
Owner's Manual

AIR POWERED CHAIN HOIST TCR SERIES

¼ tonne through 6 tonne 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.

KITO

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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.

WARNING!

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 Kito 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, derate, 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 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.

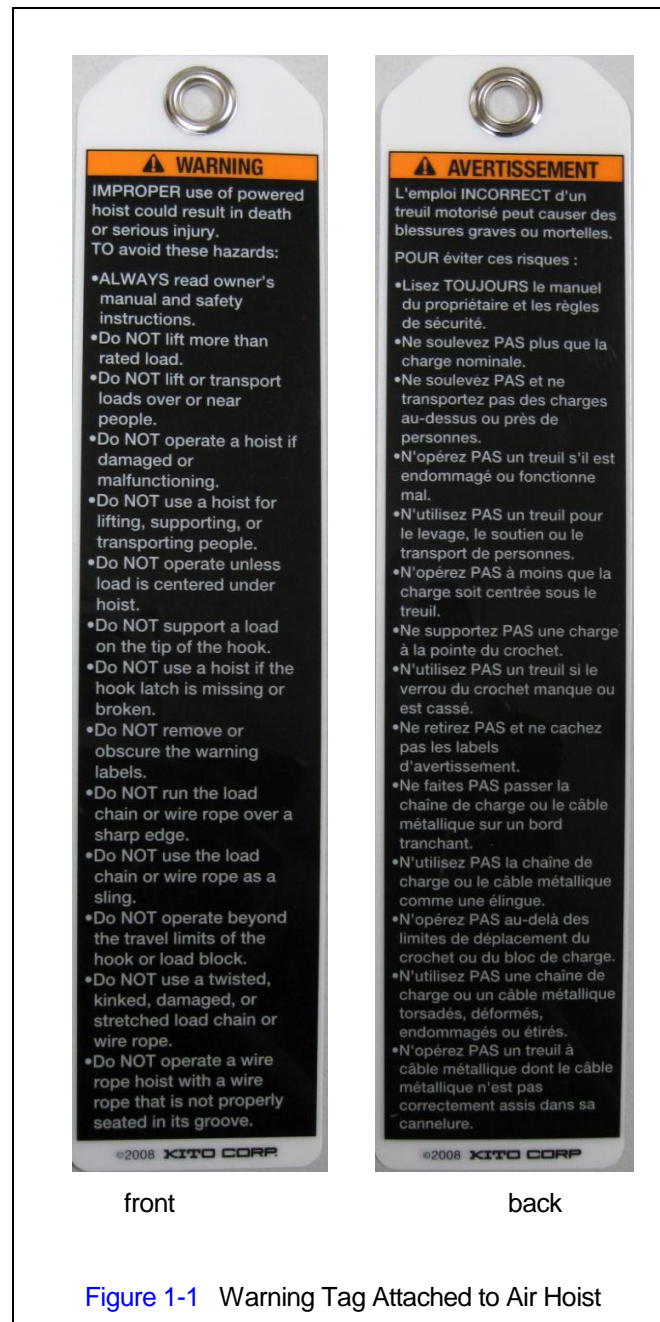
It is the responsibility of the owner/user to have all personnel that will install, inspect, test, maintain, and operate a hoist read the contents of this manual and applicable portions of ANSI/ASME B30.16 regulations. If the hoist is installed as part of a total lifting system, such as an overhead crane, 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 Kito 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

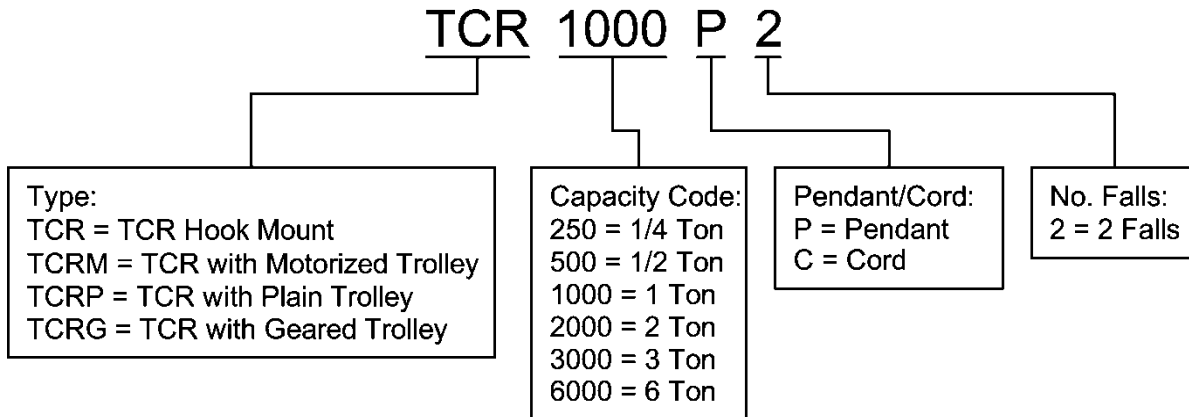
The warning tag illustrated below in [Figure 1-1](#) is supplied with each hoist shipped from the factory. If the tag is not attached to your hoist (for pendant control, the warning tag is attached to the pendant hose; for the pull cord control, the warning tag is attached to the up cord), order a tag 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: -10° to +60°C (+14° to +140°F)

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. (tonne)	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 5 ft of Lift (lbs)
					No Load	w/Full Load	No Load	w/Full Load			
Pendant Model	¼	TCR250M	6	6	55 / 41	26 / 54	32 / 25	28 / 28	4 x 1	24	---
	¼	TCR250P	10	6	55 / 41	27 / 54	32 / 25	25 / 28	4 x 1	19	4
	½	TCR500P		6	62 / 43	33 / 53	60 / 49	49 / 57	6.3 x 1	68	4
	1	TCR1000P2		6	31 / 21	16 / 26	60 / 49	49 / 57	6.3 x 2	78	8
	1	TCR1000P		6	34 / 21	19 / 30	60 / 53	49 / 60	7.1 x 1	75	5
	2	TCR2000P2		6	17 / 10	10 / 15	60 / 53	49 / 60	7.1 x 2	88	10
	3	TCR3000P		6	17 / 10	9 / 13	88 / 64	67 / 71	11.2 x 1	152	11
	6	TCR6000P2		6	8 / 5	5 / 7	88 / 64	67 / 71	11.2 x 2	198	22
Cord Model	¼	TCR250C		10	6	61 / 45	29 / 57	35 / 28	28 / 32	4 x 1	15
	½	TCR500C	6		62 / 43	33 / 53	63 / 49	49 / 57	6.3 x 1	66	4
	1	TCR1000C2	6		31 / 21	16 / 26	63 / 49	49 / 57	6.3 x 2	76	8
	1	TCR1000C	6		34 / 21	19 / 30	62 / 53	49 / 60	7.1 x 1	73	5
	2	TCR2000C2	6		17 / 10	10 / 15	62 / 53	49 / 60	7.1 x 2	86	10
	3	TCR3000C	6		17 / 10	9 / 13	90 / 64	67 / 71	11.2 x 1	150	11
	6	TCR6000C2	6		8 / 5	5 / 7	90 / 64	67 / 71	11.2 x 2	196	22

2.2 Dimensions

Table 2-2 Top and Bottom Hook Dimension*									
Units = inch									
Product Code	a	b	c	d	e	f	g	h	
TCR250C/P/M	0.8	0.8	0.6	0.8	1.4	1.7	0.9	2.9	
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	12	11.3	4	4.4	6.9	0.9	2.8	1.3	0.7
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

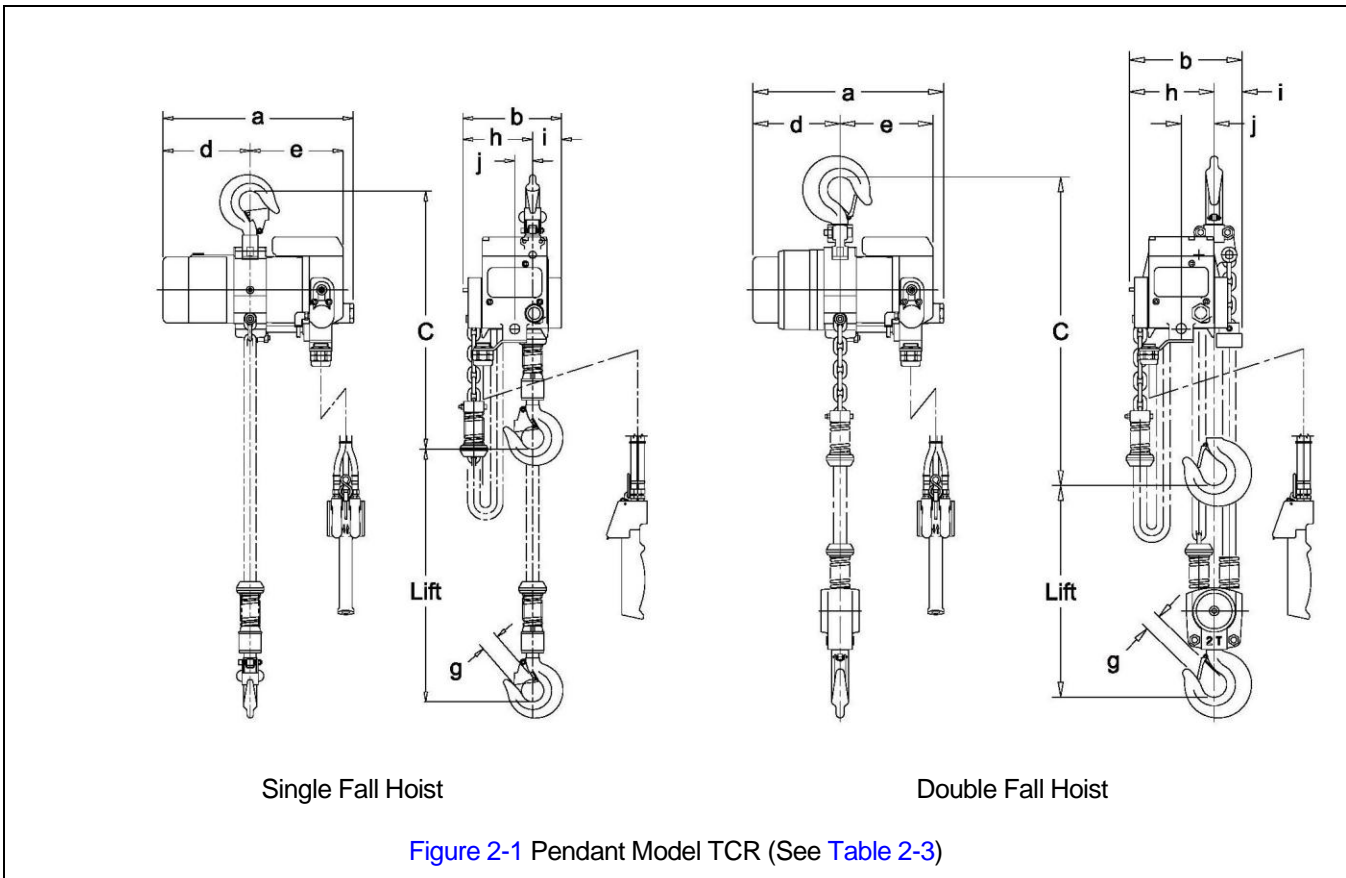
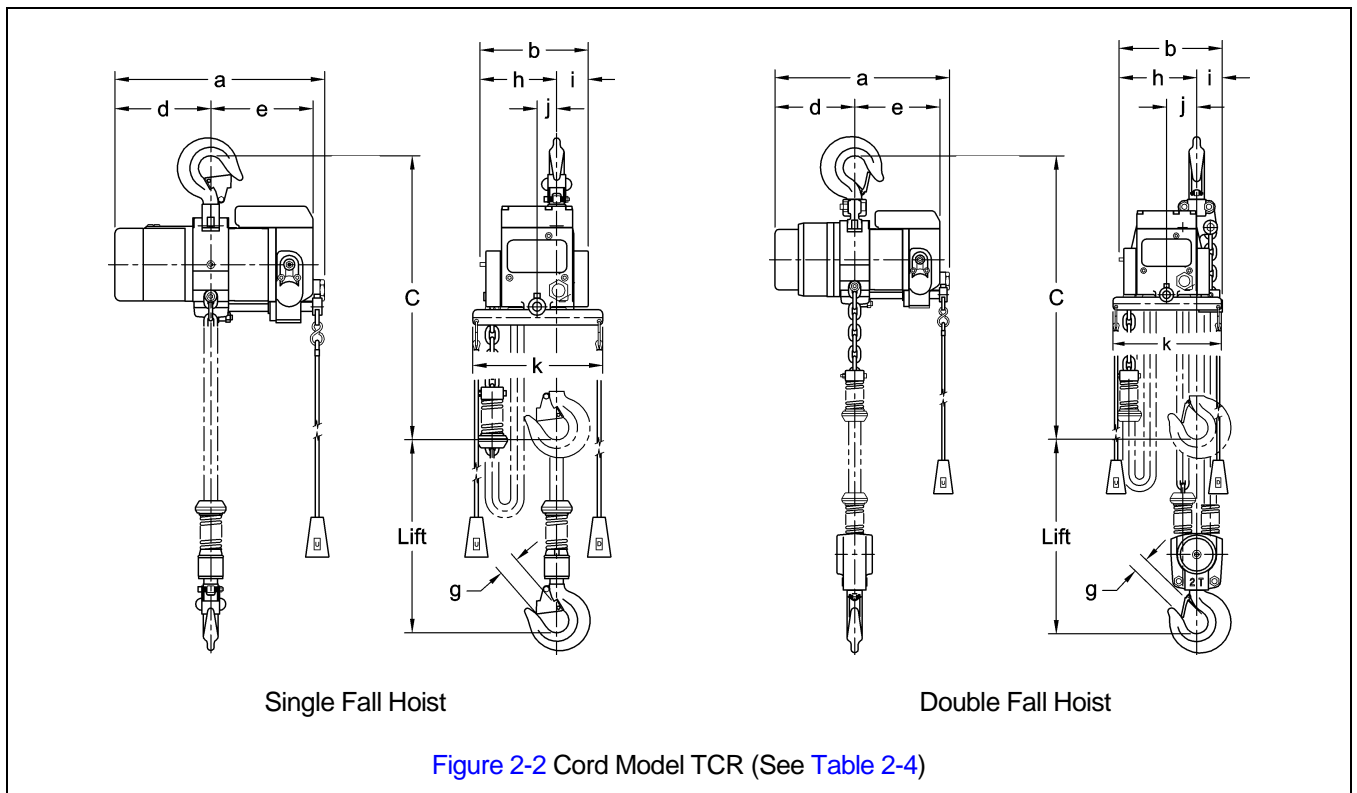


Table 2-4 TCR with Cord Control Dimensions											
Cap. (Tons)	Product Code	Headroom C (in)	a (in)	b (in)	d (in)	e (in)	g (in)	h (in)	i (in)	j (in)	k (in)
1/4	TCR250C	12	11.3	4	4.4	6.9	0.9	2.8	1.3	0.7	4
1/2	TCR500C	18.2	13.4	6.9	6.1	6.6	1.1	4.9	2.0	1.3	8.3
1	TCR1000C2	20.4	13.4	7.3	6.1	6.6	1.1	5.9	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



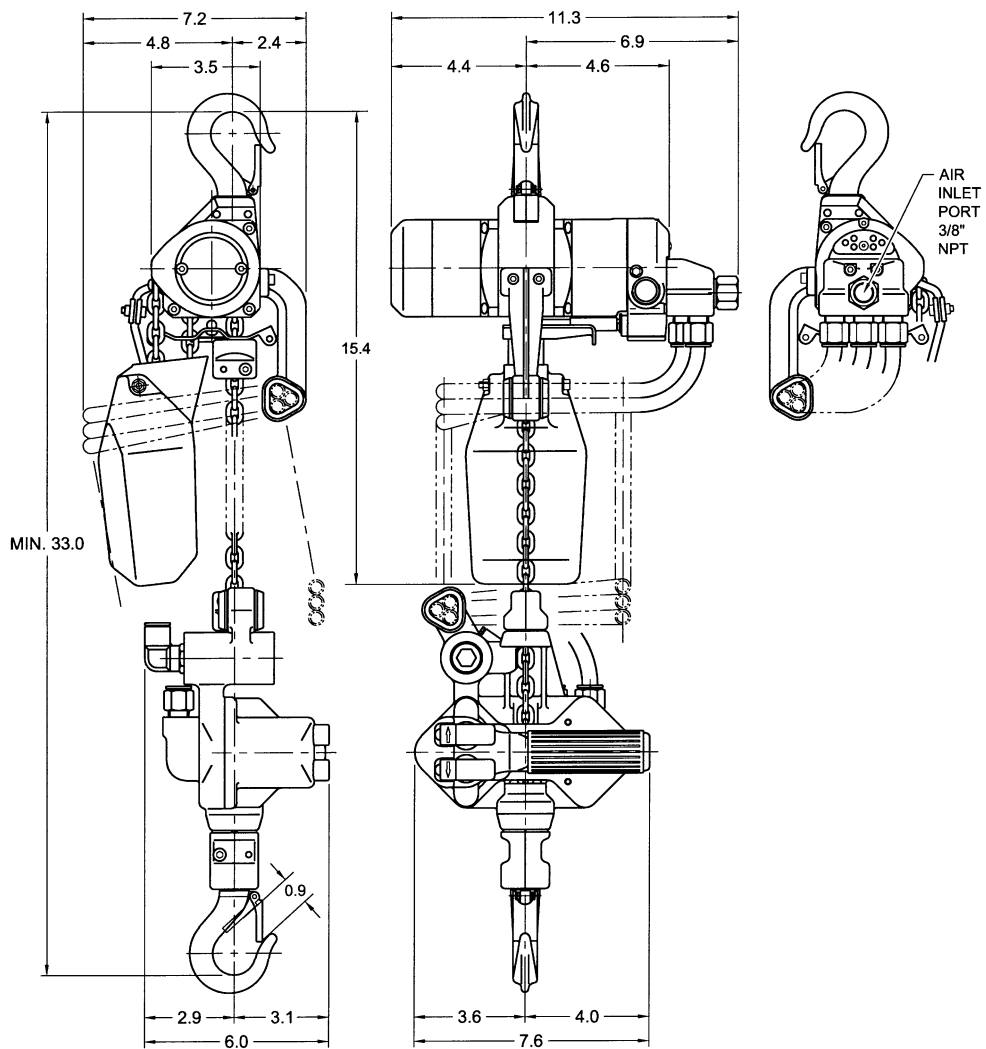


Figure 2-3 Dimensions for Manipulator TCR250 Air Hoist (inches)

