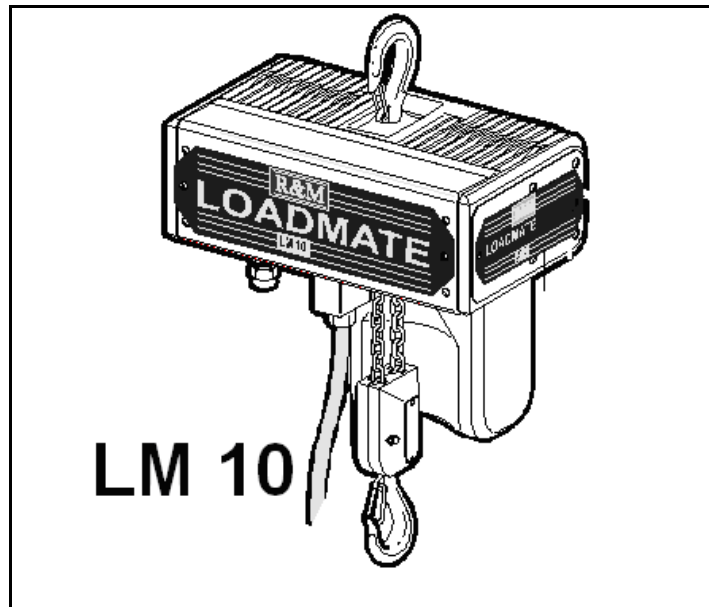




# LoadMate® LM10 ELECTRIC CHAIN HOIST



## INSTALLATION & MAINTENANCE MANUAL

JOB No.: \_\_\_\_\_

SERIAL No.: \_\_\_\_\_

(RECORD HOIST SERIAL NUMBER FOR FUTURE  
REFERENCE)



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## 1 INTRODUCTION

### 1.1 Contact Information

Please do not hesitate to use the following contact information in the event that you require assistance:

R&M MATERIALS HANDLING, INC.  
4501 Gateway Boulevard  
Springfield, OH 45502

General Telephone: 937 - 328-5100  
Toll Free Telephone (US): 800 - 955-9967

General Fax: 937 - 325-5319  
Parts Dept. Fax (US): 800 - 955-5162  
Parts Dept. Fax (other): 937 - 328-5162

Website: [www.rmhoist.com](http://www.rmhoist.com)

### 1.2 Warranty

All sales are subject to the R&M MATERIALS HANDLING, INC. Standard Terms and Conditions of Sale and Product Warranty. Copies are available upon request from R&M MATERIALS HANDLING, INC. (also available from website) and are expressly incorporated by reference hereto.

### 1.3 Disclaimer

This Manual has been prepared by R&M MATERIALS HANDLING, INC. to provide information and suggestions for hoist installation, maintenance, and inspection personnel. This manual should be used in conjunction with the LoadMate® Electric Chain Hoist Operator's Manual to train safe operating practices to all personnel associated with hoist operations and maintenance.

It is NOT intended that the recommendations in this manual take precedence over existing plant safety rules and regulations or OSHA regulations. However, a thorough study of the following information should provide a better understanding of proper installation, maintenance, and inspection procedures that are to be followed in order to afford a greater margin of safety for people and machinery in the area of hoist operations.

It must be recognized that this is a manual of recommendations for the Hoist Installation, Maintenance, and Inspection personnel and its use is permissive not mandatory. It is the responsibility of the hoist owner to make personnel aware of all federal, state, and local codes and regulations. The owner is responsible for providing instruction and insuring that certain installation, maintenance, and inspection personnel are properly trained.

## 1.4 Safety



The Safety Alert Symbol is used in this manual to indicate hazards and to alert the reader to information that should be known, understood, and followed in order to avoid DEATH or SERIOUS INJURY.

Read and understand this manual before using the hoist.

Important issues to remember during installation, operation, maintenance, and inspection are provided at the hoist control stations, at various locations on the hoist, in this manual, and in the LoadMate® Electric Chain Hoist Operator's Manual. These issues are indicated by DANGER, WARNING, or CAUTION instructions or placards that alert personnel to potential hazards, proper operation, load limitations, and more.



**DANGER:** Indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury.



**WARNING:** Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.



**CAUTION:** Indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Taking precedence over any specific rule, however, is the most important rule of all:

**“USE COMMON SENSE”**

It is a responsibility of the hoist owner / user to establish programs to:

Train and designate hoist operators, and  
Train and designate hoist inspectors / maintenance personnel.

The words SHALL and SHOULD are used throughout this manual in accordance with definitions in the ASME B30 standards as follows:

**SHALL** indicates a rule is mandatory and must be followed.

**SHOULD** indicates a rule is a recommendation, the advisability of which depends on the facts in each situation.



Hoist operation, hoist inspection, and hoist maintenance personnel training programs should be based on requirements in accordance with the latest edition of:

- **ASME B30.16 Safety Standard for Overhead Hoists ( Underhung )**

Such training should also provide information for compliance with any Federal, State, or Local Code requirements, and existing plant safety rules and regulations.

If an overhead hoist is installed as part of an overhead crane or monorail system, training programs should also include requirements in accordance with the latest editions, as applicable, of:

- **ASME B30.2 Safety Standard for Overhead and Gantry Cranes, Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist**
- **ASME B30.11 Safety Standard for Monorails and Underhung Cranes**
- **ASME B30.17 Safety Standard for Overhead and Gantry Cranes, Top Running Bridge, Single Girder, Underhung Hoist**

## NOTICE

**It is a responsibility of the owner / user to install, inspect, test, maintain, and operate a hoist in accordance with the ASME B30.16 Safety Standard, OSHA Regulations, and ANSI / NFPA 70, National Electric Code. If the hoist is installed as part of a total lifting system, it is also the responsibility of the owner / user to comply with the applicable ASME B30 volume that addresses other types of equipment used in the system.**

**Further, it is the responsibility of the owner / user to require that all personnel who will install, inspect, test, maintain, and operate a hoist read the contents of this manual, LoadMate® Electric Chain Hoist Operator's Manual, ASME B30.16 Safety Standards for Overhead Hoists (Underhung), OSHA Regulations, and ANSI / NFPA 70, National Electric Code. If the hoist is installed as part of a total lifting system, all personnel must also read the applicable ASME B30 volume that addresses other types of equipment used in the system.**

## DANGER

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

R&M MATERIALS HANDLING, INC. has no direct involvement or control over the hoist's operation and application. Conforming to good safety practices is the responsibility of the owner, the user, and it's operating personnel.

Only those Authorized and Qualified Personnel who have shown that they have read and have understood this manual and the LoadMate® Electric Chain Hoist Operator's Manual should be permitted to operate the hoist.

The owner / user SHALL insure that all Operators read and understand the LoadMate® Electric Chain Hoist Operator's Manual prior to operating the hoist.



## 1.5 Placards and Instructions

READ and OBEY all Danger, Warning, Caution, and Operating Instructions on the hoist and in this manual and LoadMate® Electric Chain Hoist Operator's Manual. Make sure that all placards are in place and legible.

Failure to comply with safety precautions in this manual and on the hoist is a safety violation that may result in serious injury, death, or property damage.



## 2 INSTALLATION



**Before installing, removing, inspection, or performing any maintenance on a hoist, the main switch shall be de-energized. Lock and tag the main switch in the de-energized position in accordance with ANSI Z244.1. Follow other maintenance procedures outlined in this manual and ASME B30.16.**

### 2.1 General

Prior to installation, the unit shall be checked thoroughly for damage during shipment or handling at the job site.

Each complete electric chain hoist is load tested at the factory at 125% of the nameplate-rated capacity.

All hoists are designed for the type of mounting specified by the purchaser. The adequacy of the supporting members (monorail beams, cranes, hangers, supports, framing, etc.) is the responsibility of user / owner and shall be determined or verified by qualified personnel.

Read the instructions contained in this manual and the LoadMate® Electric Chain Hoist Operator's Manual as well as any other related manuals. Observe the warning tags attached to the unit before the installation is started.

### 2.2 Lubrication

The hoist gear case comes completely pre-lubricated with grease.

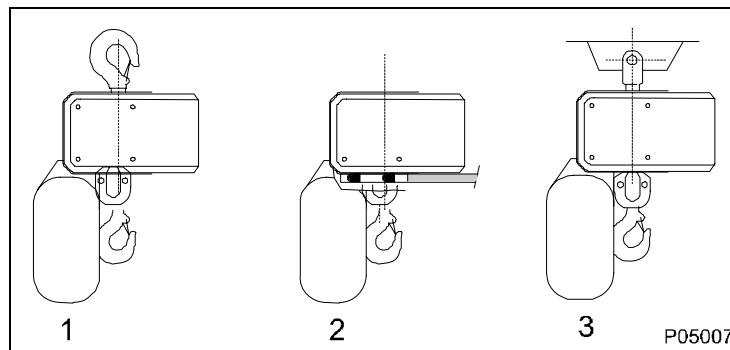
Note: Open trolley wheel gearing has not been greased at the factory. See the trolley manual for proper gear lubricant to use before installing hoist.

The load chain requires lubrication prior to first use. Chain lubricant is included with shipment of each new chain hoist.

## 2.3 Mounting

Below are three types of mounting:

1. Hook Mounted
2. Base Mounted
3. Coupling Mounted
4. Trolley Mounted – NOT SHOWN – is accomplished via a Hook or Trolley Coupling to the Trolley Assembly



For all trolley-mounted hoists, refer to appropriate trolley manual for trolley installation instructions.

After a trolley-mounted hoist has been assembled to a beam, check for balance. Each trolley-mounted hoist is balanced at the factory for “as shipped” condition. Any auxiliary devices (radio control, lights, hose reels, etc.) furnished and mounted by “others” may require additional counterweight. Hoists must hang straight without a load or there will be a noticeable “kick” when a load is applied to the hook. An unbalanced hoist / trolley may result in damage to equipment.

## 2.4 Load Hook Throat Opening



ANSI B30.16 recommends that the throat opening of a load hook be measured and recorded prior to putting a hoist into service and that a gage be made to provide a quick visual inspection for a bent hook as required during routine inspections. Record this information before initial start-up. See Section 5.8 for more detailed hook information.

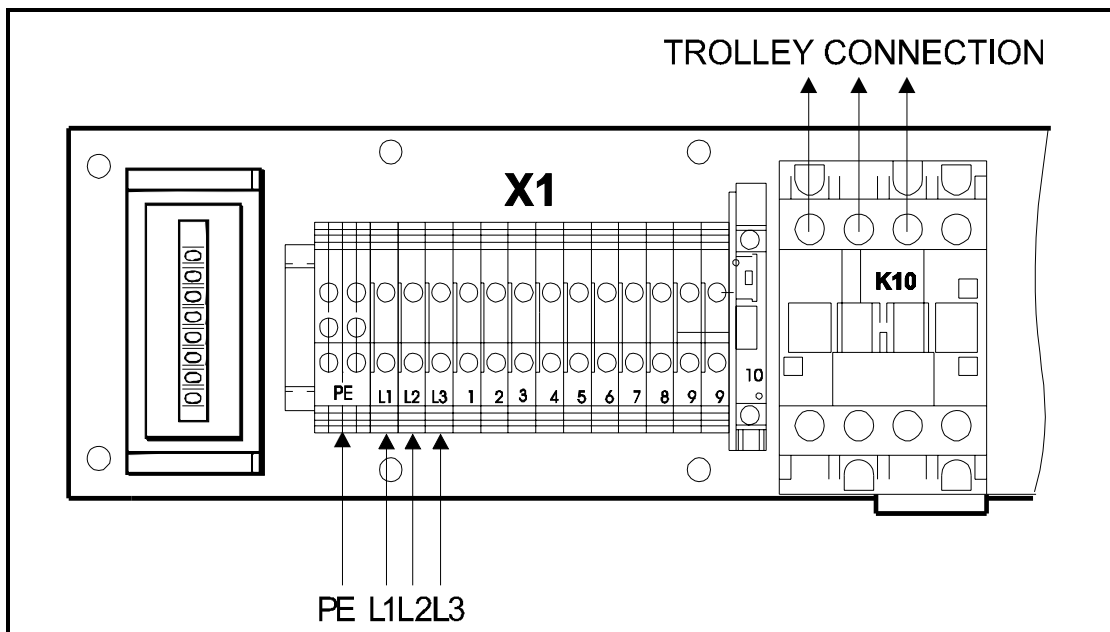
## 2.5 Electrical Connection

The user / owner must provide the main power supply hardware (cable, conductor bar, fuses, disconnect switch, etc.).



- Make sure that the power supply voltage is the same as that shown on hoist serial plate / nameplate.
- Make sure that fuses and other current overload devices are in place to protect the power supply.
- Make sure that power cable or conductors have sufficient capacity to maintain the hoist supply voltage by  $\pm 5$  percent of nominal voltage under all operating conditions.
- Poor voltage regulation may cause motor overheating or sluggishness, and chattering / inoperative motor brake(s) and controls.
- Do not use power supply cables with solid conductors.

## 2.6 Three Phase Power Connections



### Minimum cable sections:

Power supply:	AWG 16 (1.50 mm <sup>2</sup> )
Auxiliary current:	AWG 18 (0.75 mm <sup>2</sup> )
Control box/hoist:	AWG 18 (1.00 mm <sup>2</sup> )

### 3 INITIAL START-UP



**Before connecting power to hoist, check all “motion” buttons on pendant control assembly to make sure that they operate freely without binding or sticking. Check pendant cable and strain relief connection to ensure that they are not damaged.**

#### 3.1 General

Initial start-up procedures are as follows:

- Read all attached WARNING tags and placards affixed to hoist.
- Oil load chain generously over entire length of chain.
- Make sure that load chain is not twisted. If so, **untwist load chain before using.**
- Make sure fall stop is placed at least 6” [150 mm] from last chain link on free end.
- Install chain container.
- If furnished, make sure that trolley wheels have proper spacing in relation to beam flange. See appropriate trolley manual for details.
- Check direction of hook travel to make certain that it corresponds to respective control button that is depressed. That is, does hook travel “UP” when UP BUTTON is depressed? If OK, go to section 3.3. If not, proceed to section 3.2 for correcting direction of travel.

#### 3.2 Correcting the Direction of Hook Travel



**DO NOT change control leads in pushbutton enclosure or at motor relays. DO NOT change nameplates on pushbutton assembly. The upper/lower safety limit switch is wired in series with “UP” control circuit as furnished from factory. Changing pushbutton control leads or nameplates will prevent the upper safety travel limit switch from functioning properly.**

Reversing any two power leads of a three-phase AC motor will reverse the direction of rotation.

- Reverse any two leads of a three-phase power at the main power source or at connections to motor. **Do not change internal wiring of hoist.**
- After changing two of the main power leads, recheck direction of rotation. Press “UP” button only. If hook travel goes in “UP” direction, proceed to section 3.3. If not, redo section 3.2.



### 3.3 Operational Checks – No Load

- Check hoist motor brake function. Run empty load block up or down to check that load block does not drift more than 1.0 inch [25mm]. If so, adjust brake as described in Section 5.3 of this manual.
- Run empty load block down to check that fall stop (located on free end of load chain) makes proper contact with upper / lower travel safety limit switch and that limit switch functions properly.
- Run empty load block up to check that load block makes proper contact with upper / lower travel safety limit switch and that limit switch functions properly.
- Run empty load block up and down several times while checking for proper tracking of load chain.

### 3.4 Operational Checks – With Load

- After completion of no-load operational tests, the user /owner should perform a full load test even though each complete hoist is load tested at factory.
- Lift a near capacity load about one (1) foot [30cm] above floor level. Check that the brake holds load. Also, check stopping capability of brake when lifting to a stop and lowering to a stop.
- Move trolley the full length of monorail or crane beam. Check for any binding of trolley wheels on flange and/or interference at splice joints, hanger connections / bolts, etc.
- Check contact with stops. Contact with stops SHALL only be made with trolley bumpers. Stops that are designed to make contact with wheels SHALL NOT be used.



## 4 HOIST OPERATION



**BEFORE PROCEEDING WITH THE NORMAL OPERATION OF THIS HOIST, THE OPERATOR/(S) SHALL BE TRAINED IN ACCORDANCE WITH THE LoadMate® Electric Chain Hoist Operator's Manual AS SUPPLIED WITH THIS HOIST.**

**FAILURE TO READ AND COMPLY WITH ANY ONE OF THE LIMITATIONS NOTED IN THIS MANUAL AND THE LoadMate® Electric Chain Hoist Operator's Manual FURNISHED WITH THIS HOIST CAN RESULT IN PRODUCT FAILURE, SERIOUS BODILY INJURY OR DEATH, AND / OR PROPERTY DAMAGE.**

**REFER TO SECTION 1.0 OF THIS MANUAL FOR CONTACT INFORMATION IF YOU NEED ANY ADDITIONAL ASSISTANCE.**

## 5 MAINTENANCE

### 5.1 Basic Hoist Construction

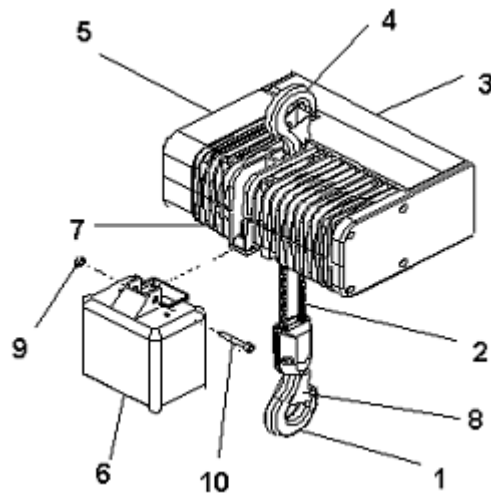


FIGURE 5.1

- 1 - LOAD BLOCK ASSEMBLY (2-FALL SHOWN)
- 2 - LOAD CHAIN
- 3 - ELECTRICAL CONTROL ENCLOSURE
- 4 - TOP HOOK
- 5 - HOIST GEAR BOX ASSEMBLY
- 6 - CHAIN CONTAINER & HARDWARE
- 7 - HOIST BODY / MOTOR
- 8 - LOAD HOOK SAFETY LATCH
- 9 - FASTENER
- 10 - PIN

### 5.2 Motor / Body

The hoist motors are designed to provide dependable hoisting service. The standard motors are enclosed for IP55 rated protection against normal hazards of dust and moisture. The motor bearings are sealed and do not require further greasing.

The hoist body is constructed of aluminum and requires no maintenance. Remove from service and replace the hoist body if damaged.

### 5.3 Hoist Motor Brake and Load-Limiting Device

The hoisting motor is equipped with a D.C. electromagnetic disc brake. The brake brings the load to a smooth and quick stop and holds the load when the motor is not energized. An energized coil releases the hoist brake to allow the hoisting motor to run freely when in use.

The load-limiting device is a slip clutch and it is integrated into the design of the hoist motor brake. Even if the clutch slips, once power is removed, the brake will engage to stop and hold the load.

