
OWNER'S MANUAL

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.

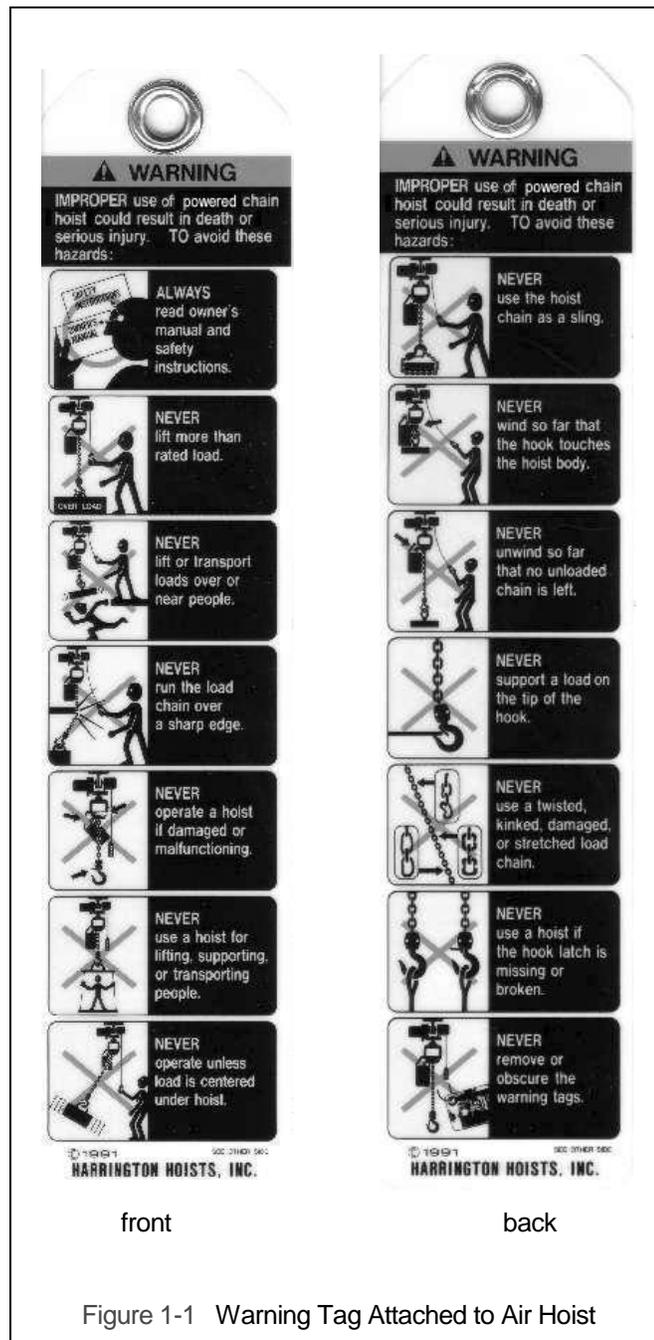
It is the responsibility of the owner/user to have all personnel that will install, inspect, test, maintain, and operate a hoist read the contents of this manual and applicable portions of ANSI/ASME B30.16, "Safety Standard for Overhead Hoists" and OSHA Regulations. If the hoist is installed as part 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

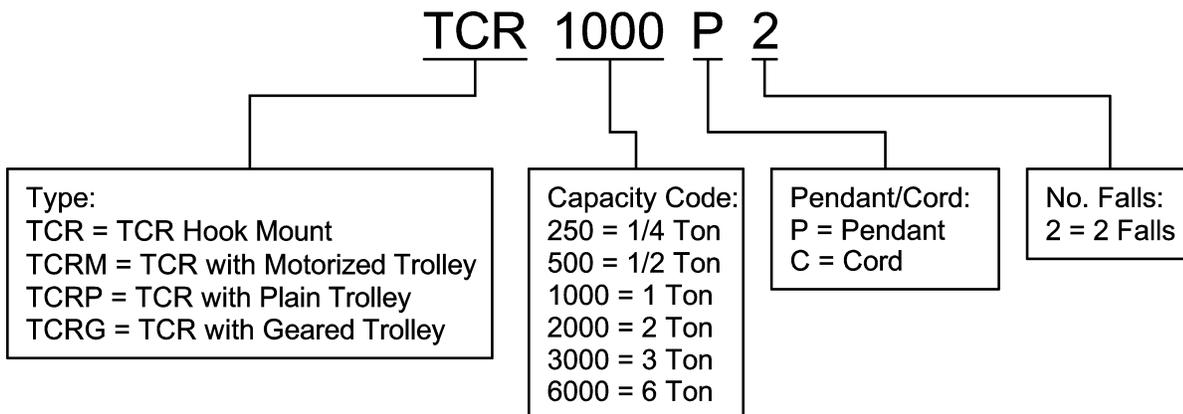
The warning tag illustrated below in Figure 1-1 is supplied with each hoist shipped from the factory. If the tag is not attached to your hoist (for pendant control, the warning tag is attached to the pendant hose; for the pull cord control, the warning tag is attached to the up cord), order a tag from 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.



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 |

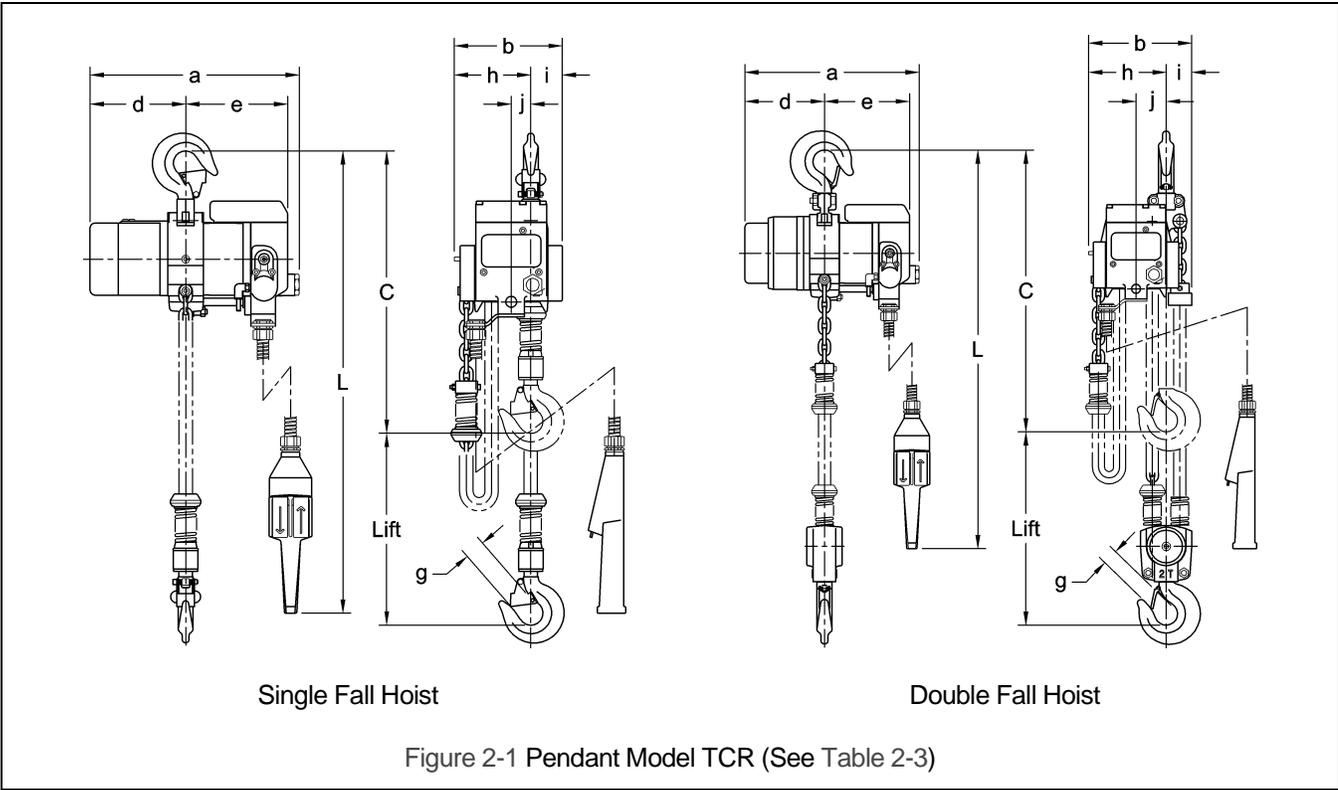
| Table 2-1 Hoist Specifications | | | | | | | | | | | |
|--------------------------------|--------------|--------------------|-------------------------|----------------------------------|-------------|---|-------------|---|------------------|--|-----|
| Cap. (Tons) | Product Code | Standard Lift (ft) | 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

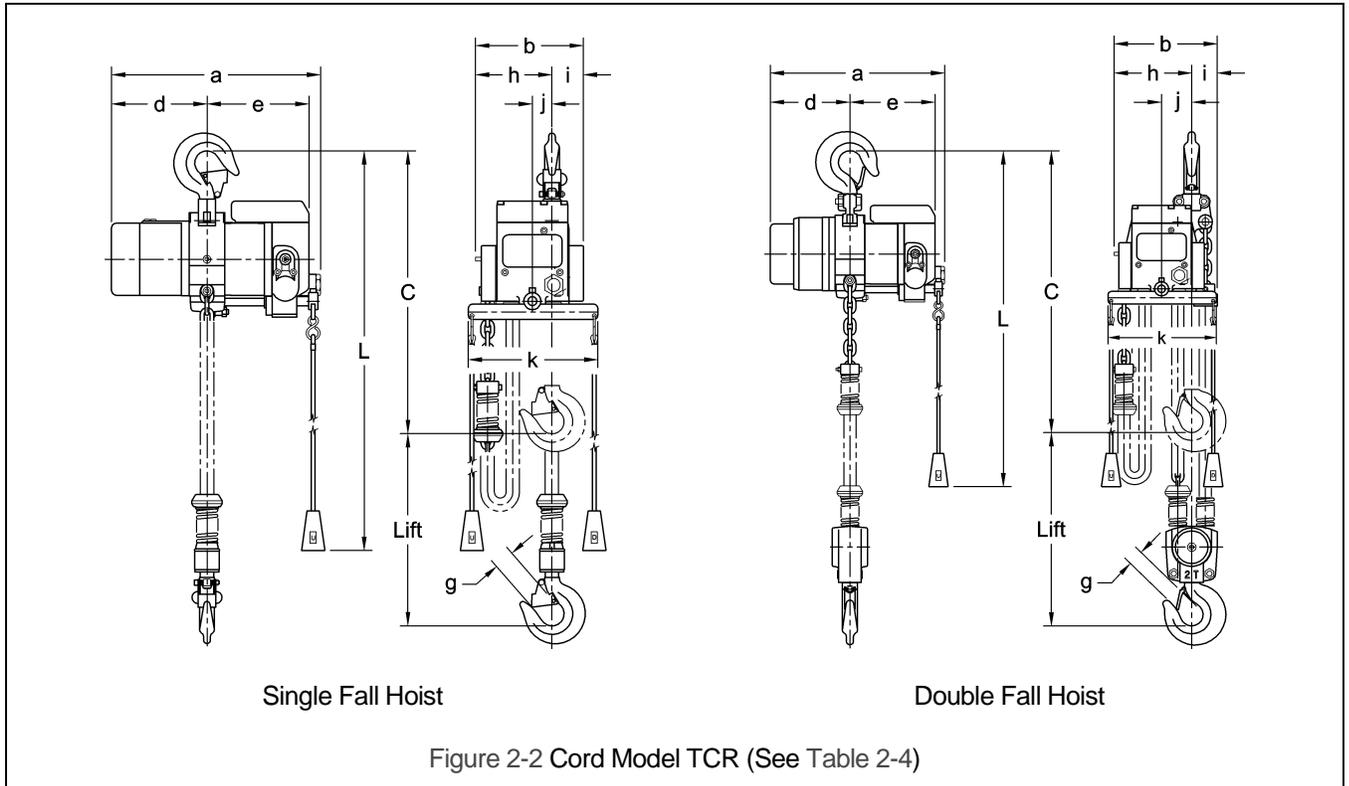
| Table 2-2 Top and Bottom Hook Dimension* | | | | | | | | | |
|--|-----|-----|-----|-----|-----|-----|-----|-----|--|
| <p style="text-align: right;">Units = inch</p> | | | | | | | | | |
| Product Code | a | b | c | d | e | f | g | h | |
| TCR250C/P | 1.4 | 0.9 | 1.1 | 0.9 | 1.6 | 1.6 | 1.1 | 4.2 | |
| 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 |



| 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

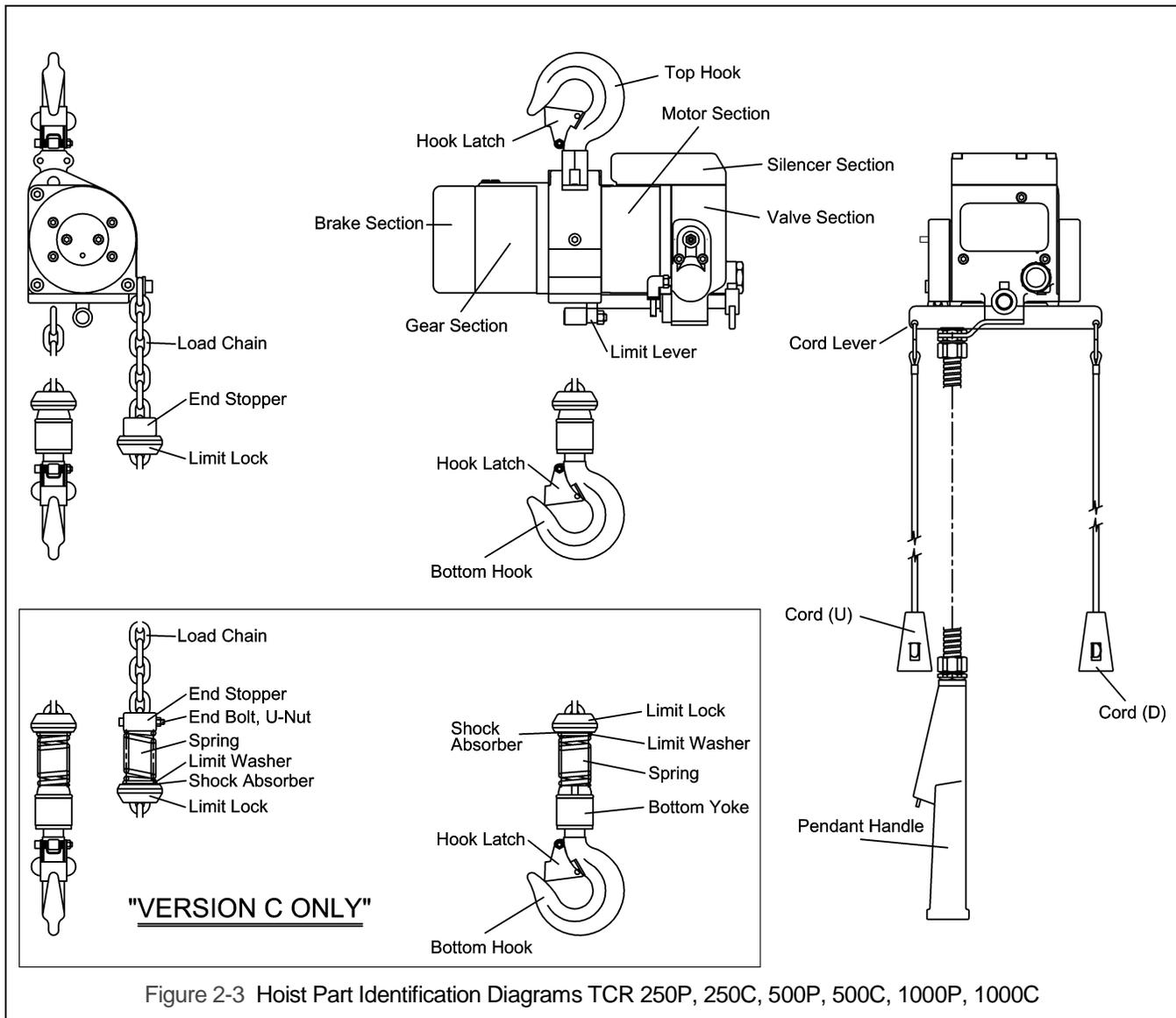


Figure 2-3 Hoist Part Identification Diagrams TCR 250P, 250C, 500P, 500C, 1000P, 1000C

