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# OWNER'S MANUAL

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## AIR POWERED CHAIN HOIST TCR SERIES

¼ Ton through 6 Ton Capacity

Code Number and Serial Number

### WARNING

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

**HARRINGTON**  
A KITO GROUP COMPANY

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## 1.0 Important Information and Warnings

### 1.1 Terms and Summary

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

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

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

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

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

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

### ⚠ CAUTION

These general instructions deal with the normal installation, operation, and maintenance situations encountered with the equipment described herein. The instructions should not be interpreted to anticipate every possible contingency or to anticipate the final system, crane, or configuration that uses this equipment. For systems using the equipment covered by this manual, the supplier and owner of the system are responsible for the system's compliance with all applicable industry standards, and with all applicable federal, state and local regulations/codes.

This manual includes instructions and parts information for a variety of hoist types. Therefore, all instructions and parts information may not apply to any one type or size of specific hoist. Disregard those portions of the instructions that do not apply.

Record your hoist's Code and Serial Number on the front cover of this manual for identification and future reference to avoid referring to the wrong manual for information or instructions on installation, operation, inspection, maintenance, or parts.

Use only Harrington authorized replacement parts in the service and maintenance of this hoist.

## **WARNING**

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

Equipment described herein should not be used in conjunction with other equipment unless necessary and/or required safety devices applicable to the system, crane, or application are installed by the system designer, system manufacturer, crane manufacturer, installer, or user.

Modifications to upgrade, rerate, or otherwise alter this equipment shall be authorized only by the original equipment manufacturer.

Equipment described herein may be used in the design and manufacture of cranes or monorails. Additional equipment or devices may be required for the crane and monorail to comply with applicable crane design and safety standards. The crane designer, crane manufacturer, or user is responsible to furnish these additional items for compliance. Refer to ANSI/ASME B30.17, "Safety Standard for Top-Running Single Girder Cranes"; ANSI/ASME B30.2 "Safety Standard for Top-Running Double-Girder Cranes"; and ANSI/ASME B30.11 "Safety Standard for Underhung Cranes and Monorails".

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

Hoists, trolleys and cranes, used to handle hot molten material may require additional equipment or devices. Refer to ANSI Z241.2, "Safety Requirements for Melting and Pouring of Metals in the Metalcasting Industry".

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

## **DANGER**

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

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

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

## **NOTICE**

It is the responsibility of the owner/user to install, inspect, test, maintain, and operate a hoist in accordance with ANSI/ASME B30.16, "Safety Standard for Overhead Hoists", OSHA Regulations. If the hoist is installed as part of a total lifting system, such as an overhead crane or monorail, it is also the responsibility of the owner/user to comply with the applicable ANSI/ASME B30 volume that addresses that type of equipment.

It is the responsibility of the owner/user to have all personnel that will install, inspect, test, maintain, and operate a hoist read the contents of this manual and applicable portions of ANSI/ASME B30.16, "Safety Standard for Overhead Hoists" and OSHA Regulations. If the hoist is installed as part of a total lifting system, such as an overhead crane, the applicable ANSI/ASME B30 volume that addresses that type of equipment must also be read by all personnel.

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

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

## 1.2 Warning Tags and Labels

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

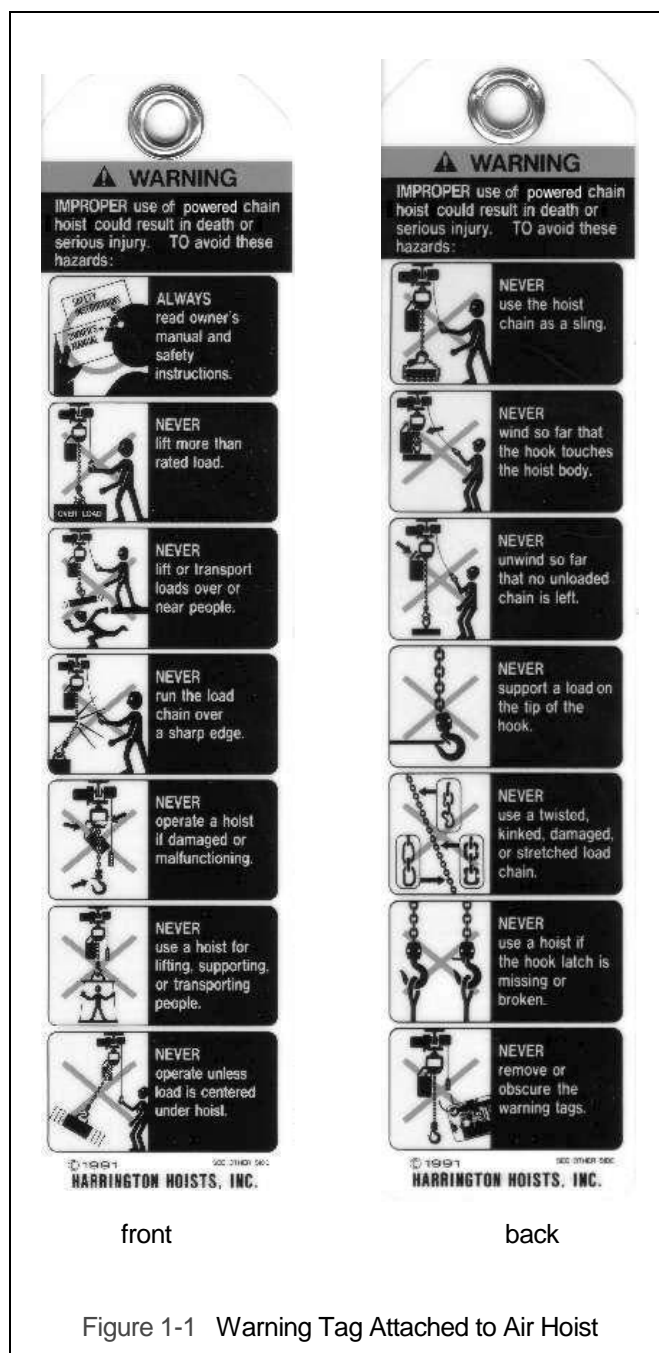
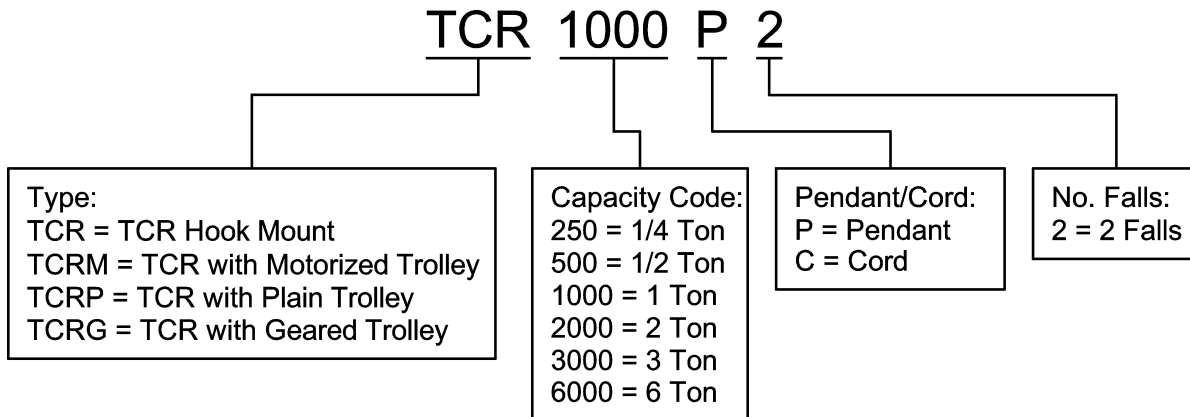


Figure 1-1 Warning Tag Attached to Air Hoist

## 2.0 Technical Information

### 2.1 Specifications

#### 2.1.1 Product Code



#### 2.1.2 Operating Conditions and Environment

Temperature range: +14° to +140°F (-10° to +60°C)

Relative Humidity: 85% or less

Noise Level: 92 dba maximum @ 1 meter when lifting rated load  
95 dba maximum @ 1 meter when lowering rated load

Supply Air: 60 to 90 pounds per square inch

Air Consumption: 30 to 90 cubic feet minute

Air Lubrication Requirements: Minimum 10 to 15 drops per minute (2-3 cc/min) of oil

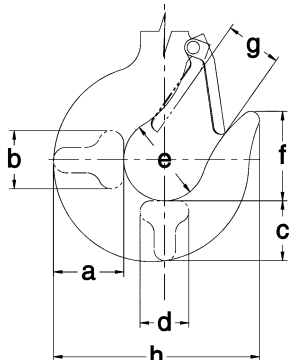
Air Filtration Requirements: Maximum 5 micron air filter or finer

Load Limiter: Adjustable; Factory set to 125% of rated capacity



Table 2-1 Hoist Specifications											
Cap. (Tons)	Product Code	Standard Lift (ft)	Push Button Hose L (ft)	Up/Down Speeds (ft/min @ 90 psi)		Up/Down Air Consumption Rates (cubic ft/min @ 90 psi)		Load Chain Diameter (mm) x Chain Fall Lines	Net Weight (lbs)	Weight for Additional One Foot of Lift (lbs)	
				No Load	w/Full Load	No Load	w/Full Load				
Pendant Model	1/4	TCR250P	10	7.5	68 / 44	52 / 51	63 / 49	48 / 57	6.3 x 1	68	0.6
	1/2	TCR500P		7.5	68 / 44	37 / 57	63 / 49	48 / 57	6.3 x 1	68	0.6
	1	TCR1000P2		7.5	34 / 22	19/ 29	63 / 49	48 / 57	6.3 x 2	78	1.2
	1	TCR1000P		7.5	37 / 22	21 / 33	62 / 53	53 / 60	7.1 x 1	77	0.8
	2	TCR2000P2		7.5	19 / 11	11 / 16	62 / 53	53 / 60	7.1 x 2	88	1.5
	3	TCR3000P		8.0	18 / 11	10 / 15	90 / 65	71 / 74	11.2 x 1	152	2.0
	6	TCR6000P2		8.0	9 / 5	5 / 7	90 / 65	71 / 74	11.2 x 2	198	4.0
Cord Model	1/4	TCR250C	10	7.5	68 / 44	52 / 51	63 / 49	48 / 57	6.3 x 1	66	0.6
	1/2	TCR500C		7.5	68 / 44	37 / 57	63 / 49	48 / 57	6.3 x 1	66	0.6
	1	TCR1000C2		7.5	34 / 22	19/ 29	63 / 49	48 / 57	6.3 x 2	76	1.2
	1	TCR1000C		7.5	37 / 22	21 / 33	62 / 53	53 / 60	7.1 x 1	75	0.8
	2	TCR2000C2		7.5	19 / 11	11 / 16	62 / 53	53 / 60	7.1 x 2	86	1.5
	3	TCR3000C		8.0	18 / 11	10 / 15	90 / 65	71 / 74	11.2 x 1	150	2.0
	6	TCR6000C2		8.0	9 / 5	5 / 7	90 / 65	71 / 74	11.2 x 2	196	4.0

## 2.2 Dimensions

Table 2-2 Top and Bottom Hook Dimension*								
 <p>Units = inch</p>								
Product Code	a	b	c	d	e	f	g	h
TCR250C/P	1.4	0.9	1.1	0.9	1.6	1.6	1.1	4.2
TCR500C/P	1.4	0.9	1.1	0.9	1.6	1.6	1.1	4.2
TCR1000C/P2	1.4	0.9	1.1	0.9	1.6	1.6	1.1	4.2
TCR1000C/P	1.4	0.9	1.1	0.9	1.6	1.6	1.1	4.2
TCR2000C/P2	1.8	1.2	1.5	1.2	1.8	2.0	1.1	4.9
TCR3000C/P	2.0	1.5	1.7	1.3	2.0	2.4	1.3	5.9
TCR6000C/P2	2.3	1.6	1.9	1.6	2.6	2.8	1.7	6.8

\*Refer to Section 5.7 for inspection dimensions and limits.

Table 2-3 TCR with Pendant Control Dimensions										
Cap. (Tons)	Product Code	Headroom C (in)	a (in)	b (in)	d (in)	e (in)	g (in)	h (in)	i (in)	j (in)
1/4	TCR250P	18.2	13.4	6.9	6.1	6.6	1.1	4.9	2.0	1.3
1/2	TCR500P	18.2	13.4	6.9	6.1	6.6	1.1	4.9	2.0	1.3
1	TCR1000P2	20.4	13.4	7.3	6.1	6.6	1.1	5.9	1.5	2.2
1	TCR1000P	18.3	13.4	6.9	6.1	6.6	1.1	4.9	2.0	1.3
2	TCR2000P2	21.8	13.4	7.6	6.1	6.6	1.1	6.0	1.6	2.3
3	TCR3000P	22.2	17.7	8.9	8.0	9.0	1.3	1.9	6.9	1.7
6	TCR6000P2	26.5	17.7	11.1	8.0	9.0	1.7	2.5	2.5	3.4

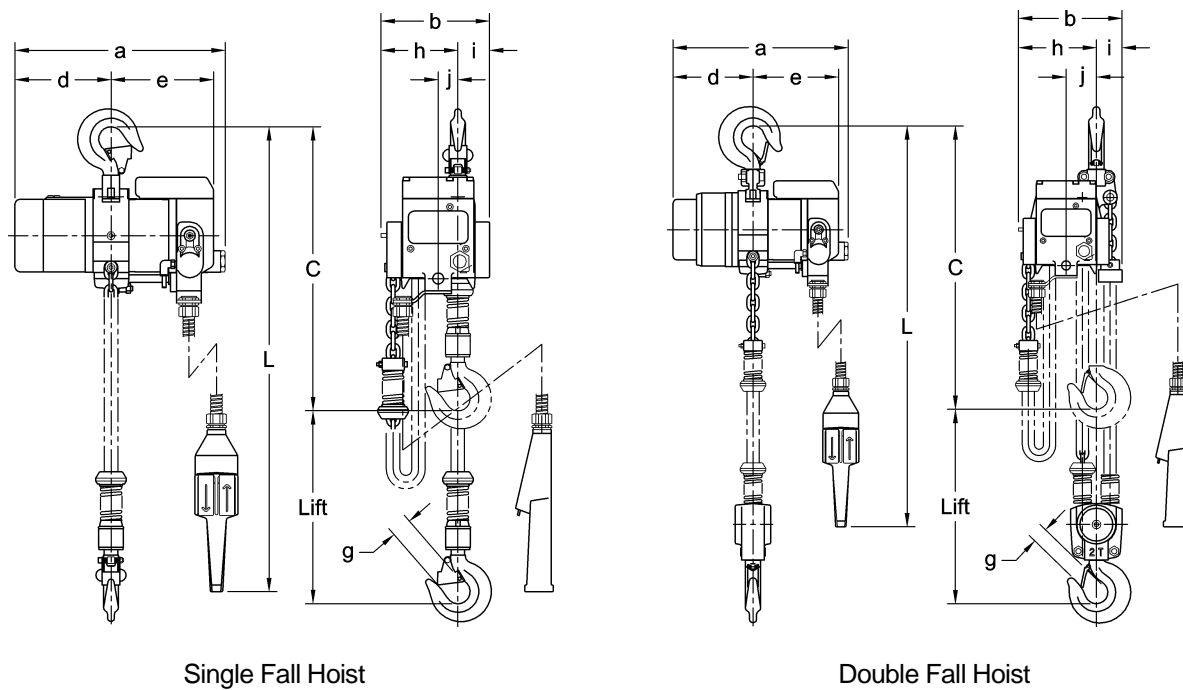
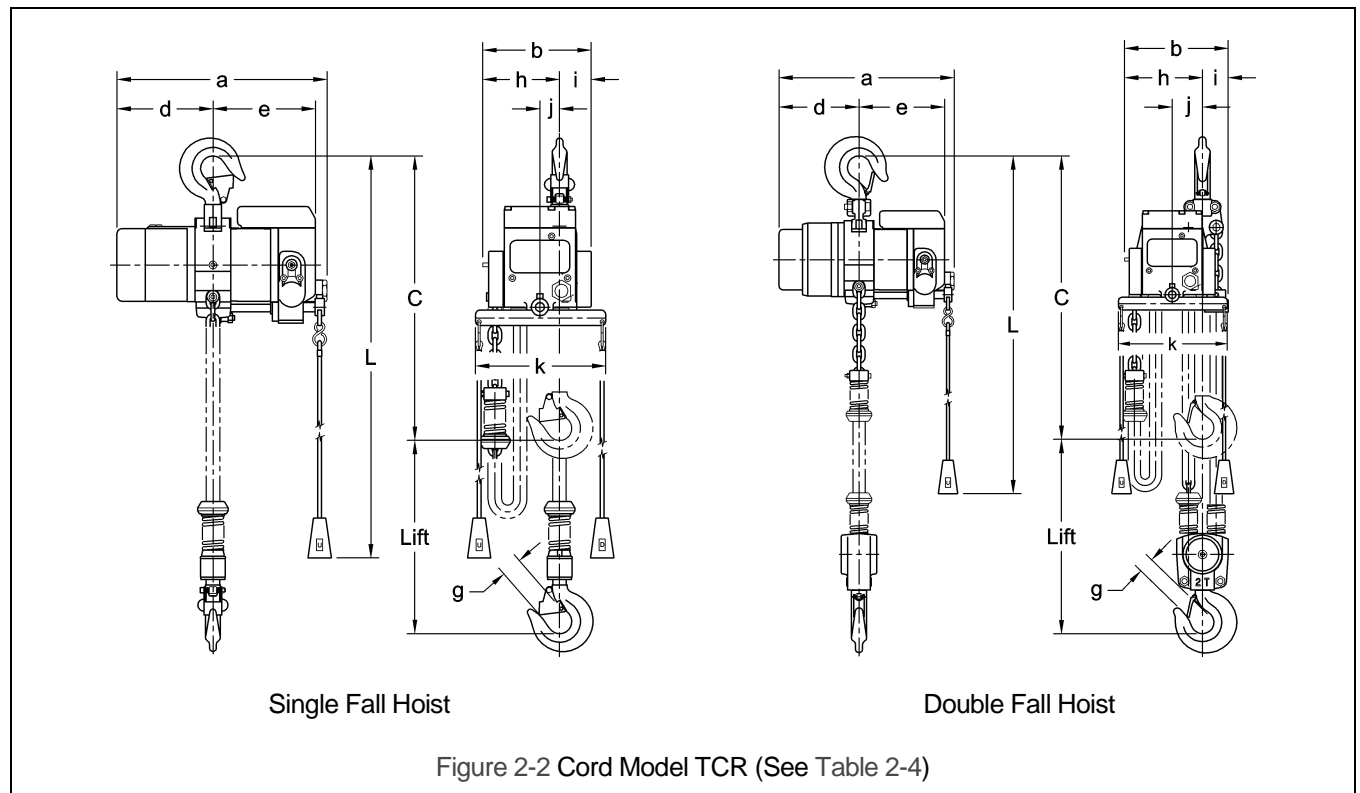


Figure 2-1 Pendant Model TCR (See Table 2-3)

Table 2-4 TCR with Cord Control Dimensions											
Cap. (Tons)	Product Code	Headroom C (in)	a (in)	b (in)	d (in)	e (in)	g (in)	h (in)	i (in)	j (in)	k (in)
1/4	TCR250C	18.2	13.4	6.9	6.1	6.6	1.1	4.9	2.0	1.3	8.3
1/2	TCR500C	18.2	13.4	6.9	6.1	6.6	1.1	4.9	2.0	1.3	8.3
1	TCR1000C2	20.4	13.4	7.3	6.1	6.6	1.1	5.9	1.5	2.2	8.3
1	TCR1000C	18.3	13.4	6.9	6.1	6.6	1.1	4.9	2.0	1.3	8.3
2	TCR2000C2	21.8	13.4	7.6	6.1	6.6	1.1	6.0	1.6	2.3	8.3
3	TCR3000C	22.2	17.7	8.9	8.0	9.0	1.3	1.9	6.9	1.7	8.3
6	TCR6000C2	26.5	17.7	11.1	8.0	9.0	1.7	2.5	8.7	3.4	8.3



## 2.3 Part Names

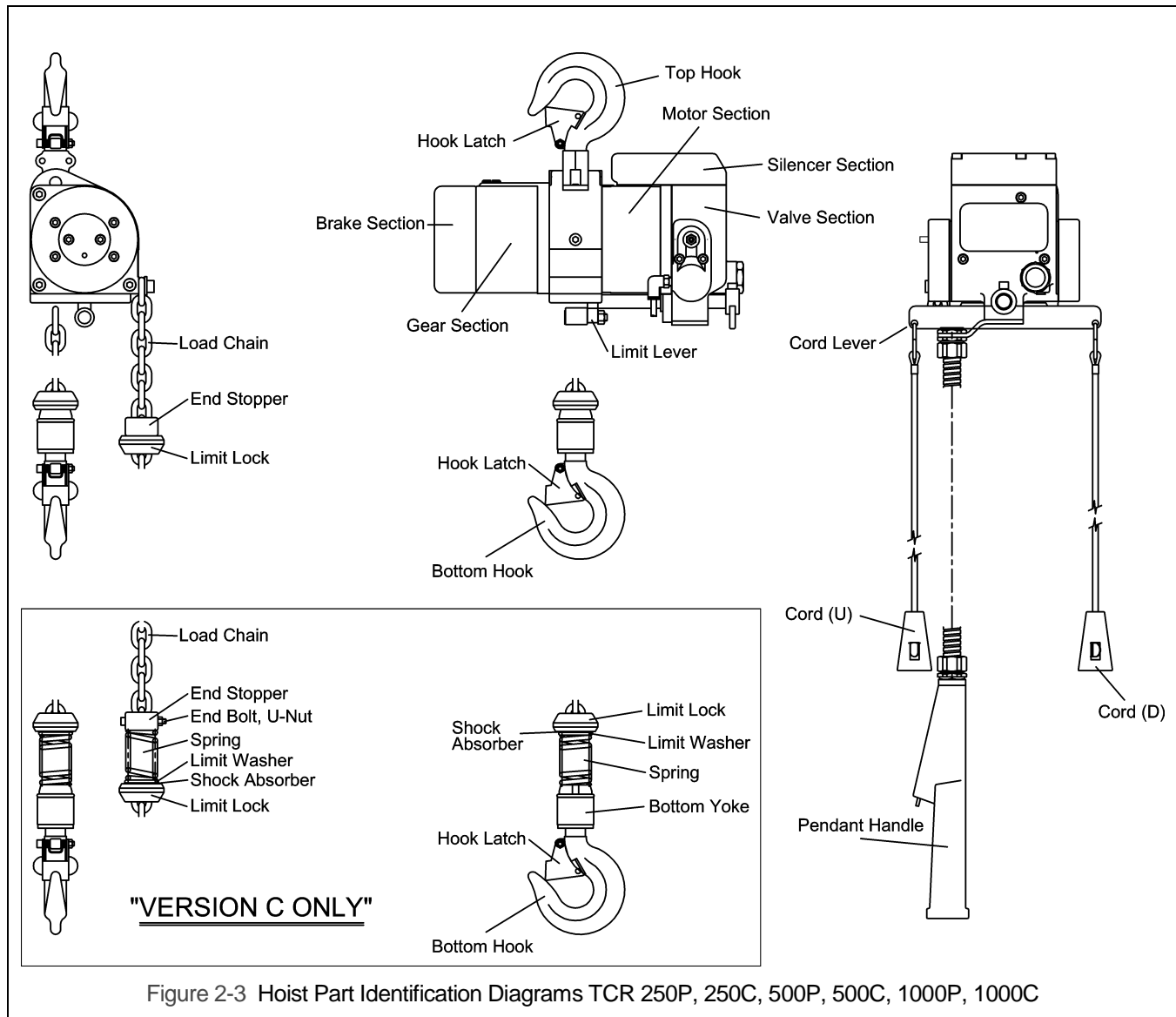


Figure 2-3 Hoist Part Identification Diagrams TCR 250P, 250C, 500P, 500C, 1000P, 1000C