### 5.4 Slip Clutch Adjustment

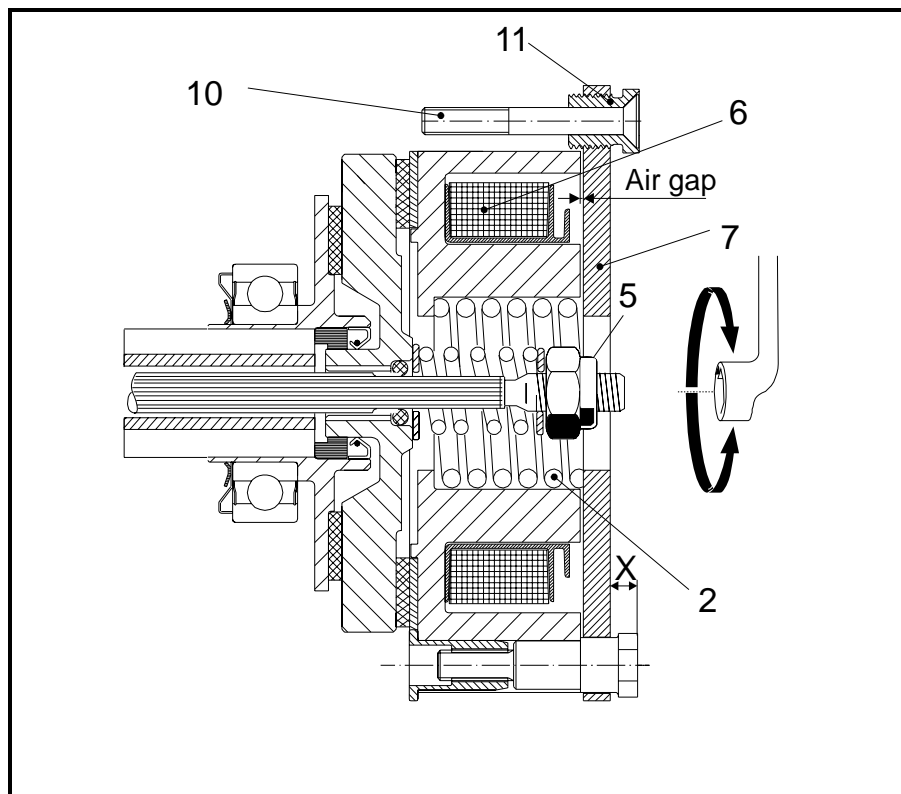


FIGURE 5.2



**⚠ CAUTION**

**SEE FIGURE 5.2**

**Make sure the motor is not running before placing tool on the nut ITEM 5 to adjust it. Do not touch any moving components.**

**The slip-clutch generates heat when slipping. When the friction surfaces items become too hot, setting clutch may be difficult due to unstable behavior of friction surfaces. If this happens, allow brake & clutch assembly to cool before trying to re-adjust slip-clutch.**

**Decreasing torque too much when adjusting slip-clutch will allow a suspended load to free-fall when trying to lift. If this is to occur, once power is removed, the brake will engage to stop and hold the load.**

Adjust the Limiter as follows:

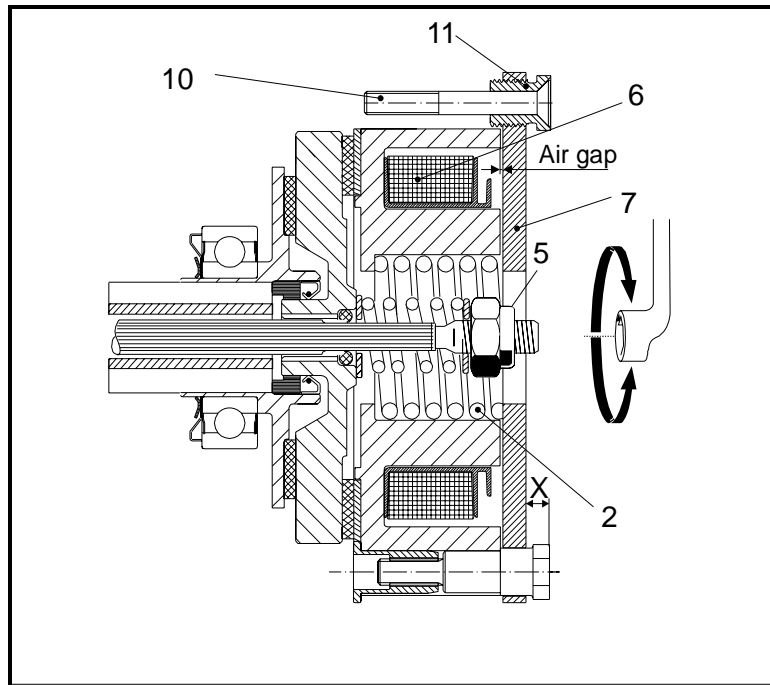
1. Hook a load of at least 110 percent but not more than 125 percent of nameplate capacity.
2. Remove plastic cap from inspection hole in brake cover.
3. Raise load at slow speed and fast speed to test slip clutch operation.
4. Insert a socket (13mm) through inspection hole, and slide it over nut.
5. Turn nut in required direction:
  - Turn nut clockwise to increase the torque.**
  - Turn nut counterclockwise to decrease the torque.**
6. Repeat steps 3 and 4 until load can be barely lifted in fast speed. **CAUTION: DO NOT OVERHEAT.** If overheated, clutch may not adjust due to instability of friction surfaces.
7. Once adjustment is completed, install plastic cap.
8. Check function of clutch at 100 percent of nameplate-capacity while in fast speed.



**NOTICE**

The Slip Clutch / Torque Limiter is a safety device to prevent overloading of the hoist. This device is not intended for use as means to measure the weight of load being lifted.

## 5.5 Hoist Motor Brake Adjustment



**FIGURE 5.3**

If maximum air gap of brake has been reached or will be exceeded before next inspection, readjust air gap. Refer to FIGURE 5.3.

Minimum air gap  
 $X = 0.008'' [ 0.2 \text{ mm } ]$

Maximum air gap  
 $X = 0.022'' [ 0.5 \text{ mm } ]$

Before adjusting brake, remove load. Per ANSI Z244.1, lockout and tag main disconnect switch in de-energized position. Follow other maintenance procedures outlined in this manual and ASME B30.16.

1. Remove brake cover and gasket.
2. With a feeler gauge, check three (3) places near each mounting bolts to measure air gap ( X ) between brake anchor disc (item 7) and brake coil.
3. To adjust air gap use a 0.008" feeler gauge and proceed as follows:
  - A. Slightly loosen motor brake mounting screws (item 10) so that adjusting nut (item 11) still touches brake housing.
  - B. To reduce air gap, turn adjusting nut (item 11) counterclockwise.
  - C. To increase air gap, turn adjusting nut (item 11) clockwise.
  - D. Check air gap after adjusting the brake. Make certain the three (3) screws (item 10) are tightened per Torque specification. See Section 6.
  - E. Check brake function and adjustment as follows:

1. Check brake function with no load by raising and lower the load block assembly.
  2. Check brake function with a near capacity load. Raise load about one foot above floor and verify that brake stops and holds the load.
- F. Install brake end cap and seal.

## 5.6 Load Chain



A hoist **SHALL NEVER** be used if the load chain shows any evidence of mechanical damage or excessive wear. Never use the load chain as a sling. Use only original equipment chain as supplied by a factory authorized source. Improper load chain storage or installation can render the load chain unusable prior to the first lift.

## 5.7 Maintenance Inspection

A qualified person **SHALL** be designated to routinely conduct an in-depth inspection of the load chain (See Section 6 – Preventative Maintenance for schedule recommendations). This designated person **SHALL** inspect load chain using good judgment in evaluating the remaining service life. Any deterioration of load chain resulting in appreciable loss of original strength **SHALL** be noted and evaluated.

An in-depth inspection **SHALL** include a written record that is dated and signed by the inspector.

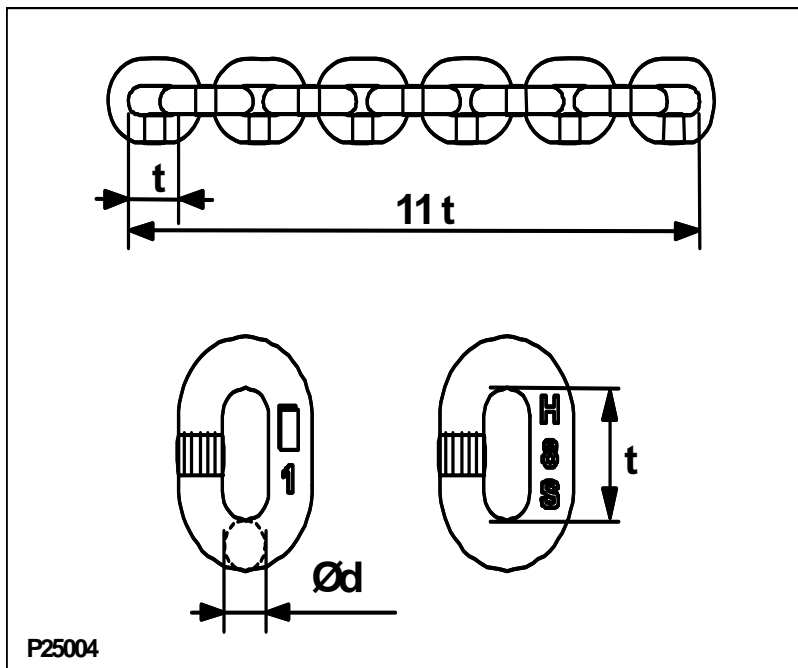


FIGURE 5.4

Measure the following chain dimensions at several points on chain: ( Figure 5.4 )  
 Dimensions of one link (  $d \times t$  ) where,  $d$  = diameter and  $t$  = pitch  
 Length over 11 links (  $11 t$  )

Replace load chain if any one of these dimensions exceed maximum allowed wear.



**Maximum allowed wear:**

<b>Minimum link diameter allowed</b>	<b>(d):</b>	0.240" [6.1 mm]	MINIMUM
<b>Maximum pitch allowed</b>	<b>(t):</b>	0.736" [18.7 mm]	MAXIMUM
<b>Maximum length allowed</b>	<b>(11t):</b>	7.862" [199.7 mm]	MAXIMUM

**NOTICE**

**If load chain needs replaced, then inspect chain guide and chain (load) wheel on hoist and idler sprocket in 2-fall load block for excessive wear. A chain sprocket showing evidence of scored pockets or sharp edges generated from wear SHALL be replaced. A worn chain sprocket or idler sprocket can greatly reduce the life of load chain.**

**5.8 Load Chain Specifications**

Chain type:	Standard Load Chain
Diameter (d) / pitch (t):	0.268" (6.8 mm) /0.701" (17.8 mm)
Class:	DAT
Grade:	H8S or HE G80 RAS
Maximum working stress:	19,595 lbs/in <sup>2</sup> (135.1 N/mm <sup>2</sup> )
Hardened surface:	580 or 700 HV (Vickers Hardness)
Thickness:	0.006" (0.14 mm) to 0.011" (0.28 mm)
Standard:	DIN 5684 - 8
Marking (10 x t):	1 or 16
	H 8 S or A 8
Maximum working load, 1 fall:	2200 lbs. (1000 kg)
Breaking load:	13,062.05 psf (58.1 kN)
Maximum breaking stress:	116 030 lbs/in <sup>2</sup> (800 N/mm <sup>2</sup> )
Total braking elongation:	>10% min.
Weight for 100 links:	2.38 lbs. (1.08 kg)

**5.9 Removing the Load Chain**

1-FALL CHAIN

1. Remove load from hook block assembly.
2. Remove load block assembly from load chain. Some disassembly of 1-fall load block is required.
3. Attach the chain insert tool to the end of bottom block end of the chain.
4. Run hoist in "UP" direction until all of chain is in container. Stop the hoist with the insertion tool remaining in the hoist ready for the new chain.
5. Remove chain container with all of old chain in chain container.
6. Remove fall stop from old chain and save for use with new chain.

2-FALL CHAIN

1. Remove load from hook block assembly.
2. Run hoist in "UP" direction until hook block assembly is about 1.0 foot [30cm] from hoist body.
3. Unfasten load chain from chain anchor mounted on hoist body.

4. Remove load block assembly from load chain by allowing chain to run through it. Attach the chain insert tool to the bottom block end of the chain.
5. Run hoist in “UP” direction until all of the chain is in the container. Stop the hoist with the insertion tool remaining in the hoist ready for the new chain.
6. Remove chain container with old chain.
7. Remove fall stop from old chain save for use with new chain.

## 5.10 Installing the Load Chain

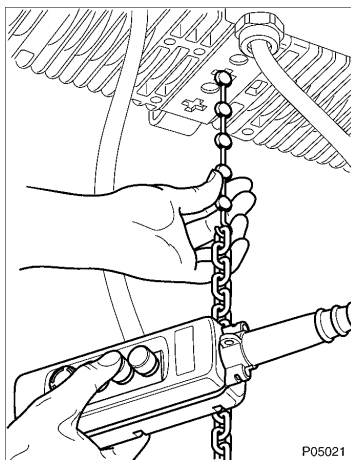


FIGURE 5.5

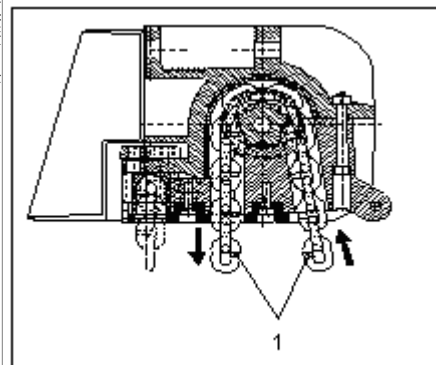
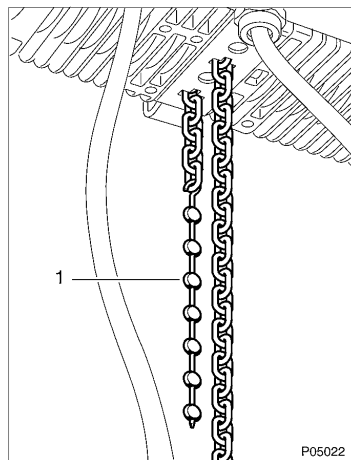


FIGURE 5.6

### 1-FALL CHAIN INSTALLATION

1. Attach last link of chain onto hook of CHAIN INSERTION TOOL (item 1, Figure 5.5).
2. If the insertion tool is not in the hoist (removal procedure), insert other end of CHAIN INSERTION TOOL into chain opening closest to chain container side.



**Make sure the chain weld on chain link faces inward toward chain wheel pocket on hoist load sprocket. See Figure 5.6.**

3. Run hoist “UP” in slow speed to feed chain through chain sprocket out other side.
4. Attach fall stop at least 6.0 inches [150 mm] from end of chain (chain container side). Attach load block assembly on other end of load chain. Refer to Figure 5.6 for details.
5. Make sure that load chain is not twisted or deformed.
6. Attach chain container.

### 2-FALL CHAIN INSTALLATION

1. If the chain insertion tool is not in the hoist (removal procedure), attach last link of chain onto hook of CHAIN INSERTION TOOL (item 1, Figure 5.5).
2. Insert other end of CHAIN INSERTION TOOL into chain opening closest to chain container.



**For a 2-Fall load block assembly, make sure the chain weld on chain link faces inward toward chain wheel pocket on hoist and away from idler sprocket of hook block assembly. See figure 5.6. Follow steps outlined below:**

3. Run hoist in slow speed to feed chain through chain sprocket. Continue running until about 2.0 feet [60cm] of chain is available out the other side.
4. Slide chain onto idler sprocket of load block making sure not to twist chain while inserting it. Link weld must face away from idler sprocket on load block assembly.
5. Attach chain anchor and chain to hoist body. Tighten chain anchor bolts per recommended torque settings in Section 6.
6. Attach fall stop 6.0 inches [150 mm] from end of chain (chain container side). See Figure 5.7 for details.
7. Make sure that chain is not twisted or kinked.
8. Attach chain container.

After chain installation:

1. Without a load, run chain up and down a few times to make sure load chain is not twisted. If so, remove chain twist.
2. Lubricate load chain.

### 5.11 Fall Stop Assembly

The slack fall stop is a safety not a functional stop. The fall stop must be located at least (6.0) inches [150mm] from end of load chain.

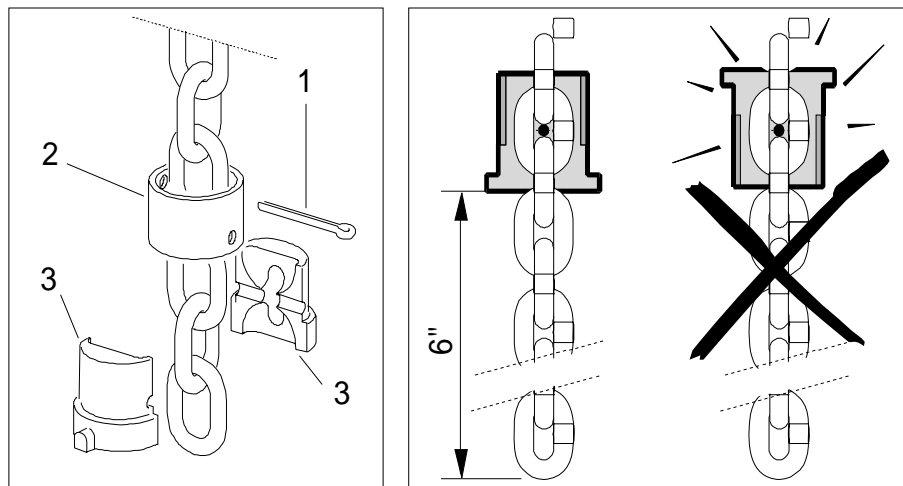


FIGURE 5.7

### 5.12 Removing Fall Stop (Figure 5.7)

1. Remove cotter pin (item 1).
2. Slide up the tube (item 2).
3. Remove the two fall stop halves (item 3).

4. Slide tube (item 2) off load chain.

### 5.13 Installing Fall Stop (Figure 5.7)

1. Slide tube (item 2) onto load chain.
2. Position two fall stop halves (item 3) on a chain link so that the fall stop will be at least 6 inches [150mm] from end of load chain.
3. Slide tube (item 2) down over two fall stop halves (item 3).
4. Insert and secure cotter pin (item 1).

