	2.50
	230/460	6.80/3.40	35.40/17.70	2.30/1.15
	575	2.70	15.00	0.92

TWO SPEED MOTORS				
.50/.17 HORSEPOWER				
RPM	VOLTS	FLA	LRA	NLA
1800/600	208	1.80/1.80	7.80/3.20	1.20/1.70
	230	1.60/1.60	7.00/3.00	1.00/1.50
	460	0.80/0.80	3.50/1.50	0.52/0.81
	575	0.70/0.70	2.90/1.30	0.46/0.64
3600/1200	208	15.62/12.32	9.46/6.82	0.70/1.12
	230	14.20/11.20	8.60/6.20	0.64/1.02
	460	7.10/5.60	4.30/3.10	0.32/0.51
	575	5.68/4.48	3.44/2.48	0.26/0.41
1.0/.33 HORSEPOWER				
1800/600	208	3.20/3.60	14.60/6.90	1.60/3.70
	230	2.90/3.30	12.90/6.00	1.50/3.20
	460	1.50/1.50	6.80/3.00	0.80/1.50
	575	1.30/1.30	5.40/2.20	0.70/1.20
3600/1200	208	3.30/2.42	20.02/12.54	1.56/2.20
	230	3.00/2.20	18.20/11.40	1.42/2.00
	460	1.50/1.10	9.10/5.70	0.71/1.00
	575	1.20/0.88	7.28/4.56	0.57/0.80
2.25/.66 HORSEPOWER				
3600/1200	208	3.20/3.60	14.60/6.90	1.60/3.70
	230	2.90/3.30	12.90/6.00	1.50/3.20
	460	1.50/1.50	6.80/3.00	0.80/1.50
	575	1.30/1.30	5.40/2.20	0.70/1.20



## 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 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			
	200, 230-3-60	465	740	1180			
	460, 575-3-60	1440	2390				
1/2	115-1-60	45	75	120	190	310	490
	230-1-60	195	305	490	775	1235	
	200, 230-3-60	280	450	715	1135		
	460, 575-3-60	860	1440				
1	115-1-60	*	45	75	120	190	300
	230-1-60	120	190	300	475	720	
	200, 230-3-60	180	290	460	730		
	460, 575-3-60	560	900				
2 1/2	200, 230-3-60	60	100	150	250		
	460, 575-3-60	260	420				

\* Do not use

Branch Circuit Conductor Size. Maximum length in feet for maximum wire sized 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  $\pm 5\%$  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.

## SPARK RESISTANT FEATURES

Spark and Corrosion Resistant models are designed for service in certain hazardous atmospheres and area where resistance to friction sparks is vitally important. These models are constructed from the following materials:

### **BUDGIT "USA" and Hi-Cap2 Aluminum Hand Chain Hoists**

Hooks: Bronze Alloy  
Hook Latch: Stainless Steel  
Lower Block: Bronze Sleeve on single line hoists  
(2 Ton and below) USA Only  
Cast Aluminum on multiple line hoists  
with Bronze idler sprockets  
(3 Ton and above)  
Load Chain: Type 304 Stainless Steel  
Hand Chain: Bronze (1/4 and 1/2 Ton) USA Only  
Aluminum (1 Ton and above)  
Hoist Frame: Heat treated, cast aluminum alloy

### **BUDGIT Series 2200 Air Chain Hoists**

Hooks: Bronze Alloy  
Hook Latch: Stainless Steel  
Lower Block: Stainless Steel single line hoists  
(3/8 Ton and below)  
Cast Aluminum on multiple line hoists  
(3/4 Ton and above)  
Load Chain: Type 304 Stainless Steel  
Hoist Frame: Heat treated, cast aluminum alloy

### **BUDGIT Series 6000 Air Chain Hoist**

Hooks: Bronze Alloy  
Hook Latch: Stainless Steel  
Lower Block: Stainless Steel single line hoists  
(1/2 Ton and below)  
Cast Aluminum on multiple line hoists  
(1 and 2 Ton and above)  
Limit Stop: Bronze  
Load Chain: Type 304 Stainless Steel  
Hoist Frame: Heat treated, cast aluminum alloy

### **BUDGIT Trolleys**

Wheels: Bronze or Beryllium Copper  
Hand Chain: Aluminum (Hand Geared Trolleys)  
Bumpers: Vinyl Sleeves provided on wrap around bumpers

## CFM REQUIREMENTS

To determine if your shop Air Compressor has enough delivered air to operate the Budget Series 6000, and series 2200 Air Hoist properly, the chart below can help determine your air requirements. The chart is an average of CFM of delivered air for industrial two stage reciprocating air compressors at 90 PSI. This is only a average, for exact CFM requirements for your compressor, check your compressor manufacturers listed specifications for delivered air. The chart below lists the CFM by compressor HP.

3 HP	11 CFM
5 HP	18 CFM
7.5 HP	26 CFM
10 HP	35 CFM
15 HP	53 CFM
20 HP	70 CFM
25 HP	88 CFM

The air requirements for the Budget Air Hoists are as follows;

Series 2200	48 CFM @ 90 PSI
Series 6000	80 CFM @ 90 PSI

DATA, TABLES, FORMULAS																
Size of Hose, Coupled Each End In.	Gage Pressure at Line, lb	Friction of Air in Hose, Pulsating Flow*														
		Cu Ft Free Air per Min Passing Through 50-ft Lengths of Hose														
		20	30	40	50	60	70	80	90	100	110	120	130	140	150	
1/2	50	1.8	5.0	10.1	18.1											
	60	1.3	4.0	8.4	14.8	23.4										
	70	1.0	3.4	7.0	12.4	20.0	28.4									
	80	0.9	2.8	6	10.8	17.4	25.2	34.6								
	90	0.8	2.4	5.4	9.5	14.8	22.0	30.5	41.0							
	100	0.7	2.3	4.8	8.4	13.3	19.3	27.2	36.6							
	110	0.6	2.0	4.3	7.6	12.0	17.6	24.6	33.3	44.5						
3/4	50	0.4	0.8	1.5	2.4	3.5	4.4	6.5	8.5	11.4	14.2					
	60	0.3	0.6	1.2	1.9	2.8	3.8	5.2	6.8	8.6	11.2					
	70	0.2	0.5	0.9	1.5	2.3	3.2	4.2	5.5	7.0	8.8	11.0				
	80	0.2	0.5	0.8	1.3	1.9	2.8	3.6	4.7	5.8	7.2	8.8	10.6			
	90	0.2	0.4	0.7	1.1	1.6	2.3	3.1	4.0	5.0	6.2	7.5	9.0			
	100	0.2	0.4	0.6	1.0	1.4	2	2.7	3.5	4.4	5.4	6.6	7.9	9.4	11.1	
	110	0.1	0.3	0.5	0.9	1.3	1.8	2.4	3.1	3.9	4.9	5.9	7.1	8.4	9.9	
1	50	0.1	0.2	0.3	0.5	0.8	1.1	1.5	2.0	2.6	3.5	4.8	7.0			
	60	0.1	0.2	0.3	0.4	0.6	0.8	1.2	1.5	2.0	2.6	3.3	4.2	5.5	7.2	
	70	...	0.1	0.2	0.4	0.5	0.7	1.0	1.3	1.6	2.0	2.5	3.1	3.8	4.7	
	80	...	0.1	0.2	0.3	0.5	0.7	0.8	1.1	1.4	1.7	2.0	2.4	2.7	3.5	
	90	...	0.1	0.2	0.3	0.4	0.6	0.7	0.9	1.2	1.4	1.7	2.0	2.4	2.8	
	100	...	0.1	0.2	0.2	0.4	0.5	0.6	0.8	1.0	1.2	1.5	1.8	2.1	2.4	
	110	...	0.1	0.2	0.2	0.3	0.4	0.6	0.7	0.9	1.1	1.3	1.5	1.8	2.1	

\*For longer or shorter lengths of hose the friction loss is proportional to the length, i.e., for 25 ft one-half of the above; for 150 ft, three times the above, etc.