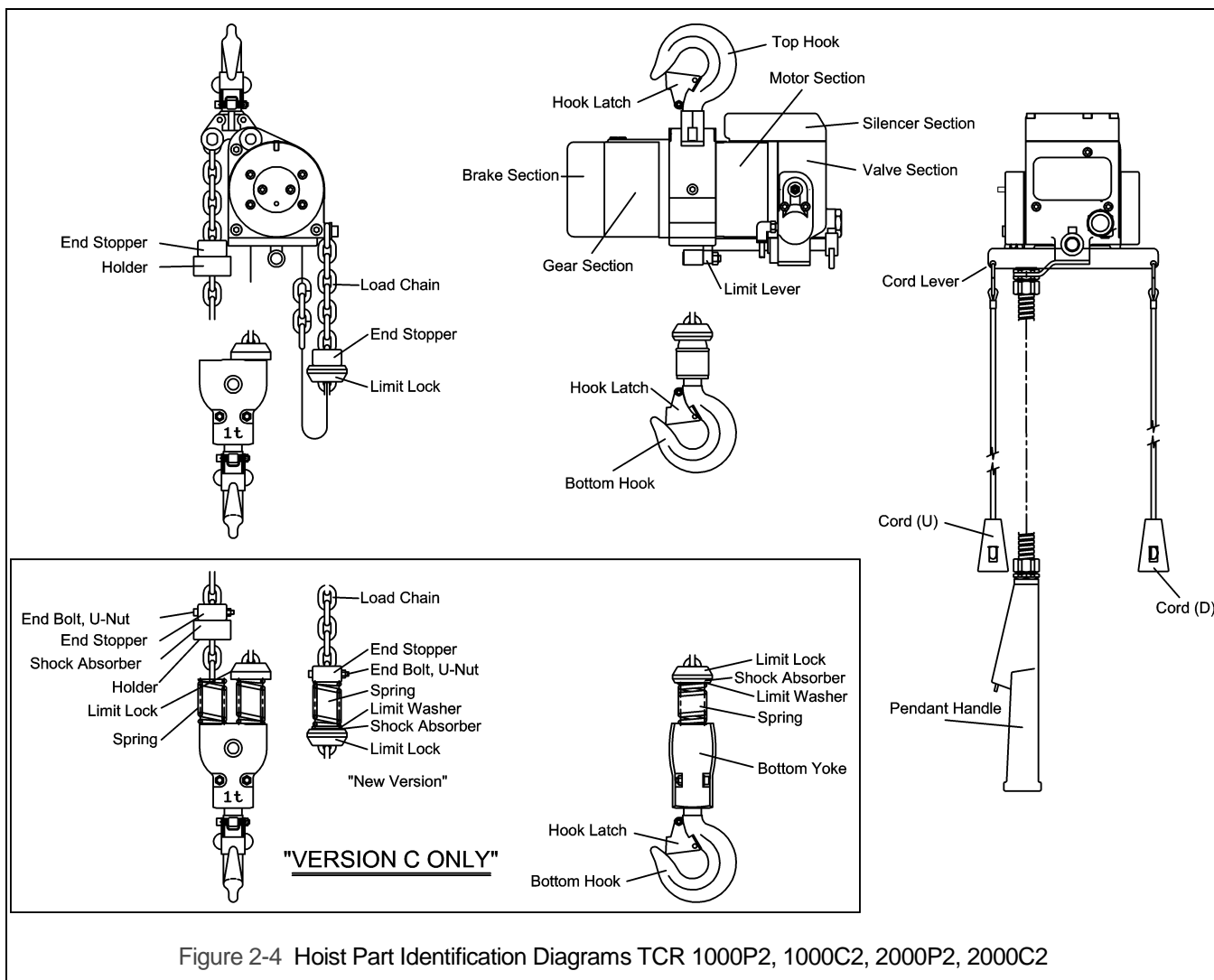


Figure 2-4 Hoist Part Identification Diagrams TCR 1000P2, 1000C2, 2000P2, 2000C2

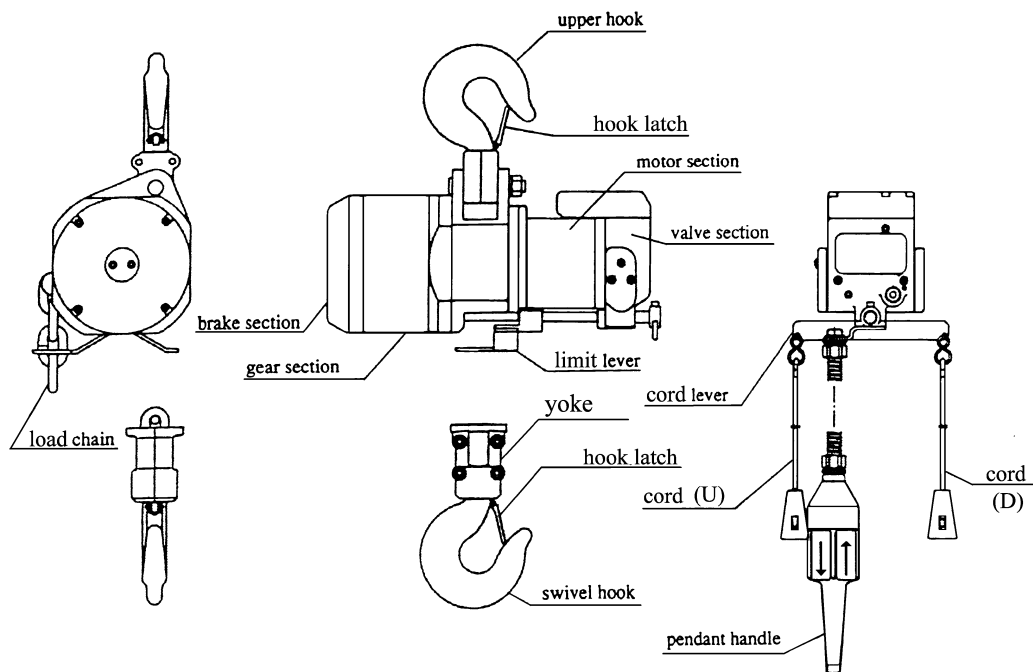


Figure 2-5 Hoist Part Identification Diagrams TCR 3000P, 3000C

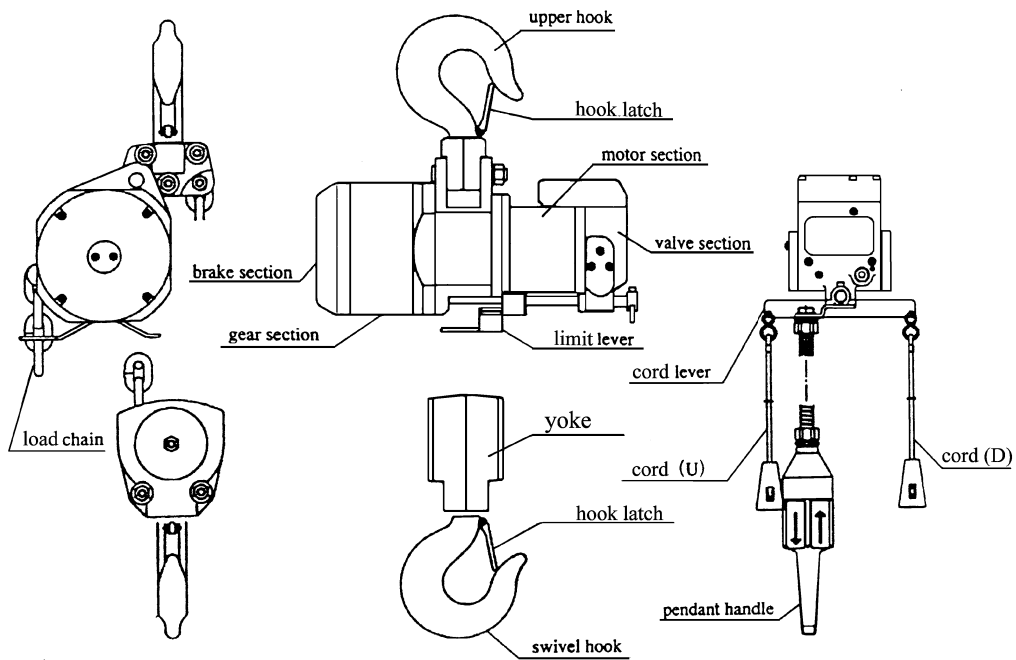


Figure 2-6 Hoist Part Identification Diagrams TCR 6000P2, 6000C2

## 3.0 Preoperational Procedures

### 3.1 Air Supply System Requirements

- 3.1.1 **NOTICE** Pressure and Flow - Verify that the air supply system has capacity to supply your air hoist with required pressure and flow. Otherwise the hoist may operate poorly or may fail to operate. See Section 3.2.
- 3.1.2 **CAUTION** Lubrication - The hoist requires lubrication for proper operation. The oil in the air supply is the primary source of lubrication to the hoist. Therefore, a dedicated air supply lubricator must be used with the hoist. Refer to Section 3.3.
- 3.1.3 **CAUTION** Air Quality - Good air quality is essential to prevent damage to your hoist and to ensure its proper operation. The air must be clean and free of debris such as dirt and rust. Refer to Section 3.4 for filtration requirements. The air must also be dry; free of moisture and water. Refer to Section 3.5.

### 3.2 Air Supply Capacity And Regulation

- 3.2.1 Capacity - The air supply system must be capable of delivering the required airflow (cfm) to the hoist inlet port. Without the required airflow the hoist will not operate properly or may not operate at all. See Section 2.0 for your hoists air consumption requirements. In determining if your system is capable of supplying the required airflow, consider the following:
- Capacity of compressor(s) and tank
  - Other air consuming equipment
  - Flow restrictions such as pipes, hoses, valves and fittings
- Inadequate capacity will cause a significant drop in pressure when the hoist is operated, and could cause poor performance or failure to operate.
- 3.2.2 Regulation - The hoist requires a constant supply of air at a pressure of between 60 and 90 psi. If the air supply is not regulated or is regulated at a pressure greater than 90 psi, then a regulator must be used. The regulator may be located anywhere upline of the lubricator in the air supply to the hoist.

### 3.3 Lubrication

- 3.3.1 **CAUTION** The hoist must be supplied with its own lubricator. The lubricator must be located as follows:
- 1) **Best location** - At the hoist inlet. In this case the lubricator can be either the mist type or drop type.
  - 2) **Second best location** - No more than 15 feet away from the hoist, at the same elevation or above the hoist inlet. In this case the mist type lubricator must be used.
  - 3) **Third best location** - No more than 15 feet away below the hoist. In this case the mist type lubricator must be used.
- 3.3.2 **CAUTION** The lubricator must be set to deliver the equivalent of 10 to 15 drops of oil per minute (2 to 3 cc/minute). The hoist's exhaust will emit a fine oil mist when properly lubricated.

### 3.4 Filtration

- 3.4.1 **CAUTION** The air entering the hoist inlet must not contain any particulate greater than 5 microns in size. Therefore, the hoist must have a 5 micron filter in its air supply. The filter must be upstream of the lubricator.

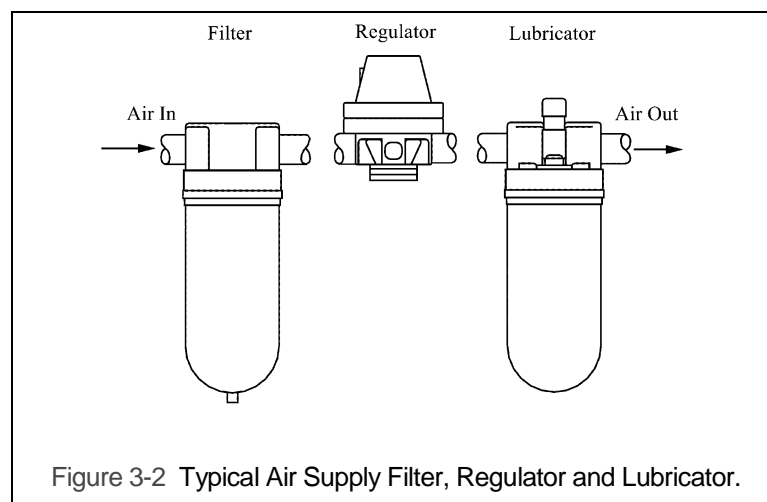
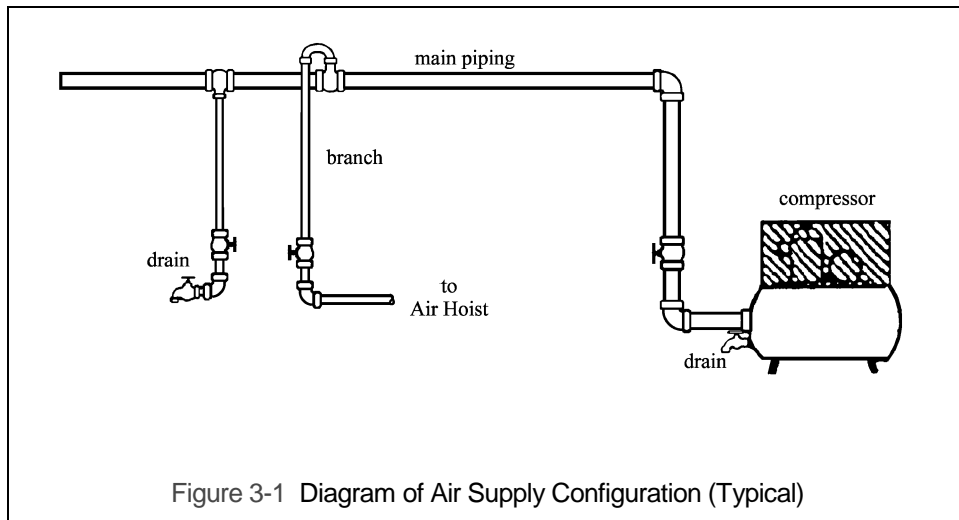
3.4.2 The filter servicing the hoist can also service other hoists and air consuming equipment. In this case, the air filter must be in sized for the total air consumption of the equipment it is servicing.

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

### 3.6 Piping, Hoses And Fittings

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

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





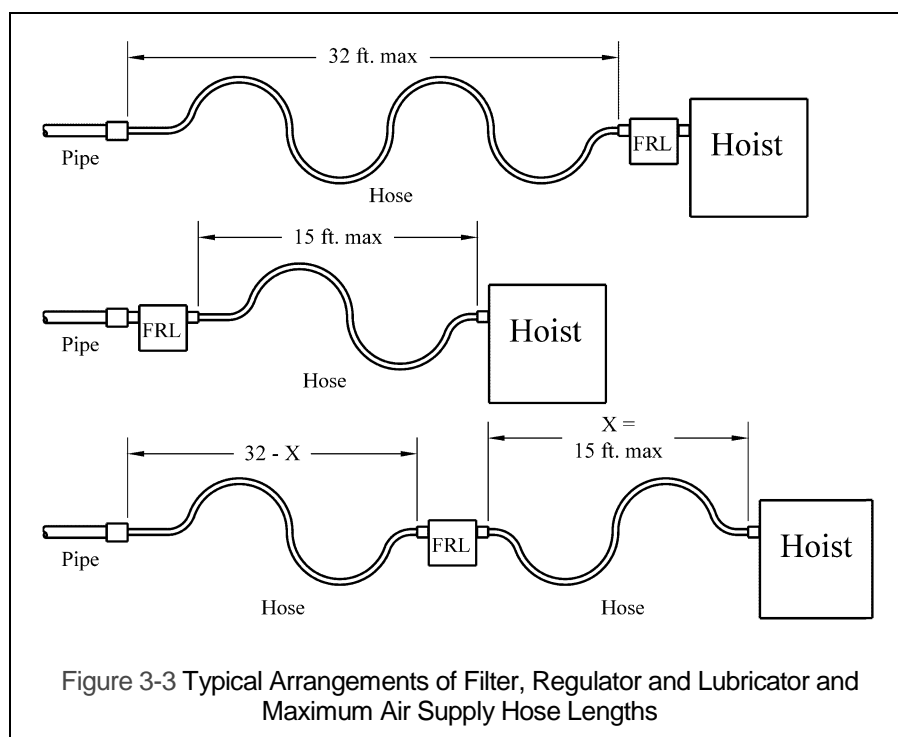
- 3.6.2 **NOTICE** Piping - Pipe should be sized to accommodate the hoist airflow requirements. Table 3-1 gives recommended pipe sizes.

Table 3-1 Air Supply Pipe and Hose Sizes		
Model	Diameter of Supply Pipe	Diameter of Supply Hose
TCR250P, 250C, 500P, 500C, 1000P, 1000C TCR1000P2, 1000C2, 2000P2, 2000C2	Inside diameter 0.75 inch or larger	Inside diameter 0.5 inch or larger
TCR3000P, 3000C TCR6000P2, 6000C2	Inside diameter 1.0 inch or larger	Inside diameter 0.75 inch or larger

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

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

If your application exceeds these requirements consult factory.



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

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

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

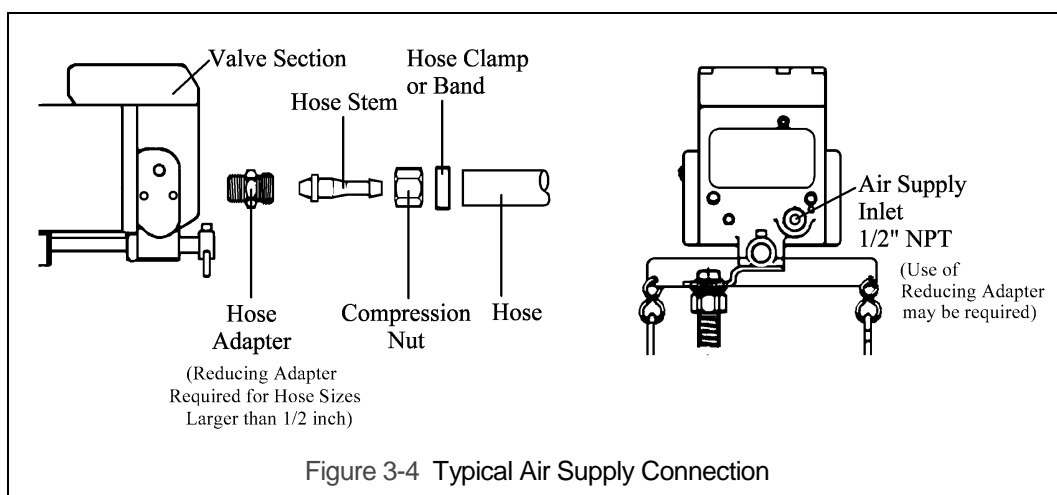
### 3.7 Mounting Location

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

- 3.7.2 **NOTICE** See Section 7.6 for outdoor installation considerations.

### 3.8 Connecting Hoist to Air Supply

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



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

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

- 3.8.4 Apply approximately 10-15 drops of turbine oil (see approved lubricant under Section 6.0 Lubricants) into the hose before attaching to the hoist.

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

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

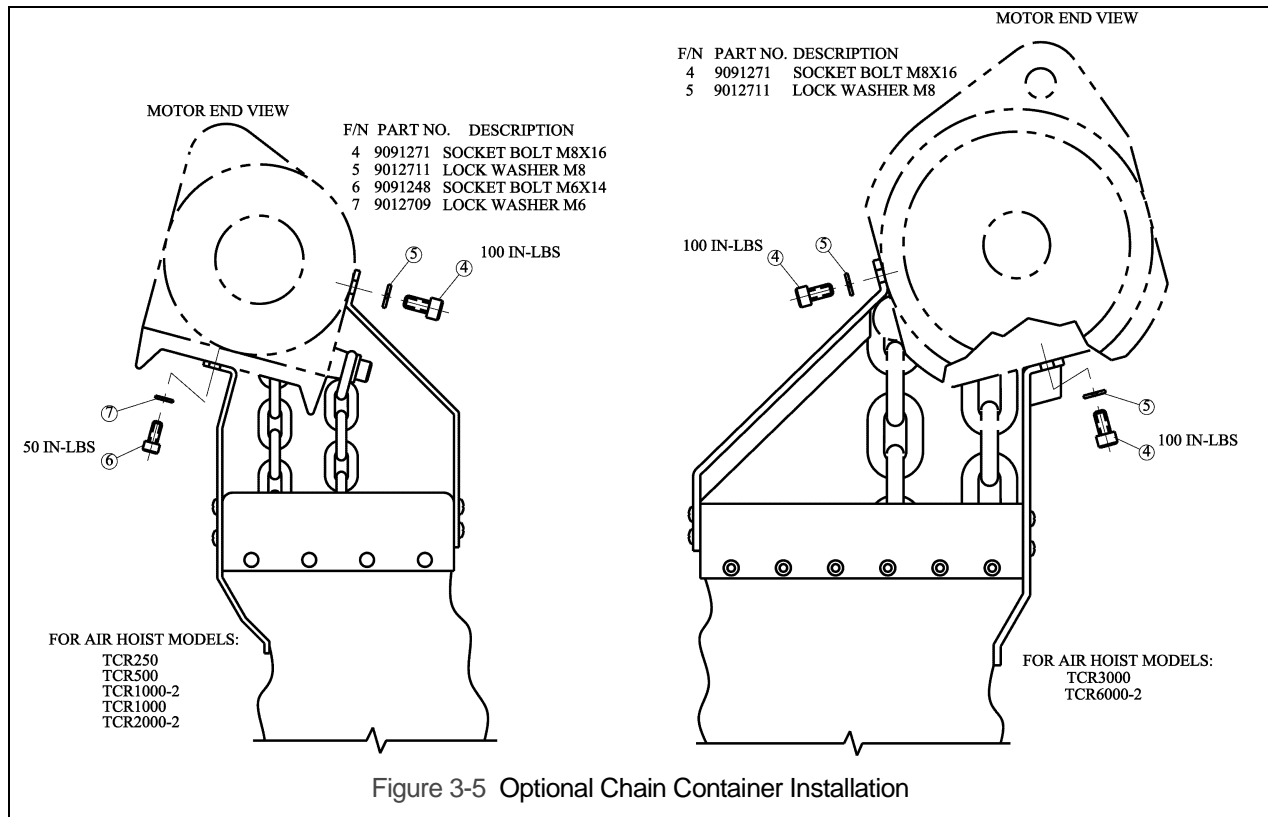
### 3.9 Mounting the Hoist

- 3.9.1 Manual Trolley - Follow instructions in Owner's Manual provided with the trolley.
- 3.9.2 Motorized Trolley - Follow instructions in Owner's Manual provided with the trolley.
- 3.9.3 Hook Mounted to a Fixed Location - Attach the hoist's top hook to the fixed suspension point.

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

### 3.10 Optional Chain Container

- 3.10.1 For installation of the optional bag style chain container refer to Figure 3-5 below and perform the following:
- Make sure all end stoppers and limit locks are installed correctly. See Sections 3.12 and 7.3.
  - Torque all fasteners to the values shown.
  - Feed the chain into the chain container beginning with the free end. Take care to avoid twisting or tangling the chain.
  - Do not use the chain container if any parts are damaged or if any fasteners/hardware are missing.