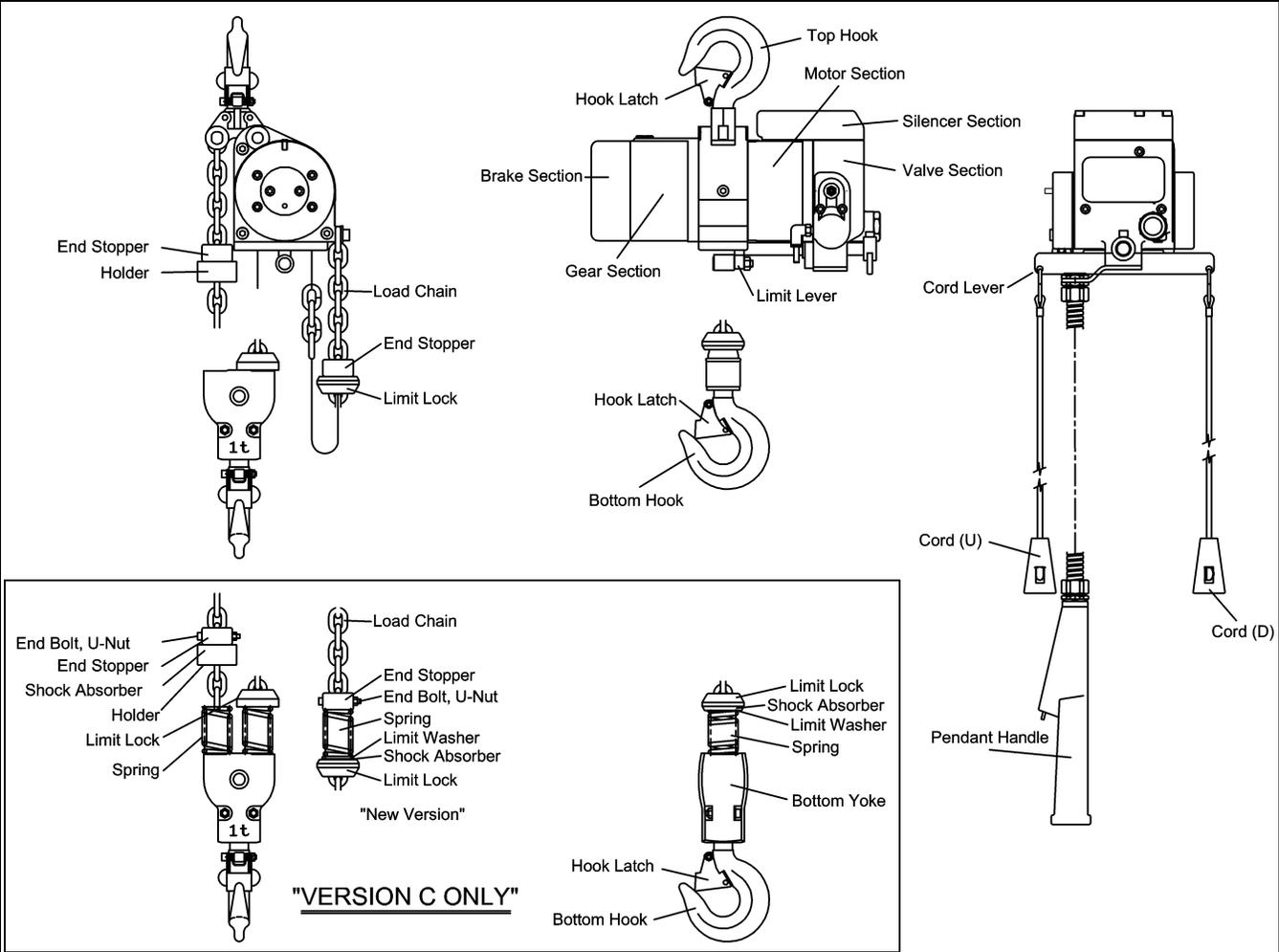
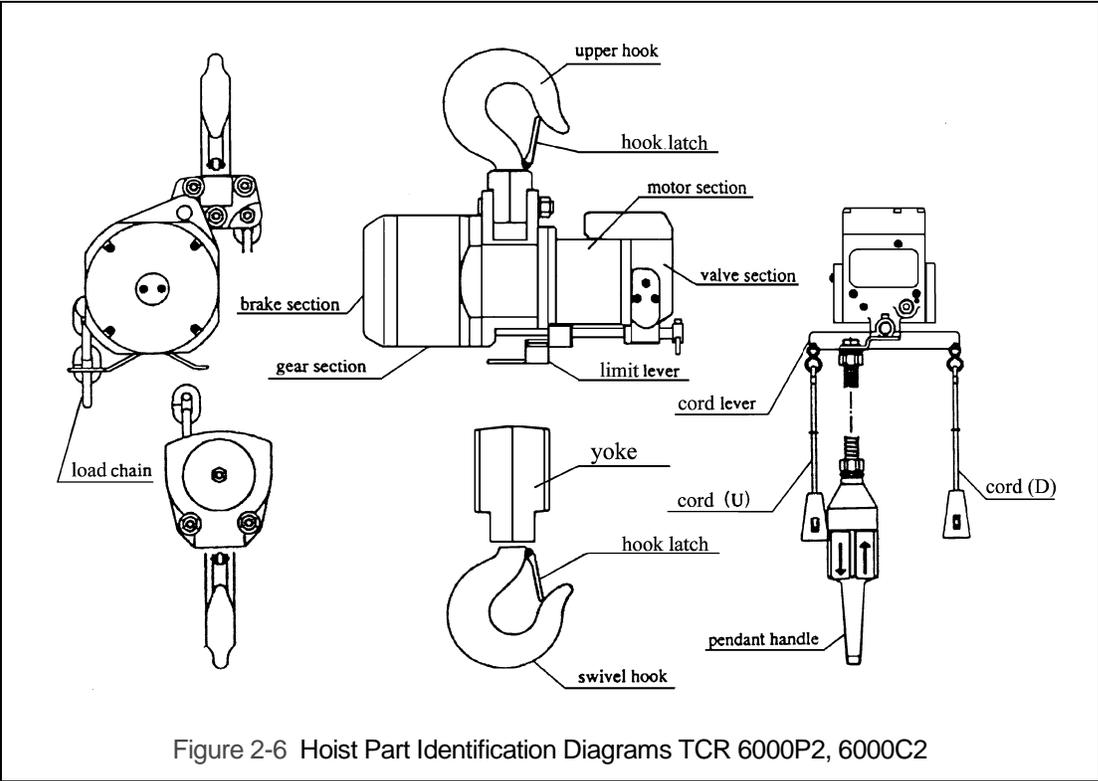
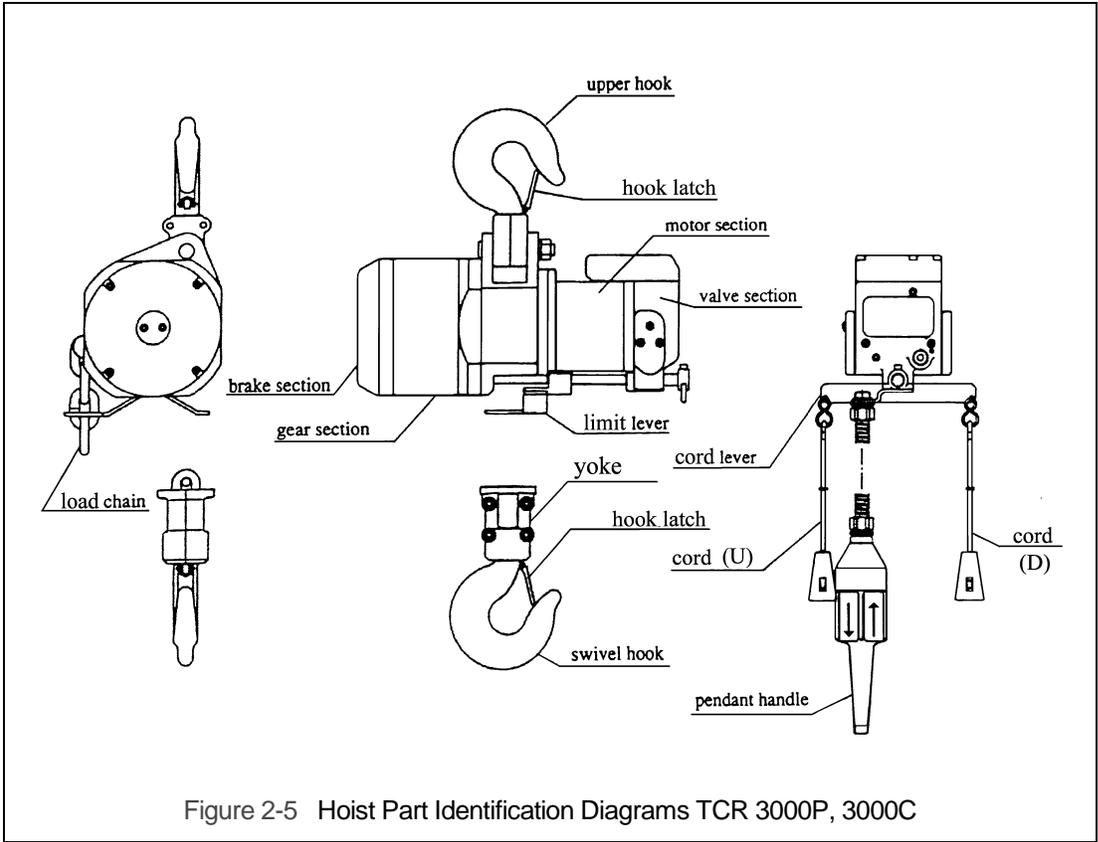


Figure 2-4 Hoist Part Identification Diagrams TCR 1000P2, 1000C2, 2000P2, 2000C2



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.

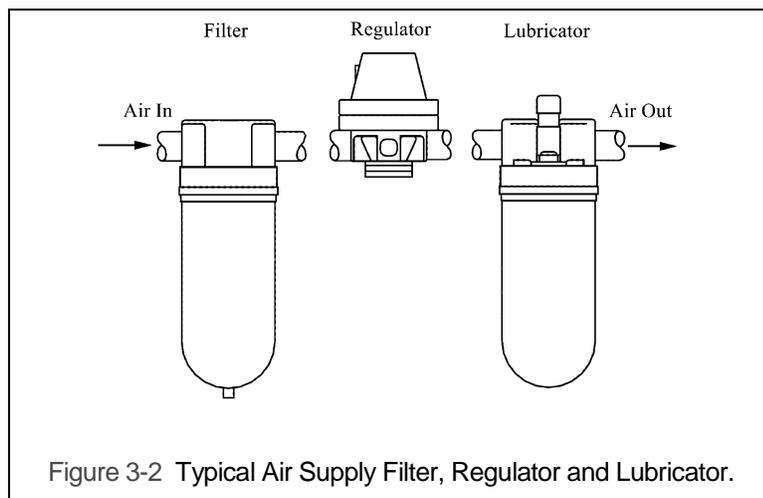
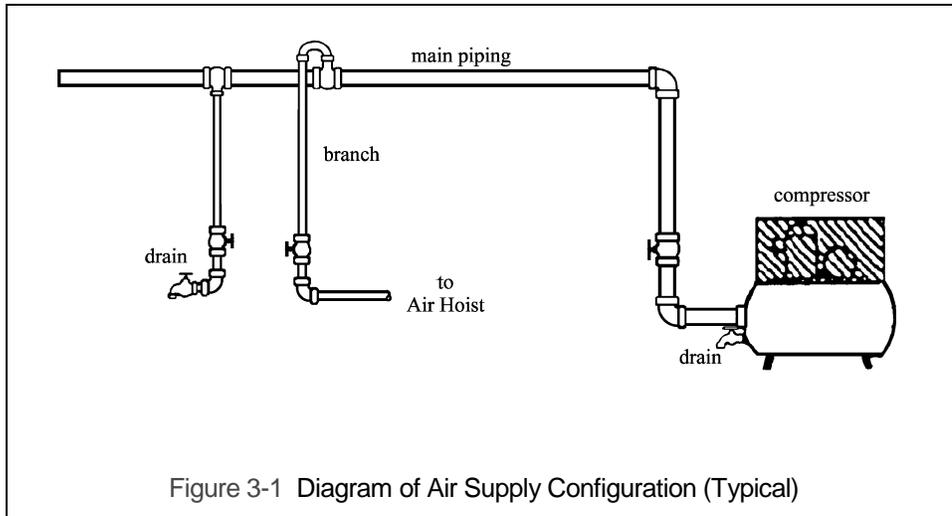
3.4.2 The filter servicing the hoist can also service other hoists and air consuming equipment. In this case, the air filter must be in sized for the total air consumption of the equipment it is servicing.

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.



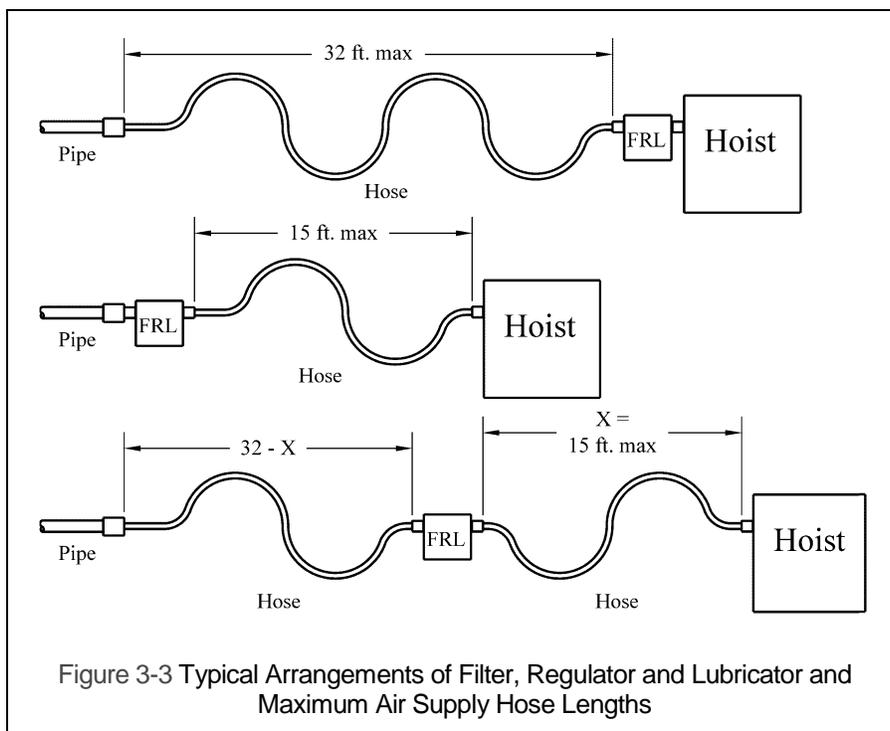
- 3.6.2 **NOTICE** Piping - Pipe should be sized to accommodate the hoist airflow requirements. Table 3-1 gives recommended pipe sizes.

| 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.