### 5.14 Chain Container

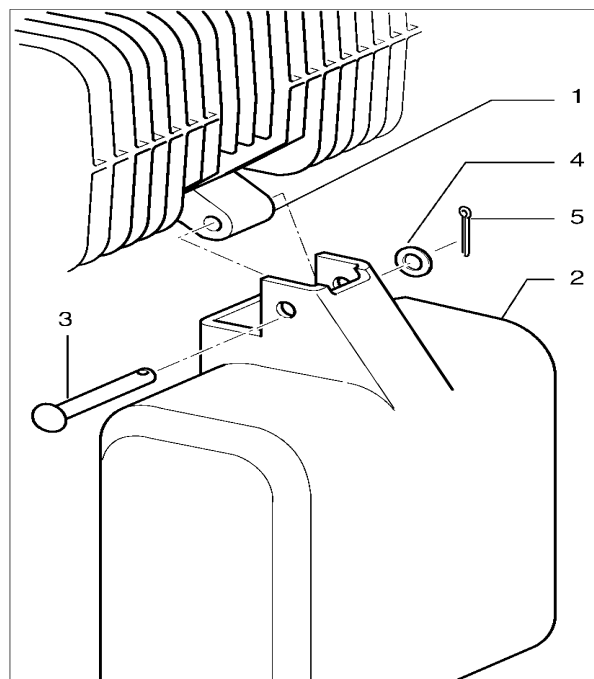


FIGURE 5.8



**Chain container must be installed for effective operation of travel limit switch.**

#### Removing Chain Container (Figure 5.8)

1. Remove cotter pin (item 5) from end of pin (item 3).
2. Pull pin (item 3) out while supporting chain container (item 2).
3. Remove chain container (item 2).

#### Installing Chain Container (Figure 5.8)

1. Insert load chain into chain container (item 2). Position chain container (item 2) onto hoist mounting bracket (item 1).
2. Align holes and insert pin (item 3) through container (item 2) and hoist mounting bracket (item 1).
3. Place washer (item 4) onto pin (item 3).

4. Insert and secure cotter pin (item 5).

## 5.15 Upper and Lower Travel Safety Limit Switch

The Upper and Lower Travel Limit Switch is an automatic reset type switch and connected to the control circuit. The switch housing is recessed into the underside of hoist body.

The upper and lower limit switches are emergency protection devices and are not to be used as a continuous stop.

The hook block activates the upper limit switch as it contacts the limit switch that is located on bottom side of hoist body. Once the switch is activated, the “UP” circuit is opened. The fall stop activates the lower limit switch when hook block is lowered to its lowest travel position. The limit switch is activated and opens the “down” circuit.

The lower limit position is adjustable between the lowest travel and maximum lift. It is adjusted by repositioning the fall stop assembly on free end of load chain. The fall stop **SHALL** always be located at least 6 inches [150mm] from end of last chain link. The upper limit position is adjustable only when an additional fall stop assembly is added between the hook block assembly and the hoist body.

### Adjustment

The position of the air-gap between the two discs (red – gray) determines the stopping place. This position can be found by gently turning the two discs. The length of air gap determines length of reset play in opposite direction.

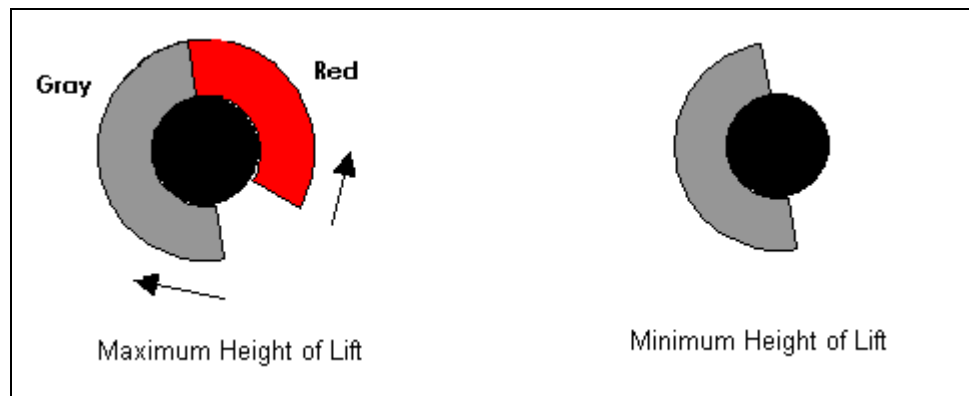


FIGURE 5.9

To reset the rotary limit once it has tripped, the load block assembly must travel approximately 11” [27cm] in opposite direction.

## 5.16 Hooks

Check hooks for deformation or cracks. Hooks must be replaced if throat opening has increased by more than 15%, or if throat opening has more than 10-degree twist from plane of straight hook.

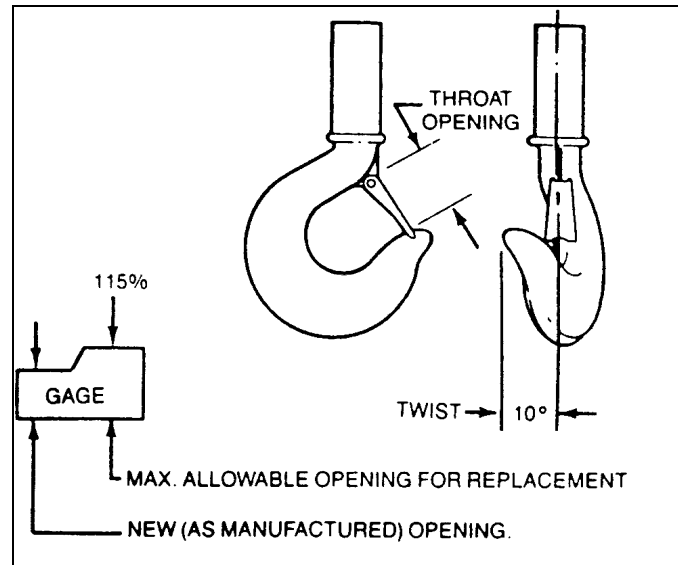


FIGURE 5.10

Due to many types and sizes of hooks that can be furnished and/or specified by the user/owner, it is recommended that user/owner measure the actual throat opening of hook as originally furnished. See FIGURE 5.10. Record the throat dimension on above sketch. Retain as a permanent record. This record can then be used for determining when hook must be replaced due to deformation or excessive throat opening.



Abuse or overloading of hoist is indicated when any hook is twisted or has a throat opening in excess of normal. Other load bearing components SHALL be checked for damage.

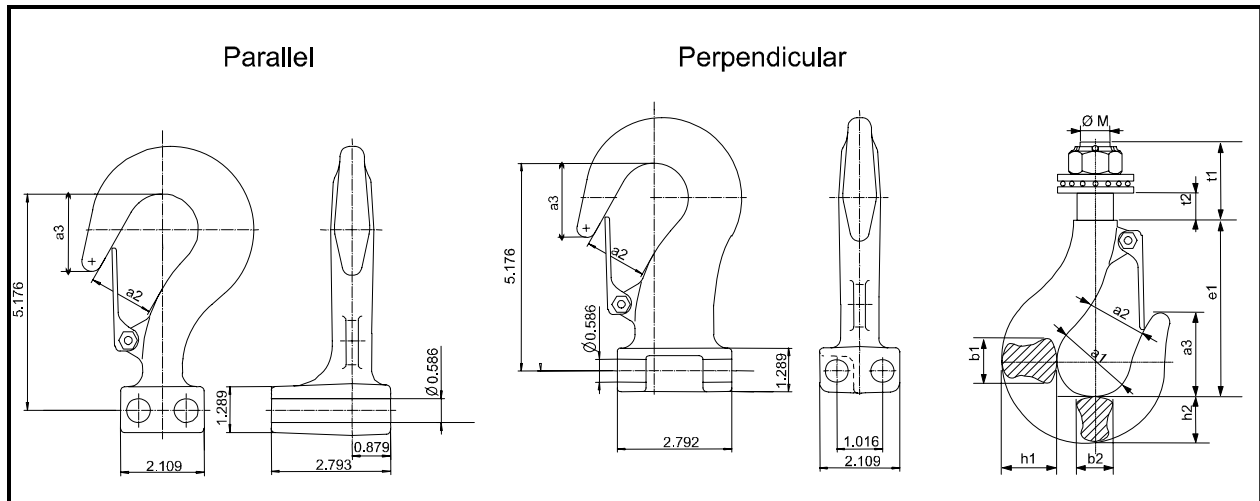
Safety latches SHALL be replaced if missing, bent, or broken.

A safety latch SHALL Function properly at all times.

**Repairing hooks by welding or reshaping is strictly forbidden.**

### 5.17 Hook Inspection

The wear on the top hook and the load hook shall be checked routinely. Measure the throat opening (dimension a2 - FIGURE 5.11). If the throat opening exceeds the maximum opening allowed, replace the hook. Damaged safety latches shall be replaced immediately.



**FIGURE 5.11**

LOAD CAPACITY (LBS)	TEST LOAD	FALLS	MINIMUM FAILURE LOAD	CLASS
1389	2778	1	8752	025T
2205	4409	1	11023	025T
2756	5512	2	17361	05T
4409	8818	2	22046	05T

HOOK DIMENSIONS – INCHES										
ØM	Øa1	a2	a3	b1	b2	e1	h1	h2	t1	t2
0.630	1.417	1.024	1.614	0.866	0.748	3.780	1.102	0.945	1.496	0.512
0.630	1.417	1.024	1.614	0.866	0.748	3.780	1.102	0.945	1.496	0.512
0.787	1.693	1.339	1.929	1.142	0.945	4.134	1.457	1.221	1.496	0.551



0.787	1.693	1.339	1.929	1.142	0.945	4.134	1.457	1.221	1.496	0.551
-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

**Initial Dimension – a2**

1.024 inches  
 1.339 inches

**Max. Allowed Dimension**

1.178 inches maximum  
 1.540 inches maximum

Mark: ISO 2766

DIN Model Number: 15401

DIN 15400 Class: T

DIN 15401 Material: 35 CD 4

**5.18 Top Hook Removal and Installation**

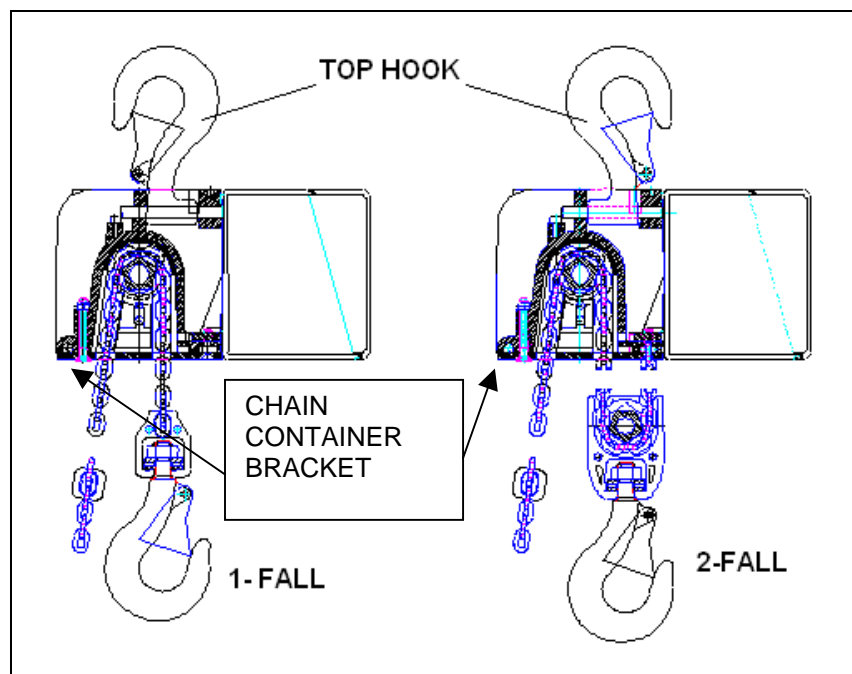


FIGURE 5.12



Before removing Top Hook, de-energize the power to the hoist per ANSI Z244.1 and make certain that any load is removed from the load hook. Also support the total weight of the hoist, including chain, prior to removing the Top Hook.

Removing Top Hook

1. Place hoist on a workbench. Protect limit switches on bottom side of hoist.
2. Remove screw and retaining washer.
3. Pull pins out and remove hook.



Proper installation of top hook is critical for hoist balance.



Installing Top Hook

1. Place hoist on a workbench. Protect limit switches on bottom side of hoist.
2. Determine number of chain falls: 1-fall or 2-fall – Reference Figure 5.12
3. Select proper placement of top hook relative to number of chain falls:
  - a. If 1-fall, align top hook so that tip of hook faces toward chain container.
  - b. If 2-fall, align top hook so that tip of hook faces away from chain container.
4. Place hook into the slot on hoist body. Verify that top hook saddle and load hook saddle are in line with each other. Install pins and retaining washer. Secure retaining washer with screw.

**5.19 Control Changes and Fuses**

The layouts and wiring diagrams found within this section are for standard hoist controls. Single speed hoists are available for 208, 230, and 460 volt three-phase power supplies; but not for 575 volts.

Two-speed hoists are available for 208, 230, 460, and 575 volt, three-phase power supplies. The two-speed hoists can only be connected to the specified voltage on the hoist serial plate.

**Control Circuit Fuse**

The control circuit fuse holder is located on terminal strip **X1**. The fuse holder top flips up to facilitate changing a defective fuse.

POWER SUPPLY	CONTROL VOLTAGE	FUSE SIZE
3 – PHASE	115 VAC	630 mA

**Three-phase Single-speed Voltage Changes:**

The Single-speed models may be changed to accommodate 208/230/460 volt power supplies. A hoist supplied with a motorized trolley CANNOT be reconnected.



**Motorized trolley drives are not voltage re-connectable. Consult the motorized trolley manual if a voltage change over is required.**

Refer to the respective Single-speed wiring diagrams and make the following connections for the following voltages:

**208 / 230 VOLT (SEE 208/230 VOLT SINGLE SPEED CONTROL LAYOUT & WIRING DIAGRAM)**

1. Connect motor brake lead (-) to terminal strip X1 terminal 14. Connect (+) to K21 terminal 4.
2. Motor Leads:
  - a. T1 & T7 connect to main line contactor K10 terminal 1.
  - b. T2 & T8 connect to UP contactor K21 terminal 2.
  - c. T3 & T9 connect to DOWN contactor K21 terminal 6.
  - d. T4 connect to terminal strip X1 terminal 11.
  - e. T5 connect to terminal strip X1 terminal 12.



- f. T6 connect to terminal strip X1 terminal 13.
- g. Jumper wires on terminal strip X1 to connect terminals 11, 12, and 13.
- 3. Control transformer connections:
  - a. Jumper connections terminals 230 to 230 and terminals 01 to 02. See control panel layouts and wiring diagrams.

**460 VOLT (REFER TO 460 VOLT SINGLE SPEED WIRING DIAGRAM)**

- 1. Connect motor brake lead (-) to contactor K21 terminal 2.
- 2. Motor leads:
  - a. T1 connect to main line contactor K10 terminal 1.
  - b. T2 connect to UP contactor K21 terminal 2.
  - c. T3 connect to DOWN contactor K21 terminal 6.
  - d. T4 & T7 connect to terminal strip X1 terminal 11.
  - e. T5 & T8 connect to terminal strip X1 terminal 12.
  - f. T6 & T9 connect to terminal strip X1 terminal 13.
  - g. Jumper connections for 208/230 volt (see wiring diagram).
- 3. Control transformer connections:
  - b. Jumper connections for 460 volt (see wiring diagram).

	Power & Motor Supply	Pendant Plug X23 Description	Pin No:	Tag strip X1 Terminal No:	Control Panel Description	Plug Pin No:
L1	Hoist power supply	Common	1	10	SD: low speed	2
L2	Hoist power supply	Hoist UP	2	1	Hoist UP	
L3	Hoist power supply	Hoist DOWN	3	4	Hoist DOWN	
K21-2	+ brake	Hoist FAST	4	6	D2: Trolley FWD	5
K21-4	- brake	Emergency stop	5	7	D1: Trolley REV	4
K10-1	T1, T7 motor supply	Trolley FWD	6	8	F: Trolley Fast	3
K22-4	T3, T9 motor supply	Trolley REV	7	9	Control voltage	1
K22-6	T2, T8 motor supply	Trolley FAST	8	1-2	Thermal protection	
X1-11	T4 motor supply			2-3	Upper limit switch	
X1-12	T5 motor supply			4-5	Lower limit switch	
X1-13	T6 motor supply			K10	Mainline contactor	
	Ground Terminals Description			K21	Hoist UP contactor	
PE	Motor			K22	Hoist DOWN contactor	
PE	Control panel			K25	Hoist FAST	
PE	Trolley connection			T100	Control Transformer	
PE	Power supply			9	Counter (option)	
				K22-22	Counter (option)	
				F100	630 mA	



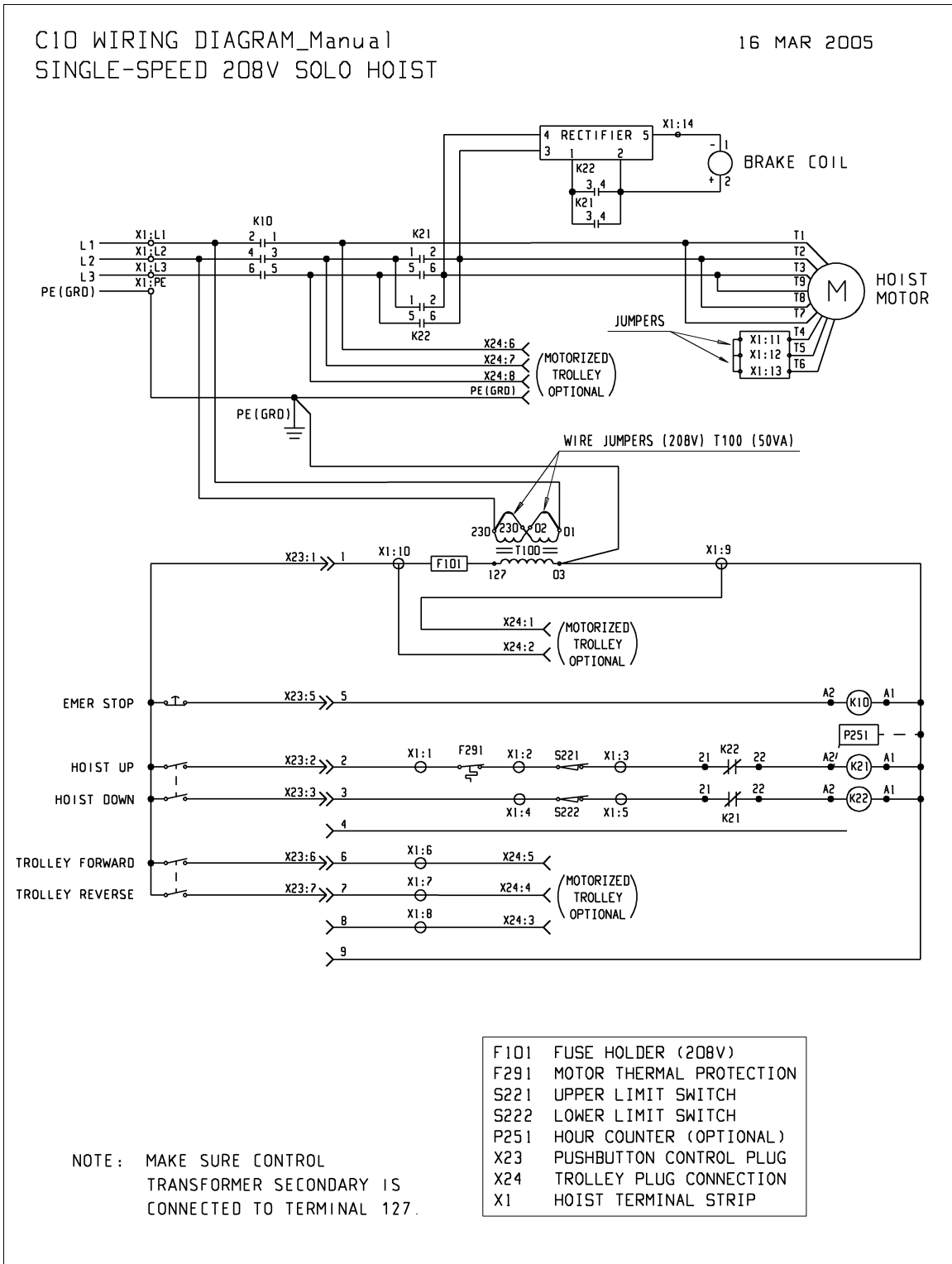
R&M Materials Handling, Inc  
Springfield, Ohio USA  
☎: 800 955-9967  
web: [www.rmhoist.com](http://www.rmhoist.com)