2.3 Part Names

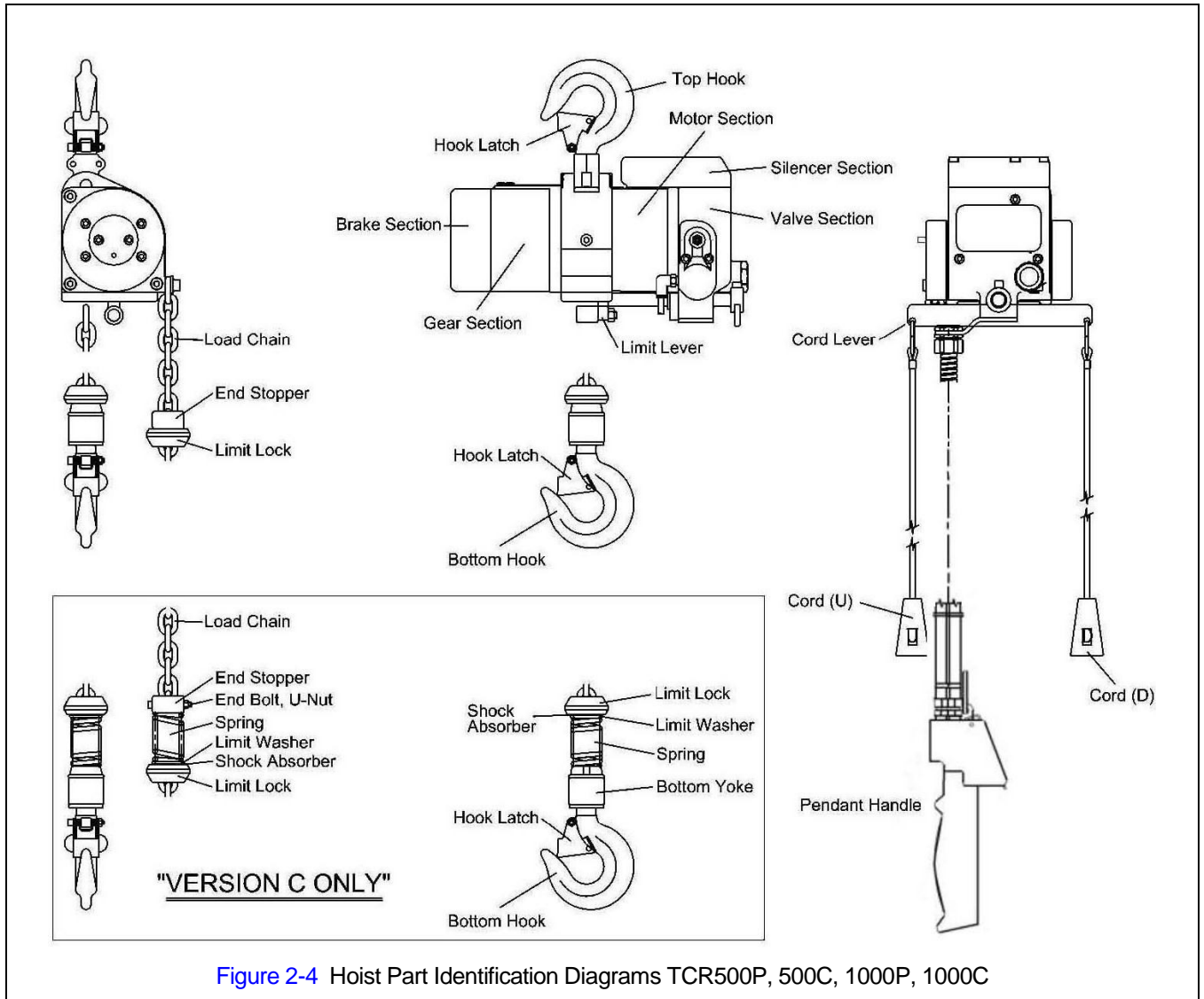


Figure 2-4 Hoist Part Identification Diagrams TCR500P, 500C, 1000P, 1000C

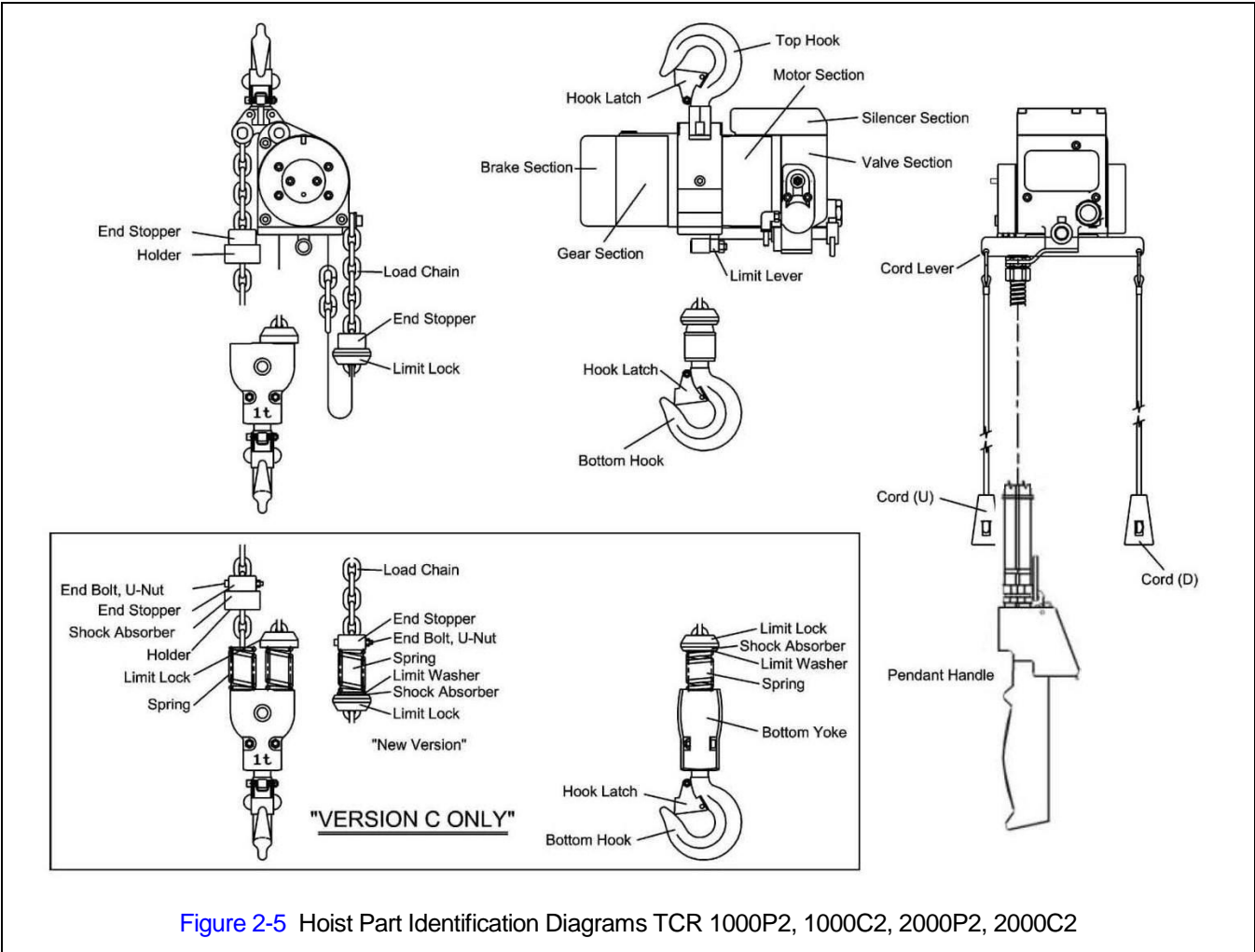
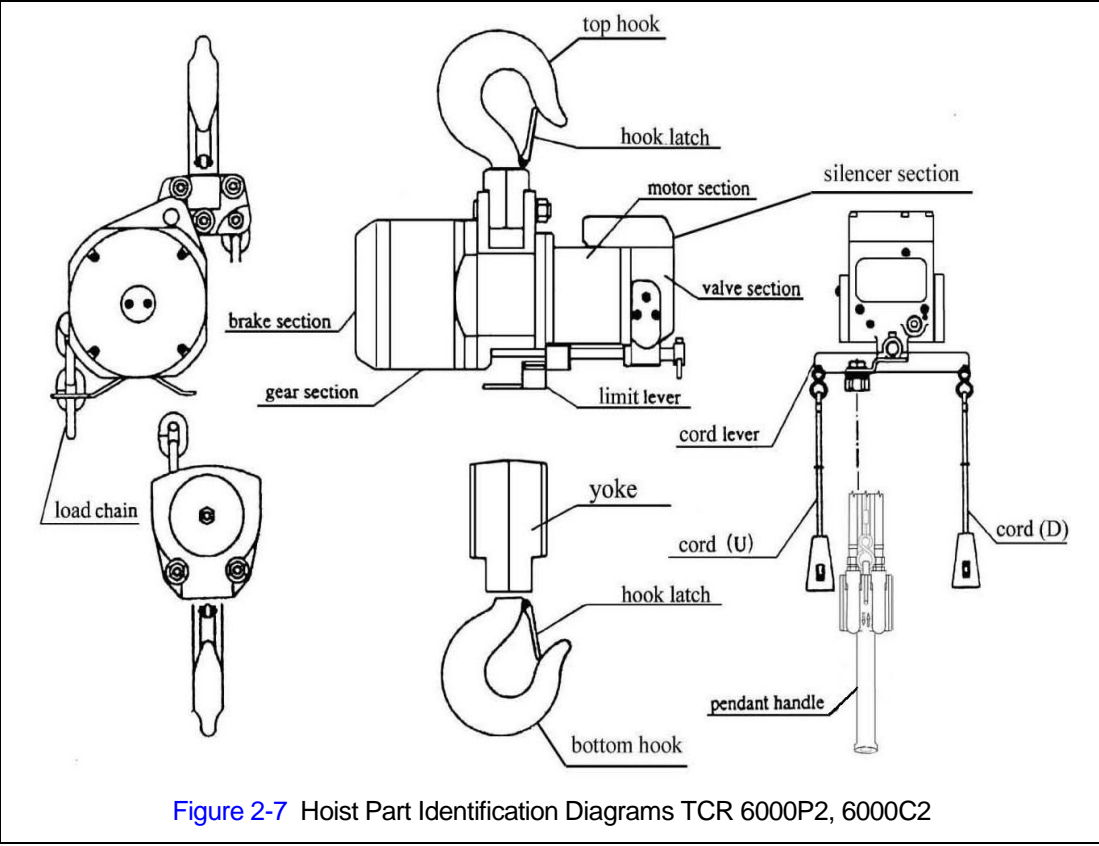
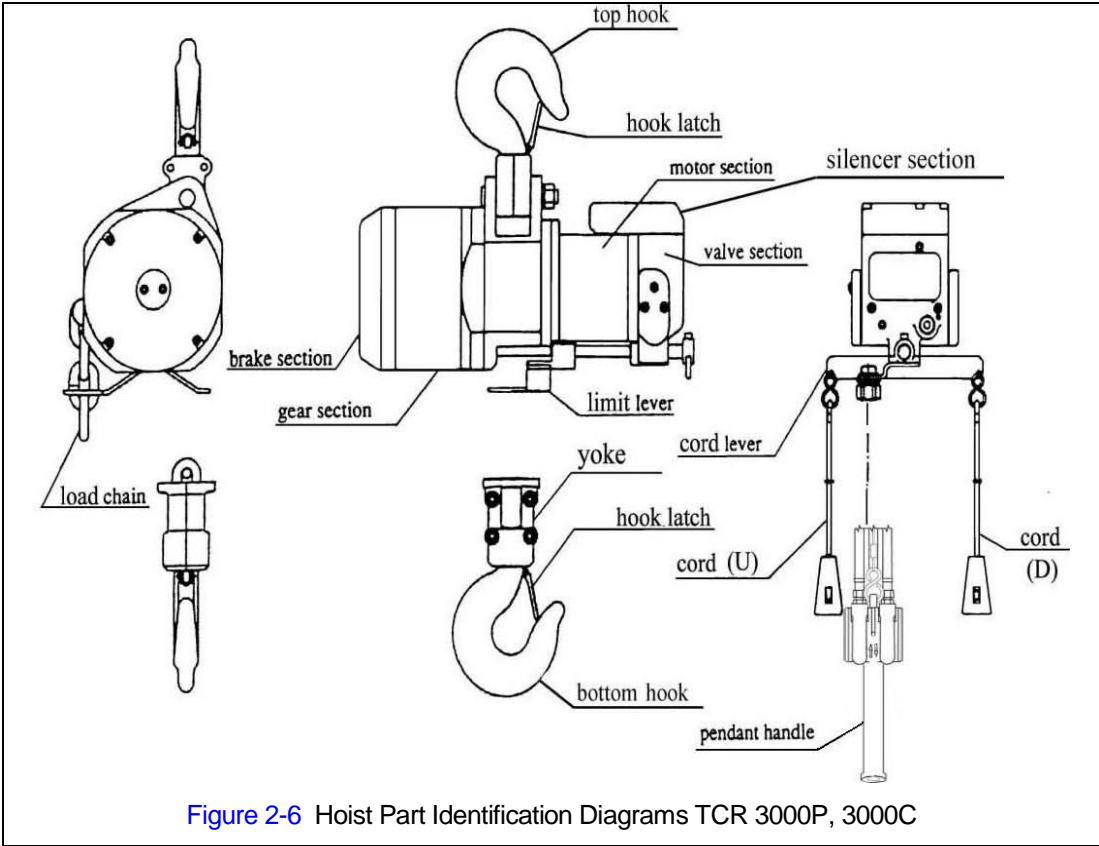


Figure 2-5 Hoist Part Identification Diagrams TCR 1000P2, 1000C2, 2000P2, 2000C2



NAME OF PARTS

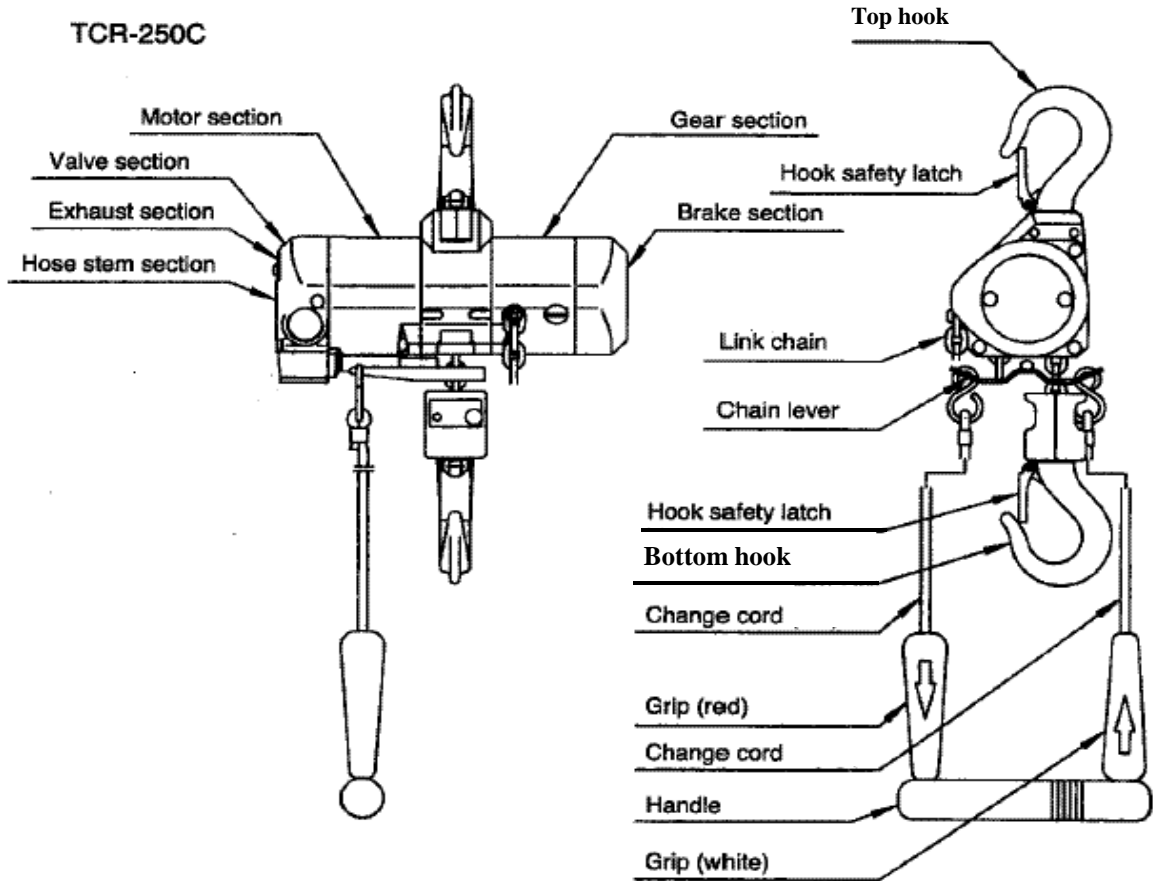


Figure 2-8 Hoist Part Identification Diagrams TCR250C

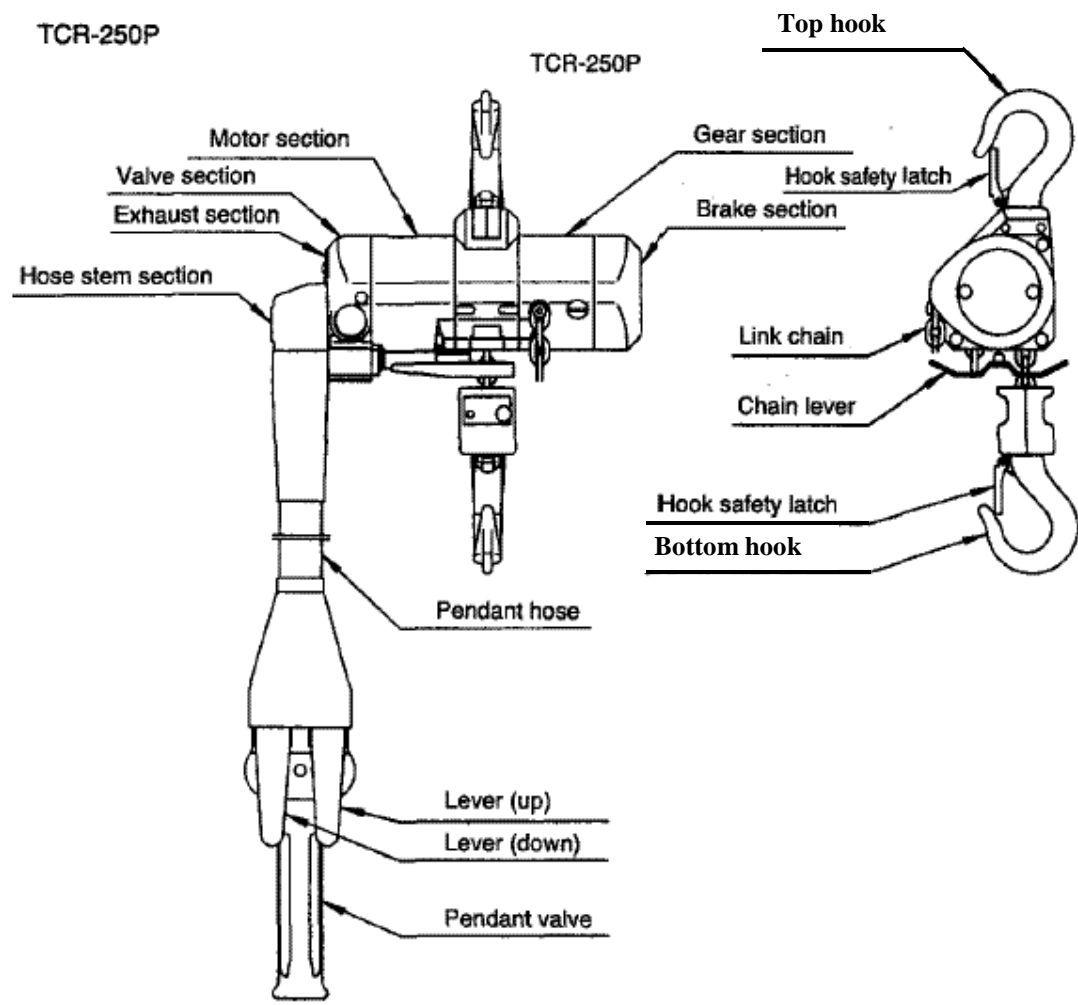


Figure 2-9 Hoist Part Identification Diagrams TCR250P

NAME OF PARTS

TCR-250M

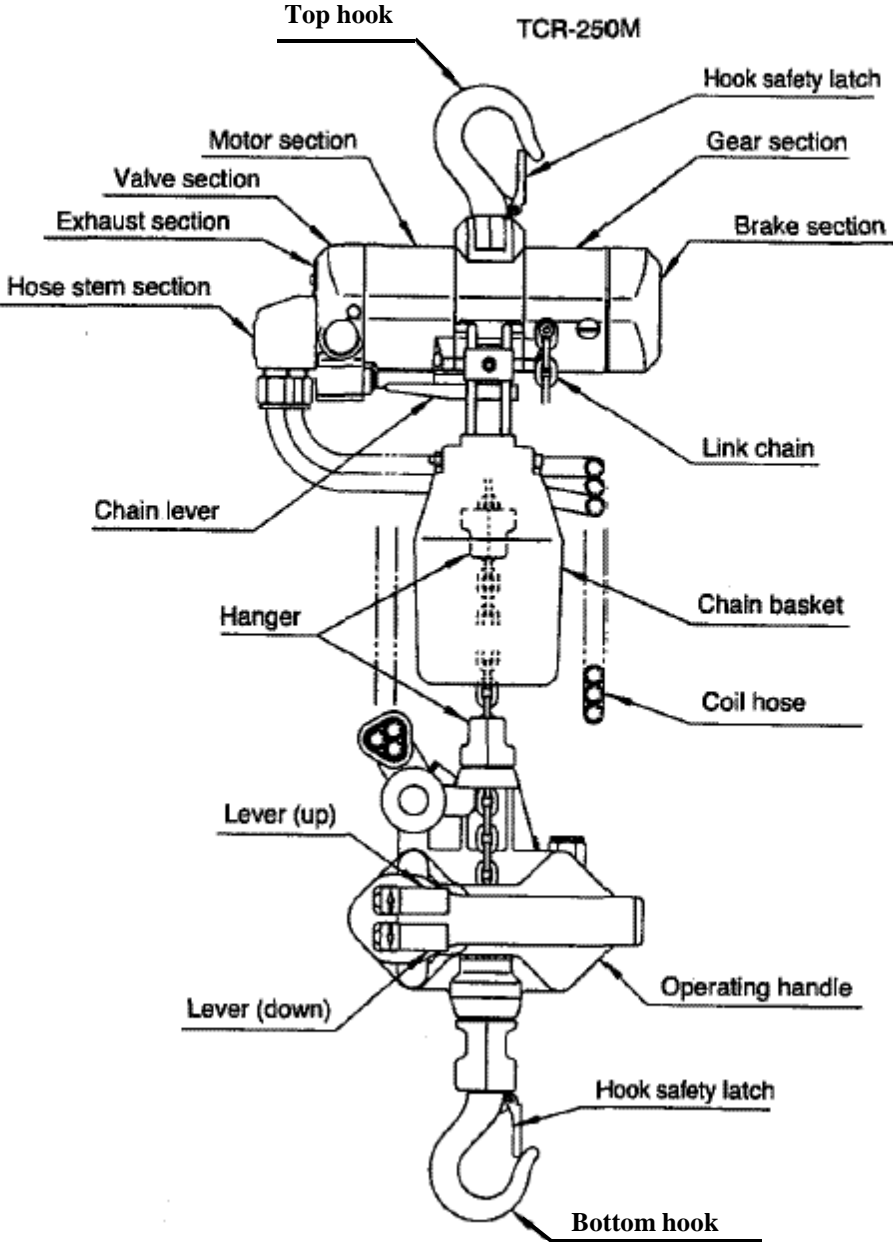


Figure 2-10 Hoist Part Identification Diagrams TCR250M

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

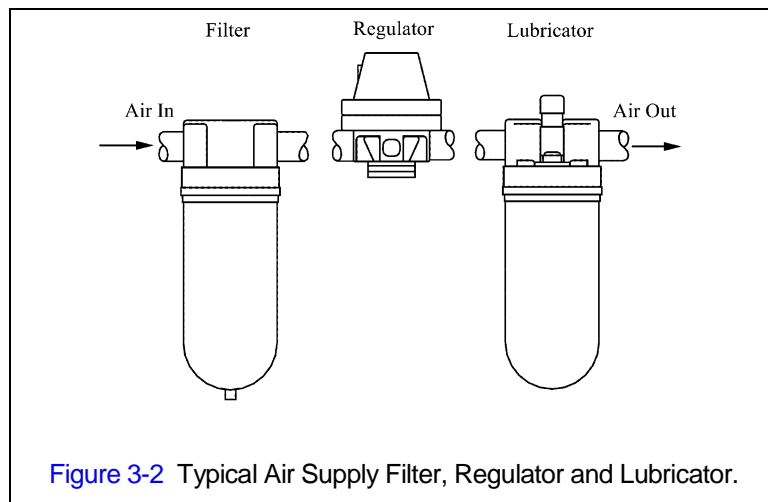
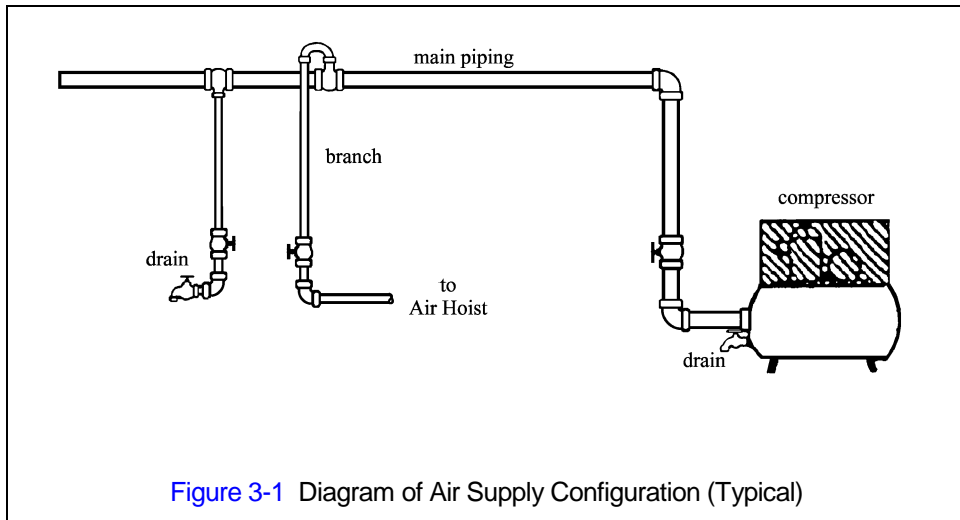
- 3.4.1 **CAUTION!** The air entering the hoist inlet must not contain any particulate greater than 5 microns in size. Therefore, the hoist must have a 5 micron filter in its air supply. The filter must be upstream of the lubricator.

3.5 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](#).



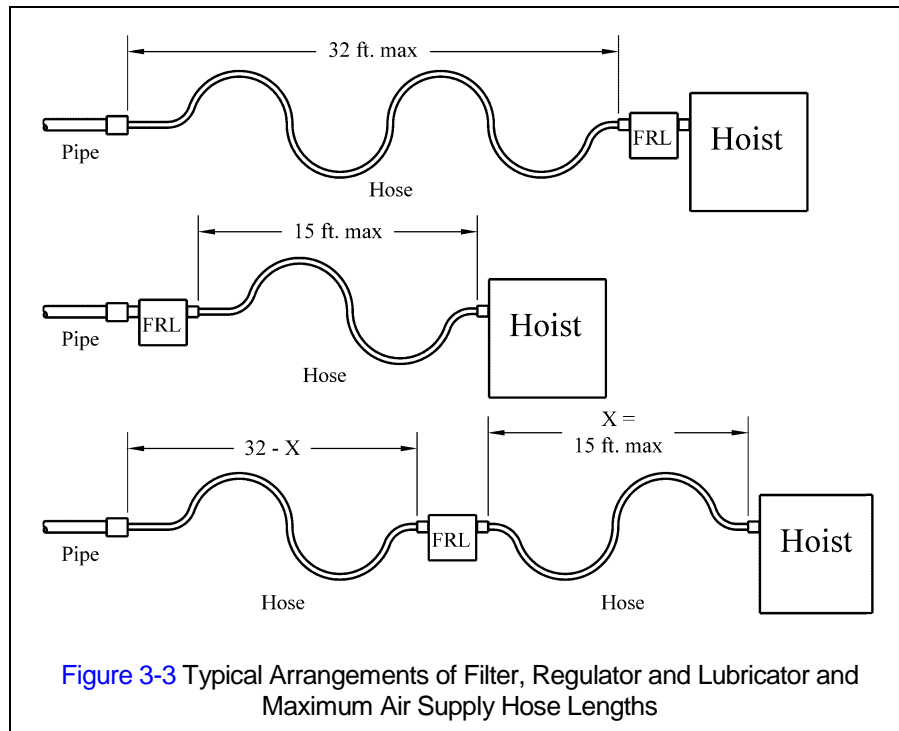
- 3.6.2 **NOTICE!** Piping - Pipe should be sized to accommodate the hoist airflow requirements. [Table 3-1](#) gives recommended pipe sizes.

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.

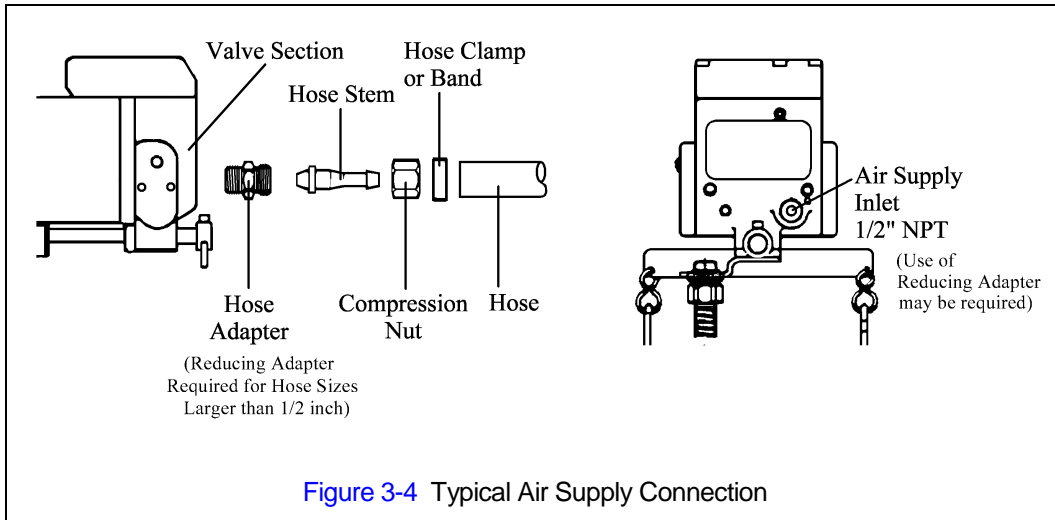
3.7 Mounting Location

3.7.1 **CAUTION!** 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. Perform Lockout /Tagout 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 **CAUTION!** 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 Hook Mounted to a Fixed Location - Attach the hoist’s top hook to the fixed suspension point.