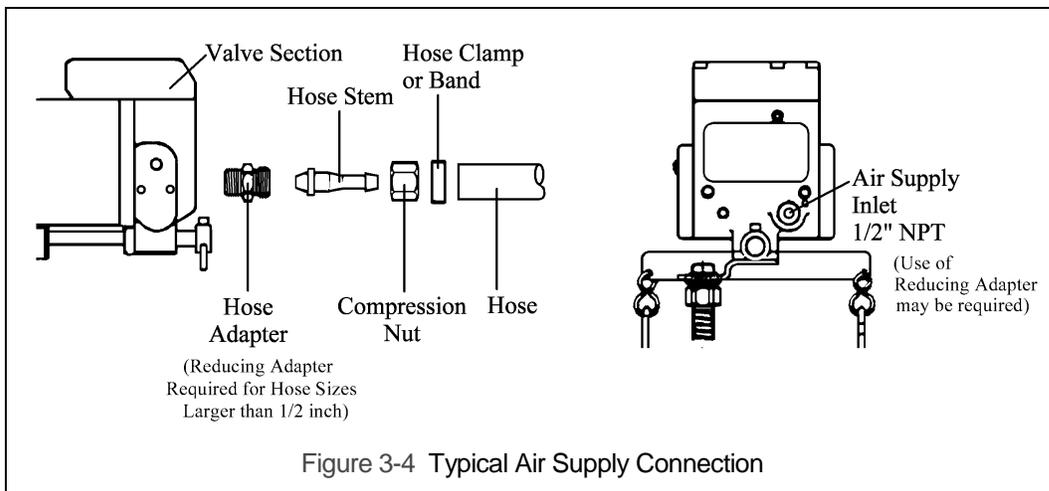
3.7 Mounting Location

- 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.

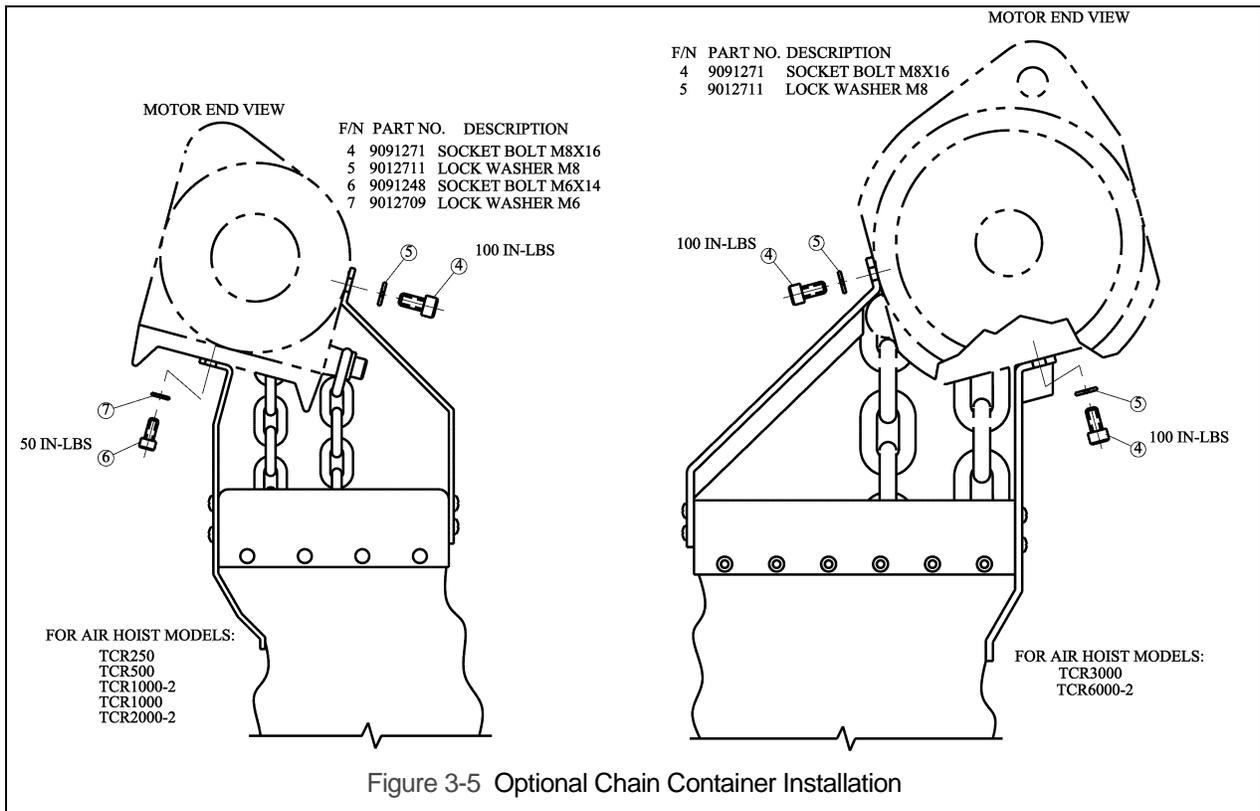
- 3.9.3 Hook Mounted to a Fixed Location - Attach the hoist's top hook to the fixed suspension point.

- 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.



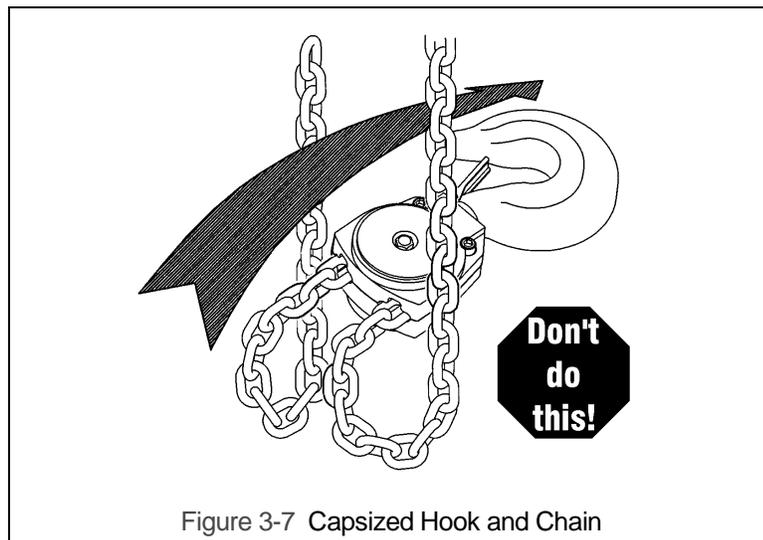
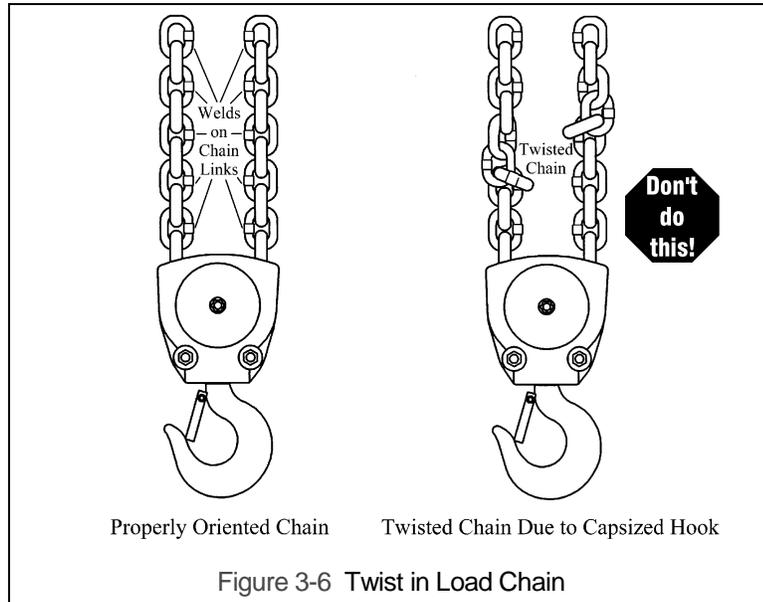
3.11 Non-Stationary Application

- 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

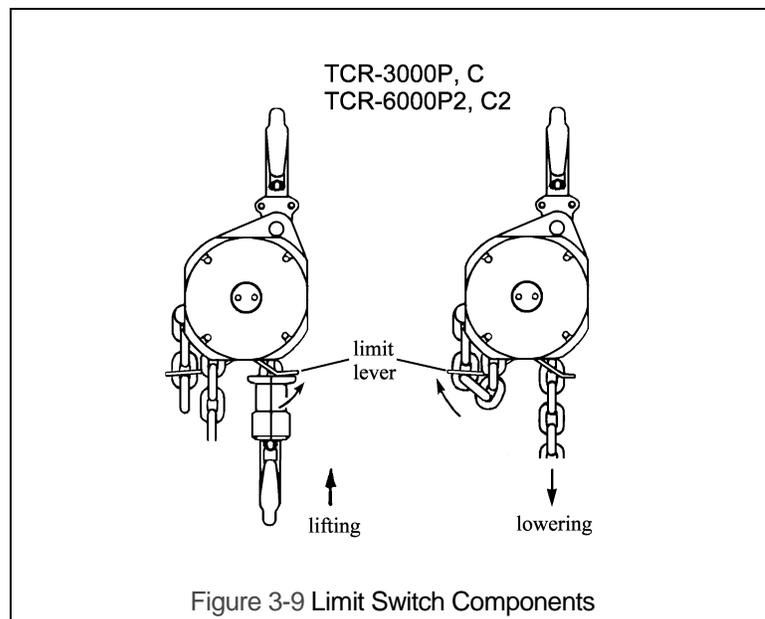
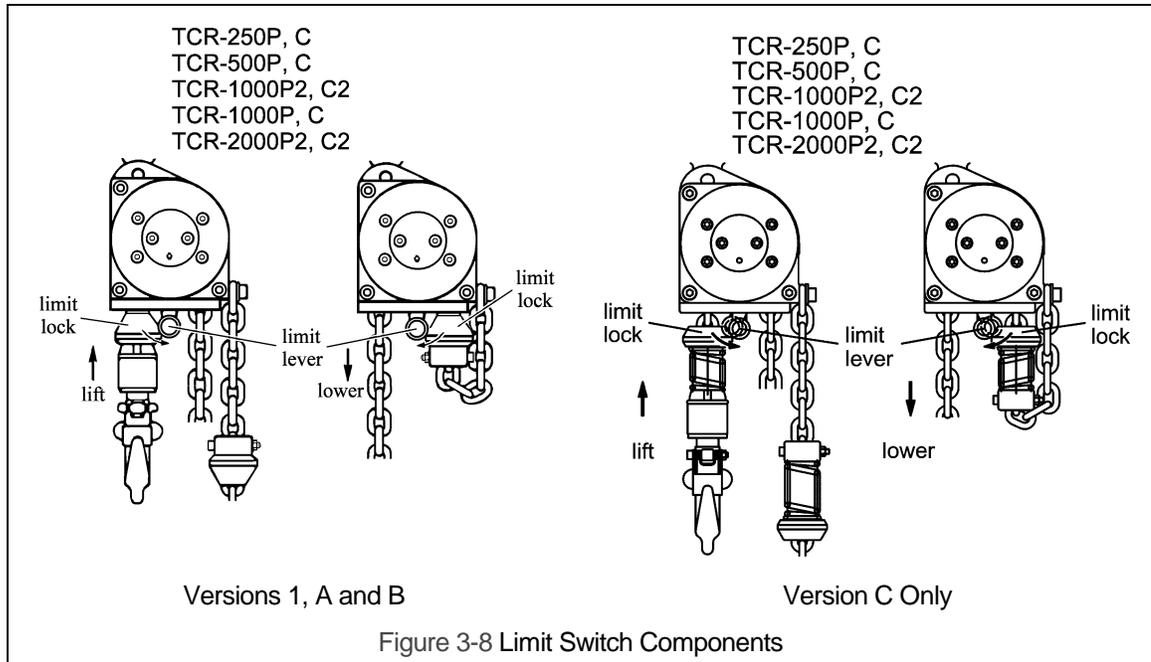
3.12.1 **⚠ CAUTION** Check for the availability of required operating air pressure of between 60 PSI to 90 PSI at the hoist's inlet port before trying to operate the hoist.

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.

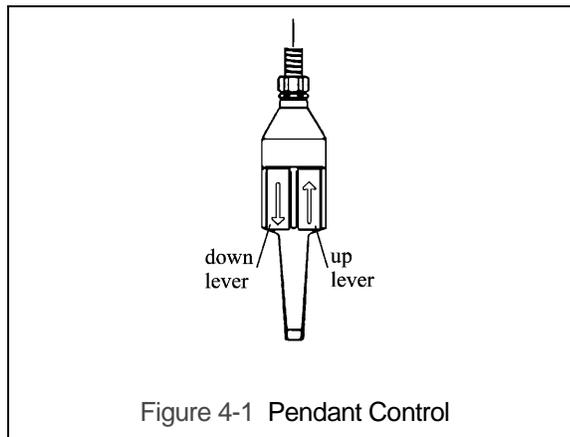
⚠ CAUTION

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:**

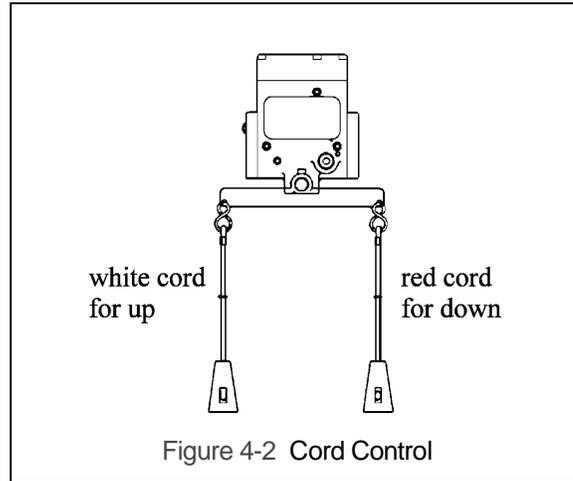
- Maintain a firm footing or be otherwise secured when operating the hoist.
- Check brake function by tensioning the hoist prior to each lift operation.
- Use hook latches. Latches are to retain slings, chains, etc. under slack conditions only.
- Make sure the hook latches are closed and not supporting 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.



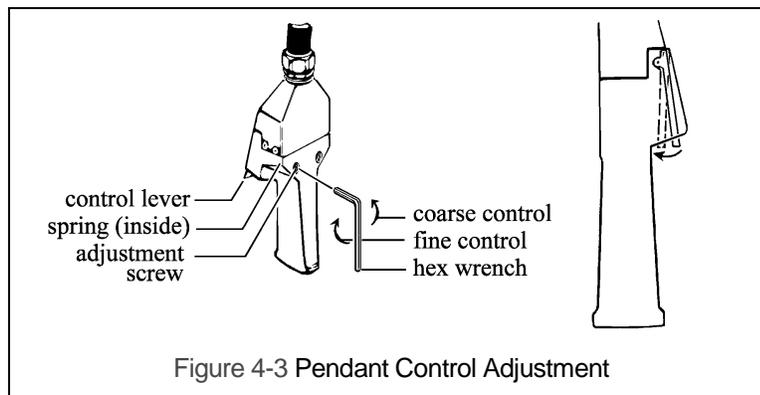
- 4.3.4 **CAUTION** Make sure the motor completely stops before reversing direction.