**DATA, TABLES, FORMULAS (continued)**

		Friction of Air in Hose, Pulsating Flow*														
		Cu Ft Free Air per Min Passing Through 50-ft Lengths of Hose														
Size of Hose, Coupled Each End In.	Gage Pressure at Line, lb	20	30	40	50	60	70	80	90	100	110	120	130	140	150	
		Loss of Pressure (psi) in 50-ft Lengths of Hose														
1 1/4	50	...	...	0.1	0.2	0.2	0.3	0.4	0.5	0.7	1.1					
	60	...	...	...	0.1	0.2	0.3	0.3	0.5	0.6	0.8	1.0	1.2	1.5		
	70	...	...	...	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.7	0.8	1.0	1.3	
	80	...	...	...	...	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	
	90	...	...	...	...	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	
	100	...	...	...	...	...	0.1	0.2	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.7
1 1/2	110	...	...	...	...	...	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.6	
	50	...	...	...	...	...	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.6	
	60	...	...	...	...	...	...	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.5	
	70	...	...	...	...	...	...	...	0.1	0.2	0.2	0.2	0.3	0.3	0.4	
	80	...	...	...	...	...	...	...	...	0.1	0.2	0.2	0.2	0.3	0.4	
	90	...	...	...	...	...	...	...	...	...	0.1	0.2	0.2	0.2	0.3	
	100	...	...	...	...	...	...	...	...	...	...	0.1	0.2	0.2	0.2	
	110	...	...	...	...	...	...	...	...	...	...	...	0.1	0.2	0.2	
		...	...	...	...	...	...	...	...	...	...	...	...	0.1	0.2	
		...	...	...	...	...	...	...	...	...	...	...	...	...	0.1	

\*For longer or shorter lengths of hose the friction loss is proportional to the length, i.e., for 25 ft one-half of the above; for 150 ft, three times the above, etc.

## LOSS OF AIR PRESSURE DUE TO FRICTION NOMINAL DIAMETER

CFM FREE AIR	1/2	3/4	1	1 1/4	1 1/2	2
10	1.00	.15	.04	.01		
20	3.97	.59	.17	.04	.02	
30	....	1.39	.39	.09	.04	
40	....	2.47	.69	.16	.07	.02
50	....	3.86	1.07	.25	.11	.03
60	....	5.55	1.54	.36	.16	.04
70	....	....	2.10	.49	.22	.06
80	....	....	2.74	.64	.28	.06
90	....	....	3.47	.80	.36	.08
100	....	....	4.28	1.00	.44	.12
125	....	....	4.62	1.24	.70	.18
150	....	....	....	2.24	.99	.26
175	....	....	....	3.08	1.34	.36
200	....	....	....	3.97	1.76	.47
250	....	....	....	....	2.75	.74
300	....	....	....	....	3.96	1.06
350	....	....	....	....	5.40	1.44
400	....	....	....	....	....	1.86
450	....	....	....	....	....	2.37
500	....	....	....	....	....	2.97

In PSI in 100 ft of pipe 60 lb. gage initial pressure

## LOSS OF AIR PRESSURE DUE TO FRICTION NOMINAL DIAMETER

CFM FREE AIR	1/2	3/4	1	1 1/4	1 1/2	2
10	.79	.12	.03			
20	3.14	.47	.14	.03		
30	7.08	1.09	.30	.07	.03	
40	....	1.95	.54	.13	.06	
50	....	3.05	.85	.20	.09	
60	....	4.38	1.22	.29	.12	.03
70	....	5.98	1.66	.39	.17	.05
80	....	7.82	2.16	.50	.22	.06
90	....	....	2.74	.64	.28	.08
100	....	....	3.38	.79	.37	.09
125	....	....	4.62	1.24	.55	.14
150	....	....	7.62	1.77	.78	.20
175	....	....	....	2.48	1.06	.29
200	....	....	....	3.14	1.39	.37
250	....	....	....	4.90	2.17	.58
300	....	....	....	7.06	3.12	.84
350	....	....	....	....	4.25	1.14
400	....	....	....	....	5.55	1.47
450	....	....	....	....	....	1.87
500	....	....	....	....	....	2.33

In PSI in 100 ft. of pipe 80 lb. gage initial pressure

## LOSS OF AIR PRESSURE DUE TO FRICTION NOMINAL DIAMETER

CFM FREE AIR	1/2	3/4	1	1 1/4	1 1/2	2
10	.65	.10	.03			
20	2.59	.39	.11	.03	.01	
30	5.85	.90	.25	.06	.03	
40	....	1.60	.45	.10	.05	
50	....	2.51	1.00	.16	.07	.02
60	....	3.62	1.00	.23	.11	.03
70	....	4.93	1.40	.32	.14	.04
80	....	6.45	1.78	.41	.18	.05
90	....	8.30	2.26	.52	.23	.06
100	....	....	2.79	.65	.29	.08
125	....	....	4.86	1.02	.45	.12
150	....	....	6.28	1.46	.64	.17
175	....	....	....	1.98	.88	.24
200	....	....	....	2.59	1.14	.31
250	....	....	....	4.04	1.79	.48
300	....	....	....	5.82	2.58	.69
350	....	....	....	....	3.51	.94
400	....	....	....	....	4.58	1.21
450	....	....	....	....	5.80	1.54
500	....	....	....	....	7.16	1.92

In PSI in 100 ft. of pipe 100 lb. gage initial pressure



## LOSS OF AIR PRESSURE DUE TO FRICTION NOMINAL DIAMETER

CFM FREE AIR	1/2	3/4	1	1 1/4	1 1/2	2
10	.54	.09	.03			
20	2.13	.33	.10	.03		
30	4.80	.75	.21	.05	.03	
40	....	1.32	.37	.09	.04	
50	....	2.06	.58	.14	.06	
60	....	2.97	.83	.19	.09	.03
70	....	4.05	1.12	.27	.12	.04
80	....	5.30	1.47	.35	.16	.04
90	....	6.80	1.86	.43	.19	.05
100	....	....	2.29	.53	.24	.06
125	....	....	3.99	.84	.37	.10
150	....	....	5.16	1.20	.53	.14
175	....	....	....	1.63	.72	.20
200	....	....	....	2.13	.94	.25
250	....	....	....	3.32	1.47	.40
300	....	....	....	4.73	2.12	.56
350	....	....	....	....	2.88	.77
400	....	....	....	....	3.76	1.00
450	....	....	....	....	4.77	1.27
500	....	....	....	....	5.88	1.57

In PSI in 100 ft. of pipe 125 lb. gage initial pressure

# BUDGIT 2200 SERIES AIR HOIST PERFORMANCE CHARTS

## 1/4 TON CAPACITY HOIST

LOAD	125 lbs.				250 lbs.				500 lbs.			
	UP		DOWN		UP		DOWN		UP		DOWN	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
0	0	0	5	8	0	0	15	40	0	0	25	65
60	35	70	30	75	30	65	35	85	20	50	40	95
70	40	75	30	80	35	70	35	85	25	60	40	95
80	40	80	35	80	35	75	35	85	30	60	40	95
90	40	80	35	80	35	80	35	85	30	65	40	95
100	40	80	35	80	40	80	35	85	30	65	40	95

## 1/2 TON CAPACITY HOIST

LOAD	250 lbs.				500 lbs.				1000 lbs.			
	UP		DOWN		UP		DOWN		UP		DOWN	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
0	0	0	15	40	0	0	25	65	0	0	45	125
60	30	65	35	85	20	50	40	95	0	20	45	125
70	35	70	35	85	25	60	40	95	0	30	50	120
80	35	75	35	85	30	60	40	95	10	40	55	120
90	35	80	35	85	30	65	40	95	15	45	55	120
100	40	80	35	85	30	65	40	95	20	50	55	120

## 1 TON CAPACITY HOIST

LOAD	500 lbs.				1000 lbs.				2000 lbs.			
	UP		DOWN		UP		DOWN		UP		DOWN	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
0	0	0	8	20	0	0	13	33	0	0	25	65
60	15	32	16	42	10	25	20	50	0	10	25	65
70	16	35	17	42	12	30	20	50	0	15	25	60
80	17	37	18	42	14	31	20	48	5	20	30	60
90	18	40	18	42	15	32	20	47	7	23	30	60
100	20	40	18	42	15	34	20	45	10	25	30	60

NOTE: Hoist Speeds are shown in feet per minute (f.p.m.)