LoadMate® Chain Hoist  
LM10 Installation & Maintenance Manual

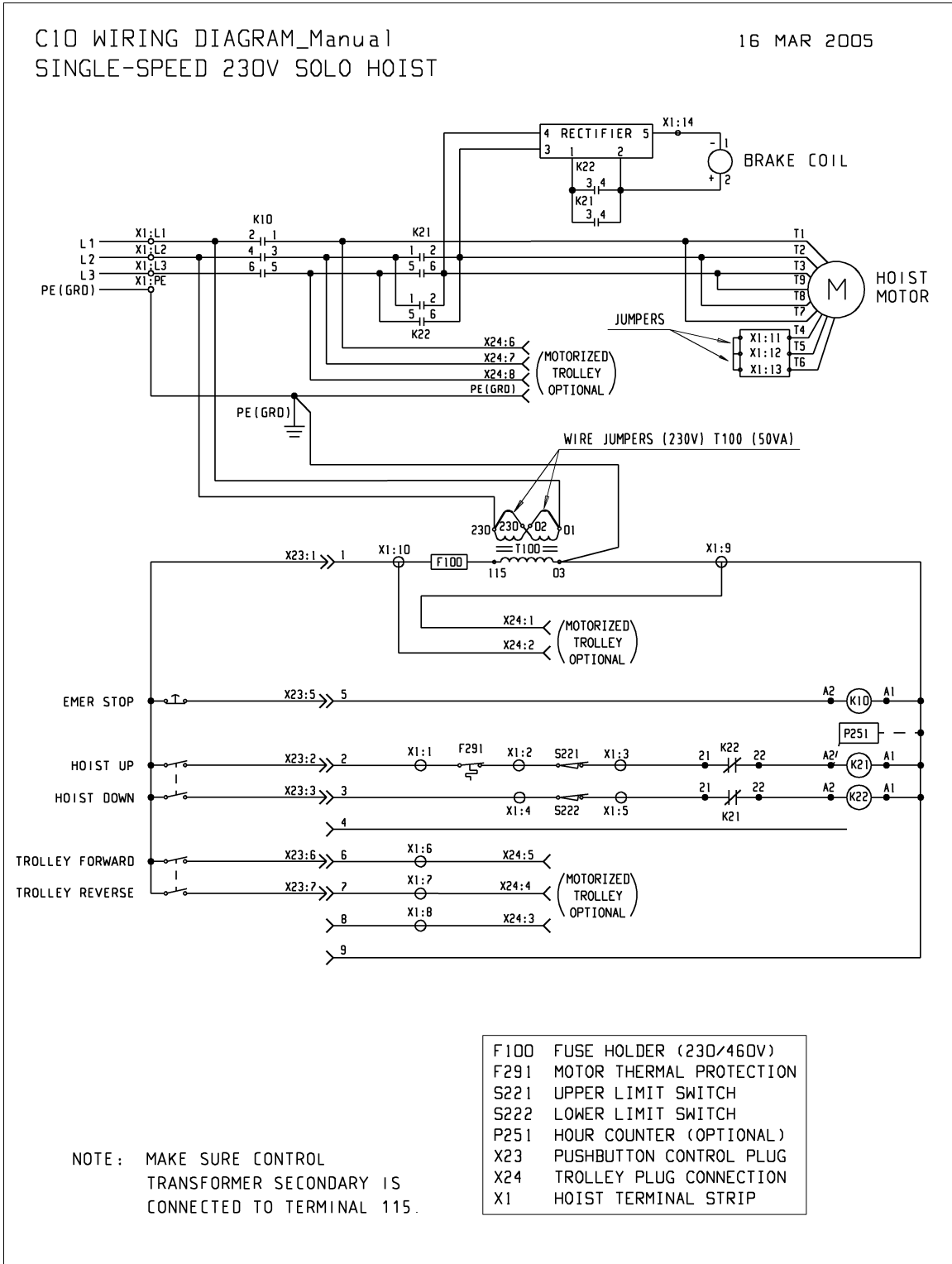
July 2006

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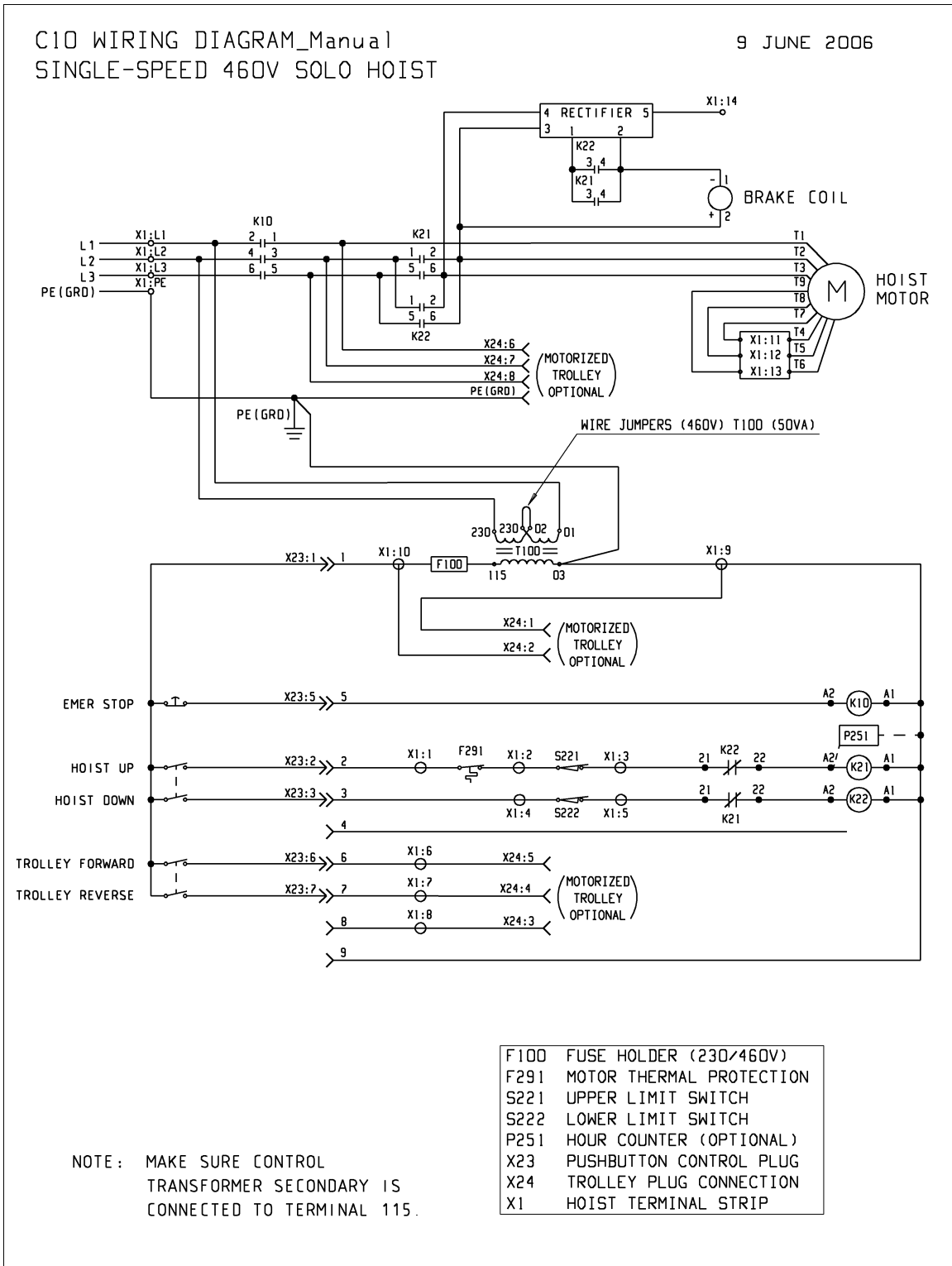
## 5.20 Single-Speed Solo Hoist – 208 Volt Wiring Diagram



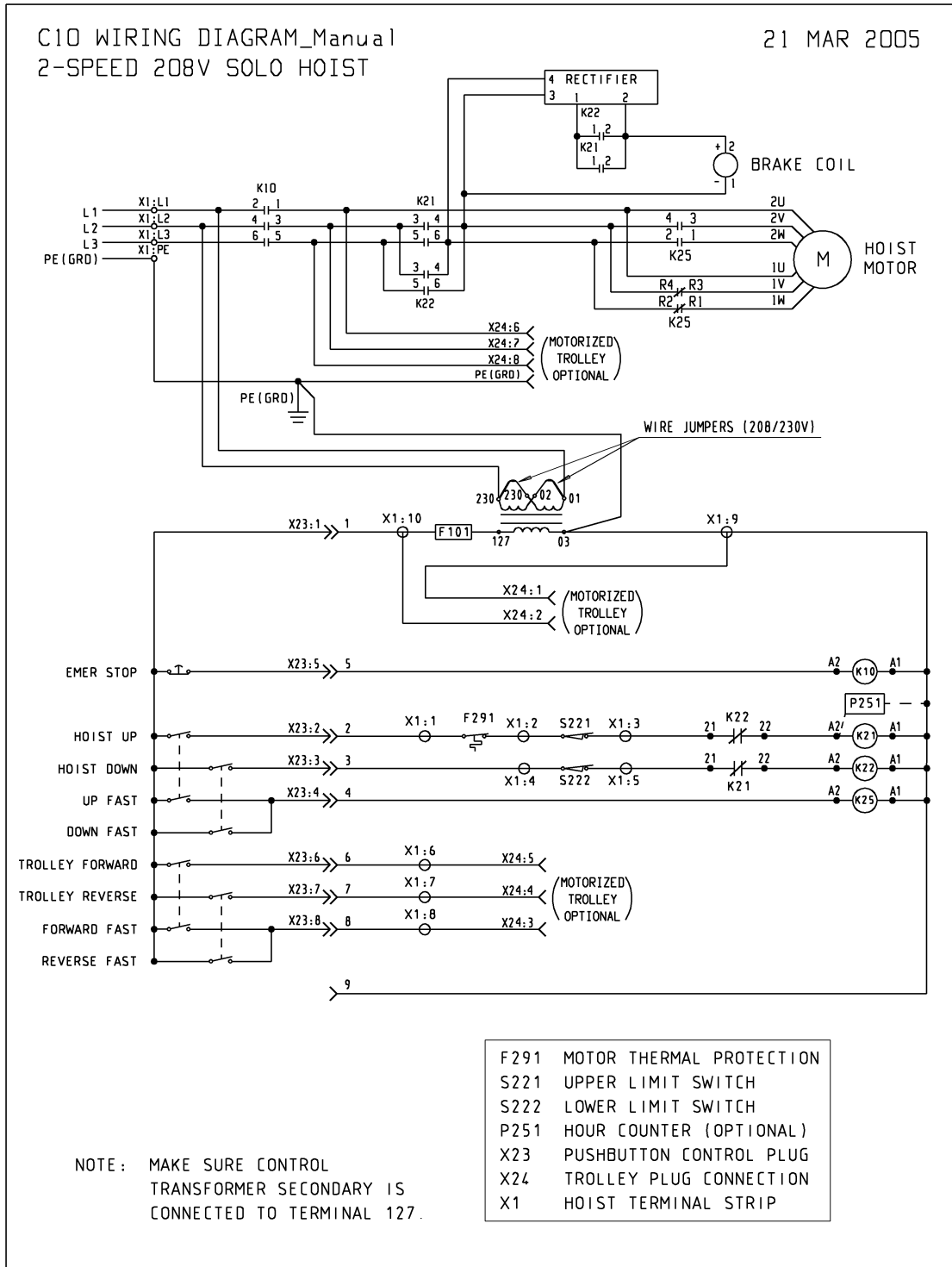
### 5.21 Single-Speed Solo Hoist – 230 Volt Wiring Diagram



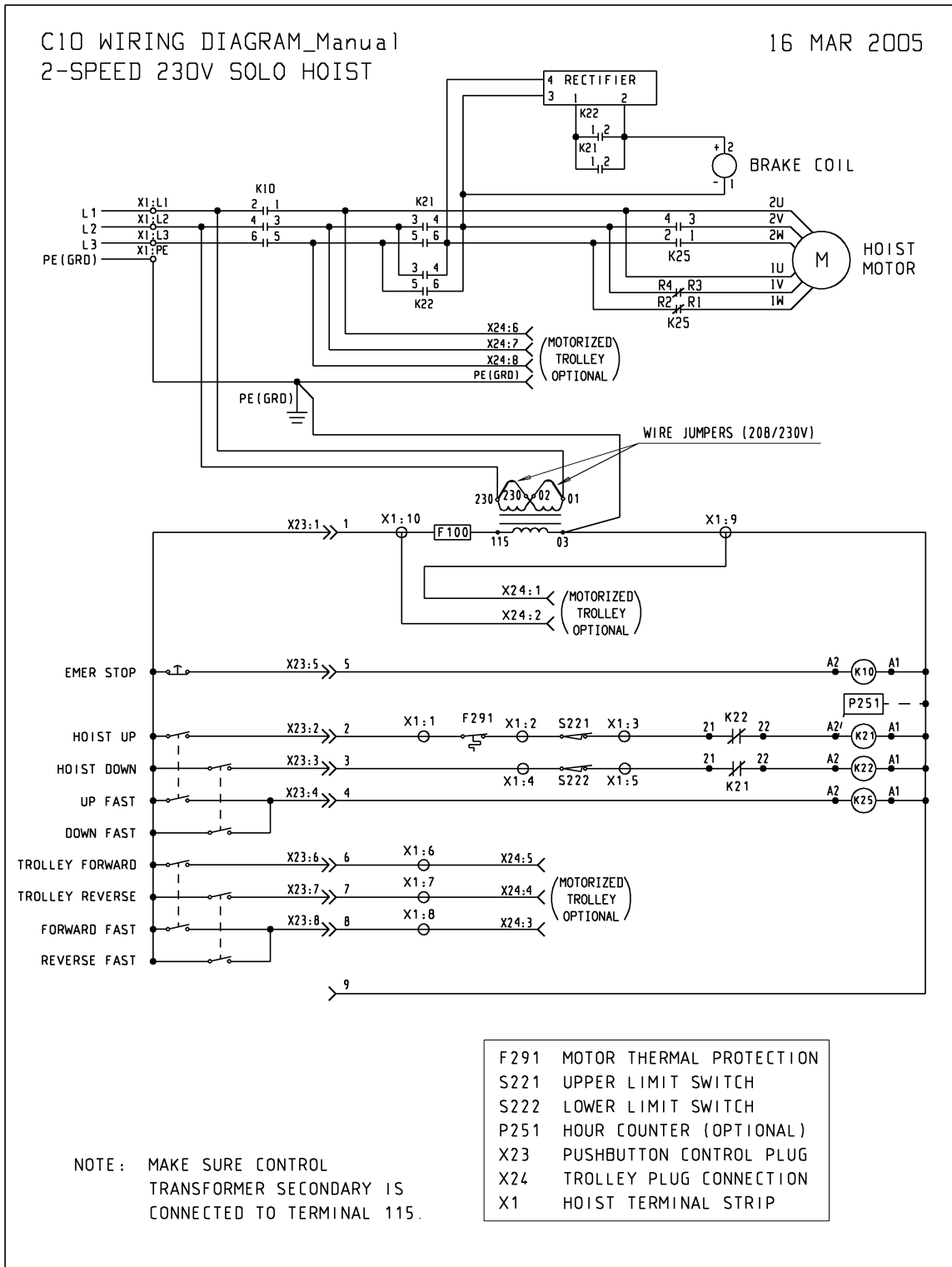
### 5.22 Single-Speed Solo Hoist – 460 Volt Wiring Diagram



### 5.23 Two-Speed Solo Hoist - 208 Volt Wiring Diagram



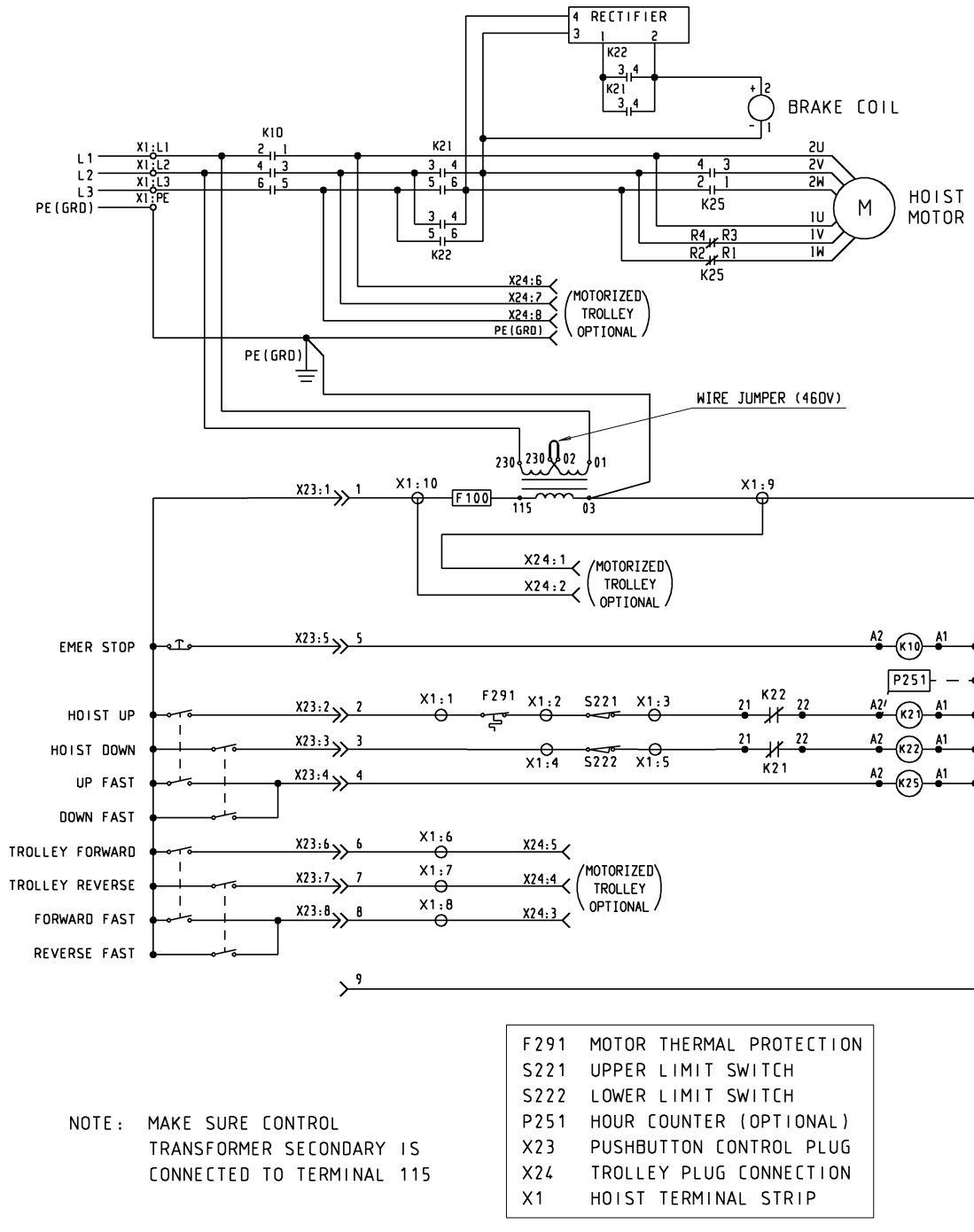
### 5.24 Two-Speed Solo Hoist - 230 Volt Wiring Diagram