3.9.3 **NOTICE!** 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.

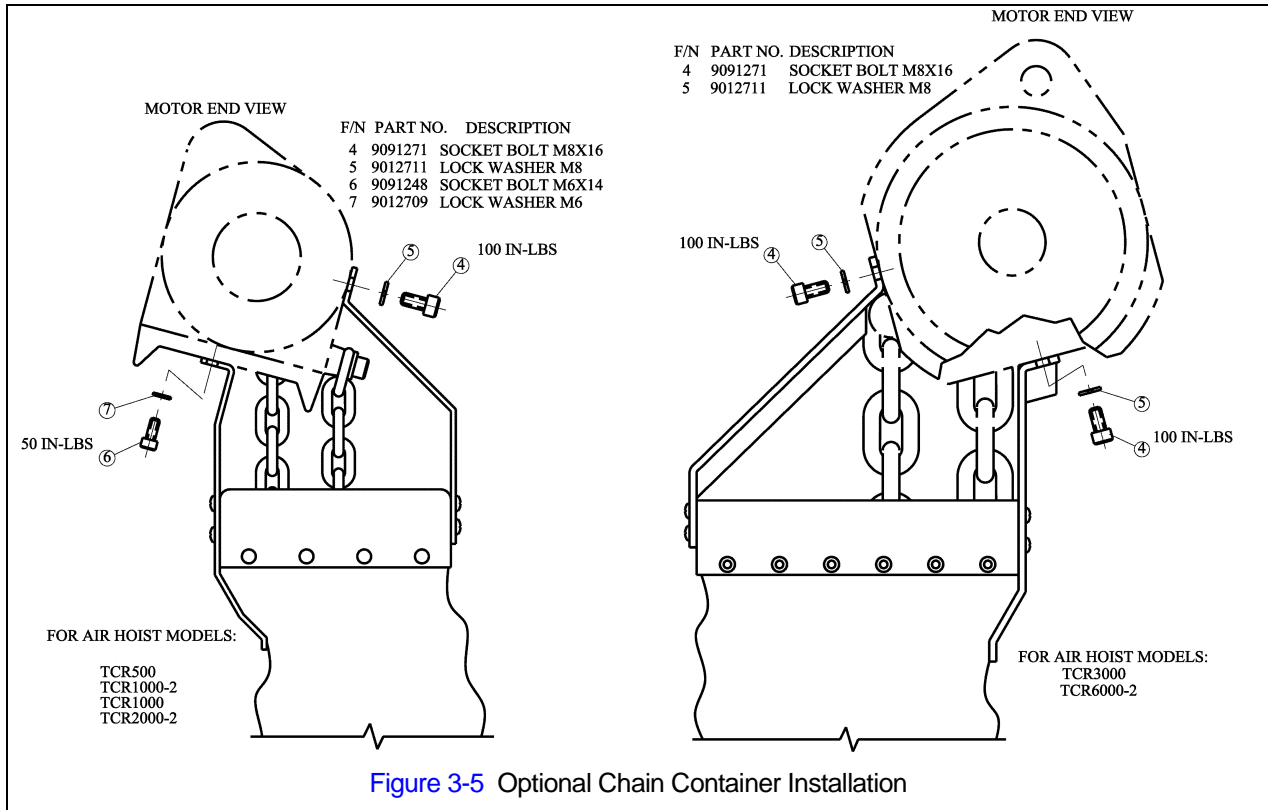
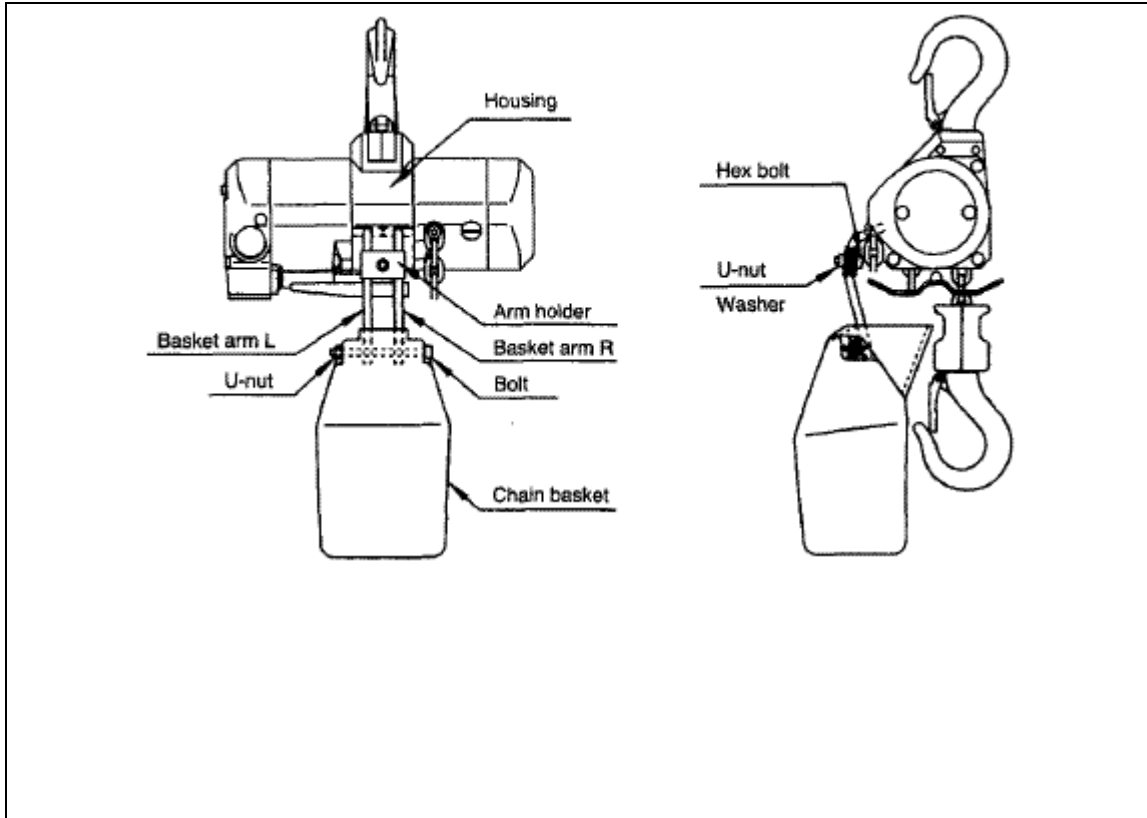


Figure 3-5 Optional Chain Container Installation

Method of Setting The Chain Basket For TCR250

- Put the basket arm into the housing front and fix them securely with the arm holder using bolts and nuts as it is shown below.
- Set the chain basket on the basket arm as it is shown below.

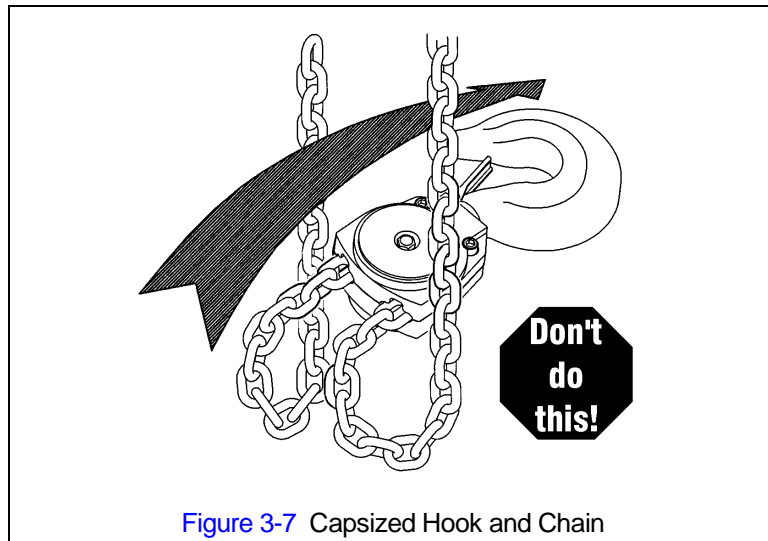
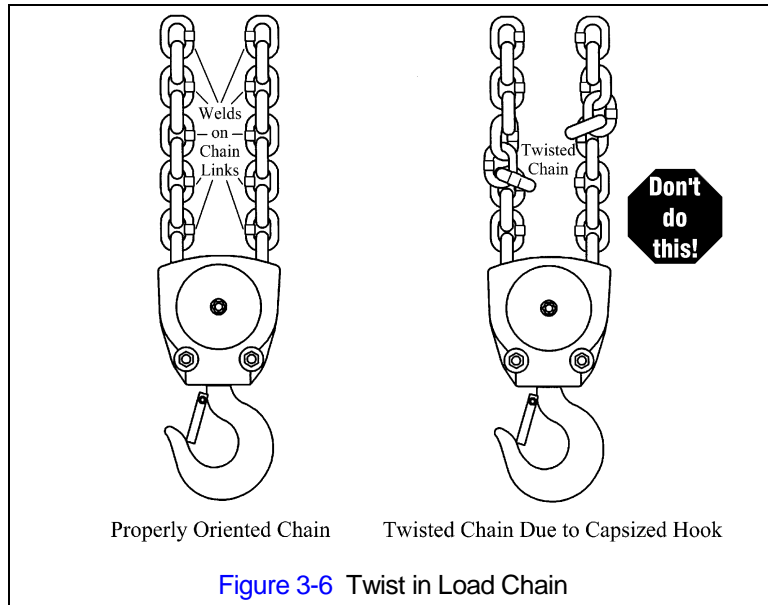


3.11 Non-Stationary Application

- 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

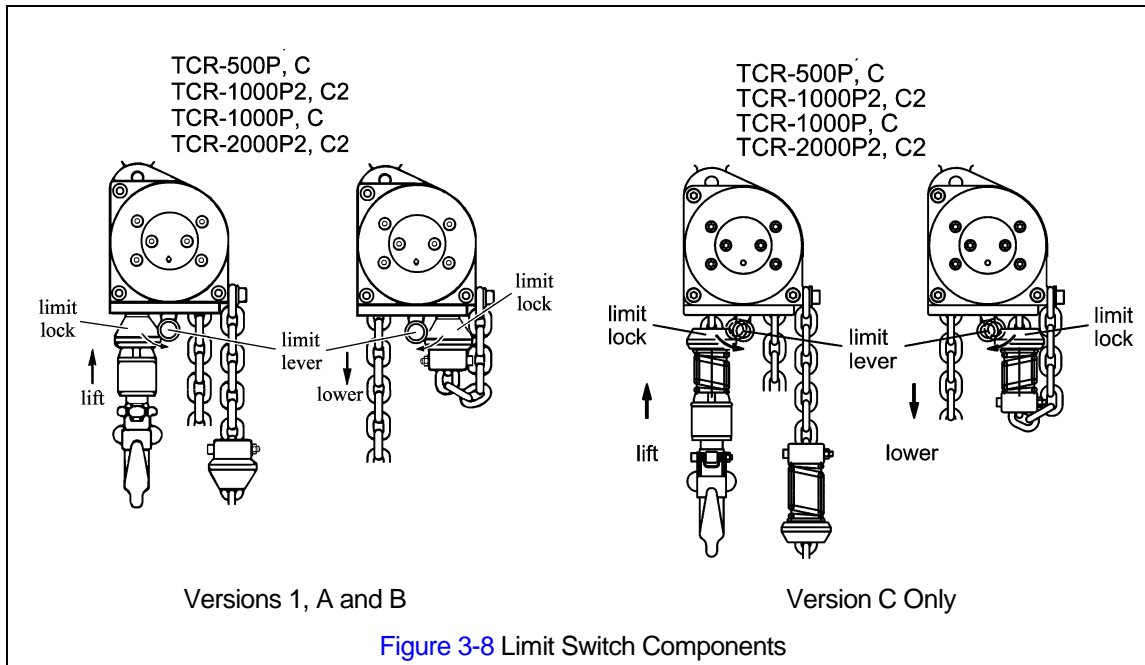
3.12 Preoperational Checks and Trial Operation

- 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](#).

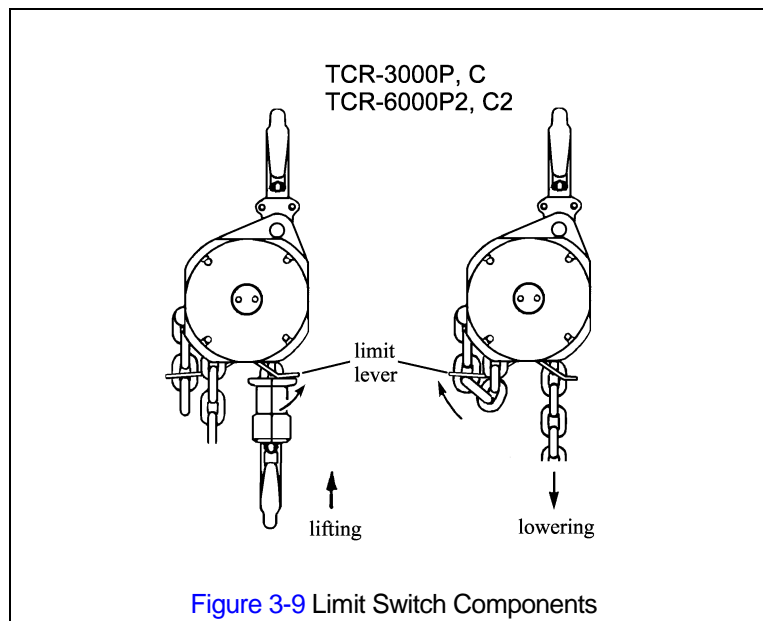


3.12.3 **WARNING!** Confirm the adequacy of the rated capacity for all slings, chains, wire ropes and all other lifting attachments before use. Inspect all load suspension members for damage prior to use and replace or repair all damaged parts.

3.12.4 **WARNING!** For Models TCR500P&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](#).



[Figure 3-8](#) Limit Switch Components



[Figure 3-9](#) Limit Switch Components

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 flexible hose is intact and is properly attached to the hoist. Also ensure that the wire cable is 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.

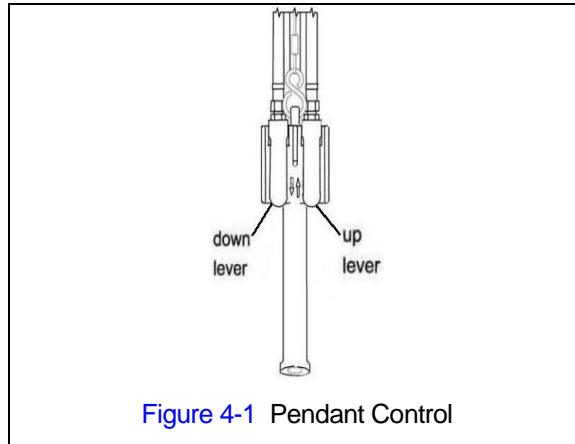
CAUTION!

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:**

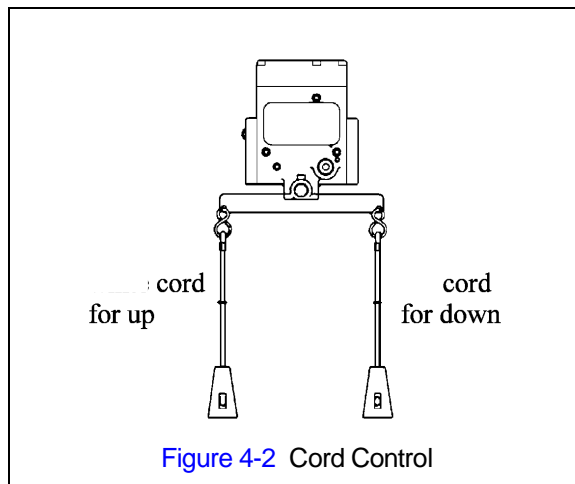
- Maintain a firm footing or be otherwise secured when operating the hoist.
- Check brake function by tensioning the hoist prior to each lift operation.
- Use hook latches. Latches are to retain slings, chains, etc. under slack conditions only.
- Make sure the hook latches are closed and not supporting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



- 4.3.2 Cord Control - When using a hoist with cord control, pull down on the appropriate cord to raise or lower the hoist. Release the cords to stop the hoist. Refer to Figure 4-2 below.

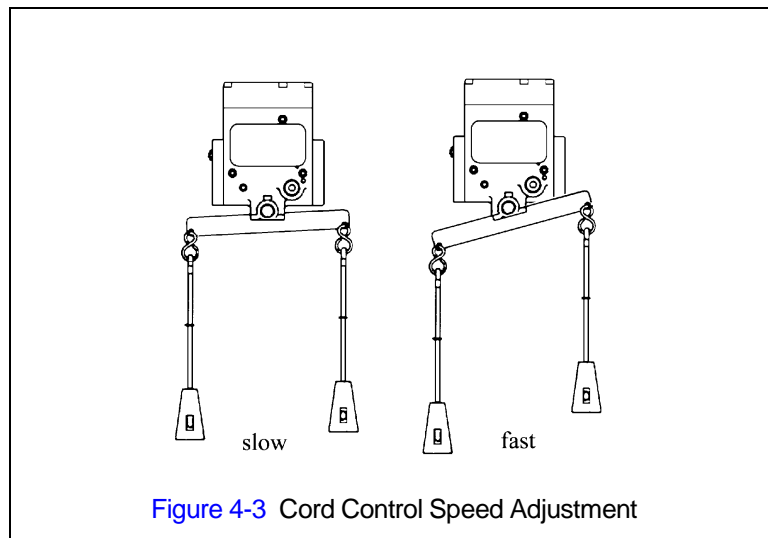


- 4.3.3 **CAUTION!** Make sure the motor completely stops before reversing direction.

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 For the cord type control, adjust the speed by varying the amount of pull on the cord. Refer to Figure 4-3.



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.

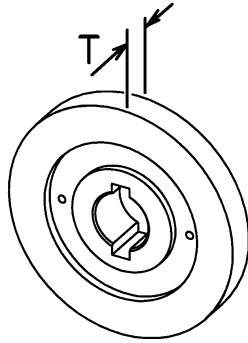
Table 5-3 Hoist Inspection Methods and Criteria

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 Springs	Visual	Chain springs should not be deformed or compressed.	Replace
Shock Absorber	Visual	Should be free of significant deformation.	Replace
Chain Container (optional)	Visual	Container should not be damaged. Brackets should not be deformed or missing.	Replace

Table 5-3 Hoist Inspection Methods and Criteria

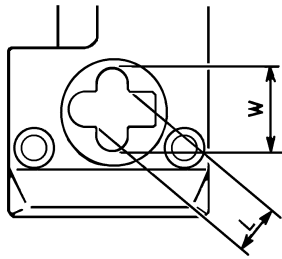
Item	Method	Criteria	Action
Bolts, Nuts and Rivets	Visual, Check with Proper Tool	Bolts, nuts and rivets should not be loose.	Tighten or replace as required.
Housing and Mechanical Components	Visual, Auditory, Vibration, Function	Hoist components including load blocks, suspension housing, chain attachments, 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

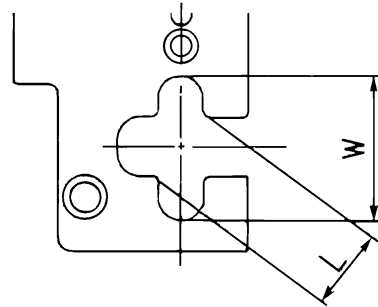


Hoists	Std Dimension Inch (mm)	Minimum Value for Replacement Inch (mm)
TCR250	T = 0.31 (8.0)	T = 0.29 (7.3)
TCR500, 1000-2	T = 0.31 (8.0)	T = 0.29 (7.3)
TCR1000, 2000-2	T = 0.31 (8.0)	T = 0.29 (7.3)
TCR3000, 6000-2	T = 0.31 (8.0)	T = 0.29 (7.3)

Table 5-5 Chain Separator Dimensions



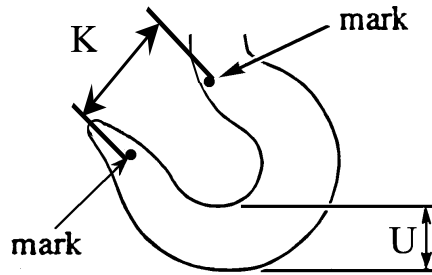
TCR250, 500, 1000-2, 1000, 2000-2



TCR 3000, 6000-2

Hoists	Std Dimension Inch (mm)	Maximum Value for Replacement Inch (mm)
TCR250	L = 0.33 (8.5) W = 0.61 (15.5)	L = 0.41 (10.5) W = 0.69 (17.5)
TCR500, 1000-2	L = 0.55 (14) W = 0.98 (25)	L = 0.67 (17) W = 1.08 (27.5)
TCR1000, 2000-2	L = 0.62 (15.8) W = 1.10 (28)	L = 0.70 (17.8) W = 1.18 (30)
TCR3000, 6000-2	L = 1.00 (25.5) W = 1.85 (47)	L = 1.10 (28) W = 1.93 (49)

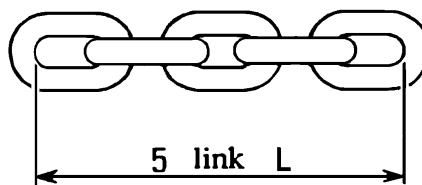
Table 5-6 Top Hook & Bottom Hook Dimensions



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

Hoists	Recorded Dimension When New	Maximum/Minimum Value for Replacement
TCR250	Top Hook K = _____ Top Hook U = _____ Bottom Hook K = _____ Bottom Hook U = _____	For K if the measured dimension exceeds 1.05 times the recorded new dimension, the hook should be replaced. For U if the measured dimension is less than .9 times the recorded new dimension, the hook should be replaced.
TCR500, 1000-2	Top Hook K = _____ Top Hook U = _____ Bottom Hook K = _____ Bottom Hook U = _____	
TCR1000, 2000-2	Top Hook K = _____ Top Hook U = _____ Bottom Hook K = _____ Bottom Hook U = _____	
TCR3000, 6000-2	Top Hook K = _____ Top Hook U = _____ Bottom Hook K = _____ Bottom Hook U = _____	

Table 5-7 Chain Dimensions



Hoists	Std Nominal Dimension Inch (mm)	Maximum Value for Replacement Inch (mm)
TCR250	Nominal L = 2.38 (60.5)	L = 2.43 (61.7)
TCR 500, 1000-2	Nominal L = 3.76 (95.5)	L = 3.82 (96.9)
TCR 1000, 2000-2	Nominal L = 4.18 (106.2)	L = 4.25 (107.8)
TCR 3000, 6000-2	Nominal L = 6.75 (171.1)	L = 6.85 (174.5)

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.

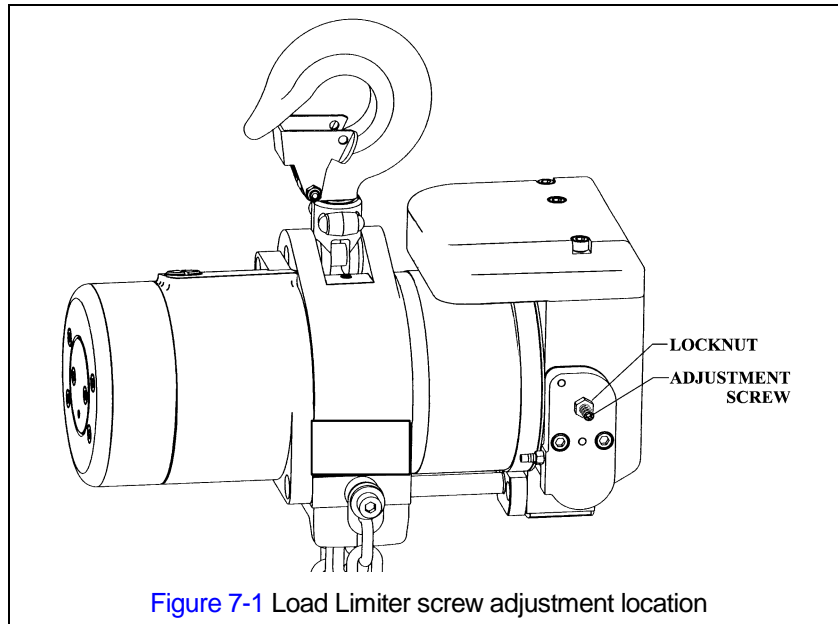
6.3.2 Suspension Pins - Lubricate at least twice per year for normal usage; more frequently for heavier usage or severe conditions.