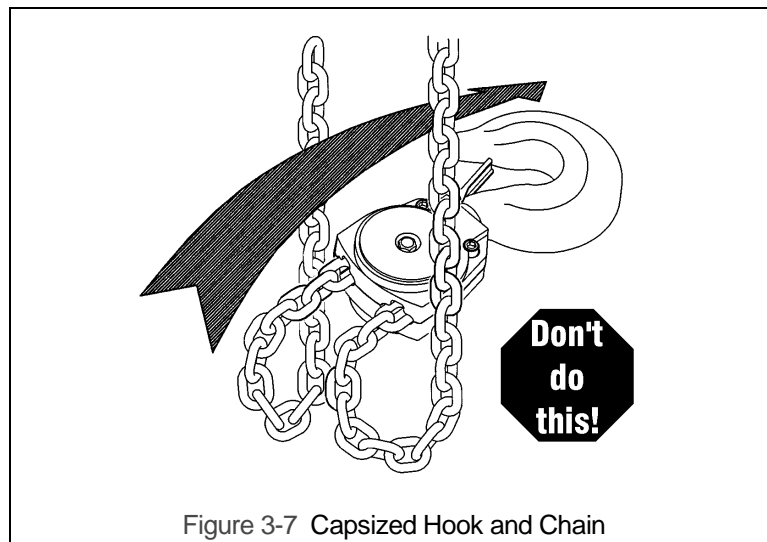
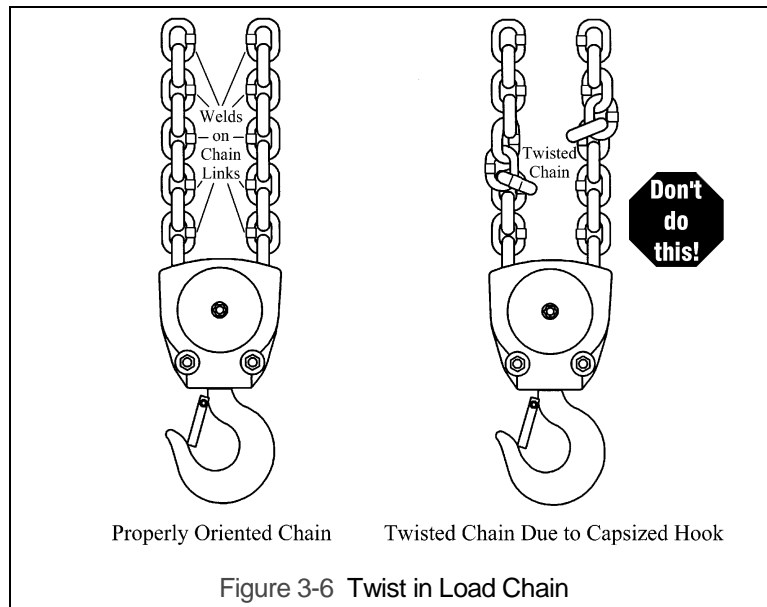


### 3.11 Non-Stationary Application

- 3.11.1 For applications such as rental fleets or construction sites where the hoist is moved from place-to-place, a filter and lubricator are still required. Consult factory for recommended methods.
- 3.11.2 Connections and fittings must be kept clean and care taken to prevent dirt, debris and moisture from entering the hoist.
- 3.11.3 Recommended practice for removing the hoist from an installation:
- Run the hoist briefly with well lubricated air
  - Disconnect the air supply line
  - Inject a small quantity (approximately 20 drops) of oil into the hoist's inlet port
  - Plug the inlet port

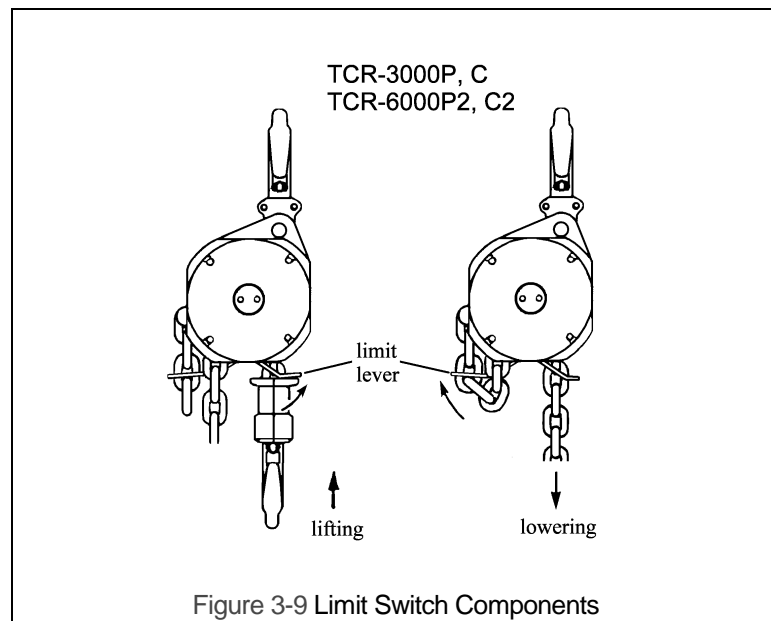
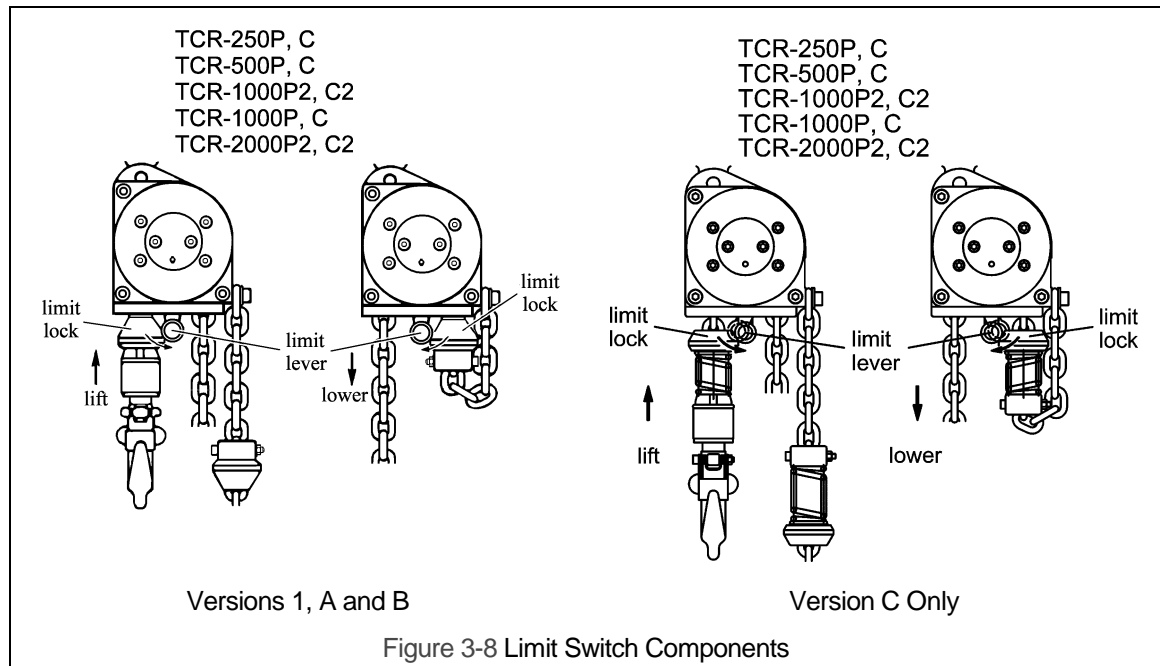
### 3.12 Preoperational Checks and Trial Operation

- 3.12.1 **⚠ CAUTION** Check for the availability of required operating air pressure of between 60 PSI to 90 PSI at the hoist's inlet port before trying to operate the hoist.
- 3.12.2 **⚠ WARNING** Verify that the load chain is not twisted or tangled and that the bottom hook is not capsized prior to operating the hoist. Correct all chain irregularities before conducting the first hoist operation. See Figures 3-6 and 3-7.



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

- 3.12.4 **⚠ WARNING** For Models TCR-250P&C, 500P&C, 1000P2&C2, 1000P&C and 2000P2&C2 verify the limit locks are properly installed on the load chain. For reference see Figure 3-8 for hoist versions 1, A, B and C and Section 7.3.2. For Models TCR-3000P&C and 6000P2&C2 verify that the chain/limit lever is operational and can move freely in both the up and down directions. For reference see Figure 3-9.



- 3.12.5 Measure and record the "K" dimension of all hooks on hoist. See Table 5-6 under Section 5, "Inspection". Always use the same side of the hook to measure and record the "K" dimension.
- 3.12.6 Record the hoist Code Number and Serial Number (from the nameplate on the hoist – see Section 10) in the space provided on the cover of this manual.

- 3.12.7 Ensure that the hoist is properly installed to either a fixed point, or trolley, whichever applies.
- 3.12.8 If hoist is installed on a trolley, ensure that
- trolley is properly installed on the beam, and
  - stops for the trolley are correctly positioned and securely installed on the beam.
- 3.12.9 Ensure that all nuts, bolts and split (cotter) pins are sufficiently fastened.
- 3.12.10 For hoists with pendant controls, ensure that the pendant's exterior flexible metal hose is intact and is properly attached to the hoist. Also ensure that the air tubing and wire cable inside the pendant hose are properly attached to the hoist. See Section 7.4.
- 3.12.11 **⚠ CAUTION** Check Air Supply - Check air supply before everyday use. Ensure proper air quality and air pressure.
- 3.12.12 **⚠ CAUTION** Check the lubricator for proper function and adequate oil level.
- 3.12.13 Confirm proper operation.
- Before operating read and become familiar with Section 4 - Operation.
  - Before operating ensure that the hoist (and trolley) meets the Inspection, Testing and Maintenance requirements of ANSI/ASME B30.16.
  - Before operating ensure that nothing will interfere with the full range of the hoist's (and trolley's) operation.
- 3.12.14 Proceed with trial operation to confirm proper operation.
- Initially operate slowly under no load in both directions. Verify controls agree with hoist direction.
  - Perform inspections per Section 5.3, "Frequent Inspections".

## 4.0 Operation

### 4.1 Introduction

#### DANGER

DO **NOT** WALK UNDER A SUSPENDED LOAD

#### WARNING

HOIST OPERATORS SHALL BE REQUIRED TO READ THE OPERATION SECTION OF THIS MANUAL, THE WARNINGS CONTAINED IN THIS MANUAL, INSTRUCTION AND WARNING LABELS ON THE HOIST OR LIFTING SYSTEM, AND THE OPERATION SECTIONS OF ANSI/ASME B30.16 and ANSI/ASME B30.10. THE OPERATOR SHALL ALSO BE REQUIRED TO BE FAMILIAR WITH THE HOIST AND HOIST CONTROLS BEFORE BEING AUTHORIZED TO OPERATE THE HOIST OR LIFTING SYSTEM.

HOIST OPERATORS SHOULD BE TRAINED IN PROPER RIGGING PROCEDURES FOR THE ATTACHMENT OF LOADS TO THE HOIST HOOK.

HOIST OPERATORS SHOULD BE TRAINED TO BE AWARE OF POTENTIAL MALFUNCTIONS OF THE EQUIPMENT THAT REQUIRE ADJUSTMENT OR REPAIR, AND TO BE INSTRUCTED TO STOP OPERATION IF SUCH MALFUNCTIONS OCCUR, AND TO IMMEDIATELY ADVISE THEIR SUPERVISOR SO CORRECTIVE ACTION CAN BE TAKEN.

HOIST OPERATORS SHOULD HAVE NORMAL DEPTH PERCEPTION, FIELD OF VISION, REACTION TIME, MANUAL DEXTERITY, AND COORDINATION.

HOIST OPERATORS SHOULD **NOT** HAVE A HISTORY OF OR BE PRONE TO SEIZURES, LOSS OF PHYSICAL CONTROL, PHYSICAL DEFECTS, OR EMOTIONAL INSTABILITY THAT COULD RESULT IN ACTIONS OF THE OPERATOR BEING A HAZARD TO THE OPERATOR OR TO OTHERS.

HOIST OPERATORS SHOULD **NOT** OPERATE A HOIST OR LIFTING SYSTEM WHEN UNDER THE INFLUENCE OF ALCOHOL, DRUGS, OR MEDICATION.

OVERHEAD HOISTS ARE INTENDED ONLY FOR VERTICAL LIFTING SERVICE OF FREELY SUSPENDED UNGUIDED LOADS. DO **NOT** USE HOIST FOR LOADS THAT ARE NOT LIFTED VERTICALLY, LOADS THAT ARE NOT FREELY SUSPENDED, OR LOADS THAT ARE GUIDED.

#### NOTICE

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

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

## 4.2 Shall's and Shall Not's for Operation

### **WARNING**

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

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



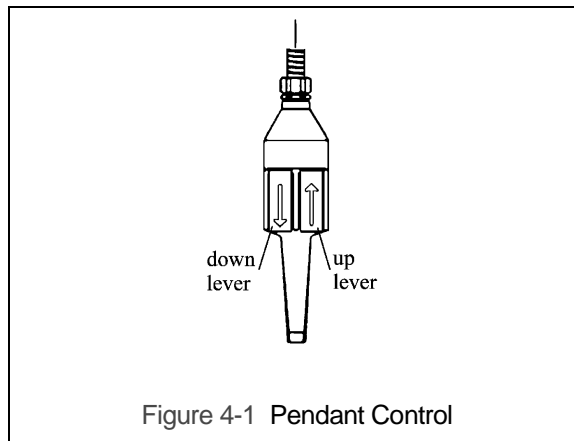
## **⚠ CAUTION**

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

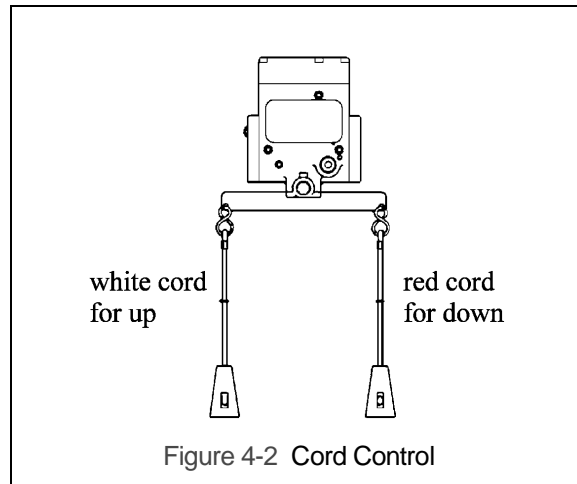
- Maintain a firm footing or be otherwise secured when operating the hoist.
- Check brake function by tensioning the hoist prior to each lift operation.
- Use hook latches. Latches are to retain slings, chains, etc. under slack conditions only.
- Make sure the hook latches are closed and not supporting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

### **4.3 Hoist Controls**

- 4.3.1 For hoists mounted to motorized trolleys follow the control instruction included in the trolley 's Owner's Manual.
- 4.3.2 Pendant Control - When using the pendant control depress the up lever to raise the hoist or the down lever to lower the hoist as shown in Figure 4-1 below. To stop motion release the lever switches.



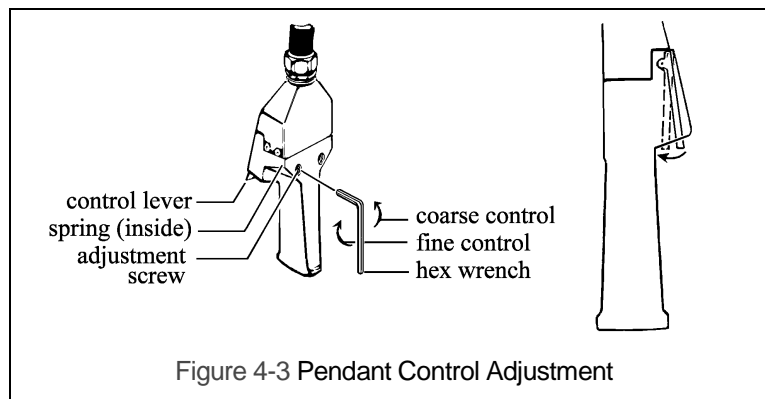
- 4.3.3 Cord Control - When using a hoist with cord control, pull down on the appropriate colored cord to raise or lower the hoist. White indicates the raise control and red indicates lowering control. Release the cords to stop the hoist. Refer to Figure 4-2 below.



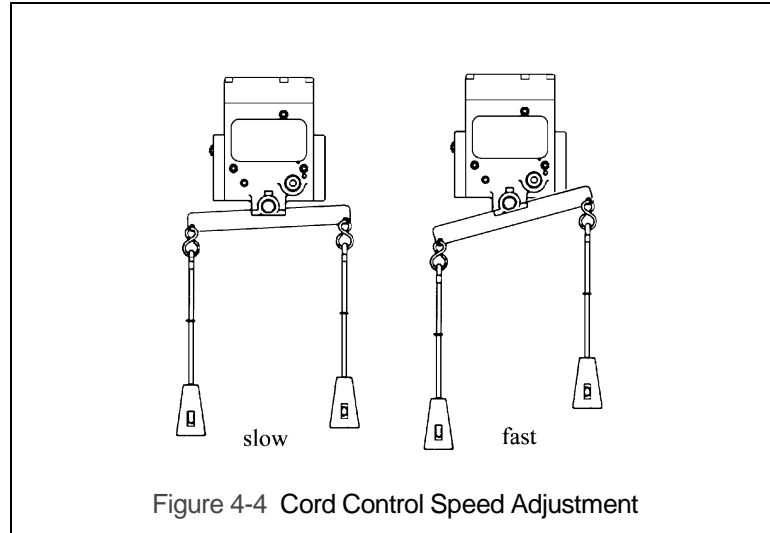
- 4.3.4 **CAUTION** Make sure the motor completely stops before reversing direction.

## 4.4 Adjusting the Controls

- 4.4.1 For pendant control, the speed can be adjusted by the amount the lever is depressed. As shown below in Figure 4-3, by depressing the lever slightly, you will be able control the hoist's motions slowly and with more precision. By depressing the lever further, the speed of the hoist will be increased until the lever is fully depressed.
- 4.4.2 By adjusting the set screw in the pendant, the control can be adjusted to suit the user's needs. Adjusting the screw does not affect the speed of the hoist; it simply changes the feel or stiffness of the lever control. Adjusting the screw sets the position of a small spring plunger and this affects how the plunger interacts with the lever.
- Turning the screw in causes the spring plunger to be in contact with the lever for more of the lever's travel, resulting in more stiffness and better feel for finer control of hoist motions.
  - Turning the screw out reduces the effect that the spring plunger has on the lever control. This makes it easier to depress the lever, which is usually preferred for coarse control (more on/off than variable) of hoist motions.



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



## 4.5 Operation of the Load Limiter

- 4.5.1 If a hoist is used to lift a load that exceeds the hoist's rated capacity, the load limiter will cause the hoist to automatically stop lifting.
- 4.5.2 If the hoist stops lifting automatically, lower and remove the load from the hoist.
- 4.5.3 If the load is at or below the hoist's capacity rating and the hoist stops lifting automatically, the load limiter may need adjustment.
  - Check air line pressure to ensure adequate pressure at the hoist.
  - If pressure is adequate, adjust the load limiter. For load limiter adjustment, refer to [Section 7](#).

## 5.0 Inspection

### 5.1 General

- 5.1.1 The inspection procedure herein is based on ANSI/ASME B30.16. The following definitions are from ANSI/ASME B30.16 and pertain to the inspection procedure below.
- **Designated Person** - a person selected or assigned as being competent to perform the specific duties to which he/she is assigned.
  - **Qualified Person** - a person who, by possession of a recognized degree or certificate of professional standing, or who, by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work.
  - **Normal Service** - that distributed service which involves operation with randomly distributed loads within the rated load limit, or uniform loads less than 65% of rated load for not more than 25% of the time.
  - **Heavy Service** - that service which involves operation within the rated load limit which exceeds normal service.
  - **Severe Service** - that service which involves normal or heavy service with abnormal operating conditions.

### 5.2 Inspection Classification

- 5.2.1 Initial Inspection - prior to initial use, all new, altered, or modified hoists shall be inspected by a designated person to ensure compliance with the applicable provisions of this manual.
- 5.2.2 Inspection Classification - the inspection procedure for hoists in regular service is divided into two general classifications based upon the intervals at which inspection should be performed. The intervals in turn are dependent upon the nature of the critical components of the hoist and the degree of their exposure to wear, deterioration, or malfunction. The two general classifications are herein designated as FREQUENT and PERIODIC, with respective intervals between inspections as defined below.
- 5.2.3 FREQUENT Inspection - visual examinations by the operator or other designated personnel with intervals per the following criteria:
- Normal service - monthly
  - Heavy service - weekly to monthly
  - Severe service - daily to weekly
  - Special or infrequent service - as recommended by a qualified person before and after each occurrence.
- 5.2.4 PERIODIC Inspection - visual inspection by a designated person with intervals per the following criteria:
- Normal service - yearly
  - Heavy service - semiannually
  - Severe service - quarterly
  - Special or infrequent service - as recommended by a qualified person before the first such occurrence and as directed by the qualified person for any subsequent occurrences.

### 5.3 Frequent Inspection

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

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

### 5.4 Periodic Inspection

- 5.4.1 Inspections should be made on a PERIODIC basis in accordance with Table 5-2, "Periodic Inspection." Evaluation and resolution of the results of PERIODIC Inspections shall be made by a designated person such that the hoist is maintained in safe working condition.
- 5.4.2 For inspections where load suspension parts of the hoist are disassembled, a load test per ANSI/ASME B30.16 must be performed on the hoist after it is re-assembled and prior to its return to service.

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

## 5.5 Occasionally Used Hoists

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

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

## 5.6 Inspection Records

- 5.6.1 Dated inspection reports and records should be maintained at time intervals corresponding to those that apply for the hoist's PERIODIC interval per Section 5.2.4. These records should be stored where they are available to personnel involved with the inspection, maintenance, or operation of the hoist.
- 5.6.2 A long range chain inspection program should be established and should include records of examination of chains removed from service so a relationship can be established between visual observation and actual condition of the chain.

## 5.7 Inspection Methods and Criteria

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

**Table 5-3 Hoist Inspection Methods and Criteria**

Item	Method	Criteria	Action
Functional operating mechanisms.	Visual, Auditory	Mechanisms should be properly adjusted and should not produce unusual sounds when operated.	Repair or replace as required.
Limit Switch	Function	Proper operation. Actuation of limit switch should stop hoist.	Repair or replace as required.
Chain Lever/Limit Lever Assembly	Visual, Function	Lever should not be bent or significantly worn and should be able to move freely.	Replace.
Braking System	Function	Braking distance should not exceed approximately five chain links.	Repair or replace as required.
Hooks - Surface Condition	Visual	Should be free of significant rust, weld splatter, deep nicks, or gouges.	Replace.
Hooks - Fretting wear	Measure	The "u" dimension should not be less than minimum value listed in Table 5-6.	Replace.
Hooks - Stretch	Measure	The "K" dimension should not exceed the maximum value for replacement from Table 5-6 (See Section 3.12).	Replace.

<b>Table 5-3 Hoist Inspection Methods and Criteria</b>			
<b>Item</b>	<b>Method</b>	<b>Criteria</b>	<b>Action</b>
Hooks - Bent Shank or Neck	Visual	Shank and neck portions of hook should be free of deformations	Replace.
Hooks - Yoke Assembly	Visual	Should be free of significant rust, weld splatter, nicks, gouges. Holes should not be elongated, fasteners should not be loose, and there should be no gap between mating parts.	Clean/Lubricate, or replace as required.
Hooks - Swivel Bearing	Visual, Function	Bearing parts and surfaces should not show significant wear, and should be free of dirt, grime and deformations. Hook should rotate freely with no roughness.	Clean/lubricate, or replace as required.
Hooks - Idle Sheave and Axle (Bottom Hook on Double Fall Hoist)	Visual, Function	Pockets of Idle Sheave should be free of significant wear. Idle Sheave surfaces should be free of nicks, gouges, dirt and grime. Bearing parts and surfaces of Idle Sheave and Axle should not show significant wear. Idle Sheave should rotate freely with no roughness or significant free play.	Clean/lubricate, or replace as required.
Hooks - Hook Latches	Visual, Function	Latch should not be deformed. Attachment of latch to hook should not be loose. Latch spring should not be missing and should not be weak. Latch movement should not be stiff - when depressed and released latch should snap smartly to its closed position.	Replace.
Load Chain - Surface Condition	Visual	Should be free of rust, nicks, gouges, dents and weld splatter. Links should not be deformed, and should not show signs of abrasion. Surfaces where links bear on one another should be free of significant wear.	Replace.
Load Chain - Pitch	Measure	The "L" dimension should not be greater than maximum value listed in Table 5-7.	Replace, inspect Load Sheave (and Idle Sheave for double fall hoist).
Load Chain - Lubrication	Visual, Auditory	Entire surface of each chain link should be coated with lubricant and should be free of dirt and grime. Chain should not emit cracking noise when hoisting a load.	Clean/lubricate (see Sections 6.0).
Load Chain - Reeving	Visual	Chain should be reeved properly through Load Sheave (and Idle Sheave for double fall hoist) - refer to Section 3.12. Chain, limit locks and stoppers should be installed properly - refer to Section 7.3.2.	Reeve/Install chain properly.
Chain Container (Optional)	Visual	Container should not be damaged. Brackets should not be deformed or missing	Replace
Chain Springs	Visual	Chain springs should not be deformed or compressed.	Replace
Shock Absorber	Visual	Should be free of significant deformation.	Replace

**Table 5-3 Hoist Inspection Methods and Criteria**

<b>Item</b>	<b>Method</b>	<b>Criteria</b>	<b>Action</b>
Chain Container (optional)	Visual	Container should not be damaged. Brackets should not be deformed or missing.	Replace
Bolts, Nuts and Rivets	Visual, Check with Proper Tool	Bolts, nuts and rivets should not be loose.	Tighten or replace as required.
Housing and Mechanical Components	Visual, Auditory, Vibration, Function	Hoist components including load blocks, suspension housing, chain attachments, clevises, yokes, suspension bolts, shafts, gears, bearings, pins and rollers should be free of cracks, distortion, significant wear and corrosion. Evidence of same can be detected visually or via detection of unusual sounds or vibration during operation.	Replace
Chain Separator	Visual, Measure	The Chain Separator should be free of cracks, distortion, significant wear and corrosion. The "L" and "W" dimension should not be greater than maximum value listed in Table 5-5.	Replace
Motor Brake	Measure, Visual	Motor brake dimension should be within the allowable limits of Table 5-4. See Section 7.2 for gaining access to motor brake. Braking surfaces should be clean, free of grease/oil and should not be glazed.	Replace
Load Sheave	Visual	Pockets of Load Sheave should be free of significant wear. See Section 7.5 to gain visual access to the load sheave.	Replace.
Pendant Control Levers	Visual, Function	Depressing and releasing pendant control levers should cause hoist to operate.	Repair or replace as necessary.
Pendant - Housing	Visual	Pendant housing should be free of cracks and mating surfaces of parts should seal without gaps.	Replace.
Pendant - Tubing	Visual, auditory	Tubing to pendant control switches should not be loose or be leaking air.	Repair or replace as necessary.
Pendant - Labels	Visual	Labels denoting functions should be legible.	Replace.
Warning Labels	Visual	Warning Labels should be affixed to the hoist (see Section 1.2) and they should be legible.	Replace
Hoist Capacity Label	Visual	The label that indicates the capacity of the hoist should be legible and securely attached to the hoist.	Replace.