# BUDGIT 6000 SERIES AIR HOIST PERFORMANCE CHARTS

## 1 TON CAPACITY HOIST

LOAD Air Pressure PSIG	500 lb.		1000 lb.		1500 lb.		2000 lb.		
	UP	DOWN (Max.)	UP	DOWN (Max.)	UP	DOWN (Max.)	UP	DOWN	
								Min.	Max.
60	40	36	33	36	28	36	20	25	36
70	43	39	36	39	31	39	24	28	39
80	47	42	39	42	34	42	28	32	42
90	50	47	42	47	38	47	30	36	47

## 2 TON CAPACITY HOIST

LOAD Air Pressure PSIG	1000 lb.		2000 lb.		3000 lb.		4000 lb.		
	UP	DOWN (Max.)	UP	DOWN (Max.)	UP	DOWN (Max.)	UP	DOWN	
								Min.	Max.
60	19	17	16	17	14	17	10	12	17
70	21	19	17	19	15	19	12	14	19
80	22	20	19	20	16	20	14	16	20
90	24	22	20	22	18	22	15	18	22

## 3 TON CAPACITY HOIST

LOAD Air Pressure PSIG	1500 lb.		3000 lb.		4500 lb.		6000 lb.		
	UP	DOWN (Max.)	UP	DOWN (Max.)	UP	DOWN (Max.)	UP	DOWN	
								Min.	Max.
60	13	11	11	11	9	11	6	8	11
70	14	12	12	12	10	12	8	9	12
80	15	13	13	13	11	13	9	10	13
90	16	14	14	14	12	14	10	11	14

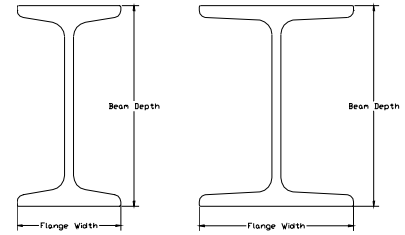
NOTE: Hoist Speeds are shown in feet per minute (f.p.m.)

# STANDARD I-BEAM SIZES

## Standard Beam Sizes

These charts show common standard beam sizes, weights and nominal flange widths for both American Standard Section "S" Shapes and Wide Flange Shapes (as listed by American Institute of Steel Construction). Wide Flange Shapes are W Shapes effective approximately September 1, 1978.

Always include beam sizes when ordering BUDGIT Trolleys and Trolley Hoists.



**American Standard I-Beams**

Flange Slope  
9° 27' - 44"  
Bevel 2 in 12

**Wide Flange Shapes**

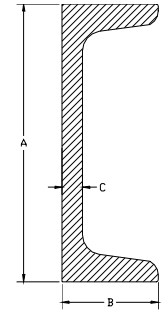
Flange Slope Varying  
0° Thru 5 Percent  
(5 Percent Slope)  
Is 2° 51' - 47"

AMERICAN STANDARD SECTIONS ("S" BEAMS)		WIDE FLANGE SECTIONS ("W" BEAMS)					
Designation (ins. & Lbs.)	Flange Width (ins.)	Designation (ins. & Lbs.)	Flange Width (ins.)	Designation (ins. & Lbs.)	Flange Width (ins.)	Designation (ins. & Lbs.)	Flange Width (ins.)
S4 X 7.7	2 5/8	W6 X 9	4	W12 X 14	4	W18 X 35	6
S4 X 9.5	2 3/4	W6 X 12	4	W12 X 16	4	W18 X 40	6
S5 X 10	3	W6 X 15	6	W12 X 19	4	W18 X 46	6
S5 X 14.75	3 1/4	W6 X 16	4	W12 X 22	4	W18 X 50	7 1/2
S6 X 12.5	3 3/8	W6 X 20	6	W12 X 26	6 1/2	W18 X 55	7 1/2
S6 X 17.25	3 5/8	W6 X 25	6	W12 X 30	6 1/2	W18 X 60	7 1/2
S7 X 15.3	3 5/8	W8 X 10	4	W12 X 35	6 1/2	W18 X 65	7 1/2
S7 X 20	3 7/8	W8 X 13	4	W12 X 40	8	W18 X 71	7 5/8
S8 X 18.4	4	W8 X 15	4	W12 X 45	8	W18 X 76	11
S8 X 23	4 1/8	W8 X 18	5 1/4	W12 X 50	8	W18 X 86	11
S10 X 25.4	4 5/8	W8 X 21	5 1/4	W12 X 53	10	W18 X 97	11 1/8
S10 X 35	5	W8 X 24	6 1/2	W12 X 58	10	W18 X 106	11 1/4
S 12 X 31.8	5	W8 X 28	6 1/2	W14 X 22	5	W18 X 119	11 1/4
S12 X 35	5 1/8	W8 X 31	8	W14 X 26	5	W21 X 44	6 1/2
S12 X 40.8	5 1/4	W8 X 35	8	W14 X 30	6 3/4	W21 X 50	6 1/2
S12 X 50	5 1/2	W8 X 40	8	W14 X 34	6 3/4	W21 X 57	6 1/2
S15 X 42.9	5 1/2	W8 X 48	8 1/8	W14 X 38	6 3/4	W21 X 62	8 1/4
S15 X 50	5 5/8	W8 X 58	8 1/4	W14 X 43	8	W21 X 68	8 1/4
S18 X 54.7	6	W8 X 67	8 1/4	W14 X 48	8	W21 X 73	8 1/4
S18 X 70	6 1/4	W10 X 12	4	W14 X 53	8	W21 X 83	8 1/4
S20 X 66	6 1/4	W10 X 15	4	W14 X 61	10	W24 X 55	7
S20 X 75	6 3/8	W10 X 17	4	W14 X 68	10	W24 X 62	7
S20 X 85	7	W10 X 19	4	W14 X 74	10	W24 X 68	9
S20 X 95	7 1/4	W10 X 22	5 3/4	W14 X 82	10 1/8	W24 X 76	9
S24 X 80	7	W10 X 26	5 3/4	W16 X 26	5 1/2	W24 X 84	9
S24 X 90	7 1/8	W10 X 30	5 7/8	W16 X 31	5 1/2	W24 X 94	9
S24 X 100	7 1/4	W10 X 33	8	W16 X 36	7	W27 X 84	10
S24 X 106	7 7/8	W10 X 39	8	W16 X 40	7	W27 X 94	10
S24 X 120	8	W10 X 45	8	W16 X 45	7	W27 X 102	10
		W10 X 54	10	W16 X 50	7	W27 X 114	10
		W10 X 60	10	W16 X 57	7 1/8	W30 X 108	10 1/2
		W10 X 68	10 1/8	W16 X 67	10 1/4	W30 X 116	10 1/2
		W10 X 77	10 1/4	W16 X 77	10 1/4	W30 X 124	10 1/2
		W10 X 88	10 1/4	W16 X 89	10 3/8	W30 X 132	10 1/2
		W10 X 100	10 3/8	W16 X 100	10 3/4		
		W10 X 112	10 1/2				

# CHANNELS

## STANDARD STRUCTURAL

A Depth in Inches	Weight Lbs. per Foot	B Flange Width Inches	C Web Thickness Inches
3	4.1	1.410	.170
	5.0	1.498	.258
	6.0	1.596	.356
4	5.4	1.580	.180
	6.25	1.647	.247
	7.25	1.720	.320
5	6.7	1.750	.190
	9.0	1.885	.325
6	8.2	1.920	.200
	10.5	2.034	.314
	13.0	2.157	.437
7	9.8	2.090	.210
	12.25	2.194	.314
	14.75	2.299	.419
8	8.5	1.875	.180
	11.5	2.260	.220
	13.75	2.343	.303
	18.75	2.527	.487
9	13.4	2.430	.230
	15.0	2.485	.285
	20.0	2.648	.448
10	15.3	2.600	.240
	20.0	2.739	.379
	25.0	2.886	.526
	30.0	3.033	.673
12	20.7	2.940	.280
	25.0	3.047	.387
	30.0	3.170	.510
13	33.9	3.400	.400
	40.0	3.520	.520
	50.0	3.716	.716



# METRIC CONVERSION FACTORS

## English to Metric

<b>Multiply</b>	<b>By</b>	<b>To Obtain</b>
Pounds (avoirdupois)	.45359	Kilograms
Net Tons (2000 Lbs.)	.90718	Metric Tons
Gross Tons (2240 Lbs.)	1.01605	Metric Tons
Inches	25.4001	Millimeters
Feet	.304801	Meters
Yards	.914402	Meters
Miles (statute)	1.60935	Kilometers
Square Inches	6.45163	Sq. Centimeters
Square Feet	.092903	Square Meters
Pounds per Lineal Ft.	1.48816	Kilograms per Lineal Meter
Pounds per Sq. Inch	.07031	Kilograms per Sq. Centimeter
Pounds per Sq. Ft.	4.88241	Kilograms per Sq. Meter
Pounds per Cu. Foot	16.01837	Kilograms per Cu. Meter

## Metric To English

Kilograms	2.20462	Lbs. (avoirdupois)
*Metric Tons	1.10231	Net Tons 2000 Pounds
*Metric Tons	.98421	Gross Tons 2240 Pounds
Millimeters	.03937	Inches
Meters	3.280833	Feet
Meters	1.09361	Yards
Kilometers	.62137	Miles (statute)
Square Centimeters	.155	Square Inches
Square Meters	10.76387	Square Feet
Kilograms per Linear Meter	.67197	Lbs. per Lineal Ft.
Kilograms per Sq. Centimeter	14.2234	Pounds per Sq. In.
Kilograms per Square Meter	.20482	Pounds per Sq. Ft.
Kilograms per Cubic Meter	.06243	Pounds per Cu. Ft.

