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# OWNER'S MANUAL

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## **ELECTRIC WIRE ROPE HOIST and TROLLEY RHN SERIES**

2 Ton through 20 Ton Capacity

Hoist Code and Serial Number

### **⚠ WARNING**

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

**HARRINGTON**  
HOISTS AND CRANES

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## 1.0 Important Information and Warnings

### 1.1 Terms and Summary

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

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

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

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

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

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

### **⚠ CAUTION**

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

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

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

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

## **WARNING**

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

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

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

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

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".

Electrical equipment described herein is designed and built in compliance with Harrington's interpretation of ANSI/NFPA 70, "National Electrical Code". The system designer, system manufacturer, crane designer, crane manufacturer, installer, or user is responsible to assure that the installation and associated wiring of these electrical components is in compliance with ANSI/NFPA 70, and all applicable Federal, State and Local Codes.

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 VOLTAGES ARE PRESENT IN THE CONTROL BOX, OTHER ELECTRICAL COMPONENTS, AND CONNECTIONS BETWEEN THESE COMPONENTS.**

Before performing ANY mechanical or electrical maintenance on the equipment, de-energize (disconnect) the main switch supplying power to the equipment; and lock and tag the main switch 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 trolley hoist in accordance with ANSI/ASME B30.16, "Safety Standard for Overhead Hoists", OSHA Regulations and ANSI/NFPA 70, "National Electric Code". If the trolley 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 trolley hoist read the contents of this manual and applicable portions of ANSI/ASME B30.16, "Safety Standard for Overhead Hoists", OSHA Regulations and ANSI/NFPA 70, "National Electric Code". If the trolley 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 trolley hoist owner/user requires additional information, or if any information in the manual is not clear, contact Harrington or the distributor of the trolley. Do not install, inspect, test, maintain, or operate this trolley hoist unless this information is fully understood.

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

## 1.2 Warning Tag and Labels

The warning tag illustrated below in Figure 1-1 is supplied with each RHN hoist and trolley hoist shipped from the factory. If the tag is not attached to the pendant cord for your hoist/trolley, order a tag from your dealer and install it. Read and obey all warnings attached to this Trolley Hoist. Tag is not shown actual size.

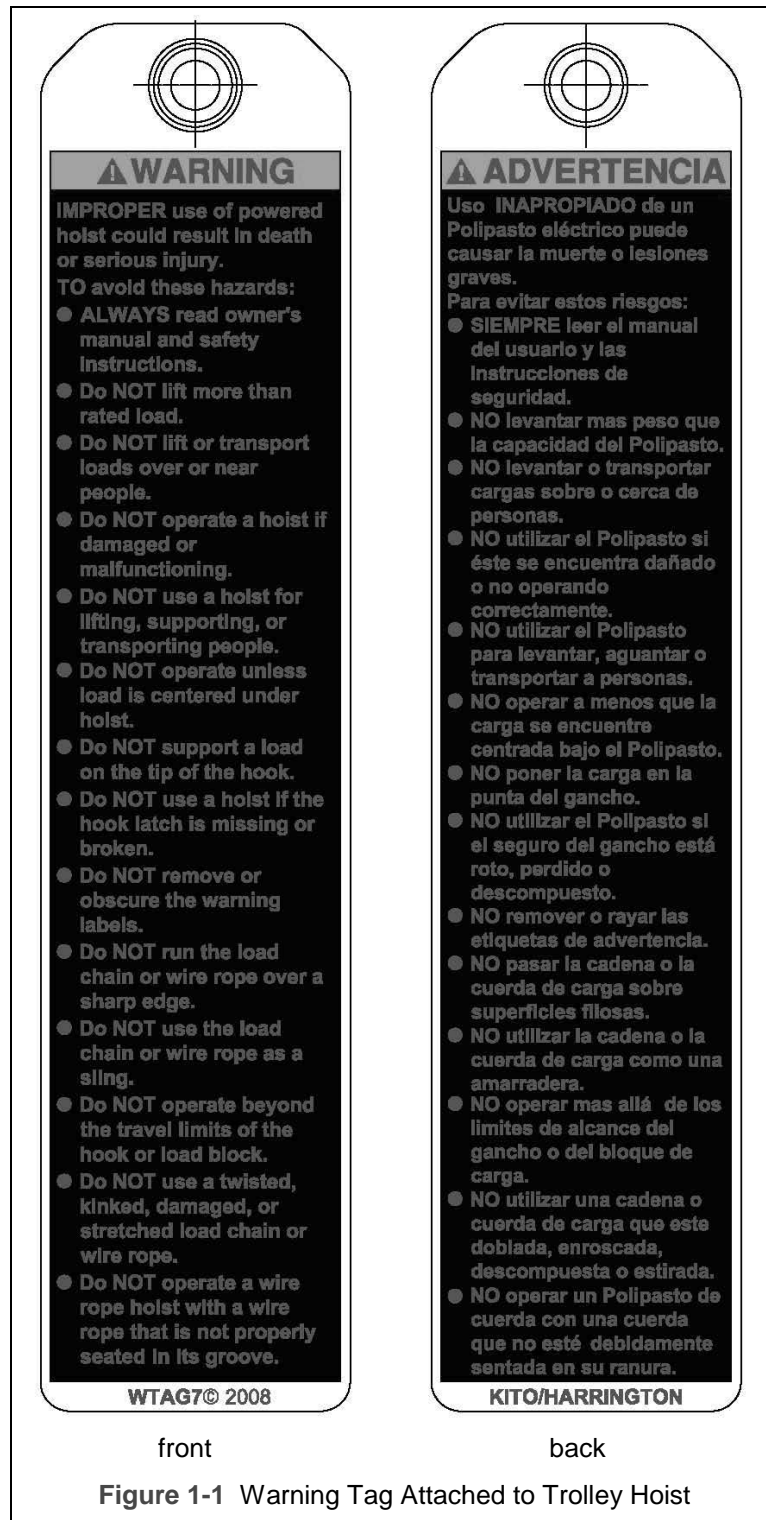
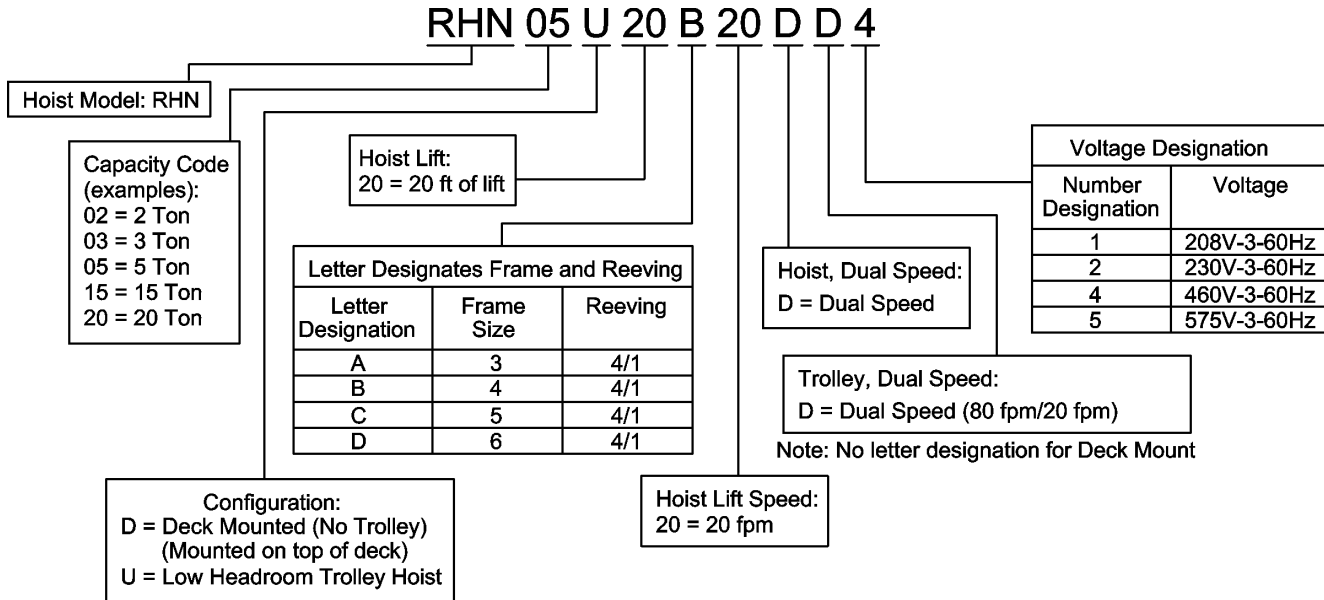


Figure 1-1 Warning Tag Attached to Trolley Hoist

## 2.0 Technical Information

### 2.1 Specifications

#### 2.1.1 Product Code:



#### 2.1.2 Operating Conditions and Environment

- Temperature Range: +14° to +104°F (-10° to +40°C)
- Humidity: 80% or less
- Electrical Enclosure Rating: IP55
- Brake Enclosure Rating: IP66
- Supply Voltage: 208V or 230V or 460V or 575V-3ph-60Hz
- Control Voltage: 110V-1ph-60Hz
- Noise Rating: less than 85 dba at full speed (A scale: measured 1 meter away from electric wire rope hoist)



Table 2-1 Deck Mounted Hoist Specifications										
Capacity (Ton)	Product Code*	Lift (ft.)	Reeving (Parts/ reeving)	Rope Dia. (mm)	Lifting Speed (ft/min)	Dual Speed Hoist Lifting Motor 3 Phase, 60 Hz				Net Weight (lbs)
						Output (Hp) Hi/Low	Current Draw (amps) - Hi/Low			
							208&230V	460V	575V	
2	RHN02D-20A-20D-①	20	4/1	7	20/3.5	5.8/0.9	17.0/8.4	8.3/4.0	6.6/3.2	353
	RHN02D-33A-20D-①	33								375
3	RHN03D-20A-20D-①	20	4/1	7	20/3.5	5.8/0.9	17.0/8.4	8.3/4.0	6.6/3.2	353
	RHN03D-33A-20D-①	33								375
5	RHN05D-20B-20D-①	20	4/1	9	20/3.5	7.2/1.2	22.0/11.0	10.0/5.4	8.2/4.3	452
	RHN05D-33B-20D-①	33								485
7 ½	RHN08D-20C-20D-①	20	4/1	12.5	20/3.5	14.8/2.1	42.0/21.0	20.0/10.0	16.0/8.0	1025
	RHN08D-33C-20D-①	33								1102
10	RHN10D-20C-20D-①	20	4/1	12.5	20/3.5	14.8/2.1	42.0/21.0	20.0/10.0	16.0/8.0	1025
	RHN10D-33C-20D-①	33								1102
15	RHN15D-20D-16D-①	20	4/1	20	16/2.5	24.1/4.0	67.0/27.0	32.0/13.0	25.6/10.4	2271
	RHN15D-33D-16D-①	33								2436
20	RHN20D-20D-16D-①	20	4/1	20	16/2.5	24.1/4.0	67.0/27.0	32.0/13.0	25.6/10.4	2271
	RHN20D-33D-16D-①	33								2436

\*See Section 2.1.1 for place holder ① designation

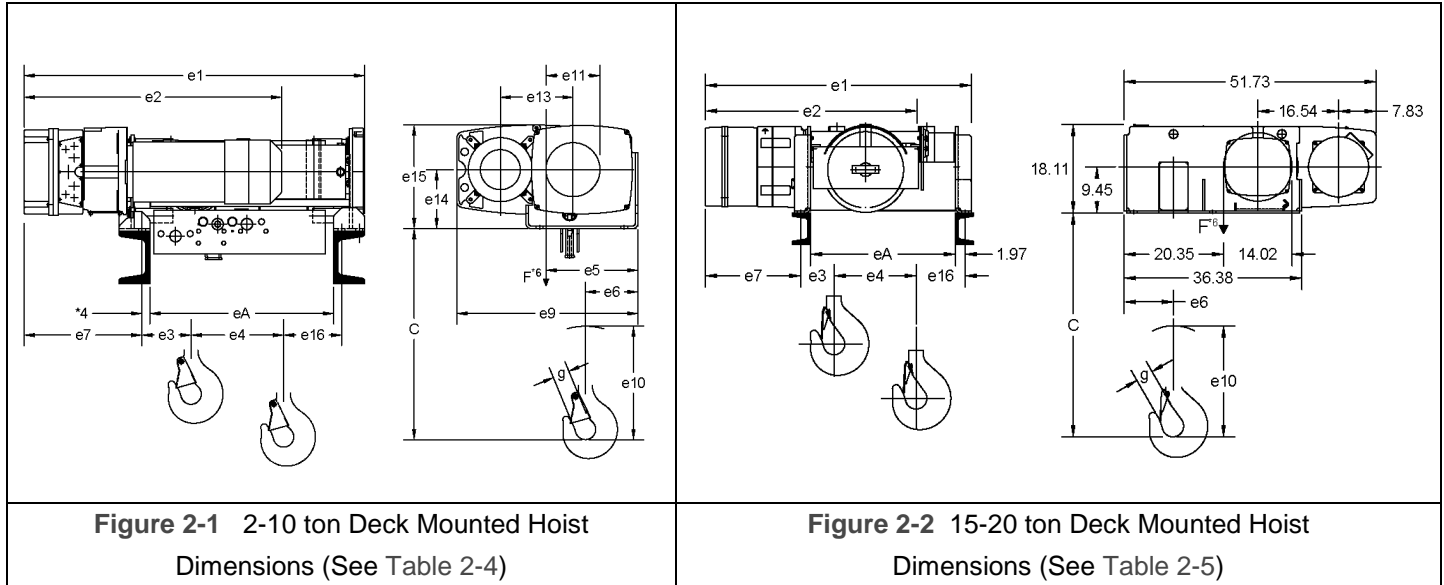
Table 2-2 Ultra-Low Headroom Trolley Hoists Hoist Specifications										
Capacity (Ton)	Product Code*	Lift (ft.)	Reeving (Parts/ reeving)	Rope Dia. (mm)	Lifting Speed (ft/min)	Dual Speed Hoist Lifting Motor 3 Phase, 60 Hz				Net Weight (lbs)
						Output (Hp) Hi/Low	Current Draw (amps) - Hi/Low			
							208&230V	460V	575V	
2	RHN02U-20A-20DD-①	20	4/1	7	20/3.5	5.8/0.9	17.0/8.4	8.3/4.0	6.6/3.2	617
	RHN02U-33A-20DD-①	33								650
3	RHN03U-20A-20DD-①	20	4/1	7	20/3.5	5.8/0.9	17.0/8.4	8.3/4.0	6.6/3.2	617
	RHN03U-33A-20DD-①	33								650
5	RHN05U-20B-20DD-①	20	4/1	9	20/3.5	7.2/1.2	22.0/11.0	10.0/5.4	8.2/4.3	767
	RHN05U-33B-20DD-①	33								831
7 ½	RHN08U-20C-20DD-①	20	4/1	12.5	20/3.5	14.8/2.1	42.0/21.0	20.0/10.0	16.0/8.0	1766
	RHN08U-33C-20DD-①	33								1872
10	RHN10U-20C-20DD-①	20	4/1	12.5	20/3.5	14.8/2.1	42.0/21.0	20.0/10.0	16.0/8.0	1766
	RHN10U-33C-20DD-①	33								1872
15	RHN15U-28C-12DD-①	28	4/1	14	12/2.0	14.8/2.1	42.0/21.0	20.0/10.0	16.0/8.0	3086
	RHN15U-46C-12DD-①	46								3439

\*See Section 2.1.1 for place holder ① designation.

Table 2-3 Ultra-Low Headroom Trolley Hoists Trolley Specifications								
Capacity (Tons)	Product Code	Standard Flange Range B* (in)	Dual Speed Traversing Motor 80 and 20 ft/min					
			Output (Hp) Hi/Low	Current Draw (amps) - Hi/Low				
				208V	230V	460V	575V	
2	RHN02U-20A-20DD-①	3.25-12	0.59/0.15	3.0/2.3	2.6/2.0	1.3/1.0	1.0/0.8	
	RHN02U-33A-20DD-①							
3	RHN03U-20A-20DD-①	3.25-12	0.59/0.15	3.0/2.3	2.6/2.0	1.3/1.0	1.0/0.8	
	RHN03U-33A-20DD-①							
5	RHN05U-20B-20DD-①	3.63-12	0.59/0.15	3.0/2.3	2.6/2.0	1.3/1.0	1.0/0.8	
	RHN05U-33B-20DD-①							
7 ½	RHN08U-20C-20DD-①	4.63-12	0.89/0.21	3.7/2.8	3.2/2.4	1.6/1.2	1.3/1.0	
	RHN08U-33C-20DD-①							
10	RHN10U-20C-20DD-①	4.63-12	0.89/0.21	3.7/2.8	3.2/2.4	1.6/1.2	1.3/1.0	
	RHN10U-33C-20DD-①							
15	RHN15U-28D-12DD-①	8.75-12	2.01/0.48	6.9/3.2	6.0/2.8	3.0/1.4	2.4/1.1	
	RHN15U-46D-12DD-①							

\*Optional wider flange ranges available up to 19.7 inches. Consult factory.