4.4 Adjusting the Controls

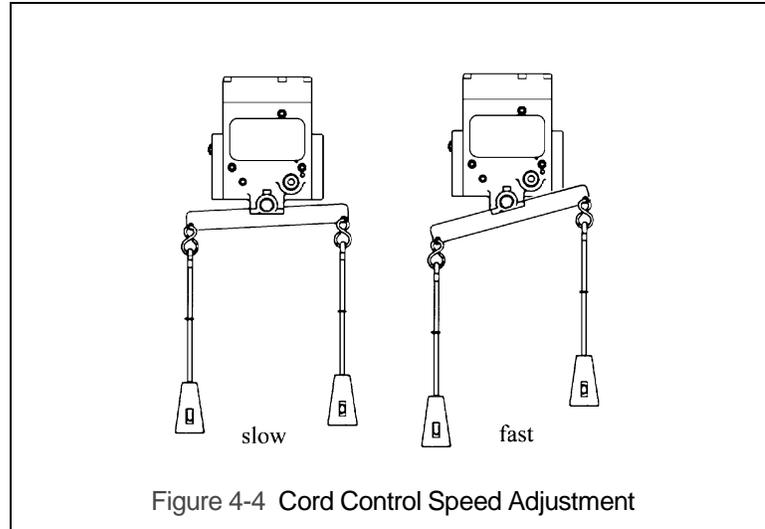
- 4.4.1 For pendant control, the speed can be adjusted by the amount the lever is depressed. As shown below in Figure 4-3, by depressing the lever slightly, you will be able control the hoist's motions slowly and with more precision. By depressing the lever further, the speed of the hoist will be increased 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 hoists 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. |

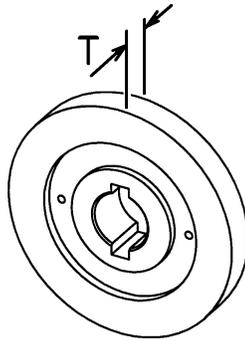
Table 5-3 Hoist Inspection Methods and Criteria

| Item | Method | Criteria | Action |
|---|------------------|--|---|
| 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

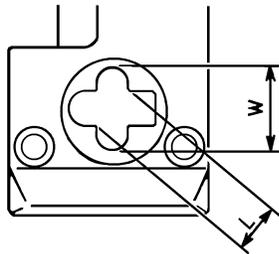
| Item | Method | Criteria | Action |
|-----------------------------------|---------------------------------------|---|---------------------------------|
| Chain Container (optional) | Visual | Container should not be damaged. Brackets should not be deformed or missing. | Replace |
| Bolts, Nuts and 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

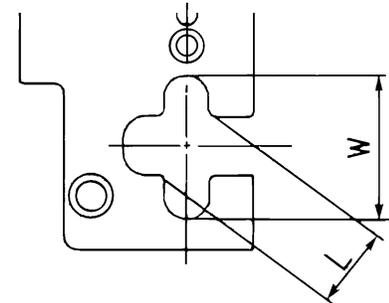


| Hoists | Parts View Item No. | Std Dimension Inch (mm) | Minimum Value for Replacement Inch (mm) |
|---------------------|---------------------|-------------------------|---|
| TCR250, 500, 1000-2 | 73 | T = 0.31 (8.0) | T = 0.29 (7.3) |
| TCR1000, 2000-2 | 73 | T = 0.31 (8.0) | T = 0.29 (7.3) |
|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

Table 5-5 Chain Separator Dimensions



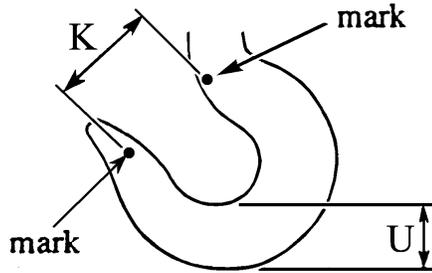
TCR250, 500, 1000-2, 1000, 2000-2



TCR 3000, 6000-2

| 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) |

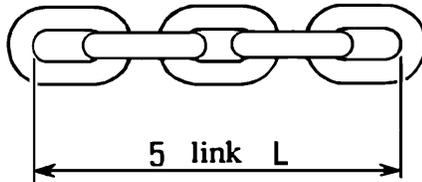
Table 5-6 Top Hook & Bottom Hook Dimensions



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 | Top Hook K = _____ Top 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. |
| | 120 | Bottom Hook K = _____ Bottom Hook U = _____ | |
| TCR1000, 2000-2 | 115 | Top Hook K = _____ Top Hook U = _____ | |
| | 120 | Bottom Hook K = _____ Bottom Hook U = _____ | |
| TCR3000, 6000-2 | 115 | Top Hook K = _____ Top Hook U = _____ | |
| | 120 | 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.

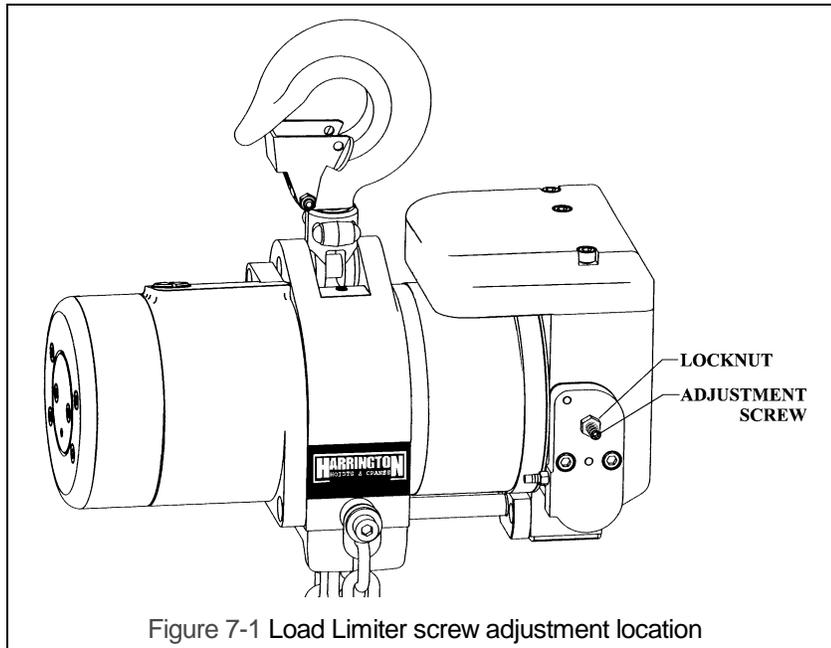
Table 6-1 Table of Approved Lubricants

| 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.



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.

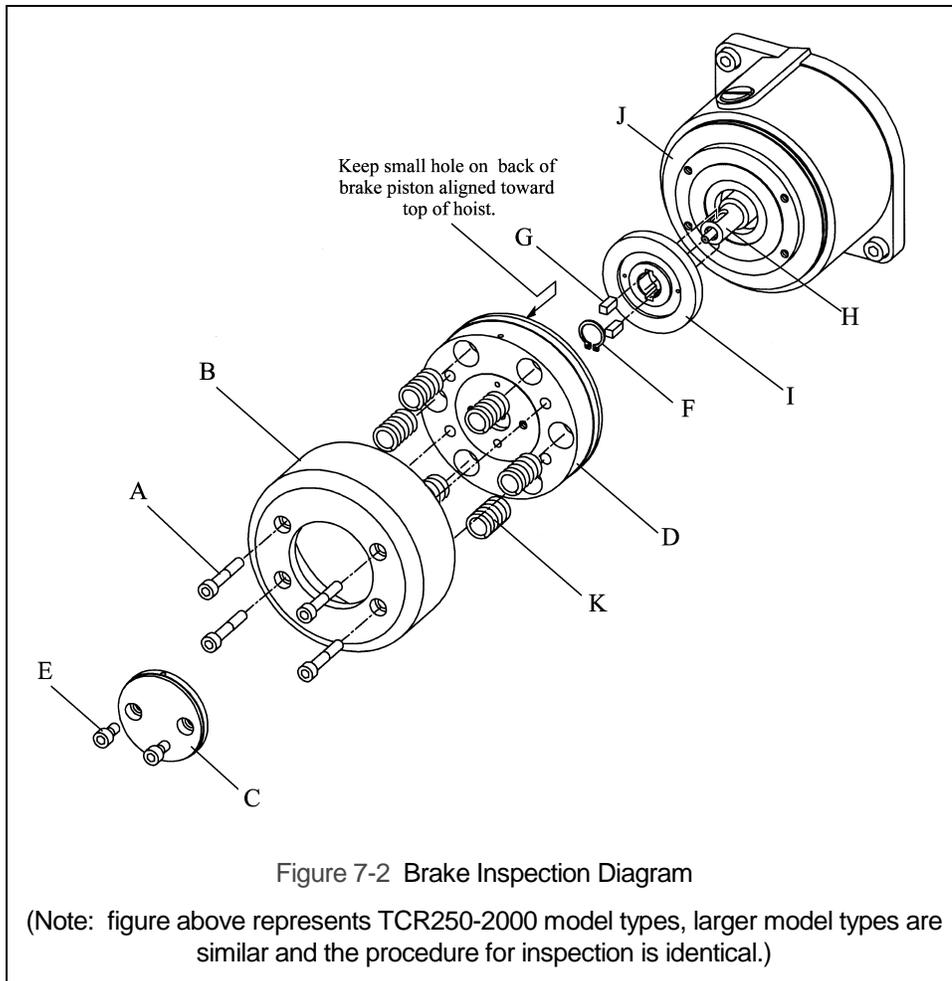
7.2 Brake

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

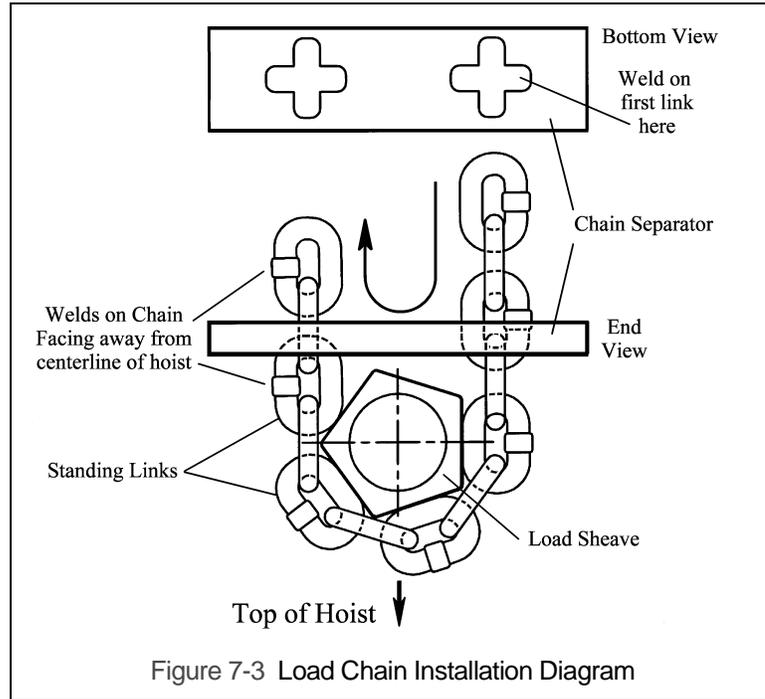
7.3.1 Lubrication and Cleaning

- 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.

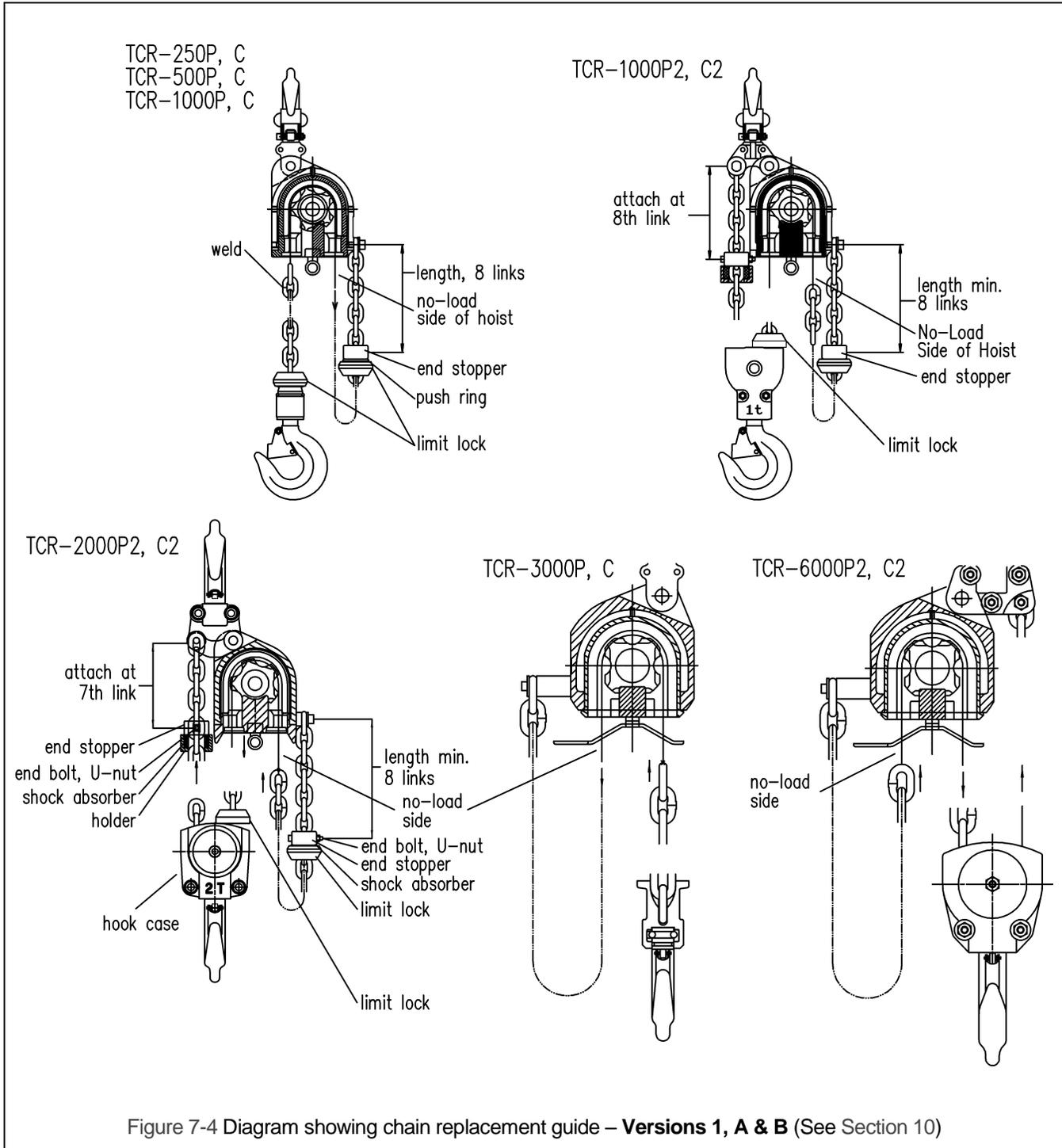
- 4) **⚠ CAUTION** Invert the hoist such that the chain separator openings are facing up. The chain must be inserted into the chain separator on the no load side opening. This is where the no load end of chain attaches to hoist body. Without inserting the load chain, operate the hoist pendant or cord 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.