NOTE: Length, width and cube denote meters  
Mass and weight denote Grams  
Capacity denotes liters

\*One Metric Ton = 2204.62 Lbs.

## Abbreviations

Kilometer	- km	Kilogram	- kg
Meter	- m	Gram	- g or gm
Centimeter	- cm	Centigram	- cg
Millimeter	- mm	Milligram	- mg

## TERMS & DEFINITIONS

**Abnormal Operating Conditions** – environmental conditions that are unfavorable, harmful, or detrimental to or for the operation of a hoist, such as excessively high or low ambient temperatures, exposure to weather, corrosive fumes, dust laden or moisture laden atmospheres, and hazardous locations.

**Appointed** – assigned specific responsibilities by the employer or the employer's representative.

**Authorized** – appointed by a duly constituted administrative or regulatory authority.

**Brake** – a device, other than a motor, used for retarding or stopping motion by friction or power means

**Brake, Mechanical Load** – an automatic type of friction brake used for controlling loads in a lowering direction. This unidirectional device requires torque from the motor or hand chain wheel to lower a load but does not impose any additional load on the motor or hand chain wheel when lifting a load.

**Braking, Dynamic** – a method of controlling speed by using the motor as a generator, with the energy being dissipated by resistance.

**Braking, Eddy Current** – a method of controlling or reducing speed by means of an energy induction load brake.

**Braking, Mechanical** – a method of controlling or reducing speed by friction.

**Braking, Pneumatic** – a method of controlling or powering a drive or brake by means of a compressed gas.

**Braking, Regenerative** – a method of controlling speed in which the electrical energy generated by the motor is fed back into the power system.

**Bridge** – that part of an overhead crane, consisting of one girder, trucks, and (if applicable) drive mechanism, which carries the trolley or trolleys.

**Bridge Girder** – a crane member of which carriers or trolleys travel horizontally, mounted between and supported by the end trucks.

**Bridge Travel** – the crane movement in a direction parallel to the crane runway.

**Bumper** – a device for reducing impact when a moving crane or trolley reaches the end of its permitted travel, or when two moving cranes or trolleys come into contact. This device may be attached to the bridge, trolley, or runway stop.

**Chain, Hand** – the chain grasped by a person to apply force required for the lifting or lowering motion.

**Chain, Load** – the load-bearing chain in a hoist.

**Chain, Roller** – a series of alternately assembled roller links and pin links in which the pins articulate inside the bushings and the rollers are free to turn on the bushings. Pins and bushings are press fit in their respective link plates.

**Chain, Welded Link** – a chain consisting of a series of interwoven links formed and welded.

**Clearance** – the distance from any part of the crane to the nearest obstruction.

**Collectors, Current** – contacting devices for conducting current from runway or bridge conductors.

**Conductors, Bridge** – the electrical conductors located along the bridge structure of the crane that transmit control signals and power to the trolley(s).

## TERMS & DEFINITIONS

(Continued)

**Conductors, Runway (Main)** – the electrical conductors located along a crane runway that transmit control signals and power to the crane.

**Control Panel** – an assembly of components (magnetic, static, hydraulic, pneumatic, etc.) which governs the flow of power to or from a motor or other equipment in response to signals from a master switch, push button station, remote control, automatic program control, etc.

**Crane** – a machine for lifting and lowering a load, and moving it horizontally. Cranes, whether fixed or mobile, are driven manually, by power, or by a combination of both.

**Crane, Cantilever Gantry** – a gantry or semigantry crane in which the bridge girders or trusses extend transversely beyond the crane runway on one or both sides.

**Crane, Floor Operated** – a crane that is controlled by a means suspended from the crane, operated by a person on the floor or on an independent platform.

**Crane, Gantry** – a crane similar to an overhead crane, except that the bridge for carrying the trolley or trolleys is rigidly supported on two or more legs running on fixed rails or other runway.

**Crane, Manually Operated** – a crane whose hoist mechanism is drive by pulling an endless chain or whose travel mechanism is driven in the same manner or by manually moving the load.

**Crane, Overhead** – a crane with a movable bridge carrying a movable or fixed hoisting mechanism and traveling on an overhead, fixed runway structure.

**Crane, Power-Operated** – a crane whose mechanism is driven by electric, pneumatic, hydraulic, or internal combustion means.

**Crane, Semigantry** – a gantry crane with one end of the bridge rigidly supported on one or more legs that run on a fixed rail or runway, the other end of the bridge being supported by an end truck running on an elevated rail or runway.

**Crane Service, Normal** – that service which involves operation with randomly distributed loads within the rated load limit, or with uniform loads of less than 65% of the rated load, for no more than 15% of the time of a single work shift for manually operated cranes and 25% of the time of a single work shift for electrically or pneumatically powered cranes.

**Crane Service, Heavy** – that service which involves operation within the rated load limit which exceeds normal service.

**Crane Service, Severe** – that service which involves normal or heavy service with abnormal operating conditions.

**Crane Service, Standby** – a crane which is not regular service but which is used occasionally or intermittently as required.

**Designated** – selected or assigned by the employer or the employer's representative as being competent to perform specific duties.

**Drift Point** – a point on a travel motion master switch or on a manual controller that maintains the brake released while the motor is not energized. This allows for coasting.

**End Truck** – the assembly consisting of the frame and wheels which support the crane girder and allow movement along the runway.

**Guide, Chain** – a means to guide the load chain at the load sprocket.



# TERMS & DEFINITIONS

## (Continued)

**Hazardous (Classified) Locations** – Locations where fire or explosion hazards may exist. Locations are classified depending on the properties of the flammable vapors, liquids or gases, or combustible dusts or fibers which may be present and the likelihood that a flammable or combustible concentration or quantity is present.

**Class 1 Locations** – locations in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

**Class 2 Locations** – locations that are hazardous because of the presence of combustible dust.

**Class 3 Locations** – locations that are hazardous because of the presence of easily ignitable fibers or flyings, but in which such fibers or flyings are not likely to be in suspension in the air quantities sufficient to produce ignitable mixtures.

**Headroom** – the distance from the bottom of the beam or top of the hoist to the saddle hook in its highest position.

**Hoist** – a suspended machinery unit that is used for lifting or lowering a freely suspended (unguided) load.

**Hoist, Auxiliary** – a supplemental hoisting unit, usually of lower load rating and higher speed than the main hoist.

**Hoist Motion** – that motion which lifts or lowers a load.

**Limit Device** – a device which is operated by some part or motion of a power driven hoist to limit motion.

**Lifting Devices** – devices which are not reeved onto the hoist rope or chain, such as hooks on buckets, magnets, grabs, and other supplemental devices used for ease of handling certain types of loads. The weight of these devices is to be considered part of the rated load.

**Load** – the total superimposed weight on the load block or hook.

**Load Block** – the assembly of hook or shackle, swivel, bearing, sheaves, sprockets, pins, and frame suspended by the hoisting rope or load chain. This shall include any appurtenances reeved in the hoisting rope or load chain.

**Load Rated** – the maximum load for which a hoist is designated by the manufacturer or qualified person.

**Load Suspension Parts** – the load suspension parts of the hoist are the means of suspension (hook or lug), the structure or housing which supports the drum or load sprocket, the rope or load chain, the sheaves or sprockets, and the load block or hook.

**Normal Operating Conditions** – conditions during which a hoist is performing functions within the scope of the original design.

**Overload** – any load greater than the rated load.

**Overtravel Restraint** – a device used to prevent the slack load chain from inadvertently being lowered out of the load sprocket.

**Parts (Lines)** – number of lines of rope or chain supporting the load block or hook.

**Pawl** – a device for holding the machinery against undesired rotation by engaging a ratchet.

**Pendant Station** – controls suspended from the hoist for operating the unit from the floor.

**Power Transmission Parts** – the machinery components including the gears, shafts, clutches, couplings, bearings, motors, and brakes.