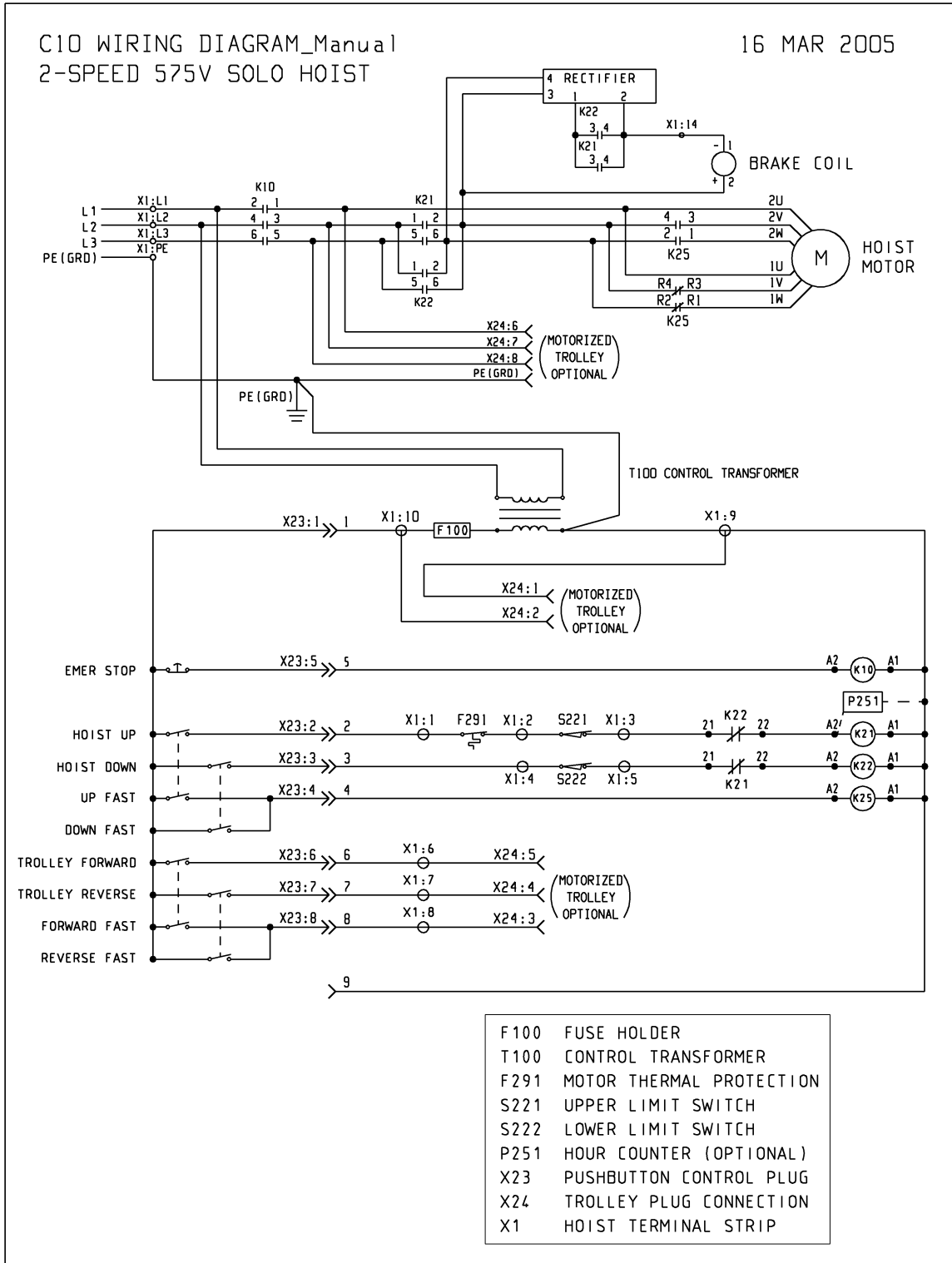
### 5.25 Two-Speed Solo Hoist - 460 Volt Wiring Diagram

C10 WIRING DIAGRAM\_Manual  
2-SPEED 460V SOLO HOIST

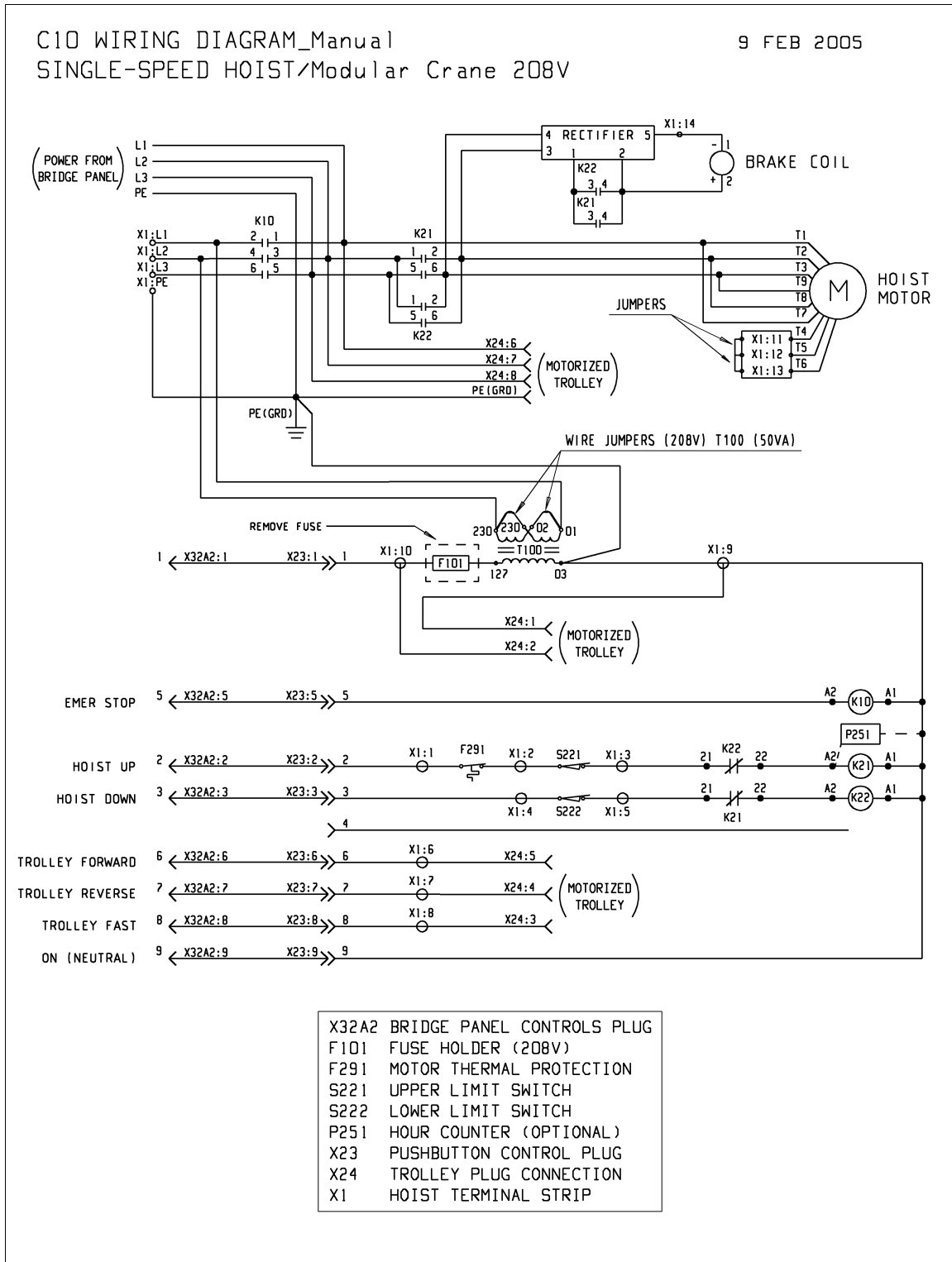
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### 5.26 Two-Speed Solo Hoist – 575 Volt Wiring Diagram

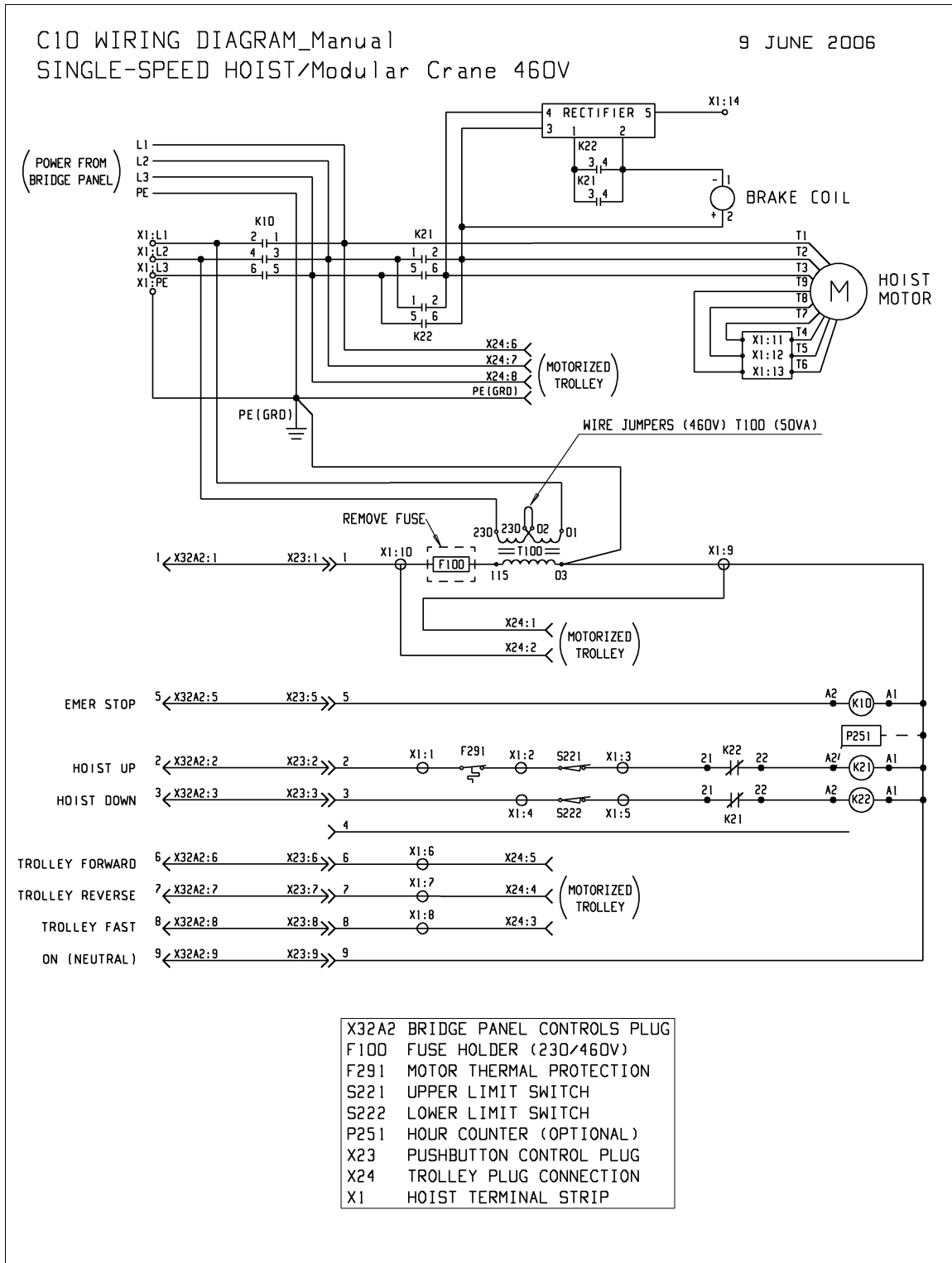


### 5.27 Single-Speed Hoist – Modular Crane – 208 Volt Diagram

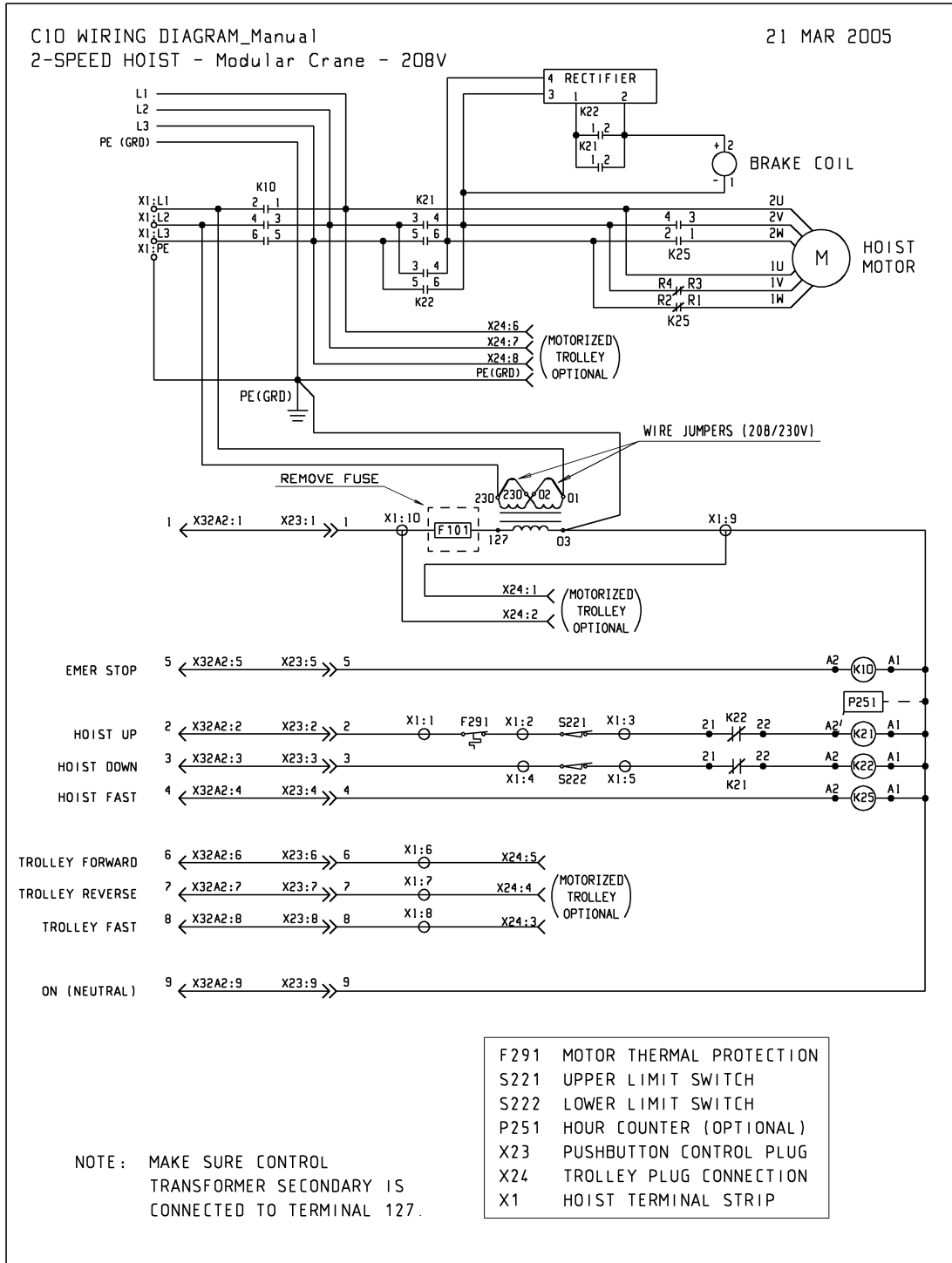




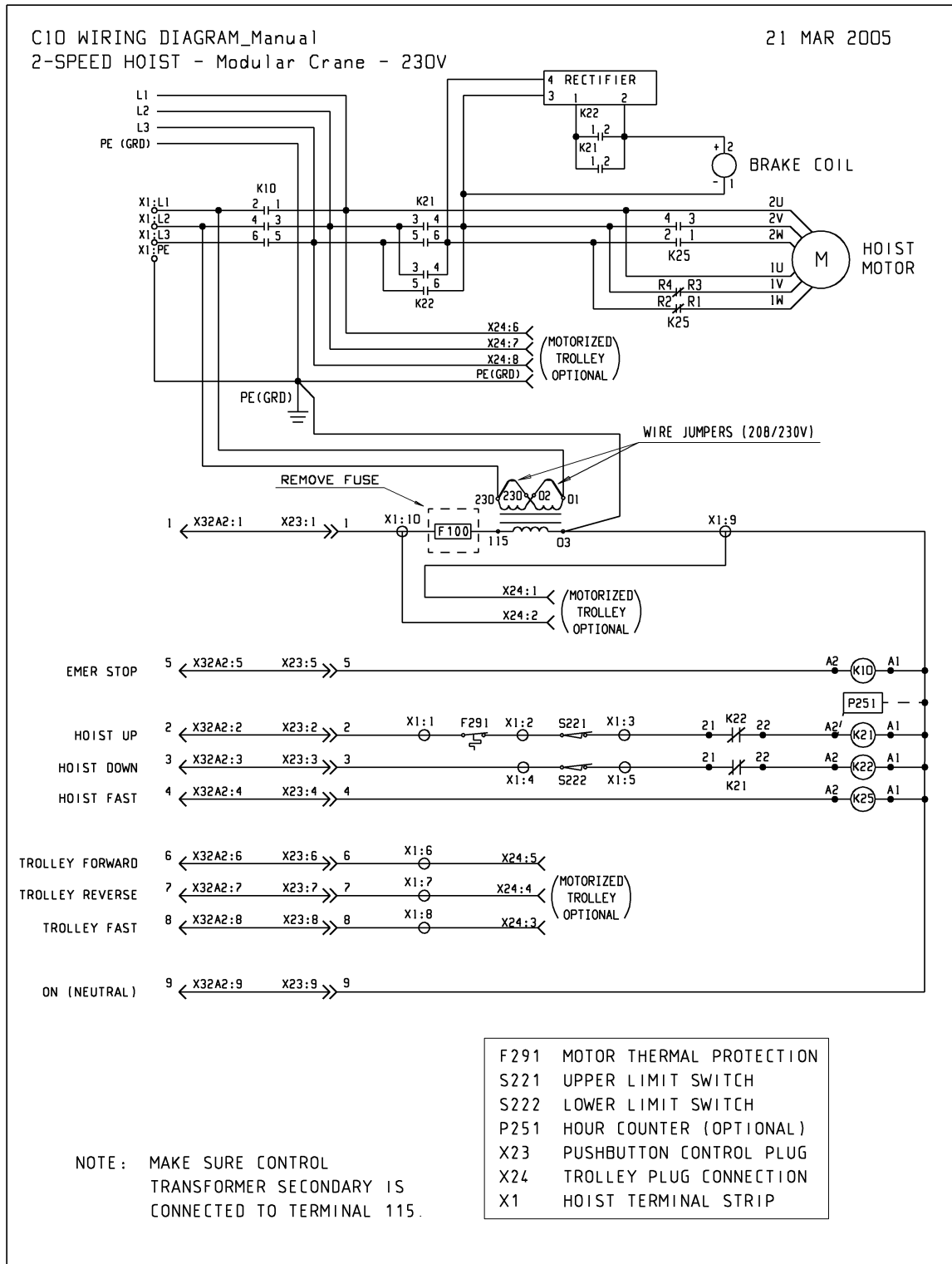
### 5.29 Single-Speed Hoist – Modular Crane – 460 Volt Diagram