## 2.2 Dimensions



Capacity (Tons)	Product Code*	Min. Headroom C (in)	e1 (in)	e2 (in)	e3 (in)	e4 (in)	e5 (in)	e6 (in)	e7 (in)	e9 (in)	e10 (in)	e11 (in)	e13 (in)	e14 (in)	e15 (in)	e16 (in)	eA (in)
2	RHN02D-20A-20D-①	22.6	40.9	29.6	6.3	4.6	9.0	4.8	13.9	21.3	11.5	4.9	7.2	6.3	11.0	13.3	22.2
	RHN02D-33A-20D-①		52.5		6.2	7.6										22.1	33.8
3	RHN03D-20A-20D-①	22.6	40.9	29.6	6.3	4.6	9.0	4.8	13.9	21.3	11.5	4.9	7.2	6.3	11.0	13.3	22.2
	RHN03D-33A-20D-①		52.5		6.2	7.6										22.1	33.8
5	RHN05D-20B-20D-①	25.6	41.3	31.2	6.4	4.3	11.2	5.9	14.3	22.0	13.8	6.6	8.8	7.2	12.9	13.5	22.2
	RHN05D-33B-20D-①		52.9			7.2										22.2	33.8
7 ½	RHN08D-20C-20D-①	32.5	48.0	39.3	9.5	4.6	14.1	7.5	17.2	28.6	18.2	8.6	11.7	9.4	16.9	12.6	24.6
	RHN08D-33C-20D-①		60.4			7.8										21.8	37.0
10	RHN10D-20C-20D-①	32.5	48.0	39.3	9.5	4.6	14.1	7.5	17.2	28.6	18.2	8.6	11.7	9.4	16.9	12.6	24.6
	RHN10D-33C-20D-①		60.4			7.8										21.8	37.0

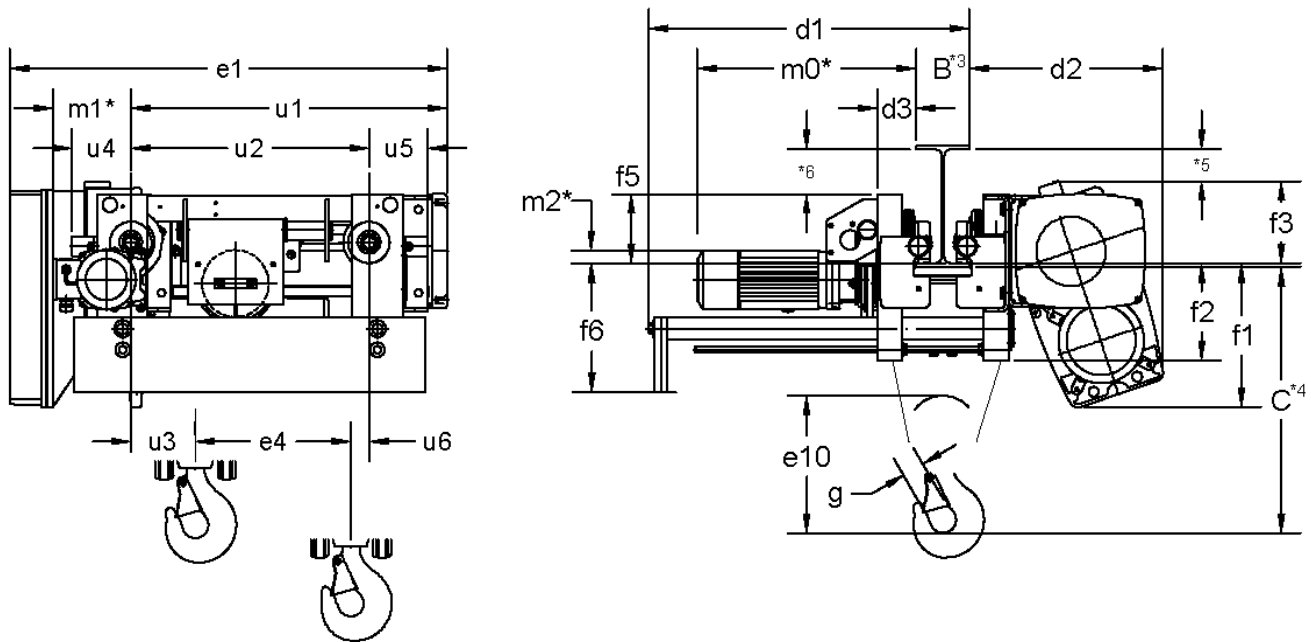
Capacity (Tons)	Product Code*	Min. Headroom C (in)	e1 (in)	e2 (in)	e3 (in)	e4 (in)	e6 (in)	e7 (in)	e10 (in)	e16 (in)	eA (in)
15	RHN15D-20D-16D-①	37.0	54.4	43.7	13.4	4.6	10.9	19.5	29.7	15.7	29.7
	RHN15D-33D-16D-①		66.6			7.6				24.9	41.9
20	RHN20D-20D-16D-①	37.0	54.4	43.7	13.4	4.6	10.9	19.5	29.7	15.7	29.7
	RHN20D-33D-16D-①		66.6			7.6				24.9	41.9

**Notes:**

\*See Section 2.1.1 for place holder ① designation

\*\* See Table 2-10 and Table 2-11 for attachment point dimensions

**Table 2-6 Ultra-Low Headroom Trolley Hoist Dimensions**



Capacity (Tons)	Product Code *1	e1 (in)	e4 (in)	e10 (in)	d1 (in)	d2 (in)	d3 (in)	f1 (in)	f2 (in)	f3 (in)	f5 (in)	f6 (in)	u1 (in)	u2 (in)	u3 (in)	u4 (in)	u5 (in)	u6 (in)
2	RHN02U-20A-20DD-①	40.3	4.6	11.5	28.6	18.0	3.7	13.9	8.9	6.5	6.1	11.9	30.0	22.4	9.1	5.1	5.9	8.7
	RHN02U-33A-20DD-①	51.9	7.6															
3	RHN03U-20A-20DD-①	40.3	4.6	11.5	28.6	18.0	3.7	13.9	8.9	6.5	6.1	11.9	30.0	22.4	9.1	5.1	5.9	8.7
	RHN03U-33A-20DD-①	51.9	7.6															
5	RHN05U-20B-20DD-①	41.2	4.3	13.8	30.8	18.2	3.7	13.5	9.1	7.7	6.5	12.1	29.8	22.4	9.9	5.6	5.6	8.3
	RHN05U-33B-20DD-①	54.6	7.2							8.1	8.1	10.9	47.3	40.0	15.8			17.0
7 ½	RHN08D-20C-20DD-①	47.2	4.6	18.2	37.0	22.9	4.5	16.1	11.4	10.7	9.8	15.7	33.7	24.6	12.6	6.7	6.7	7.4
	RHN08U-33C-20DD-①	59.6	7.8									15.0	46.1	37.0	12.6			16.6
10	RHN10U-20C-20DD-①	47.2	4.6	18.2	37.0	22.9	4.5	16.1	11.4	10.7	9.8	15.7	33.7	24.6	12.6	6.7	6.7	7.4
	RHN10U-33C-20DD-①	59.6	7.8									15.0	46.1	37.0	12.6			16.6
15*	RHN15U-28D-12DD-①	65.6†	4.6	23.0	44.4	25.2	6.6	24.5	11.8	10.0	10.0	16.7	49.4†	40.7	15.9	8.7	8.7	20.3
	RHN15U-46D-12DD-①	79.7†	7.7									15.2	69.5†	60.8	23.7			29.4

**Notes:**

\* Refer to Table 2-7 for motor dimensions m0, m1, and m2. Motor dimension m0 may extend past the counterweight depending on the hoist model and flange width B.

\*1 - See Section 2.1.1 for place holder ① designation

\*3 - Refer to Table 2-8 for flange range dimension B (Trolleys are suitable for use on S or W shaped beams)

\*4 - Refer to Table 2-8 for headroom dimension C

\*5/\*6 - Observe clearance dimensions

† - For the 15t trolley hoist model, this measurement is to the end of the trolley frame because it extends past the drum cover shown in the figure.

<b>Table 2-7 Ultra-Low Headroom Trolley Motor Dimensions</b>				
<b>Capacity (Tons)</b>	<b>Product Code*</b>	<b>m0 (in)</b>	<b>m1 (in)</b>	<b>m2 (in)</b>
2	RHN02U-20A-20DD-①	20.6	7.4	1.3
	RHN02U-33A-20DD-①			
3	RHN03U-20A-20DD-①	20.6	7.4	1.3
	RHN03U-33A-20DD-①			
5	RHN05U-20B-20DD-①	20.6	7.4	1.3
	RHN05U-33B-20DD-①			
7 ½	RHN08U-20C-20DD-①	22.4	9.5	0.8
	RHN08U-33C-20DD-①			
10	RHN10U-20C-20DD-①	22.4	9.5	0.8
	RHN10U-33C-20DD-①			
15	RHN15U-28D-12DD-①	26.5	10.1	1.3
	RHN15U-46D-12DD-①			

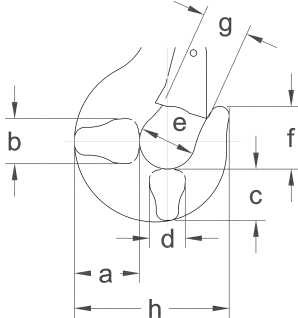
\*See Section 2.1.1 for place holder ① designation

<b>Table 2-8 Ultra-Low Headroom Trolley Hoist Headroom Dimensions</b>			
<b>Capacity (Tons)</b>	<b>Flange Range, B (in)</b>	<b>Headroom, C* (in)</b>	<b>Headroom, C for 6 inch Flange (in)</b>
2 3	3.25-4.69	22.0	21.7
	4.69-6.69	23.4-(0.29*T)	
	6.69-12	17.6+(0.58*T)	
5	3.625-4.69	26.2	26.0
	4.69-6.69	26.6-(0.10*T)	
	6.69-12	27.5-(0.23*T)	
7 ½ 10	4.625-6.69	33.1-(0.29*T)	31.4
	6.69-12	33.4-(0.35*T)	
15	8.75-12	40.8-(0.31*T)	38.0**

\*T in formulas is the exact beam flange width in inches.

\*\*Headroom value for 9 inch flange.

## 2.3 Miscellaneous

Table 2-9 Hook Dimension*									
									
Units = inch									
Capacity (Tons)	Product Code**	a	b	c	d	e	f	g	h
2	RHN02D-20A-20D-①	2.2	1.8	1.9	1.5	2.2	2.5	1.6	5.8
	RHN02D-33A-20D-①								
3	RHN03D-20A-20D-①	2.2	1.8	1.9	1.5	2.2	2.5	1.6	5.8
	RHN03D-33A-20D-①								
5	RHN05D-20B-20D-①	2.6	2.1	2.3	1.8	2.5	2.8	1.7	6.6
	RHN05D-33B-20D-①								
7 ½	RHN08D-20C-20D-①	3.1	2.5	2.6	2.1	2.8	3.1	1.9	7.7
	RHN08D-33C-20D-①								
10	RHN10D-20C-20D-①	3.1	2.5	2.6	2.1	2.8	3.1	1.9	7.7
	RHN10D-33C-20D-①								
15	RHN15U-28D-12DD-①	3.9	3.1	3.3	2.6	3.5	4.0	2.4	10.1
	RHN15U-46D-12DD-①								
	RHN15D-20D-16D-①	4.9	3.9	4.2	3.3	4.4	5.0	3.2	12.0
	RHN15D-33D-16D-①								
20	RHN20D-20D-16D-①	4.9	3.9	4.2	3.3	4.4	5.0	3.2	12.0
	RHN20D-33D-16D-①								

\*Refer to Section 5.6 for inspection dimensions and limits.

\*\*Product codes represent deck/base mounted hoists (except RHN15U), but hook dimensions also apply to ultra-low trolley hoists. See Section 2.1.1 for place holder ① designation

**Table 2-10 Deck Mounted Hoist Attachment Point Dimensions (2-10 ton)**

Capacity (Tons)	Product Code*	e1 (in)	e12 (in)	Deck/Base Mounted	
2	RHN02D-20A-20D-①	40.9	24.2		
	RHN02D-33A-20D-①	52.5	35.8		
3	RHN03D-20A-20D-①	40.9	24.2		
	RHN03D-33A-20D-①	52.5	35.8		
5	RHN05D-20B-20D-①	41.3	24.2		
	RHN05D-33B-20D-①	52.9	35.8		
7 1/2	RHN08D-20C-20D-①	48.0	26.8		
	RHN08D-33C-20D-①	60.4	39.2		
10	RHN10D-20C-20D-①	48.0	26.8		
	RHN10D-33C-20D-①	60.4	39.2		

**Notes:**

\*See Section 2.1.1 for place holder ① designation

\*5 – Lock washer

**Table 2-11 Deck Mounted Hoist Attachment Point Dimensions (15 & 20 ton)**

Capacity (Tons)	Product Code*	e1 (in)	e2 (in)	e12 (in)	Deck/Base Mounted
15	RHN15D-20D-16D-ⓐ	54.4	43.7	33.7	
	RHN15D-33D-16D-ⓐ	66.6		45.9	
20	RHN20D-20D-16D-ⓐ	54.4	43.7	33.7	
	RHN20D-33D-16D-ⓐ	66.6		45.9	

**Notes:**

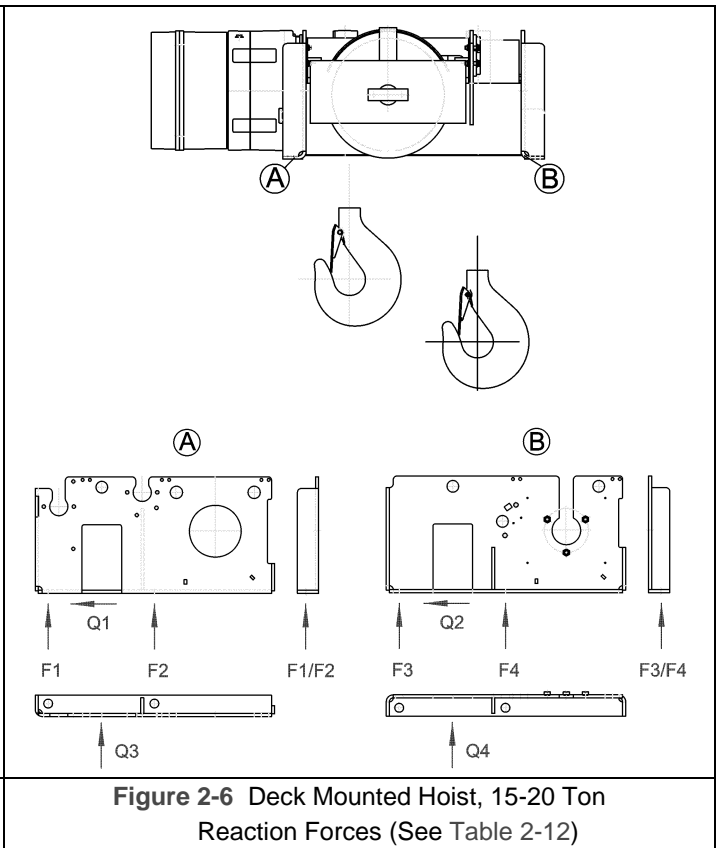
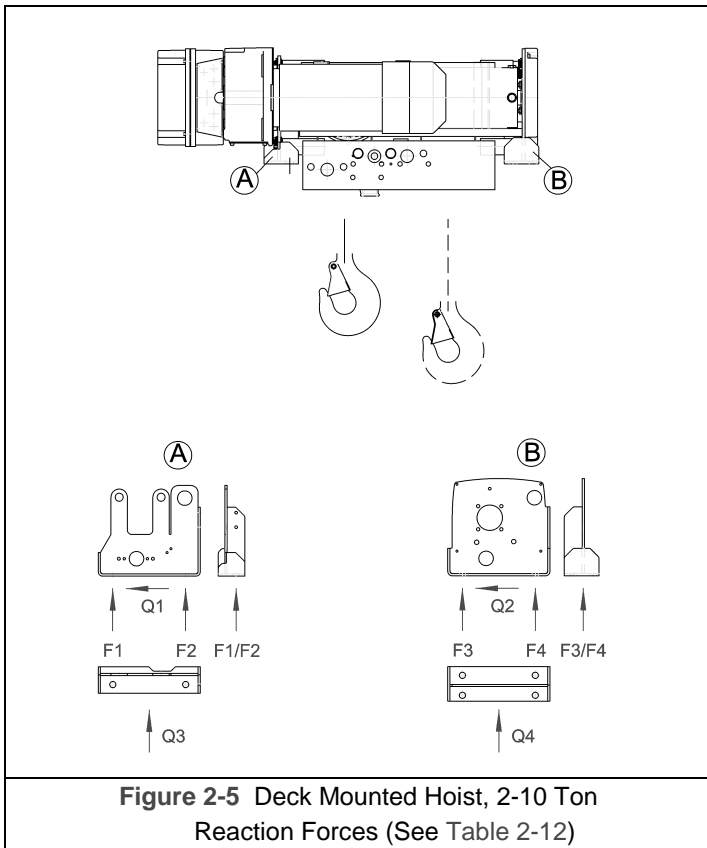
\*See Section 2.1.1 for place holder ⓐ designation

\*5 – Lock washer (Schnorr)



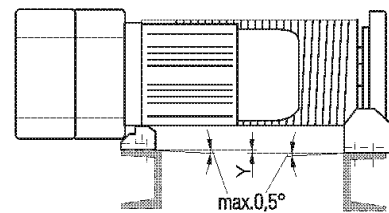
Table 2-12 Reaction Forces at Rated Load, Deck Mounted										
Capacity (Tons)	Product Code	F1 (lbs)	F2 (lbs)	F3 (lbs)	F4 (lbs)	Q1 (lbs)	Q2 (lbs)	Q3 (lbs)	Q4 (lbs)	Moment*, M <sub>T</sub> (ft-lbs)
2	RHN02D-20A-20D-①	1817	1902	654	1292	295	169	393	393	232*
	RHN02D-33A-20D-①	1950	2149	582	1122	328	147	393	393	
3	RHN03D-20A-20D-①	2700	3043	1038	2067	472	270	629	629	372*
	RHN03D-33A-20D-①	2906	3439	916	1795	524	235	629	629	
5	RHN05D-20B-20D-①	4171	4683	1618	3151	736	415	984	984	770*
	RHN05D-33B-20D-①	4480	5272	1435	2744	814	362	984	984	
7 ½	RHN08D-20C-20D-①	6989	5019	3625	5051	978	741	1475	1475	1514*
	RHN08D-33C-20D-①	7758	6054	3112	4278	1129	627	1475	1475	
10	RHN10D-20C-20D-①	9041	6692	4763	6735	1304	988	1967	1967	2019*
	RHN10D-33C-20D-①	10042	8072	4076	5703	1506	836	1967	1967	
15	RHN15D-20D-16D-①	9297	14086	5835	13988	1894	1684	3147	3147	**
	RHN15D-33D-16D-①	10384	16989	4931	12154	2227	1445	3147	3147	
20	RHN20D-20D-16D-①	12088	16707	7449	17186	2367	2105	3934	3934	**
	RHN20D-33D-16D-①	13494	20243	6316	14899	2784	1807	3934	3934	

See Section 2.1.1 for place holder ① designation

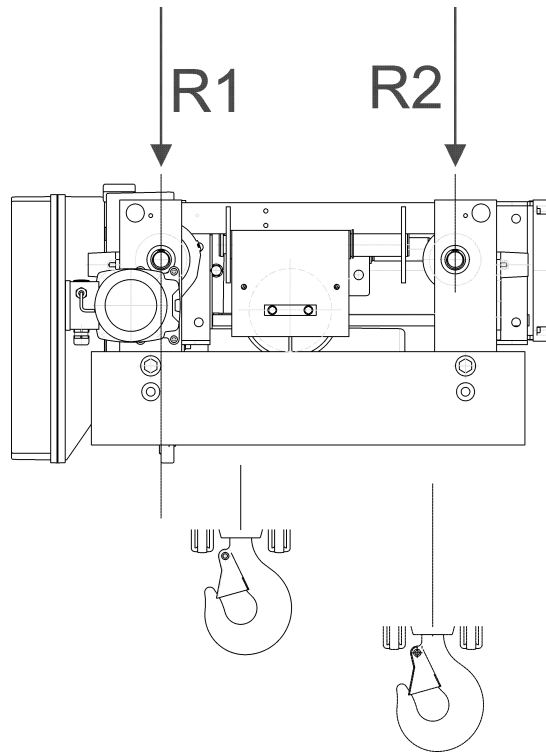


\*For 2-10t capacities, the customer's substructure must account for the moment M<sub>T</sub> (torque) from the rope drum. Therefore it must be torsion resistant and level, (max permissible offset, Y = .0787in.)