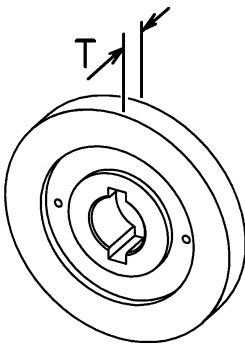
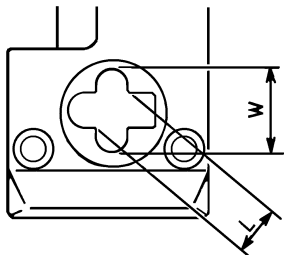
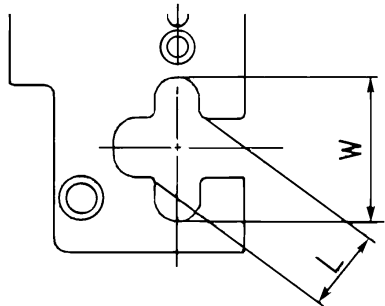
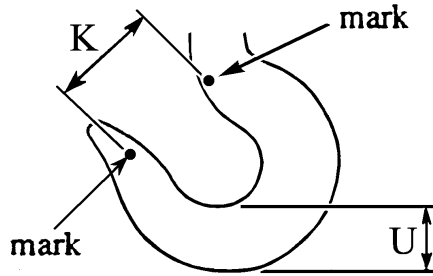
Table 5-4 Brake Disc Dimension			
			
Hoists	Parts View Item No.	Std Dimension Inch (mm)	Minimum Value for Replacement Inch (mm)
TCR250, 500, 1000-2	73	T = 0.31 (8.0)	T = 0.29 (7.3)
TCR1000, 2000-2	73	T = 0.31 (8.0)	T = 0.29 (7.3)
TCR3000, 6000-2	73	T = 0.31 (8.0)	T = 0.29 (7.3)

Table 5-5 Chain Separator Dimensions			
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>TCR250, 500, 1000-2, 1000, 2000-2</p> </div> <div style="text-align: center;">  <p>TCR 3000, 6000-2</p> </div> </div>			
Hoists	Parts View Item No.	Std Dimension Inch (mm)	Maximum Value for Replacement Inch (mm)
TCR250, 500, 1000-2	97	L = 0.55 ( 14) W = 0.98 ( 25)	L = 0.67 ( 17) W = 1.08 ( 27.5)
TCR1000, 2000-2	97	L = 0.62 ( 15.8) W = 1.10 ( 28)	L = 0.70 ( 17.8) W = 1.18 ( 30)
TCR3000, 6000-2	97	L = 1.00 ( 25.5) W = 1.85 ( 47)	L = 1.10 ( 28) W = 1.93 ( 49)

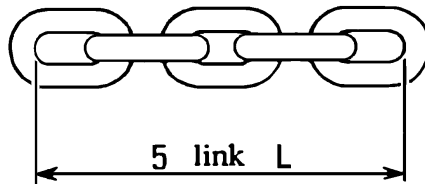
**Table 5-6 Top Hook & Bottom Hook Dimensions**



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

Hoists	Parts View Item No.	Recorded Dimension When New	Maximum/Minimum Value for Replacement
TCR250, 500, 1000-2	115 120	Top Hook K = _____ Top Hook U = _____ Bottom Hook K = _____ Bottom Hook U = _____	For K if the measured dimension exceeds 1.05 times the recorded new dimension, the hook should be replaced.  For U if the measured dimension is less than .9 times the recorded new dimension, the hook should be replaced.
TCR1000, 2000-2	115 120	Top Hook K = _____ Top Hook U = _____ Bottom Hook K = _____ Bottom Hook U = _____	
TCR3000, 6000-2	115 120	Top Hook K = _____ Top Hook U = _____ Bottom Hook K = _____ Bottom Hook U = _____	

**Table 5-7 Chain Dimensions**



Hoists	Parts View Item No.	Std Nominal Dimension Inch (mm)	Maximum Value for Replacement Inch (mm)
TCR 250, 500, 1000-2	131	Nominal L = 3.76 (95.5)	L = 3.82 (96.9)
TCR 1000, 2000-2	131	Nominal L = 4.18 (106.2)	L = 4.25 (107.8)
TCR 3000, 6000-2	131	Nominal L = 5.96 (151.5)	L = 6.05 (153.8)

## 6.0 Lubrication

### 6.1 Air Hoist Lubrication

6.1.1 See Section 3.0 for lubrication requirements.

6.1.2 **⚠ CAUTION** Lubrication to the motor will be provided primarily by the air supply lubricator. The recommended amount is 10-15 drops/minute (2-3cc/min.). Refer to Table 6-1 below for the approved lubricant for use with your air hoist.

6.1.3 Additional lubrication to the reduction gears is not necessary. When disassembling the hoist for service or repair, apply new grease to the gears before reassembling the hoist.

### 6.2 Load Chain Lubrication

6.2.1 For longer life, lightly coat the load chain with machine or gear oil. Ensure that the oil is applied to the bearing surfaces of the load chain links.

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

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

### 6.3 Hooks and Suspension Components

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

6.3.2 Suspension Pins - Lubricate at least twice per year for normal usage; more frequently for heavier usage or severe conditions.

Table 6-1 Table of Approved Lubricants			
Application	Part Location	Lubrication	Grade
Air motor	Lubricator	Turbine Oil	ISO VG 32-56 or equivalent
Load chain & pocket wheel	Load chain	Machine or gear oil	ISO VG 46-68 or equivalent
Hook bearings & suspension pins	Top & bottom hook sets	Grease	National Lubricating Grease #3
Gears and Bearings	Gear Section	Grease	National Lubricating Grease #2

## 7.0 Maintenance and Handling

### 7.1 Load Limiter

- 7.1.1 The purpose of the load limiter is to prevent using the hoist in an overload situation. When lifting, the hoist will stop automatically if the load is above the rated capacity of the hoist.
- 7.1.2 The adjustment is factory set to actuate at approximately 125% of rated capacity (based on supply air pressure of 90 PSI). Note: the load limiter may need adjustment to compensate for air supply pressures significantly less than 90 PSI.

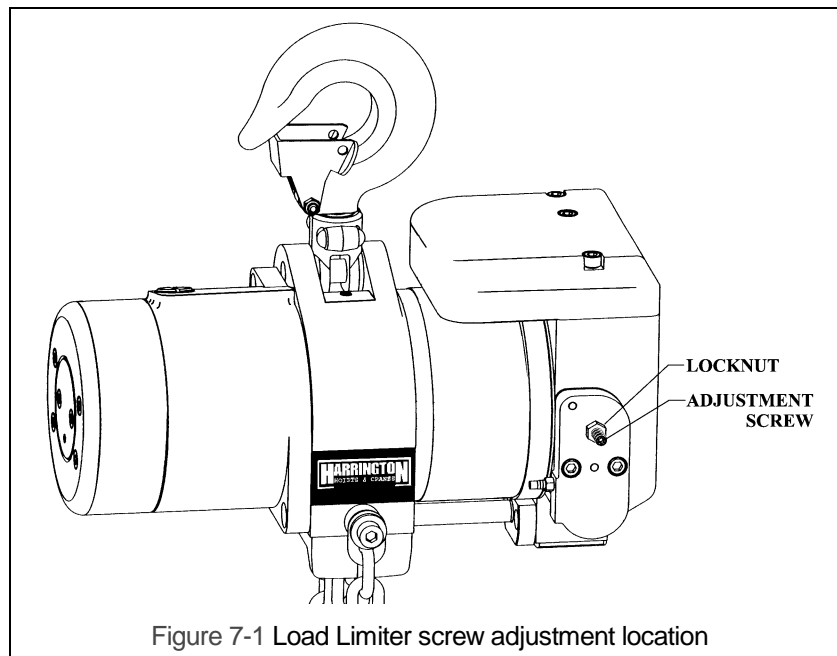


Figure 7-1 Load Limiter screw adjustment location

#### 7.1.3 Adjustment Procedure

- 1) Before proceeding with the load limiter adjustment, note the following:
  - a. **⚠ WARNING** Adjusting the load limiter involves operating the hoist. Personnel involved in the adjustment procedure should read, understand, and follow Section 4, "Operation".
  - b. For the adjustment procedure, the hoist should be connected to an air supply (see Section 3.1) and it should initially be without a load on its hook.
  - c. Start this procedure with an unloaded hoist. All adjustments to the load limiter should be made with the load in a resting position so that the load chain is not tensioned.
  - d. For the adjustment procedure: OUT means the counter-clockwise (CCW) direction, and IN means the clockwise (CW) direction.
  - e. The pressure of the air supply at the hoist's inlet port (acceptable range is 60 to 90 PSI) affects the performance of your air hoist, including the actuation point of the load limiter. Therefore, ensure that during the adjustment procedure the air pressure at the hoist's inlet port is the same as that which the hoist will experience in normal operation. The relationship between air supply pressure and load limiter actuation is:
    - for a given load limiter setting, as pressure decreases, the actuation point increases.

- f. When the load limiter is adjusted and working properly, the hoist will operate and lift the load a short distance before the load limiter automatically stops lifting.
- 2) Refer to Figure 7-1. Loosen the lock nut and slowly turn the adjustment screw OUT until it is loose and no longer is in contact with the internal load limiter spring – as this occurs the screw should become easier to turn. Stop turning the screw once it is loose and easier to turn.
- 3) Turn the adjustment screw IN just enough so that it begins to contact the internal load limiter spring – as this occurs the screw should become slightly harder to turn.
- 4) Put a load equal to the desired actuation point on the hoist's hook (do not exceed 125% of the hoist's rated capacity). Begin to slowly lift the load, then increase the lifting speed. Return the load to its resting position so the load chain is not under tension.
- 5) If the load limiter prevents lifting, turn the adjustment screw IN one full turn.
- 6) Repeat steps 4 and 5 until the load limiter allows lifting.
- 7) Turn the adjustment screw OUT  $\frac{3}{4}$  of a turn.
- 8) Attempt to lift the rated capacity load again, beginning slowly, then increasing the lifting speed.
- 9) If the load limiter does not allow lifting, then turn the adjustment screw IN  $\frac{1}{4}$  turn.
- 10) Repeat steps 8 and 9 until the load limiter allows lifting.
- 11) Turn the adjustment screw IN  $\frac{1}{4}$  turn. Then, while holding the adjustment screw, tighten the lock nut to secure the setting.

### NOTICE

Turning the adjustment screw IN 8 full turns or more will disable the load limiter.

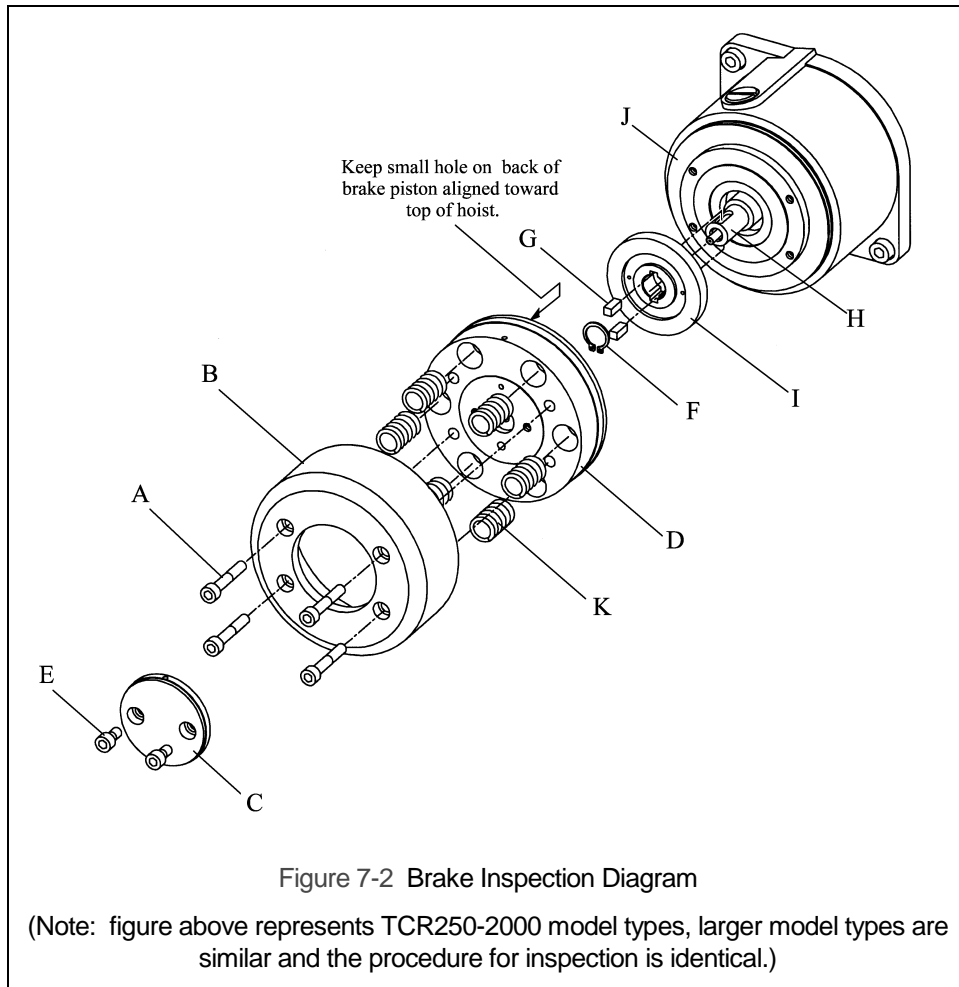
## 7.2 Brake

7.2.1 The hoist brake is not adjustable.

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

7.2.3 The following is the hoist brake inspection procedure. Refer to Figure 7-2.

- 1) **⚠ WARNING** HAZARDOUS AIR PRESSURE IS PRESENT IN THE HOIST, IN THE SUPPLY OF COMPRESSED AIR TO THE HOIST, AND IN THE CONNECTIONS BETWEEN COMPONENTS. Shut off the air supply and stop the airflow completely. Lock out and tag out in accordance with ANSI Z244.1 "Personnel Protection -Lockout/Tagout of Energy Sources".
- 2) Gradually back out all four hex socket cap screws (A) from brake cover (B) from gear case (J) to slowly decrease spring tension (K) of brake piston (D) against brake disc (I).
- 3) Remove brake cover (B) from top of gear case (J). Keep brake piston (D), springs (K), seals and piston cover (C) together inside the brake cover. Do not remove cap screws (E). Set parts aside for reassembly.
- 4) Remove retaining ring (F) on pinion shaft (H) adjacent to brake disc (I).
- 5) Remove brake disc for inspection and measurement and then the two keys (G) from each side of pinion shaft (H). Refer to "Motor Brake" in Table 5-3, "Hoist Inspection Methods and Criteria".
- 6) Prior to reassembly, clean all surfaces of debris, dirt and loose paint. Apply a light film of grease to all "O"-ring seals.
- 7) Reassemble in reverse order. Keep the small hole on the back of the brake piston (D) aligned toward the top of the hoist. Torque all mounting hardware evenly during the reassembly process.



## 7.3 Load Chain

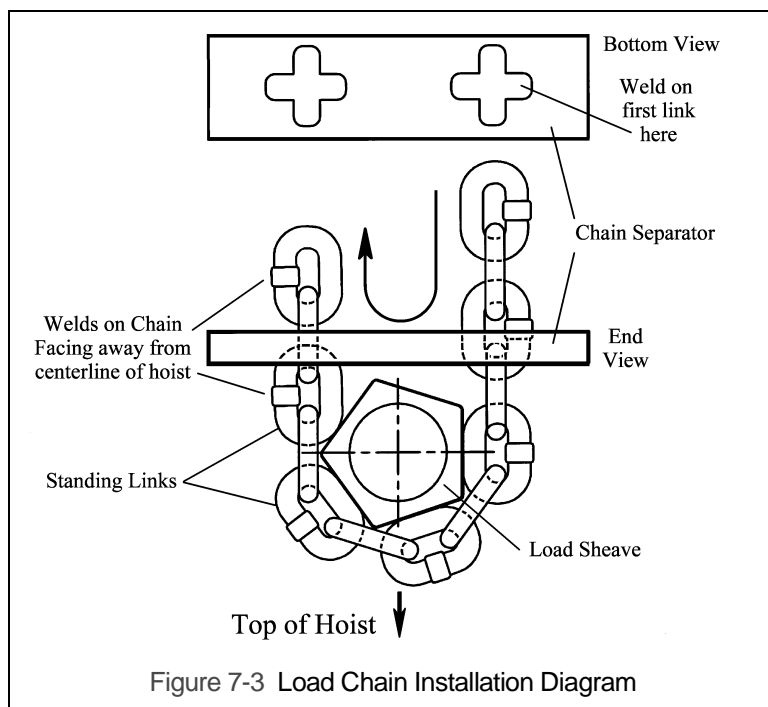
### 7.3.1 Lubrication and Cleaning

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

### 7.3.2 Replacement

- 1) **CAUTION** An air supply line must be connected to the hoist in order to perform the following procedures.
- 2) **WARNING** Be certain that the replacement chain is obtained from Harrington and is the exact size, grade and construction as the original chain.
- 3) **CAUTION** When replacing load chain, check for wear on mating parts, i.e. Load Sheave, Chain Guides and Idler Wheels, and replace parts if necessary. Remove old chain. Remove hook set assemblies, limit locks, stoppers and end connections from the chain for reuse on new chain. If the load chain is being replaced due to damage or wear out, prevent its reuse by destroying the old chain.

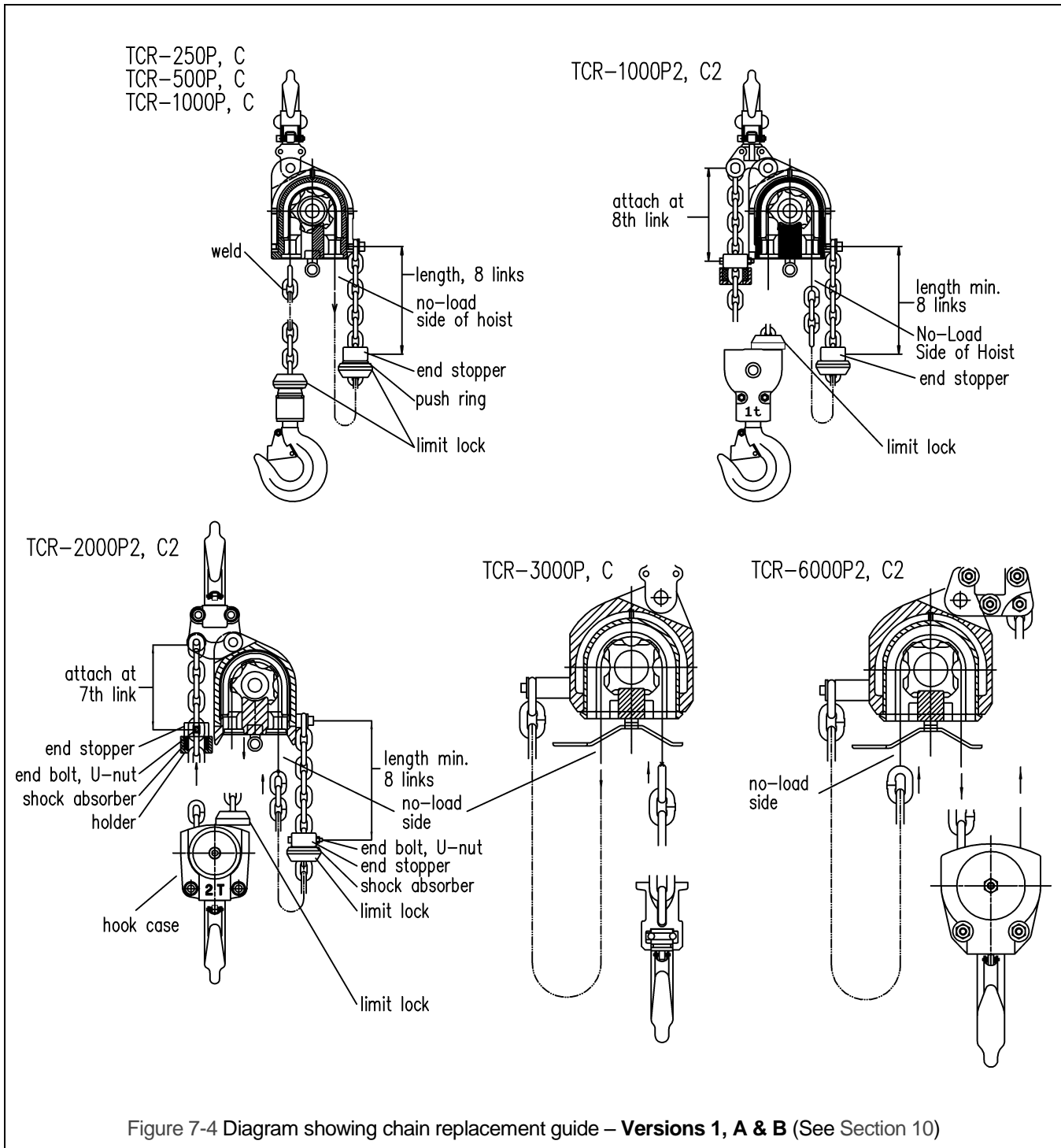
- 4) **⚠ CAUTION** Invert the hoist such that the chain separator openings are facing up. The chain must be inserted into the chain separator on the no load side opening. This is where the no load end of chain attaches to hoist body. Without inserting the load chain, operate the hoist pendant or cord control to determine which direction the load sheave is rotating in relation to the pendant control function pressed or pulled. Install load chain into the hoist making certain the first link is a standing link and that its weld is facing away from the centerline of the hoist. See Figures 7-3 and 7-4 below.



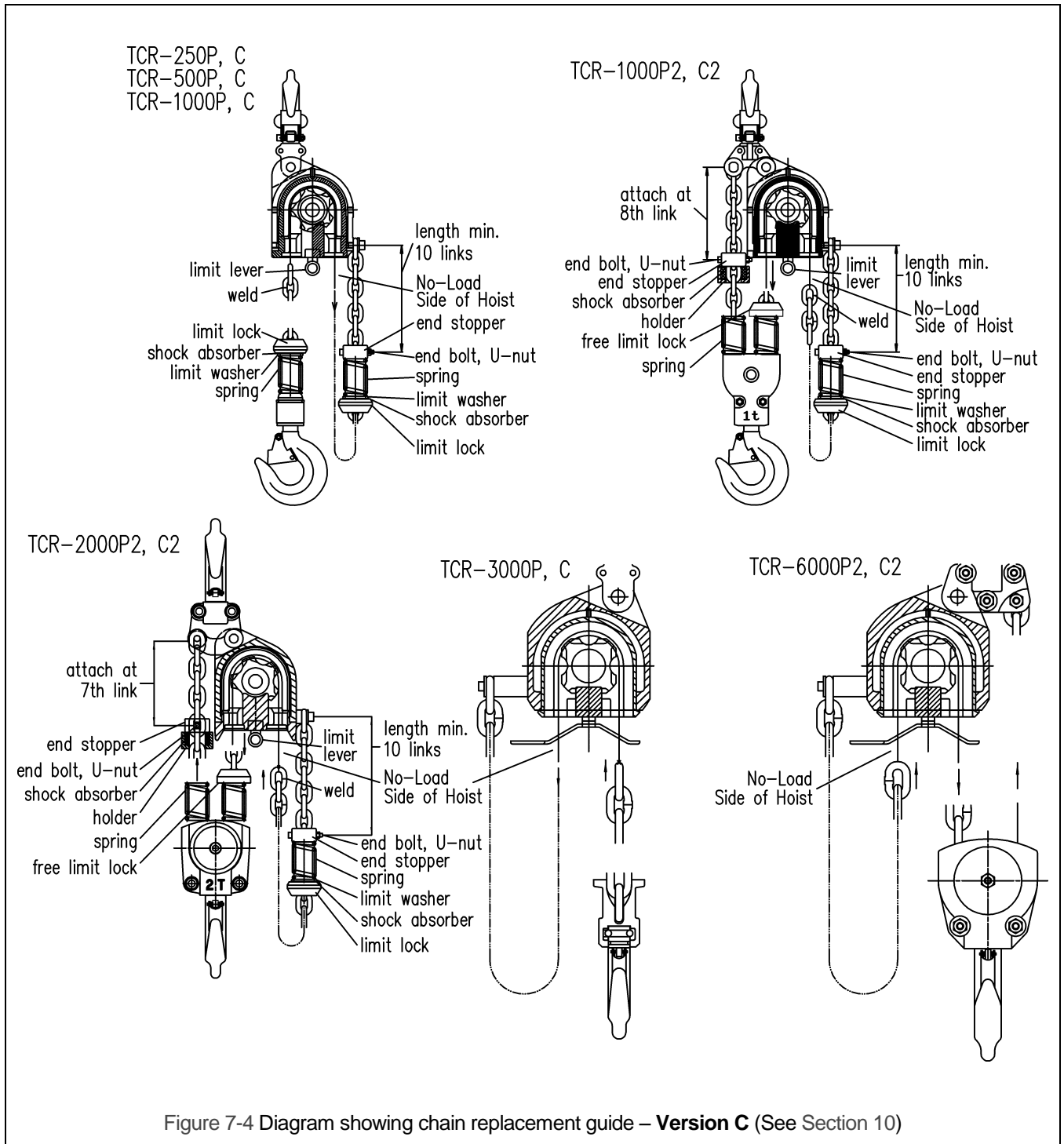
- 5) **⚠ CAUTION** Operate the hoist slowly to catch and pull the chain through the hoist. Make sure the chain feeds smoothly while operating the hoist. If binding occurs, stop and reverse the hoist direction to back the chain out. Reinsert the chain while gradually operating the hoist controls. Continue until sufficient quantity of chain is fed through the hoist.

Table 7-1 Placement of Stoppers on Load Chain				
Model Type Hoist	Version 1, A & B		Version C	
	Load Side Chain End	No Load Side Chain End	Load Side Chain End	No Load Side Chain End
TCR250P, C TCR500P, C TCR1000P, C	None	8	None	10
TCR1000P2, C2	8	8	8	10
TCR2000P2, C2	7	8	7	10
TCR3000P, C TCR6000P2, C2	None	None	None	None

- 6) **⚠ WARNING** Make sure end stoppers and limit locks are installed in accordance with Table 7-1 and the diagram in Figure 7-4.
- 7) Ensure that chain remains free of twists when attaching dead end(s) of chain and when feeding chain through bottom hook case (double fall units). Refer to Figures 3-6 and 3-7.
- 8) After installation has been completed, perform steps outlined in Section 3.12 "Preoperational Checks and Trial Operation".