## TERMS & DEFINITIONS (Continued)

**Qualified Person** – a person who, by possession of a recognized degree or certificate of professional standing, or who, by extensive knowledge, training, and experience, as successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work.

**Rail Sweep** – a device attached to the crane and located in front of the crane's leading wheels to push aside loose obstruction.

**Ratchet** – a toothed member for engagement with the pawl.

**Reeving** – a system in which a rope or chain travels around drums, sheaves, or sprockets.

**Runway** – an assembly of rails, beams, girders, brackets, and framework on which the crane travels.

**Service, Normal** – that distributed service which involves operation with randomly distributed loads within the rated load limit, or uniform loads less than 65% of rated load for not more than 15% of the time for manually operated hoists, and 25% of the time for electric or air-powered hoists.

**Service, Heavy** – that service which involves operation within the rated load limit which exceeds normal service.

**Service, Severe** – that service which involves normal or heavy service with abnormal operating conditions.

**Sheave** – a grooved wheel or pulley used with a rope or chain to change direction and point of application of pulling force.

**Side Pull** – the component of the hoist pull acting horizontally when the hoist lines are not operated vertically.

**Span** – the horizontal distance, center to center, between runway rails.

**Sprocket, Idler** – a freely rotation device that changes the direction of the load chain.

**Sprocket, Load** – a hoist component that transmits motion to the load chain. This component is sometimes called load wheel, load sheave, pocket wheel or chain wheel.

**Stop** – a device to limit travel of a trolley or crane bridge. This device normally is attached to a fixed structure and normally does not have energy absorbing ability.

**Switch** – a device for making, breaking, or changing the connections in an electric, hydraulic, or pneumatic circuit.

**Switch, Limit** – a device that is actuated by the motion of a part of a power-driven machine or equipment to alter or disconnect the electric, hydraulic, or pneumatic circuit associated with the machine or equipment.

**Top Running** – to run on top of the bridge beams or runway beams.

**Trolley** – the unit which travels on the bottom flange of the bridge girder and carries the hoist.

**Trolley Travel** – the trolley movement in directions at right angles to the crane runway.

**Unattended** – a condition in which the operator of a hoist is not at the operating control devices (pendant station or hand chain). However, if the control devices are within an unobstructed distance of 26 ft. (8.0 m) and within sight of the operator, the hoist should be considered attended.

**Under Hung** – to ride on the lower flange of the runway beams or bridge beam.

**Wheel, Hand Chain** – a wheel with formed pockets on its periphery to allow torque to be transmitted when a force is applied to the hand chain.

# INSPECTIONS & MAINTENANCE

## RECOMMENDED HOIST MAINTENANCE AND INSPECTION

**Daily or start of each shift** — Check operation of all functional mechanisms including limit switch operation, brakes, & control. Check hoist load chain for gouges, nicks, weld spatter, corrosion, distorted links, or twists in the chain. Inspect hooks, upper and lower blocks, hook latches, and all load bearing components for signs of damage.

### FOLLOW INSPECTION GUIDELINES IN REPAIR MANUAL & ANSI B30.16 INSPECTION PROCEDURES

#### HOISTS

Lubricate Load Chain Frequently

Lubricate Upper Hook & Lower Block Assembly

Lubricate Limit Lever Control Shaft Gears

Change Gear Case Oil – Electric & 6000 Series Air Hoist 1-½ pints Dexron II Automatic Transmission Fluid required

Check & drain air line filters daily — Air Hoists only

Check & fill air line lubricators daily — Air Hoists only

#### TROLLEYS

Check for proper Trolley spacing on beams

Drive wheel gears are to be lubricated with an open type gear grease

Change gear case oil on gear reducers on powered trolleys, if needed drain and replace with a 90 wt. gear oil

## HAND CHAIN OPERATED HOISTS

### INSPECTION SCHEDULE AND MAINTENANCE REPORT

HOIST SERIAL NO. (MFGRS) \_\_\_\_\_  
 RATED LOAD \_\_\_\_\_  
 TYPE \_\_\_\_\_

CUSTOMER HOIST IDENTITY NO. \_\_\_\_\_  
 LOCATION IN PLANT \_\_\_\_\_  
 THIS INSPECTION IS    MONTHLY     ANNUAL   
    SEMI-ANNUAL   
 INSPECTED BY \_\_\_\_\_ DATE \_\_\_\_\_

COMPONENT, UNIT OR PART and location on hoist		*Recommended Inspection Interval			CONDITION (Check column best indicating condition when part or unit is inspected. Use note column to the right if condition is not listed below.)							CORRECTIVE ACTION NOTES
LOCATION	COMPONENT, UNIT OR PART	MONTHLY	SEMIANNUAL	ANNUAL	GOOD	ADJUSTMENT REQUIRED	REPAIR REQUIRED (Loose Parts or Wires)	REPLACEMENT REQUIRED (Worn or Damaged)	LUBRICATION REQ. (Low Oil or Grease Rust or Corrosion)	CLEANING OR PAINTING REQUIRED	(Indicate corrective action taken during inspection and note date. For corrective action to be done after inspection, a designated person must determine that the existing deficiency does not constitute a safety hazard before allowing unit to operate. When corrective action is completed, describe and note date in this column.)	DATE
HOIST	Motor	○										
	Motor Brake	○										
	Mechanical Load Brake	○										
	Overload Clutch	○									If so equipped	
	Hook Latch Operation	○										
	Gears, Shafts & Bearings	○										
	Upper Block & Hook	○										
	Lower Block & Idler Sprockets	○										
	Hook & Throat Opening	●			X						Record Hook Throat Opening	
	Load Chain	○									In Accordance with ANSI B30.16	
	Load Sprocket		○									
	Guards		○									
	Limit Switch	○										
Load Chain Reeving	○											
CONTROL STATION OR PUSHBUTTON	Pushbutton		○									
	Air Hose	○										
	Pendant Throttle	○										
	Wiring		○									
TROLLEY	Motor	○										
	Brake (when so equipped)	○										
	Gears, Shafts & Bearings	○										
	Frame			○								
	Wheels		○									
	Wheel Spacing on Beam	○									In Accordance with Manufacture Specs.	
	Bumpers		○									
	Guards		○									
	Hand Chain & Wheel	○										
	Conductors	○										
Collectors	○											
AIR SYSTEM	Air Lines & Valves	○										
	Filters	○									Drained (daily)	
	Lubricators	○									Filled (when needed)	
	Regulators	○										
RUNWAYS	Monorail Joints		○									
	Monorail		○									
	Main Conductors	○										
	Main Collectors	○										
MISC.	General Condition		○									
	Load Attachment Chains	●										
	Rope Slings & Connections	●										
	Change Gearcase Lub.			○								
	Grounding Faults		○									
	Req. Warning Labels	○										
Grease Wheels			○							If equipped with grease fitting on axles		

\*See text for DAILY & WEEKLY REQUIREMENTS  
 ○ INSPECTION INTERVAL

● SIGNED & DATED REPORT REQUIRED - OSHA  
 X MAGNETIC PARTICLE OR EQUIVALENT EXAMINATION REQUIRED.

## HAND CHAIN OPERATED HOISTS

### INSPECTION SCHEDULE AND MAINTENANCE REPORT

HOIST SERIAL NO. (MFGRS) \_\_\_\_\_  
 RATED LOAD \_\_\_\_\_  
 TYPE \_\_\_\_\_

CUSTOMER HOIST IDENTITY NO. \_\_\_\_\_  
 LOCATION IN PLANT \_\_\_\_\_  
 THIS INSPECTION IS    MONTHLY     ANNUAL   
    SEMI-ANNUAL   
 INSPECTED BY \_\_\_\_\_ DATE \_\_\_\_\_