\*\*For 15-20t capacities, the design structure accounts for the moment, and the forces are diverted to the fixation points.



**Table 2-13 Wheel Pair Reaction Forces at Rated Load,  
Ultra-Low Headroom Monorail Trolley**

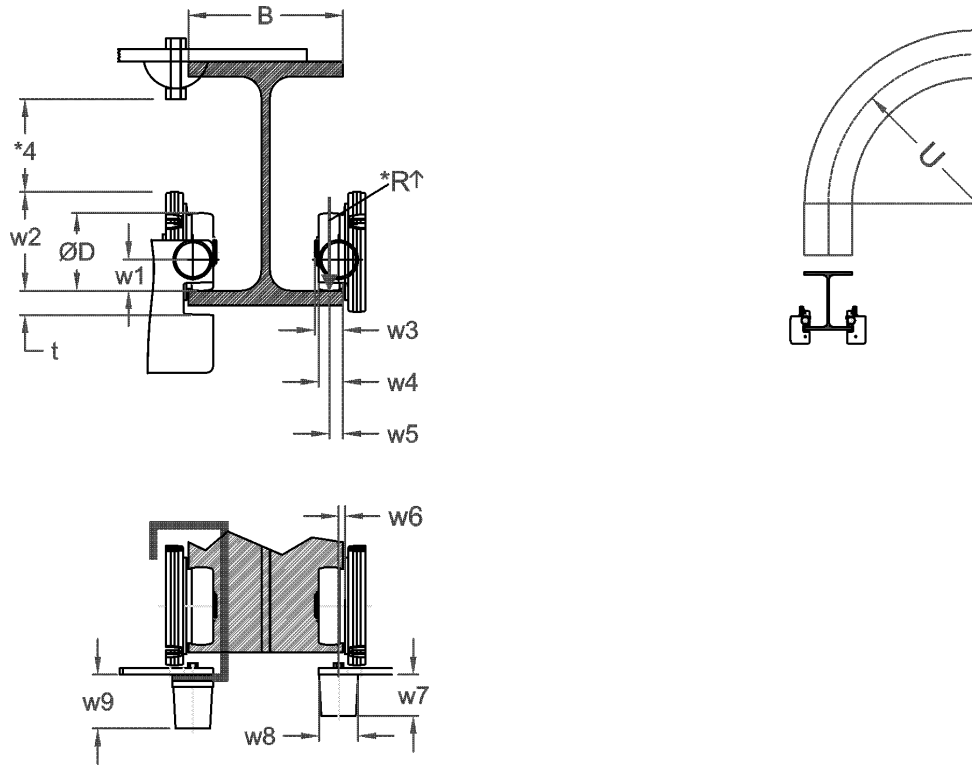


Capacity (Tons)	Product Code*	R1 (lbs)	R2 (lbs)
2	RHN02U-20A-20DD-①	2985	2939
	RHN02U-33A-20DD-①	3632	2411
3	RHN03U-20A-20DD-①	4292	4285
	RHN03U-33A-20DD-①	5253	3487
5	RHN05U-20B-20DD-①	6629	7288
	RHN05U-33B-20DD-①	7167	6675
7 1/2	RHN08D-20C-20DD-①	9102	12320
	RHN08U-33C-20DD-①	12011	9860
10	RHN10U-20C-20DD-①	11783	16192
	RHN10U-33C-20DD-①	15641	12898
15	RHN15U-28D-12DD-①	22045	17881
	RHN15U-46D-12DD-①	22226	18478
20	N/A		
	N/A		

**Notes:**

\*See Section 2.1.1 for place holder ① designation

Table 2-14 Trolley Wheel Dimensions



Capacity (Tons)	Product Code <sup>*5</sup>	Wheel Dia. Ø D (in)	w1 (in)	w2 (in)	w3 (in)	w4 (in)	w5 (in)	w6 (in)	w7 (in)	w8 (in)	w9 (in)	U <sup>*2</sup> (ft)	Maximum Flange Thickness t (in)
2	RHN02U-20A-20DD-①	3.1	1.6	4.1	1.2	1.1	0.5 (0.6)**	0.2	2.1	2.0	2.5	37.4*	0.96
	RHN02U-33A-20DD-①											56.8*	
3	RHN03U-20A-20DD-①	3.1	1.6	4.1	1.2	1.1	0.5 (0.6)**	0.2	2.1	2.0	2.5	37.4*	0.96
	RHN03U-33A-20DD-①											56.8*	
5	RHN05U-20B-20DD-①	3.9	1.6	5.1	1.5	1.2	0.7 (0.9)**	0.2	2.1	2.0	2.5	37.4*	1.04
	RHN05U-33B-20DD-①											56.8*	
7 1/2	RHN08D-20C-20DD-①	5.5	1.5	6.9	N/A	1.8	0.9 (1.3)**	0.5	2.1	2.5	2.5	41.0*	1.46
	RHN08U-33C-20DD-①											61.7*	
10	RHN10U-20C-20DD-①	5.5	1.5	6.9	N/A	1.8	0.9 (1.3)**	0.5	2.1	2.5	2.5	41.0*	1.46
	RHN10U-33C-20DD-①											61.7*	
15	RHN15U-28D-12DD-①	7.9	1.7	10.5	N/A	1.8	0.9 (1.3)**	0.5	2.1	2.5	2.5	N/A	1.81
	RHN15U-46D-12DD-①											N/A	

Notes :

- \* Smaller bend radius upon request
- \*\* - ( ) with sloping flange
- \*R - See page 18 for reaction forces R1 and R2
- \*2 - only up to B ≤ 7.9 inches
- \*4 - Observe clearance dimensions
- \*5 - See Section 2.1.1 for place holder ① designation

## 3.0 Pre-operational Procedures

### 3.1 General Information

- 3.1.1 When the RHN trolley hoist or deck mounted hoist is incorporated into lifting systems utilizing other equipment, follow and complete all pre-operational procedures and instructions provided with the equipment. Special wiring considerations must also be taken to complete the integration of the RHN trolley hoist or deck mounted hoist into the system.
- 3.1.2 The RHN hoist is delivered pre-assembled on a pallet with a wooden frame. The frame is wrapped in plastic for additional protection. (see Figure 3-1). During shipment and storage prior to installation, the trolley hoist should be kept between  $-4^{\circ}$  and  $+140^{\circ}\text{F}$  ( $-20^{\circ}$  and  $+60^{\circ}\text{C}$ ) and the relative humidity must not exceed 80%. The standard packaging is not watertight and rainproof.



Figure 3-1 Packaged as delivered

- 3.1.3 The RHN trolley hoist or deck mounted hoist is shipped pre-lubricated and the gear box(s) are filled with the correct amount and type of oil. Follow the lubrication requirements in Section 6.1 after the trolley hoist is placed into service.

### 3.2 Handling

- 3.2.1 Transportation – When moving the hoist or trolley hoist prior to installation, do not remove hoist from crate. Always move hoist/trolley hoist utilizing a fork lift, pallet jack or hoist/crane system. Do NOT stack or place anything on top of the trolley hoist or crate. Avoid swinging and unbalanced conditions.
- 3.2.2 Lift points – When a pallet/crate is not practical, use of RHN lifting location is acceptable. The RHN deck mounted hoist is equipped with lifting lugs to facilitate lifting, while the RHN trolley hoist is equipped with openings in the vertical tubes to accept hooks or slings (see Figures 3-2 and 3-3). While lifting do NOT support the deck mount hoist or trolley hoist any other way.

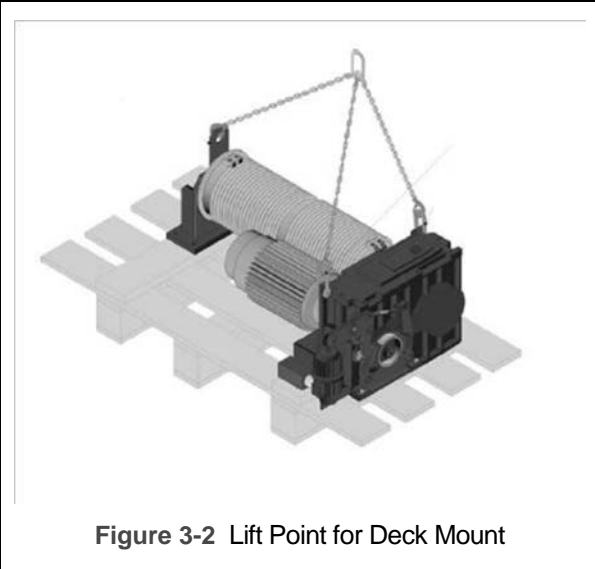


Figure 3-2 Lift Point for Deck Mount

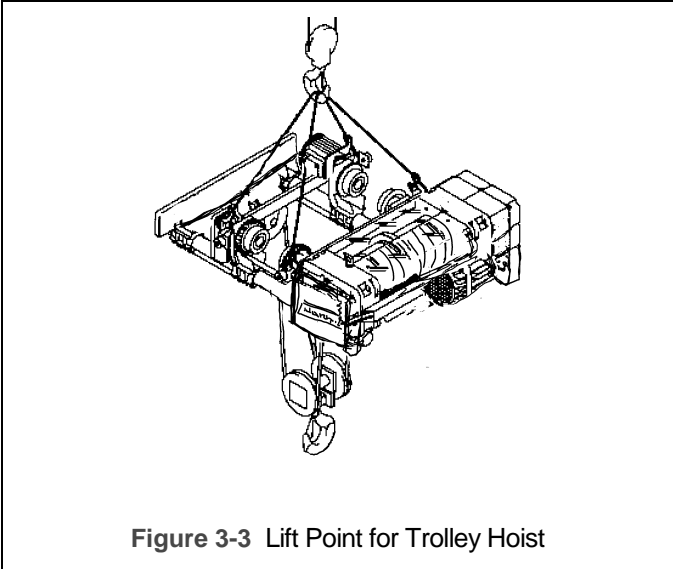


Figure 3-3 Lift Point for Trolley Hoist

### 3.3 Mounting Location

- 3.3.1 **⚠WARNING** Prior to mounting the RHN deck mounted hoist, ensure that the substructure is adequate and capable of withstanding the forces generated by the hoist and the load. Therefore, the substructure must be torsion resistant and level (See Table 2-12 for more details). Prior to mounting the RHN trolley hoist ensure that the trolley beam and its supporting structure are adequate to support the trolley hoist and its load. (See Table 2-13). If necessary consult a professional that is qualified to evaluate the adequacy of the suspension location and its supporting structure.
- 3.3.2 Ensure that there is adequate vertical and horizontal clearance along the entire range of the trolley hoist's motion.
- 3.3.3 **NOTICE** See Section 6.8 for outdoor installation considerations.

### 3.4 Assembly, Adjustments and Mounting

**⚠WARNING** When installing the trolley hoist on a beam, ALWAYS raise the hoist into position with the trolley assembled together and securely attached to a pallet. Raise the trolley hoist with a forklift, lifting platform, or other similar means. NEVER use slings to raise and install the trolley hoist onto the beam (see Figure 3-4). Using a forklift or another suitable means, position the pallet so that the horizontal axis of the beam is parallel to the horizontal axis of the hoist (see Figure 3-5)

Note: Unless specified when ordered, the RHN Trolley hoist is factory set to accommodate a 12 inch (306mm) beam flange. If a smaller flange width is necessary, the driveshaft position and/or length may require a change as well (See Table 3-1). If the supplied trolley drive shaft is too long for the desired flange, a short trolley drive shaft can be ordered, or the existing shaft can be cut down to the appropriate length. Use caution and always wear eye protection when cutting the trolley drive shaft with a powered saw or a manual saw. Deburr the cut end of shaft before reinstalling. The RHN is equipped with the maximum number of counterweights necessary for the standard (advertised) flange range for each capacity. If the flange range exceeds 12 inches (306mm), some counter weight may need to be removed to achieve proper balance.

#### 3.4.1 RHN Trolley Hoist Installation

- 1) Make sure the mounting location complies with Section 3.3.
- 2) Before attempting to install the trolley hoist, verify beam width and the “c” dimension (see Figure 3-6). See Table 3-1 for dimensions respective values. If adjustment is not necessary, move onto section Section 3.4.1 (step 8). If adjustment is necessary move onto step 3, below.
- 3) Determine the correct driveshaft length for your application.
  - a. If a shorter driveshaft length is required, it is necessary to replace or cut the existing driveshaft to the appropriate length. (See Table 3-2)
  - b. If a longer driveshaft length is required, it is necessary to replace the existing driveshaft with one of the appropriate length. (See Table 3-2)
- 4) Determine the correct Snap Ring Position on the driveshaft, for your application. (2 ton – 10 ton)  
Each driveshaft has multiple Snap Ring positions shown as X3 and X4. These different positions allow the Trolley Driveshaft to be inserted at two different depths within the motor housing. This gives the drive shaft the ability to accommodate a range of beam flange widths before it necessary to change the shaft length.(See Table 3-2)
- 5) Accessing the Drive Shaft for replacement, shortening and/or Snap Ring relocation.
  - a. Carefully remove the trolley motor by loosening and removing the 4 trolley motor mounting bolts. It may be necessary to disconnect the trolley motor cable, if there is not enough slack to allow for the motor to be safely supported, as work is being performed. With the bolts removed, the motor can slide off of the drive shaft.
  - b. With the motor removed and safely placed out of the way, the driveshaft can pulled out of the trolley assembly.
- 6) Adjust the trolley flange to fit beam width.
  - a. Working on the trolley motor side of the hoist, (the side closest to the large rectangular counter weights), loosen the nuts (2) on the two threaded shafts (1) of the trolley hoist. **DO NOT** loosen the nuts closest to the hoist. **NEVER** move the hoist side of the trolley. (See Figure 3-6 and Figure 3-11)

- b. With the nuts (2) loosened enough to allow the trolley frame to move, slide the trolley motor side of the hoist outward or inward to meet the desired flange width. Tighten nuts (2) with a torque wrench, to 155 ft lbs (210 Nm). (See Figure 3-6 and Figure 3-11.)

## 7) Installing the Drive Shaft

### a. 2Ton – 10Ton Trolley Hoist

Install Snap Rings (S) on to Driveshaft (D) in position X3 or X4 depending on flange width (B) of the runway beam and length (L) of drive shaft (D). Slide Drive Shaft through drive pinions and install trolley motor. (See Figures 3-8, and 3-9. Also see Tables 3-2 and 3-3.)

### b. 15 Ton Trolley Hoist

Insert drive shaft (5) into the two drive pinions (6) from the counterweight side, then assemble spacer tube (7) and adjusting ring (8). (See Figure 3-11).

Adjust drive shaft (5) so that on the hoist side of the shaft end projects between “min. 0in. (0mm)” and “max. 4.72 in.(120mm)” beyond the drive pinion (6) and on the counterweight side the shaft end projects between “min. 1.89 in. (48 mm)” and “max. 6.30in. (160 mm)” beyond the trolley frame (10). (See Figure 3-11).

Lock adjusting ring (8) with the adjusting screw so that there is approximately "3 mm" space between spacer tube (7) and the adjusting ring (8) when spacer tube (7) is against drive pinion (6). After fitting travel drive, check drive shaft (5) for ease of movement. (See Figure 3-11).

## 8) Mounting the Trolley Hoist to the beam.

- a. Install any additional devices, if any (power supply cords or pendants, for instance – see Section 3.5), onto the trolley hoist. If the trolley hoist is not secured to a pallet, place and secure it to one making sure that the trolley hoist is completely stable.
- b. Before attempting to install the trolley hoist, verify beam width and the “c” dimension (see Figure 3-6). See Table 3-1 for dimensions respective values. Adjust flange width if necessary. (See Section 3.4.1 Step 6)
- c. If the end of the runway beam is accessible, slide the trolley hoist onto the end of the runway beam. Check clearance f/2 ( Figure 3-7 and Table 3-1). Adjust if necessary. (See Section 3.4.1 Step 6).

If the end of the runway beam is not accessible, the trolley flange width will need to be opened up to allow the Trolley Hoist to fit around the beam. (See Section 3.4.1 Step 6).