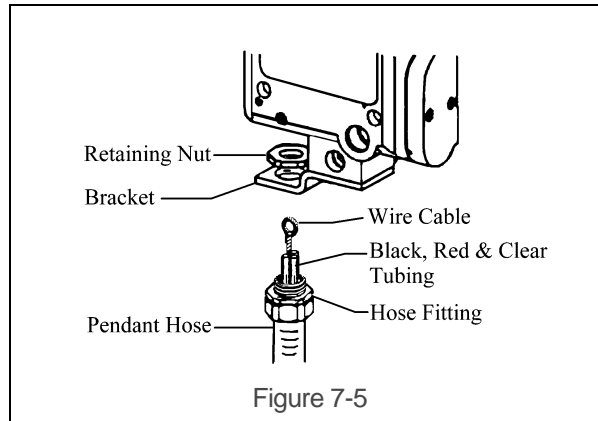




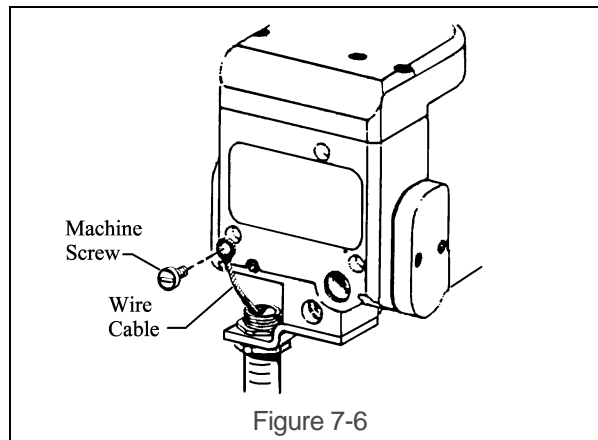
## 7.4 Pendant

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

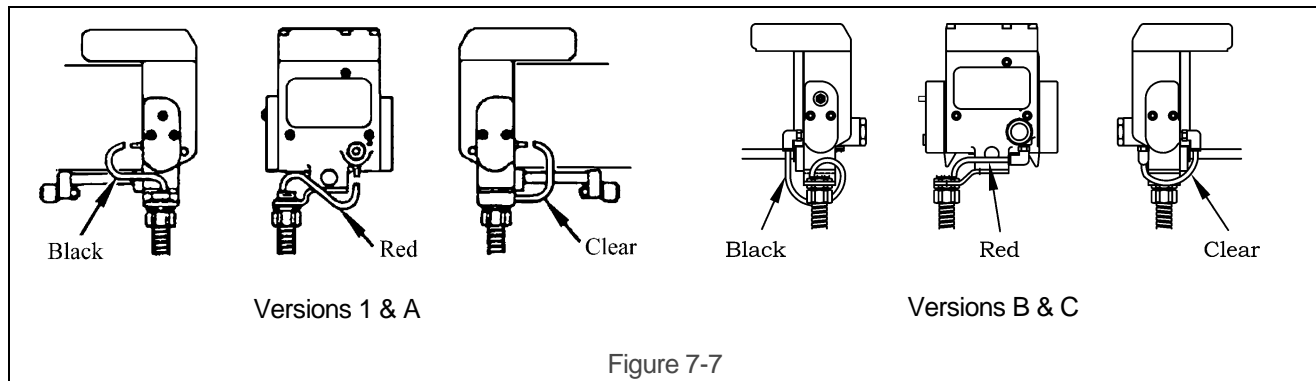
- 1) Put hose, 3 tubes and wire through the bracket hole. See Figure 7-5.
- 2) Attach the hose to the bracket by installing the retaining nut to the hose fitting.
- 3) Torque retaining nut to 20 lbf.-ft.



- 4) Attach the wire cable to the hoist valve body with the screw as shown in Figure 7-6.
- 5) Torque machine screw to between 30 and 40 in-lbf.



- 6) Attach the three tubes to each nipple as shown in Figure 7-7. Red tube for main air, clear tube for lifting and black tube for lowering.

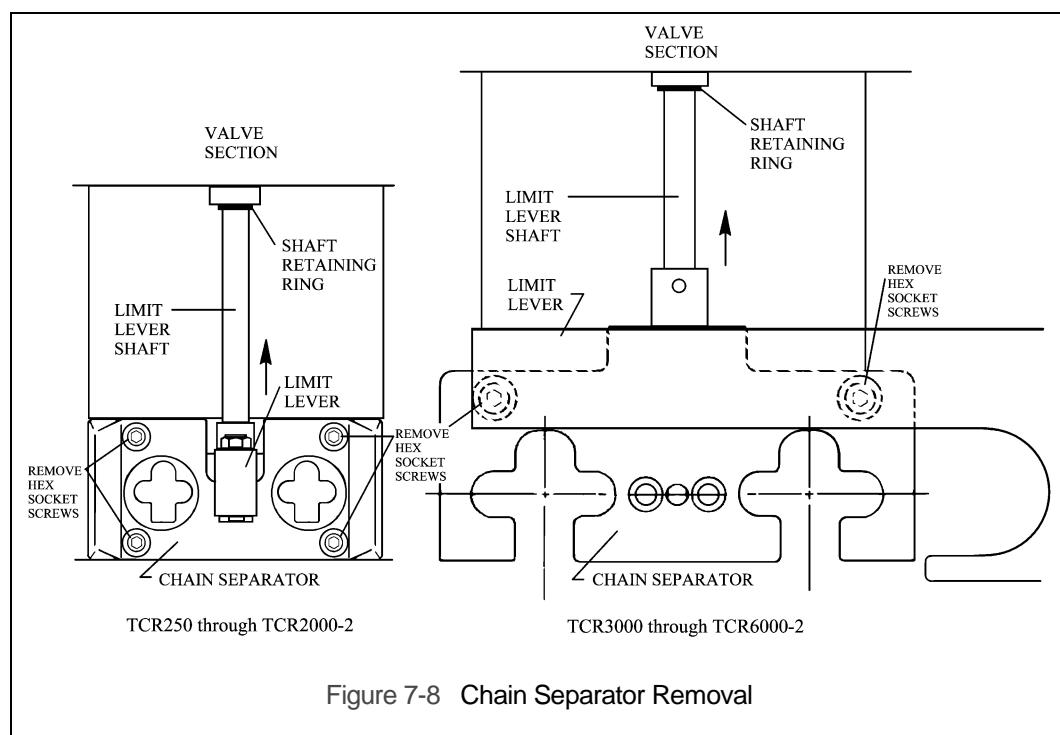


**NOTICE** When attaching tubes take care not to bend or kink tubing. This will result in the air flow being restricted and poor response to the pendant controls.

## 7.5 Load Sheave Inspection

7.5.1 Perform this inspection by removing the chain separator and viewing the load sheave while operating the hoist slowly, with no load, and in accordance with Section 4 “Operation”. Refer to Figure 7-8 and remove the chain separator as follows.

- TCR3000 and TCR6000-2: The chain separator can be removed by removing the shaft retaining ring from its groove on the limit lever shaft adjacent to the valve section, sliding the limit lever assembly away from the chain separator, and removing the two larger outboard hex socket screws holding the chain separator to the hoist body.
- TCR250 through TCR2000-2: The chain separator can be removed by removing the shaft retaining ring from its groove on the limit lever shaft adjacent to the valve section, sliding the limit lever assembly away from the chain separator, removing the limit lever from the limit lever shaft, and removing the hex socket screws holding the chain separator to the hoist body.



## 7.6 Storage

7.6.1 Whenever the hoist is to be placed into storage, place extra lubricating oil into the air inlet opening and circulate the air motor before plugging the inlet. Make certain that no debris, dirt or moisture is allowed to enter the air hoist through air inlet opening during preparations for storage.

7.6.2 The storage location should be clean and dry.

## 7.7 Outdoor Installation

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

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

## 8.0 Troubleshooting

### **WARNING**

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

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

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

**Table 8-1 Troubleshooting Guide**

Symptom	Cause	Remedy
Does not operate	Lack of air pressure or loss of air supply.	Repair or adjust air supply or filters.
	Seizure of Main Spool, Brake Spool, or Air Motor.	Repair at service facility.
	Seizure of brake or brake mechanism fails to release.	Repair at service facility.
	Bending or crimping of pendant hose or control tubes	Correct or repair bend or crimp in hose and/or tubes
	Air leak between the two chambers in the Top Cover	Correct or repair to eliminate air leak.
	Hoist is overloaded.	Reduce the load to the rated capacity of hoist.
Lifting speed is slow	Low air pressure at hoist inlet port.	Repair or adjust air supply or filters. Check for air line obstruction.
	Air supply hose or piping is too small.	Replace hose or piping sizes with recommended sizes in Section 3.0.
	Malfunction of brake.	Repair at service facility.
	Bending or crimping of pendant hoses or control tubes	Correct or repair the bend or crimp in hose and/or control tubes
	Lack of sufficient oil in air supply to hoist	Increase oil in air supply to hoist in accordance with requirements in Section 3.0.
	Exhaust Silencer or Nylon Silencer clogged	Clean or replace.
	Air flow capacity of compressed air system insufficient	Increase air flow capacity of compressed air system to requirements in Section 2.0.
	Air motor vanes or bearings worn	Repair at service facility.
	Air supply to hoist contains dirt or debris	Filter the air supply to the hoist in accordance with the requirements in Section 3.0.
	Air leak between the two chambers in the Top Cover	Correct or repair to eliminate air leak.

Table 8-1 Troubleshooting Guide		
Symptom	Cause	Remedy
Unable to lift rated load	Lack of air pressure or loss of air supply.	Repair or adjust air supply or filters.
	Improper adjustment of load limiter.	Adjust Load Limiter. See Section 7.1.
	Air leak between the two chambers in the Top Cover	Correct or repair to eliminate air leak.
Hoist moving in wrong direction (pendant control)	Pendant control tubes are terminated to incorrect ports on hoist body.	Connect the control tubes in accordance with Section 7.4.
Hoist lowers but will not lift	Hoist is overloaded.	Reduce load to hoist rated capacity.
	Faulty pendant control or control tube(s)	Repair or replace pendant control or control tube(s)
	Lack of air pressure or partial loss of or leakage in air supply.	Repair or adjust air supply or filters.
Hoist continues running after pendant or cord is released	Main Spool sticking	Inject approx. 20 drops of oil into inlet port to lubricate the main spool. If spool still sticks, repair at service facility.
	Main Spool spring broken	Repair at service facility
	Main Spool leaking	Repair at service facility
	Mis-alignment of Limit Shaft with Bottom Plate (TCR3000/6000 only)	Loosen Bottom Plate and re-align so that Limit Shaft operates freely.
	Valve in Pendant Handle stuck	Repair at service facility
Hoist drifts excessively when hoist is stopped	Brake is not holding.	Repair brake at service facility.
	Motor vanes leaking.	Replace motor vanes and springs at service facility.

## **9.0 Warranty**

Warranty explanation and terms.

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

- 1 year – Electric and Air Powered Hoists (excluding (N)ER2 Enhanced Features Models), Powered Trolleys, Powered Tiger Track Jibs and Gantries, Crane Components, Below the Hook Devices, Spare / Replacement Parts**
- 2 years – Manual Hoists & Trolleys, Beam Clamps**
- 3 years – (N)ER2 Enhanced Features Model Hoists**
- 5 years – Manual Tiger Track Jibs and Gantries, TNER Pull - Rotor Motor Brake**
- 10 years – (N)ER2 “The Guardian” Smart Brake**

The product must be used in accordance with manufacturer’s recommendations and must not have been subject to abuse, lack of maintenance, misuse, negligence, or unauthorized repairs or alterations.

Should any defect in material or workmanship occur during the above time period in any product, as determined by Harrington Hoist’s inspection of the product, Harrington Hoists, Inc. agrees, at its discretion, either to replace (not including installation) or repair the part or product free of charge and deliver said item F.O.B. Harrington Hoists, Inc. place of business to customer.

Customer must obtain a Return Goods Authorization as directed by Harrington or Harrington’s published repair center prior to shipping product for warranty evaluation. An explanation of the complaint must accompany the product. Product must be returned freight prepaid. Upon repair, the product will be covered for the remainder of the original warranty period. Replacement parts installed after the original warranty period will only be eligible for replacement (not including installation) for a period of one year from the installation date. If it is determined there is no defect, or that the defect resulted from causes not within the scope of Harrington’s warranty, the customer will be responsible for the costs of returning the product.

Harrington Hoists, Inc. disclaims any and all other warranties of any kind expressed or implied as to the product’s merchantability or fitness for a particular application. Harrington will not be liable for death, injuries to persons or property or for incidental, contingent, special or consequential damages, loss or expense arising in connection with the use or inability whatever, regardless of whether damage, loss or expense results from any act or failure to act by Harrington, whether negligent or willful, or from any other reason.

## 10.0 Parts List

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

Reminder: Per Sections 3.12.6 and 1.1 to aid in ordering Parts and Product Support, record the Hoist code number and serial number in the space provided on the cover of this manual.



Parts lists for the TCR Air Hoists are presented in this section and are subdivided for reference in Figures 10-1 through 10-6.

The letters C and P designate "Cord" and "Pendant" controlled hoists. Hoists with 2 parts or falls of load chain have a "-2" designator following the model number.

Certain hoists parts in the following parts list are identified by hoist version 1, A, B or C. Use Table 10-1 to determine the hoist version and select the correct hoist part(s).

Table 10-1 Hoist Version Identification Chart				
Item	Version 1	Version A	Version B	Version C
Last digit of the Serial Number:	Numerical digit (ex. BL18 <u>2</u> )	"A" (ex. MD165 <u>A</u> )	"B" (ex. DF124 <u>B</u> )	"C" (ex. KE189 <u>C</u> )
Limit Shaft Attachment Method:	External Retaining Ring	Hairpin Cotter and Washer	Hairpin Cotter and Washer	Hairpin Cotter and Washer
Pendant Hose Connections:	Hose Barb 5mm thread	Hose Barb 5mm thread	90° Tube Fitting 1/8" pipe thread	90° Tube Fitting 1/8" pipe thread
Side Cover Thickness:	1/2"	1/2"	1/2"	7/8"
Chain Springs	No	No	No	Yes

## 10.1 Main Body

### 10.1.1 TCR250 / TCR500 Main Body

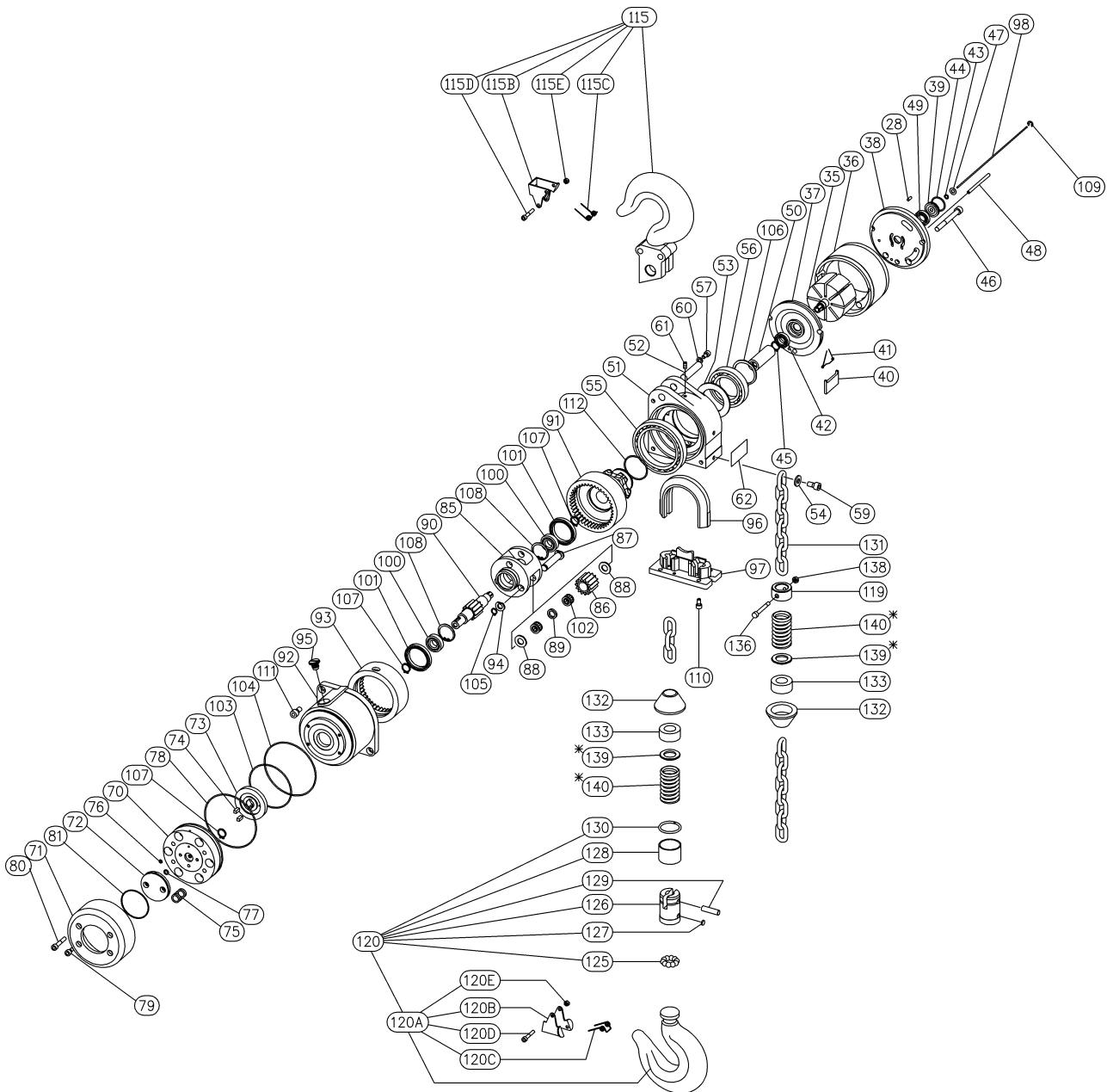


Figure 10-1 TCR250 / TCR500 Main Body



Figure Number	Part Number	Part Name	Parts Per Hoist
28	TCR130406005	Parallel Pin	2
35	TCR426224151	Rotor	1
36	TCR426224161	Stator	1
37	TCR426224171	Front Plate	1
38	TCR426224182	Rear Plate	1
39	TCR426224191	Rear Retainer	1
40	TCR137102020	Vane	8
41	TCR130802212	Vane Spring	8
42	9001202	Bearing	1
43	TCR131103004	O-Ring	1
44	TCR131103023	O-Ring	1
45	9047115	Retaining Ring	1
46	9091283	Socket Bolt	3
47	9012511	Washer	1
48	TCR130402051	Knock Pin	1
49	9000102	Bearing	1
50	TCR426224200	Coupling	1
51	TCR426224212	Wheel Housing	1
52	TCR426224220	Top Pin	1
53	TCR426224230	Spacer	1
54	TCR426261R50	Washer	1
55	9001204	Bearing	1
56	9000109	Bearing	1
57	9091247	Socket Bolt	1
59	9091273	Socket Bolt	1
60	TCR426221R50	Washer	1
61	TCR132108012	Set Screw	1
62	TCR137309075	Brand Name Plate	1
70	TCR426224401	Brake Piston	1
71	TCR426224410	Brake Cover	1
72	TCR426224421	Piston Cover	1
73	TCR426224430	Brake Disc	1
74	TCR130408081	Key	2
75	TCR130802213	Disc Spring	6
76	TCR131103002	O-Ring	1
77	TCR131101004	O-Ring	1

Figure Number	Part Number	Part Name	Parts Per Hoist
78	TCR131103055	O-Ring	1
79	9091247	Socket Bolt	2
80	9091254	Socket Bolt	4
81	TCR131117033	O-Ring	1
85	TCR426224240	Cage	1
86	TCR426224250	Star Gear	3
87	TCR426224260	Pin	3
88	TCR426224270	Thrust Collar	6
89	TCR426224280	Retainer	3
90	TCR426224290	Pinion	1
91	TCR426224300	Load Sheave	1
92	TCR426224312	Gear Case	1
93	TCR426224322	Ring Gear	1
94	TCR426224330	Spacer (P)	3
95	TCR426221K90	Lock Screw	1
96	TCR426224352	Chain Guide	1
97	TCR426224363	Chain Separator	1
98	TCR426224381	Brake Tube	1
100	9000102	Bearing	2
101	9001201	Bearing	2
102	TCR130170035	Needle Bearing	6
103	TCR131117042	O-Ring	1
104	TCR131103055	O-Ring	1
105	9047110	Retaining Ring	3
106	9047145	Retaining Ring	1
107	9047115	Retaining Ring	3
108	9047232	Retaining Ring	2
109	TCR130303005	Retaining Ring	1
110	9091247	Socket Bolt	4
111	9091271	Socket Bolt	3
112	TCR131103036	O-Ring	1
115	TCR42622457B	Top Hook Set	1
115B	TCR426221S30	Hook Latch	1
115C	TCR130802258	Hook Spring	1
115D	9091232	Socket Bolt	1
115E	E2D853125	U-Nut	1

Figure Number	Part Number	Part Name	Parts Per Hoist
119	TCR426224390	End Stopper	1
120	TCR42622477C	Bottom Hook Set 250	1
120A	TCR426221S2F	Bottom Hook Assy.	1
120B	TCR426221S30	Hook Latch	1
120C	TCR130802258	Hook Spring	1
120D	9091232	Socket Bolt	1
120E	E2D853125	U-Nut	1
125	TCR130502020	Steel Ball	8
126	TCR426221S80	Bottom Hook Holder	1
127	TCR420846PY0	Swivel Hook Plug	1
128	TCR426224770	Sleeve	1
129	TCR426221T20	Chain Pin	1
130	TCR130802259	Lock Ring	1
120	TCR426221S2C	Bottom Hook Set 500	1
120A	TCR426221S2F	Bottom Hook Assy.	1
120B	TCR426221S30	Hook Latch	1
120C	TCR130802258	Hook Spring	1
120D	9091232	Socket Bolt	1
120E	E2D853125	U-Nut	1
125	TCR130502020	Steel Ball	8
126	TCR426221S80	Bottom Hook Holder	1
127	TCR420846PY0	Swivel Hook Plug	1
128	TCR426224760	Sleeve	1
129	TCR426221T20	Chain Pin	1
130	TCR130802259	Lock Ring	1
131	LCER005C	Load Chain	FT
132	TCR426224450	Limit Lock	2
133	TCR136206002	Shock Absorber	2
136	TCR426224680	End Bolt	1
138	9098504	U Nut	1
139*	TCR426224C80	Limit Washer*	2
140*	TCR130802219	Chain Spring*	2

\* Version C hoists only.