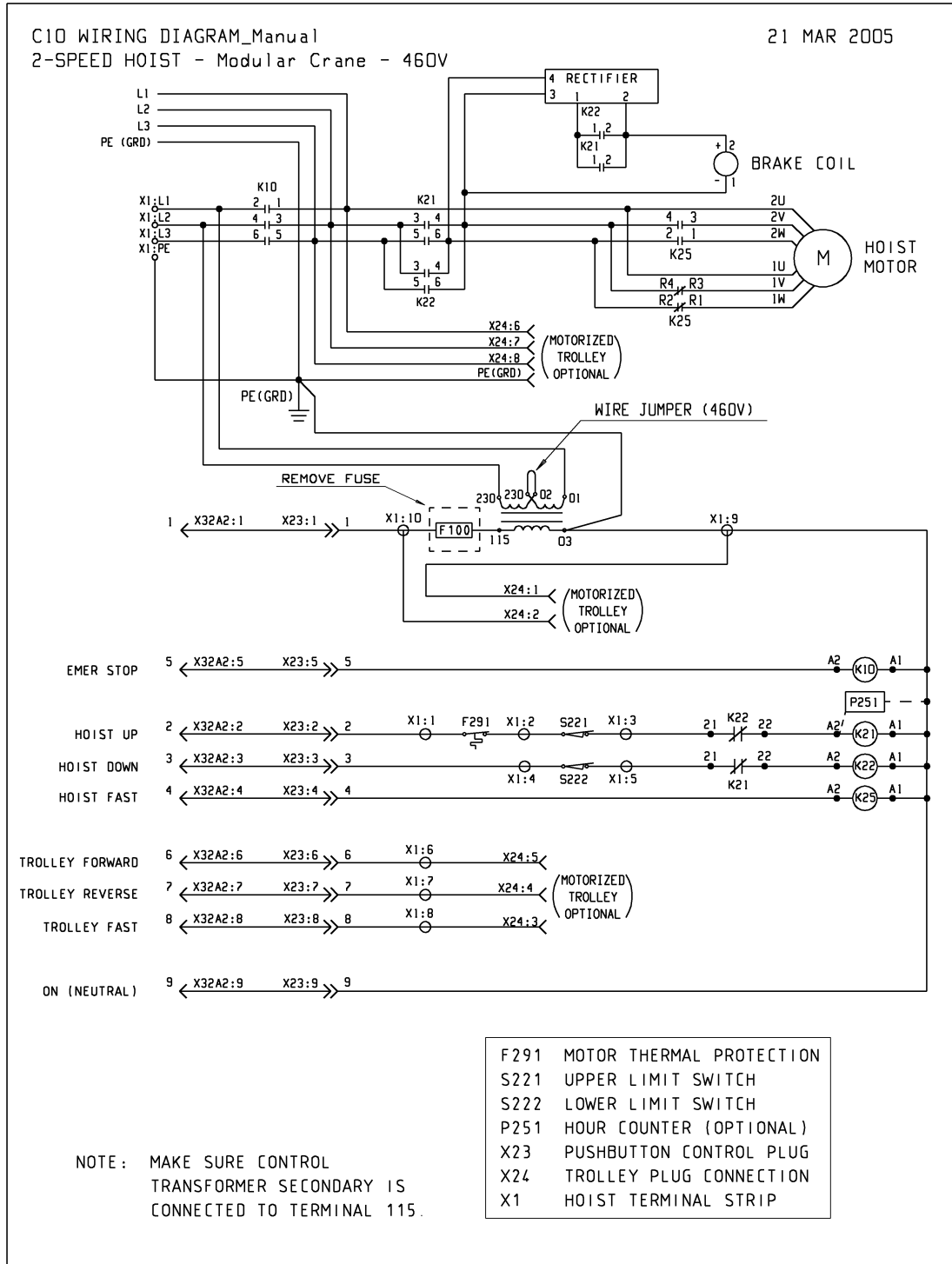
### 5.30 Two-Speed Hoist – Modular Crane – 208 Volt Diagram



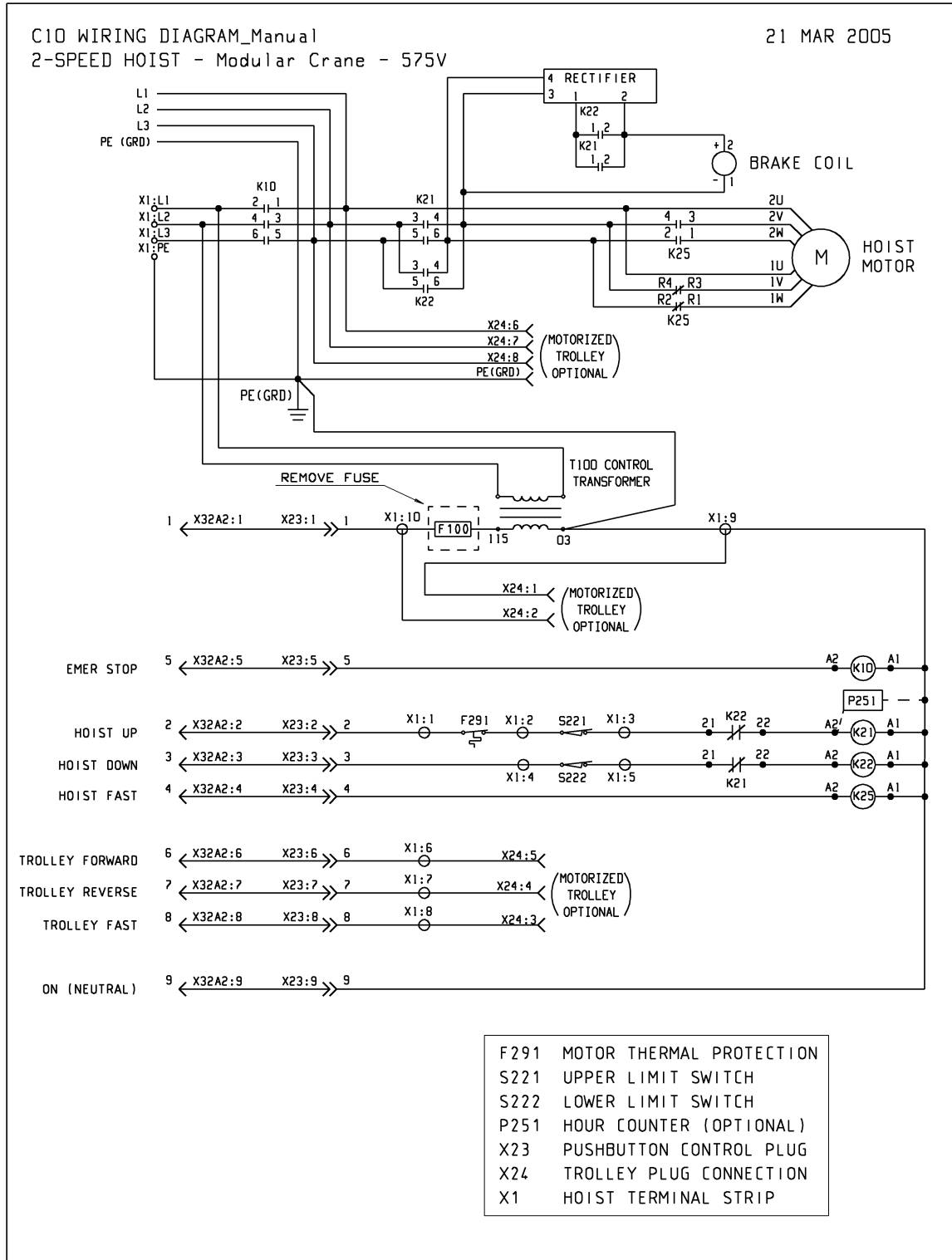
### 5.31 Two-Speed Hoist – Modular Crane – 230 Volt Diagram



### 5.32 Two-Speed Hoist – Modular Crane – 460 Volt Diagram



### 5.33 Two-Speed Hoist – Modular Crane – 575 Volt Diagram





## 6 PREVENTATIVE MAINTENANCE

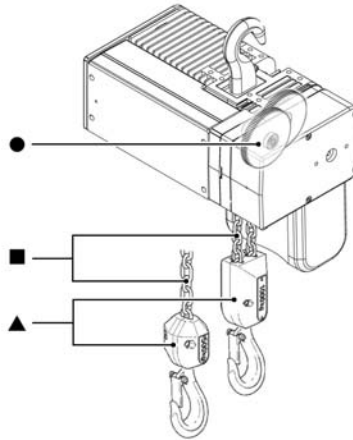
### 6.1 Recommended Periodic Maintenance and Inspection Table

CHECK	INTERVAL	QUALIFIED PERSON
BRAKE OPERATION – HOLDING & RELEASING	Daily	Operator
LOAD CHAIN FOR VISUAL DAMAGE	Daily	Operator
SUSPENSION SUPPORT FOR P/B ASSEMBLY	Daily	Operator
CLEANLINESS & LUBRICATION OF CHAIN	Daily	Operator
UPPER / LOWER LIMIT SWITCHES	Daily	Operator
CHECK LOAD CHAIN FOR WEAR – MEASURE AND RECORD	Every 3 months	Qualified Inspector
CHECK HOOKS FOR WEAR – MEASURE AND RECORD	Every 3 months	Qualified Inspector
CHECK LOAD BLOCK SCREWS / NUTS FOR TIGHTNESS	Every 3 months	Operator
CHECK TOP HOOK / COUPLING HARDWARE FOR TIGHTNESS	Every 3 months	Operator
CHECK SLIP CLUTCH & HOIST BRAKE ADJUSTMENT	3 to 6 months	Qualified mechanic
LUBRICATE OPEN WHEEL GEARING	3 to 6 months	Qualified mechanic
CHECK WIRE TERMINAL TIGHTNESS	Semi-annually	Qualified mechanic
LUBRICATE 2-FALL LOAD BLOCK IDLER SPROCKET	Annually	Operator
CHECK ALL SCREWS / NUTS FOR TIGHTNESS & CORROSION	Annually	Qualified mechanic
CHECK LOAD BLOCK ROTATION AND LUBRICATION	Annually	Qualified mechanic



**INSPECTION INTERVALS SHALL BE SHORTENED IF THE HOIST IS USED MORE FREQUENTLY WITH MAXIMUM LOADS OR IN EXTREME AMBIENT CONDITIONS.**

## 6.2 Lubrication



LUBRICATION POINT	SPECIFICATIONS	ACCEPTABLE LUBRICANTS	QUANTITY
Chain ■	Oil or Liquid grease	Chain lubricating fluid (Ceplattyn or similar) EP-90	As required
Idler sprocket Slide bearing + bearing ▲	Grease (without MoS2) KP 2 (DIN 51 502) Soap-based lithium Approx. drip point + 500°F Worked penetration 509-563°F Operating temperature - 4°F - +266°F	BP: BP Energrease LS - EP 2 Esso: Unirex N2 Mobil: Mobilgrease HP Shell: Shell Alvania EP Grease 2	As required
Gears ●	KP 0 K grease (DIN 51502) Soap-based lithium + MoS 2 Approx. drip point + 180°C Worked penetration 355 - 385°C Operating temperature -30°C to + 130°C	Mobil: Mobilgrease special BP: Multi-purpose grease L 21 M Shell: Shell Retimax AM Texaco: Molytex grease EP 2	0.05 liter

**Open Wheel Gearing: EP1 Mobilux or equivalent.**



### 6.3 Recommended technical support for various spare parts

SPARE PART	REPLACED BY
Upper chain guide	Qualified electrician & mechanic
Output shaft	Qualified electrician & mechanic
PG cable gland	Qualified electrician
Gear input shaft + adjusting nuts	Qualified mechanic
Motor end cap	Qualified mechanic
Gearing (1st/2nd stage)	Qualified electrician & mechanic
Brake cap/end cap sealing	Qualified mechanic
Other seals and O-rings	Qualified mechanic
Brake-limiter	Qualified electrician
Brake end cap	Qualified mechanic
Lower chain guide	Qualified mechanic
Rubber buffer	Qualified mechanic
Electric box	Qualified electrician
PC-board	Qualified electrician
Plugs	Qualified electrician
Chain	Qualified mechanic
Chain bucket	Qualified mechanic
Slack fall stop	Qualified mechanic
Suspension hook	Qualified mechanic
Hook block (1/1; 2/1)	Qualified mechanic
Control box	Qualified electrician

Once a part has been replaced, check hoist operation per sections 3.3 and 3.4.

### 6.4 Screw Tightening Torque (lb-ft) Specification

	M5	M6	M8	M10	M12
Standard screws	4	7	18	35	61
Self-tapping screws	4	6	15	30	53

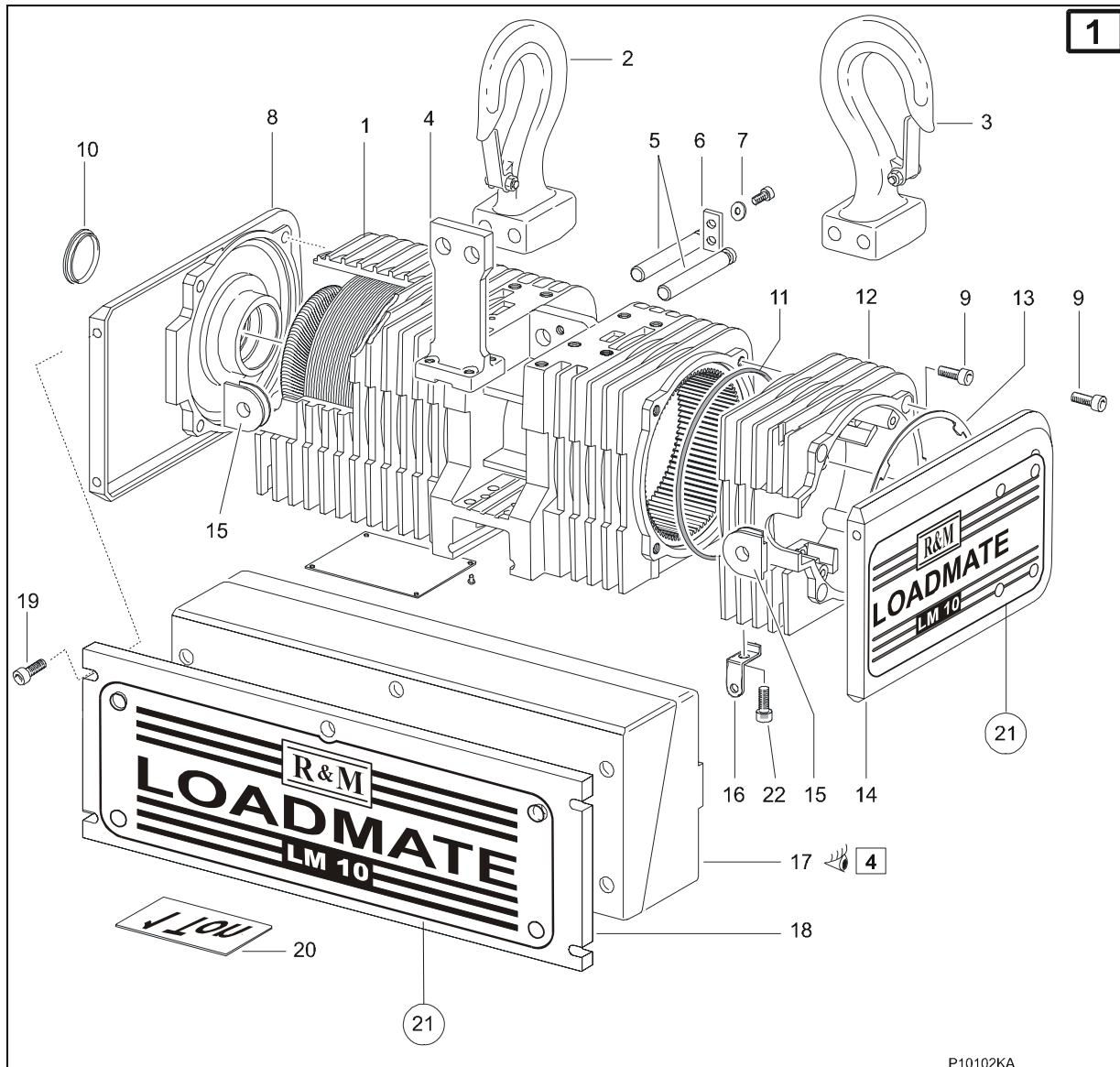


## 6.5 Troubleshooting

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Hoist does not lift or lower load	Emergency stop button is activated	Deactivate button
	Blown fuse	Replace the fuse
	Motor thermal protection activated	Allow motor too cool down
	Pendant plug pin pushed out	Reinstall plug pin
	Contactora terminal screws loose	Tighten screws
	Mainline switch shut off	Turn switch on
Hoist does not lift load	Overload condition	Reduce load
	Slip clutch worn or incorrectly adjusted	Replace wear items or readjust slip clutch torque
	Brake not releasing	Check brake coil resistance. Check air gap setting. Adjust if necessary. Check rectifier output voltage.
Load drifts more than 4 inches [100mm]	Brake lining worn Air gap on brake is too wide	Replace wear items as necessary Adjust air gap setting
Travel direction does not correspond to that indicated on pushbutton	Power supply incorrectly connected	See SECTION 2
Abnormal noises while lifting or lowering	Load chain and its components are not lubricated	Clean and lubricate load chain.
	Load chain is worn	Replace chain
	Chain wheel or chain guide is worn	Replace chain wheel or chain guide
	Idler sprocket is worn	Replace idler sprocket
	A supply phase is missing	Connect the three phases
	Twist or kink in load chain	Remove twist or kink