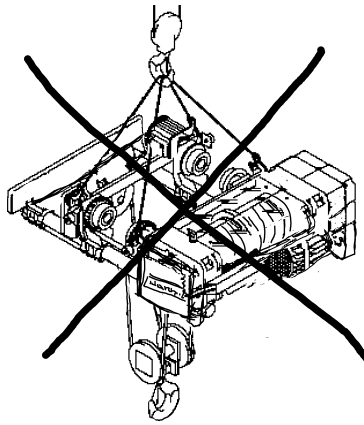


Figure 3-4 Lift Point for Deck Mount

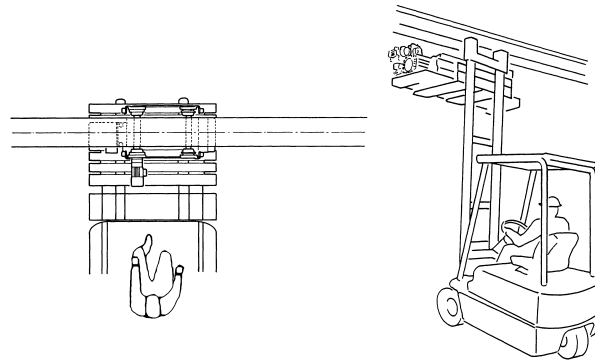


Figure 3-5 Lift Point for Trolley Hoist

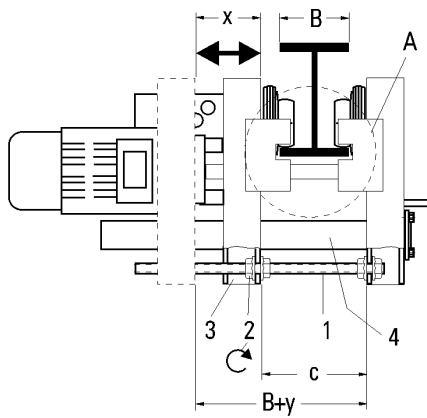


Figure 3-6 Trolley Hoist Clearances 2 Ton – 10 Ton

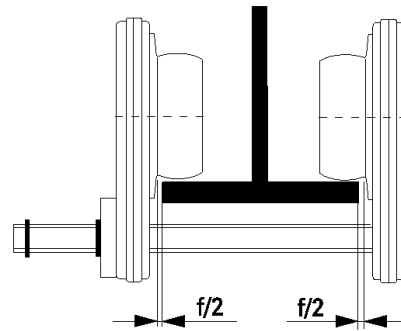


Figure 3-7 Trolley Hoist Clearances

Table 3-1 Trolley Clearances and Wheel Diameters

Hoist	Wheel Diameter		c		f/2		y	
	in	mm	in	mm	in	mm	in	mm
RHN02 RHN03	3 1/8	80	B+2 5/8	B+67	1/16	1.5	5 3/8	137
RHN05	4	100	B+2 5/8	B+67	1/16	1.5	5 3/4	147
RHN08 RHN10	5 1/2	140	B+2 5/8	B+67	1/16	1.5	6 3/8	162
RHN15	8	200	B+3 5/8	B+67	1/16	1.5	7 3/8	187



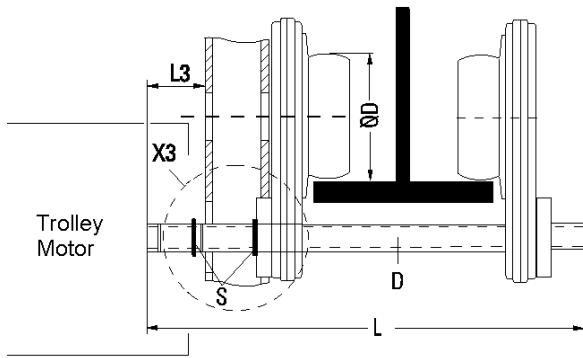


Figure 3-8

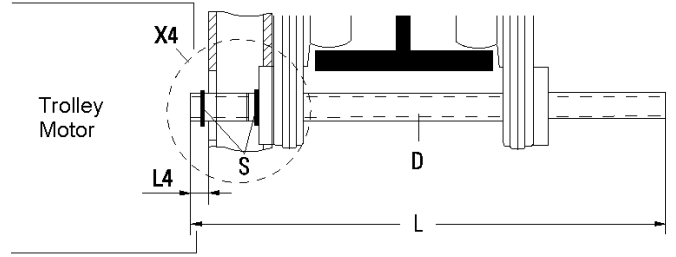
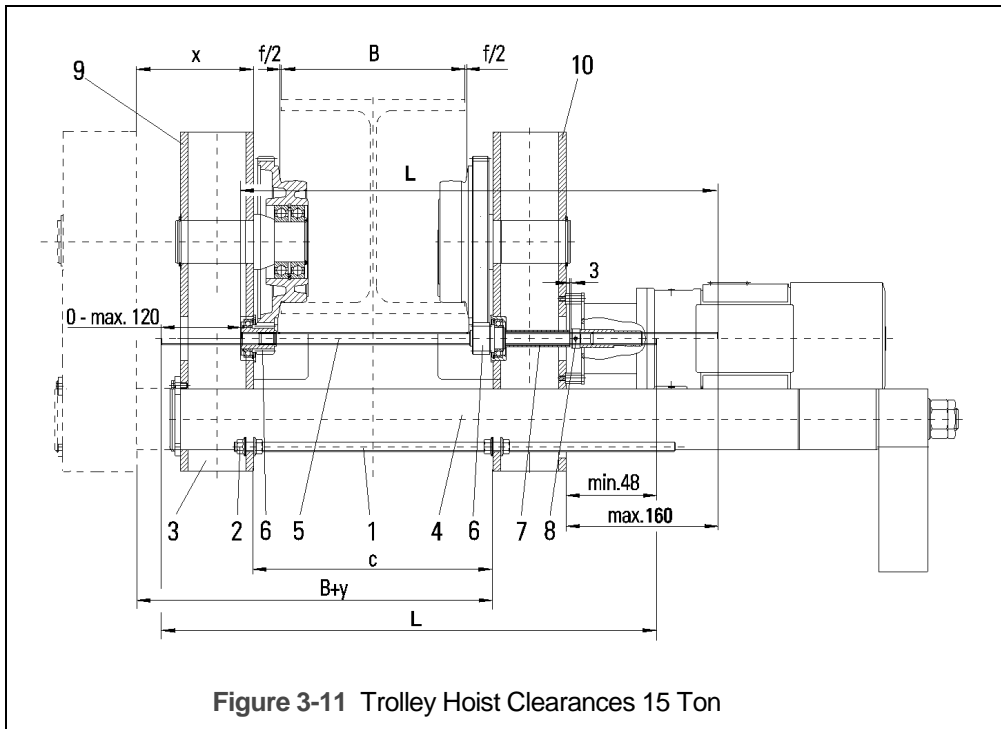


Figure 3-9

Table 3-2 Drive Shaft Length and Positions for Fig 3-8, 3-9 and 3-11				
Hoist	Beam Flange Width in. (mm)	Drive Shaft		
		Shaft Length "L" (mm)	Snap Ring Position "S"	
RHN02 RHN03	3.25-5.71 (82-145)	15.35 (390)	X3	
	5.75-7.68 (146-195)			X4
	7.72-9.84 (196-250)	19.49 (495)	X3	
	9.88-12.05 (251-306)			X4
	12.09-13.78 (307-350)	23.43 (595)	X3	
	13.82-15.71 (351-399)			X4
	15.75-17.72 (400-450)	27.36 (695)	X3	
	17.76-19.69 (451-500)			X4
RHN05	3.63-5.71 (92-145)	15.35 (390)	X3	
	5.75-7.68 (146-195)			X4
	7.72-9.84 (196-250)	19.49 (495)	X3	
	9.88-12.05 (251-306)			X4
	12.09-13.78 (307-350)	23.43 (595)	X3	
	13.82-15.71 (351-399)			X4
	15.75-17.72 (400-450)	27.36 (695)	X3	
	17.76-19.69 (451-500)			X4
RHN08 RHN10	4.63-7.87 (117-200)	19.88 (505)	X3	
	7.91-12.20 (201-310)			X4
	12.24-15.75 (311-400)	27.95 (695)	X3	
	15.79-19.69 (401-500)			X4
RHN15	6.69-8.66 (170-220)	20.08 (510)	See Figure 3-11	
	8.70-15.75 (221-400)	29.13 (740)		
	15.79-19.69 (401-500)	30.71 (780)		

Table 3-3 L3 and L4 Dimensions from Fig 3-8 and 3-9		
Hoist	L3+/- 2 in. (mm)	L4+/-2 in. (mm)
RHN02, RHN03, RHN05	3.8 (96.4)	1.82 (46.4)
RHN08, RHN10	4.9 (124.6)	1.82 (46.4)
RHN15	See Figure 3-11	



### 3.5 Electrical Connections

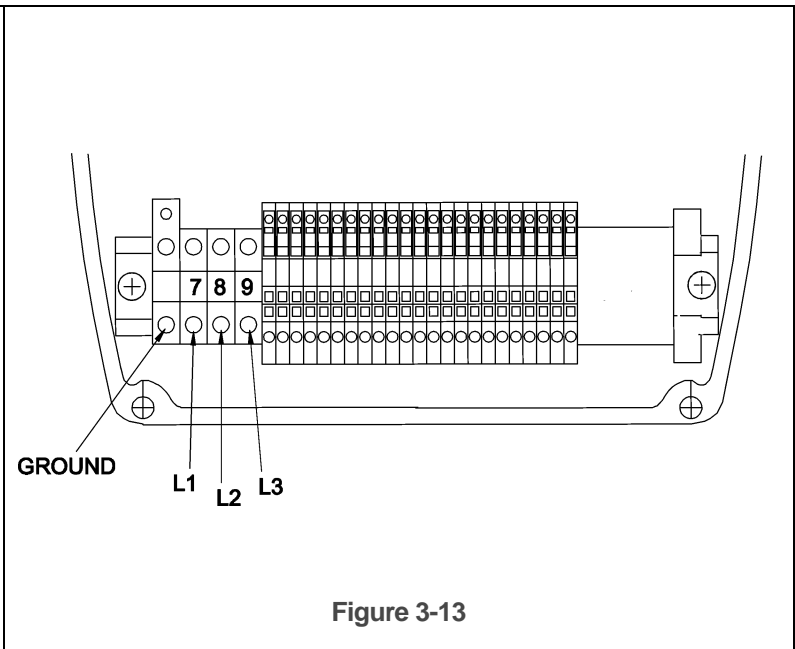
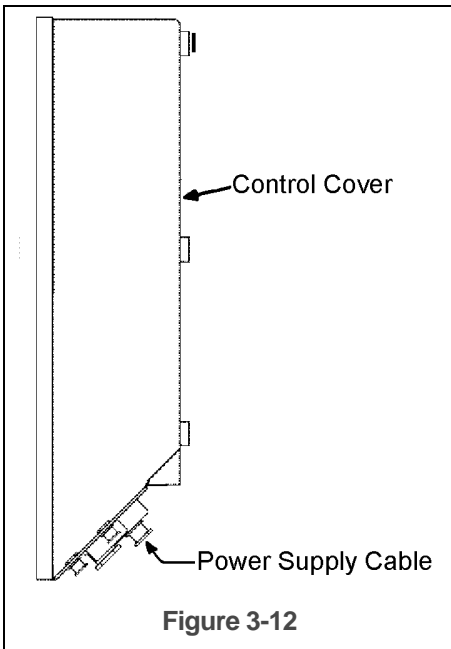
3.5.1 **▲ CAUTION** Ensure that the voltage of the electric power supply is proper for the trolley hoist.

3.5.2 **▲ CAUTION** Do NOT apply electronic soft-start control or voltage varying controls to the RHN lifting or traversing motors. Use of such devices may cause the motor brake and other electrical components to malfunction. For variable frequency drives contact Harrington for more information.

3.5.3 **▲ DANGER** Before proceeding, ensure that the electrical supply for the hoist or trolley has been de-energized (disconnected). Lock out and tag out in accordance with ANSI Z244.1 "Personnel Protection -Lockout/Tagout of Energy Sources".

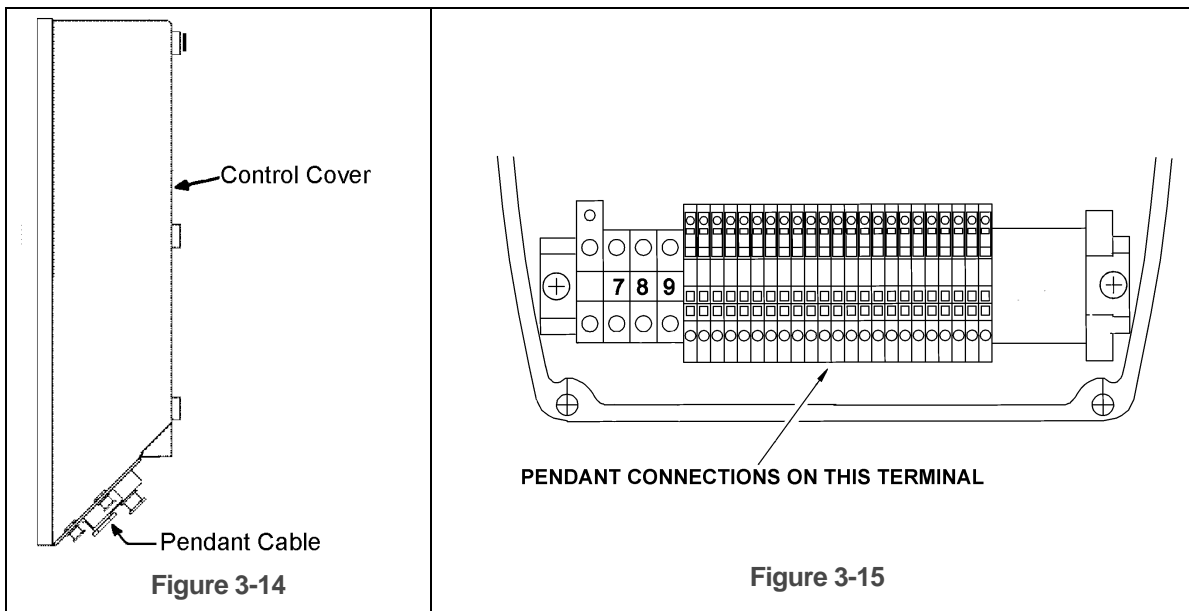
#### 3.5.4 Installing Power Supply Cord

- 1) Refer to Figure 3-12, Figure 3-13 and the wiring diagram provided with the Hoist.
- 2) Remove Control Cover.
- 3) Loosen the cable fitting located on the lower side of the electrical enclosure and insert the Power Supply Cable. Pull through enough cable to reach the power supply terminal and securely tighten the cable fitting.
- 4) Connect the 3 phase power leads (L1, L2 and L3) and the ground lead of the Power Supply Cable to the power supply terminal. Make sure the terminals are securely tightened and each lead is completely isolated.
- 5) Replace the Control Cover. Be careful not damage the seal or sealing surfaces and make sure to securely tighten all fasteners or latches.



### 3.6 Pendant Installation

- 1) Refer to Figure 3-14, Figure 3-15 and the wiring diagram and the interconnection diagram provided with the Hoist.
- 2) Remove Control Cover.
- 3) Loosen the cable fitting located on the lower side of the electrical enclosure and insert the Pendant Cable. Pull through enough cable to reach the terminals then securely tighten the cable fitting.
- 4) Attach a strain relief cable or chain between the pendant and hoist. The cable should attach to the small plate located at the bottom of the electrical enclosure under the gear box.
- 5) Access to terminal strip: The terminal strip is mounted on DIN rail, located on the lower portion of the control box.
- 6) Connect the individual pendant leads to the correct terminals as shown on the interconnection diagram. Make sure the terminals are securely tightened and each lead is completely isolated.
- 7) Reinstall the Control Cover. Be careful to not to pinch any wires wire closing and tightening down the Control Cover.



- 3.6.1 Connection to Electrical Power Source - The 3 power leads of the Power Supply Cable (normally red, white, and black wires) should be connected to an electric power disconnect switch or circuit breaker. This connection should be made so that the hoist is phased properly. Refer to Section 3.9.4 for instructions on how to check for correct power supply phase connection.
- 3.6.2 Fuse/Breaker Capacity - The trolley and hoist's power supply should be equipped with overcurrent protection such as fuses, which should be selected for 110% to 120% of total listed full load amperage, and should be dual element time-delay fuses. For the total full load amperage draw, add the amperage draws shown on the motor nameplates of ALL lifting and traversing motors.
- 3.6.3 **⚠ DANGER** Grounding - An improper or insufficient ground connection creates an electrical shock hazard when touching any part of the hoist or trolley. In the Power Supply Cable the ground wire will be either Green with Yellow stripe or solid Green. It should always be connected to a suitable ground connection. Do not paint the trolley wheel running surfaces of the beam as this can affect grounding.

## 3.7 RPU Load Monitor Device

The RHN hoist is equipped with the RPU Load Monitor Device. The RPU version (SLE21 or SLE22) is located on the front cover of the RPU unit. The main function of this device is to evaluate the load conditions of the hoist (overload protection, temperature monitoring of the hoist and trolley motors, and displaying the operating hours of the hoist).

- 3.7.1 Monitoring of Load Conditions – After powering up the hoist, the RPU will run through an internal test cycle, for approximately 4 seconds. The test will be finalized when the user initially operates the hoist in the up or down direction. At this time the “err” light will illuminate temporarily as well as the LEDs II and III. If the internal test cycle was completed successfully without resulting in error, the hoist will function.
- 3.7.2 Temperature Monitoring – The hoist and trolley motors are equipped with PTC thermistors that are directly linked to the RPU. If an excessive motor temperature condition has developed, the RPU will not allow the load to be lifted or lowered until the excessive temperature condition is no longer present. The LED display on the RPU will display and “err”. See Table 7-2.
- 3.7.3 Count/Hour Meter – See section 6.1 for Count/Hour meter details.
- 3.7.4 Load Testing RHN – The RPU Load Monitoring device is designed to sense an overload of the hoist and cut-off power when subjected to a lifting load of 110% of the rated RHN capacity. Due to this load monitoring feature, a Crane Test function is used when conducting a load test of 125% of the rated capacity. The crane test function temporarily changes the overload cut-off from 110% rated capacity to 137.5% rated capacity. This temporary load test override for both RPU versions (SLE21 or SLE22) is accomplished by following the applicable instructions below:

### **For Model SLE21:**

1. Remove RPU cover.
2. Press the S5 button, hold for more than 3 seconds, and release. (The S5 button is located directly below the red “err” LED). Figure 3-16.
3. Notice the “err” LED is flashing. This will continue to flash for 30 minutes. After 30 minutes, the RPU reboots and the overload cut-off returns to 110% of the rated capacity.