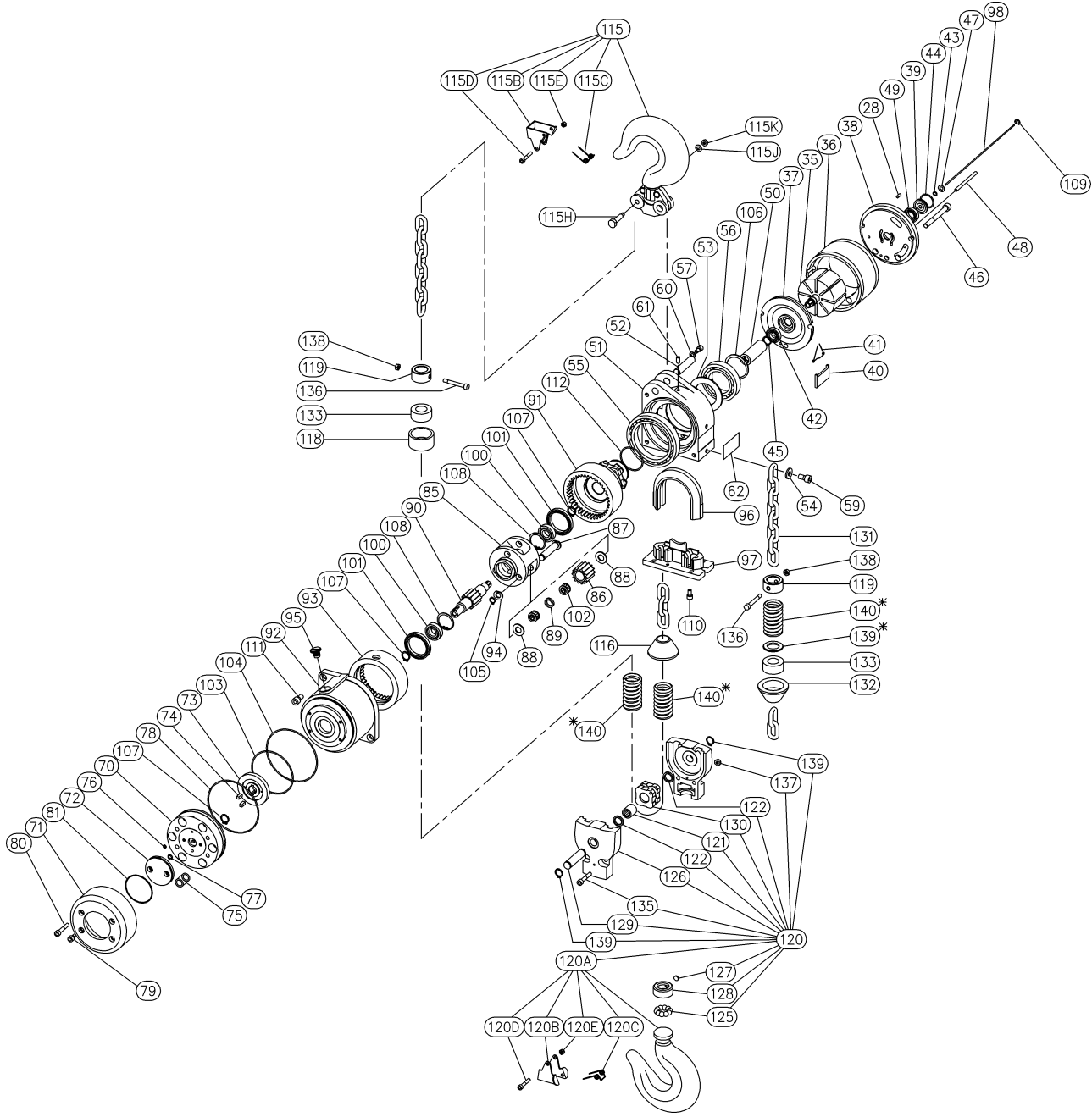


Figure 10-2 TCR1000-2 Main Body

Figure Number	Part Number	Part Name	Parts Per Hoist
28	TCR130406005	Parallel Pin	2
35	TCR426224151	Rotor	1
36	TCR426224161	Stator	1
37	TCR426224171	Front Plate	1
38	TCR426224182	Rear Plate	1
39	TCR426224191	Rear Retainer	1
40	TCR137102020	Vane	8
41	TCR130802212	Vane Spring	8
42	9001202	Bearing	1
43	TCR131103004	O-Ring	1
44	TCR131103023	O-Ring	1
45	9047115	Retaining Ring	1
46	9091283	Socket Bolt	3
47	9012511	Washer	1
48	TCR130402051	Knock Pin	1
49	9000102	Ball Bearing	1
50	TCR426224200	Coupling	1
51	TCR426224212	Wheel Housing	1
52	TCR426224220	Top Pin	1
53	TCR426224230	Spacer	1
54	TCR426261R50	Washer	1
55	9001204	Bearing	1
56	9000109	Bearing	1
57	9091247	Socket Bolt	1
59	9091273	Socket Bolt	1
60	TCR426221R50	Washer	1
61	TCR132108012	Set Screw	1
62	TCR137309075	Brand Name Plate	1
70	TCR426224401	Brake Piston	1
71	TCR426224410	Brake Cover	1
72	TCR426224421	Piston Cover	1
73	TCR426224430	Brake Disc	1
74	TCR130408081	Key	2
75	TCR130802213	Disc Spring	6
76	TCR131103002	O-Ring	1
77	TCR131101004	O-Ring	1

Figure Number	Part Number	Part Name	Parts Per Hoist
78	TCR131103055	O-Ring	1
79	9091247	Socket Bolt	2
80	9091254	Socket Bolt	4
81	TCR131117033	O-Ring	1
85	TCR426224240	Cage	1
86	TCR426224250	Star Gear	3
87	TCR426224260	Pin	3
88	TCR426224270	Thrust Collar	6
89	TCR426224280	Retainer	3
90	TCR426224290	Pinion	1
91	TCR426224300	Load Sheave	1
92	TCR426224312	Gear Case	1
93	TCR426224322	Ring Gear	1
94	TCR426224330	Spacer (P)	3
95	TCR426221K90	Lock Screw	1
96	TCR426224352	Chain Guide	1
97	TCR426224363	Chain Separator	1
98	TCR426224381	Brake Tube	1
100	9000102	Bearing	2
101	9001201	Bearing	2
102	TCR130170035	Needle Bearing	6
103	TCR131117042	O-Ring	1
104	TCR131103055	O-Ring	1
105	9047110	Retaining Ring	3
106	9047145	Retaining Ring	1
107	9047115	Retaining Ring	3
108	9047232	Retaining Ring	2
109	TCR130303005	Retaining Ring	1
110	9091247	Socket Bolt	4
111	9091271	Socket Bolt	3
112	TCR131103036	O-Ring	1
115	TCR42624457H	Top Hook Set	1
115B	TCR426221S30	Hook Latch	1
115C	TCR130802258	Hook Spring	1
115D	9091232	Socket Bolt	1
115E	E2D853125	U-Nut	1

Figure Number	Part Number	Part Name	Parts Per Hoist
115H	TCR426244580	Chain Pin	1
115J	9012511	Washer	1
115K	9098504	U Nut	1
116	TCR426244630	Free Limit Lock	1
118	TCR426244620	Holder	1
119	TCR426224390	End Stopper	2
120	TCR426244S2C	Bottom Hook Set	1
120A	TCR426221S2F	Bottom Hook Assy.	1
120B	TCR426221S30	Hook Latch	1
120C	TCR130802258	Hook Spring	1
120D	9091232	Socket Bolt	1
120E	E2D853125	U-Nut	1
121	TCR130172006	Needle Bearing	1
122	TCR131204014	Oil Seal	2
125	TCR130502020	Steel Ball	8
126	TCR426244590	Bottom Yoke Assy.	1
127	TCR420846PY0	Swivel Hook Plug	1
128	TCR420846PW0	Outer Bearing Race	1
129	TCR426244600	Wheel Shaft	1
130	TCR426241U20	Idle Sheave	1
135	9091253	Socket Bolt	2
137	9098504	U Nut	2
139	9047114	Retaining Ring	1
131	LCER005C	Load Chain	FT
132	TCR426224450	Limit Lock	1
133	TCR136206002	Shock Absorber	2
136	TCR426224680	End Bolt	2
138	9098504	U Nut	2
139*	TCR426224C80	Limit Washer*	1
140*	TCR130802219	Chain Spring*	3

\* Version C hoists only.

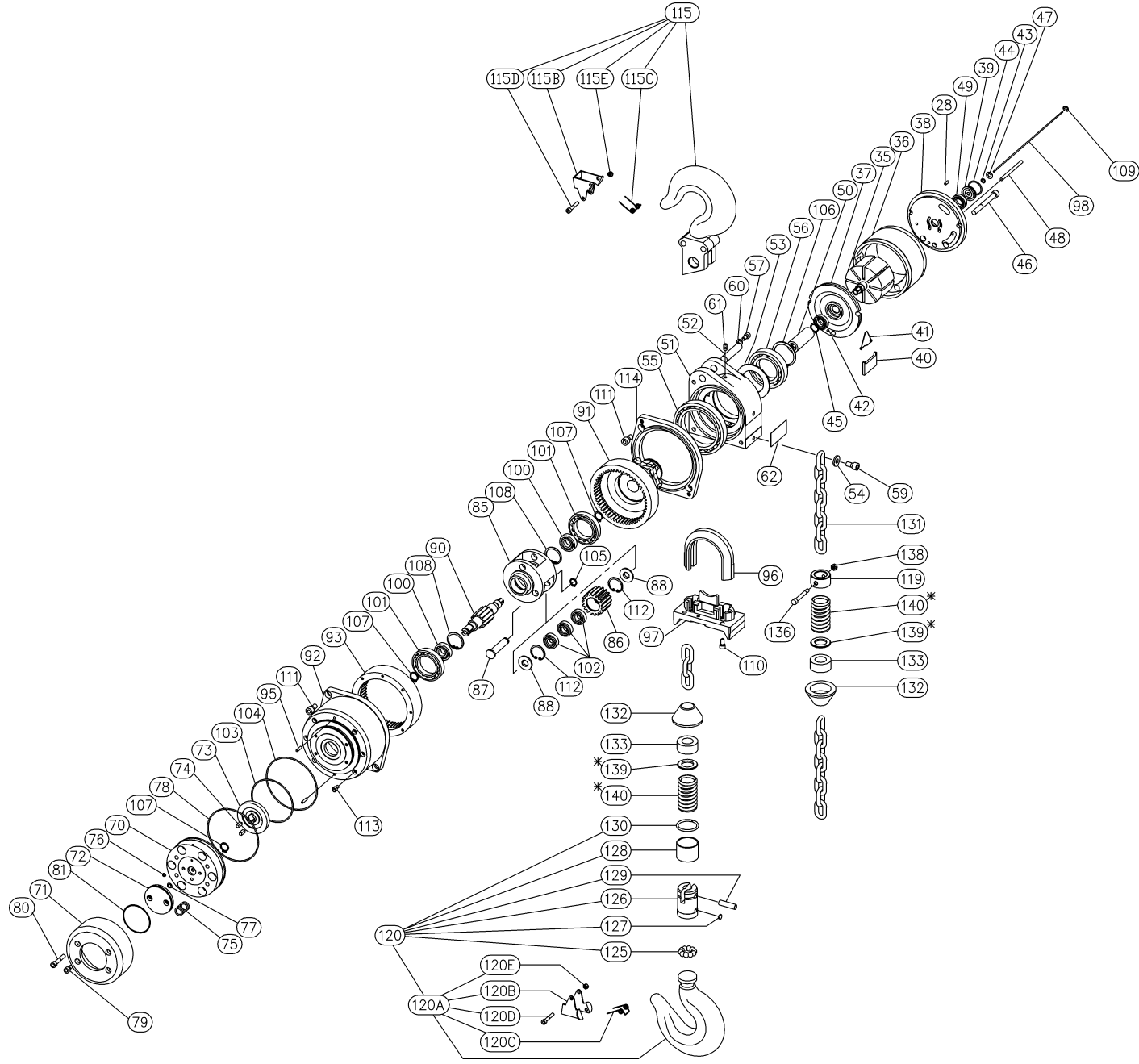


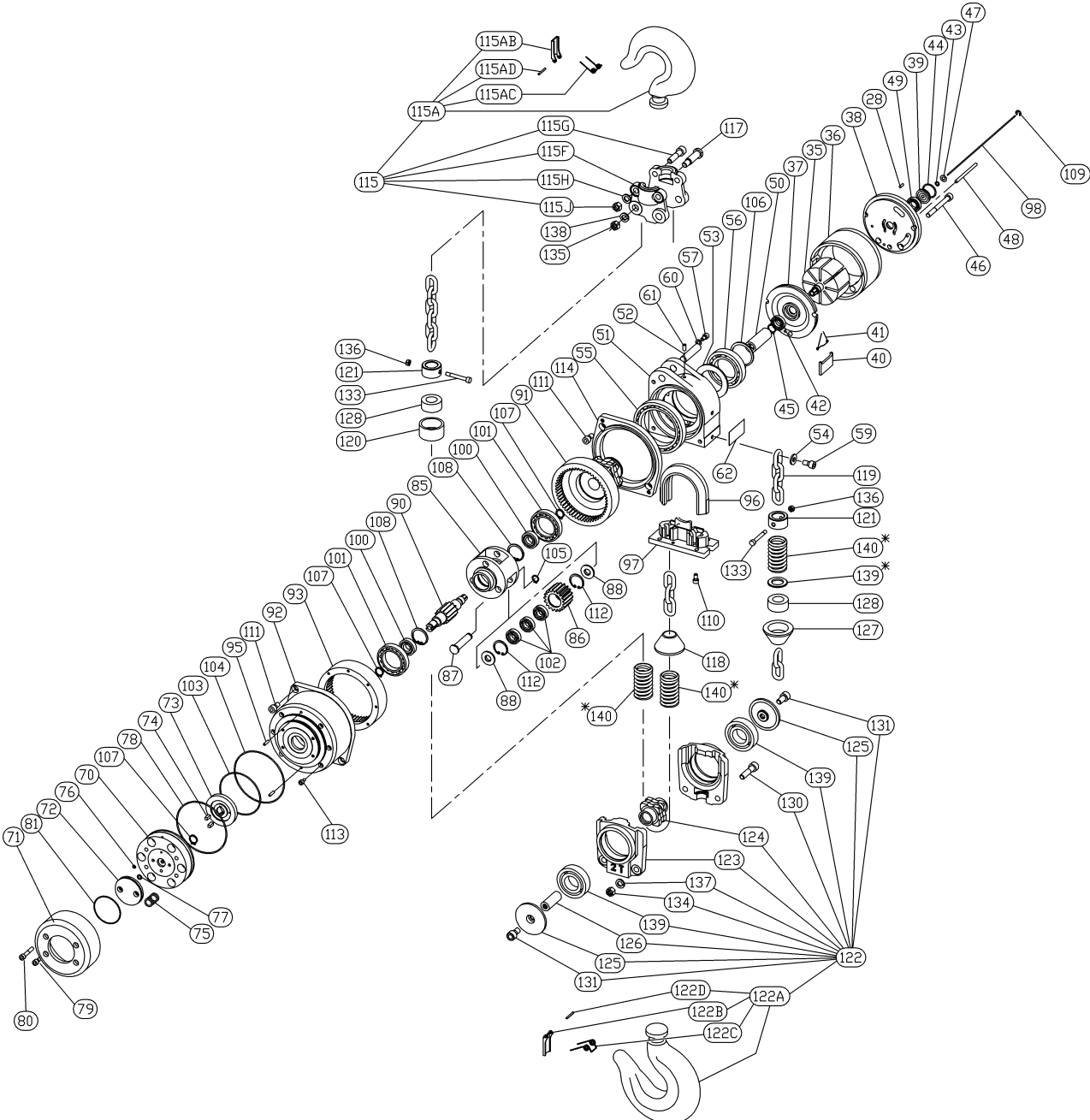
Figure 10-3 TCR1000 Main Body

Figure Number	Part Number	Part Name	Parts Per Hoist
28	TCR130406005	Parallel Pin	2
35	TCR426224151	Rotor	1
36	TCR426224161	Stator	1
37	TCR426224171	Front Plate	1
38	TCR426224182	Rear Plate	1
39	TCR426224191	Rear Retainer	1
40	TCR137102020	Vane	8
41	TCR130802212	Vane Spring	8
42	9001202	Bearing	1
43	TCR131103004	O-Ring	1
44	TCR131103023	O-Ring	1
45	9047115	Retaining Ring	1
46	9091283	Socket Bolt	3
47	9012511	Washer	1
48	TCR130402051	Knock Pin	1
49	9000102	Bearing	1
50	TCR426224200	Coupling	1
51	TCR426224212	Wheel Housing	1
52	TCR426224220	Top Pin	1
53	TCR426224230	Spacer	1
54	TCR426261R50	Washer	1
55	9001204	Bearing	1
56	9000109	Bearing	1
57	9091247	Socket Bolt	1
59	9091273	Socket Bolt	1
60	TCR426221R50	Washer	1
61	TCR132108012	Set Screw	1
62	TCR137309075	Brand Name Plate	1
70	TCR426224401	Brake Piston	1
71	TCR426224410	Brake Cover	1
72	TCR426224421	Piston Cover	1
73	TCR426224430	Brake Disc	1
74	TCR130408081	Key	2
75	TCR130802213	Disc Spring	6
76	TCR131103002	O-Ring	1
77	TCR131101004	O-Ring	1

Figure Number	Part Number	Part Name	Parts Per Hoist
78	TCR131103055	O-Ring	1
79	9091247	Socket Bolt	2
80	9091254	Socket Bolt	4
81	TCR131117033	O-Ring	1
85	TCR426266240	Cage	1
86	TCR426266250	Star Gear	3
87	TCR426266260	Pin	3
88	TCR426266270	Thrust Collar	6
90	TCR426266290	Pinion	1
91	TCR426266300	Load Sheave	1
92	TCR426266310	Gear Case	1
93	TCR426266320	Ring Gear	1
95	TCR426266340	Dowel Pin	4
96	TCR426266351	Chain Guide	1
97	TCR426266360	Chain Separator	1
98	TCR426224381	Brake Tube	1
100	9000102	Bearing	2
101	9001203	Bearing	2
102	9000101	Bearing	9
103	TCR131117042	O-Ring	1
104	TCR131103055	O-Ring	1
105	9047112	Retaining Ring	3
106	9047145	Retaining Ring	1
107	9047115	Retaining Ring	3
108	9047232	Retaining Ring	2
109	TCR130303005	Retaining Ring	1
110	9091247	Socket Bolt	4
111	9091271	Socket Bolt	6
112	9047228	Retaining Ring	6
113	9091225	Socket Bolt	6
114	TCR426266640	Adapter	1
115	TCR42622457B	Top Hook Set	1
115B	TCR426221S30	Hook Latch	1
115C	TCR130802258	Hook Spring	1
115D	9091232	Socket Bolt	1
115E	E2D853125	U-Nut	1

Figure Number	Part Number	Part Name	Parts Per Hoist
119	TCR426266390	End Stopper	1
120	TCR426261S2C	Bottom Hook Set	1
120A	TCR426221S2F	Bottom Hook Assy.	1
120B	TCR426221S30	Hook Latch	1
120C	TCR130802258	Hook Spring	1
120D	9091232	Socket Bolt	1
120E	E2D853125	U-Nut	1
125	TCR130502020	Steel Ball	8
126	TCR426261S80	Bottom Hook Holder	1
127	TCR420846PY0	Swivel Hook Plug	1
128	TCR426266760	Sleeve	1
129	TCR426261T20	Chain Pin	1
130	TCR130802259	Lock Ring	1
131	LCES010	Load Chain	FT
132	TCR426266450	Limit Lock	2
133	TCR136206003	Shock Absorber	2
136	TCR426224680	End Bolt	1
138	9098504	U Nut	1
139*	TCR426266C80	Limit Washer*	2
140*	TCR130802219	Chain Spring*	2

\* Version C hoists only.



### Figure 10-4 TCR2000-2 Main Body

Figure Number	Part Number	Part Name	Parts Per Hoist
28	TCR130406005	Parallel Pin	2
35	TCR426224151	Rotor	1
36	TCR426224161	Stator	1
37	TCR426224171	Front Plate	1
38	TCR426224182	Rear Plate	1
39	TCR426224191	Rear Retainer	1
40	TCR137102020	Vane	8
41	TCR130802212	Vane Spring	8
42	9001202	Bearing	1
43	TCR131103004	O-Ring	1
44	TCR131103023	O-Ring	1
45	9047115	Retaining Ring	1
46	9091283	Socket Bolt	3
47	9012511	Washer	1
48	TCR130402051	Knock Pin	1
49	9000102	Bearing	1
50	TCR426224200	Coupling	1
51	TCR426224212	Wheel Housing	1
52	TCR426224220	Top Pin	1
53	TCR426224230	Spacer	1
54	TCR426261R50	Washer	1
55	9001204	Bearing	1
56	9000109	Bearing	1
57	9091247	Socket Bolt	1
59	9091273	Socket Bolt	1
60	TCR426221R50	Washer	1
61	TCR132108012	Set Screw	1
62	TCR137309075	Brand Name Plate	1
70	TCR426224401	Brake Piston	1
71	TCR426224410	Brake Cover	1
72	TCR426224421	Piston Cover	1
73	TCR426224430	Brake Disc	1
74	TCR130408081	Key	2
75	TCR130802213	Disc Spring	6
76	TCR131103002	O-Ring	1
77	TCR131101004	O-Ring	1

Figure Number	Part Number	Part Name	Parts Per Hoist
78	TCR131103055	O-Ring	1
79	9091247	Socket Bolt	2
80	9091254	Socket Bolt	4
81	TCR131117033	O-Ring	1
85	TCR426266240	Cage	1
86	TCR426266250	Star Gear	3
87	TCR426266260	Pin	3
88	TCR426266270	Thrust Collar	6
90	TCR426266290	Pinion	1
91	TCR426266300	Load Sheave	1
92	TCR426266310	Gear Case	1
93	TCR426266320	Ring Gear	1
95	TCR426266340	Dowel Pin	4
96	TCR426266351	Chain Guide	1
97	TCR426266360	Chain Separator	1
98	TCR426224381	Brake Tube	1
100	9000102	Bearing	2
101	9001203	Bearing	2
102	9000101	Bearing	9
103	TCR131117042	O-Ring	1
104	TCR131103055	O-Ring	1
105	9047112	Retaining Ring	3
106	9047145	Retaining Ring	1
107	9047115	Retaining Ring	3
108	9047232	Retaining Ring	2
109	TCR130303005	Retaining Ring	1
110	9091247	Socket Bolt	4
111	9091271	Socket Bolt	6
112	9047228	Retaining Ring	6
113	9091225	Socket Bolt	6
114	TCR426266640	Adapter	1
115	TCR42628657B	Hook Set	1
115A	TCR420645PAA	Hook Assy.	1
115AB	TCR420645P10	Hook Latch	1
115AC	TCR130802046	Hook Spring	1
115AD	TCR130603024	Spring Pin	1

Figure Number	Part Number	Part Name	Parts Per Hoist
115F	TCR426286570	Top Yoke Assy.	1
115G	9091297	Socket Bolt	2
115H	9012712	Spring Washer	2
115J	9098508	U-Nut	2
117	TCR426286580	Chain Pin	1
118	TCR426286630	Free Limit Lock	1
119	LCES010	Load Chain	FT
120	TCR426286620	Holder	1
121	TCR426266390	End Stopper	2
122	TCR426001PAC	Bottom Hook Set	1
122A	TCR420645PAA	Hook Assy.	1
122B	TCR420645P10	Hook Latch	1
122C	TCR130802046	Hook Spring	1
122D	TCR130603024	Spring Pin	1
123	TCR420866QG0	Bottom Yoke Assy.	1
124	TCR426001RB0	Idle Sheave	1
125	TCR420866QH0	Bottom Hook Cover	2
126	TCR420866Q10	Bottom Hook Shaft	1
130	9091297	Socket Bolt	2
131	9091293	Socket Bolt	2
134	9098508	U-Nut	2
137	9012712	Spring Washer	2
139	9000606	Bearing	2
127	TCR426266450	Limit Lock	1
128	TCR136206003	Shock Absorber	2
133	TCR426224680	End Bolt	2
135	9098506	U-Nut	1
136	9098504	U Nut	2
138	9012513	Washer	1
139*	TCR426266C80	Limit Washer*	1
140*	TCR130802219	Chain Spring*	3

\* Version C hoists only.

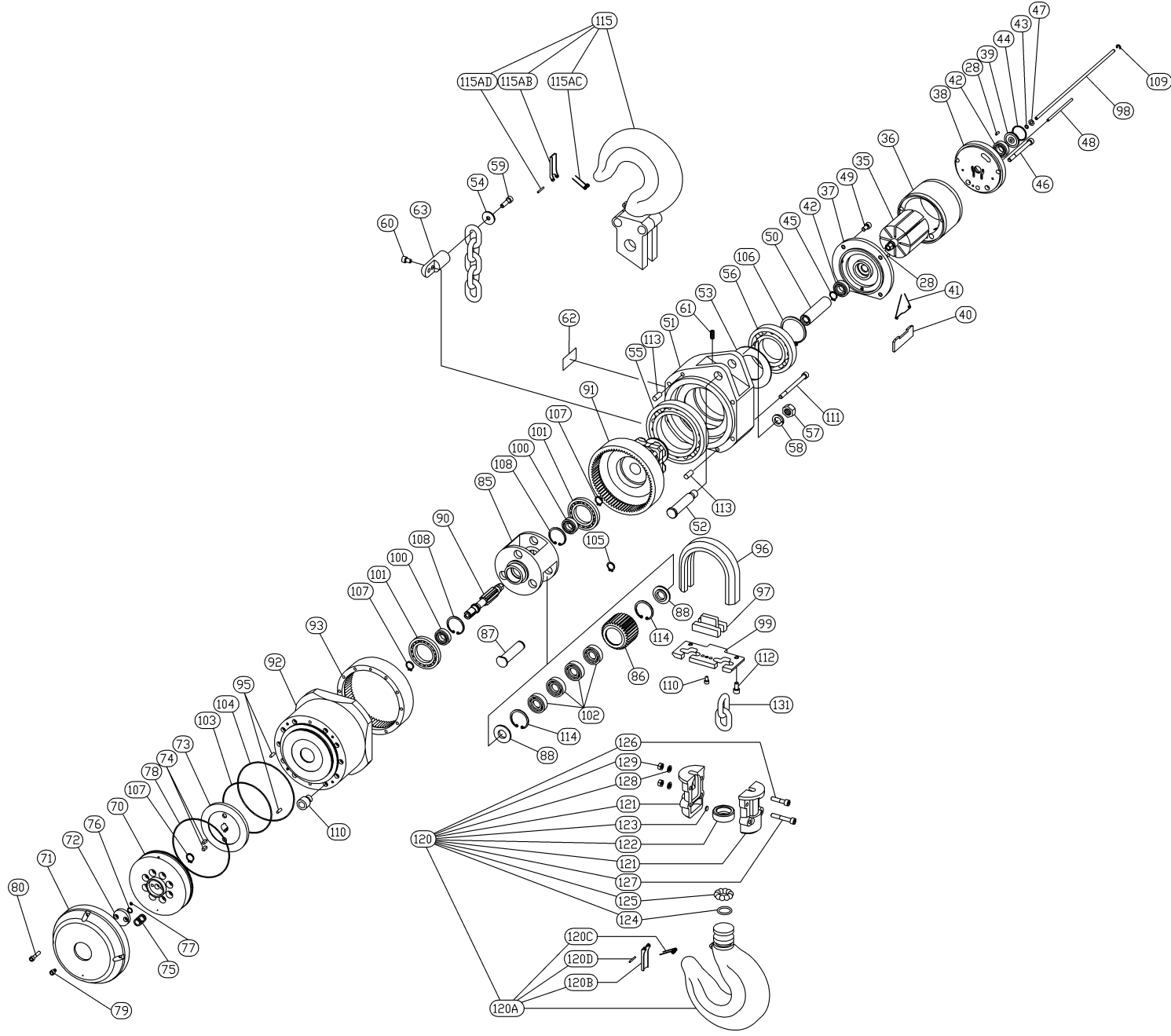


Figure 10-5 TCR3000 Main Body



Figure Number	Part Number	Part Name	Parts Per Hoist
28	TCR130406005	Parallel Pin	2
35	TCR426325150	Rotor	1
36	TCR426325160	Stator	1
37	TCR426325170	Front Plate	1
38	TCR426325180	Rear Plate	1
39	TCR426325190	Rear Retainer	1
40	TCR137102022	Vane	8
41	TCR130802212	Vane Spring	8
42	9000103	Bearing	2
43	TCR131103004	O-Ring	1
44	TCR131103026	O Ring	1
45	9047117	Retaining Ring	1
46	9091288	Socket Bolt	3
47	9012511	Washer	1
48	TCR130402054	Knock Pin	1
49	9091269	Socket Bolt	4
50	TCR426325200	Coupling	1
51	TCR426325212	Wheel Housing	1
52	TCR426325220	Top Pin	1
53	TCR426325230	Spacer	1
54	TCR420875MN0	Chain End Set Washer	1
55	9000119	Bearing	1
56	9000212	Bearing	1
57	9098516	U Nut	1
58	9012715	Spring Washer	1
59	9091274	Socket Bolt	1
60	9091269	Socket Bolt	2
61	TCR132108020	Set Screw	1
62	TCR137309075	Brand Name Plate	1
63	TCR426325730	Set Piece	1
70	TCR426325400	Brake Piston	1
71	TCR426325410	Brake Cover	1
72	TCR426325420	Piston Cover	1
73	TCR426325430	Brake Disk	1
74	TCR130408084	Key	2