COMPONENT, UNIT OR PART and location on hoist		*Recommended Inspection Interval			CONDITION <small>(Check column best indicating condition when part or unit is inspected. Use note column to the right if condition is not listed below.)</small>						CORRECTIVE ACTION NOTES
LOCATION	COMPONENT, UNIT OR PART	MONTHLY	SEMIANNUAL	ANNUAL	GOOD	ADJUSTMENT REQUIRED	REPAIR REQUIRED (Loose Parts or Wires)	REPLACEMENT REQUIRED (Worn or Damaged)	LUBRICATION REQ. (Low Oil or Grease Rust or Corrosion)	CLEANING OR PAINTING REQUIRED	(Indicate corrective action taken during inspection and note date. For corrective action to be done after inspection, a designated person must determine that the existing deficiency does not constitute a safety hazard before allowing unit to operate. When corrective action is completed, describe and note date in this column.)
HOIST	Load Brake	○									
	Overload Clutch	○									If so equipped
	Gears, Shafts & Bearings	○									
	Upper Block & Hook	○									
	Lower Block & Idler Sprockets	○									
	Hook & Throat Opening	●			X						Record Hook Throat Opening
	Hook Latch Operation	○									
	Hand Chain & Wheel		○								
	Guards		○								
	Load Chain	○									In Accordance with ANSI B30.16
	Capacity Labels	○									
	Load Chain Reeving	○									
TROLLEY	Hand Chain & Wheel	○									
	Loose Nuts & Bolts		○								
	Gears, Shafts & Bearings	○									
	Frame			○							
	Bumpers		○								
	Guards		○								
	Wheels		○								
	Wheel Spacing on Beam	○									In Accordance with Manufacture Specs.
Grease Wheels			○							If equipped with Grease fittings on Axles	
RUN-WAYS	Monorail Joints		○								
	Monorail		○								
MISC.	General Condition		○								
	Load Attachment Chains	●									
	Rope Slings & Connections	●									
	Req. Warning Labels	○									

\*See text for DAILY & WEEKLY REQUIREMENTS  
 ○ INSPECTION INTERVAL

● SIGNED & DATED REPORT REQUIRED - OSHA  
 X MAGNETIC PARTICLE OR EQUIVALENT EXAMINATION REQUIRED.

# MANGUARD ELECTRIC CHAIN HOIST

## TROUBLE SHOOTING

Trouble	Cause May Be	Remedy
1. Hoist Will Not Operate.	<p>a. No power to hoist.</p> <p>b. Wrong voltage.</p> <p>c. No control voltage.</p> <p>d. Loose or broken wire connections in hoist electrical system.</p> <p>e. Contactor assembly not functioning.</p> <p>f. Starting switch burnes out (single phase motor).</p> <p>g. Motor burned out</p>	<p>a. Check switches, circuit breakers and connections in power supply lines. Check power collectors</p> <p>b. Check voltage required on motor data plate against power supply.</p> <p>c. Check transformer fuse. If blown, check for grounding and/or short in the push button station. Check the transformer coils 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.</p> <p>d. Shut off power supply, remove electrical cover from hoist and check wiring connections. Also check connections in push button station and limit switches.</p> <p>e. Check for burned out solenoid coil. See that necessary jumper wires are properly installed.</p> <p>f. Replace burned out parts.</p> <p>g. Replace motor. On single-phase motors the starting switch may be burned out.</p>
2. Hook Moves in Wrong Direction.	<p>a. Reverse phasing on three-phase hoists.</p> <p>b. Hoist wired wrong.</p> <p>c. Starting switch not working correctly (single phase motor).</p>	<p>a. Interchange any two of three power supply line leads. Do not change green ground lead.</p> <p>b. Check wiring connections with appropriate wiring diagram.</p> <p>c. Check for correct starting switch part number and function. Replace if necessary.</p>
3. Hook Will Raise But Not Lower.	<p>a. "DOWN" electrical circuit open</p> <p>b. Contactor assembly not functioning.</p> <p>c. Push button inoperative.</p> <p>d. Load brake locked up and overload clutch slipping.</p>	<p>a. Check for loose connections. See that necessary jumper wires are properly installed on contactor. Check limit switch condition and electrical conditions.</p> <p>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.</p> <p>c. Check push button contacts and wires.</p> <p>d. Consult Authorized BUDGIT Hoist Repair Station.</p>

WHEN SERVICING OR REPAIRING A BUDGIT HOIST, ALWAYS REFER TO THE CORRECT BUDGIT REPAIR MANUAL FOR COMPLETE INSTRUCTIONS ON SERVICING & REPAIRING OF THE HOIST, OR CONSULT AN AUTHORIZED BUDGIT HOIST REPAIR STATION.

# MANGUARD ELECTRIC CHAIN HOIST

## TROUBLE SHOOTING

Trouble	Cause May Be	Remedy
1. Hook Will Lower But Not Raise.	<ul style="list-style-type: none"> <li>a. Excessive Load, causing overload clutch to slip.</li> <li>b. Overload clutch out of adjustment.</li> <li>c. "UP" electrical circuit open.</li> <li>d. Contactor assembly not functioning.</li> <li>e. Push button inoperative</li> </ul>	<ul style="list-style-type: none"> <li>a. Reduce loading to rated load of hoist, as shown on nameplate.</li> <li>b. Test hoist and replace clutch if hoist will not lift rated load.</li> <li>c. Check for loose connections. See that necessary jumper wires are properly installed on contactor. Check limit switch condition and electrical connections.</li> <li>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.</li> <li>e. Check push button contacts and wires.</li> </ul>
2. Hoist Will Not Lift Rated Load.	<ul style="list-style-type: none"> <li>a. Low voltage.</li> <li>b. Overload clutch out of adjustment.</li> <li>c. Motor brake not releasing.</li> </ul>	<ul style="list-style-type: none"> <li>a. See that power supply is same voltage listed on motor data plate. Check size of power supply lines.</li> <li>b. Remove and replace clutch assembly.</li> <li>c. Check brake components.</li> </ul>
3. Excessive Drift When Stopping.	<ul style="list-style-type: none"> <li>a. Excessive load.</li> <li>b. Motor brake not holding.</li> <li>c. Load brake not holding.</li> </ul>	<ul style="list-style-type: none"> <li>a. Reduce loading to rated load, shown on nameplate.</li> <li>b. Check brake components.</li> <li>c. Remove load brake and inspect parts.</li> </ul>
4. Hoist Motor Overheats.	<ul style="list-style-type: none"> <li>a. Excessive load.</li> <li>b. Excessive duty-cycle.</li> <li>c. Excessive "jogging".</li> <li>d. Wrong Voltage.</li> <li>e. Starting switch on single-phase motors not opening starting winding.</li> <li>f. Damaged motor or worn bearings in motor or hoist frame.</li> <li>g. Motor brake not releasing.</li> </ul>	<ul style="list-style-type: none"> <li>a. Reduce loading to rated load of hoist, shown on nameplate.</li> <li>b. Reduce frequency of lifts.</li> <li>c. Reduce frequency of jogs.</li> <li>d. Check voltage rating on motor data plate against power supply.</li> <li>e. Inspect switch.</li> <li>f. Disassemble hoist and inspect for worn or damaged parts.</li> <li>g. Check brake components.</li> </ul>

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## 2200 SERIES AIR CHAIN HOIST TROUBLE SHOOTING

Trouble	Cause May Be	Remedy
1. Hoist does not operate.	<ul style="list-style-type: none"> <li>a. Insufficient air pressure at source.</li> <li>b. Brake improperly adjusted.</li> <li>c. Clogged air intake screen.</li> <li>d. Excessive Overload.</li> <li>e. Clogged valve.</li> <li>f. Valve shifter not functioning.</li> <li>g. Motor failure.</li> </ul>	<ul style="list-style-type: none"> <li>a. Check air pressure and adjustment.</li> <li>b. Adjust brake.</li> <li>c. Shut off air - disconnect air hose - clean inlet swivel screen.</li> <li>d. Reduce load.</li> <li>e. Remove valve caps - remove any obstructions, clean and lubricate valve.</li> <li>f. Check for proper installation of drive pin in valve shifter and control lever and also that shifter pin is assembled solidly to throttle valve.</li> <li>g. Disassemble motor and check rotor blades. Replace defective parts.</li> </ul>
2. Hoist will not hold load in suspension.	<ul style="list-style-type: none"> <li>a. Brake out of adjustment.</li> <li>b. Brake lining oily, glazed or badly worn.</li> <li>c. Excessive overload.</li> </ul>	<ul style="list-style-type: none"> <li>a. Adjust brake.</li> <li>b. Remove brake arms and replace with new.</li> <li>c. Reduce load</li> </ul>
3. Control lever does not return to horizontal position.	<ul style="list-style-type: none"> <li>a. Control shaft bent.</li> <li>b. Foreign material, rust or corrosion causing it to bind.</li> <li>c. Foreign material, rust or corrosion in control cylinders or pendant throttle control.</li> <li>d. Brake improperly adjusted.</li> </ul>	<ul style="list-style-type: none"> <li>a. Remove shaft and straighten or replace.</li> <li>b. Remove shaft and clean. Lubricate bearings, brake cam and valve shifter.</li> <li>c. Clean control cylinders.</li> <li>d. Adjust brake.</li> </ul>
4. Hoist loses power.	<ul style="list-style-type: none"> <li>a. Insufficient air pressure.</li> <li>b. Clogged air intake screen.</li> <li>c. Clogged muffler screen.</li> <li>d. Worn or broken rotor blades.</li> </ul>	<ul style="list-style-type: none"> <li>a. Check air pressure and adjust.</li> <li>b. See this section, paragraph 1.</li> <li>c. Remove throttle valve housing. Clean screen and muffler.</li> <li>d. Replace rotor blades.</li> </ul>