### **For Model SLE22:**

1. Loosen the screw on the RPU cover and remove the cover.
2. Execute the following steps in less than 12 seconds:
  - a. Press the S5 button for more than 3 seconds. (The S5 button is located directly below the red “err” LED). See Figure 3-16.
  - b. Release the S5 button for 1 second.
  - c. Press the S5 button for more than 3 seconds.
3. If an error occurs in the sequence of step 2, the “err” LED flashes 3 times. After this error signal, the crane test function can be activated again by following the sequence in step 2.
4. If the sequence in step 2 is followed correctly, then the “err” LED will flash for 30 minutes. After 30 minutes, the RPU reboots and the overload cut-off returns to 110% of the rated capacity.
5. To deactivate the crane test, either press the S5 button until the red LED no longer flashes or reboot the device.

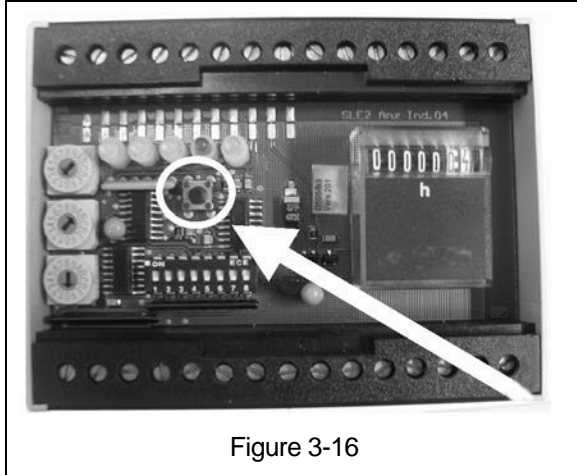


Figure 3-16

### 3.8 Hoist Limit Switches and Adjustment

The RHN wire rope hoist is equipped with a geared limit switch in the hoist control panel box. The limit switch is equipped with four switches, all of which are utilized for standard hoist functions. The four limit switch positions are as follows: S1 (Upper Safety Limit), S2 (Lower Limit), S3 (Upper Limit), and S4 (Speed Transition Limit).

The wire rope hoist is also equipped with a BLS (Block Limit Switch) as a standard feature.

- 3.8.1 Description and order of the limit switch function, including BLS as hook travels in the UP direction – See Figure 3-17.

**S4↑↑ (Speed Transition Geared Limit):** As the hook travels in the up direction, the first switch position to activate will be S4↑↑. If the hoist is being operated in the up direction, high speed will be deactivated when the S4↑↑ switch is activated. The hoist will then remain in low speed until reaching the switch position S3↑ (Upper Limit).

**S3↑ (Upper Geared Limit):** When the S3↑ switch position is activated, hook travel is disabled in the up direction. The hoist can still be operated in down direction.

**BLS↑ (Block Operated Upper Limit Switch):** See also Figure 3-19.

In addition to the geared limit switch, there is also a block operated upper limit switch (BLS↑) installed on the hoist. The BLS↑ switch opens when the hook block lifts a weight and releases the tension from the cable that holds the switch in the closed position. The BLS↑ is adjusted so that the S3↑ (Upper Geared Limit) switch position activates first and the BLS↑ second as a “back-up” safety.

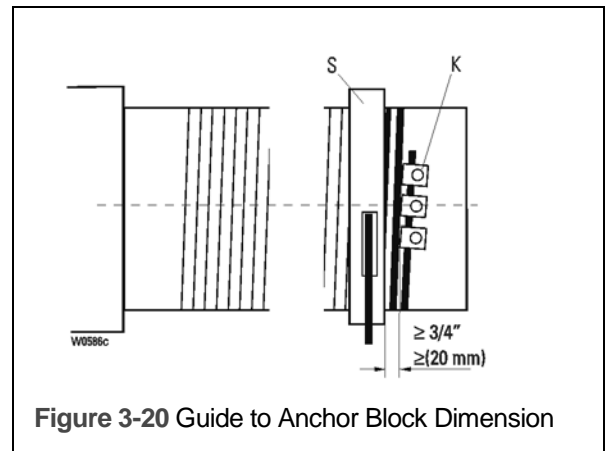
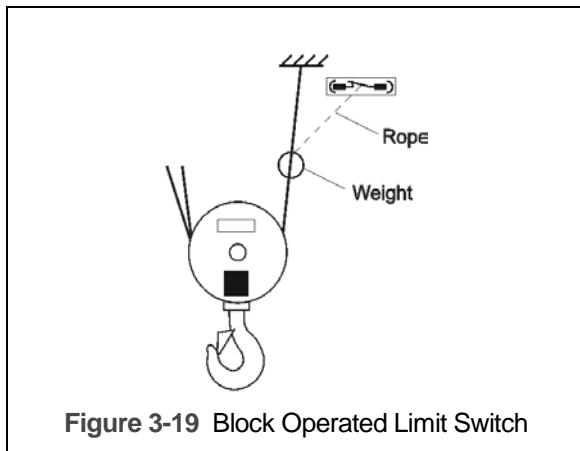
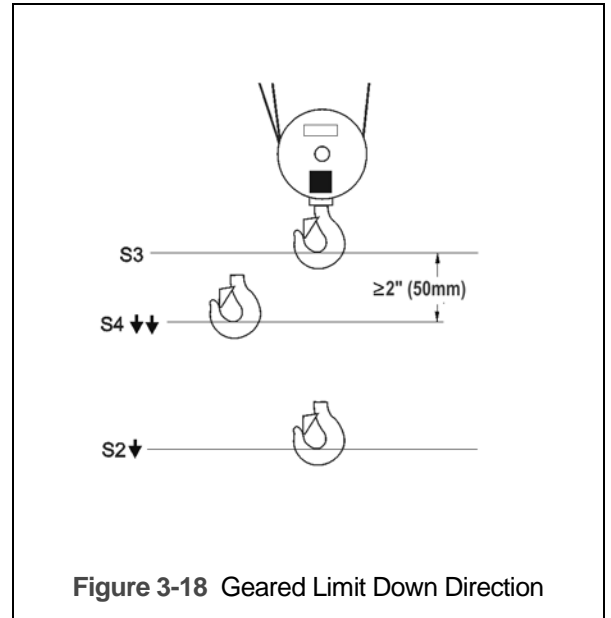
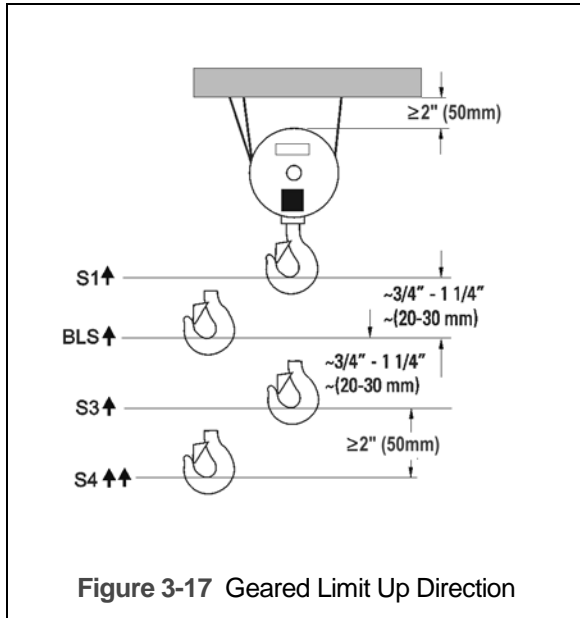
**S1↑ (Upper Safety Geared Limit):** In the event of a major malfunction where the upper limit switch (S3↑) and the block operated upper limit switch (BLS↑) are overrun, the S1↑ switch position is activated and disables all directional movement and control. The only way to operate the hoist after the S1↑ switch has been activated is to eliminate the source of the problem and bridge (jumper) terminals 110 to 116 on the terminal strip located at the bottom of the hoist control panel box. **WARNING: If the S1 Geared Limit Switch position has been activated, a major malfunction has occurred. Therefore, the equipment should be inspected by a qualified individual before attempting to resume hoist operation.**

- 3.8.2 Description and order of the limit switch function as the hook travels in the DOWN direction – See Figure 3-18.

**S4↓↓ (Speed Transition Geared Limit):** When the hook is located at the S3 (Upper Geared Limit) position, and moving in the down direction, the hoist will remain at low speed until the hook is below the

S4↓ location and the switch on the geared limit is no longer activated. The hoist high speed function is now enabled and will function if high speed is desired by the operator.

**S2↓ (Lower Geared Limit):** When the S2 ↓ switch position is activated, hook travel is disabled in the down direction. The hoist can still be operated in the up direction.



3.8.3 Testing the upper and lower limit switch, S3↑ (Upper Geared Limit) and S2↓ (Lower Geared Limit).

- 1) Test at high and low speed without load.
- 2) Activate the “up” button on the control pendant carefully, observing the hoisting motion, until the S3↑ upper geared limit switch disables hook motion in the up direction.

- 3) The upper geared limit switch S3↑ should activate before the BLS↑ limit switch. If this is not the case, reset the S3↑ limit switch according to Section 3.8.7
  - 4) Observe that the distance between the top of the hook block and the next obstacle is greater than 3.5". This distance is the minimum clearance dimension (2") plus the minimum distance between S3↑ and BLS↑ (¾") plus the minimum distance between BLS↑ and S1↑ (¾"), see Figure 3-17. If the clearance dimension is less than 3.5", reset the upper limit switch, see Section 3.8.7.
  - 5) Activate the "down" button on the control pendant carefully, observing the hoisting motion, until the S2↑ lower geared limit switch disables hook motion in the down direction.
- 6) Observe minimum clearance between rope guide (S) and the rope anchor clamps (K). There clearance between the should be equal to or greater than ¾" (20mm), see Figure 3-17. If necessary, reset the lower limit switch, see Section 3.8.7
- 3.8.4 Testing the high to low and low to high speed transition limit switch, S4↑↑ and S4↓↓.
- 1) Activate the "up" button on the control pendant. Carefully observing the hoisting motion.
  - 2) Ensure that the S4↑↑ (low speed transition limit), activates at least 2.0 in. (50mm) before the upper limit, S3↑, see Figure 3-17. This means that the hook motion should transition from high to low speed at least 2.0 in. (50mm) before the hook motion completely stops at S3↑.
  - 3) Lower the hook block from S3↑ and ensure that the hook motion is at low speed until S4↓↓. Once switch S4↓↓ is no longer activated, the hoist will have the ability to run at high speed in the down direction see Figure 3-18.
  - 4) Reset the limit switch if necessary, see Section 3.8.7.
- 3.8.5 Testing the S1↑ (Safety Limit Switch)
- The safety limit switch, S1↑, is tested at the factory and does not require on site testing. **If replacing the geared limit switch, consult the factory for proper adjustment.**
- 3.8.6 Testing the BLS↑ (Block Operated Limit Switch).
- ⚠WARNING** The hoist is being operated while testing the BLS. Keep away from all moving parts to ensure your safety and the safety of others.
- 3.8.6.1 Lower the hook 2-3 feet below the S3↑ switching position.
- 3.8.6.2 Begin raising the hook at slow speed and manually lift the ball weight of the BLS that is located above the hook block. Lifting the weight removes the tension from the rope that is holding the switch closed. The hoist should be inoperable in the up direction as long as the switch remains open, but should be operable in the down direction.
- 3.8.6.3 Adjust the limit switch if necessary, see Section 3.8.7
- 3.8.7 Setting hoist limit switch (Figure 3-17, Figure 3-18, Figure 3-19, Figure 3-20, and Figure 3-21).
- 1) **⚠WARNING** The cover of the limit switch must be removed to set the contacts. This exposes live contact connections. There is a danger of contact with electrically live parts!
  - 2) **⚠WARNING** The limit switch is state of the art construction and is safe in operation. However dangers may arise if it is used incorrectly and not for its intended purpose.
- 3) The limit switch can be adjusted at the setscrews (S1), (S2), (S3), and (S4) see **Figure 3-21**.
- Turning to the left: switching point is moved "downwards".



- Turning to the right: switching point is moved “upwards”.
- 4) Adjusting the gear limit switch
- All the cam discs can be moved together with the aid of the black setscrew (SO), Figure 3-21. The settings of the individual contacts relative to one another remain unchanged. The gear ratio inside the limit switch is very high and in some instances it might require many revolutions of the set screws to adjust the proper position.
  - **Set the limit switch using a screwdriver and without using excessive force. Do not use a power screwdriver or similar tool.**
  - Set the switching points in the following sequence:
    1. BLS↑ (**Set at Factory, only adjust if completely necessary**).
    2. S1↑ (**Set at factory, only adjust if installing a new limit switch**)
    3. S3↑
    4. S4↑↑
    5. S2↓
  - The safety limit (S1↑), the block operated upper limit (BLS↑), the upper limit (S3↑), and the high to slow speed transition limit (S4↑↑) are all adjusted at the factory according to the procedure below. **The only limit that needs to be adjusted at “start-up” in the field is the lower limit S2↓.** The lower limit S2↓ should be set so the bottom block stops approximately 3” above the ground (load platform).
- 5) Block Operated Upper Limit, BLS↑
- Lift bottom hook block to a distance of >2 ¾” (55mm) from the top of the hook block to the bottom of the clearance object.
  - If necessary, turn setscrew (S2) to the right beforehand.
  - Set BLS rope length so that switch is activated in this position
- 6) Safety Limit, S1↑
- Raise bottom hook block until BLS is activated
  - Turn setscrew (S1) to the left until contact S1↑ switches audibly
  - Turn set screw (S1) back to the right approx. ½ turn.
- 7) Upper Limit, S3↑
- Raise bottom hook block until BLS is activated
  - Turn set screw S3 to the left until contact S3 switches audibly
  - Turn setscrew S3 approx. ½ turn to the left
  - Lower and raise bottom hook block until S3↑ is activated
- 8) High to Low Speed Transition Limit, S4↑↑
- After the upper limit S3↑ has been activated, lower bottom hook block by at least 2.0in (50mm)
  - Turn setscrew S4 to the left until contact S4 switches audibly
  - Check disconnect by operating hoist in the “up” direction point in high speed.
- 9) Lower Limit, S2↓
- Minimum clearance between rope guide (S) and rope anchorage clamps (K) should be equal to or greater than ¾” (20mm)
  - Set bottom hook position so that the bottom block does not touch the ground, approximately 3 inches above ground or platform level.(do not allow the formation of slack rope).
  - Make sure there are at least 3 wraps of wire rope left on the drum when adjusting for the lowest hook position

- Lower bottom hook block to desired hook position, if necessary turn setscrew (S2) to the left before hand.
- Turn setscrew (S2) to the right until contact S2 switched audibly
- Check disconnect point

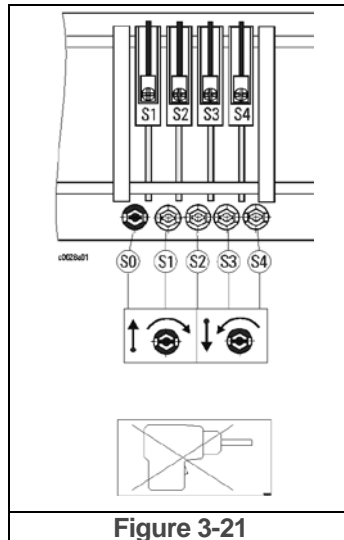


Figure 3-21

### 3.8.8 Servicing limit switch

- Maintenance work is restricted to checking the cut-off points. No maintenance or inspection is necessary for the gear limit switch itself
- Any dust deposits that may be visible when the housing is opened must on no account be removed with compressed air as this would force the dust into the contacts and impair the switching function
- **Benzene or other solvents MUST NOT be used to clean the limit switch!**

## 3.9 Pre-operational Checks and Trial Operation

3.9.1 Refer to the trolley hoist's nameplate and record the Product Code, and Serial Numbers in the space provided on the cover of this manual.

3.9.2 Perform pre-operational checks for the trolley hoist:

- **⚠ 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.
- **⚠ WARNING** Verify and correct all wire rope irregularities prior to operating the hoist. Refer to Section 3.6.
- Measure and record the "k" dimension of the bottom hook on the hoist. See Table 5-5 under Section 5.
- Ensure that trolley is properly installed on the beam, and stops for the trolley are correctly positioned and securely installed on the beam.
- Ensure that all nuts, bolts and split pins (cotter pins) are sufficiently fastened.
- Pull down on the Pendant and ensure that the Cord Strain Relief Cable takes the force, not the Pendant Cord.
- **⚠ CAUTION** Check supply voltage before everyday use. If the voltage varies more than 10% of the rated value, electrical devices may not function normally.

3.9.3 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.

3.9.4 Proceed with trial operation to confirm proper operation.

- Verify that the controls agree with hoist direction. Make sure that depression of the Up button lifts the Bottom Block and depression of the Down button lowers the Bottom Block. If the Bottom Block does not move in the correct direction when the push buttons are pushed, the power supply is phased incorrectly. In this case, turn off the power source or breaker switch then reverse any two of the three wires at the power source. The hook will then move in accordance with the directions of the push button.
- Operate the trolley through its full range of motion. Make sure the trolley runs smoothly and does not bind. Check the power supply and festoon system for proper operation
- **NOTICE** Ensure that wire rope is not allowed to go "slack".
- 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** operate a damaged, malfunctioning or unusually performing hoist.
- **NOT** operate a hoist until you have thoroughly read and understood Manufacturer's Operating and Maintenance Instructions or Manuals.
- Be familiar with operating controls, procedures, and warnings.
- **NOT** operate a hoist that has been modified without the manufacturer's approval or without certification that it is in conformity with ANSI/ASME B30 volumes.
- **NOT** lift more than rated load for the hoist.
- **NOT** use hoist with twisted, kinked, damaged, or worn wire rope.
- **NOT** use the hoist to lift, support, or transport people.
- **NOT** lift loads over people.
- **NOT** operate a hoist unless all persons are and remain clear of the supported load.
- **NOT** operate unless load is centered under hoist.
- **NOT** attempt to lengthen the wire rope or repair damaged wire rope.
- Protect the hoist's wire rope from weld splatter or other damaging contaminants.
- **NOT** operate hoist when it is restricted from forming a straight line from hook to support in the direction of loading.
- **NOT** use hoist's wire rope as a sling or wrap load wire rope around load.
- **NOT** apply the load to the tip of the hook or to the hook latch.
- **NOT** apply load unless the wire rope is properly seated in its grooves.
- **NOT** apply load if bearing prevents equal loading on all load-supporting wire ropes.
- **NOT** operate beyond the limits of the load wire rope travel.
- **NOT** leave load supported by the hoist unattended unless specific precautions have been taken.
- **NOT** allow the load wire rope or hook to be used as an electrical or welding ground.
- **NOT** allow the load wire rope or hook to be touched by a live welding electrode.
- **NOT** remove or obscure the warnings on the hoist.
- **NOT** operate a hoist on which the safety placards or decals are missing or illegible
- **NOT** operate a hoist unless it has been securely attached to a suitable support.
- **NOT** operate a hoist unless load slings or other approved single attachments are properly sized, and seated in the hook saddle.
- **NOT** use the hoist in such a way that could result in shock or impact loads being applied to the hoist.
- Take up slack carefully – make sure load is balanced and load-holding action is secure before continuing.
- Shut down a hoist that malfunctions or performs unusually and report such malfunction.
- Make sure hoist limit switches function properly.
- Warn personnel before lifting or moving a load.
- Warn personnel of an approaching load.