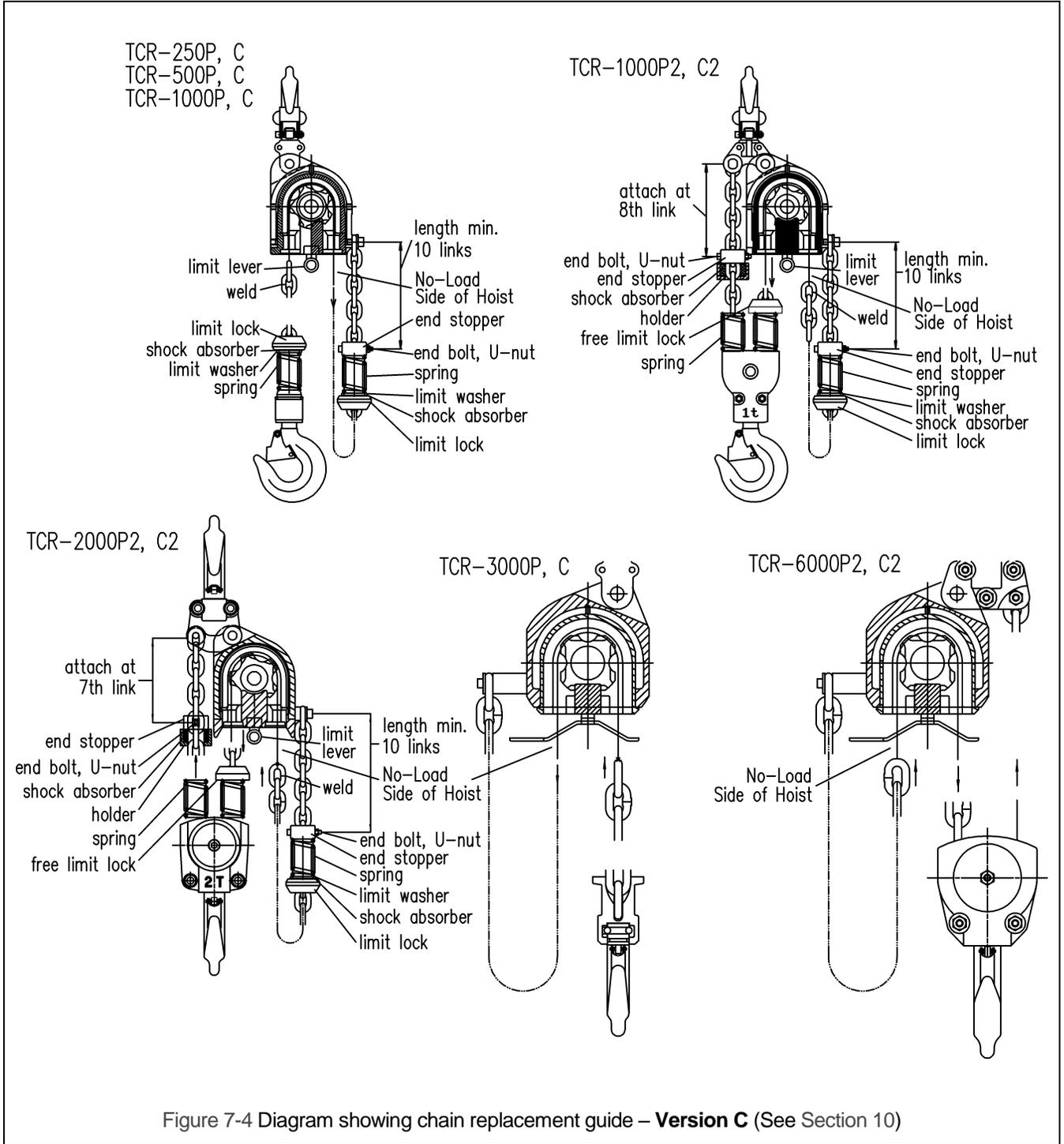


- 5) **⚠ CAUTION** Operate the hoist slowly to catch and pull the chain through the hoist. Make sure the chain feeds smoothly while operating the hoist. If binding occurs, stop and reverse the hoist direction to back the chain out. Reinsert the chain while gradually operating the hoist controls. Continue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

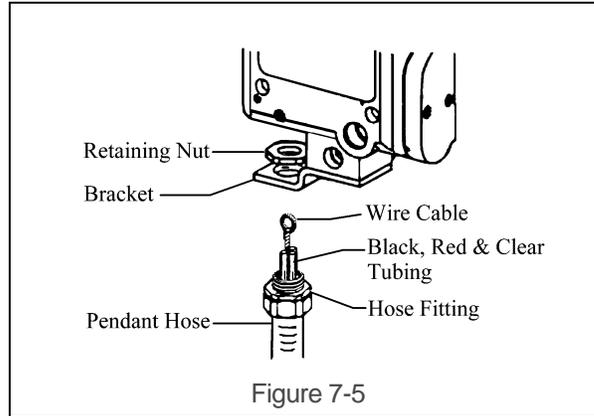




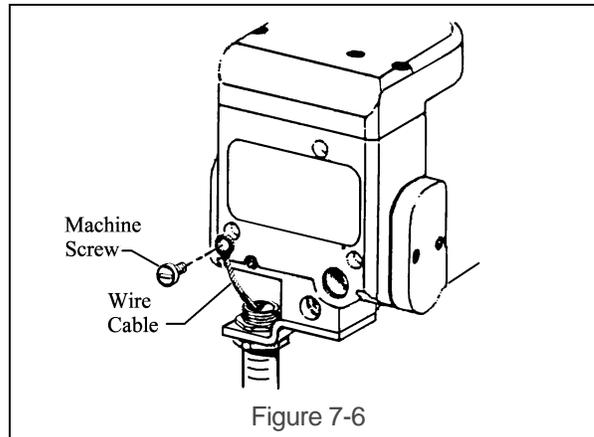
7.4 Pendant

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

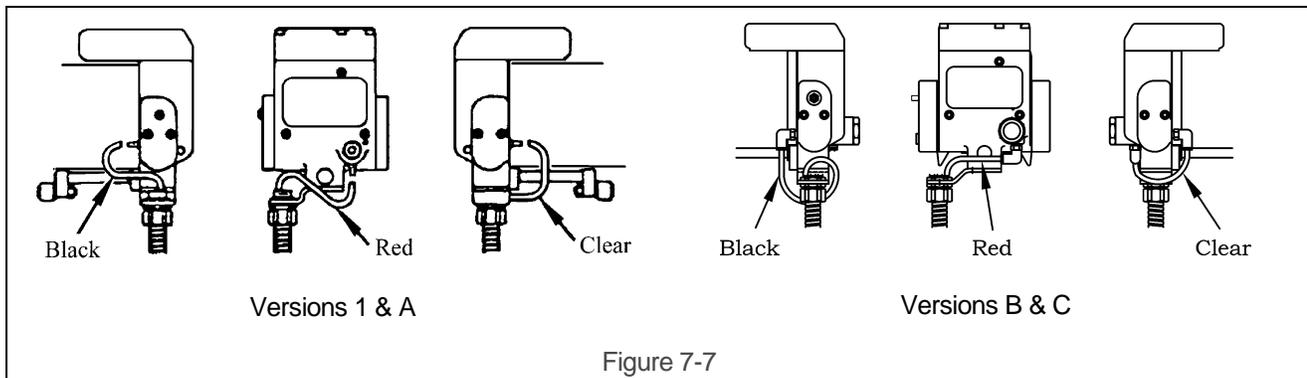
- 1) Put hose, 3 tubes and wire through the bracket hole. See Figure 7-5.
- 2) Attach the hose to the bracket by installing the retaining nut to the hose fitting.
- 3) Torque retaining nut to 20 lbf.-ft.



- 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.

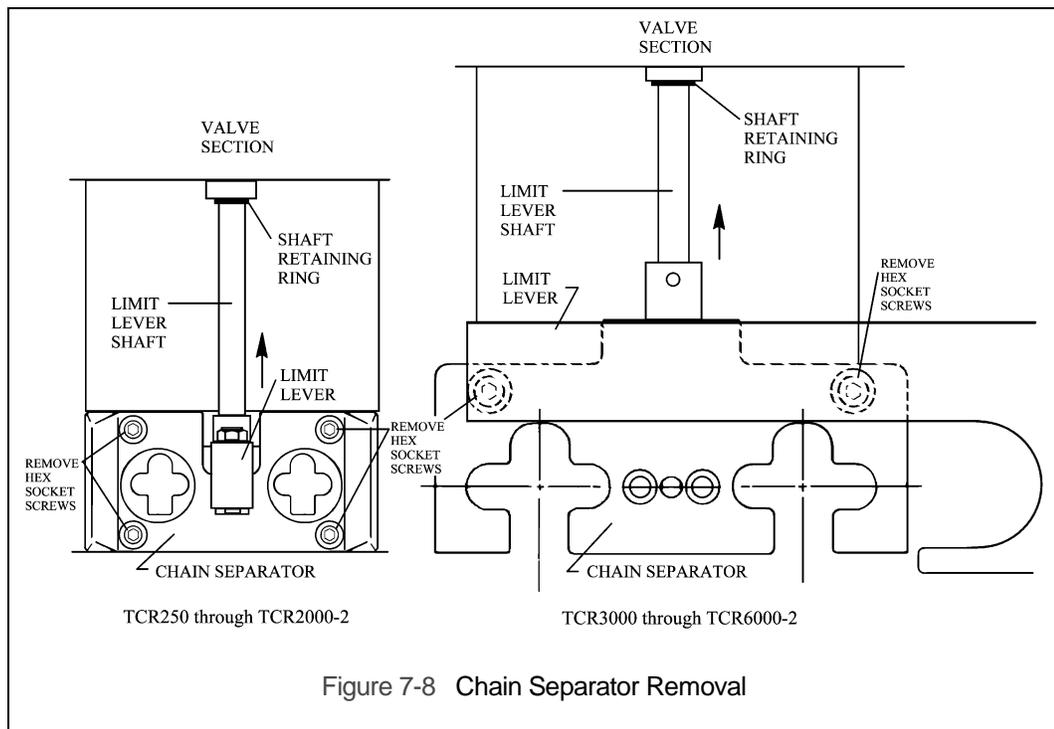


NOTICE When attaching tubes take care not to bend or kink tubing. This will result in the air flow being restricted and poor response to the pendant controls.

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.

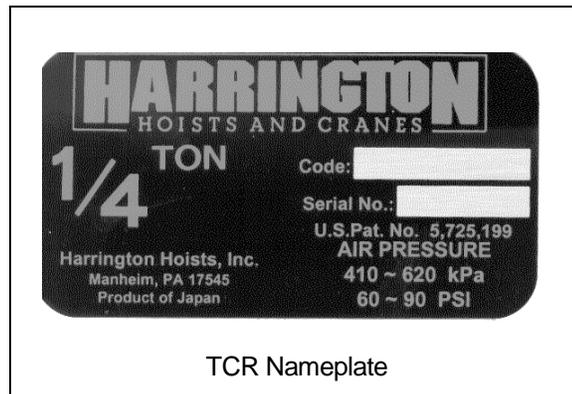
Customer must obtain a Return Goods Authorization as directed by Harrington or Harrington’s published repair center prior to shipping product for warranty evaluation. An explanation of the complaint must accompany the product. Product must be returned freight prepaid. Upon repair, the product will be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



TCR Nameplate

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

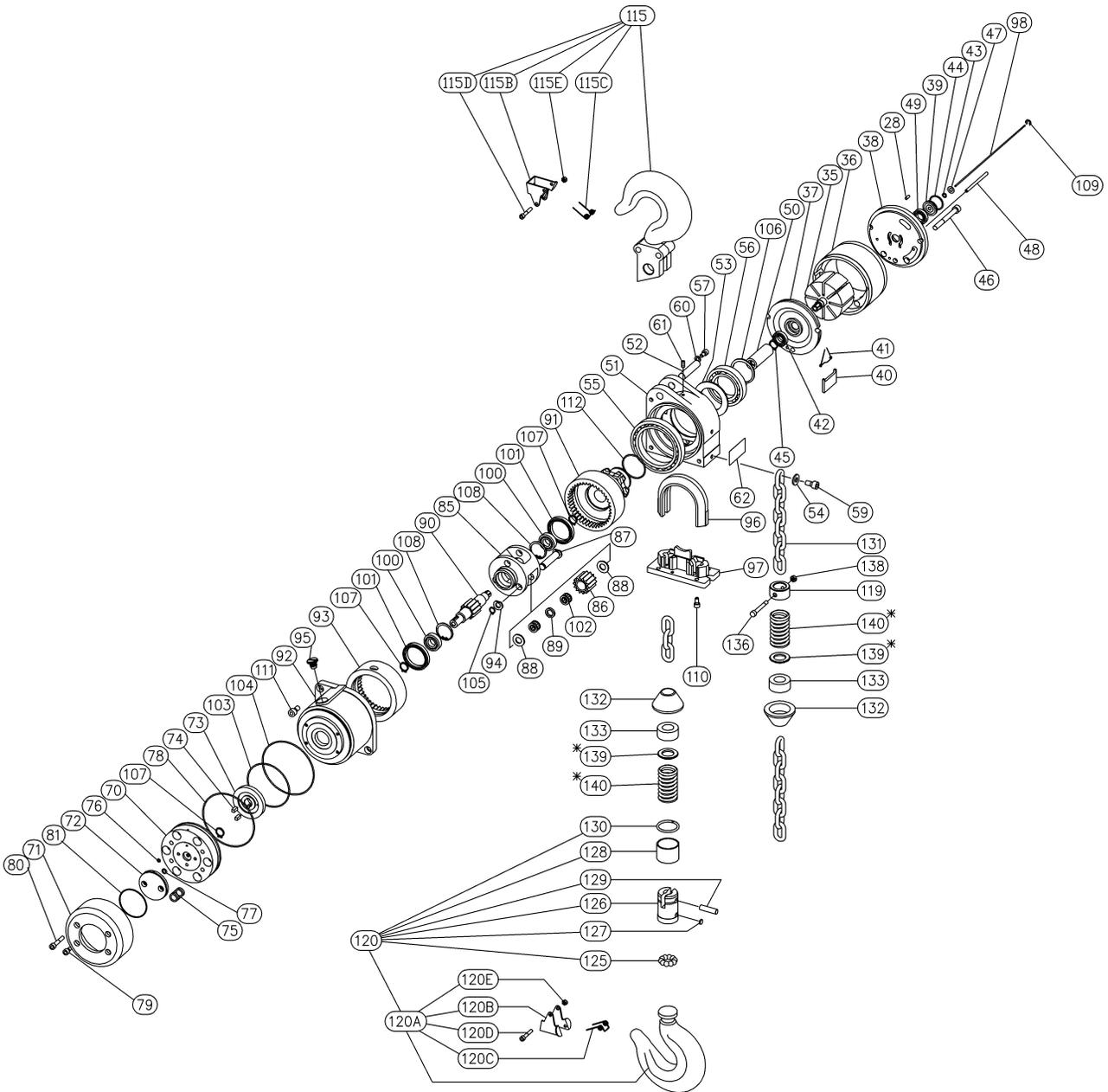


Figure 10-1 TCR250 / TCR500 Main Body

| 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.