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## 2200 SERIES AIR CHAIN HOIST TROUBLE SHOOTING

Trouble	Cause May Be	Remedy
1. Cannot regulate speed by control handles.	<ul style="list-style-type: none"> <li>a. Brake improperly adjusted.</li> <li>b. Speed adjustment screws improperly set.</li> </ul>	<ul style="list-style-type: none"> <li>a. Adjust Brake.</li> <li>b. Readjust screws.</li> </ul>
2. Cannot regulate speed by pendant handle.	<ul style="list-style-type: none"> <li>a. Brake improperly adjusted.</li> <li>b. Control cylinders improperly adjusted.</li> </ul>	<ul style="list-style-type: none"> <li>a. Adjust brake.</li> <li>b. Adjust control cylinder set screws.</li> </ul>
3. Hoist lifting or lowering speed differs from rated speed at full load.	<ul style="list-style-type: none"> <li>a. Valve shifter or control shaft bent or damaged.</li> <li>b. Incorrect air pressure or inadequate air supply.</li> <li>c. Speed adjustment screws improperly set.</li> <li>d. Loss of power.</li> <li>e. Set screw in control cylinder is improperly set.</li> </ul>	<ul style="list-style-type: none"> <li>a. Repair or install new parts, and lubricate.</li> <li>b. Check pressure near hoist when hoist is operating.</li> <li>c. Readjust screws.</li> <li>d. See paragraph 4</li> <li>e. Screw set screw all of the way in, then back of screw about 1/2 to 1 turn.</li> </ul>

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## 6000 SERIES AIR CHAIN HOIST TROUBLE SHOOTING

Trouble	Cause May Be	Remedy
1. Hoist does not operate.	<ul style="list-style-type: none"> <li>a. Insufficient air pressure at source.</li> <li>b. Insufficient air supply at hoist.</li> <li>c. Clogged air intake.</li> <li>d. Excessive overload.</li> <li>e. Clogged valve — pendant throttle control.</li> <li>f. Clogged or Inoperative valve — supply head assembly.</li> <li>g. Motor failure.</li> </ul>	<ul style="list-style-type: none"> <li>a. Check air pressure and adjust.</li> <li>b. Use correct size supply hose.</li> <li>c. Shut off air — disconnect air hose — clean air filter.</li> <li>d. Reduce loading to rated capacity of hoist, as shown on nameplate.</li> <li>e. Disassemble and check pendant throttle control.</li> <li>f. Disassemble and check supply head assembly.</li> <li>g. Disassemble motor and check rotor vanes and springs. Replace defective parts.</li> </ul>
2. Hoist will not hold load in suspension.	<ul style="list-style-type: none"> <li>a. Load brake not holding.</li> </ul>	<ul style="list-style-type: none"> <li>a. Remove load brake and inspect parts.</li> </ul>
3. Hoist will raise but not lower.	<ul style="list-style-type: none"> <li>a. Load brake locked up and overload clutch slipping (Caused by excessive overload).</li> </ul>	<ul style="list-style-type: none"> <li>a. Consult Authorized BUDGIT Hoist Repair Station.</li> </ul>
4. Hoist loses power.	<ul style="list-style-type: none"> <li>a. Insufficient air pressure.</li> <li>b. Clogged air intake.</li> <li>c. Clogged muffler (Iced).</li> <li>d. Worn or broken rotor vanes, springs, or pins.</li> </ul>	<ul style="list-style-type: none"> <li>a. Check air pressure and adjust.</li> <li>b. See this Section, Paragraph 1.</li> <li>c. Remove muffler cover. Clean screen and muffler. Reduce frequency of lift to prevent icing.</li> <li>d. Replace rotor vanes, springs and pins.</li> </ul>
5. Cannot regulate speed by control handles.	<ul style="list-style-type: none"> <li>a. Clogged valve — Pendant throttle control.</li> </ul>	<ul style="list-style-type: none"> <li>a. See this Section, Paragraph 1.</li> </ul>
6. Hoist lifting or lowering speed differs from rated speed at full load.	<ul style="list-style-type: none"> <li>a. Incorrect air pressure or inadequate air supply.</li> <li>b. Loss of power.</li> </ul>	<ul style="list-style-type: none"> <li>a. Check pressure at hoist when hoist is operating.</li> <li>b. See this Section, Paragraph 4.</li> </ul>

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# BUDGIT USA MANUAL CHAIN HOIST

## TROUBLE SHOOTING

Trouble	Cause May Be	Remedy
1. Hoist is hard to operate in hoisting direction.	<ul style="list-style-type: none"> <li>a. Hoist is overloaded.</li> <li>b. Load chain is damaged, worn, elongated or binding between load chain sprocket and guide.</li> <li>c. Load chain dry, rusty corroded or dirty with foreign material adhering to chain.</li> <li>d. Load chain sprocket worn or clogged with foreign material.</li> <li>e. Chain twisted.</li> </ul>	<ul style="list-style-type: none"> <li>a. Reduce load to within rated hoist capacity Hoist should be dismantled and thoroughly inspected for additional damage from overloading.</li> <li>b. Check chain for bent or twisted links, gouges or nicks. Check for wear between links and gauge chain. Replace if necessary.</li> <li>c. Clean chain by tumble polishing or clean with solvent.</li> <li>d. Clean and inspect sprocket. Replace if necessary.</li> <li>e. Rereeve chain hoist keeping chain free of twist.</li> </ul>
2. Load brake slips and chain hoist will not support load.	<ul style="list-style-type: none"> <li>a. Brake friction surfaces coated with excessive oil or friction washers glazed.</li> <li>b. Brake parts worn or damaged.</li> <li>c. Load chain reeved incorrectly</li> <li>d. Brake pawl hangs up.</li> </ul>	<ul style="list-style-type: none"> <li>a. Remove and disassemble load brake. Clean and buff friction washers or install new washers.</li> <li>b. Remove brake parts. Inspect brake parts. Replace worn or damaged parts.</li> <li>c. Remove load chain and install correctly.</li> <li>d. Check brake pawl engagement and brake pawl spring.</li> </ul>
3. Load brake drags, hard to lower load. (Hand chain is hard to pull).	<ul style="list-style-type: none"> <li>a. Dirty or corroded internal parts.</li> <li>b. Brake friction surfaces scored.</li> <li>c. Load gearing damaged from overloading.</li> <li>d. Chain binding.</li> </ul>	<ul style="list-style-type: none"> <li>a. Remove and disassemble brake. Clean and buff surfaces. Install Brake.</li> <li>b. Refer to a. above. Replace if scored excessively.</li> <li>c. Remove damaged gears and install new gears. Hoist should be dismantled and thoroughly inspected for additional damage from overloading.</li> <li>d. See items 1.b., 1.c. and 1.d.</li> </ul>

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# BUDGIT USA MANUAL CHAIN HOIST