## 7 PARTS ILLUSTRATIONS

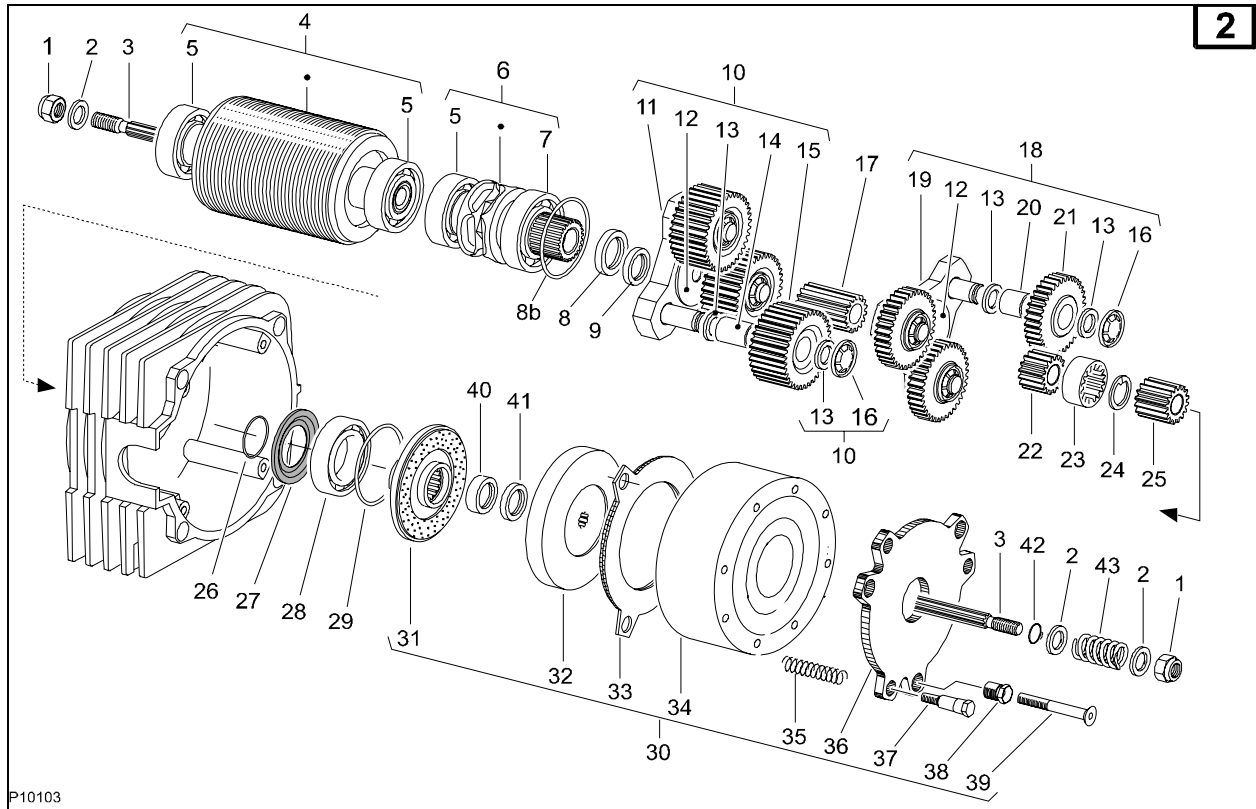
### 7.1 Hoist Body





ITEM	PART NUMBER	DESCRIPTION	QTY
-		HOIST BODY	1
1		STATOR	1
1a	2249961	COUPLING SET – PERPENDICULAR FOR PUSH / PARALLEL FOR TDU	1
1a	2249962	COUPLING SET – PARALLEL FOR PUSH / PERPENDICULAR FOR TDU	1
2	2249955	TOP HOOK SET (INCLUDES 5+6+7) – PERPENDICULAR	1
3	2249952	TOP HOOK SET (INCLUDES 5+6+7) – PARALLEL	1
4	2242011	TOP HOOK PLATE	1
5	-	TOP HOOK SUPPORT PIN	2
6	-	TOP HOOK KEEPER PLATE	1
7	-	SCREW	1
	2249904	MOTOR END CAP SET (8+9+10)	1
8	-	MOTOR END CAP	1
9	-	M6 SCREW	13
10	-	DUST CAP	1
11	2240013	O-RING	1
12	2240011	BRAKE HOUSING	1
13	2240013	SEAL	1
	2249903	BRAKE END CAP SET (14+9)	1
14	-	BRAKE END CAP	1
15	2218004	CABLE GLAND	2
16	2218000	PUSH BUTTON SUPPORT BRACKET SET (16+22)	1
17		ELECTRICAL ENCLOSURE	1
18	2243008	COUNTER WEIGHT	1
19		M6 SCREW	4
20	2213309008	CAPACITY STICKER – 500 kg	1
20	2213309009	CAPACITY STICKER – 1000 kg	1
20	2213309016	CAPACITY STICKER – 1500 kg	1
20	2213309010	CAPACITY STICKER – 2000 kg	1
20	2213309002	CAPACITY STICKER - ½ ton	1
60	2213309003	CAPACITY STICKER – 1 ton	1
20	2213309014	CAPACITY STICKER – 1.5 ton	1
20	2213309004	CAPACTIY STICKER – 2 ton	1
21	2406879002	R&M BRANDING SET	1
22	-	M8 SCREW	1

## 7.2 Gear Mechanism With Motor Brake - Version A



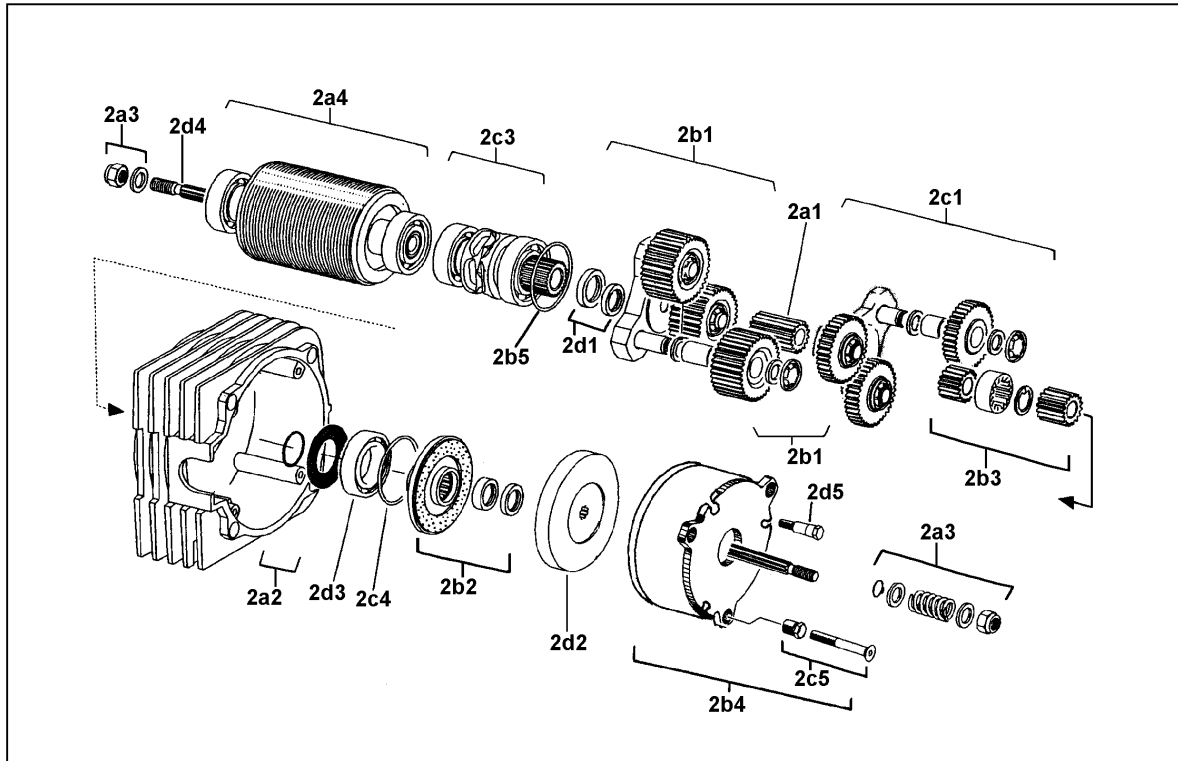
Motor Brake Version A is REPLACED BY MOTOR BRAKE VERSION B. They are interchangeable.



**Gear Mechanism with Motor Brake - Version A**

ITEM	PART NUMBER	DESCRIPTION	QTY
1		TORQUE ADJUSTING NUT	2
2		WASHER	3
3	2241501	MOTOR SHAFT	1
4	2245025	ROTOR ASSEMBLY	1
5		BEARING	3
6	2249941	CHAIN SPROCKET ASSEMBLY (5+7+8+9)	1
7		BEARING	1
8		BUSHING	1
8b		RETAINING RING	1
9		SEAL	1
10	2249938	GEAR ASSEMBLY - 2 <sup>nd</sup> STEP – 16FPM	1
10	2249951	GEAR ASSEMBLY - 2 <sup>nd</sup> STEP – 32FPM	1
16		RETAINING RING	6
17	2240503	PINION - 2 <sup>nd</sup> STEP	1
18	2249937	GEAR ASSEMBLY - 1 <sup>st</sup> STEP	1
19		PLANET CARRIER	1
20		NEEDLE BEARING	3
21		PLANET GEAR - 1 <sup>st</sup> STEP	3
	2249981	COUPLING PINION SET (22+23+24+25)	1
22		PINION - 1 <sup>st</sup> STEP	1
23		COUPLING SLEEVE	1
24		SNAP RING	1
25		COUPLING	1
	2249972	METAL SEALING RING SET (26+27+28+29)	1
26		LOCK RING	1
28	8176214	BEARING	1
29		O-RING	1
30	2241075	BRAKE & LIMITER ASSY 190VDC / 380- 480VAC	1
30	2248000	BRAKE & LIMITER ASSY 100VDC / 208- 230VAC	1
30		BRAKE & LIMITER ASSY 240VDC / 575VAC	1
31	2241018	TORQUE LIMITER FRICTION DISC ASSY (31+40+41)	1
32	2241015	LIMITER & BRAKE DISC	1
33		FRICTION DISC	1
34	2241010	190VDC BRAKE COIL & FRICTION DISC 380- 480VAC	1
34	2241011	100VDC BRAEK COIL & FRICTION DISC 200- 230VAC	1
34	2241012	240VDC BRAKE COIL & FRICTION DISC 575VAC	1
35	2241030	BRAKE SPRING	1
36	2241070	ANCHOR DISC	1
37	2241027	SCREW	3
38		ADJUSTING NUT	3
39	2249951	SCREW M6x40 & NUT KIT (38+39)	3
40		LOCATING BUSHING	1
41		LIP SEAL	1
42		O-RING	1
43	2249940	TORQUE LIMITER SPRING SET (1+2+42+43)	1

### 7.3 Gear Mechanism with Motor Brake - Version B

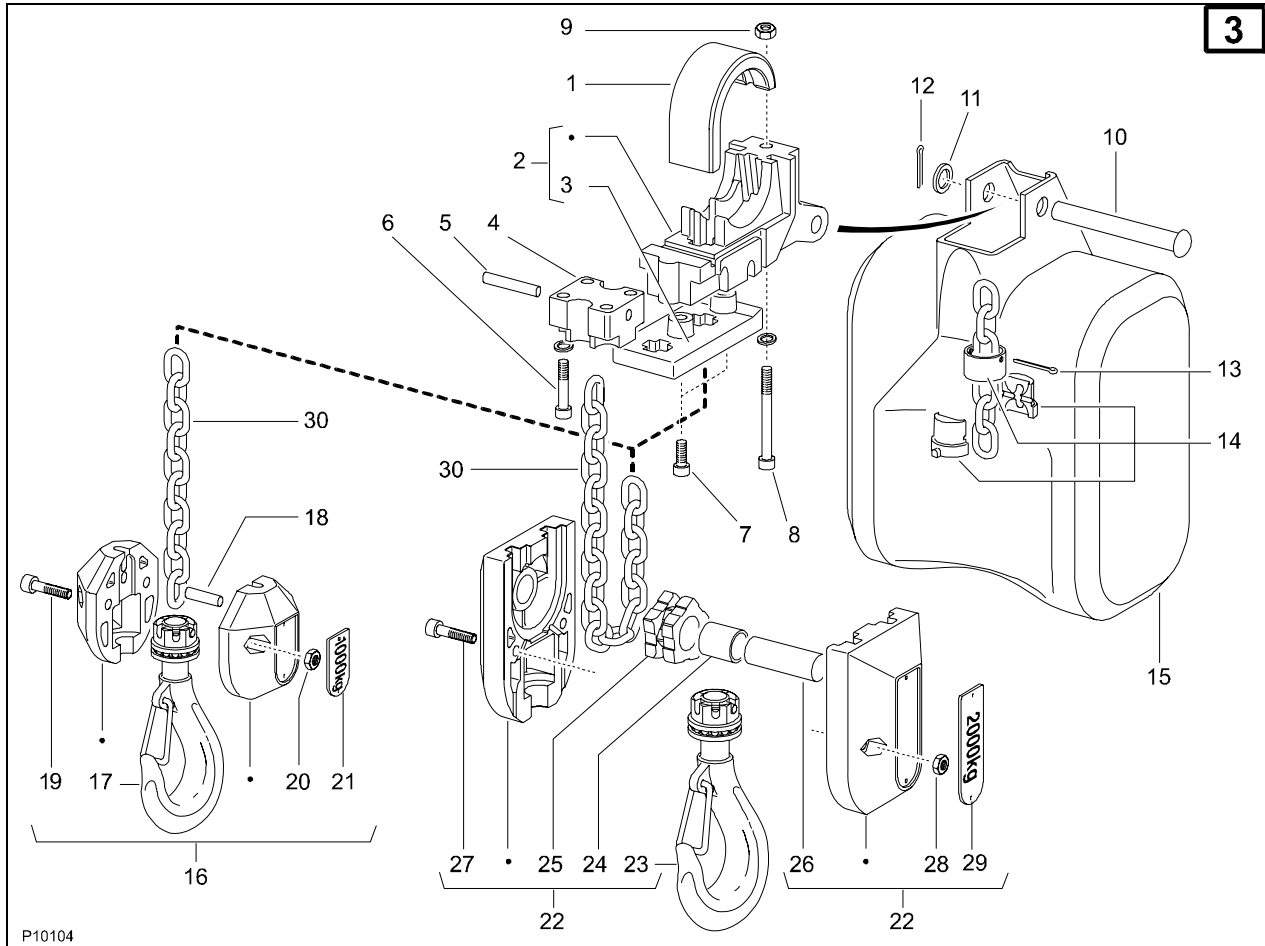




Gear Mechanism with Motor Brake - Version B

ITEM	PART NUMBER	DESCRIPTION	QTY
2a1	2240503	PINION	1
2a2	2249970	SEAL / RING SET	1
2a3	2249940	LIMITER SPRING SET	1
2a4	2245001	ROTOR ASSEMBLY	1
2b1	2249938	GEAR ASSEMBLY, 2 <sup>nd</sup> STEP – 16 FPM	1
2b1	2240552	GEAR ASSEMBLY, 2 <sup>nd</sup> STEP 32 FPM	1
2b2	2241018	LIMITER FRICTION DISC SET	1
2b3	2249981	BRAKE COUPLING SET	1
2b4	2248001	COIL ASSEMBLY 190 VDC – 380 – 480VAC	1
2b4	2248000	COIL ASSEMBLY 100 VDC – 208-230VAC	1
2b4	2248003	COIL ASSEMBLY 240 VDC – 575VAC	1
2b5	8287225	RETAINING RING	1
2c1	2249937	GEAR ASSEMBLY 1 <sup>st</sup> STEP	1
2c3	2249941	SPROCKET ASSEMBLY	1
2c4	8386202	O-RING	1
2c5	2249951	BRAKE LIMITER SCREW SET	1
2d1	2249980	SPROCKET PARTS	1
2d2	2241015	CLUTCH DISC	1
2d3	8176214	BEARING	1
2d4	2241501	SHAFT	1
2d5	2241027	SCREW	3