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.

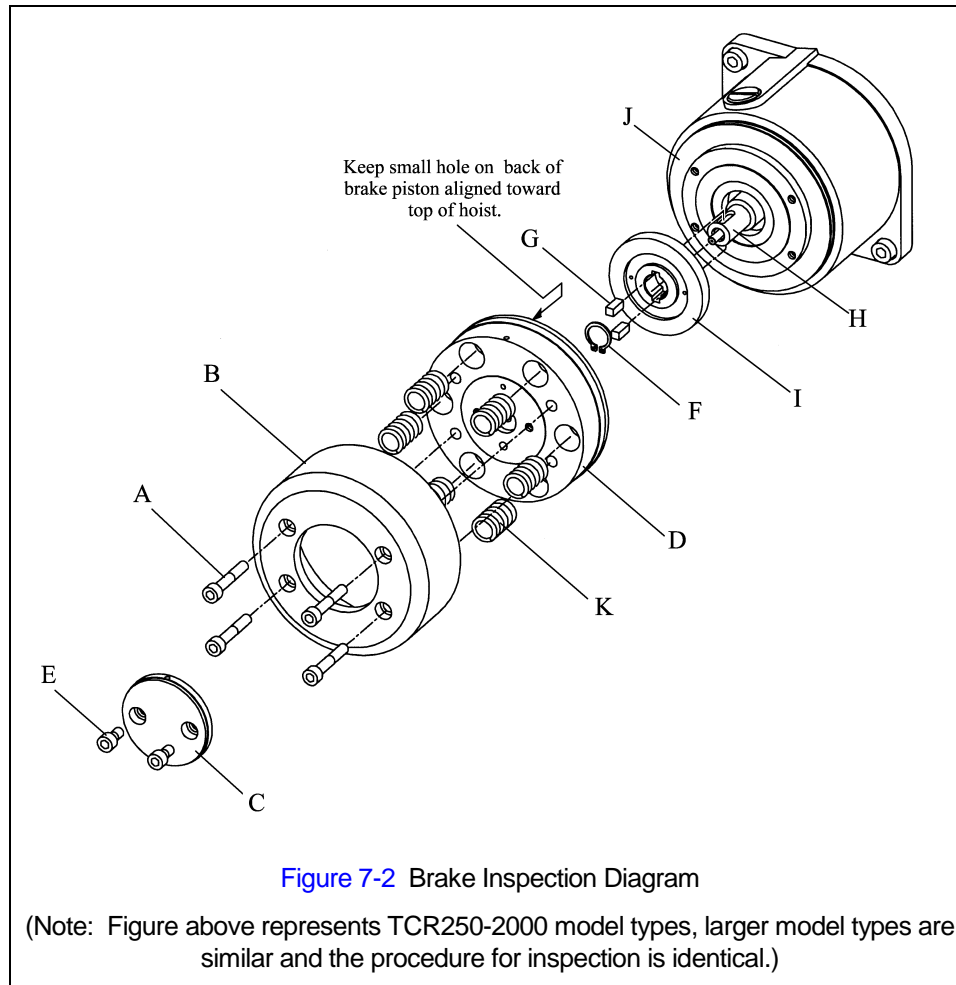
7.2 Brake

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

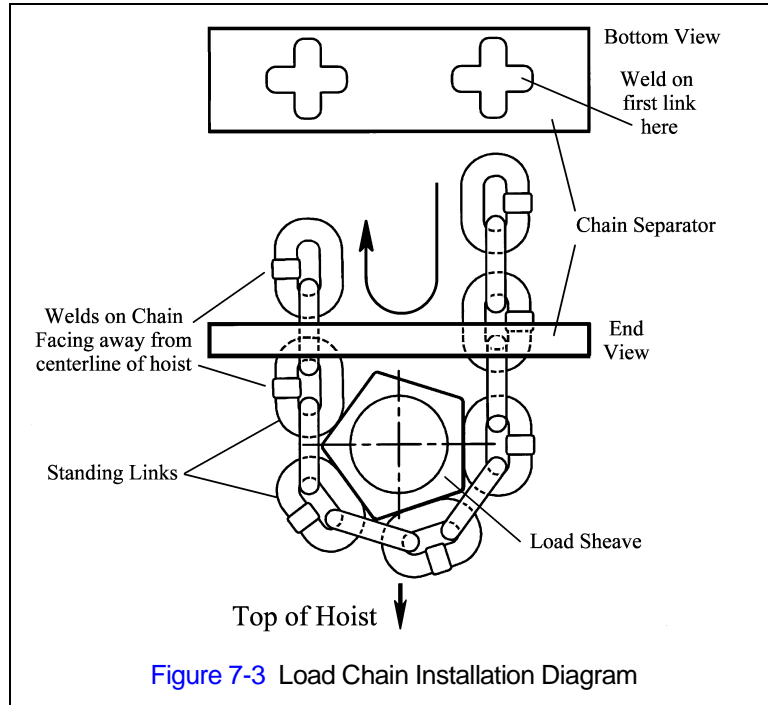
7.3.1 Lubrication and Cleaning

- 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 Kito 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, prevent its reuse by destroying the old chain.

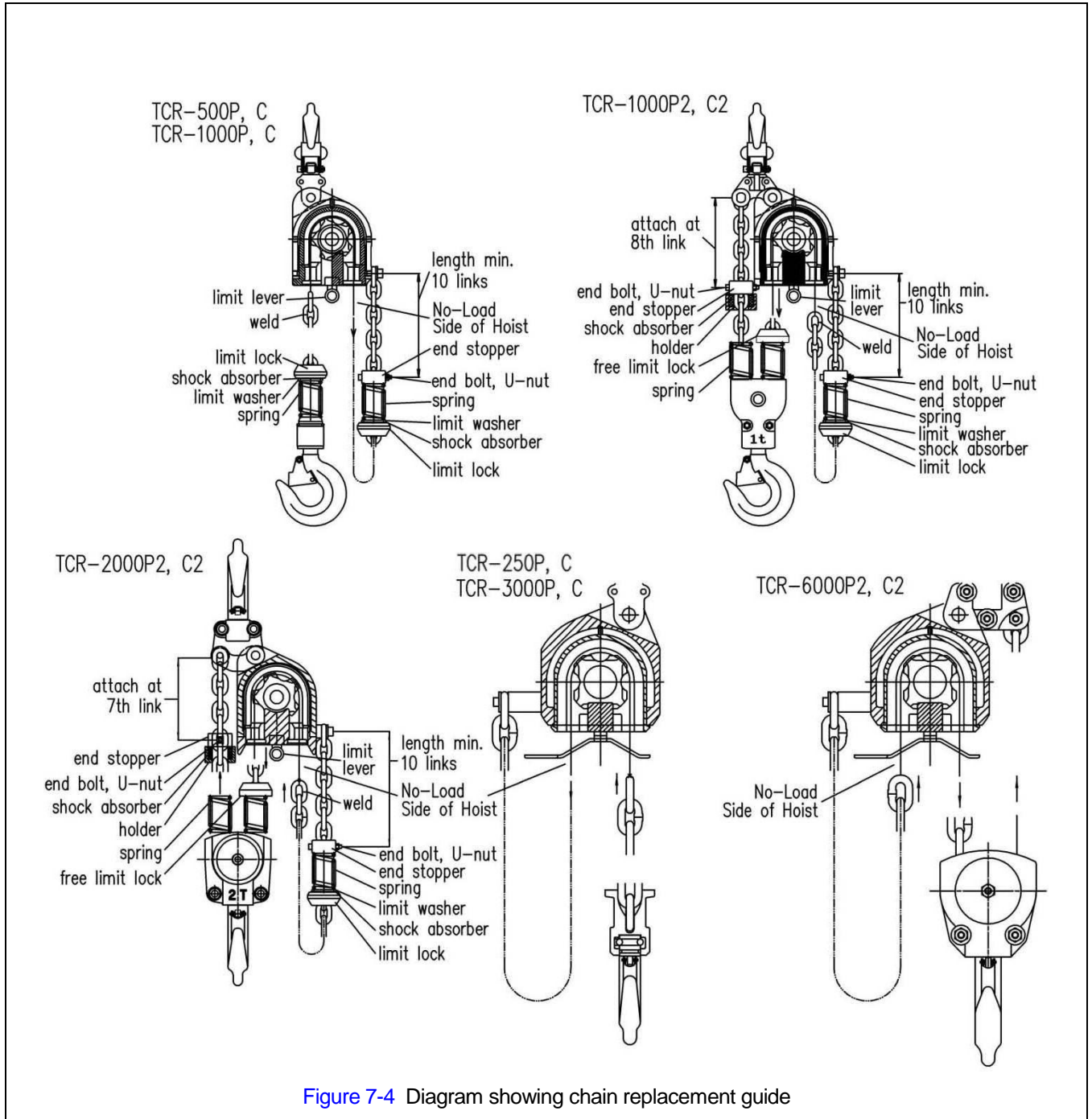
- 4) **CAUTION!** Invert the hoist such that the chain separator openings are facing up. The chain must be inserted into the chain separator on the no load side opening. This is where the no load end of chain attaches to hoist body. Without inserting the load chain, operate the hoist pendant or cord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

Model Type Hoist	Load Side	No Load Side
TCR500P, C TCR1000P, C	None	10 links
TCR1000P2, C2	8 links	10 links
TCR2000P2, C2	7 links	10 links
TCR250P, C TCR3000P, C TCR6000P2, C2	None	None

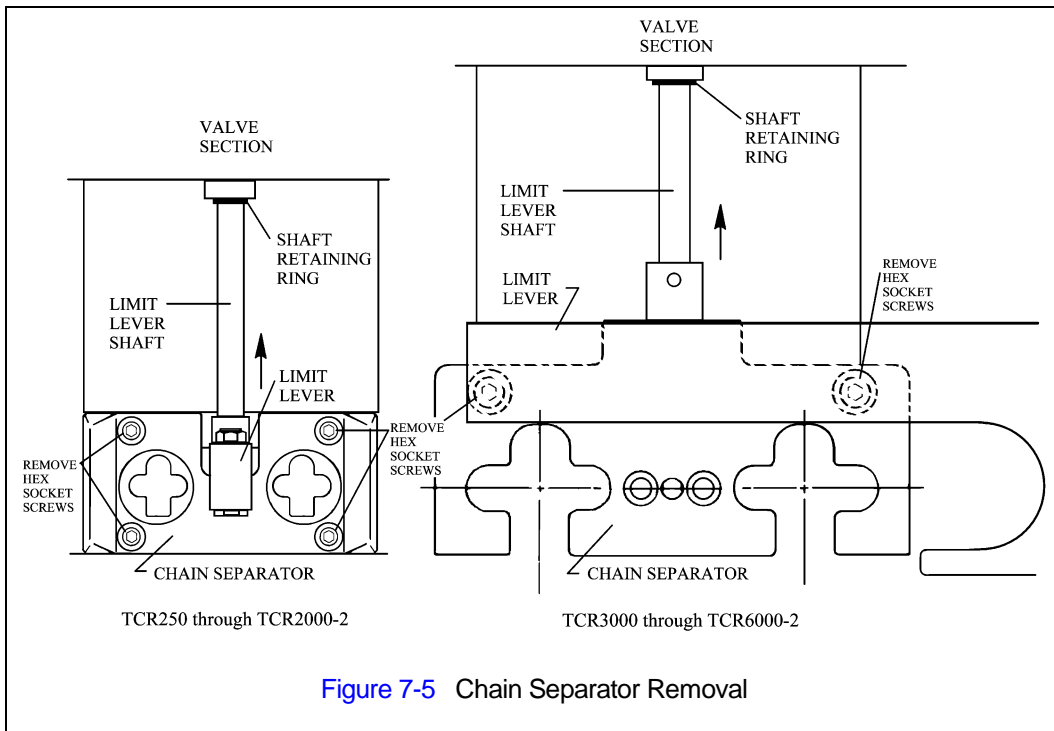
- 6) **WARNING!** Make sure end stoppers and limit locks are installed in accordance with [Table 7-1](#) and the diagram in [Figure 7-4](#).
- 7) Ensure that chain remains free of twists when attaching dead end(s) of chain and when feeding chain through bottom hook case (double fall units). Refer to [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 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.

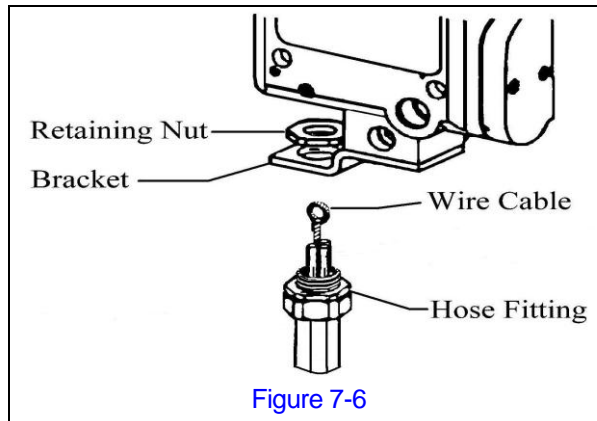
- TCR3000 and TCR6000-2: The chain separator can be removed by removing the shaft retaining ring from its groove on the limit lever shaft adjacent to the valve section, sliding the limit lever assembly away from the chain separator, and removing the two larger outboard hex socket screws holding the chain separator to the hoist body.
- TCR500 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.



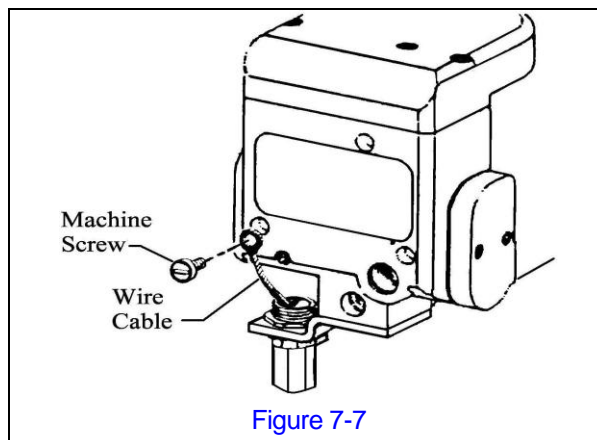
7.5 Pendant

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

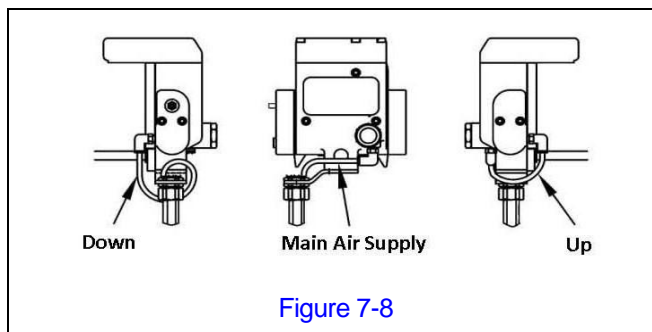
- 1) Put 3 red tubes and wire through the bracket hole. See [Figure 7-6](#).
- 2) Attach the hoses to the bracket by installing the retaining nut to the fitting.
- 3) Torque retaining nut to 20 lbf.-ft.



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



- 6) Attach the 3 red hoses to each nipple as shown in [Figure 7-8](#). Main air supply, lifting and lowering.



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

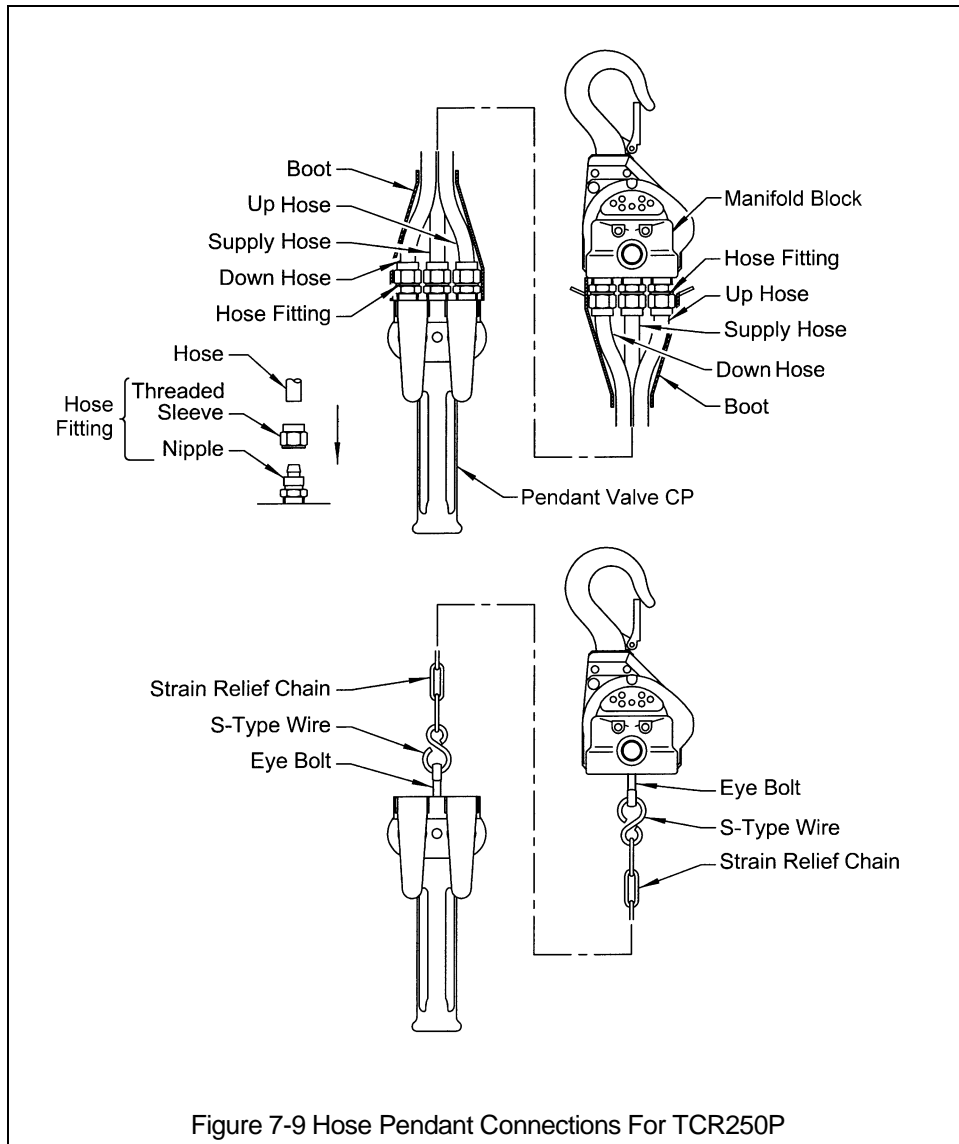


Figure 7-9 Hose Pendant Connections For TCR250P

7.6 Storage

7.4.1 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.

7.4.2 The storage location should be clean and dry.

7.7 Outdoor Installation

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

7.5.2 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 .

Table 8-1 Troubleshooting Guide

Symptom	Cause	Remedy
Lifting speed is slow	Air leak between the two chambers in the Top Cover	Correct or repair to eliminate air leak.
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.

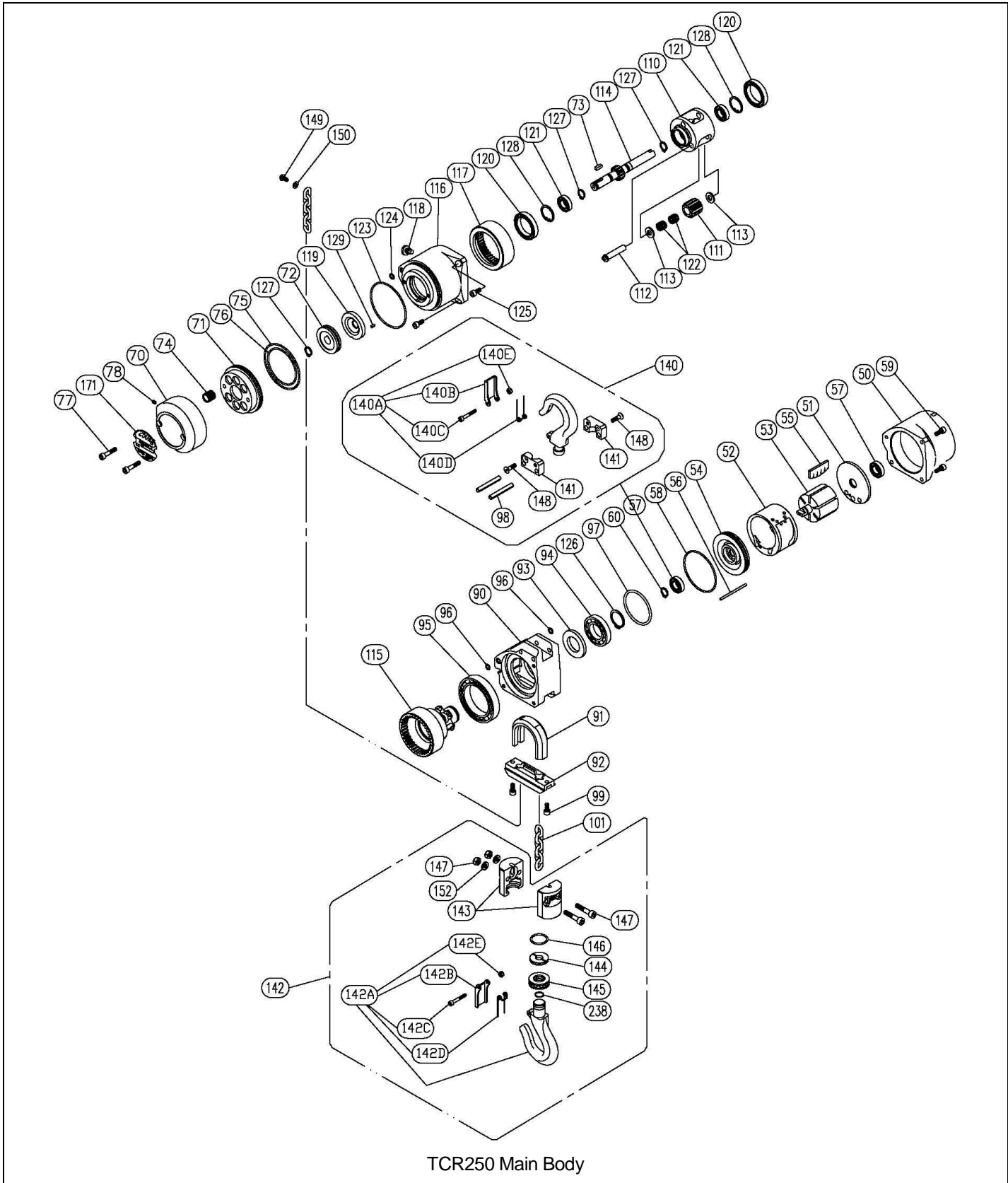
Kito

Air Hoists

Parts List



9.0 Parts List



TCR250 Main Body

Figure #	Name	Parts Per Hoist	Part #	
50	Motor Case	1	T1CR426205790	
51	Rear Plate	1	T1CR426205180	
52	Cylinder	1	T1CR426205160	
53	Rotor	1	T1CR426205150	
54	Front Plate	1	T1CR426205170	
55	Vane	6	T1CR137102018	
56	Knock Pin	1	T1CR130402049	
57	Bearing	2	T1CR130113003	
58	O-Ring	1	T1CR131103044	
59	Socket Bolt	3	T1CR131705014	
60	Retaining Ring	1	T1CR130302012	
70	Brake Cover	1	T1CR426205410	
71	Brake Piston	1	T1CR426205400	
72	Brake Disk	1	T1CR426205430	
73	Key	1	T1CR130408079	
74	Brake Spring	6	T1CR130802207	
75	O-Ring	1	T1CR131103047	
76	O-Ring	1	T1CR131103042	
77	Socket Bolt	2	T1CR131705030	
78	Set Screw	1	T1CR132104005	
90	Wheel Housing Cord and Pendant Models	–	1	T1CR426205210
	Wheel Housing Manipulator Model	–	1	T1CR426215210
91	Chain Guide	1	T1CR426205350	
92	Chain Separator	1	T1CR136610025	
93	Spacer	1	T1CR426205230	
94	Bearing	1	T1CR130116005	
95	Bearing	1	T1CR130113010	
96	O-Ring	2	T1CR131103004	
97	O-Ring	1	T1CR131102006	
98	Spring Pin	2	T1CR130606045	
99	Socket Bolt	2	T1CR131705014	
101	Load Chain	FT	KED040	
110	Cage	1	T1CR426205240	
111	Star Gear	3	T1CR426205250	
112	Pin	3	T1CR426205260	
113	Thrust Collar	6	T1CR426205270	
114	Pinion	1	T1CR426205290	
115	Load Sheave	1	T1CR426205300	
116	Gear Case	1	T1CR426205310	
117	Ring Gear	1	T1CR426205320	