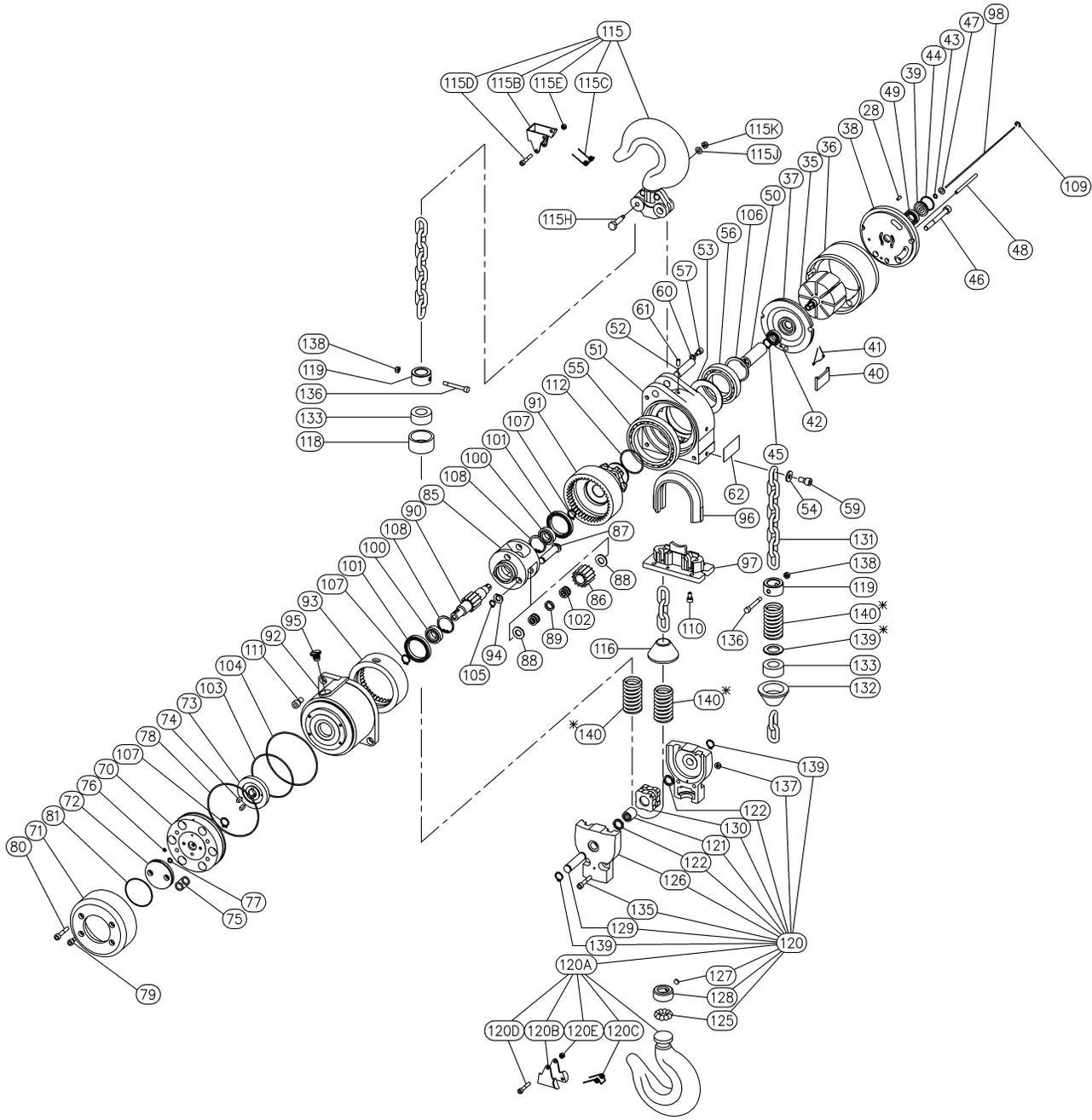


Figure 10-2 TCR1000-2 Main Body

| 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.

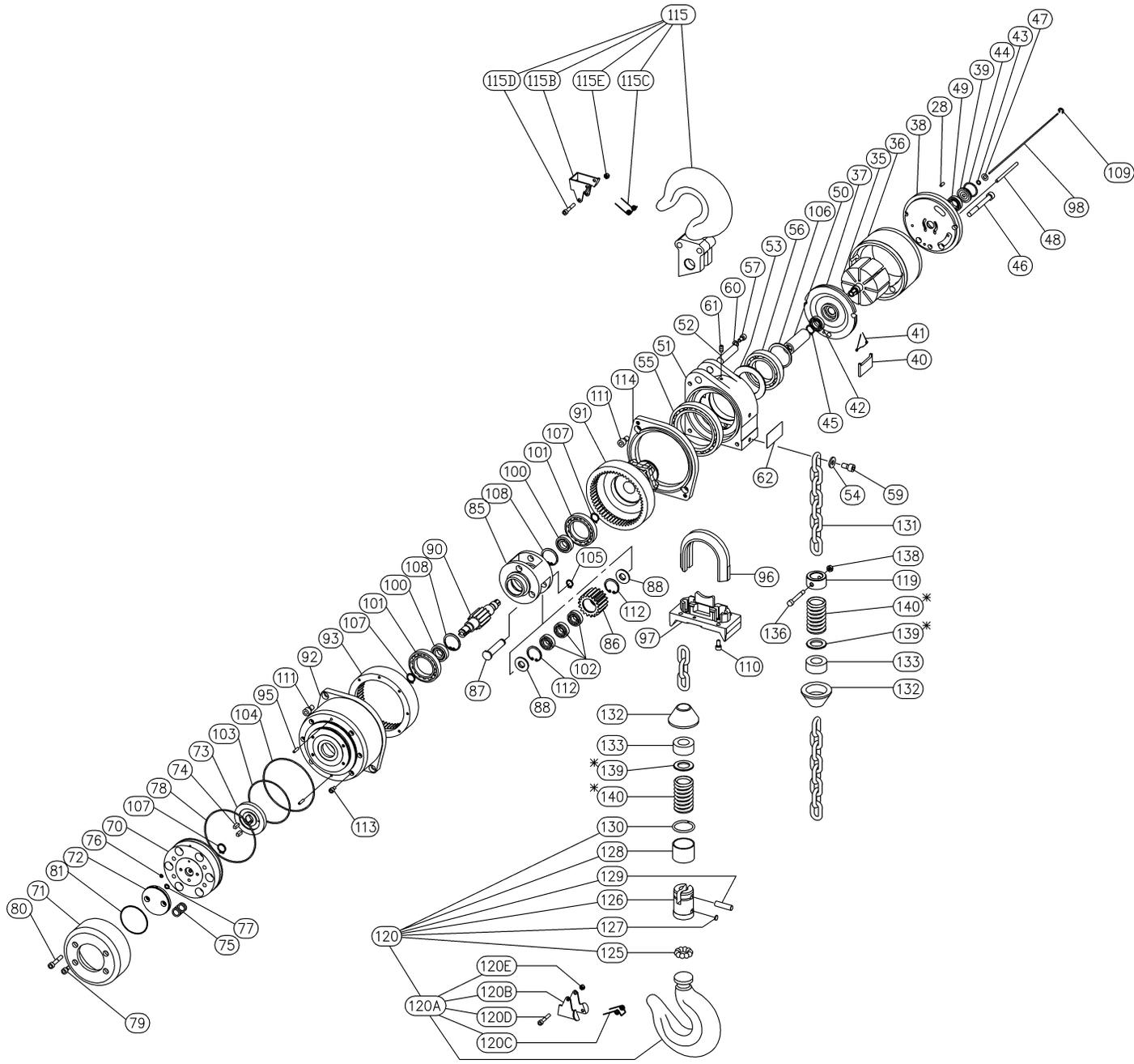


Figure 10-3 TCR1000 Main Body

| 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.

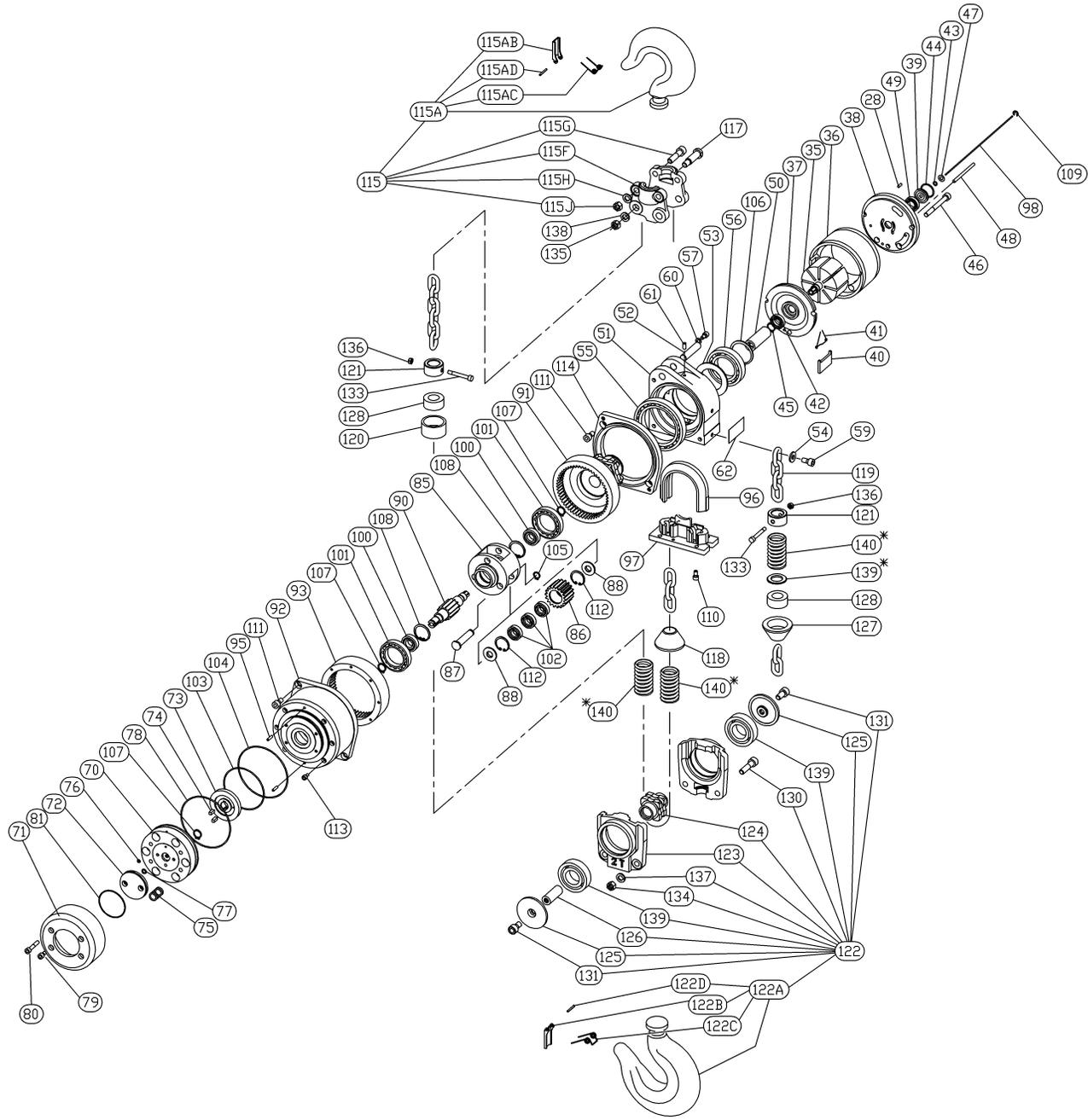


Figure 10-4 TCR2000-2 Main Body

| 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.