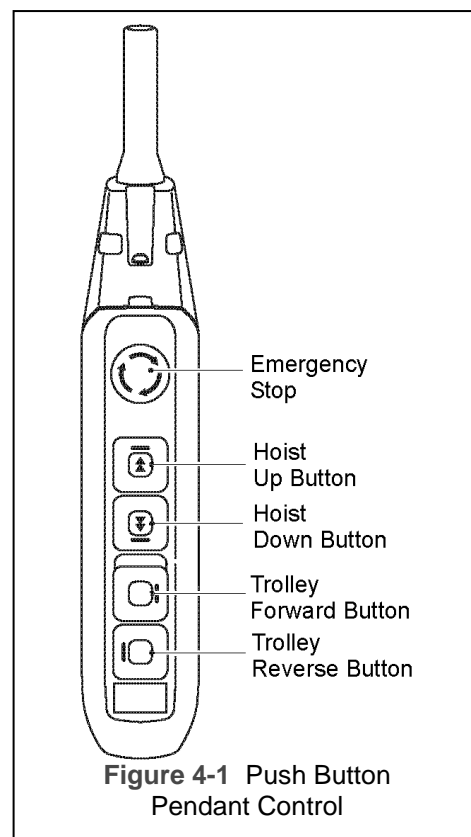
## ⚠ CAUTION

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 wire rope 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 and Trolley Controls

- 4.3.1 Dual Speed Pendant Control – Pendant controls supplied with dual speed trolley hoists have two-step control buttons. For low speed depress the button to the first step and for high speed depress the button fully to the second step. Use the Up button to raise the hoist's hook or the Down button to lower the hoist's hook as shown in Figure 4-1. Depress the Forward and Reverse buttons to move the trolley horizontally. To stop motion release the buttons.



## 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 by the employer or employer’s representative as being competent to perform the specific duties.

**Qualified Person** – a person who, by possession of a recognized degree in an applicable field, 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 that exceeds normal service.

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

### 5.2 Inspection Classification

- 5.2.1 The Initial Inspection –prior to initial use all new, re-installed, altered, or modified hoists/trolleys 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/trolleys 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 hoists/trolleys 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:

Service	Hoist and Trolley Interval	Rope Inspection Interval
Normal Service	Monthly	Start of Every Shift
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:

<b>Table 5-2 Periodic Inspection Intervals</b>		
<b>Service</b>	<b>Hoist and Trolley Interval</b>	<b>Rope Inspection Interval</b>
Normal Service	Yearly	1) At Least monthly (per OSHA), AND 2) Determined by a qualified person and based on such factors as expected rope life as determined by experience on the particular or similar installations; severity of environment; percentage of capacity lifts; frequency rates of operation; and exposure to shock loads. Inspections need not be at equal calendar intervals and should be more frequent as the rope approaches the end of its useful life. (per ANSI B30.16-2.4.1)
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 5-3, "Frequent Inspection." Included in these FREQUENT Inspections are observations made during operation for any defects or damage that might appear between Periodic Inspections. A designated person shall evaluate and resolve the results of FREQUENT Inspections such that the hoist/trolley is maintained in safe working condition.

<b>Table 5-3 Frequent Inspection</b>
All functional operating mechanisms for maladjustment and unusual sounds.
Hoist and trolley in accordance with ANSI/ASME B30.16
Operation of all limit switches and associated components
Upper limit devices in accordance with ANSI/ASME B30.16
Hoist/trolley braking system for proper operation
Hooks and hook latches in accordance with ANSI/ASME B30.10
Hook latch operation
Wire rope in accordance with Section 5.7
Wire rope reeving for compliance with Section 3.6 and 6.4
Proper function of pendant controls.



## 5.4 Periodic Inspection

- 5.4.1 Inspections should be made on a PERIODIC basis in accordance with Table 5-4, "Periodic Inspection." A designated person shall make evaluation and resolution of the results of PERIODIC Inspections such that the hoist is maintained in safe working condition.
- 5.4.2 For inspections where load suspension parts of the hoist/trolley are disassembled, a load test per ANSI/ASME B30.16 must be performed on the hoist/trolley after it is re-assembled and prior to its return to service.

<b>Table 5-4 Periodic Inspection</b>
Requirements of frequent inspection.
Evidence of loose bolts, nuts, or rivets.
Evidence of worn, corroded, cracked, or distorted parts such as suspension bolts, mounting eye bolts, stirrup bolts, stiffening plate bolts, gears, pins, bearings, pins, rollers.
Evidence of worn or damaged hook block, hook, clevises, yokes, shafts, wire rope and wire rope attachments.
Evidence of damage to hook retaining nuts or collars and pins, and welds or rivets used to secure the retaining members.
Evidence of worn or damaged rope-drum, rope guide and pulleys (sheaves).
End connections of wire rope.
Evidence of damage or excessive wear of load and idler sheaves.
Evidence of excessive wear on hoist or trolley motor parts.
Evidence of excessive wear on hoist or trolley brake system parts.
Evidence of excessive wear or damage to trolley wheels, gears and guide rollers.
Evidence of damage to supporting structure or trolley, if used.
Evidence of stress cracks on trolley stirrup plate welds.
Electrical apparatus for signs of pitting or any deterioration of visible controller contacts and electrical components, such as, switches, contacts and pushbuttons.
Proper function of motion limit devices that interrupt power or cause a warning to be activated.
Proper function of load limiter device.
Evidence of damage to all cables, including festooned cables.
Function labels on pendant control stations for legibility.
Function, instruction and warning labels properly attached to the hoist/trolley and legible (see Section 1.2).
Verify proper lubrication of gears, rope drum, rope guide, rope, sheaves and all other parts requiring lubrication.

## 5.5 Occasionally Used Hoists and Trolleys

- 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 in Section 5.3.
- Hoist Idle More Than 1 Year: Inspect per PERIODIC Inspection criteria in Section 5.4.

## 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/trolley.
- 5.6.2 A long-range rope inspection program should be established and should include records of examination of ropes removed from service so a relationship can be established between visual observation and actual condition of the rope.

## 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 or trolley.

**Table 5-5 Hoist (and Trolley) 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.
Hoist Braking System Operation	Function	The brake disc (brake rotor) should not exceed the maximum permissible air gap (S) values listed in <b>Table 5-8</b> .	Replace as required (see <b>Section 6.3</b> ).
Hook – Surface Condition	Visual	Should be free of significant rust; weld splatter, deep nicks, or gouges.	Replace.
Hook – Fretting wear	Measure	The “u” and “t” dimensions should not be less than discard value listed in <b>Table 5-6</b>	Replace.
Hook – Stretch	Measure	The “k” dimension should not be greater than 1.1 times that measured and recorded at the time of purchase (See <b>Section 3.9</b> and <b>Table 5-6</b> ).	Replace.
Hook – Bent Shank or Neck	Visual	Shank and neck portions of hook should be free of deformations.	Replace.
Hook Block 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.	Tighten or replace as required.
Hook Block – 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.

**Table 5-5 Hoist (and Trolley) Inspection Methods and Criteria (continued)**

Item	Method	Criteria	Action
Hook Block – Sheave(s) and Shaft	Visual, Function	Sheave(s) should be free of significant wear. Sheave surfaces should be free of nicks, gouges, dirt and grime. Bearing parts and surfaces of Sheave and Shaft should not show significant wear. Sheave should rotate freely with no roughness or significant free play.	Clean/lubricate, or replace as required.
Hook – 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.
Hoist – Housing and Mechanical Components	Visual, Auditory, Vibration, Function	Hoist components including load blocks, suspension housing, wire rope 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
Trolley – Housing and Mechanical Components	Visual, Auditory, Vibration, Function	Trolley components including load bars, trolley wheels, trolley wheel axles, eye bolts, hex shafts, gears, bearings, pins, rollers, and bumpers 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.
Bolts, Nuts and Rivets	Visual	Bolts, nuts and rivets should not be loose.	Tighten or replace as required.
Wire Rope Wedge	Visual	The fixing (anchorage with wedge) must be replaced if it shows deformation, wear, cuts, or necking.	Replace
Wire Rope Drum	Visual, Function	Entire surface of the drum should be coated with lubricant and should be free of dirt and grime. Rope should fit in drum grooves.	Clean/lubricate (see <b>Section 6.2</b> ).
Wire Rope Guide	Visual, Function	Rope Guide should be free of significant wear, cracks, nicks, gouges, dirt and grime. Rope Guide should take up rope play and move with the rope on the drum during rope unwinding and winding.	Replace
Wire Rope – Reeving	Visual	The wire rope should be reeved properly through Hook Block Sheave (and Crossbar Sheave for 4/1hoist) – refer to <b>Section 6.6</b> . Wire rope should be installed properly – refer to <b>Section 6.5</b> .	Reeve/Install properly.

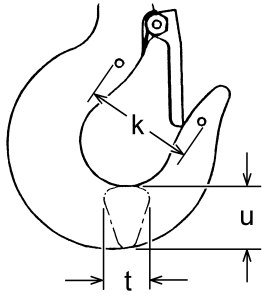
**Table 5-5 Hoist (and Trolley) Inspection Methods and Criteria (continued)**

Item	Method	Criteria	Action
<p><b>⚠ WARNING</b> The full length of the Wire Rope must be inspected for rope diameter, broken strands or wires, and condition. The rope must be free of load for testing to detect any broken wires when bending the rope by hand (especially by radius of rope sheave). Special care should be taken when inspecting sections of rapid deterioration, such as the following:</p> <ul style="list-style-type: none"> <li>▪ sections in contact with saddles, equalizer sheaves, or other sheaves where the rope travel is limited;</li> <li>▪ sections of the rope at or near terminal ends where corroded or broken wires may protrude;</li> <li>▪ sections subject to reverse bends;</li> <li>▪ sections of rope that are normally hidden during visual inspection, such as parts passing over sheaves.</li> </ul> <p><b>⚠ WARNING</b> In certain applications (constant deadweight, recurrent stopping position, automatic operation, etc.) wire fractures may occur inside the rope without being visible from outside.</p> <p>Any condition that could degrade the strength and performance of the wire rope must be reported to a qualified person for evaluation and disposition.</p>			
Wire Rope Diameter	Measure, Visual	Any reduction in the diameter of the wire rope must not be reduced due to corrosion, wear or core collapse more than the discard value in <b>Table 5-7</b> . The outer wires should not be worn more than 10% of their original diameter.	Replace. Inspect drum and all sheaves.
Wire Rope – Broken Wires or Strands	Visual	<p>The wire rope should be inspected for broken wires or strands, paying close attention to end connection and sections that frequently pass over sheaves. The rope must NOT have:</p> <ul style="list-style-type: none"> <li>▪ More than the Maximum number of broken wires listed in <b>Table 5-7</b>.</li> <li>▪ More than 4 broken wires in 1 strand in one lay (one full revolution of a strand around the rope).</li> <li>▪ Any broken strands.</li> </ul>	Replace
Wire Rope – Condition	Visual	<ul style="list-style-type: none"> <li>▪ Any wire rope deformation with permanent bends, flattening, unraveling, birdcaging, etc.</li> <li>▪ General corrosion.</li> <li>▪ Rope core exposure.</li> <li>▪ One or more loose or protruding strands or wires from rope.</li> <li>▪ Severely corroded or broken wires at end connections.</li> <li>▪ Severely corroded, cracked, bent, worn or improperly applied end connections</li> <li>▪ Any evidence of heat damage of any kind. (Wire rope exhibits any heat discoloration or localized loss of lubrication).</li> </ul>	Replace

**Table 5-5 Hoist (and Trolley) Inspection Methods and Criteria (continued)**

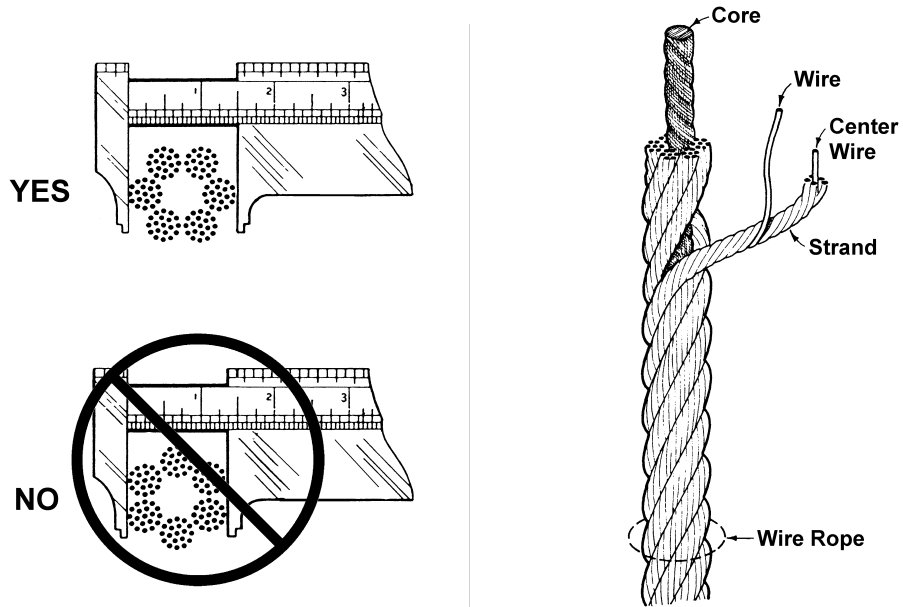
Item	Method	Criteria	Action
Wire Rope - Twisting	Visual	<ul style="list-style-type: none"> <li>▪ Run the hoist into the highest and lowest hook positions without load.</li> <li>▪ If any twisting is detected , untwist the rope immediately. See Section 6.6 “Reeving and Adjustments” and Section 6.5 “Wire Rope Removal”</li> <li>▪ Inspect the condition of the rope (especially near pulleys and rope anchorage. See Table 5-5 “Wire Rope- Condition”, “Wire Rope – Diameter”, “Wire Rope-Broken Wires or Strands”)</li> </ul>	Replace as required.
Wire Rope - Lubrication	Visual	The wire rope must be maintained in a clean and well lubricated condition.	Clean/lubricate (see <b>Section 6.2</b> ).
Trolley Side Plates	Visual	Must be free of significant deformation	Replace
Trolley Wheel – Condition	Visual	Trolley Wheel should be free of significant wear, cracks, nicks and gouges.	Replace.
Trolley Wheel – Tread	Visual, Measure	The diameter and width of the tread surface should not be less than the values listed in <b>Table 5-10</b> . The diameter should not be less than 5% of its original diameter as new.	Replace.
Trolley Wheel – Gear	Visual	Teeth should not be cracked, damaged, or excessively worn.	Replace.
Load Bar	Visual, Measure	Load Bar should be free of significant wear, cracks, nicks and gouges. Load Bar should not be bent.	Replace.
Trolley Motor Brake	Visual	Braking action should not be overly abrupt and should not allow excessive drift. The brake disc (brake rotor) should not exceed the maximum permissible air gap (S) values listed in <b>Table 5-11</b> .	Replace.
Contactor Contacts	Visual	Contacts should be free of significant pitting or deterioration.	Replace.
Sheaves	Visual	Sheave should be free of significant wear. The wall thickness, t, should not be less than the “t min” values in <b>Table 5-9</b> . The groove depth, h, should not be greater than the “h max” values listed in <b>Table 5-9</b> . They should also be checked for easy running, indicating that the ball bearings are in good condition.	Replace.
Pendant – Switches	Function	Depressing and releasing push buttons should make and break contacts in switch contact block and result in corresponding electrical continuity or open circuit. Push buttons should be interlocked either mechanically or electrically to prevent simultaneous energizing of circuits for opposing motions (e.g. up and down, forward and reverse).	Repair or replace as necessary.