## TROUBLE SHOOTING

Trouble	Cause May Be	Remedy
1. Chain hoist works erratically.	<ul style="list-style-type: none"> <li>a. Load chain incorrectly installed.</li> <li>b. Load brake pawl or ratchet teeth worn or damaged.</li> <li>c. Frame cracked or mutilated.</li> <li>d. Hand chain rubbing on cover.</li> <li>e. Hand chain hanging up in hand wheel.</li> </ul>	<ul style="list-style-type: none"> <li>a. Remove load chain. Install chain correctly.</li> <li>b. Remove load brake parts. Inspect parts. Replace damaged parts.</li> <li>c. Replace frame.</li> <li>d. Remove interference.</li> <li>e. Clean and lubricate hand chain.</li> </ul>
2. Hooks opened.	<ul style="list-style-type: none"> <li>a. Chain hoist overloaded.</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace opened hooks. Hoist should be dismantled and thoroughly inspected for additional damage from overloading.</li> </ul>
3. Frame damaged.	<ul style="list-style-type: none"> <li>a. Hoist subjected to overloading.</li> <li>b. Load chain run too far through chain block frame.</li> <li>c. Chain hoist subjected to extreme angular or side pulls, causing chain to bind.</li> <li>d. Chain hoist damaged by dropping or throwing.</li> </ul>	<ul style="list-style-type: none"> <li>a. Load chain hoist only to rated capacity. Replace damaged frame. Hoist should be dismantled and thoroughly inspected for additional damage from overloading.</li> <li>b. Replace damaged frame.</li> <li>c. Operate chain hoist properly. Replace damaged frame.</li> <li>d. Disassemble chain hoist. Inspect chain hoist. Replace damaged parts and assemble chain hoist. Whenever the frame shows evidence of damage from misuse or rough handling, the hoist should be completely dismantled, all parts inspected and damaged or worn parts replaced. Always apply the safety rules shown on the inside of the back cover when using BUDGIT USA hand chain hoist.</li> </ul>
4. Clutch slipping excessively.	<ul style="list-style-type: none"> <li>a. Hoist is overloaded.</li> <li>b. Internal binding.</li> <li>c. Load brake locked up.</li> <li>d. Clutch worn.</li> </ul>	<ul style="list-style-type: none"> <li>a. Reduce load to within rated hoist capacity. Hoist should be dismantled and thoroughly inspected for additional damage from overloading.</li> <li>b. See item 6.d.</li> <li>c. See item 2.a.</li> <li>d. Replace clutch.</li> </ul>

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# HI-CAP 2 ALUMINUM HAND CHAIN HOIST

## TROUBLE SHOOTING

Trouble	Cause May Be	Remedy
1. Hoist is hard to operate in either direction.	<p>a. Load chain worn long to gage, thus binding between liftwheel and chain guide.</p> <p>b. Load chain rusty, corroded or clogged up with foreign matter such as cement or mud.</p> <p>c. Load chain damaged.</p> <p>d. Liftwheel clogged with foreign matter or worn excessively, causing binding between the liftwheel and chain guide.</p> <p>e. Hand chain worn long to gage, thus binding between handwheel and cover.</p> <p>f. Handwheel clogged with foreign matter or worn excessively, causing binding of chain between the handwheel and cover.</p> <p>g. Liftwheel or gear teeth deformed.</p>	<p>a. Check gage of chain. Replace if worn excessively.</p> <p>b. Clean by tumble polishing or using a non-acid or non-caustic type solvent. Lubricate with Lubriplate Bar and Chain Oil 10-R (Fiske Bros. Refining Co.) or equal lubricant.</p> <p>c. Check chain for gouges, nicks, bent or twisted links. Replace if damaged.</p> <p>d. Clean out pockets. Replace if worn excessively.</p> <p>e. Check gage of chain.</p> <p>f. Clean out pockets. Replace if worn excessively.</p> <p>g. Excessive overload has been applied. Replace damaged parts.</p>
2. Hoist is hard to operate in the lowering direction.	<p>a. Brake parts corroded or coated with foreign matter.</p> <p>b. Chain binding.</p>	<p>a. Disassemble brake and clean thoroughly (by wiping with a cloth-not by washing in a solvent.) Replace washers if gummy, visibly worn or coated with a foreign matter. Keep washers and brake surfaces clean and dry.</p> <p>b. See items 1A, 1B and 1C</p>
3. Hoist is hard to operate in the hoisting direction.	<p>a. Chain binding.</p> <p>b. Chain twisted (3 ton capacity or larger.)</p> <p>c. Overload.</p>	<p>a. See items 1A, 1B and 1C</p> <p>b. Rereeve chain on 3 and 4 ton unit. If both chains are twisted, capsize hook block through loop in chain until twists are removed. Caution-do not operate unit in hoisting direction with twisted chain or serious damage will result.</p> <p>c. Reduce load or use correct capacity hoist.</p>
4. Hoist will not operate in either direction.	<p>a. Liftwheel gear key or friction hub key missing or sheared.</p> <p>b. Gears jammed.</p>	<p>a. Install or replace key.</p> <p>b. Inspect for foreign matter in gear teeth.</p>

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## HI-CAP 2 ALUMINUM HAND CHAIN HOIST TROUBLE SHOOTING (continued)

Trouble	Cause May Be	Remedy
5. Hoist will not operate in the lowering direction.	<ul style="list-style-type: none"> <li>a. Locked brake due to a suddenly applied load, shock load, or load removed by means other than by operating unit in the lowering direction.</li> <li>b. Chain binding.</li> <li>c. Lower hook all the way out. Load chain fully extended.</li> </ul>	<ul style="list-style-type: none"> <li>a. With hoist under load keep chain taut, pull sharply on hand chain in the lowering direction to loosen brake.</li> <li>b. See items 1A, 1B and 1C</li> <li>c. Chain taut between the liftwheel and loose end screw. Operate unit in hoisting direction only.</li> </ul>
6. Hoist will not operate in the hoisting direction.	<ul style="list-style-type: none"> <li>a. Chain binding.</li> </ul>	<ul style="list-style-type: none"> <li>a. See items 1A, 1B and 1C</li> </ul>
7. Hoist will not hold load in suspension.	<ul style="list-style-type: none"> <li>a. Lower hook or load side of chain on wrong side of liftwheel.</li> <li>b. Ratchet assembled in reverse.</li> <li>c. Pawl not engaging with ratchet.</li> <li>d. Ratchet teeth or pawl worn or broken.</li> <li>e. Worn brake parts.</li> <li>f. Oil, dirty or corroded brake friction surfaces.</li> </ul>	<ul style="list-style-type: none"> <li>a. Lower hook must be on same side of liftwheel as upper hook.</li> <li>b. Ratchet must be assembled correctly.</li> <li>c. Pawl spring missing or broken. Pawl binding on pawl stud. Replace spring and clean so pawl operates freely and engages properly with ratchet. Do not oil.</li> <li>d. Replace pawl and/or ratchet.</li> <li>e. Replace brake parts which are worn.</li> <li>f. See item 2A.</li> </ul>

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## TUGIT2 LEVER HOISTS

### TROUBLE SHOOTING

Trouble	Cause May Be	Remedy
1. Is hard to operate in either direction	<p>a. Load chain worn long to gauge, thus binding between liftwheel and frame.</p> <p>b. Load chain rusty, corroded or clogged with foreign matter such as cement or mud.</p> <p>c. Bushings clogged with matter such as cement and dust.</p> <p>d. Lever head binding on frame.</p> <p>e. Brake parts corroded or clogged with foreign matter.</p> <p>f. Liftwheel pockets clogged with foreign matter or worn excessively causing chain to bind between liftwheel and frame.</p> <p>g. Liftwheel twisted or bent - gear teeth bent (1½, 3 &amp; 6 ton only.)</p>	<p>a. Check chain and replace if worn excessively.</p> <p>b. Clean chain by tumble polishing or using a non-acid or non-caustic type solvent. Check chain for gouges, damaged or bent links. Lubricate with Lubriplate, Bar and Chain Oil 10-R (Fiske Bros. Refining Co.) or equal lubricant.</p> <p>c. Disassemble and clean liftwheel bushings, pinion shaft bushings, ratchet bushings and sliding surfaces of ratchet plunger and lever plunger. Any parts worn excessively should be replaced.</p> <p>d. Clean by removing any foreign matter that may be between the head of the lever and the frame section surrounding the brake.</p> <p>e. Disassemble brake and clean thoroughly (by wiping with a cloth-not by washing in a solvent.) Replace washers if too gummy, worn or scored. Keep washers and brake surfaces clean and dry.</p> <p>f. Clean out pockets and use if not worn excessively.</p> <p>g. Excessive overload has been applied. Replace damaged parts.</p>
2. Is hard to operate in down direction.	<p>a. Brake adjusting nut is too tight.</p> <p>b. Brake parts corroded or clogged with foreign matter.</p> <p>c. Chain binding in frame.</p>	<p>a. See instructions on brake assembly.</p> <p>b. See item 1E.</p> <p>c. See items 1A and 1B.</p>
3. Is hard to operate in up direction.	<p>a. Chain binding in frame.</p> <p>b. Chain twisted - 3 &amp; 6 ton only.</p> <p>c. Overload.</p>	<p>a. See items 1A and 1B.</p> <p>b. Rereeve chain or on 3 ton unit, if both chains are twisted, capsize hook block through loop in chain until twists are removed. Caution: Do not operate the Puller in the up direction with twisted chain or chain may become jammed in frame or hook block.</p> <p>c. Reduce load or use correct capacity unit.</p>

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