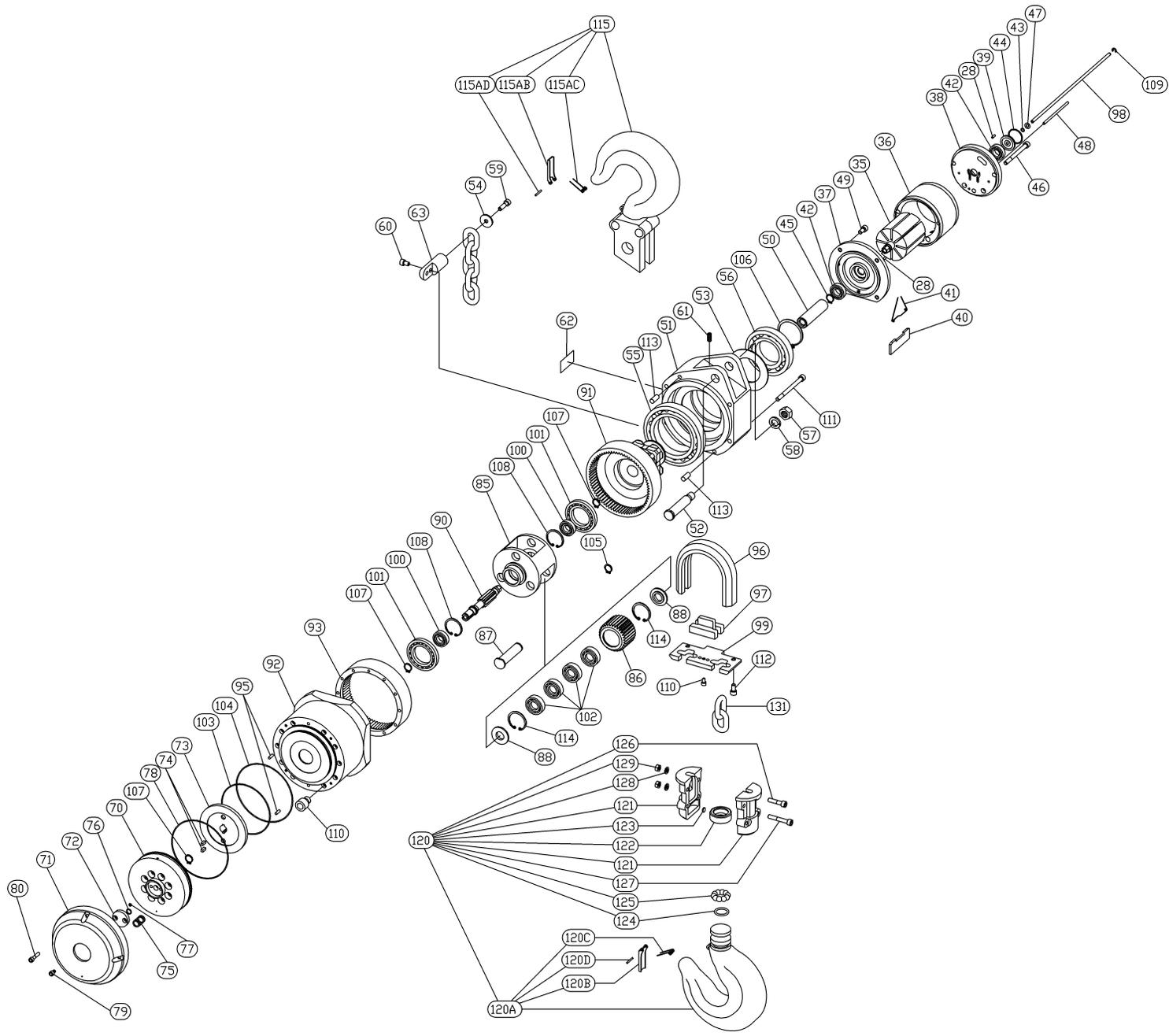


Figure 10-5 TCR3000 Main Body

| 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 |

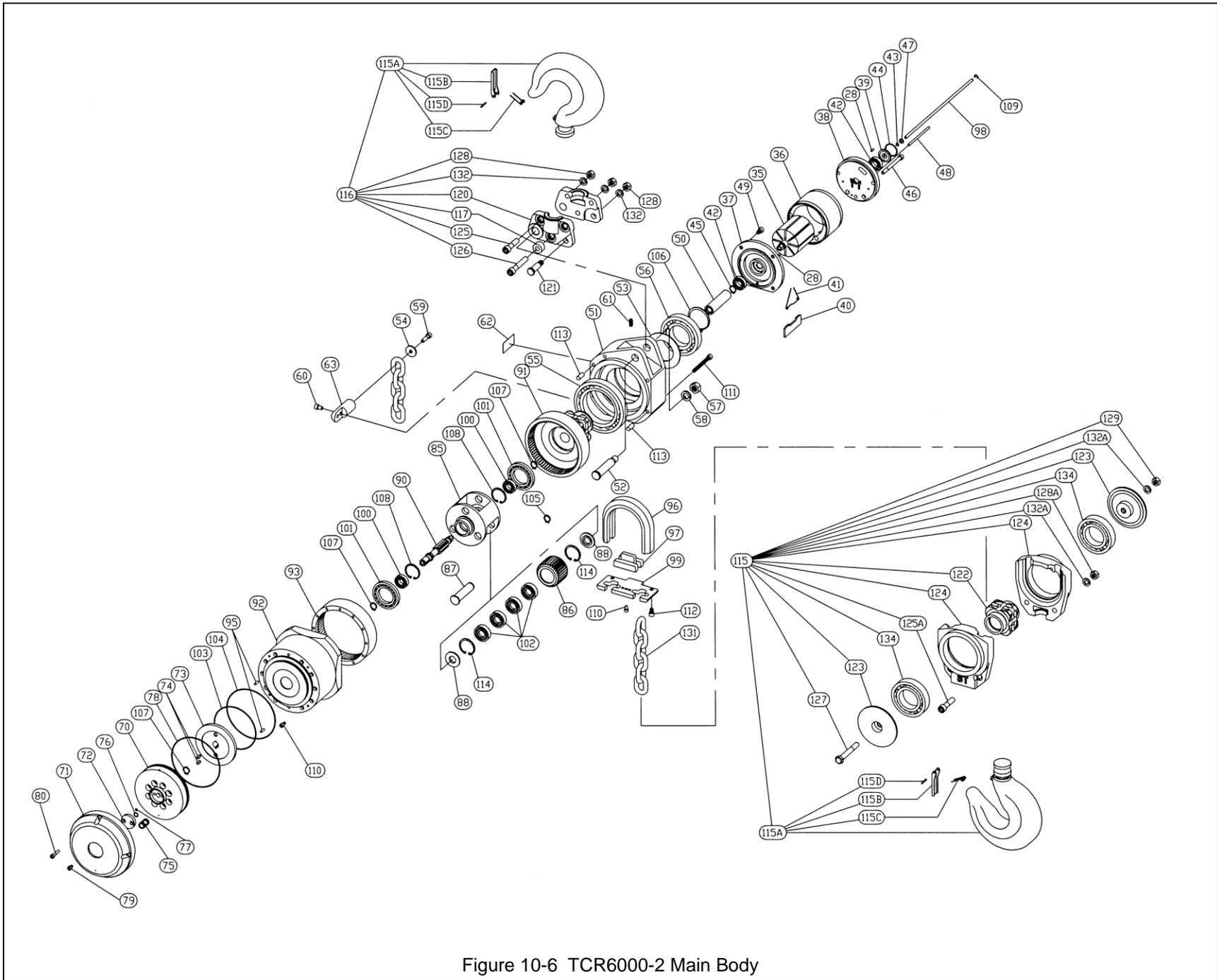


Figure 10-6 TCR6000-2 Main Body

| 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 |

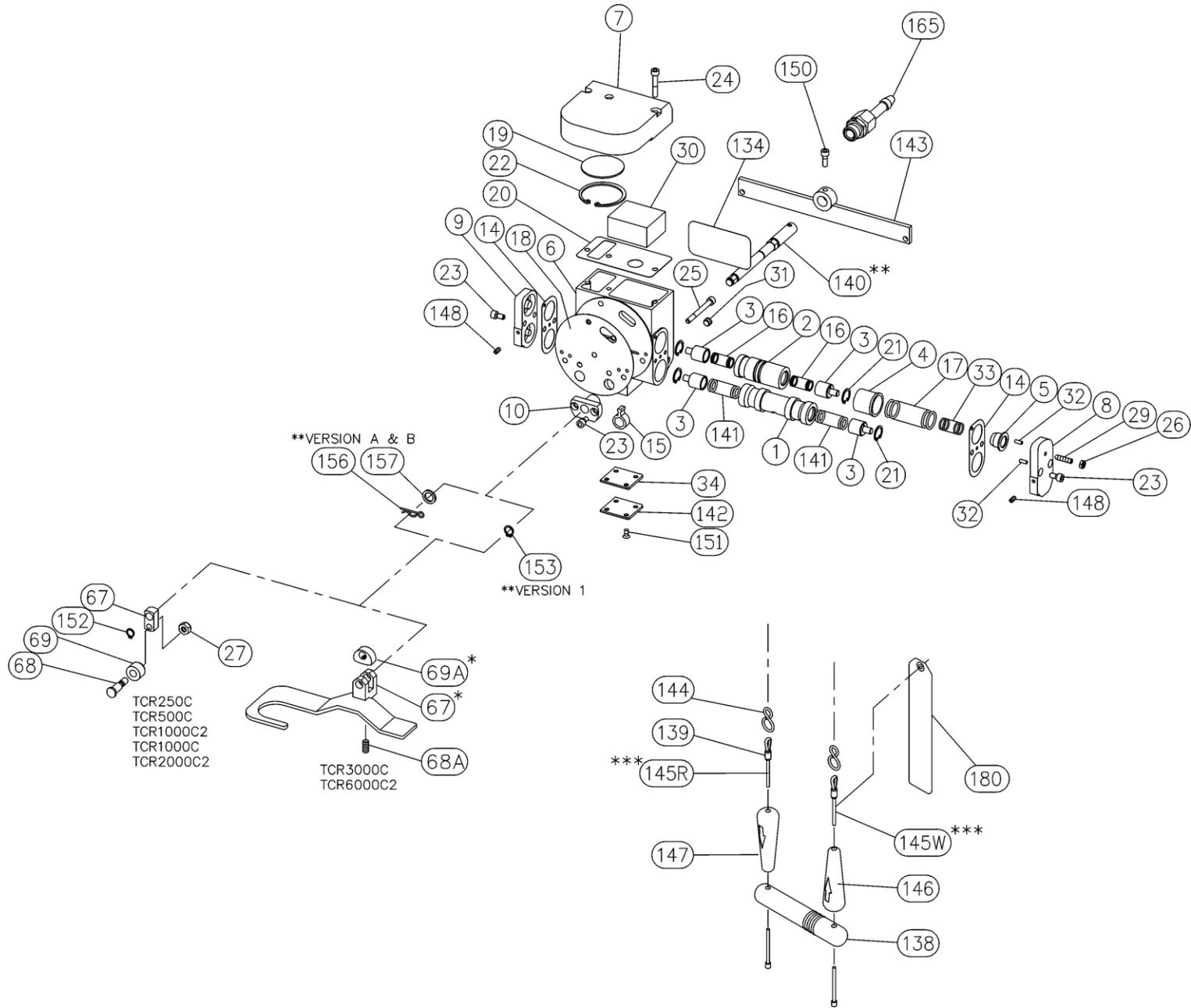


Figure 10-7 Cord Control Valve Body – Versions 1, A and B Hoists

| 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.

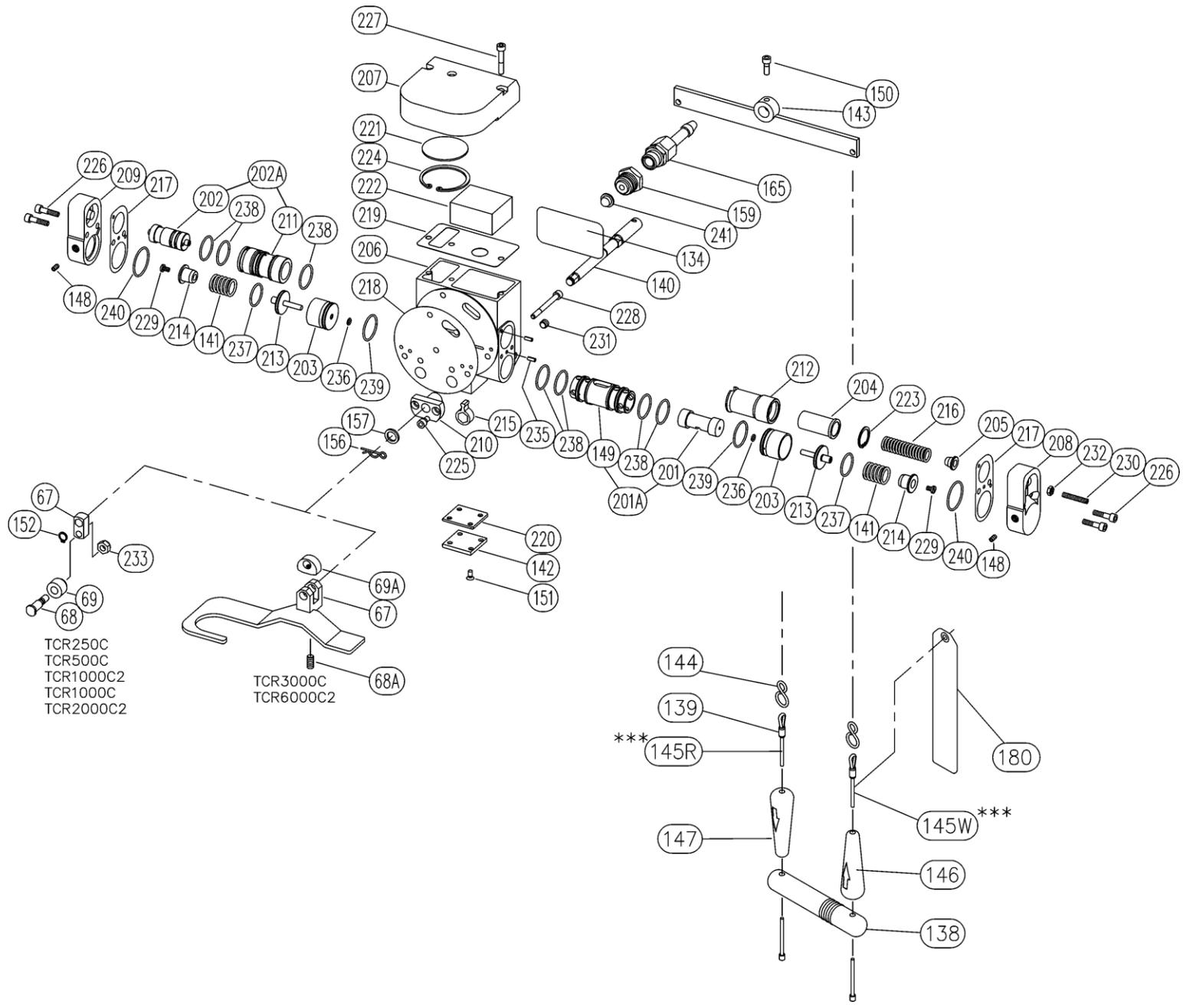


Figure 10-8 Cord Control Valve Body – Version C Hoists

| 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.