Figure #	Name	Parts Per Hoist	Part #	
118	Lock Screw	1	T1CR426205890	
119	Brake Plate	1	T1CR426205900	
120	Bearing	2	T1CR130112806	
121	Bearing	2	T1CR130113003	
122	Needle Bearing	6	T1CR130170013	
123	O-Ring	1	T1CR131103047	
124	O-Ring	1	T1CR131103004	
125	Socket Bolt	3	T1CR131705014	
126	Retaining Ring	1	T1CR130302025	
127	Retaining Ring	3	T1CR130302012	
128	Retaining Ring	2	T1CR130301024	
129	Spring Pin	1	T1CR130603006	
140	Top Hook Complete Set	1	T1CR42620557C	
140A	Top Hook Assembly	1	T1CR420810PAE	
	140B	Hook Latch	1	T1CR420620P11
	140C	Socket Bolt	1	T1CR131704028
	140D	Latch Spring	1	T1CR130802046
	140E	U-Nut	1	T1CR134501004
141	Top Yoke Pair	1	T1CR426205570	
148	Hex Flat Head Machine Screw	2	T1CR132805018	
142	Bottom Hook Complete Set	1	T1CR42620593C	
142A	Bottom Hook Assembly	1	T1CR42620593E	
	142B	Hook Latch	1	T1CR420620P11
	142C	Socket Bolt	1	T1CR131704028
	142D	Latch Spring	1	T1CR130802046
	142E	U-Nut	1	T1CR134501004
139	U-Nut	1	T1CR134501006	
143	Bottom Yoke Pair	1	T1CR426205801	
144	Hook Thrust Plate Pair	1	T1CR426205910	
145	Thrust Bearing	1	T1CR130121103	
146	O-Ring	1	T1CR131103017	
147	Socket Bolt	2	T1CR131706030	
152	Spring Washer	2	T1CR131301006	
149	Button Head Screw	1	T1CR131905010	
150	Washer	1	T1CR131305005	
171	Name Plate	1	T1CR137309201	
238	O-Ring – Manipulator Model Only	1	T1CR131101015	

TCR250 VALVE BODY

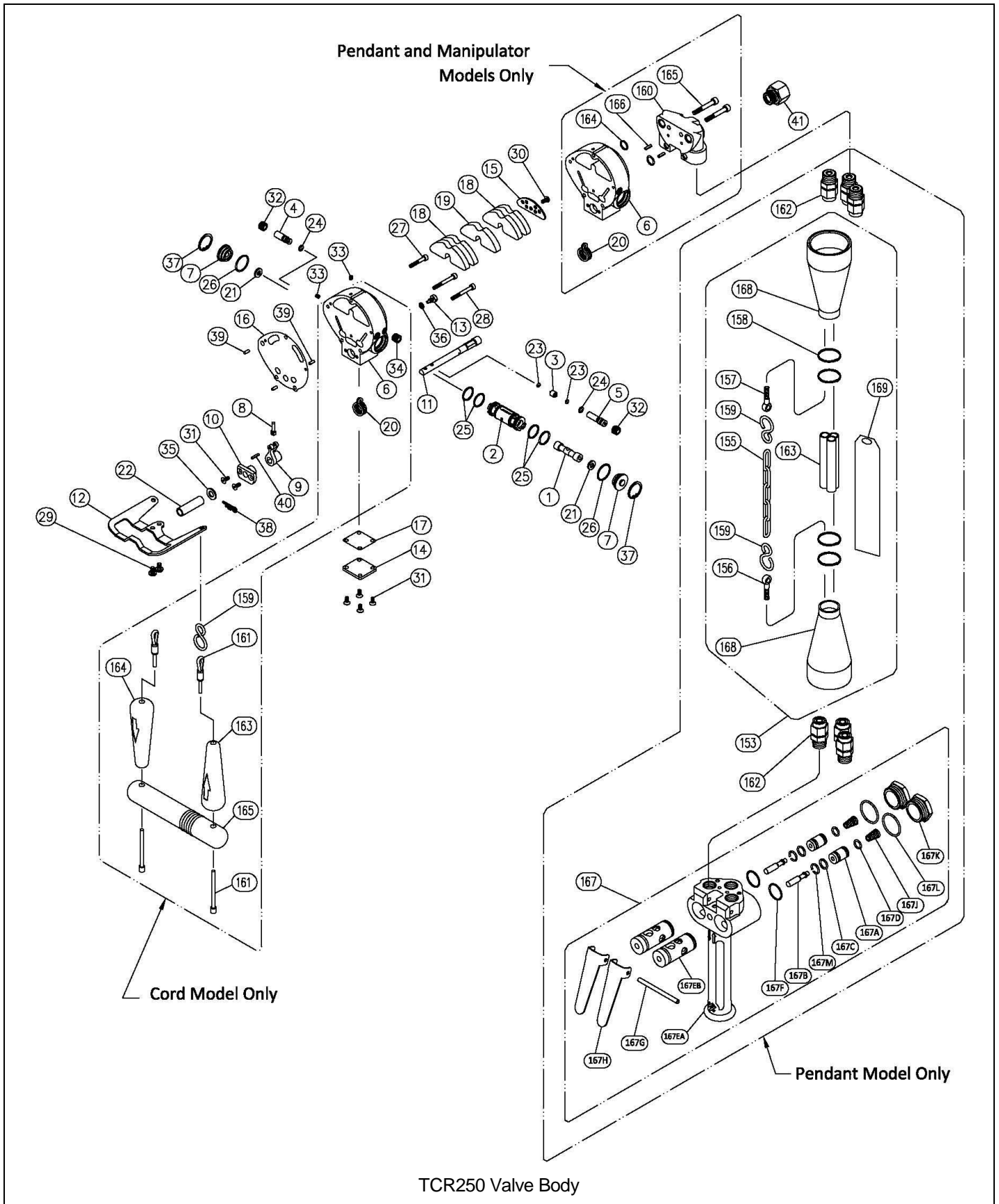


Figure #	Name	Parts Per Hoist	Part #
1	Main Spool	1	T1CR426205010
2	Valve Bushing	1	T1CR426205780
3	Shuttle	1	T1CR426205870
4	Valve Seat R	1	T1CR426205830
5	Valve Seat L	1	T1CR426205840
7	Side Cover	2	T1CR426205080
8	Valve Pin	1	T1CR426205850
9	Limit Lever	1	T1CR426205140
10	Limit Guide	1	T1CR426205100
11	Limit Shaft	1	T1CR426205460
12	Chain Lever	1	T1CR426205110
13	Stopper	1	T1CR426205860
14	Under Cover	1	T1CR426205470
15	Exhaust Plate	1	T1CR426205810
16	Valve Packing	1	T1CR136102151
17	Under Packing	1	T1CR136102153
18	Silencer S	4	T1CR137402022
19	Silencer F	1	T1CR137402021
21	Bumper	2	T1CR136406025
22	Protector	1	T1CR426205880
23	O-Ring	2	T1CR131117004
24	O-Ring	2	T1CR131103003
25	O-Ring	4	T1CR131103014
26	O-Ring	2	T1CR131103016
27	Socket Bolt	1	T1CR131704030
28	Socket Bolt	2	T1CR131704035
29	Button Head Screw	2	T1CR131905008
30	Button Head Screw	1	T1CR131904008
31	Hex Flat Head Mach Screw	6	T1CR132804010
32	Set Screw	2	T1CR132110008
33	Set Screw	3	T1CR132104005
35	Washer	1	T1CR131309008
36	Washer	1	T1CR131309005
37	Retaining Ring	2	T1CR130301022
38	Hair Pin Cotter	1	T1CR130790008
39	Parallel Pin	3	T1CR130406017
40	Spring Pin	1	T1CR130602112
41	Inlet Bushing w/Screen	1	T1CR134703050
42	Hose Stem	1	T1CR134803040

Pendant and Manipulator Models Only:

Figure #	Name	Parts Per Hoist	Part #
6	Valve Body	1	T1CR426206060
20	Valve Spring	1	T1CR130802209
160	Manifold Block	1	T1CR426206941
164	O-Ring	2	T1CR131103008
165	Socket Bolt	2	T1CR131705035
166	Spring Pin	2	T1CR130603010

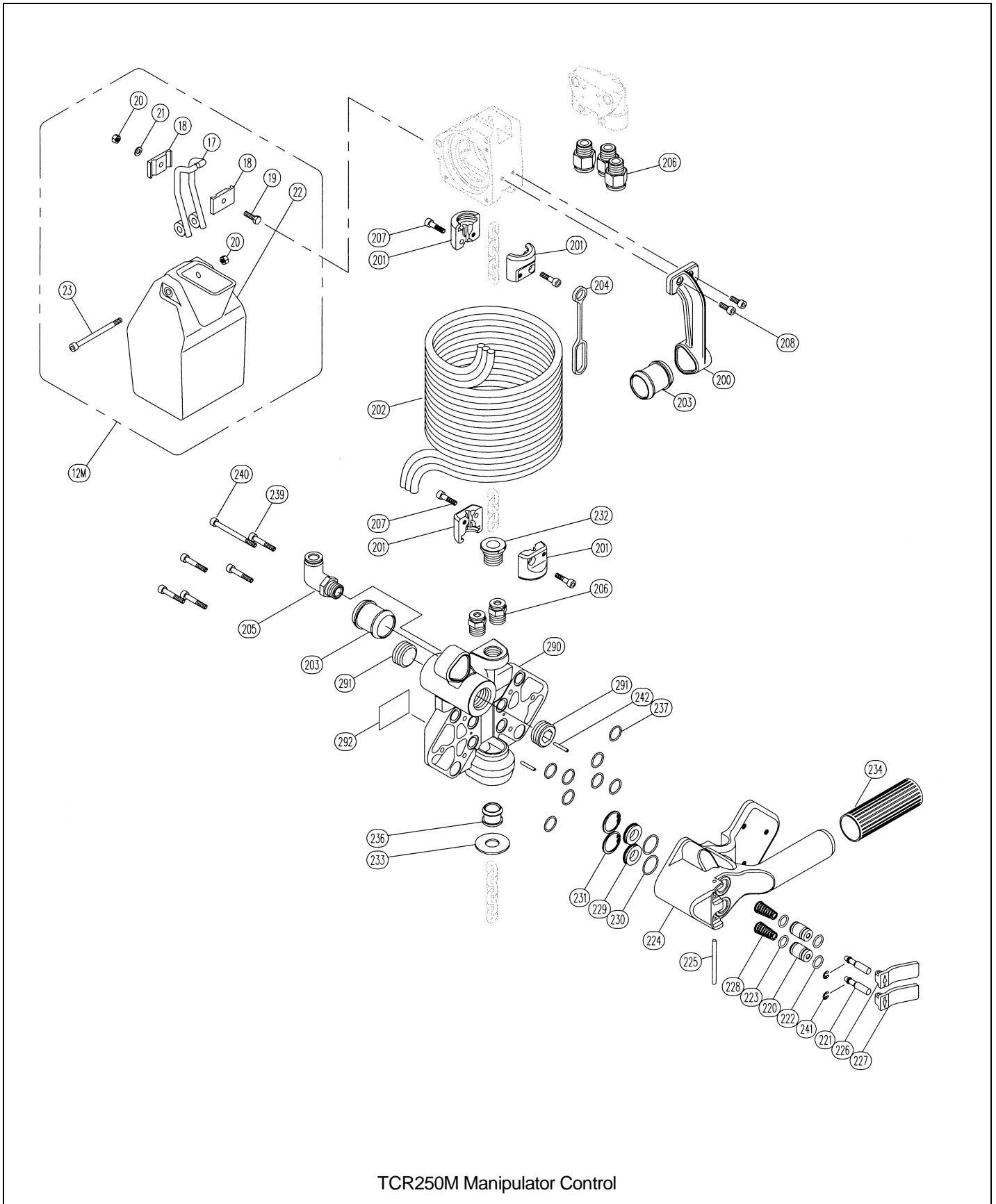
Cord Model Only:

Figure #	Name	Parts Per Hoist	Part #
6	Valve Body	1	T1CR426205061
20	Valve Spring	1	T1CR130802208
34	Hex Socket Pipe Plug	1	T1CR134902003
159	S-Type Wire	2	T1CR130802081
161W	White Cord	FT	T1CR138001015WH
161W	White Cord	FT	T1CR138001015WH
163	Grip White (UP)	1	T1CR136602625
164	Grip Red (DOWN)	1	T1CR136602626
165	Handle	1	T1CR136602627

Pendant Model Only:

Figure #	Name	Parts Per Hoist	Part #
153	Pendant Hose Assy. (Three hoses)	1	T1CR137240520
155	Cord Chain	FT	E3S626
156	Eye Bolt (pendant)	1	T1CR131756050
157	Eye Bolt (hoist)	1	T1CR131756030
158	Split Ring	A/R	T1CR130802093
159	S-Type Wire	2	T1CR130802081
168	Boot	2	T1CR136608250
163	Hose	3@FT	T1CR137240520
169	Warning Tag	1	E2R567-001H
162	Hose Fittings	6	T1CR137291310
167	Pendant Valve CP	1	T1CR420215VBC
167A	Throttle Valve	2	T1CR420215VB0
167B	Push Rod	2	T1CR420215VC0
167C	O-Ring	2	T1CR131118012
167D	O-Ring	2	T1CR131117013
167E	Pendant Valve Body CP	1	T1CR420215VRB
167EA	Pendant Valve Body	1	T1CR420215VR0
167EB	Bushing	2	T1CR420214VF0
167F	O-Ring	2	T1CR131103016
167G	Spring Pin	2	T1CR130604132
167H	Pendant Valve Lever	2	T1CR420210VH0
167J	Valve Spring	2	T1CR130802030
167K	Pendant Valve Cap	2	T1CR420214V10
167L	O-Ring	2	T1CR131103022
167M	E-Ring	2	T1CR130303004

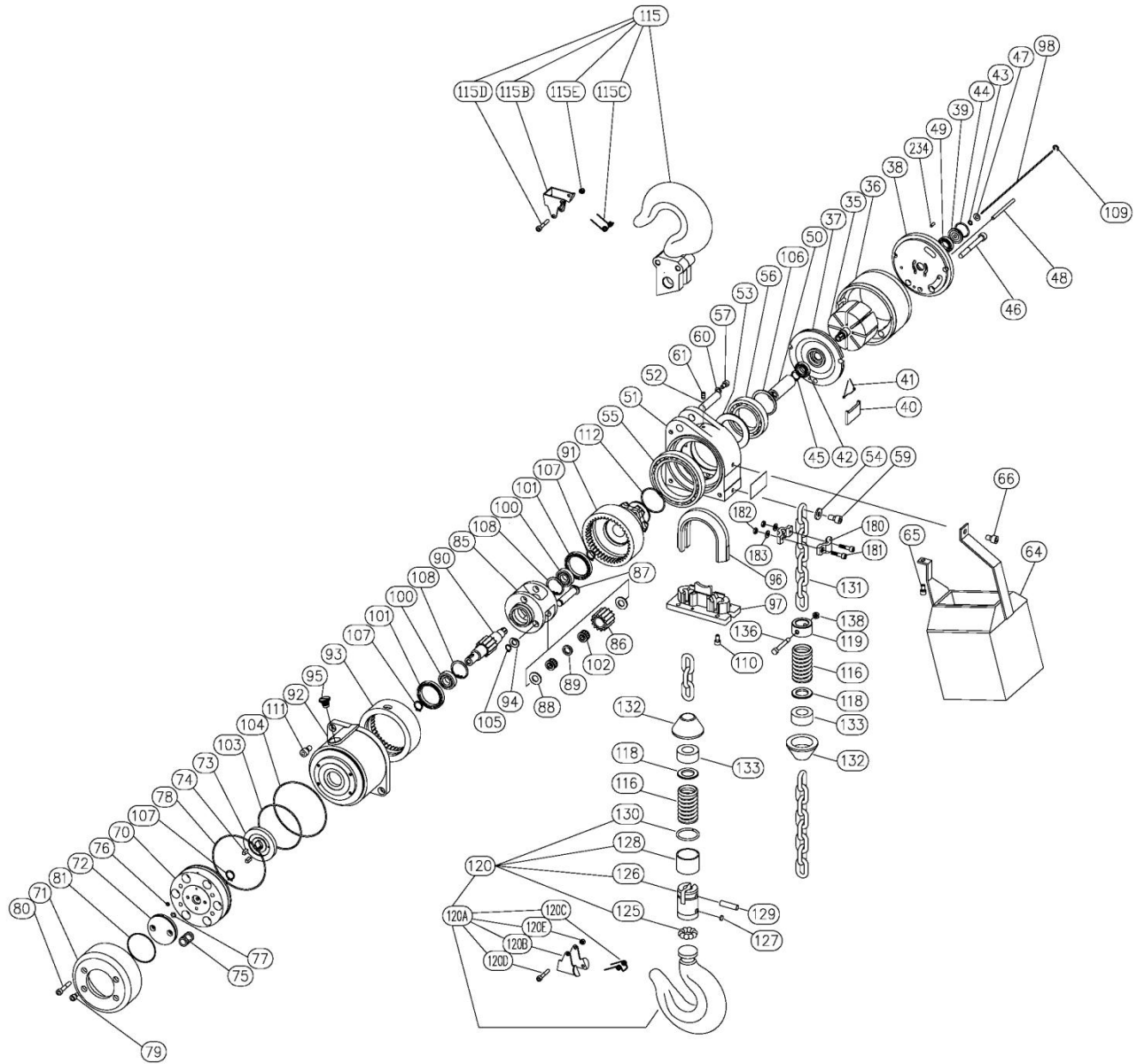
TCR250 MANIPULATOR CONTROL



TCR250M Manipulator Control

Figure #	Name	Parts Per Hoist	Part #
12M	Chain Basket CP	1	T1CR42621592C
17	Bucket Arm Assembly (pair)	1 pr.	T1CR426205920
18	Arm Holder	2	T1CR426205820
19	Bolt	1	T1CR131605016
20	U-Nut	2	T1CR134501005
21	Washer	1	T1CR131307005
22	Chain Basket	1	E2D1831
23	Socket Bolt	1	T1CR131705070
200	Hose Arm	1	T1CR426215960
201	Hanger Half	4	T1CR426215B30
202	Coil Hose – Std. 6.5 ft lift	1	T1CR137202018
203	Rubber Bushing	2	T1CR136608252
204	Hose Support	1	T1CR136608253
205	Tube Fitting	1	T1CR137289310
206	Tube Fitting	5	T1CR137290310
207	Socket Bolt	4	T1CR131705020
208	Socket Bolt	2	T1CR131705014
220	Throttle Valve	2	T1CR420215VB0
221	Push Rod	2	T1CR420215VC0
222	O-Ring	2	T1CR131118012
223	O-Ring	2	T1CR131117013
224	Throttle Valve Body CP	1	T1CR42621597B
225	Lever Pin	1	T1CR130402048
226	Throttle Lever Up	1	T1CR420985UY0
227	Throttle Lever Down	1	T1CR420985UZ0
228	Valve Spring	2	T1CR130802221
229	Spring Seat	2	T1CR426215B00
230	O-Ring	2	T1CR131103016
231	Retaining Ring	2	T1CR130301024
234	Grip	1	T1CR136608140
241	Retaining Ring	2	T1CR130303004
232	Rotary Joint	1	T1CR426215B40
233	Hook Protector	1	T1CR136201200
236	Rubber Bushing	1	T1CR136608251
237	O-Ring	8	T1CR131103013
238	O-Ring	1	T1CR131101015
239	Button Head Screw	5	T1CR131905030
40	Button Head Screw	1	T1CR131905060
242	Spring Pin	2	T1CR130603010

Figure #	Name	Parts Per Hoist	Part #
290	Shield	1	T1CR426215B20
291	Hex Socket Pipe Plug	2	T1CR134901006
292	Manipulator Warning Tag	1	T1CR137304071



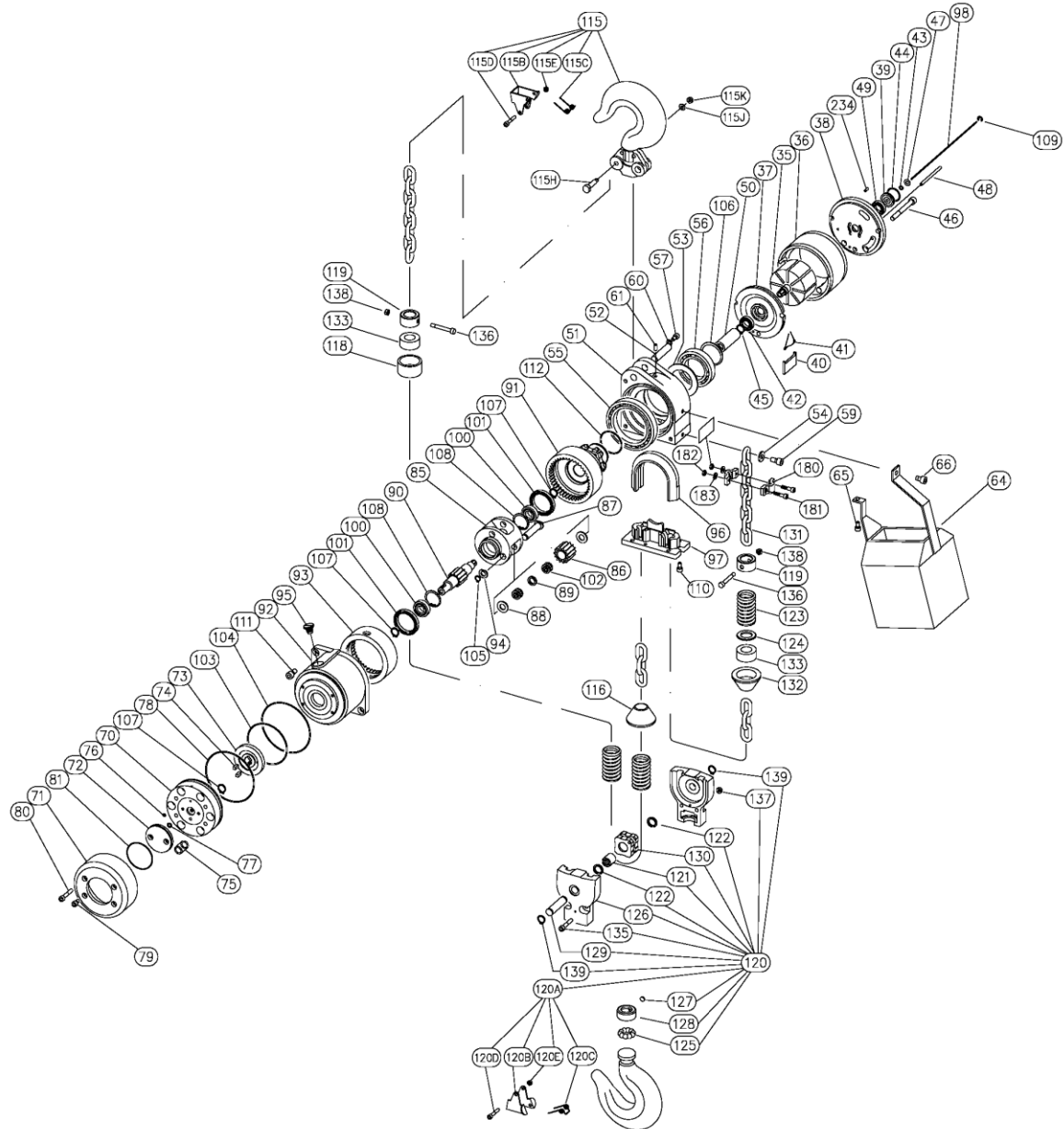
TCR500 MAIN BODY

Figure #	Part #	Part Name	Parts Per
234	T1CR130406005	PARALLEL PIN	2
35	T1CR426224151	ROTOR	1
36	T1CR426224161	STATOR	1
37	T1CR426224171	FRONT PLATE	1
38	T1CR426224182	REAR PLATE	1
39	T1CR426224191	REAR RETAINER	1
40	T1CR137102123	VANE	8
41	T1CR130802212	VANE SPRING	8
42	T1CR130113002	BEARING	1
43	T1CR131103004	O-RING	1
44	T1CR131103023	O-RING	1
45	T1CR130302015	RETAINING RING	1
46	T1CR131708075	SOCKET BOLT	3
47	T1CR131307006	WASHER	1
48	T1CR130402051	KNOCK PIN	1
49	T1CR130104003	BEARING	1
50	T1CR426224200	COUPLING	1
51	T1CR426224212	WHEEL HOUSING	1
52	T1CR426224220	TOP PIN	1
53	T1CR426224230	SPACER	1
54	T1CR426261R50	WASHER	1
55	T1CR130113015	BEARING	1
56	T1CR130104010	BEARING	1
57	T1CR131706012	SOCKET BOLT	1
59	T1CR131708025	SOCKET BOLT	1
60	T1CR426221R50	WASHER	1
61	T1CR132108012	SET SCREW	1
64	BC-T1	MAX LIFT 68' (option)	1
65	T1CR131706012	SCREW M6 x 12	1
66	T1CR131708012	SCREW M8 x 12	1
70	T1CR426224401	BRAKE PISTON	1
71	T1CR426224410	BRAKE COVER	1
72	T1CR426224421	PISTON COVER	1
73	T1CR426224430	BRAKE DISC	1
74	T1CR130408081	KEY	2
75	T1CR130802213	DISC SPRING	6