<b>Item</b>	<b>Method</b>	<b>Criteria</b>	<b>Action</b>
Pendant - Housing	Visual	Pendant housing should be free of cracks and mating surfaces of parts should seal without gaps.	Replace
Pendant - Wiring	Visual	Wire connections to switches in pendant should not be loose or damaged.	Tighten or repair
Pendant and Power Cords	Visual, Electrical Continuity	Surface of cord should be free from nicks, gouges, and abrasions. Each conductor in cord should have 100% electrical continuity even when cord is flexed back-and-forth. Pendant Cord Strain Relief Cable should absorb the entire load associated with forces applied to the pendant.	Replace
Pendant - Labels	Visual	Labels denoting functions should be legible.	Replace
Warning Labels	Visual	Warning Labels should be affixed to the hoist (see <b>Section 1.2</b> ) 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

				
<p><b>k Measured When New*:</b></p> <hr style="width: 20%; margin-left: 0;"/>				
<b>Hook Capacity Code</b>	<b>(u) Dimension inch (mm)</b>		<b>(t) Dimension inch (mm)</b>	
	<b>Standard</b>	<b>Discard</b>	<b>Standard</b>	<b>Discard</b>
RHN02(D/U)	1.89 (48)	1.80 (45.6)	1.50 (38)	1.42 (36.1)
RHN03(D/U)	1.89 (48)	1.80 (45.6)	1.50 (38)	1.42 (36.1)
RHN05(D/U)	2.28 (58)	2.17 (55.1)	1.77 (45)	1.68 (42.75)
RHN08(D/U)	2.64 (67)	2.51 (63.65)	2.09 (53)	1.98 (50.35)
RHN10(D/U)	2.64 (67)	2.51 (63.65)	2.09 (53)	1.98 (50.35)
RHN15U	3.35 (85)	3.18 (80.75)	2.64 (67)	2.51 (63.65)
RHN15D	4.17 (106)	3.96 (100.7)	3.35 (85)	3.18 (80.75)
RHN20D	4.17 (106)	3.96 (100.7)	3.35 (85)	3.18 (80.75)

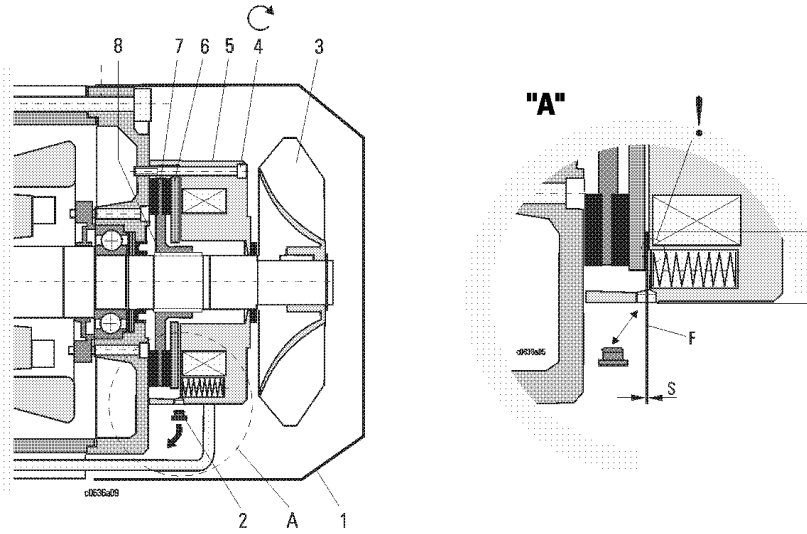
\* The “k” dimension should be measured when the hook is new – this becomes a reference measurement. Subsequent measurements are compared to this reference to make determinations about hook deformation/stretch. See Section 5.7, “Hooks – Stretch”.

**Table 5-7 Wire Rope Wear Dimensions**



Hoist Capacity (tons)	Rope Diameter			Maximum Allowable Number of Broken Wires				
	Standard (mm)	Discard		Rope Diameter (mm)	For 6xDia. Length		For 30xDia. Length	
		(mm)	(in)		No. Broken Wires	Length in. (mm)	No. Broken Wires	Length in. (mm)
RHN02(D/U)	7	6.3	0.25	7	13	1.65 (42)	26	8.27 (210)
RHN03(D/U)	7	6.3	0.25	7	13	1.65 (42)	26	8.27 (210)
RHN05(D/U)	9	8.1	0.32	9	13	2.13 (54)	26	10.63 (270)
RHN08(D/U)	12.5	11.25	0.44	12.5	13	2.95 (75)	26	14.76 (375)
RHN10(D/U)	12.5	11.25	0.44	12.5	13	2.95 (75)	26	14.76 (375)
RHN 15U	14	12.6	0.50	14	6	3.31 (84)	13	16.54 (420)
RHN 15D	20	18	0.71	20	24	4.72 (120)	48	23.62 (600)
RHN 20D	20	18	0.71	20	24	4.72 (120)	48	23.62 (600)

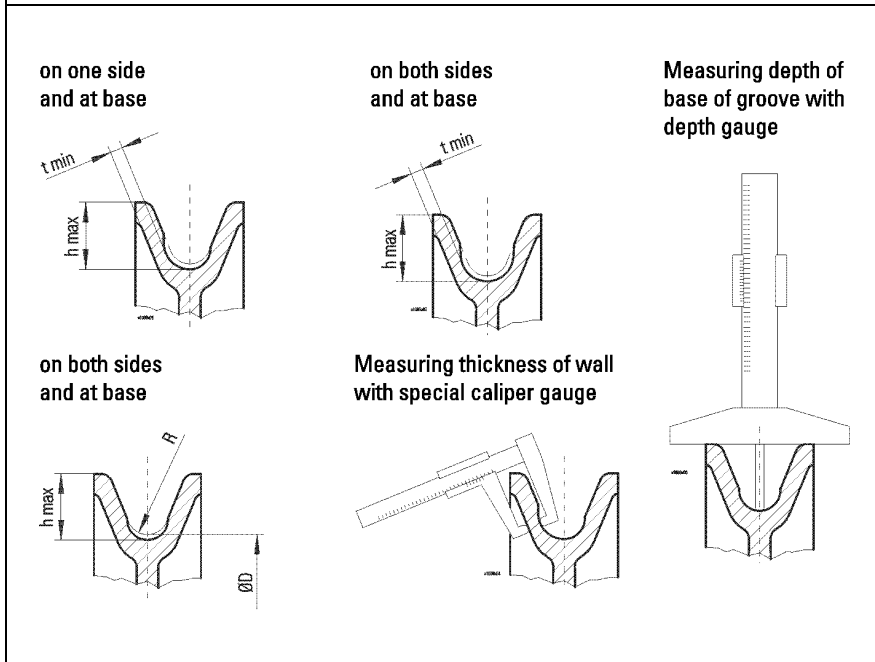
**Table 5-8 - Hoist Motor Brake**



Hoist Capacity Code	Motor Type	S max. in. (mm)	a in. (mm)	Screw Torque ft-lbs (Nm)
RHN02(D/U)	Dual speed	.031 (0.8)	.98 (25)	6.6 (9)
RHN03(D/U)	Dual speed	.031 (0.8)	.98 (25)	6.6 (9)
RHN05(D/U)	Dual speed	.035 (0.9)	.98 (25)	6.6 (9)
RHN08(D/U)	Dual speed	.071 (1.8)	1.18 (30)	16 (22)
RHN10(D/U)	Dual speed	.071 (1.8)	1.18 (30)	16 (22)
RHN15U	Dual speed	.071 (1.8)	1.18 (30)	16 (22)
RHN15D	Dual speed	.071 (1.8)	1.18 (30)	16 (22)
RHN20D	Dual speed	.071 (1.8)	1.18 (30)	16 (22)

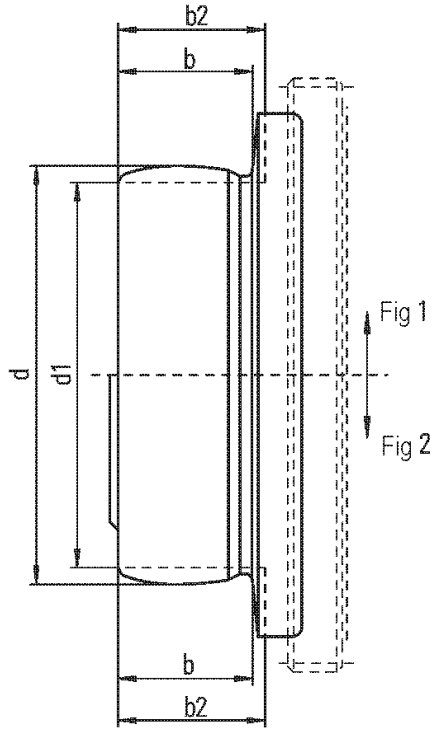


**Table 5-9 Rope Sheave Dimensions**



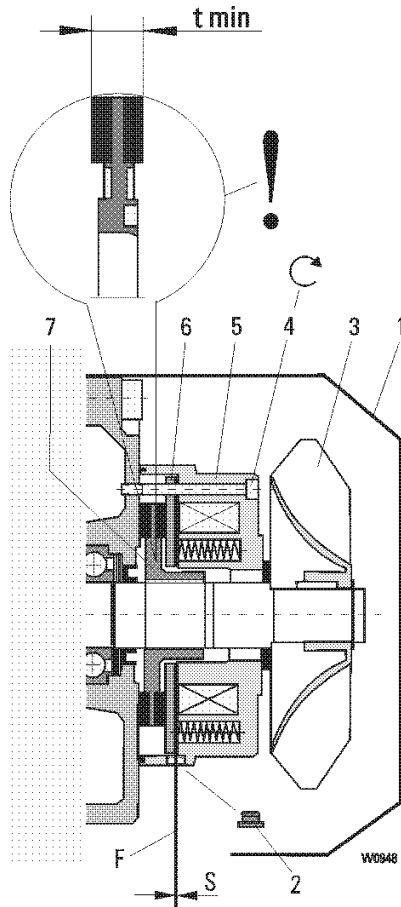
Part Number	Diameter (mm)	t min in. (mm)	h max in. (mm)	h new in. (mm)
RHN0032	125	0.16 (4)	0.55 (14)	0.47 (12)
RHN0129	160	0.16 (4)	0.75 (19)	0.65 (16.5)
RHN0191	225	0.22 (5.5)	0.94 (24)	0.83 (21)
RHN0327	250	0.22 (5.5)	1.10 (28)	0.98 (25)
RHN0260	375	0.26 (6.5)	1.48 (37.5)	1.34 (34)

**Table 5-10 Wheel Dimensions**



Hoist Capacity Code	Fig.	Nominal value		Limit for wear	
		d in. (mm)	b in. (mm)	d1 in. (mm)	b2 in. (mm)
RHN02 RHN03	1	3.15 (80)	1.08 (27.5)	2.99 (76)	1.16 (29.5)
RHN05	1	3.94 (100)	1.30 (33)	3.74 (95)	1.38 (35)
RHN08 RHN10	1	5.51 (140)	1.75 (44.5)	5.24 (133)	1.85 (47)
	2		1.67 (42.5)		1.77 (45)
RHN15U	2	7.87 (200)	1.67 (42.5)	7.48 (190)	1.77 (45)

Table 5-11- Travel Motor Brake

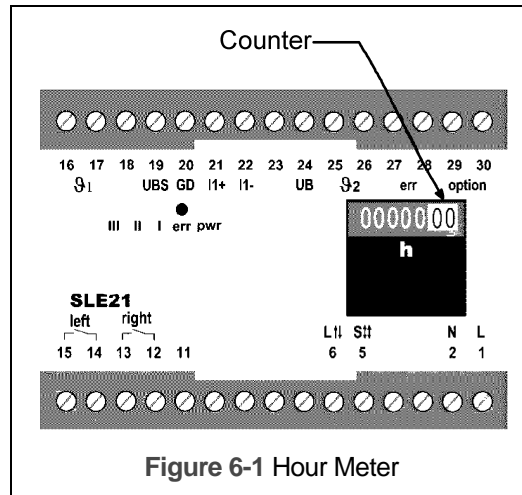


Hoist Capacity Code	Motor Type	Motor Speed (fpm)	S min. in. (mm)	S max. in. (mm)	t in. (mm)	Screw Torque ft-lbs (Nm)
RHN02U	Dual speed	80/20	.008 (0.2)	.079 (2.0)	.22 (5.7)	2.2 (3)
RHN03U	Dual speed	80/20	.008 (0.2)	.079 (2.0)	.22 (5.7)	2.2 (3)
RHN05U	Dual speed	80/20	.008 (0.2)	.079 (2.0)	.22 (5.7)	2.2 (3)
RHN08U	Dual speed	80/20	.008 (0.2)	.063 (1.6)	.24 (6.1)	2.2 (3)
RHN10U	Dual speed	80/20	.008 (0.2)	.063 (1.6)	.24 (6.1)	2.2 (3)
RHN15U	Dual speed	80/20	.012 (0.3)	.079 (2.0)	.35 (8.8)	7.4 (10)

## 6.0 Maintenance and Handling

### 6.1 Hour Meter

The RHN Hoist is equipped with a Counter, located on the face of the RPU Load Monitor Device. This counter registers and displays the total operating hours of the hoist (See Figure 6-1).



### 6.2 Lubrication

#### 6.2.1 Wire Rope:

- For proper performance the Wire Rope must be maintained in a clean and well lubricated condition.
- The rope should be lubricated every 3 months (more frequently for heavier usage or severe conditions).
- To lubricate the rope, first remove any dirt, grime, moisture or other accumulations of contaminants. Then coat the Wire Rope with grease in Table 6-1. Ensure that the lubricant is applied to the entire surface of the rope over its entire length.

#### 6.2.2 Wire Rope Drum, Hook Block and Sheaves:

- The drum and hook block should be lubricated every 3 months (more frequently for heavier usage or severe conditions).
- Lubricate the Drum, Hook Block and Sheaves with grease in Table 6-1.

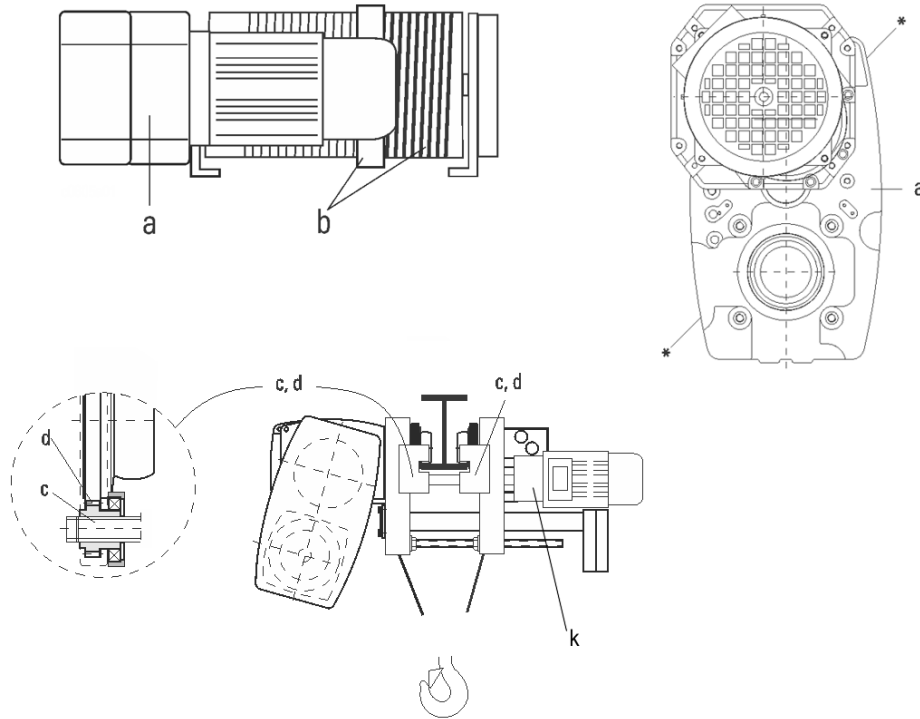
#### 6.2.3 Trolley Wheels and Gears:

- The Trolley Wheels and Gears should be lubricated every 3 months (more frequently for heavier usage or severe conditions).
- Lubricate the Trolley Wheels and Gears with grease in Table 6-1.

#### 6.2.4 Hoist and Trolley Gearboxes – The hoist and trolley gearboxes are lubricated for life and should not need any lubricant replacement.

- If necessary, replace according to Table 6-1.

Table 6-1



Lubrication Point		Type of Lubricant	Quantity of Lubricant Oil - US quarts (ml) Grease - Ounces (g)		Characteristics, Makes
a	Hoist Gear Box	Oil	RHN02, RHN03	1.7 (1500)	1 1 Viscosity: 460 /s/40°C (220/s/40°C), pour point: -20°C (-40°C) flash point: +265°C (+320°C), e.g.: Fuchs Renolin CLP 460 <sup>2</sup> , Aral Degol BG 460, BP Energol GR-XP 460, Esso Spartan EP 460, Mobil Gear 634, Tribol 1100/460, (Shell Tivela Oil WB) 2 Soap base: Lithium + MoS <sub>2</sub> , dripping point: approx. 185°C penetration: 310-340, operating temperature: -20°C to +120°C e.g.: Aralub PMD1 <sup>2</sup> , BP Multi-purpose Grease L21M, Esso Multi-purpose Grease M, Mobilith SHC 460, Shell Retinax AM, STABYL L-TS 1 Mo
			RHN05	2.1 (2000)	
			RHN08, RHN10	6.3 (6000)	
			RHN15, RHN20	16.9 (16000) 19 (18000) <sup>1</sup>	
b	Rope/Rope Guide/Drum	Grease	All Models	21-88 (600-2500)	3 3 Soap base: Synthetic (lithium), dripping point: approx 150°C penetration: 400-430 (400-430), operating temperature: -20°C to +80°C (-35°C to +130°C), e.g.: Aralub FDP00, BP Energrease HT-00 EP, Esso Liquid Gear Grease, Shell Special, Gear grease H <sup>2</sup> , Mobilux Liquid grease EP 004, (Tivela Compound A)
c	Drive Shaft	Grease	All Models	3.5 (100)	2 4 Soap base: Lithium + MoS <sub>2</sub> (Synthetic + lithium), dripping point: approx. +180°C, penetration: 355-385 (400-430), operating temperature: -30°C to +120°C (-35°C to +130°C), e.g.: Aralub LFZ 0, Renolit FLM 0 <sup>2</sup> , Tribol Molub-Alloy MPG 00, (Tivela Compound A)
d	Pinion	Grease	All Models	18-35 (500-1000)	5 5 Soap base: Lithium, dripping point: approx. +170°C (+260°), penetration: 220-250 (265-290), operating temperature: -20°C to +120°C (-40°C to +120°C), e.g.: Aralub HL3, BP Energrease RBB3, ESSO Roller Bearing Grease Andak C AC 205, Mobilux 3 <sup>2</sup> (Mobil Mobilgrease 28)
k	Trolley Gear Box	Grease	RHN02U-RHN05U	3.5 (100)	6 6 Soap base: Lithium + MoS <sub>2</sub> , dripping point: ca. +180°C, penetration: 355-385, operating temperature: -30°C to +130°C, e.g.: Aral Grease P64037 <sup>2</sup> , Aralub PMD0, Tribol Molub-Alloy Multi-purpose grease
			RHN08U-RHN15U	7.1 (200)	

\* - Oil filling/oil drainage screw. Depending on the installation position of gear, the filling screw is "at the top" and the drainage screw is "at the bottom."