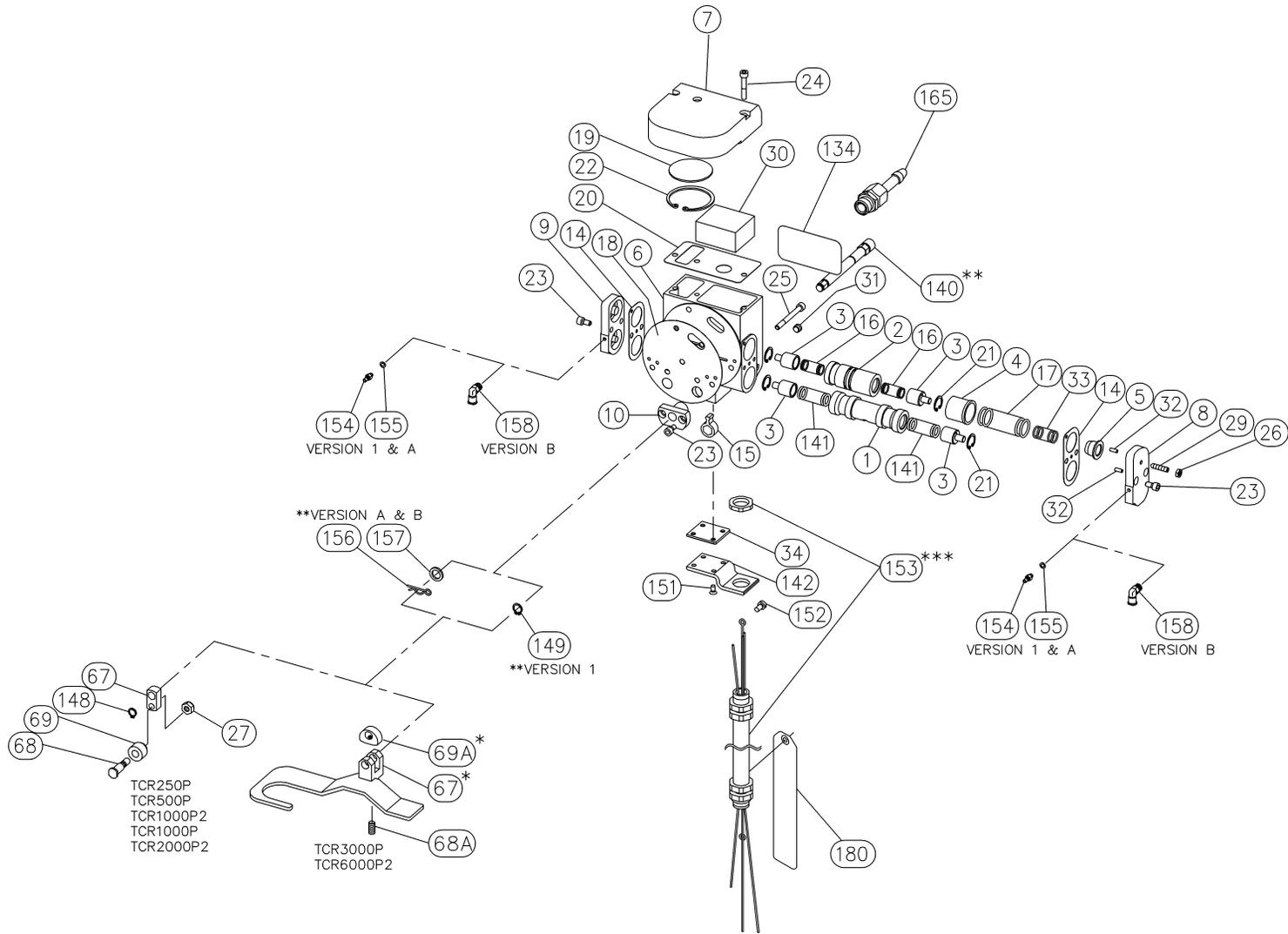


Figure 10-9 Pendant Control Valve Body – Versions 1, A and B Hoists

| 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

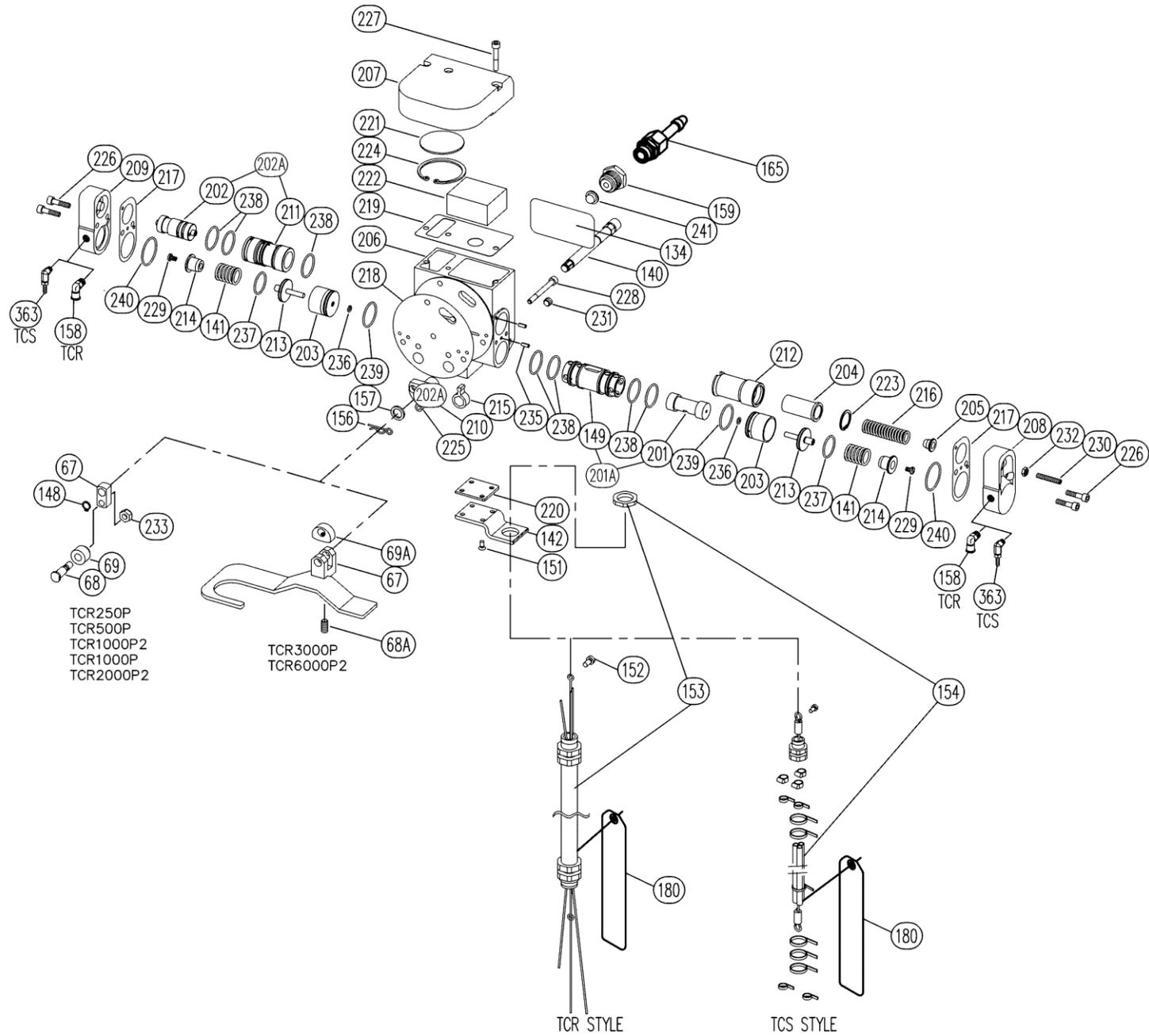


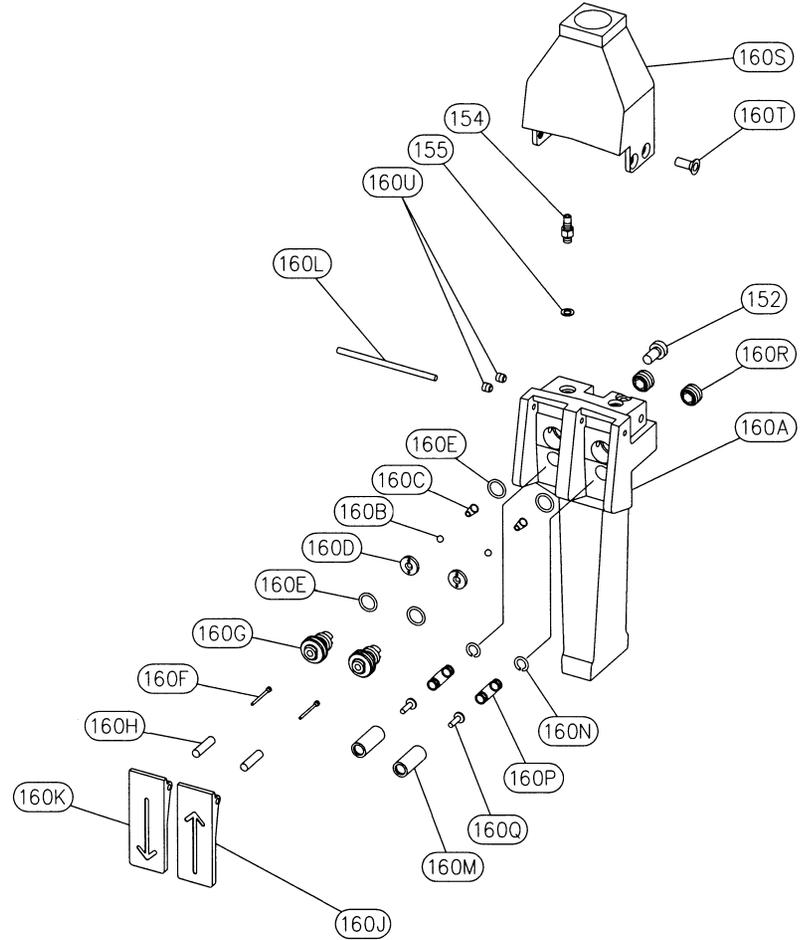
Figure 10-10 Pendant Control Valve Body – Version C Hoists

| 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 |

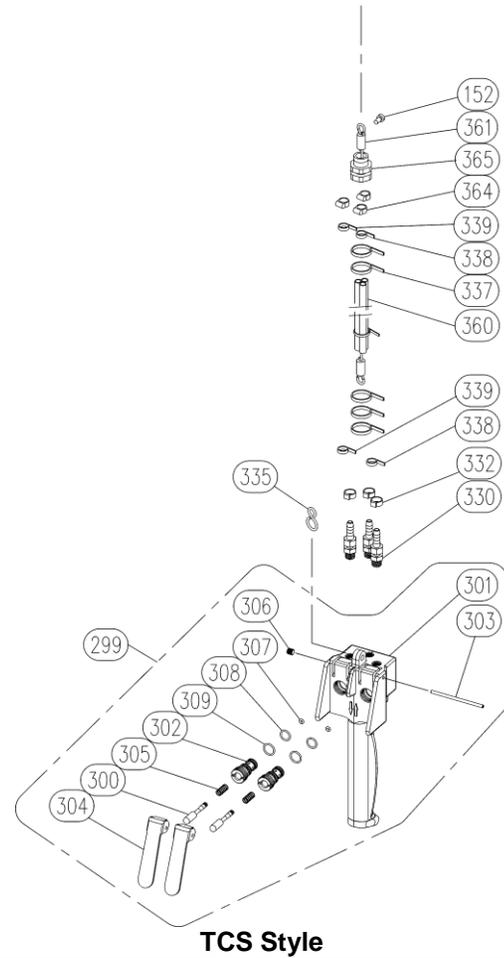
| Figure Number | Part Number | | Part Name | Parts Per Hoist |
|---------------|--|-----------------------|-------------------------------|-----------------|
| | TCR250P TCR500P TCR1000P2 TCR1000P TCR2000P2 | TCR3000P TCR6000P2 | | |
| 208 | TCR426224083 | | Side Cover (L) | 1 |
| 209 | TCR426224093 | | 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 |



| 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 |



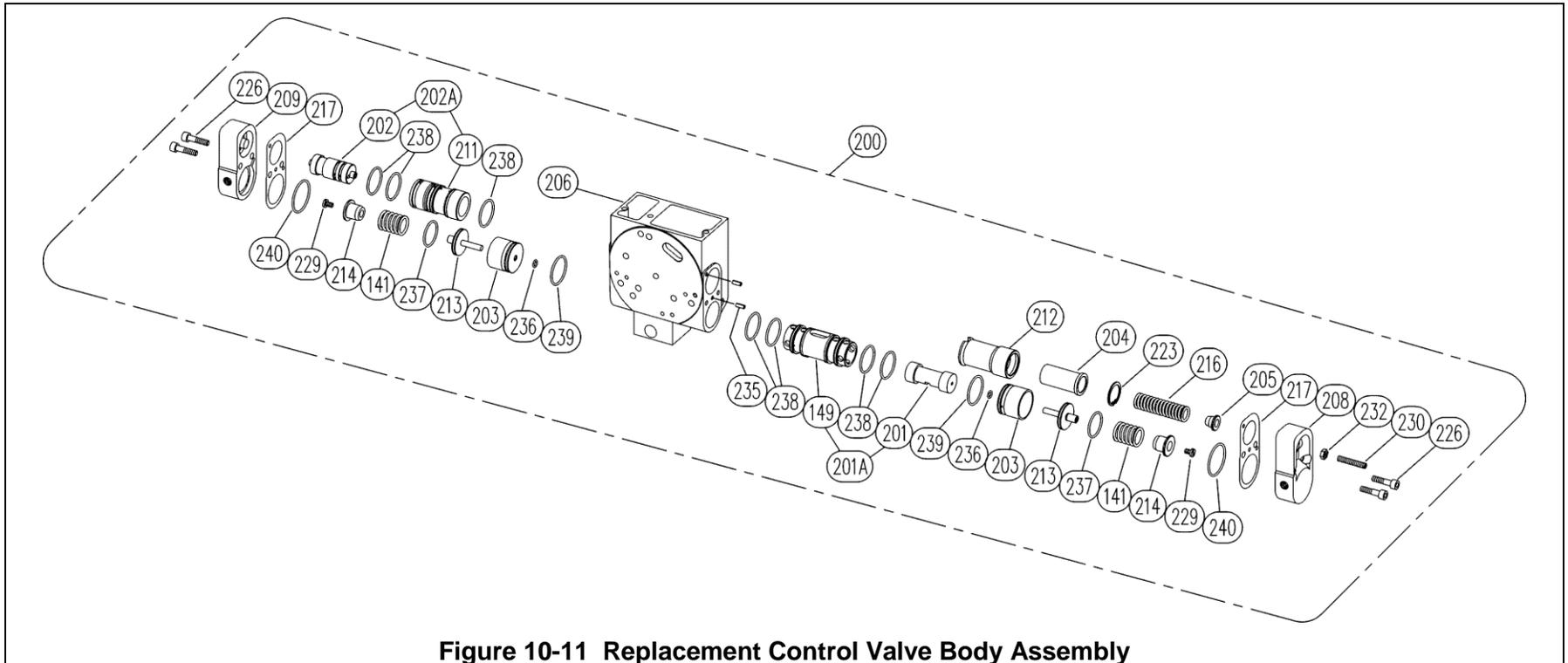
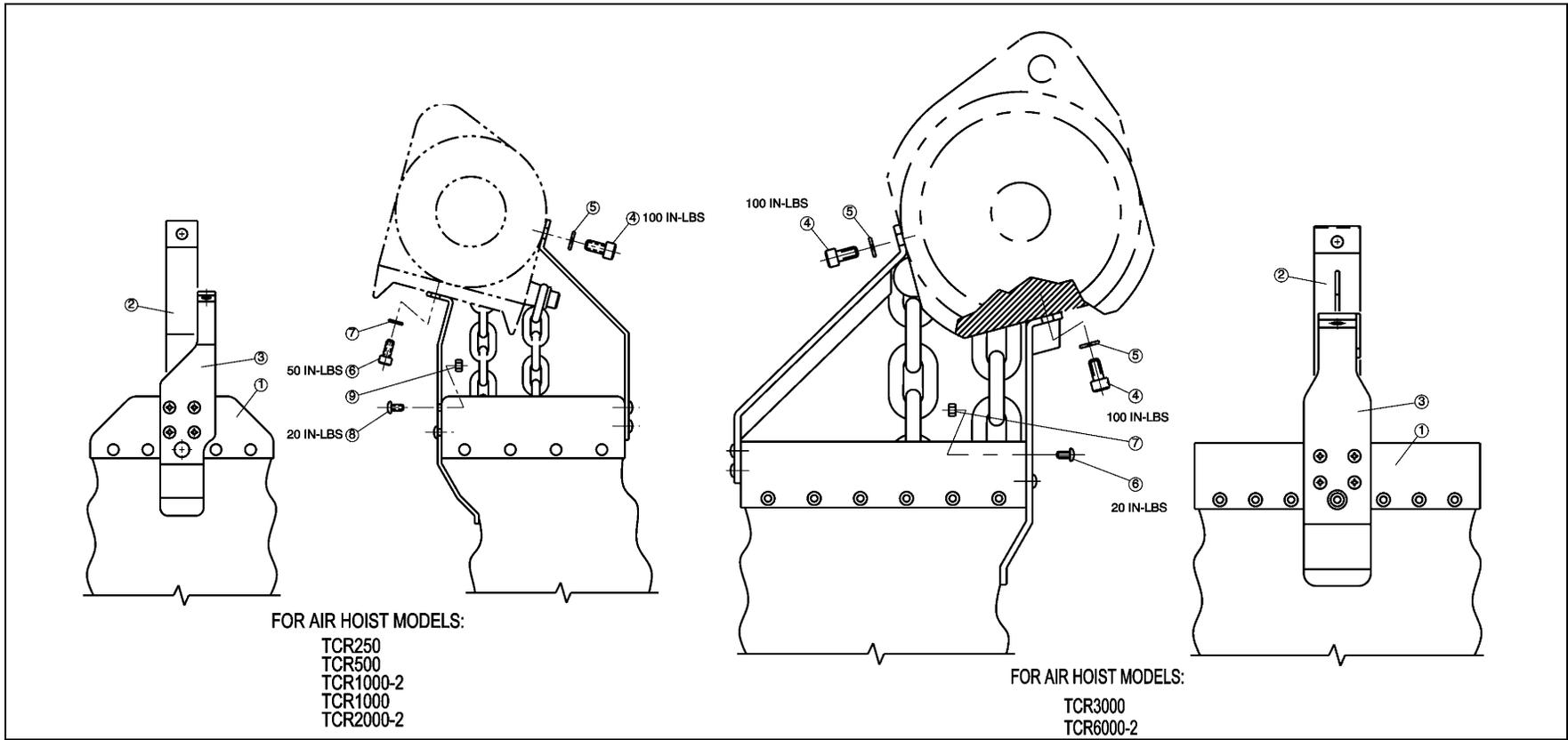


Figure 10-11 Replacement Control Valve Body Assembly

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 |



| 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 |

| 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 |

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