Figure #	Part #	Part Name	Parts Per
76	T1CR131103002	O-RING	1
77	T1CR131101004	O-RING	1
78	T1CR131103055	O-RING	1
79	T1CR131706012	SOCKET BOLT	2
80	T1CR131706040	SOCKET BOLT	4
81	T1CR131117033	O-RING	1
85	T1CR426224240	CAGE	1
86	T1CR426224250	STAR GEAR	3
87	T1CR426224260	PIN	3
88	T1CR426224270	THRUST COLLAR	6
89	T1CR426224280	RETAINER	3
90	T1CR426224290	PINION	1
91	T1CR426224300	LOAD SHEAVE	1
92	T1CR426224312	GEAR CASE	1
93	T1CR426224322	RING GEAR	1
94	T1CR426224330	SPACER (P)	3
95	T1CR426221K90	LOCK SCREW	1
96	T1CR426224352	CHAIN GUIDE	1
97	T1CR426224363	CHAIN SEPARATOR	1
98	T1CR426224381	BRAKE TUBE	1
100	T1CR130104003	BEARING	2
101	T1CR130112808	BEARING	2
102	T1CR130170035	NEEDLE BEARING	6
103	T1CR131117042	O-RING	1
104	T1CR131103055	O-RING	1
105	T1CR130302010	RETAINING RING	3
106	T1CR130302045	RETAINING RING	1
107	T1CR130302015	RETAINING RING	3
108	T1CR130301032	RETAINING RING	2
109	T1CR130303005	RETAINING RING	1
110	T1CR131706012	SOCKET BOLT	4
111	T1CR131708016	SOCKET BOLT	3
112	T1CR131103036	O-RING	1
115	T1CR42622457B	TOP HOOK SET	1
115B	T1CR426221S30	HOOK LATCH	1
115C	T1CR130802258	HOOK SPRING	1

Figure #	Part #	Part Name	Parts Per
115D	T1CR131705035	SOCKET BOLT	1
115E	T1CR134501005	U-NUT	1
116	CHAIN SPRING	T1CR130802219	2
118	T1CR426224C80	LIMIT WASHER	2
119	T1CR426224390	END STOPPER	1

Figure #	Part #	Part Name	Parts Per
120	T1CR426221S2C	BOTTOM HOOK SET	1
120A	T1CR426221S2F	BOTTOM HOOK ASSY.	1
120B	T1CR426221S30	HOOK LATCH	1
120C	T1CR130802258	HOOK LATCH SPRING	1
120D	T1CR131705035	SOCKET BOLT	1
120E	T1CR134501005	U-NUT	1
125	T1CR130502020	STEEL BALL	8
126	T1CR426221S80	BOTTOM HOOK HOLDER	1
127	T1CR420846PY0	SWIVEL HOOK PLUG	1
128	T1CR426224760	SLEEVE	1
129	T1CR426221T20	CHAIN PIN	1
130	T1CR130802259	LOCK RING	1
131	KER063	LOAD CHAIN	FT
132	T1CR426224450	LIMIT LOCK	2
133	T1CR136206002	SHOCK ABSORBER	2
136	T1CR426224680	END BOLT	1
138	T1CR134501006	U NUT	1
180	T1CR420620JF0	CHAIN DOWN STOPPER	2
181	T1CR131705022	SOCKET BOLT	2
182	T1CR134401005	NUT	2
183	T1CR131301005	SPRING WASHER	2

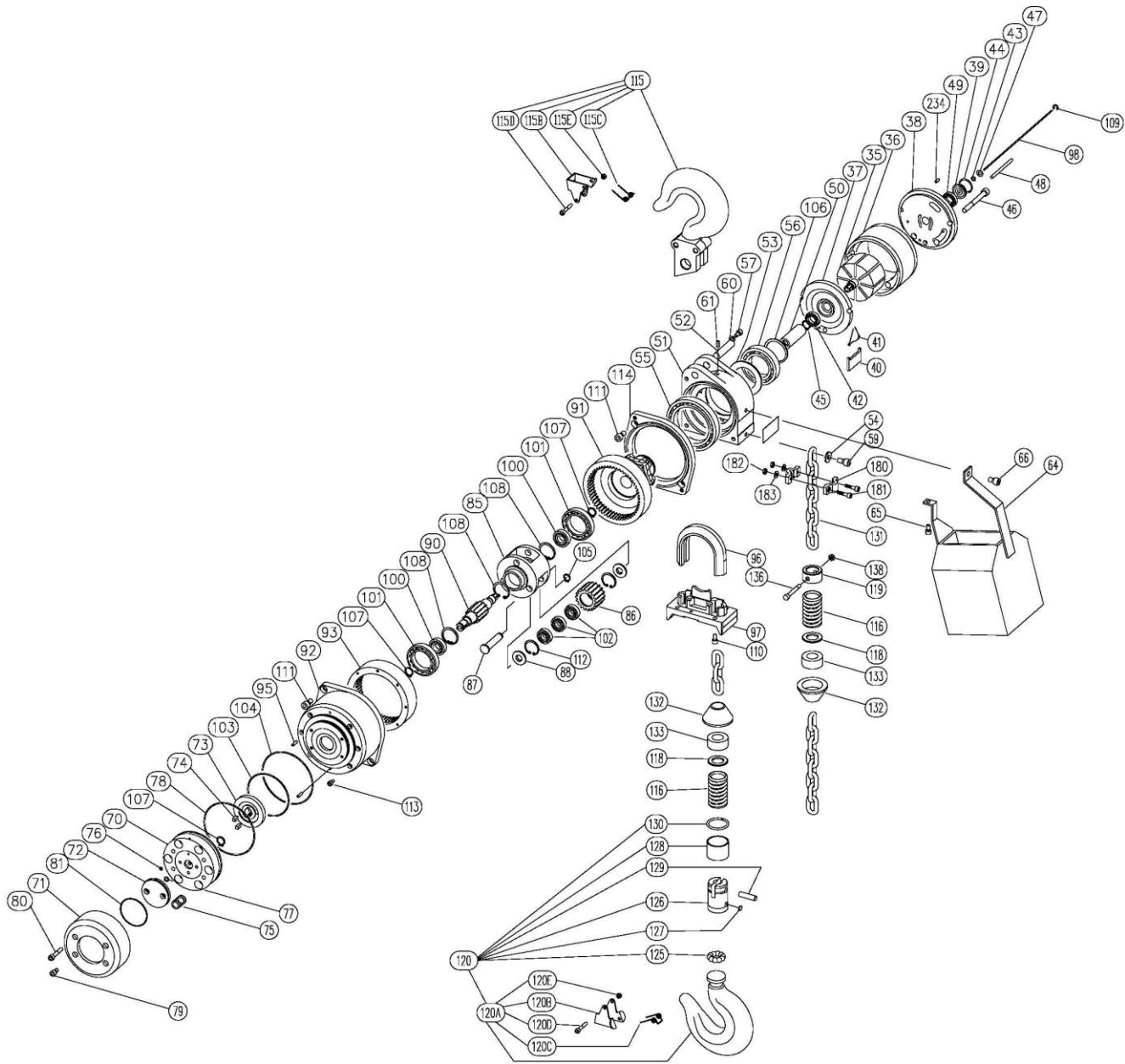


TCR1000-2 Main Body

Figure #	Part #	Part Name	Parts Per Hoist
234	T1CR130406005	PARALLEL PIN	2
35	T1CR426224151	ROTOR	1
36	T1CR426224161	STATOR	1
37	T1CR426224171	FRONT PLATE	1
38	T1CR426224182	REAR PLATE	1
39	T1CR426224191	REAR RETAINER	1
40	T1CR137102123	VANE	8
41	T1CR130802212	VANE SPRING	8
42	T1CR130113002	BEARING	1
43	T1CR131103004	O-RING	1
44	T1CR131103023	O-RING	1
45	T1CR130302015	RETAINING RING	1
46	T1CR131708075	SOCKET BOLT	3
47	T1CR131307006	WASHER	1
48	T1CR130402051	KNOCK PIN	1
49	T1CR130104003	BALL BEARING	1
50	T1CR426224200	COUPLING	1
51	T1CR426224212	WHEEL HOUSING	1
52	T1CR426224220	TOP PIN	1
53	T1CR426224230	SPACER	1
54	T1CR426261R50	WASHER	1
55	T1CR130113015	BEARING	1
56	T1CR130104010	BEARING	1
57	T1CR131706012	SOCKET BOLT	1
59	T1CR131708025	SOCKET BOLT	1
60	T1CR426221R50	WASHER	1
61	T1CR132108012	SET SCREW	1
64	BC-T1	CHAIN BASKET	1
70	T1CR426224401	BRAKE PISTON	1
71	T1CR426224410	BRAKE COVER	1
72	T1CR426224421	PISTON COVER	1
73	T1CR426224430	BRAKE DISC	1
74	T1CR130408081	KEY	2
75	T1CR130802213	DISC SPRING	6
76	T1CR131103002	O-RING	1
77	T1CR131101004	O-RING	1

Figure #	Part #	Part Name	Parts Per Hoist
78	T1CR131103055	O-RING	1
79	T1CR131706012	SOCKET BOLT	2
80	T1CR131706040	SOCKET BOLT	4
81	T1CR131117033	O-RING	1
85	T1CR426224240	CAGE	1
86	T1CR426224250	STAR GEAR	3
87	T1CR426224260	PIN	3
88	T1CR426224270	THRUST COLLAR	6
89	T1CR426224280	RETAINER	3
90	T1CR426224290	PINION	1
91	T1CR426224300	LOAD SHEAVE	1
92	T1CR426224312	GEAR CASE	1
93	T1CR426224322	RING GEAR	1
94	T1CR426224330	SPACER (P)	3
95	T1CR426221K90	LOCK SCREW	1
96	T1CR426224352	CHAIN GUIDE	1
97	T1CR426224363	CHAIN SEPARATOR	1
98	T1CR426224381	BRAKE TUBE	1
100	T1CR130104003	BEARING	2
101	T1CR130112808	BEARING	2
102	T1CR130170035	NEEDLE BEARING	6
103	T1CR131117042	O-RING	1
104	T1CR131103055	O-RING	1
105	T1CR130302010	RETAINING RING	3
106	T1CR130302045	RETAINING RING	1
107	T1CR130302015	RETAINING RING	3
108	T1CR130301032	RETAINING RING	2
109	T1CR130303005	RETAINING RING	1
110	T1CR131706012	SOCKET BOLT	4
111	T1CR131708016	SOCKET BOLT	3
112	T1CR131103036	O-RING	1
115	T1CR42624457H	TOP HOOK SET	1
115B	T1CR426221S30	HOOK LATCH	1
115C	T1CR130802258	HOOK LATCH SPRING	1
115D	T1CR131705035	SOCKET BOLT	1
115E	T1CR134501005	U-NUT	1

Figure #	Part #	Part Name	Parts Per Hoist
115H	T1CR426244580	CHAIN PIN	1
115J	T1CR131307006	WASHER	1
115K	T1CR134501006	U NUT	1
116	T1CR426244630	FREE LIMIT LOCK	1
118	T1CR426244620	HOLDER	1
119	T1CR426224390	END STOPPER	2
120	T1CR426244S2C	BOTTOM HOOK SET	1
120A	T1CR426221S2F	BOTTOM HOOK ASSY.	1
120B	T1CR426221S30	HOOK LATCH	1
120C	T1CR130802258	HOOK LATCH SPRING	1
120D	T1CR131705035	SOCKET BOLT	1
120E	T1CR134501005	U-NUT	1
121	T1CR130172006	NEEDLE BEARING	1
122	T1CR131204014	OIL SEAL	2
125	T1CR130502020	STEEL BALL	8
126	T1CR426244590	BOTTOM YOKE ASSY.	1
127	T1CR420846PY0	SWIVEL HOOK PLUG	1
128	T1CR420846PW0	OUTER BEARING RACE	1
129	T1CR426244600	WHEEL SHAFT	1
130	T1CR426241U20	IDLE SHEAVE	1
135	T1CR131706035	SOCKET BOLT	2
137	T1CR134501006	U NUT	2
139	T1CR130302014	RETAINING RING	2
123	T1CR130802219	CHAIN SPRING	3
124	T1CR426224C80	LIMIT WASHER	1
131	KER063	LOAD CHAIN	FT
132	T1CR426224450	LIMIT LOCK	1
133	T1CR136206002	SHOCK ABSORBER	2
136	T1CR426224680	END BOLT	2
138	T1CR134501006	U NUT	2
180	T1CR420620JF0	CHAIN DOWN STOPPER	2
181	T1CR131705022	SOCKET BOLT	2
182	T1CR134401005	NUT	2
183	T1CR131301005	SPRING WASHER	2

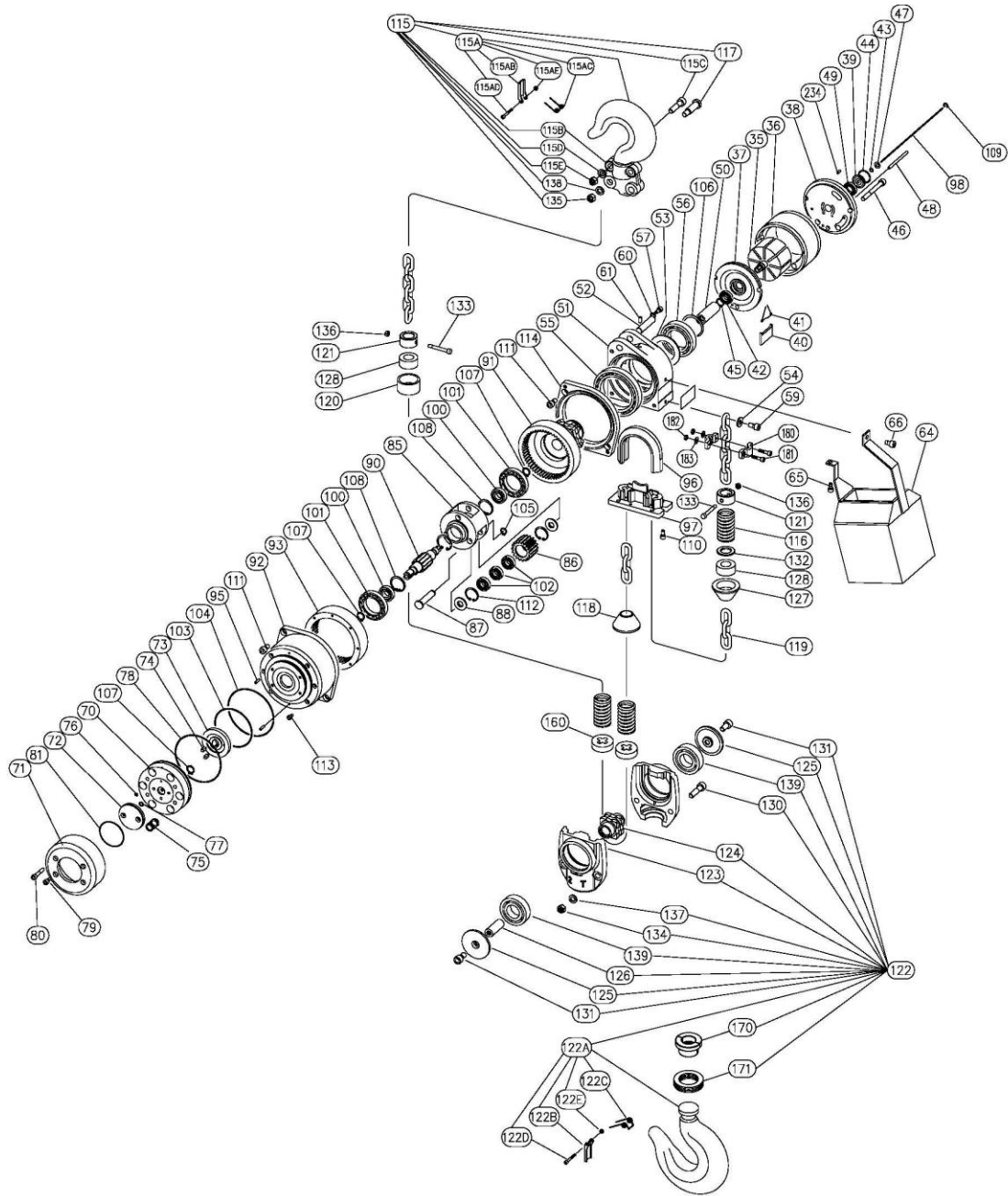


TCR1000 Main Body

Figure #	Part #	Part Name	Parts Per Hoist
28	T1CR130406005	PARALLEL PIN	2
35	T1CR426224151	ROTOR	1
36	T1CR426224161	STATOR	1
37	T1CR426224171	FRONT PLATE	1
38	T1CR426224182	REAR PLATE	1
39	T1CR426224191	REAR RETAINER	1
40	T1CR137102123	VANE	8
41	T1CR130802212	VANE SPRING	8
42	T1CR130113002	BEARING	1
43	T1CR131103004	O-RING	1
44	T1CR131103023	O-RING	1
45	T1CR130302015	RETAINING RING	1
46	T1CR131708075	SOCKET BOLT	3
47	T1CR131307006	WASHER	1
48	T1CR130402051	KNOCK PIN	1
49	T1CR130104003	BEARING	1
50	T1CR426224200	COUPLING	1
51	T1CR426224212	WHEEL HOUSING	1
52	T1CR426224220	TOP PIN	1
53	T1CR426224230	SPACER	1
54	T1CR426261R50	WASHER	1
55	T1CR130113015	BEARING	1
56	T1CR130104010	BEARING	1
57	T1CR131706012	SOCKET BOLT	1
59	T1CR131708025	SOCKET BOLT	1
60	T1CR426221R50	WASHER	1
61	T1CR132108012	SET SCREW	1
64	BC-T1	CHAIN BASKET	1
65	T1CR131706012	SOCKET BOLT	1
66	T1CR131708012	SOCKET BOLT	1
70	T1CR426224401	BRAKE PISTON	1
71	T1CR426224410	BRAKE COVER	1
72	T1CR426224421	PISTON COVER	1
73	T1CR426224430	BRAKE DISC	1
74	T1CR130408081	KEY	2
75	T1CR130802213	DISC SPRING	6
76	T1CR131103002	O-RING	1

Figure #	Part #	Part Name	Parts Per Hoist
77	T1CR131101004	O-RING	1
78	T1CR131103055	O-RING	1
79	T1CR131706012	SOCKET BOLT	2
80	T1CR131706040	SOCKET BOLT	4
81	T1CR131117033	O-RING	1
85	T1CR426266240	CAGE	1
86	T1CR426266250	STAR GEAR	3
87	T1CR426266260	PIN	3
88	T1CR426266270	THRUST COLLAR	6
90	T1CR426266290	PINION	1
91	T1CR426266300	LOAD SHEAVE	1
92	T1CR426266310	GEAR CASE	1
93	T1CR426266320	RING GEAR	1
95	T1CR426266340	DOWEL PIN	4
96	T1CR426266351	CHAIN GUIDE	1
97	T1CR426266360	CHAIN SEPARATOR	1
98	T1CR426224381	BRAKE TUBE	1
100	T1CR130104003	BEARING	2
101	T1CR130113008	BEARING	2
102	T1CR130104002	BEARING	9
103	T1CR131117042	O-RING	1
104	T1CR131103055	O-RING	1
105	T1CR130302012	RETAINING RING	3
106	T1CR130302045	RETAINING RING	1
107	T1CR130302015	RETAINING RING	3
108	T1CR130301032	RETAINING RING	2
109	T1CR130303005	RETAINING RING	1
110	T1CR131706012	SOCKET BOLT	4
111	T1CR131708016	SOCKET BOLT	6
112	T1CR130301028	RETAINING RING	6
113	T1CR131705010	SOCKET BOLT	6
114	T1CR426266640	ADAPTER	1
115	T1CR42622457B	TOP HOOK SET	1
115B	T1CR426221S30	HOOK LATCH	1
115C	T1CR130802258	HOOK SPRING	1
115D	T1CR131705035	SOCKET BOLT	1
115E	T1CR134501005	U-NUT	1

Figure #	Part #	Part Name	Parts Per Hoist
119	T1CR426266390	END STOPPER	1
120	T1CR426261S2C	BOTTOM HOOK SET	1
120A	T1CR426221S2F	BOTTOM HOOK ASSY.	1
120B	T1CR426221S30	HOOK LATCH	1
120C	T1CR130802258	HOOK SPRING	1
120D	T1CR131705035	SOCKET BOLT	1
120E	T1CR134501005	U-NUT	1
125	T1CR130502020	STEEL BALL	8
126	T1CR426261S80	BOTTOM HOOK HOLDER	1
127	T1CR420846PY0	SWIVEL HOOK PLUG	1
128	T1CR426266760	SLEEVE	1
129	T1CR426261T20	CHAIN PIN	1
130	T1CR130802259	LOCK RING	1
131	KER071	LOAD CHAIN	FT
132	T1CR426266450	LIMIT LOCK	2
133	T1CR136206003	SHOCK ABSORBER	2
136	T1CR426224680	END BOLT	1
138	T1CR134501006	U NUT	1
118	T1CR426266C80	LIMIT WASHER	2
116	T1CR130802219	CHAIN SPRING	2
180	T1CR420620JF0	CHAIN DOWN STOPPER	2
181	T1CR131705022	SOCKET BOLT	2
182	T1CR134401005	HEX NUT	2
183	T1CR131301005	SPRING WASHER	2