## 7.4 Lifting Assembly

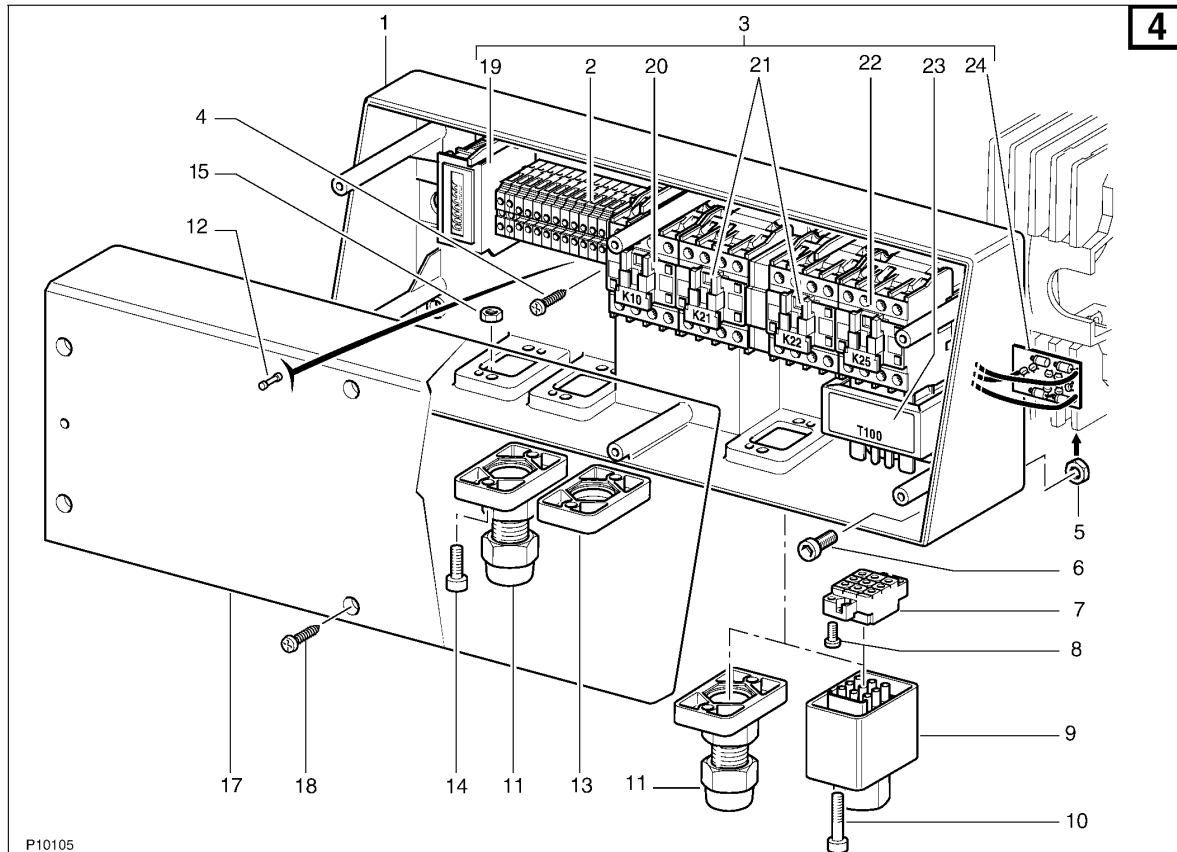




ITEM	PART NUMBER	DESCRIPTION	QTY
	2242060	CHAIN GUIDE ASSEMBLY	
1	-	UPPER CHAIN GUIDE	1
2	-	LOWER CHAIN GUIDE SET (2+8+9)	1
	-	LOWER CHAIN GUIDE	1
3	2249936	RUBBER PLATE SET	1
		RUBBER PLATE	1
4	2243523	CHAIN ANCHOR SET	1
5		DOWEL	1
7		SCREW	1
8		SCREW	1
9		SCREW	1
10		SCREW	1
11		WASHER	1
12		SPLIT PIN	1
13		SPLIT PIN	1
14	2249942	SLACK FALL STOP ASSEMBLY	1
15	2249925	CHAIN CONTAINER & HARDWARE – 25 FT MAX. (10+11+12+15)	1
15	2249926	CHAIN CONTAINER & HARDWARE – 50 FT MAX. (10+11+12+15)	1
15	2249932	CHAIN CONTAINER & HARDWARE – 100 FT MAX. (10+11+12+15)	1
15	2249933	CHAIN CONTAINER & HARDWARE – 150 FT MAX. (10+11+12+15)	1
16	2249905	LOAD BLOCK ASSEMBLY – 1 FALL	1
17	2249926	HOOK ASSEMBLY – 1 FALL	1
	001515	SAFETY LATCH - 1 FALL	1
18		SHAFT	1
19		SCREW	2
20		SELF LOCKING NUT	2
21	2213333002	CAPACITY STICKER - 1/2 TON – 1 FALL	1
21	2213333004	CAPACITY STICKER - 1 TON – 1 FALL	1
21	2213333009	CAPACITY STICKER - 500 kg – 1 FALL	1
21	2213333011	CAPACITY STICKER – 1000 kg – 1 FALL	1
22	2249978	LOAD BLOCK ASSEMBLY – 2 FALL	1
23	2242021	HOOK ASSEMBLY – 2 FALL	1
23a	001513	SAFETY LATCH - 2 FALL	1
24		BUSHING – 2 FALL	1
25		IDLER SPROCKET ASSEMBLY (24+25+26)	1
26		SHAFT	1
27		SCREW	2
28		SELF LOCKING NUT	2
29	2213333004	CAPACITY STICKER – 1 TON - 2 FALL	2
29	2213333005	CAPACITY STICKER – 2 TON 2 FALL	2
29	2213333011	CAPACITY STICKER – 1000 kg – 2 FALL	2
29	2213333012	CAPACITY STICKER – 2000 kg – 2 FALL	2
30a	2243500	LOAD CHAIN – ZINC PLATED	N
30b	2243501	LOAD CHAIN – BLACK	

30c	2243502	LOAD CHAIN – STAINLESS STEEL	
	2241045	CHAIN INSERTION TOOL	1

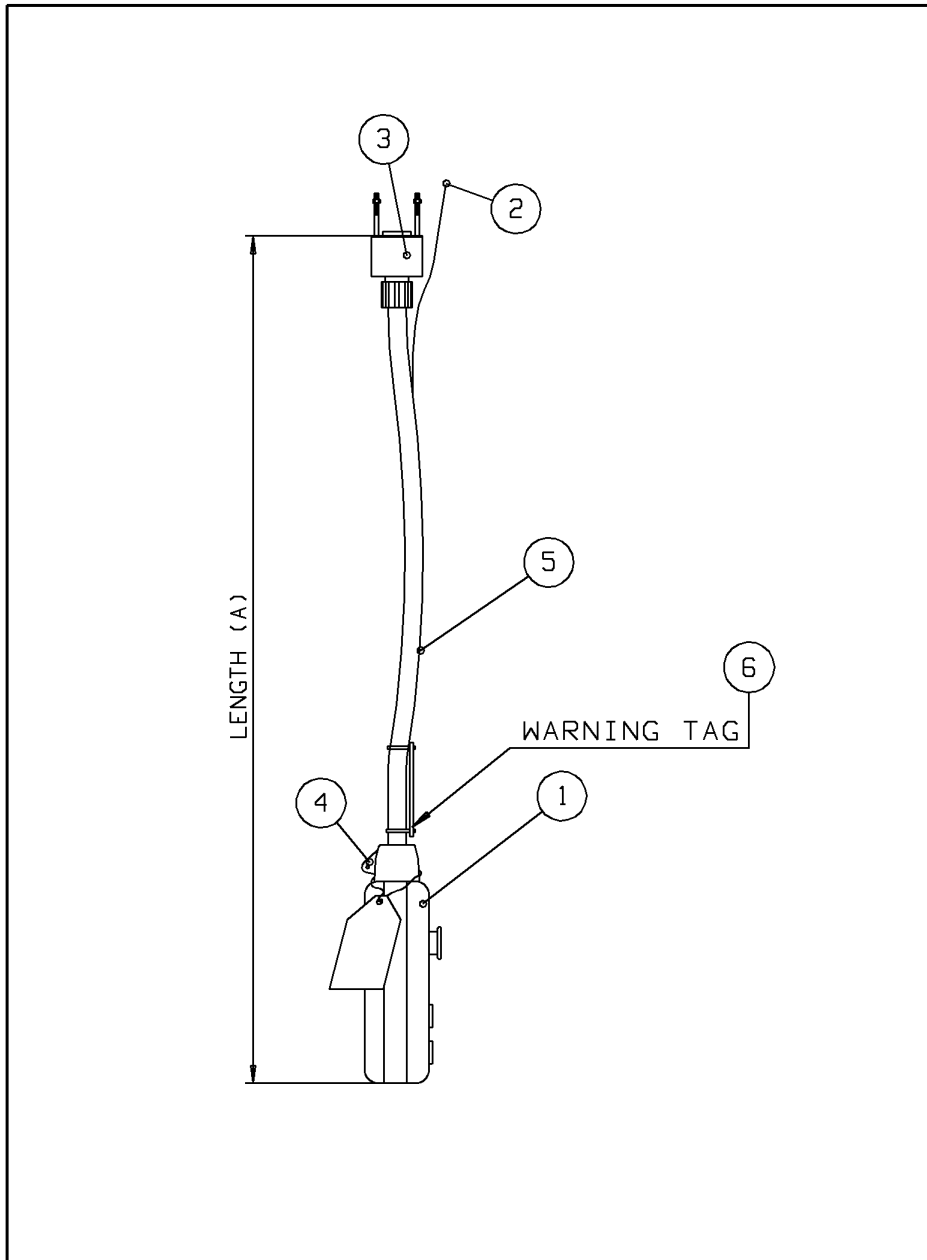
## 7.5 Controls





ITEM	PART NUMBER	DESCRIPTION	QTY
1	2249965	CONTROL BOX BASE	1
2		TERMINIAL BOARD	1
3a	2243017	CONTROL PANEL ASSEMBLY – TWO SPEED – 460V / 115V / 60HZ	1
3b	2243016	CONTROL PANEL ASSEMBLY – TWO SPEED - 575V / 115V / 60Hz	1
3c	2243018	CONTROL PANEL ASSEMBLY TWO SPEED - 230V/115V/60Hz	1
3d	-	CONTROL PANEL ASSEMBLY – SINGLE SPEED – 230 / 460V / 115V	1
4		SCREW	9
5		STOP NUT	4
6		7.5.1.1 SCREW	4
7	7285039	RECEPTACLE WITH WIRES - PUSHBUTTON	1
8		PLASTIC SCREW	2
	2249945	PLUG SET – PUSHBUTTON	1
	2249946	PLUG SET – TROLLEY	1
	2249982	PLUG SET – POWER SUPPLY	1
9		PLUG	1
10		SCREW	2
11	2249947	POWER CABLE GLAND	1
12	2249979	FUSE (SET OF SET)	1
13	2219814	COVER PLATE	1
14		SCREW	4
15		NUT	4
17	2249965	CONTROL BOX COVER SET	1
18		PLASTIC SCREW	6
19	2213028	HOUR COUNTER	1
20	-	K10 MAINLINE CONTACTOR ( 208 - 575V / 115V )	1
21a	-	K21 CONTACTOR ( 208 - 575V / 115V )	2
21b	-	K22 CONTACTOR ( 208 - 575V / 115V )	1
22	-	K25 CONTACTOR ( 208 - 575V / 115V )	1
23a	7983026	CONTROL TRANSFORMER ( 208 / 230 / 460V / 115V)	1
23b	7983027	CONTROL TRANSFORMER ( 575V / 115V )	1
23c	7983028	TRANSFORMER	1
23d	7983029	TRANSFORMER	1
23e	7983030	TRANSFORMER	1
24a	2243060	RECTIFIER – 4 WIRES – 575V	1
24b	2243061	RECTIFIER – 5 WIRES – RECONNECTABLE – 208 / 230 / 460	1
	2218000	PENDANT SUSPENSION SET	1

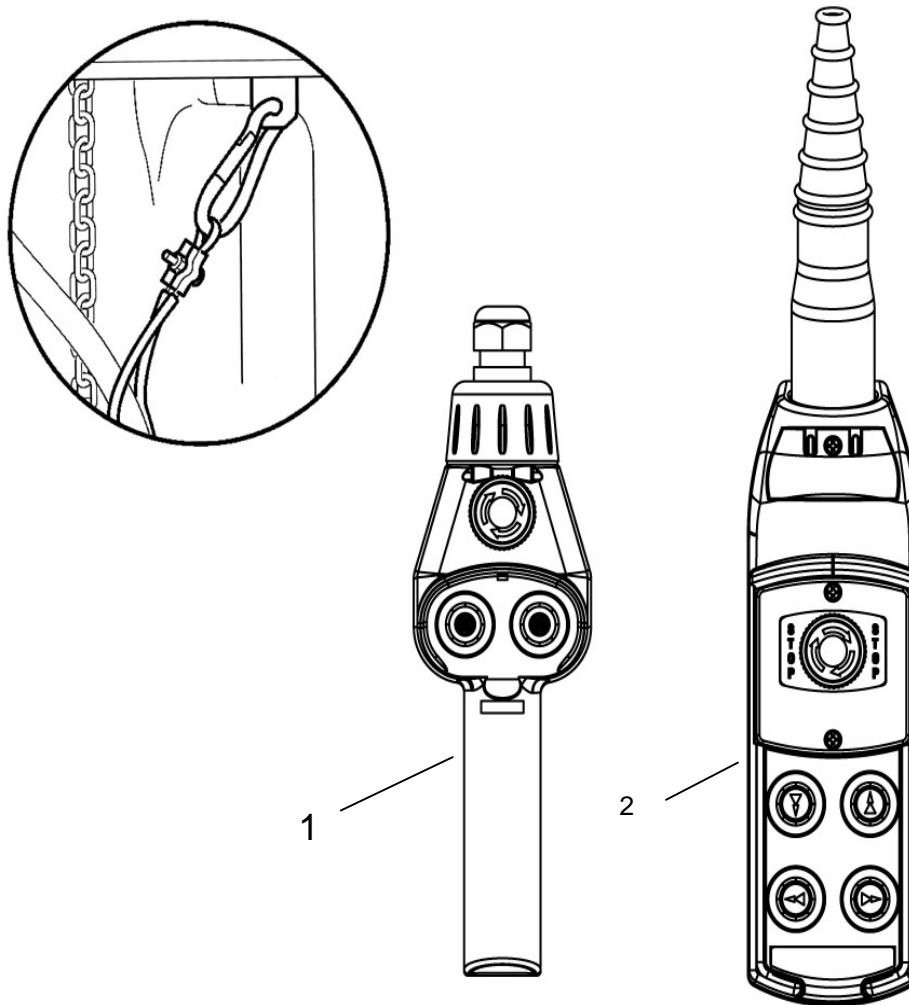
## 7.6 Push Button Assembly – Vertical Pairs of Buttons





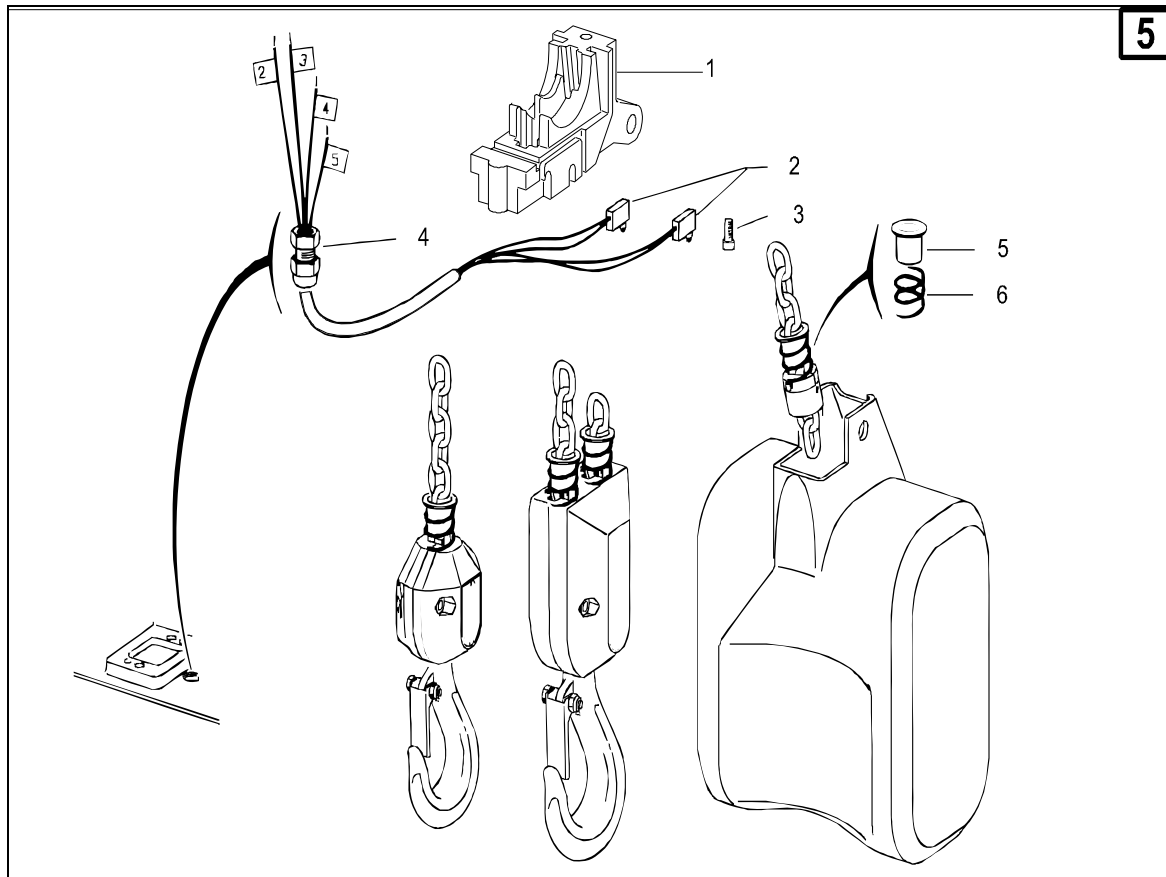
ITEM	PART NUMBER	DESCRIPTION	QTY
-	2309673010	P/B ASSEMBLY – 10 FT, E-STOP, SS HOIST	1
-	2309673015	P/B ASSEMBLY – 15 FT, E-STOP, SS HOIST	1
-	2309673020	P/B ASSEMBLY – 20 FT, E-STOP, SS HOIST	1
-	2309674010	P/B ASSEMBLY – 10 FT, E-STOP, TS HOIST	1
-	2309674015	P/B ASSEMBLY – 15 FT, E-STOP, TS HOIST	1
-	2309674020	P/B ASSEMBLY – 20 FT, E- STOP, TS HOIST	1
-	2309675010	P/B ASSEMBLY – 10 FT, E-STOP, SS HOIST, TS TROLLEY	1
-	2309675015	P/B ASSEMBLY – 15 FT, E-STOP, SS HOIST, TS TROLLEY	1
-	2309675020	P/B ASSEMBLY – 20 FT, E-STOP, SS HOIST, TS TROLLEY	1
-	2309676010	P/B ASSEMBLY – 10 FT, E-STOP, TS HOIST, TS TROLLEY	1
-	2309676015	P/B ASSEMBLY – 15 FT, E-STOP, TS HOIST, TS TROLLEY	1
-	2309676020	P/B ASSEMBLY – 20 FT, E-STOP, TS HOIST, TS TROLLEY	1
1a	2212932011	P/B ENCLOSURE ASSEMBLY: E-STOP, SS HOIST	1
1b	2212932012	P/B ENCLOSURE ASSEMBLY: E-STOP, TS HOIST	1
1c	2212932032	P/B ENCLOSURE ASSEMBLY: E-STOP, SS HOIST, TS TROLLEY	1
1c	2212932033	P/B ENCLOSURE ASSEMBLY: E-STOP, TS HOIST, TS TROLLEY	1
2	2218000	UPPER SUSPENSION KIT	1
3	7285035	PLUG KIT – P/B ASSEMBLY	1
4	-	SUSPENSION UNIT – INCLUDED WITH ITEM 3	1
5	52292266	P/B ELECTRICAL CABLE – 16 GAUGE / 12 CONDUCTOR RPC	1
6	2309414001	R&M OPERATOR'S WARNING TAG - ENGLISH	1

## 7.7 Push Button Assembly – Horizontal Pairs of Buttons



ITEM	PART NUMBER	DESCRIPTION	QTY
1	52301832	PISTOL GRIP P/B CONTROL ASSEMBLY – TWO SPEED	1
-	2309414001	R&M OPERATOR'S WARNING TAG - ENGLISH	1

## 7.8 Upper & Lower Limit Switch



ITEM	PART NUMBER	DESCRIPTION	QTY
	2242061	LIMIT SWITCH ASSEMBLY (1+2+3+4+5+6)	1
1		SWITCH PLATE	1
2	7291040	MICRO SWITCH	2
3		M8 x 25 SCREW	1
4		CABLE GLAND	1
--	2241068	SPRING & SPRING PLATE SET (5+6)	N