Figure Number	Part Number	Part Name	Parts Per Hoist
75	TCR130802213	Disc Spring	6
76	TCR131103008	O-Ring	1
77	TCR131101004	O-Ring	1
78	TCR131103063	O Ring	1
79	9091247	Socket Bolt	2
80	9091252	Socket Bolt	4
85	TCR426325240	Cage	1
86	TCR426325250	Star Gear	3
87	TCR426325260	Pin	3
88	TCR426325270	Thrust Collar	6
90	TCR426325290	Pinion	1
91	TCR426325300	Load Sheave	1
92	TCR426325310	Gear Case	1
93	TCR426325320	Ring Gear	1
95	TCR426325340	Dowel Pin	4
96	TCR426325351	Chain Guide	1
97	TCR426325360	Chain Separator	1
98	TCR426325380	Brake Tube	1
99	TCR426325371	Bottom Plate	1
100	9000103	Bearing	2
101	9000109	Bearing	2
102	9000104	Bearing	12
103	TCR131103058	O Ring	1
104	TCR131103063	O Ring	1
105	9047120	Retaining Ring	3
106	9047160	Retaining Ring	1
107	9047117	Retaining Ring	3
108	9047235	Retaining Ring	2
109	TCR130303005	Retaining Ring	1
110	9091247	Socket Bolt	12
111	9091284	Socket Bolt	4
112	9091271	Socket Bolt	2
113	TCR130406028	Parallel Pin	2
114	9047245	Retaining Ring	6

Figure Number	Part Number	Part Name	Parts Per Hoist
115	TCR42632557B	Top Hook Set	1
115AB	TCR420655P10	Hook Latch	1
115AC	TCR130802046	Hook Spring	1
115AD	TCR130603024	Spring Pin	1
120	TCR420875PAH	Bottom Hook Set	1
120A	TCR420875PAA	Bottom Hook Assy.	1
120B	TCR420655P10	Hook Latch	1
120C	TCR130802046	Hook Spring	1
120D	TCR130603024	Spring Pin	1
121	TCR420875PZ1	Bottom Yoke Assy.	1
122	TCR420875PW0	Outer Bearing Race	1
123	TCR420875PY0	Swivel Hook Plug	1
124	TCR131101025	O Ring	1
125	TCR130502024	Steel Ball	10
126	9091275	Socket Bolt	2
127	9091278	Socket Bolt	2
128	9012711	Spring Washer	4
129	9098506	U-Nut	4
131	LCER025C	Load Chain	FT

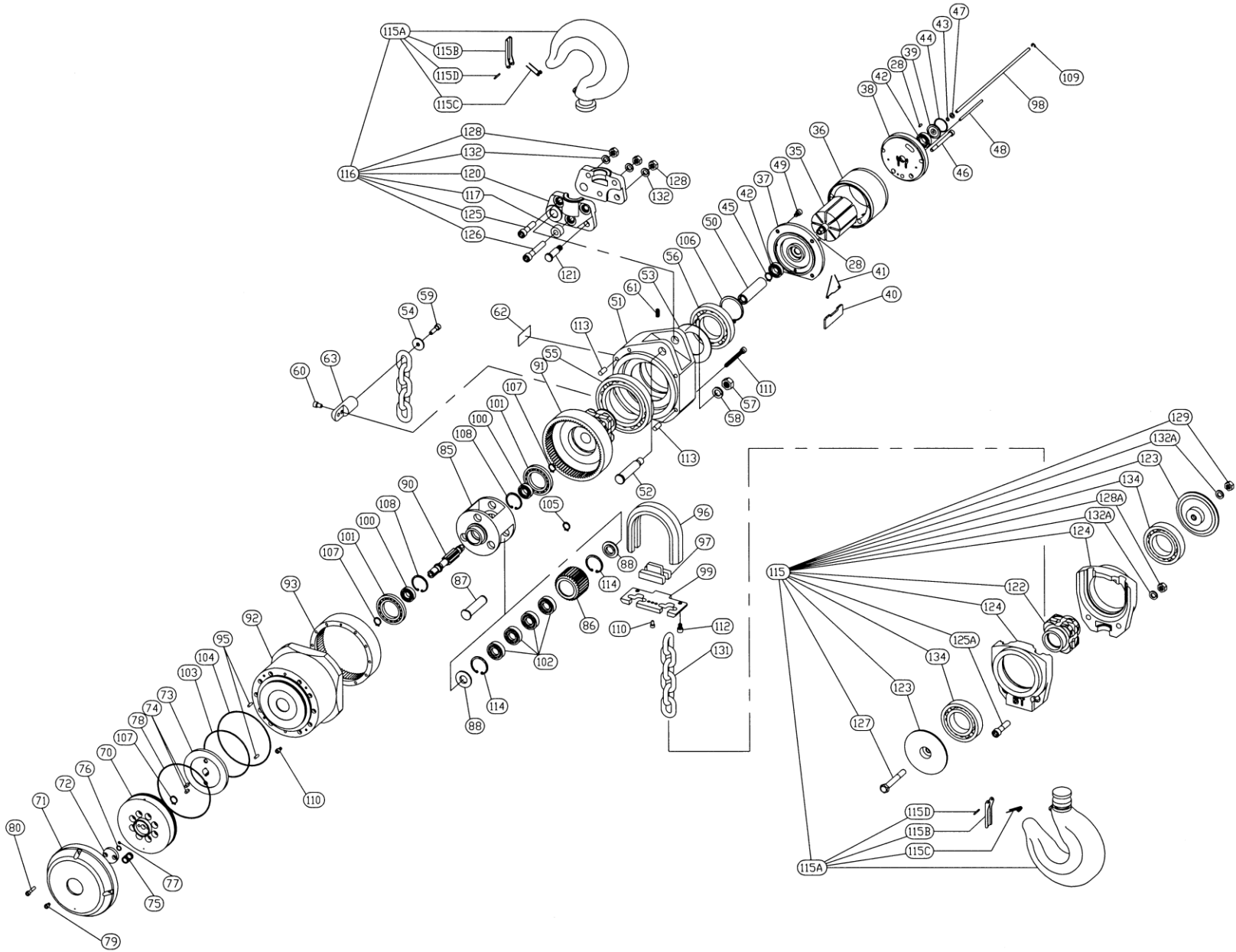


Figure 10-6 TCR6000-2 Main Body

Figure Number	Part Number	Part Name	Parts Per Hoist
28	TCR130406005	Parallel Pin	2
35	TCR426325150	Rotor	1
36	TCR426325160	Stator	1
37	TCR426325170	Front Plate	1
38	TCR426325180	Rear Plate	1
39	TCR426325190	Rear Retainer	1
40	TCR137102022	Vane	8
41	TCR130802212	Vane Spring	8
42	9000103	Bearing	2
43	TCR131103004	O-Ring	1
44	TCR131103026	O Ring	1
45	9047117	Retaining Ring	1
46	9091288	Socket Bolt	3
47	9012511	Washer	1
48	TCR130402054	Knock Pin	1
49	9091269	Socket Bolt	4
50	TCR426325200	Coupling	1
51	TCR426325212	Wheel Housing	1
52	TCR426325220	Top Pin	1
53	TCR426325230	Spacer	1
54	TCR420875MN0	Chain End Set Washer	1
55	9000119	Bearing	1
56	9000212	Bearing	1
57	9098516	U Nut	1
58	9012715	Spring Washer	1
59	9091274	Socket Bolt	1
60	9091269	Socket Bolt	2
61	TCR132108020	Set Screw	1
62	TCR137309075	Brand Name Plate	1
63	TCR426325730	Set Piece	1
70	TCR426325400	Brake Piston	1
71	TCR426325410	Brake Cover	1
72	TCR426325420	Piston Cover	1
73	TCR426325430	Brake Disk	1

Figure Number	Part Number	Part Name	Parts Per Hoist
74	TCR130408084	Key	2
75	TCR130802213	Disc Spring	6
76	TCR131103008	O-Ring	1
77	TCR131101004	O-Ring	1
78	TCR131103063	O Ring	1
79	9091247	Socket Bolt	2
80	9091252	Socket Bolt	4
85	TCR426325240	Cage	1
86	TCR426325250	Star Gear	3
87	TCR426325260	Pin	3
88	TCR426325270	Thrust Collar	6
90	TCR426325290	Pinion	1
91	TCR426325300	Load Sheave	1
92	TCR426325310	Gear Case	1
93	TCR426325320	Ring Gear	1
95	TCR426325340	Dowel Pin	4
96	TCR426325351	Chain Guide	1
97	TCR426325360	Chain Separator	1
98	TCR426325380	Brake Tube	1
99	TCR426325371	Bottom Plate	1
100	9000103	Bearing	2
101	9000109	Bearing	2
102	9000104	Bearing	12
103	TCR131103058	O Ring	1
104	TCR131103063	O Ring	1
105	9047120	Retaining Ring	3
106	9047160	Retaining Ring	1
107	9047117	Retaining Ring	3
108	9047235	Retaining Ring	2
109	TCR130303005	Retaining Ring	1
110	9091247	Socket Bolt	12
111	9091284	Socket Bolt	4
112	9091271	Socket Bolt	2
114	9047245	Retaining Ring	6

Figure Number	Part Number	Part Name	Parts Per Hoist
116	TCR4200HH006	Top Hook Set	1
115A	TCR420890PAB	Hook Assy.	1
115B	TCR420890P10	Hook Latch	1
115C	TCR130802046	Hook Spring	1
115D	TCR130603024	Spring Pin	1
117	TCR426335690	Hook Anchor	1
120	TCR420890QF0	Top Yoke Assy.	1
121	TCR420890JG0	Chain Pin	1
125	90912118	Socket Bolt	2
126	90912121	Socket Bolt	1
128	9098511	U Nut	4
132	9012713	Spring Washer	4
115	TCR420890PAC	Bottom Hook Set	1
115A	TCR420890PAB	Hook Assy.	1
115B	TCR420890P10	Hook Latch	1
115C	TCR130802046	Hook Spring	1
115D	TCR130603024	Spring Pin	1
122	TCR420890RB0	Idle Sheave	1
123	TCR420890QH0	Bottom Hook Cover	2
124	TCR420890QG0	Bottom Yoke Assy. Pr.	1 PR
125A	90912118	Socket Bolt	2
127	9093155	Hex Head Bolt	1
128A	9098511	U Nut	2
129	9093433	Hex Nut	1
132A	9012713	Spring Washer	3
134	9000611	Bearing	2
131	LCER025C	Load Chain	FT

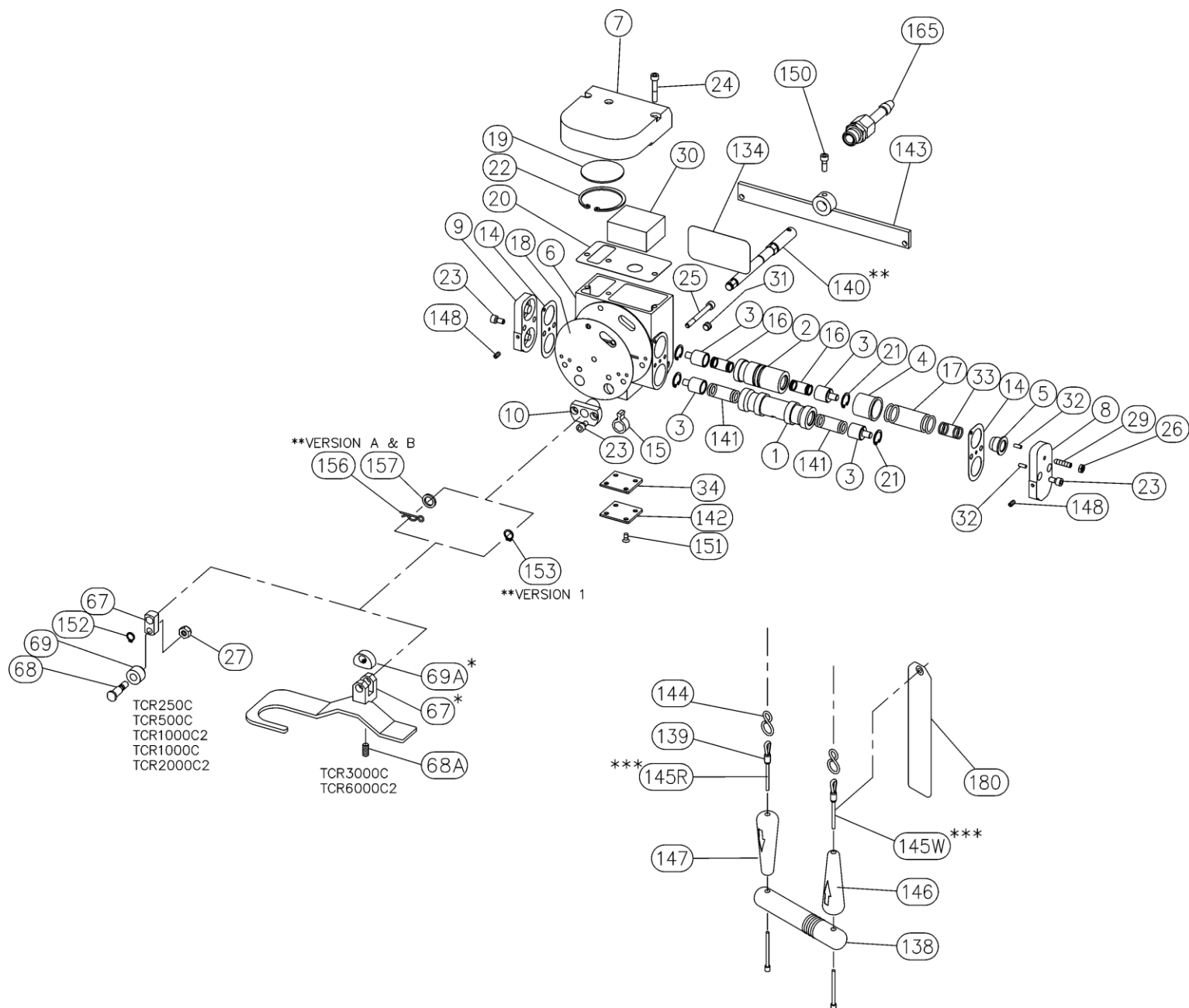


Figure 10-7 Cord Control Valve Body – Versions 1, A and B Hoists

Figure Number	Part Number		Part Name	Parts Per Hoist
	TCR250C TCR500C TCR1000C2 TCR1000C TCR2000C2	TCR3000C TCR6000C2		
1	TCR426224012	TCR426325010	Main Spool****	1
2	TCR426224020		Brake Spool****	1
3	TCR426224030		Spool Retainer****	4
4	TCR426224040		Brake Retainer****	1
5	TCR426224050		Brake Nut	1
6	TCR426224061	TCR426325060	Valve Body Version 1 & A****	1
	TCR426224062	TCR426325061	Valve Body Version B****	
7	TCR426224070		Top Cover	1
8	TCR426224081		Side Cover (L) Version 1 & A	1
	TCR426224082		Side Cover (L) Version B	
9	TCR426224091		Side Cover (R) Version 1 & A	1
	TCR426224092		Side Cover (R) Version B	
10	TCR426224100		Limit Guide	1
14	TCR136102160		Side Packing	2
15	TCR426224140		Limit Lever	1
16	TCR130802210		Brake Spring	2
17	TCR130802211		Limit Spring	1
18	TCR136102161		Valve Packing	1
19	TCR426224A90		Exhaust Plate	1
20	TCR136102162	TCR136102192	Top Packing	1
21	9047219		Retaining Ring	4
22	9047258		Retaining Ring	1
23	9091247		Socket Bolt	6
24	9091253		Socket Bolt	3
25	9091258		Socket Bolt	3
26	9093420		Hex Nut	1
27	9098506		U-Nut	1
29	TCR132306028		Set Screw	1
30	TCR137402031		Nylon Silencer	1
31	TCR134902003		Hex Socket Pipe Plug	3
32	TCR130604010		Spring Pin	2
33	TCR130821418		Spring	1
34	TCR136102163		Under Packing	1
69*	TCR426224110	TCR426325113	Chain Lever*	1

Figure Number	Part Number		Part Name	Parts Per Hoist
	TCR250C TCR500C TCR1000C2 TCR1000C TCR2000C2	TCR3000C TCR6000C2		
68	TCR426224120		Roller Shaft	1
68A		TCR132108016	Set Screw	1
69	TCR426224130		Limit Roller	1
69A*		TCR426325740	Cam*	1
134	TCR137309277		Name Plate 250	1
	TCR137309276		Name Plate 500	
	TCR137309278		Name Plate 1000, 1000-2	
	TCR137309280		Name Plate 2000-2	
		TCR137309282	Name Plate 3000	
		TCR137309288	Name Plate 6000-2	
138	AH136602627		Handle	1
139	TCR1302CRIMP		Rope Crimp	2
140**	TCR426225461	TCR426326461	Limit Shaft**	1
141	TCR130802215		Main Spring	2
142	TCR426225470		Under Cover	1
143	TCR426225540		Cord Lever	1
144	TCR130802081		S-Type Wire	2
145W	9013101		White Cord (Up)	FT***
145R	9013102		Red Cord (Down)	FT***
146	AH136602625		Throttle Valve Grip (Up)	1
147	AH136602626		Throttle Valve Grip (Down)	1
148	9091301		Set Screw Versions 1 & A	3
	TCR134902003		Hex Socket Pipe Plug Version B	3
150	9091250		Socket Bolt	1
151	TCR132805010		Hex Flat Head Machine Screw	4
152	9047110		Retaining Ring	1
153	9047112		Retaining Ring Version 1	1
156	TCR130790012		Hairpin Cotter Versions A & B	1
157	TCR426325750		Washer Version A & B	1
165	TCR1350005HH	TCR420845DHH	Hose Stem Assembly	1
180	WTAG7		Warning Tag	1

\* Replacing the one-piece Chain Lever (#67) on 3 and 6 Ton version 1 hoists.

Hoist requires figure numbers 67 and 69A.

\*\* Replacing limit shaft (#140) on version 1 hoists requires figure numbers 140, 156 and 157.

\*\*\* Specify the hoist's lift or the required cord drop when ordering.

\*\*\*\*Discontinued. Replacement of complete Control Valve Body available. See Figure 10-11 Replacement Control Valve Body Assembly.

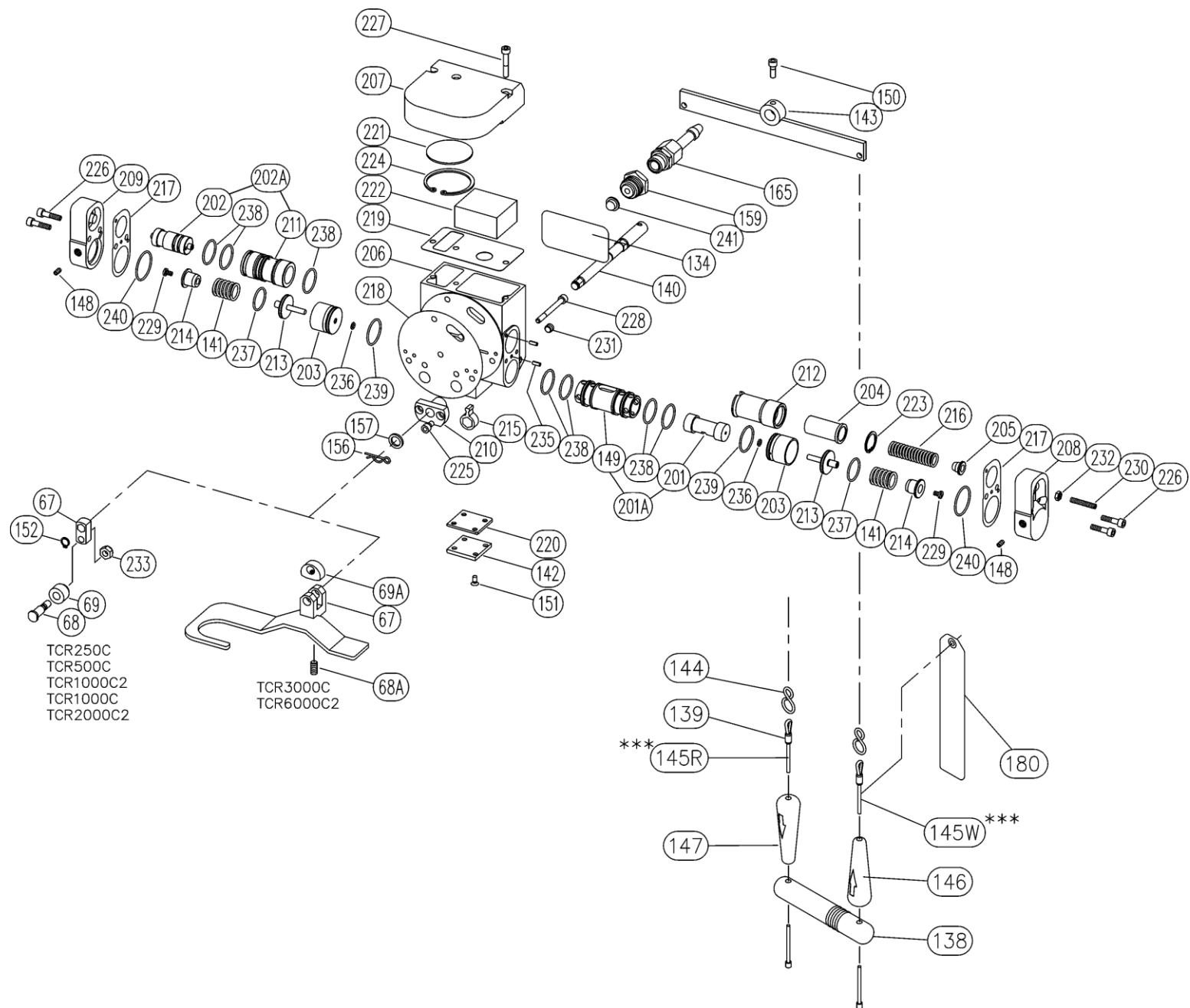


Figure 10-8 Cord Control Valve Body – Version C Hoists

Figure Number	Part Number		Part Name	Parts Per Hoist
	TCR250C TCR500C TCR1000C2 TCR1000C TCR2000C2	TCR3000C TCR6000C2		
67	TCR426224110	TCR426325113	Chain Lever	1
68	TCR426224120		Roller Shaft	1
68A		TCR132108008	Set Screw	1
69	TCR426224130		Limit Roller	1
69A		TCR426325740	Cam	1
134	TCR137309277		Name Plate 250	1
	TCR137309276		Name Plate 500	
	TCR137309278		Name Plate 1000, 1000-2	
	TCR137309280		Name Plate 2000-2	
		TCR137309282	Name Plate 3000	
		TCR137309288	Name Plate 6000-2	
138	AH136602627		Handle	1
139	TCR1302CRIMP		Rope Crimp	2
140	TCR426225461	TCR426326461	Limit Shaft	1
141	TCR130802217		Spring	2
142	TCR426225470		Under Cover	1
143	TCR426225540		Cord Lever	1
144	TCR130802081		S-Type Wire	2
145W*	9013101		White Cord (Up)	FT*
145R*	9013102		Red Cord (Down)	FT*
146	AH136602625		Throttle Valve Grip (Up)	1
147	AH136602626		Throttle Valve Grip(Down)	1
148	TCR134902003		Hex Socket Pipe Plug	3
150	9091250		Socket Bolt	1
151	TCR132805010		Hex Flat Head Mach. Screw	4
152	9047110		Retaining Ring	1
156	TCR130790012		Hairpin Cotter	1
157	TCR426325750		Washer	1
159	TCR134703060	TCR134703070	Inlet Bushing	1
165	TCR1350005HH	TCR420845DHH	Hose Stem Assembly	1
180	WTAG7		Warning Tag	1
201A	TCR426224C3B	TCR426325C3B	Spool-Main Bushing Set	1
149	TCR426224C30	TCR426325C30	Main Bushing	1
201	TCR426224013		Main Spool	1
202A	TCR426224C4B		Brake Spool-Bushing Set	1
202	TCR426224021		Brake Spool	1
211	TCR426224C40		Brake Bushing	1

Figure Number	Part Number		Part Name	Parts Per Hoist
	TCR250C TCR500C TCR1000C2 TCR1000C TCR2000C2	TCR3000C TCR6000C2		
203	TCR426224C20		Spool Cylinder	2
204	TCR426224041		Brake Retainer	1
205	TCR426224051		Brake Nut	1
206	TCR426224063		Valve Body	1
207	TCR426224070		Top Cover	1
208	TCR426224083		Side Cover (L)	1
209	TCR426224093		Side Cover (R)	1
210	TCR426224101		Limit Guide	1
212	TCR426224C50		Limit Bushing	1
213	TCR426224C60		Spool Piston	2
214	TCR426224C70		Spring Seat	2
215	TCR426224140		Limit Lever	1
216	TCR130802216		Spring	1
217	TCR136102164		Side Packing	2
218	TCR136102161		Valve Packing	1
219	TCR136102162	TCR136102192	Top Packing	1
220	TCR136102163		Under Packing	1
221	TCR426224A90		Exhaust Plate	1
222	TCR137402031		Nylon Silencer	1
223	9047225		Retaining Ring	1
224	9047258		Retaining Ring	1
225	9091247		Socket Bolt	2
226	9091251		Socket Bolt	4
227	9091254		Socket Bolt	3
228	9091258		Socket Bolt	3
229	9798532		Machine Screw	2
230	TCR132306035		Set Screw	1
231	TCR134902003		Hex Socket Pipe Plug	3
232	9093420		Hex Nut	1
233	9098506		U-Nut	1
235	TCR130604010		Spring Pin	2
236	TCR131103004		O-Ring	2
237	TCR131103021		O-Ring	2
238	TCR131103022		O-Ring	7
239	TCR131103024		O-Ring	2
240	TCR131103027		O-Ring	2
241	TCR136803032		Screen	1

\*Specify the hoist's lift or the required pendant drop when ordering.