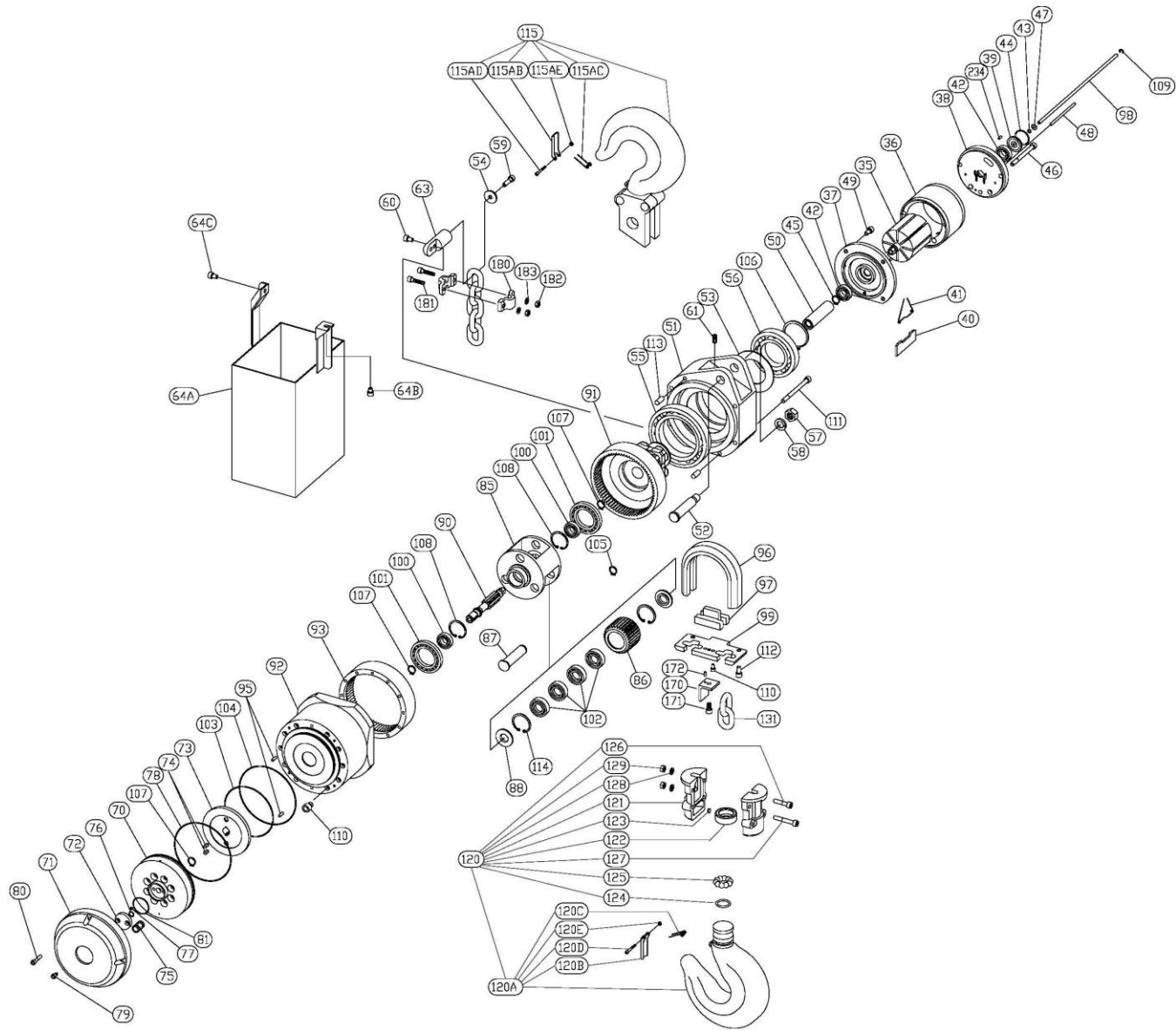


TCR2000-2 Main Body

Figure #	Part #	Part Name	Parts Per Hoist
234	T1CR130406005	PARALLEL PIN	2
35	T1CR426224151	ROTOR	1
36	T1CR426224161	STATOR	1
37	T1CR426224171	FRONT PLATE	1
38	T1CR426224182	REAR PLATE	1
39	T1CR426224191	REAR RETAINER	1
40	T1CR137102123	VANE	8
41	T1CR130802212	VANE SPRING	8
42	T1CR130113002	BEARING	1
43	T1CR131103004	O-RING	1
44	T1CR131103023	O-RING S	1
45	T1CR130302015	RETAINING RING	1
46	T1CR131708075	SOCKET BOLT	3
47	T1CR131307006	WASHER	1
48	T1CR130402051	KNOCK PIN	1
49	T1CR130104003	BEARING	1
50	T1CR426224200	COUPLING	1
51	T1CR426224212	WHEEL HOUSING	1
52	T1CR426224220	TOP PIN	1
53	T1CR426224230	SPACER	1
54	T1CR426261R50	WASHER	1
55	T1CR130113015	BEARING	1
56	T1CR130104010	BEARING	1
57	T1CR131706012	SOCKET BOLT	1
59	T1CR131708025	SOCKET BOLT	1
60	T1CR426221R50	WASHER	1
61	T1CR132108012	SET SCREW	1
64	BC-T1	CHAIN BASKET	1
70	T1CR426224401	BRAKE PISTON	1
71	T1CR426224410	BRAKE COVER	1
72	T1CR426224421	PISTON COVER	1
73	T1CR426224430	BRAKE DISC	1
74	T1CR130408081	KEY	2
75	T1CR130802213	DISC SPRING	6
76	T1CR131103002	O-RING	1
77	T1CR131101004	O-RING	1

Figure #	Part #	Part Name	Parts Per Hoist
78	T1CR131103055	O-RING	1
79	T1CR131706012	SOCKET BOLT	2
80	T1CR131706040	SOCKET BOLT	4
81	T1CR131117033	O-RING	1
85	T1CR426266240	CAGE	1
86	T1CR426266250	STAR GEAR	3
87	T1CR426266260	PIN	3
88	T1CR426266270	THRUST COLLAR	6
90	T1CR426266290	PINION	1
91	T1CR426266300	LOAD SHEAVE	1
92	T1CR426266310	GEAR CASE	1
93	T1CR426266320	RING GEAR	1
95	T1CR426266340	DOWEL PIN	4
96	T1CR426266351	CHAIN GUIDE	1
97	T1CR426266360	CHAIN SEPARATOR	1
98	T1CR426224381	BRAKE TUBE	1
100	T1CR130104003	BEARING	2
101	T1CR130113008	BEARING	2
102	T1CR130104002	BEARING	9
103	T1CR131117042	O-RING	1
104	T1CR131103055	O-RING	1
105	T1CR130302012	RETAINING RING	3
106	T1CR130302045	RETAINING RING	1
107	T1CR130302015	RETAINING RING	3
108	T1CR130301032	RETAINING RING	2
109	T1CR130303005	RETAINING RING	1
110	T1CR131706012	SOCKET BOLT	4
111	T1CR131708016	SOCKET BOLT	6
112	T1CR130301028	RETAINING RING	6
113	T1CR131705010	SOCKET BOLT	6
114	T1CR426266640	ADAPTER	1
115	T1CR42628657F	TOP HOOK SET	1
115A	T1CR420645PAE	TOP HOOK ASSY.	1
115AB	T1CR420645P11	HOOK LATCH	1
115AC	T1CR130802046	HOOK SPRING	1
115AD	T1CR131704028	SOCKET BOLT	1

Figure #	Part #	Part Name	Parts Per Hoist
115AE	T1CR134501004	U-NUT	1
115B	T1CR426286570	TOP YOKE ASSY.	1
115C	T1CR131710040	SOCKET BOLT	2
115D	T1CR131301010	SPRING WASHER	2
115E	T1CR134501010	U-NUT	2
116	T1CR130802219	CHAIN SPRING	3
117	T1CR426286580	CHAIN PIN	1
118	T1CR426286630	FREE LIMIT LOCK	1
119	KER071	LOAD CHAIN	FT
120	T1CR426286620	HOLDER	1
121	T1CR426266390	END STOPPER	2
122	T1CR426001PAL	BOTTOM HOOK SET	1
122A	T1CR420645PAE	BOTTOM HOOK ASSY.	1
122B	T1CR420645P11	HOOK LATCH	1
122C	T1CR130802046	HOOK SPRING	1
122D	T1CR131704028	SOCKET BOLT	1
122E	T1CR134501004	U-NUT	1
123	T1CR426286590	BOTTOM YOKE ASSY.	1
124	T1CR426001RB0	IDLE SHEAVE	1
125	T1CR420866QH0	BOTTOM HOOK COVER	2
126	T1CR420866Q10	BOTTOM HOOK SHAFT	1
130	T1CR131710045	SOCKET BOLT	2
131	T1CR131710020	SOCKET BOLT	2
134	T1CR134501010	U-NUT	2
137	T1CR131301010	SPRING WASHER	2
139	T1CR130109007	BEARING	2
170	T1CR426286710	THRUST RING	1
171	T1CR130121108	THRUST BEARING	1
127	T1CR426266450	LIMIT LOCK	1
128	T1CR136206003	SHOCK ABSORBER	2
132	T1CR426266C80	LIMIT WASHER	1
133	T1CR426224680	END BOLT	2
135	T1CR134501008	U-NUT	1
136	T1CR134501006	U NUT	2
138	T1CR131307008	WASHER	1
160	T1CR426291G50	LIMIT WASHER C	2

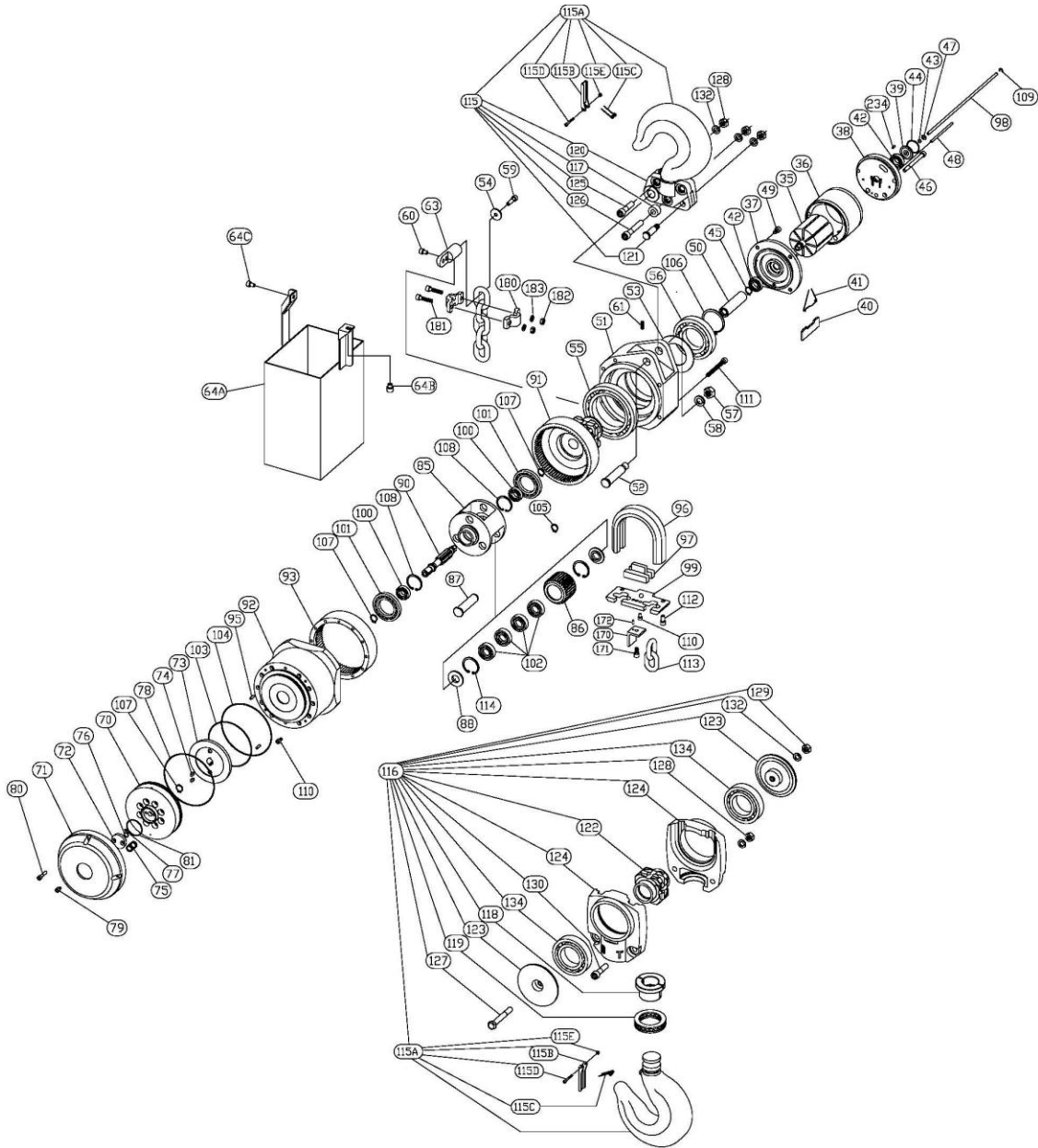


TCR3000 Main Body

Figure #	Part #	Part Name	Parts Per Hoist
234	T1CR130406005	PARALLEL PIN	2
35	T1CR426325150	ROTOR	1
36	T1CR426325160	STATOR	1
37	T1CR426325170	FRONT PLATE	1
38	T1CR426325180	REAR PLATE	1
39	T1CR426325190	REAR RETAINER	1
40	T1CR137102122	VANE	8
41	T1CR130802212	VANE SPRING	8
42	T1CR130104004	BEARING	2
43	T1CR131103004	O-RING	1
44	T1CR131103026	O RING	1
45	T1CR130302017	RETAINING RING	1
46	T1CR131708105	SOCKET BOLT	3
47	T1CR131307006	WASHER	1
48	T1CR130402054	KNOCK PIN	1
49	T1CR131708012	SOCKET BOLT	4
50	T1CR426325200	COUPLING	1
51	T1CR426325212	WHEEL HOUSING	1
52	T1CR426325220	TOP PIN	1
53	T1CR426325230	SPACER	1
54	T1CR420875MN0	CHAIN END SET	1
55	T1CR130104019	BEARING	1
56	T1CR130107013	BEARING	1
57	T1CR134501016	U NUT	1
58	T1CR131301016	SPRING WASHER	1
59	T1CR131708030	SOCKET BOLT	1
60	T1CR131708012	SOCKET BOLT	2
61	T1CR132108020	SET SCREW	1
63	T1CR426325730	SET PIECE	1
64A	BC-T2	CHAIN BASKET	1
64B	T1CR131708010	SOCKET BOLT	1
64C	T1CR131708012	SOCKET BOLT	1
70	T1CR426325400	BRAKE PISTON	1
71	T1CR426325410	BRAKE COVER	1
72	T1CR426325420	PISTON COVER	1
73	T1CR426325430	BRAKE DISK	1
74	T1CR130408084	KEY	2

Figure #	Part #	Part Name	Parts Per Hoist
75	T1CR130802213	DISC SPRING	6
76	T1CR131103008	O-RING	1
77	T1CR131101004	O-RING	1
78	T1CR131103063	O RING	1
79	T1CR131706012	SOCKET BOLT	2
80	T1CR131706030	SOCKET BOLT	4
81	T1CR131117030	O-RING	1
85	T1CR426325240	CAGE	1
86	T1CR426325250	STAR GEAR	3
87	T1CR426325260	PIN	3
88	T1CR426325270	THRUST COLLAR	6
90	T1CR426325290	PINION	1
91	T1CR426325300	LOAD SHEAVE	1
92	T1CR426325310	GEAR CASE	1
93	T1CR426325320	RING GEAR	1
95	T1CR426325340	DOWEL PIN	4
96	T1CR426325351	CHAIN GUIDE	1
97	T1CR426325360	CHAIN SEPARATOR	1
98	T1CR426325380	BRAKE TUBE	1
99	T1CR426325371	BOTTOM PLATE	1
100	T1CR130104004	BEARING	2
101	T1CR130104010	BEARING	2
102	T1CR130104005	BEARING	12
103	T1CR131103058	O RING	1
104	T1CR131103063	O RING	1
105	T1CR130302020	RETAINING RING	3
106	T1CR130302060	RETAINING RING	1
107	T1CR130302017	RETAINING RING	3
108	T1CR130301035	RETAINING RING	2
109	T1CR130303005	RETAINING RING	1
110	T1CR131706012	SOCKET BOLT	12
111	T1CR131708080	SOCKET BOLT	4
112	T1CR131708016	SOCKET BOLT	2
113	T1CR130406028	PARALLEL PIN	2
114	T1CR130301042	RETAINING RING	6

Figure #	Part #	Part Name	Parts Per Hoist
115	T1CR42632557F	TOP HOOK SET	1
115AB	T1CR420655P11	HOOK LATCH	1
115AC	T1CR130802046	HOOK SPRING	1
115AD	T1CR131704028	SOCKET BOLT	1
115AE	T1CR134501004	U-NUT	1
120	T1CR420875PAD	BOTTOM HOOK SET	1
120A	T1CR420875PAE	BOTTOM HOOK ASSY.	1
120B	T1CR420655P11	HOOK LATCH	1
120C	T1CR130802046	HOOK SPRING	1
120D	T1CR131704028	SOCKET BOLT	1
120E	T1CR134501004	U-NUT	1
121	T1CR420875PZ1	BOTTOM YOKE ASSY.	1
122	T1CR420875PW0	OUTER BEARING RACE	1
123	T1CR420875PY0	SWIVEL HOOK PLUG	1
124	T1CR131101025	O RING	1
125	T1CR130502024	STEEL BALL	10
126	T1CR131708035	SOCKET BOLT	2
127	T1CR131708050	SOCKET BOLT	2
128	T1CR131301008	SPRING WASHER	4
129	T1CR134501008	U-NUT	4
131	KER112	LOAD CHAIN	FT
170	T1CR426325C90	STAY	1
171	T1CR131708015	SOCKET BOLT	1
172	T1CR130604010	SPRING PIN	1
180	T1CR420645JF0	CHAIN DOWN STOPPER	2
181	T1CR131708035	SOCKET BOLT	2
182	T1CR134401008	NUT	2
183	T1CR131301008	SPRING WASHER	2

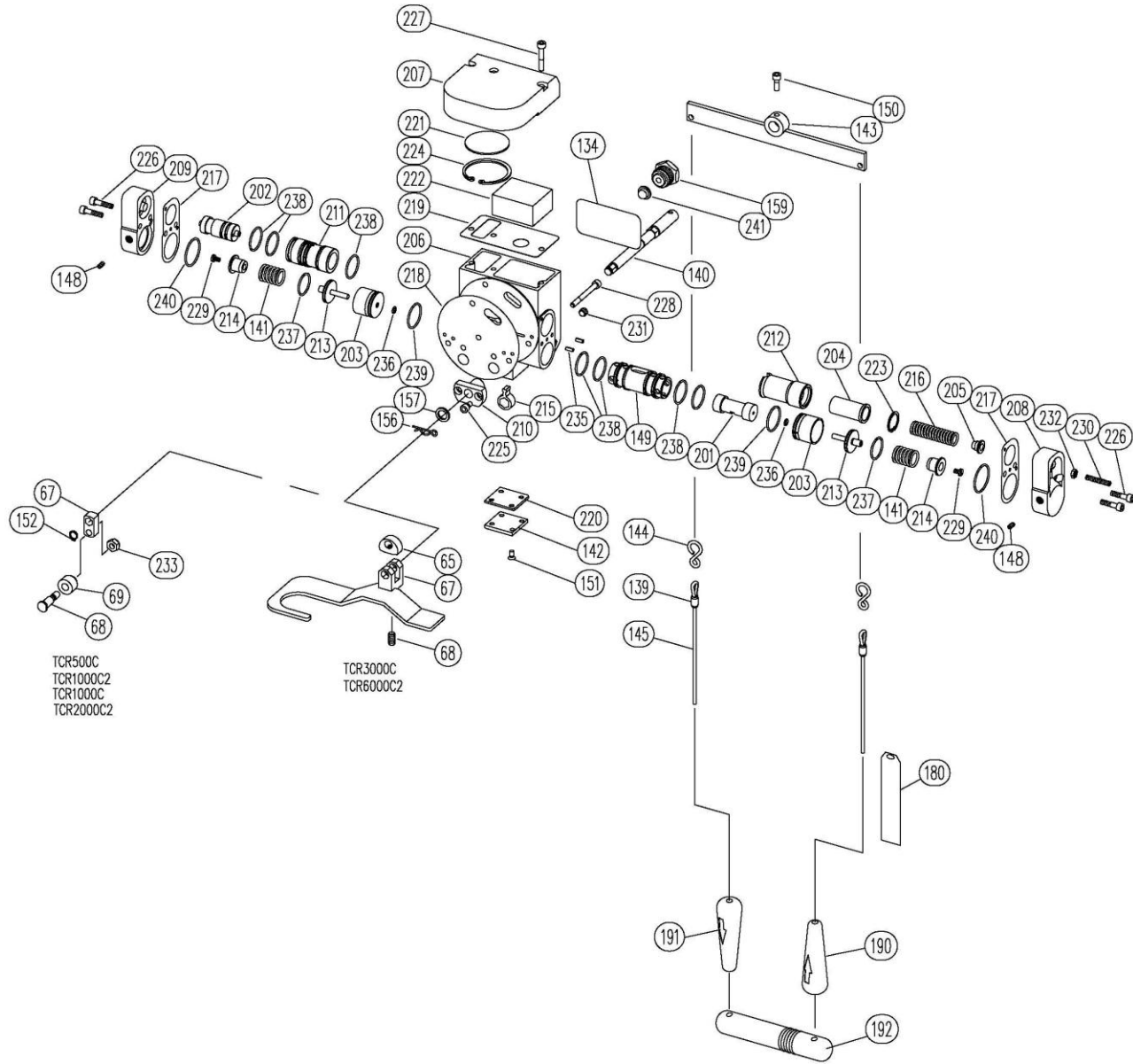


TCR6000-2 Main Body

Figure #	Part #	Part Name	Parts Per Hoist
234	T1CR130406005	PARALLEL PIN	2
35	T1CR426325150	ROTOR	1
36	T1CR426325160	STATOR	1
37	T1CR426325170	FRONT PLATE	1
38	T1CR426325180	REAR PLATE	1
39	T1CR426325190	REAR RETAINER	1
40	T1CR137102122	VANE	8
41	T1CR130802212	VANE SPRING	8
42	T1CR130104004	BEARING	2
43	T1CR131103004	O-RING	1
44	T1CR131103026	O RING	1
45	T1CR130302017	RETAINING RING	1
46	T1CR131708105	SOCKET BOLT	3
47	T1CR131307006	WASHER	1
48	T1CR130402054	KNOCK PIN	1
49	T1CR131708012	SOCKET BOLT	4
50	T1CR426325200	COUPLING	1
51	T1CR426325212	WHEEL HOUSING	1
52	T1CR426325220	TOP PIN	1
53	T1CR426325230	SPACER	1
54	T1CR420875MN0	CHAIN END SET	1
55	T1CR130104019	BEARING	1
56	T1CR130107013	BEARING	1
57	T1CR134501016	U NUT	1
58	T1CR131301016	SPRING WASHER	1
59	T1CR131708030	SOCKET BOLT	1
60	T1CR131708012	SOCKET BOLT	2
61	T1CR132108020	SET SCREW	1
63	T1CR426325730	SET PIECE	1
64A	BC-T2	CHAIN BASKET	1
70	T1CR426325400	BRAKE PISTON	1
71	T1CR426325410	BRAKE COVER	1
72	T1CR426325420	PISTON COVER	1
73	T1CR426325430	BRAKE DISK	1
74	T1CR130408084	KEY	2

Figure #	Part #	Part Name	Parts Per Hoist
75	T1CR130802213	DISC SPRING	6
76	T1CR131103008	O-RING	1
77	T1CR131101004	O-RING	1
78	T1CR131103063	O RING	1
79	T1CR131706012	SOCKET BOLT	2
80	T1CR131706030	SOCKET BOLT	4
81	T1CR131117030	O-RING	1
85	T1CR426325240	CAGE	1
86	T1CR426325250	STAR GEAR	3
87	T1CR426325260	PIN	3
88	T1CR426325270	THRUST COLLAR	6
90	T1CR426325290	PINION	1
91	T1CR426325300	LOAD SHEAVE	1
92	T1CR426325310	GEAR CASE	1
93	T1CR426325320	RING GEAR	1
95	T1CR426325340	DOWEL PIN	4
96	T1CR426325351	CHAIN GUIDE	1
97	T1CR426325360	CHAIN SEPARATOR	1
98	T1CR426325380	BRAKE TUBE	1
99	T1CR426325371	BOTTOM PLATE	1
100	T1CR130104004	BEARING	2
101	T1CR130104010	BEARING	2
102	T1CR130104005	BEARING	12
103	T1CR131103058	O RING	1
104	T1CR131103063	O RING	1
105	T1CR130302020	RETAINING RING	3
106	T1CR130302060	RETAINING RING	1
107	T1CR130302017	RETAINING RING	3
108	T1CR130301035	RETAINING RING	2
109	T1CR130303005	RETAINING RING	1
110	T1CR131706012	SOCKET BOLT	12
111	T1CR131708080	SOCKET BOLT	4
112	T1CR131708016	SOCKET BOLT	2
113	KER112	LOAD CHAIN	FT
114	T1CR130301042	RETAINING RING	6

Figure #	Part #	Part Name	Parts Per Hoist
115	T1CR42633569G	TOP HOOK SET	1
115A	T1CR420890PAF	TOP HOOK ASSY.	1
115B	T1CR420890P11	HOOK LATCH	1
115C	T1CR130802046	HOOK SPRING	1
115D	T1CR131704028	SOCKET BOLT	1
115E	T1CR134501004	U-NUT	1
117	T1CR426335690	HOOK ANCHOR	1
120	T1CR420890QF0	TOP YOKE ASSY.	1
121	T1CR420890JG0	CHAIN PIN	1
125	T1CR131712050	SOCKET BOLT	4
126	T1CR131712065	SOCKET BOLT	1
128	T1CR134501012	U NUT	6
132	T1CR131301012	SPRING WASHER	7
116	T1CR420890PAL	BOTTOM HOOK SET	1
115A	T1CR420890PAF	BOTTOM HOOK ASSY.	1
115B	T1CR420890P11	HOOK LATCH	1
115C	T1CR130802046	HOOK SPRING	1
115D	T1CR131704028	SOCKET BOLT	1
115E	T1CR134501004	U-NUT	1
118	T1CR426335710	THRUST RING	1
119	T1CR130121111	THRUST BEARING<51111>	1
122	T1CR420890RB0	IDLE SHEAVE	1
123	T1CR420890QH0	BOTTOM HOOK COVER	2
124	T1CR426335590	BOTTOM YOKE ASSY.	1
127	T1CR131612090	HEX HEAD BOLT	1
128	T1CR134501012	U NUT	6
129	T1CR134401012	HEX NUT	1
130	T1CR131712055	SOCKET BOLT	2
132	T1CR131301012	SPRING WASHER	7
134	T1CR130109012	BEARING	2
170	T1CR426325C90	STAY	1
171	T1CR131708015	SOCKET BOLT	1
180	T1CR420645JF0	CHAIN DOWN STOPPER	2
181	T1CR131708035	SOCKET BOLT	2
182	T1CR134401008	NUT	2

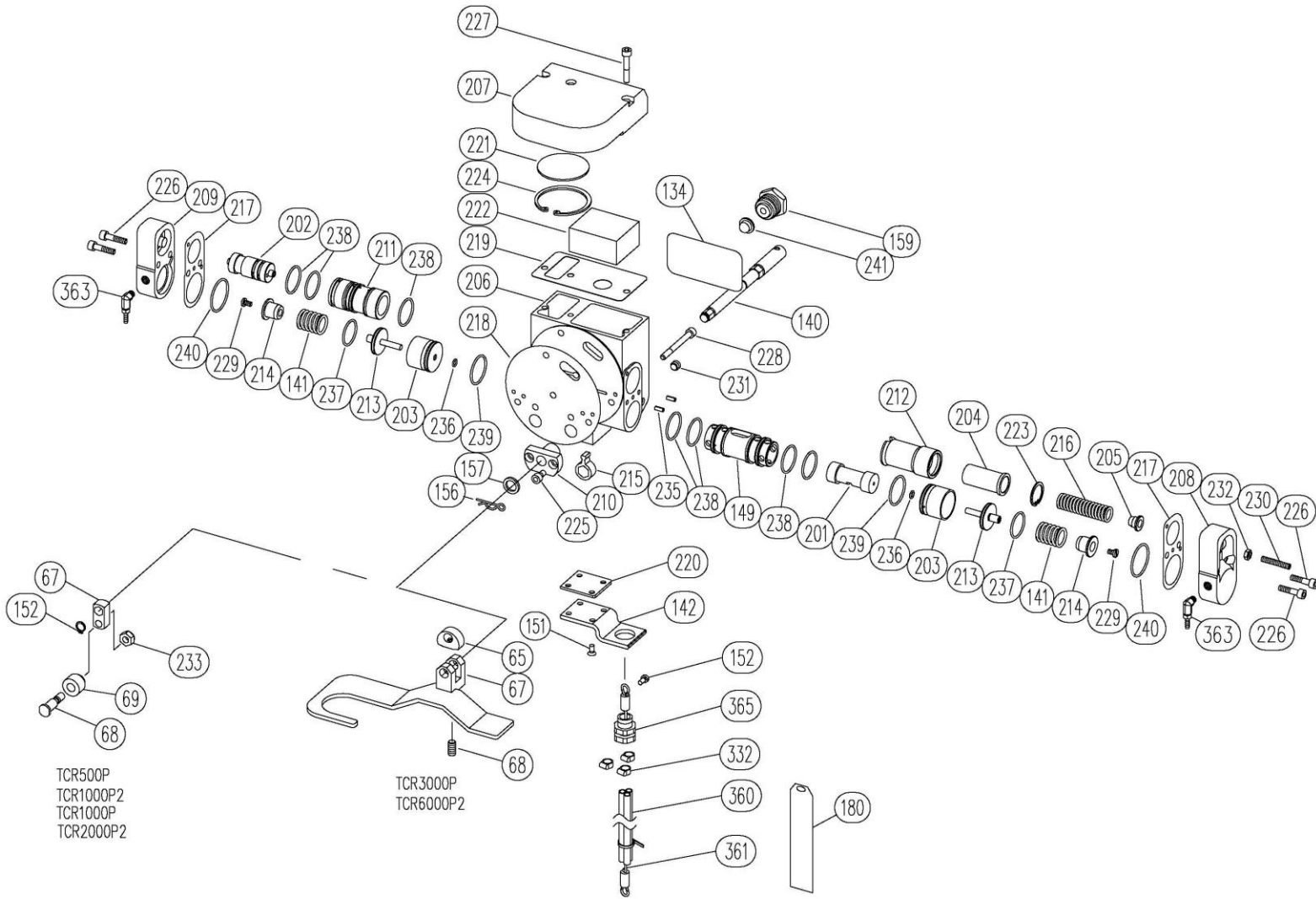


Cord Control Valve Body

Figure #	Part Number		Part Name	Parts Per Hoist
	TCR500C TCR1000C2 TCR1000C TCR2000C2	TCR3000C TCR6000C2		
65		T1CR426325740	CAM	1
67	T1CR426224110	T1CR426325113	CHAIN LEVER	1
68	T1CR426224120		ROLLER SHAFT	1
		T1CR132108008	SET SCREW	1
69	T1CR426224130		LIMIT ROLLER	1
134	T1CR137309202		NAME PLATE 500	1
	T1CR137309203		NAME PLATE 1000, 1000-2	
	T1CR137309204		NAME PLATE 2000-2	
		T1CR137309205	NAME PLATE 3000	
		T1CR137309206	NAME PLATE 6000-2	
139	T1CR1302CRIMP		ROPE CRIMP	2
140	T1CR426225461	T1CR426326461	LIMIT SHAFT	1
141	T1CR130802217		SPRING	2
142	T1CR426225470		UNDER COVER	1
143	T1CR426225540		CORD LEVER	1
144	T1CR130802081		S-TYPE WIRE	2
145*	T1CR138001015WH		WHITE CORD	FT*
148	T1CR134902003		HEX SOCKET PIPE PLUG	3
149	T1CR426224C30	T1CR426325C30	MAIN BUSHING	1
150	T1CR131706018		SOCKET BOLT	1
151	T1CR132805010		HEX FLAT HEAD MACH. SCREW	4
152	T1CR130302010		RETAINING RING	1
156	T1CR130790012		HAIRPIN COTTER	1
157	T1CR426325750		WASHER	1
159	T1CR134703060	T1CR134703070	INLET BUSHING	1
165	T1CR135000500	T1CR420845DA0	HOSE STEM ASSEMBLY	1
180	E2R567-001H		WARNING TAG	1
190	T1CR136602625		GRIP WHITE (UP)	1
191	T1CR136602626		GRIP RED (DOWN)	1
192	T1CR136602627		HANDLE	1
201	T1CR426224013		MAIN SPOOL	1
202	T1CR426224021		BRAKE SPOOL	1
203	T1CR426224C20		SPOOL CYLINDER	2
204	T1CR426224041		BRAKE RETAINER	1
205	T1CR426224051		BRAKE NUT	1

Figure #	Part Number		Part Name	Parts Per Hoist
	TCR500C TCR1000C2 TCR1000C TCR2000C2	TCR3000C TCR6000C2		
206	T1CR426224063		VALVE BODY	1
207	T1CR426224070		TOP COVER	1
208	T1CR426224083		SIDE COVER (L)	1
209	T1CR426224093		SIDE COVER (R)	1
210	T1CR426224101		LIMIT GUIDE	1
211	T1CR426224C40		BRAKE BUSHING	1
212	T1CR426224C50		LIMIT BUSHING	1
213	T1CR426224C60		SPOOL PISTON	2
214	T1CR426224C70		SPRING SEAT	2
215	T1CR426224140		LIMIT LEVER	1
216	T1CR130802216		SPRING	1
217	T1CR136102164		SIDE PACKING	2
218	T1CR136102161		VALVE PACKING	1
219	T1CR136102162	T1CR136102192	TOP PACKING	1
220	T1CR136102163		UNDER PACKING	1
221	T1CR426224A90		EXHAUST PLATE	1
222	T1CR137402031		NYLON SILENCER	1
223	T1CR130301025		RETAINING RING	1
224	T1CR130301058		RETAINING RING	1
225	T1CR131706012		SOCKET BOLT	2
226	T1CR131706025		SOCKET BOLT	4
227	T1CR131706040		SOCKET BOLT	3
228	T1CR131706060		SOCKET BOLT	3
229	T1CR132405008		MACHINE SCREW	2
230	T1CR132306035		LIMIT SET SCREW	1
231	T1CR134902003		HEX SOCKET PIPE PLUG	3
232	T1CR134403006		HEX NUT	1
233	T1CR134501008		U-NUT	1
235	T1CR130604010		SPRING PIN	2
236	T1CR131103004		O-RING	2
237	T1CR131103021		O-RING	2
238	T1CR131103022		O-RING	7
239	T1CR131103024		O-RING	2
240	T1CR131103027		O-RING	2
241	T1CR136803032		SCREEN	1

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



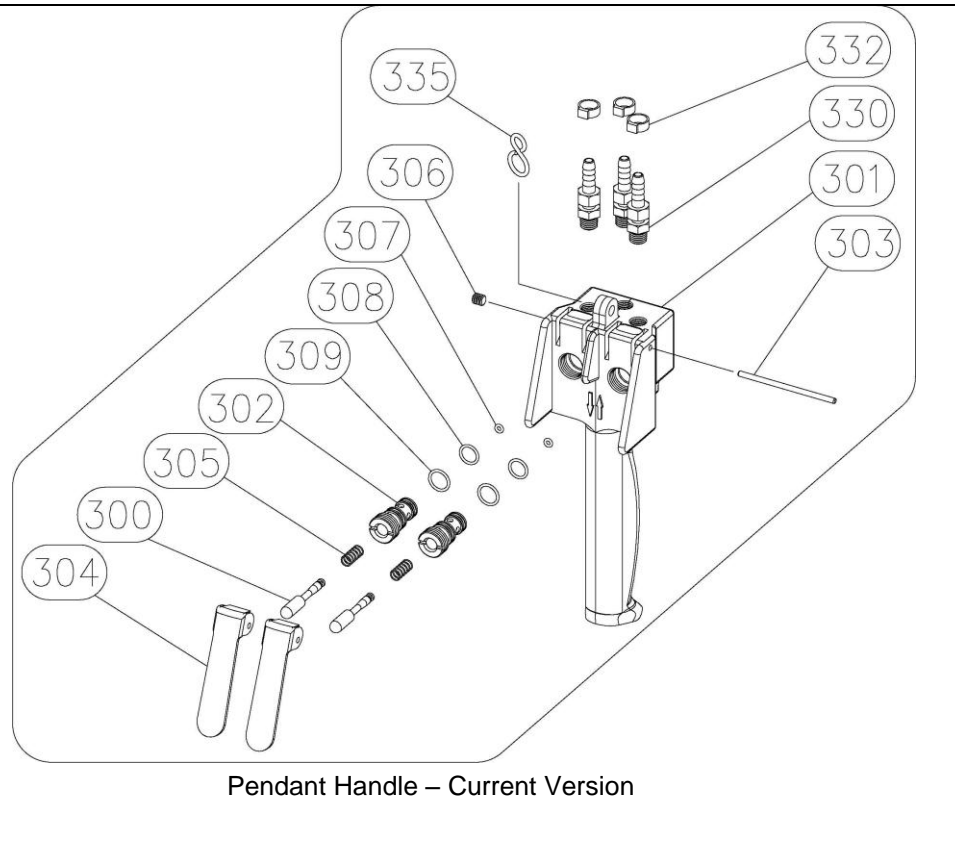
Pendant Control Valve Body

Figure #	Part #		Part Name	Parts Per Hoist
	TCR500P TCR1000P2 TCR1000P TCR2000P2	TCR3000P TCR6000P2		
65		T1CR426325740	CAM	1
67	T1CR426224110	T1CR426325113	CHAIN LEVER	1
68	T1CR426224120		ROLLER SHAFT	1
		T1CR132108008	SET SCREW	1
69	T1CR426224130		LIMIT ROLLER	1
	T1CR137309202		NAME PLATE 500	1
134	T1CR137309203		NAME PLATE 1000, 1000-2	1
	T1CR137309204		NAME PLATE 2000-2	1
		T1CR137309205	NAME PLATE 3000	1
		T1CR137309206	NAME PLATE 6000-2	1
140	T1CR426224461	T1CR426325461	LIMIT SHAFT	1
141	T1CR130802217		SPRING	2
142	T1CR426224472		UNDER COVER	1
148	T1CR130302010		RETAINING RING	1
149	T1CR426224C30	T1CR426325C30	MAIN BUSHING	1
151	T1CR132805010		HEX FLAT HEAD MACHINE SCREW	4
152	T1CR132506012		SLOTTED HEAD MACHINE SCREW	1
156	T1CR130790012		HAIRPIN COTTER	1
157	T1CR426325750		WASHER	1
159	T1CR134703060	T1CR134703070	INLET BUSHING	1
165	T1CR135000500	T1CR420845DA0	HOSE STEM ASSEMBLY	1
180	E2R567-001H		WARNING TAG	1
201	T1CR426224013		MAIN SPOOL	1
202	T1CR426224021		BRAKE SPOOL	1
203	T1CR426224C20		SPOOL CYLINDER	2
204	T1CR426224041		BRAKE RETAINER	1
205	T1CR426224051		BRAKE NUT	1
206	T1CR426224063		VALVE BODY	1
207	T1CR426224070		TOP COVER	1

Figure #	Part #		Part Name	Parts Per Hoist
	TCR500P TCR1000P2 TCR1000P TCR2000P2	TCR3000P TCR6000P2		
208	T1CR426224083		SIDE COVER (L)	1
209	T1CR426224093		SIDE COVER (R)	1
210	T1CR426224101		LIMIT GUIDE	1
211	T1CR426224C40		BRAKE BUSHING	1
212	T1CR426224C50		LIMIT BUSHING	1
213	T1CR426224C60		SPOOL PISTON	2
214	T1CR426224C70		SPRING SEAT	2
215	T1CR426224140		LIMIT LEVER	1
216	T1CR130802216		SPRING	1
217	T1CR136102164		SIDE PACKING	2
218	T1CR136102161		VALVE PACKING	1
219	T1CR136102162	T1CR136102192	TOP PACKING	1
220	T1CR136102163		UNDER PACKING	1
221	T1CR426224A90		EXHAUST PLATE	1
222	T1CR137402031		NYLON SILENCER	1
223	T1CR130301025		RETAINING RING	1
224	T1CR130301058		RETAINING RING	1
225	T1CR131706012		SOCKET BOLT	2
226	T1CR131706025		SOCKET BOLT	4
227	T1CR131706040		SOCKET BOLT	3
228	T1CR131706060		SOCKET BOLT	3
229	T1CR132405008		MACHINE SCREW	2
230	T1CR132306035		SET SCREW	1
231	T1CR134902003		HEX SOCKET PIPE PLUG	3
232	T1CR134403006		HEX NUT	1
233	T1CR134501008		U-NUT	1
235	T1CR130604010		SPRING PIN	2
236	T1CR131103004		O-RING	2
237	T1CR131103021		O-RING	2
238	T1CR131103022		O-RING	7
239	T1CR131103024		O-RING	2
240	T1CR131103027		O-RING	2
241	T1CR136803032		SCREEN	1

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

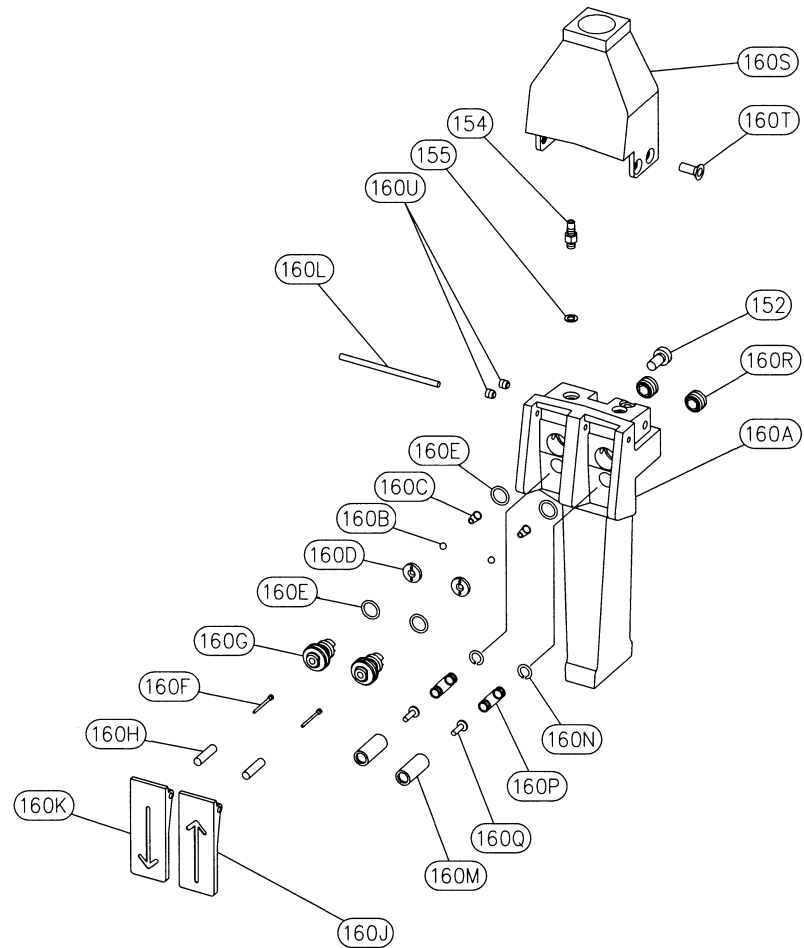
Figure Number	Part Number	Part Name	Parts Per Handle
	T1CR420226VRD	PENDANT VALVE ASSEMBLY	1
300	T1CR420218VB0	THROTTLE VALVE	2
301	T1CR420226VR0	VALVE BODY	1
302	T1CR420218VF0	BUSHING	2
303	T1CR130402071	LEVER PIN	1
304	T1CR420218VH0	LEVER	2
305	T1CR130802220	SPRING 6X14X0.6	2
306	T1CR132106006	SET SCREW M6X6	1
307	T1CR131109001	O-RING S-3 (HS90)	2
308	T1CR131103008	O-RING S-10	2
309	T1CR131103009	O-RING S-11.2	2
330	T1CR135106302	HOSE JOINT H-2 PT 1/8-7	3
335	T1CR130802081	S-TYPE WIRE	1
332	T1CR137501012	HOSE BAND 5.6~16	3
360*	T1CR137240926	POLYURETHANE HOSE HR-6R 2.1M	3
363	T1CR135106303	HOSE JOINT GHJL-0107 (HOIST)	3
361	T1CR230708005	WIRE CABLE	1
365	T1CR135111022	CONNECTOR EBG2022BK (HOIST)	1



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

**Pendant Assembly applies to hoists beginning with serial number 8G _____ and beyond.

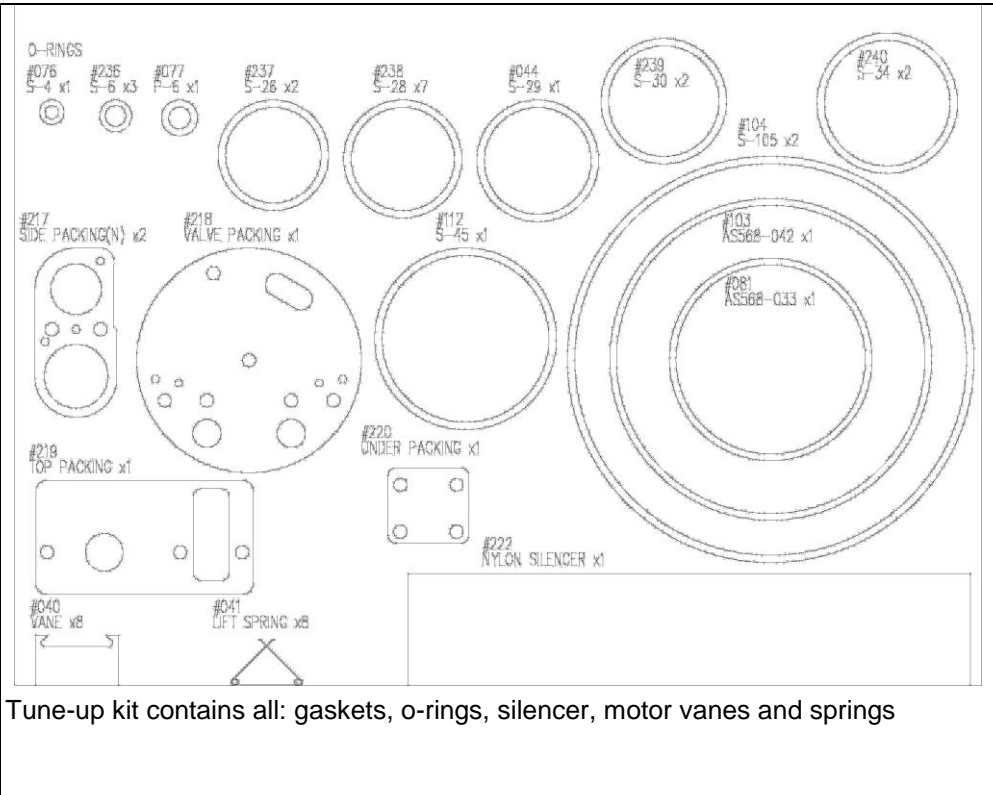
Figure #	Part #	Part Name	Parts Per Hoist
152	T1CR132506012	SLOTTED HEAD MACHINE SCREW	1
160	T1CR42622452D	PENDANT HANDLE CP	1
154	T1CR426221E20	HOSE NIPPLE	3
153	T1CR137240020	PENDANT HOSE ASSEMBLY	FT
155	T1CR136102094	SEAL WASHER	3
160A	T1CR426224520	CONTROL HANDLE	1
160B	T1CR130501004	STEEL BALL	2
160C	T1CR130802255	PENDANT VALVE SPRING	2
160D	T1CR426221H30	PENDANT VALVE SEAT	2
160E	T1CR131103008	O-RING	4
160F	T1CR426224480	CONTROL SPOOL	2
160G	T1CR426224530	CONTROL BUSH	2
160H	T1CR426221H60	PUSH ROD	2
160J	T1CR136602023	VALVE LEVER (U)	1
160K	T1CR136602024	VALVE LEVER (D)	1
160L	T1CR130402006	LEVER PIN	1
160M	T1CR426221H90	BUFFER SLEEVE	2
160N	T1CR130305007	CIR-CLIP	2
160P	T1CR130802256	BUFFER SPRING	2
160Q	T1CR426221J20	BUFFER ROD	2
160R	T1CR132112010	SET SCREW	2
160S	T1CR426221J40	HANDLE COVER	1
160T	T1CR132805010	HEX FLAT HEAD MACHINE SCREW	4
160U	T1CR132105005	SET SCREW	2



Pendant Handle - Old Version

**Pendant Assembly applies to hoists with serial numbers preceding 8G _ _ _ _ _.

Model	Part Number	Quantity per Hoist
TCR250P	T1CR426206D5D	1
TCR500P	T1CR426224D5D	1
TCR1000P2	T1CR426224D5D	1
TCR1000P	T1CR426266D5D	1
TCR2000P2	T1CR426266D5D	1
TCR3000P	T1CR426325D5D	1
TCR6000P2	T1CR426325D5D	1
TCR250C	T1CR426205D5D	1
TCR500C	T1CR426224D5D	1
TCR1000C2	T1CR426224D5D	1
TCR1000C	T1CR426266D5D	1
TCR2000C2	T1CR426266D5D	1
TCR3000C	T1CR426325D5D	1
TCR6000C2	T1CR426325D5D	1



10.0 Warranty

All products sold by Kito Canada Inc. are warranted to be free from defects in material and workmanship for the given period of that product, from the date of purchase.

The product must be used in accordance with manufacturer's recommendations and must not have been subject to abuse, lack of maintenance, misuse, negligence, unauthorized repairs or alterations. Should any defect in material or workmanship occur during the time period for any product, as determined by Kito's inspection of the product, Kito 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. Kito Canada Inc. place of business to customer.

Customer must obtain a Return Goods Authorization (RGA) as directed by Kito Canada Inc. 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. If it is determined there is no defect, or that the defect resulted from causes not within the scope of Kito's warranty, the customer will be responsible for the costs of returning the product.

Kito Canada 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. Kito will not be liable for death, injury 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 Kito, whether negligent or willful, or from any other reason.

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