Figure Number	Part Number		Part Name	Parts Per Hoist
	TCR250P TCR500P TCR1000P2 TCR1000P TCR2000P2	TCR3000P TCR6000P2		
1	TCR426224012	TCR426325010	Main Spool****	1
2	TCR426224020		Brake Spool****	1
3	TCR426224030		Spool Retainer****	4
4	TCR426224040		Brake Retainer****	1
5	TCR426224050		Brake Nut	1
6	TCR426224061	TCR426325060	Valve Body Version 1 & A****	1
	TCR426224062	TCR426325061	Valve Body Version B****	
7	TCR426224070		Top Cover	1
8	TCR426224081		Side Cover (L) Version 1 & A	1
	TCR426224082		Side Cover (L) Version B	
9	TCR426224091		Side Cover (R) Version 1 & A	1
	TCR426224092		Side Cover (R) Version B	
10	TCR426224100		Limit Guide	1
14	TCR136102160		Side Packing	2
15	TCR426224140		Limit Lever	1
16	TCR130802210		Brake Spring	2
17	TCR130802211		Limit Spring	1
18	TCR136102161		Valve Packing	1
19	TCR426224A90		Exhaust Plate	1
20	TCR136102162	TCR136102192	Top Packing	1
21	9047219		Retaining Ring	4
22	9047258		Retaining Ring	1
23	9091247		Socket Bolt	6
24	9091253		Socket Bolt	3
25	9091258		Socket Bolt	3
26	9093420		Hex Nut	1
27	9098506		U-Nut	1
29	TCR132306028		Set Screw	1
30	TCR137402031		Nylon Silencer	1
31	TCR134902003		Hex Socket Pipe Plug	3
32	TCR130604010		Spring Pin	2
33	TCR130821418		Spring	1

Figure Number	Part Number		Part Name	Parts Per Hoist
	TCR250P TCR500P TCR1000P2 TCR1000P TCR2000P2	TCR3000P TCR6000P2		
34	TCR136102163		Under Packing	1
67*	TCR426224110	TCR426325113	Chain Lever*	1
68	TCR426224120		Roller Shaft	1
68A		TCR132108016	Set Screw	1
69	TCR426224130		Limit Roller	1
69A*		TCR426325740	Cam*	1
134	TCR137309277		Name Plate 250	1
	TCR137309276		Name Plate 500	
	TCR137309278		Name Plate 1000, 1000-2	
	TCR137309280		Name Plate 2000-2	
		TCR137309282	Name Plate 3000	
		TCR137309288	Name Plate 6000-2	
140**	TCR426224461	TCR426325461	Limit Shaft**	1
141	TCR130802214	TCR130821123	Main Spring	2
142	TCR426224471		Under Cover****	1
148	9047110		Retaining Ring	1
149	9047112		Retaining Ring Version 1	1
151	TCR132805010		Hex Flat Head Machine Screw	4
152	TCR132506012		Slotted Head Machine Screw	2
153	TCR137240020		Pendant Hose Assy.	FT***
154	TCR426221E20		Hose Nipple Version 1 & A	3
155	TCR136102094		Seal Washer Version 1 & A	3
156	TCR130790012		Hairpin Cotter Versions A & B	1
157	TCR426325750		Washer Version A & B	1
158	9013137		90° Tube Fitting Version B	3
165	TCR1350005HH	TCR420845DHH	Hose Stem Assy.	1
180	WTAG7		Warning Tag	1

\* Replacing the one-piece Chain Lever (#67) on 3 and 6 Ton version 1 hoists.

Hoist requires figure numbers 67 and 69A.

\*\* Replacing limit shaft (#140) on version 1 hoists requires figure numbers 140, 156 and 157.

\*\*\* Specify the hoist's lift or the required pendant drop when ordering.

\*\*\*\*Discontinued. Replacement of complete Control Valve Body available. See Figure 10-11 Replacement Control Valve Body Assembly



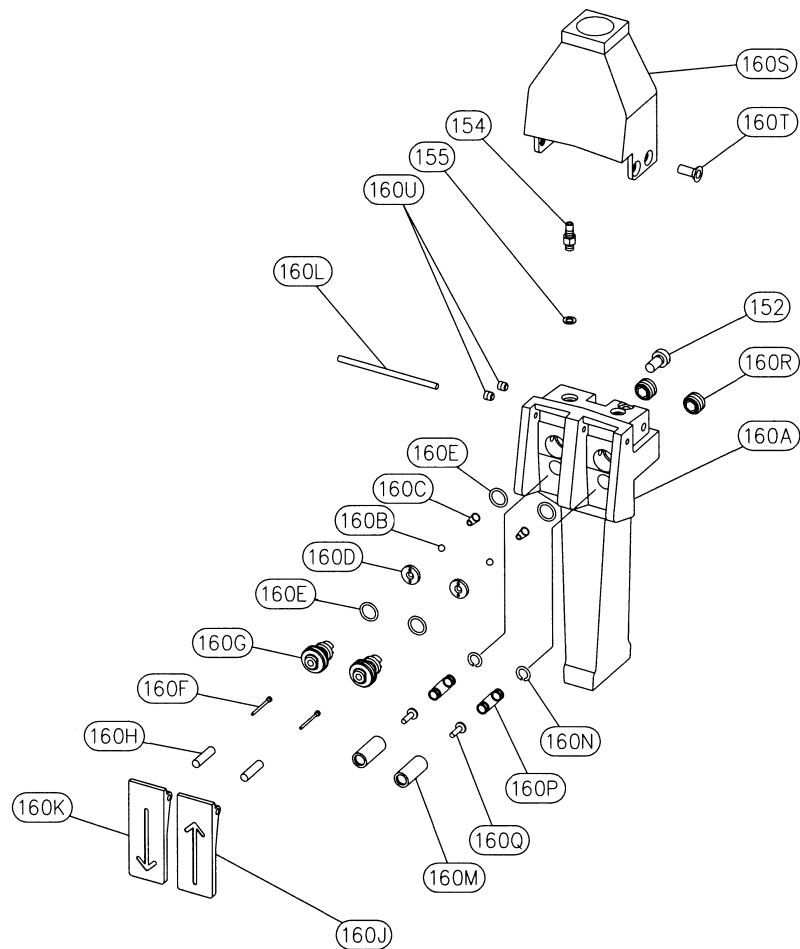
Figure 10-10 Pendant Control Valve Body – Version C Hoists

Figure Number	Part Number		Part Name	Parts Per Hoist
	TCR250P TCR500P TCR1000P2 TCR1000P TCR2000P2	TCR3000P TCR6000P2		
67	TCR426224110	TCR426325113	Chain Lever	1
68	TCR426224120		Roller Shaft	1
68A		TCR132108008	Set Screw	1
69	TCR426224130		Limit Roller	1
69A		TCR426325740	Cam	1
134	TCR137309277		Name Plate 250	1
	TCR137309276		Name Plate 500	
	TCR137309278		Name Plate 1000, 1000-2	
	TCR137309280		Name Plate 2000-2	
		TCR137309282	Name Plate 3000	
		TCR137309288	Name Plate 6000-2	
140	TCR426224461	TCR426235461	Limit Shaft	1
141	TCR130802217		Spring	2
142	TCR426224472		Under Cover	1
148	9047110		Retaining Ring	
151	TCR132805010		Hex Flat Head Machine Screw	4
152	TCR132506012		Slotted Head Machine Screw	1
153*	TCR137240020		Pendant Hose Assembly (Tcr Style)	FT*
154*	7008499		Pendant Hose Assembly (Tcs Style)	FT*
156	TCR130790012		Hairpin Cotter	1
157	TCR426325750		Washer	1
158	9013137		90 Degree Tube Fitting	3
159	TCR134703060	TCR134703070	Inlet Bushing	1
165	TCR1350005HH	TCR420845DHH	Hose Stem Assembly	1
180	WTAG7		Warning Tag	1
201A	TCR426224C3B	TCR426325C3B	Spool-Main Bushing Set	1
149	TCR426224C30	TCR426325C30	Main Bushing	1
201	TCR426224013		Main Spool	1
202A	TCR426224C4B		Brake Spool-Bushing Set	1
202	TCR426224021		Brake Spool	1
211	TCR426224C40		Brake Bushing	1
203	TCR426224C20		Spool Cylinder	2
204	TCR426224041		Brake Retainer	1
205	TCR426224051		Brake Nut	1
206	TCR426224063		Valve Body	1
207	TCR426224070		Top Cover	1

Figure Number	Part Number		Part Name	Parts Per Hoist
	TCR250P TCR500P TCR1000P2 TCR1000P TCR2000P2	TCR3000P TCR6000P2		
208	TCR426224083		Side Cover (L)	1
209	TCR426224093		Side Cover (R)	1
210	TCR426224101		Limit Guide	1
212	TCR426224C50		Limit Bushing	1
213	TCR426224C60		Spool Piston	2
214	TCR426224C70		Spring Seat	2
215	TCR426224140		Limit Lever	1
216	TCR130802216		Spring	1
217	TCR136102164		Side Packing	2
218	TCR136102161		Valve Packing	1
219	TCR136102162	TCR136102192	Top Packing	1
220	TCR136102163		Under Packing	1
221	TCR426224A90		Exhaust Plate	1
222	TCR137402031		Nylon Silencer	1
223	9047225		Retaining Ring	1
224	9047258		Retaining Ring	1
225	9091247		Socket Bolt	2
226	9091251		Socket Bolt	4
227	9091254		Socket Bolt	3
228	9091258		Socket Bolt	3
229	9798532		Machine Screw	2
230	TCR132306035		Set Screw	1
231	TCR134902003		Hex Socket Pipe Plug	3
232	9093420		Hex Nut	1
233	9098506		U-Nut	1
235	TCR130604010		Spring Pin	2
236	TCR131103004		O-Ring	2
237	TCR131103021		O-Ring	2
238	TCR131103022		O-Ring	7
239	TCR131103024		O-Ring	2
240	TCR131103027		O-Ring	2
241	TCR136803032		Screen	1
363	TCR135106303		90 Degree Fitting (Tcs Style)	3

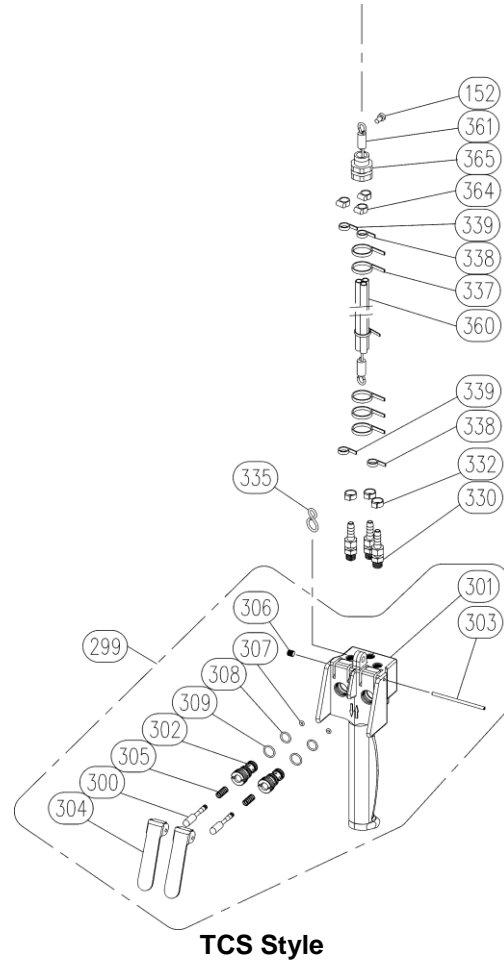
\*Specify the hoist's lift or the required pendant drop when ordering.

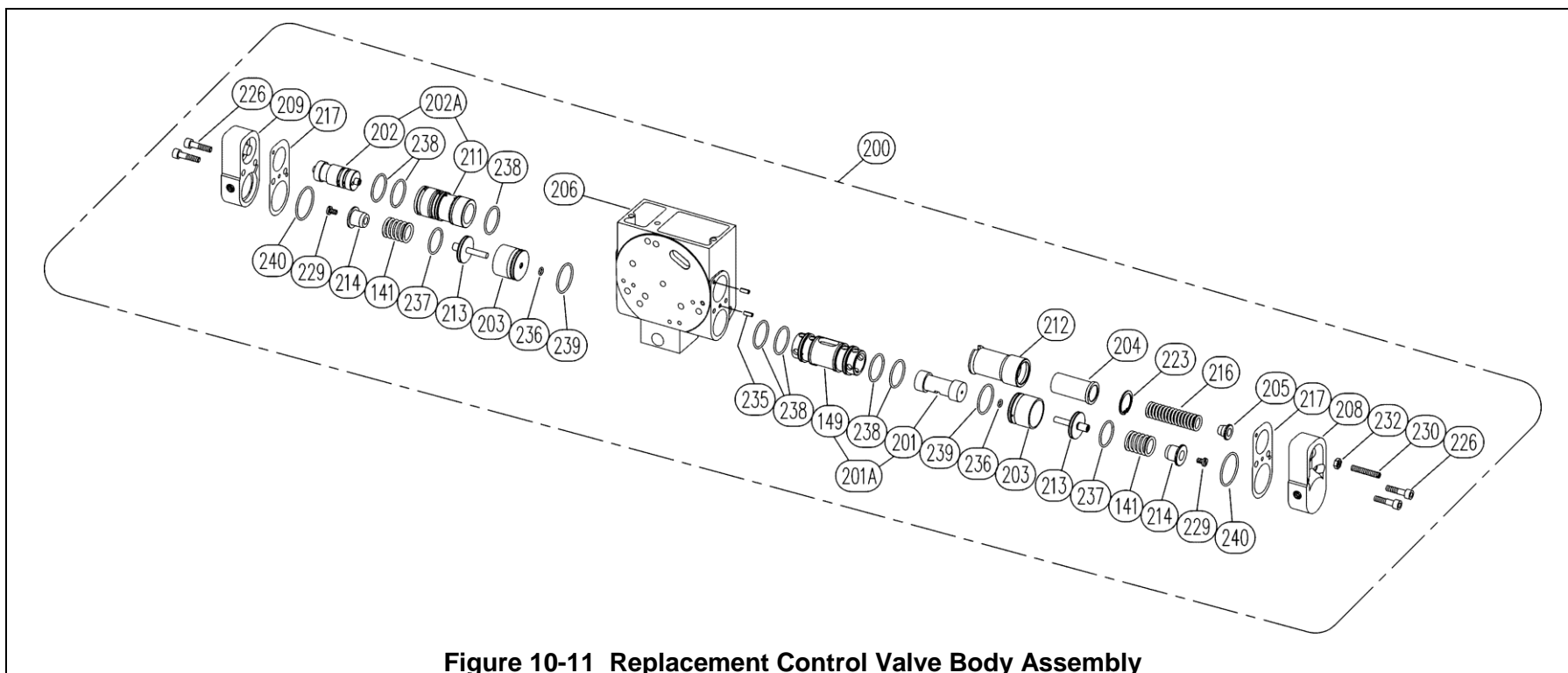
Figure Number	Part Number	Part Name	Parts Per Handle
152	TCR132506012	Slotted Head Machine Screw	1
154	TCR426221E20	Hose Nipple	3
155	TCR136102094	Seal Washer	3
160	TCR42622452D	Pendant Handle Cp	1
160A	TCR426224520	Control Handle	1
160B	TCR130501004	Steel Ball	2
160C	TCR130802255	Pendant Valve Spring	2
160D	TCR426221H30	Pendant Valve Seat	2
160E	TCR131103008	O-Ring	4
160F	TCR426224480	Control Spool	2
160G	TCR426224530	Control Bush	2
160H	TCR426221H60	Push Rod	2
160J	TCR136602023	Valve Lever (U)	1
160K	TCR136602024	Valve Lever (D)	1
160L	TCR130402006	Lever Pin	1
160M	TCR426221H90	Buffer Sleeve	2
160N	TCR130305007	Cir-Clip	2
160P	TCR130802256	Buffer Spring	2
160Q	TCR426221J20	Buffer Rod	2
160R	TCR132112010	Set Screw	2
160S	TCR426221J40	Handle Cover	1
160T	TCR132805010	Hex Flat Head Machine Screw	4
160U	TCR132105005	Set Screw	2



TCR Style

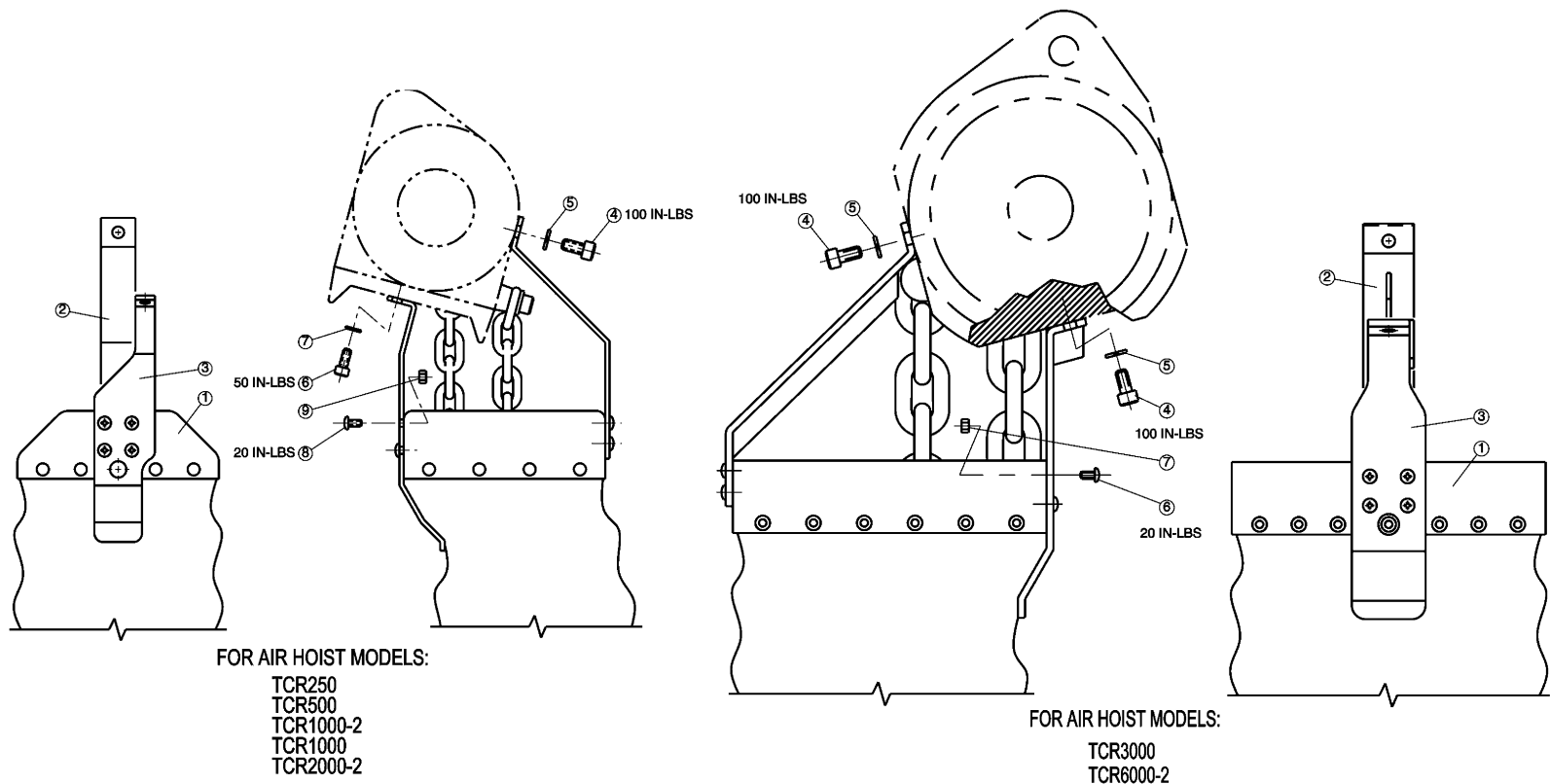
Figure Number	Part Number	Part Name	Parts Per Handle
152	TCR132506012	Slotted Flat Head Machine Screw	1
330	TCS135106302	Hose Joint	3
332	TCS137501013	Hose Band	3
335	TCR130802081	S-Type Wire	1
338	TCS137502036	Cable Tie - White	2
339	TCS137502037	Cable Tie - Black	2
360	9013156	Tcs Hose	AR
361	9013120	Strain Relief Cable	AR
364	9013155	Hose Clamp	6
365	TCR135111022	Connector For Under Cover	1
299	TCS420226VRD	Pendant Handle Cp	1
300	TCR420218VB0	Throttle Valve	2
301	TCS420226VR0	Valve Body	1
302	TCR420218VF0	Bushing	2
303	TCS130402071	Lever Pin	1
304	TCS420218VH0	Lever	2
305	TCS130802220	Spring	2
306	TCS132106006	Hex.Socket Set Screw	1
307	TCS131109001	O-Ring	2
308	TCR131103008	O-Ring	2
309	TCS131103009	O-Ring	2





Replacement control valve body may be used for replacement of version 1, A or B control valve. Additional part may be required, dependent upon cord or pendant type model.

Figure Number	Part Number		Part Name	Parts Per Hoist
	TCR250P TCR500P TCR1000P2 TCR1000P TCR2000P2	TCR3000P TCR6000P2		
200	TCR426274D7D	TCR426342D7D	Control Valve Assembly	1
141	TCR130802217		Spring	2
201A	TCR426224C3B	TCR426325C3B	Spool-Main Bushing Set	1
149	TCR426224C30	TCR426325C30	Main Bushing	1
201	TCR426224013		Main Spool	1
202A	TCR426224C4B		Brake Spool-Bushing Set	1
202	TCR426224021		Brake Spool	1
211	TCR426224C40		Brake Bushing	1
203	TCR426224C20		Spool Cylinder	2
204	TCR426224041		Brake Retainer	1
205	TCR426224051		Brake Nut	1
206	TCR426224063		Valve Body	1
208	TCR426224083		Side Cover (L)	1
209	TCR426224093		Side Cover (R)	1
212	TCR426224C50		Limit Bushing	1
213	TCR426224C60		Spool Piston	2
214	TCR426224C70		Spring Seat	2
216	TCR130802216		Spring	1
217	TCR136102164		Side Packing	2
223	9047225		Retaining Ring	1
226	9091251		Socket Bolt	4
229	9798532		Machine Screw	2
230	TCR132306035		Set Screw	1
232	9093420		Hex Nut	1
235	TCR130604010		Spring Pin	2
236	TCR131103004		O-Ring	2
237	TCR131103021		O-Ring	2
238	TCR131103022		O-Ring	7
239	TCR131103024		O-Ring	2
240	TCR131103027		O-Ring	2



TCR250C TCR500C TCR1000-2 TCR1000 TCR2000-2			
Figure Number	Part Number	Part Name	Parts Per Hoist
—	60395	Chain Container Assy.	1
1	E7SU010S683	Chain Bag	1
2	60392	Bracket A	1
3	60393	Bracket "B"	1
4	9091271	Socket Bolt M8x16	1
5	9012711	Lock Washer M8	1
6	9091248	Socket Bolt M6x14	1
7	9012709	Lock Washer M6	1
8	9798533	Machine Screw M5x10	6
9	9098503	Lock Nut M5	6

TCR3000 TCR6000-2			
Figure Number	Part Number	Part Name	Parts Per Hoist
—	60401	Chain Container Assy.	1
1	E7SU020S683	Chain Bag	1
2	60398	Bracket A	1
3	60399	Bracket "B"	1
4	9091271	Socket Bolt M8x16	2
5	9012711	Lock Washer M8	2
6	9798535	Machine Screw M5x16	8
7	9098503	Lock Nut M5	8



## NOTES

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