1 - If motor at top

2 - Factory filled

## 6.3 Hoist Motor Brake

6.3.1 To keep your hoist working in optimum condition and prevent possible down time, it is recommended to check your motor brake at regular intervals. Intervals must be adapted in accordance with the application.

6.3.2 **⚠ DANGER** Before proceeding, ensure that the electrical supply for the hoist or trolley has been de-energized (disconnected). Lock out and tag out in accordance with ANSI Z244.1 "Personnel Protection –Lockout/Tagout of Energy Sources". The hoist must be unloaded and the bottom hook block set down.

6.3.3 Motor Brake Check:

- 1) Remove fan cover (1). See **Figure 6-1**.
- 2) Remove plug (2). See **Figure 6-1**.
- 3) Measure air gap (S) with feeler gauge (F). When measuring, ensure that the feeler gauge is pushed in at least as far as depth "a" and does not catch on shoulder. See **Table 5-8** for max. permissible air gap (S). See **Figure 6-2**.
- 4) The brake is not adjustable. If the max. permissible air gap (S) has been reached, the brake disc (brake rotor) must be replaced. See **Figure 6-2**.

6.3.4 Brake Rotor Replacement - See **Figure 6-1**.

- 1) Remove fan cover (1).
- 2) Pull off fan wheel (3), remove feather key
- 3) Disconnect brake
- 4) Unscrew fixing screws (4)
- 5) Remove magnet piece (5) together with armature disc (6)
- 6) Remove brake disc (brake rotor) (7)
- 7) Clean brake (wear a dust protection mask)
- 8) Check friction surfaces for wear
- 9) Push new brake disc (brake rotor) (7) onto hub (8) and check radial play. If there is increased play in the gearing between brake disc (7) and hub (8) the hub (8) must be pulled off the motor shaft and replaced.
- 10) **⚠ CAUTION** Danger of damage - Always contact the manufacturer before removing the hub (8).

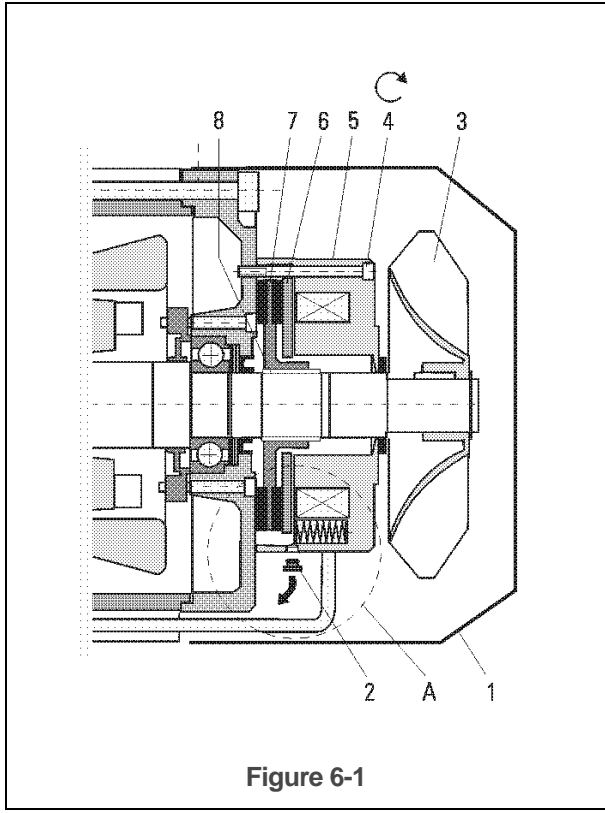


Figure 6-1

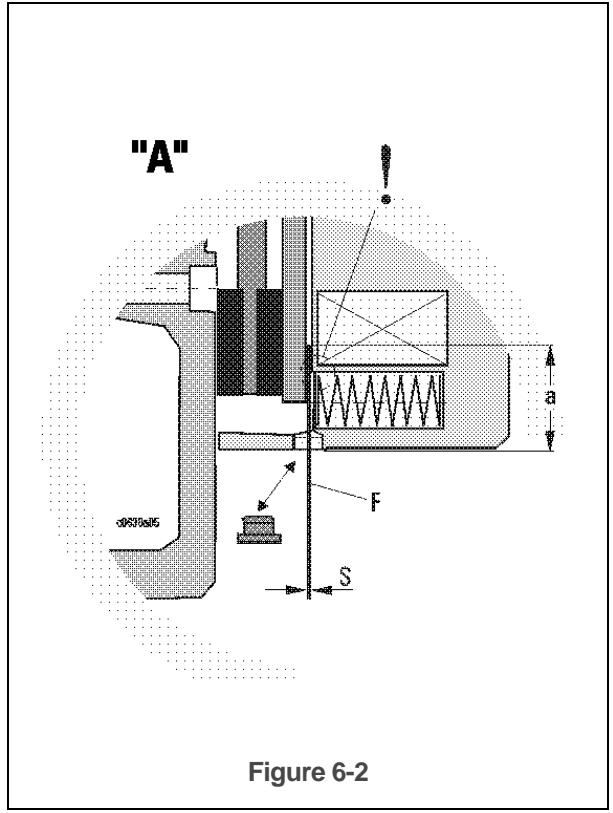


Figure 6-2

- 6.3.5 Motor Brake Re-assembly – Reassemble the parts in reverse order of removal. Ensure that the check hole for measuring the air gap is underneath. Observe tightening torques in **Table 5-8**.

## 6.4 Trolley Motor Brake

- 6.4.1 To keep your hoist working in optimum condition and prevent possible down time, it is recommended to check your motor brake at regular intervals. Intervals must be adapted in accordance with the application.

- 6.4.2 **⚠ DANGER** Before proceeding, ensure that the electrical supply for the hoist or trolley has been de-energized (disconnected). Lock out and tag out in accordance with ANSI Z244.1 “Personnel Protection –Lockout/Tagout of Energy Sources”.

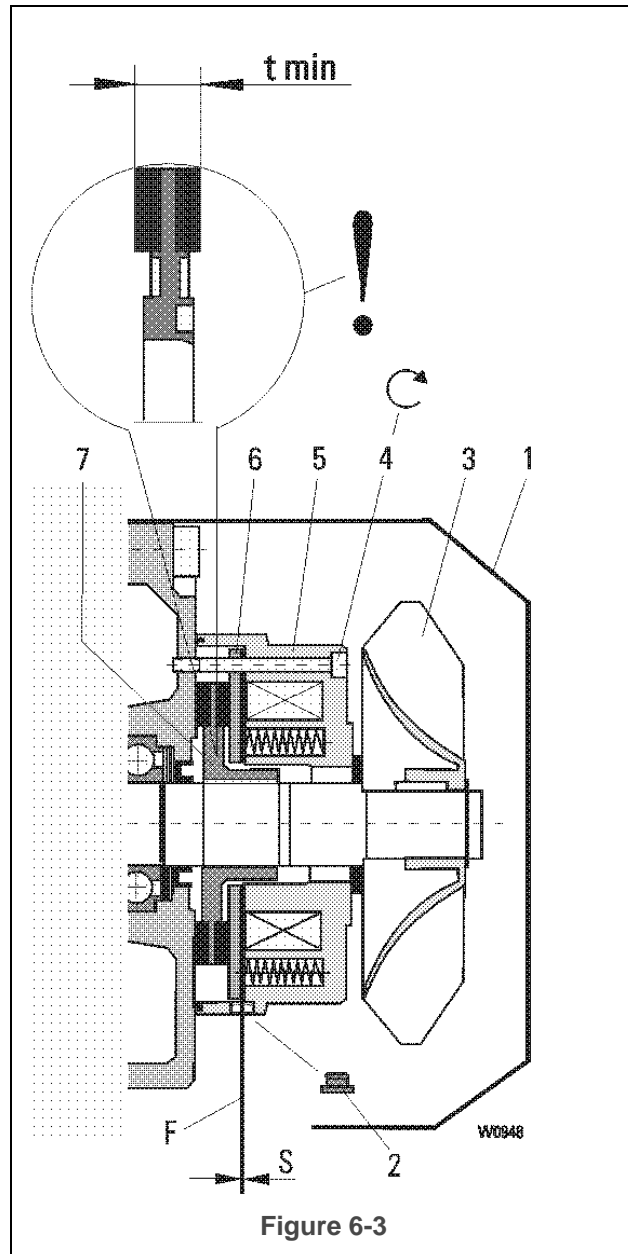
- 6.4.3 Motor brake Check - See **Figure 6-3**.

- 1) Move carriage into a safe position
- 2) Remove fan cover (1)
- 3) Remove plug (2)
- 4) Measure air gap (S) with feeler gauge (F). See **Table 5-11** for max. permissible air gap (S).
- 5) The travel motor brake needs no adjustment. If the max. permissible air gap (S) has been reached, the brake disc (brake rotor) must be replaced.

- 6.4.4 Brake Rotor Replacement - See **Figure 6-3**.

- 1) Remove fan cover (1)
- 2) Pull off fan wheel (3), remove feather key
- 3) Disconnect brake
- 4) Unscrew fixing screws (4)
- 5) Remove magnet piece (5) together with armature disc (6)
- 6) Remove brake disc (brake rotor) (7).





6.4.5 Motor brake reassembly – Reassemble the parts in reverse order of removal. Ensure that the check hole for measuring the air gap is underneath. Observe tightening torques in Table 5-11.

## 6.5 Wire Rope

6.5.1 Lubrication and Cleaning – Refer to Section 6-2.

6.5.2 **⚠ WARNING** Be certain that the replacement wire rope is obtained from Harrington Hoists, Inc. and is the correct wire rope for the hoist. See factory certificate for part number of rope. Rope must be replaced as required by DIN 15020, FEM 9.661 and ISO 4309. If the wire rope is being replaced due to damage or wear out, destroy the old rope to prevent its reuse.

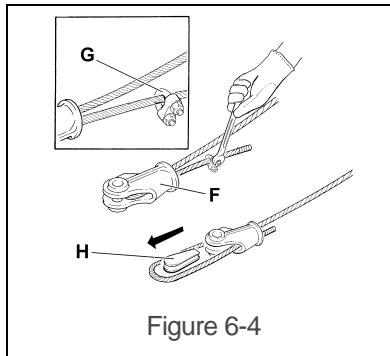
6.5.3 After commissioning a new wire rope hoist, or after replacing the rope, the rope of multi-fall hoists may twist. This can be seen from the bottom hook block turning, particularly when unloaded.

**⚠ WARNING** Twisting in the rope prejudices safety and service life. Remove any twists!

Regularly inspect the rope for twisting and follow the procedure in Table 5-5 “Wire Rope-Twisting” and other corresponding Wire Rope sections in Table 5-5.

#### 6.5.4 Wire Rope Removal/Rope Guide Replacement

- 1) **⚠ CAUTION** The hoist must be properly powered and operational in order to perform the following procedures.
- 2) **⚠ CAUTION** When replacing Wire Rope, check for wear on mating parts, i.e. Drum, Sheaves, Hook Block Sheaves and replace if necessary.
- 3) Lower the Hook Block to the lowest possible position without touching the floor or ground.
- 4) Remove the Wire Rope Clamp (G) and loosen the Wire Rope until the Terminal Wedge (H) can be removed from the Anchorage Assembly (F) (see Figure 6-4).



- 5) Remove (unreeve) the Wire Rope from the Bottom Block and all Sheaves.
- 6) Remove the rope guide
  - Unscrew protective plate (1) under the rope drum at points (a). The rope guide can then be rotated freely. For RHN02-RHN10 models see Figure 6-5 ; for RHN15 & RHN20 models see Fig 6-6.
  - **⚠ WARNING** Danger of bodily injury or material damage - Do not unscrew stop with bearing (2)! The stop with bearing (2) is locked with a conical spring washer. This must be refitted correctly. See Figure 6-5.
  - Unscrew screws (3). See Figure 6-7.
  - Remove half-rings.
  - Unhook rope tensioning spring.
- 7) Unscrew the fixing screws in the clamping plates on the rope drum (see Figure 6-8)

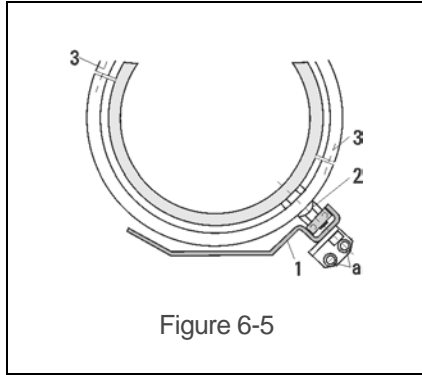


Figure 6-5

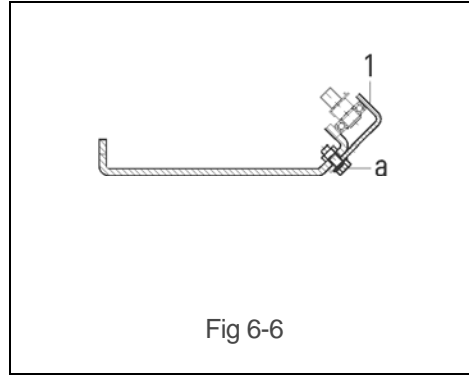


Fig 6-6

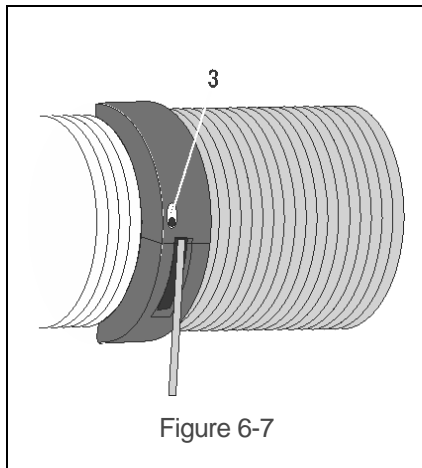


Figure 6-7

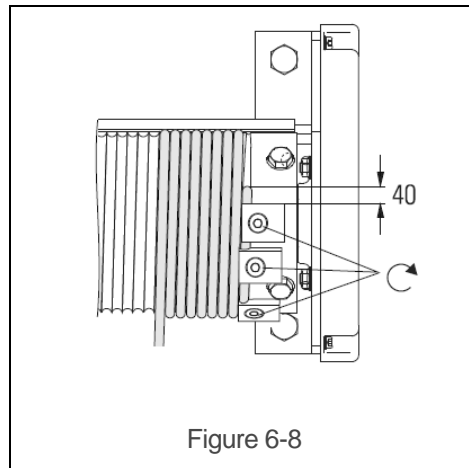
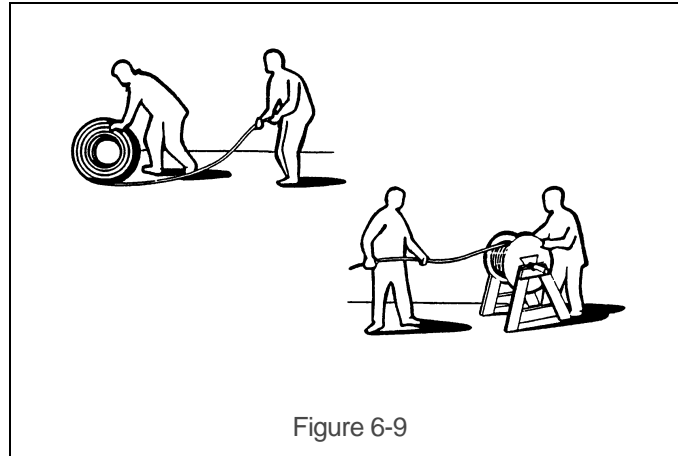


Figure 6-8

### 6.5.5 Wire Rope Installation/Rope Guide Installation

- 1) **⚠ CAUTION** The hoist must be properly powered and operational in order to perform the following procedures.
- 2) **⚠ CAUTION** When replacing Wire Rope, check for wear on mating parts, i.e. Drum, Sheaves, Hook Block Sheaves, and replace if necessary.
- 3) **⚠ WARNING** ALWAYS unwind the roll of the new Wire Rope without kinks or bends (see Figure 6-9). Protect the rope from dirt.
- 4) Examine the Wire Rope Guide Ring Halves and the Drum after cleaning/degreasing thoroughly.
- 5) Verify proper fit of the Wire Rope Guide Ring Halves with the Drum, matching up the respective grooves and check that there is no excessive clearance. Check for pointed or sharp crests and heavy wear and tear. Where necessary assess the need for replacing the wire rope guides and the Drum.
- 6) Secure the end of the Wire Rope to the Drum with 3 Wire Rope Clamps (do not forget the lock washers!). Allow the rope end to project by approximately 30-40mm, see Figure 6-8.



- 7) Press the “UP” button on the Pendant to wind the Wire Rope onto the Drum. Tightly wind about 5-10 turns onto the drum (see Figure 6-8). Let the rope run through a greased rag. See Section 6.1 for grease type.
- 8) Without loosening the tension on the Wire Rope, clamp a weight onto the Wire Rope below the Rope Guide, taking care not to damage the Wire Rope. Replacing the manual tension with the weight will prevent the Wire Rope from unrolling off the Drum.
- 9) Fit the rope guide:
  - Grease thread and rope guide groove thoroughly.
  - Place the half-ring (1) with the short window section onto the rope drum next to the last rope winding so that the rope exits from the region of the window (x) (see Figure 6-10).
  - Push rope tensioning spring (2) into the guide groove of the half-ring (1) and hook the ends of the spring together (see Figure 6-11). The special spring tool will make this easier (see “a” in Figure 6-12).
  - Place the second half-ring (3) with the long rope exit window on the rope drum so that the rope exits from the drum groove through the window straight and without kinking. The second half-ring must lie flush against the first (see Figure 6-13).
  - Bolt the two half-rings together with pressure screws and bolts (5) (see Figure 6-13).
  - **The rope guide must rest lightly on the drum and be able to be turned by hand. If this is not the case the guide has been fitted incorrectly or the rope drum is damaged.**
  - Bolt stop with bearing and conical spring washer (6) to the rope guide (see Figure 6-14).
  - Bolt on protective plate (8) (see Figure 6-15).

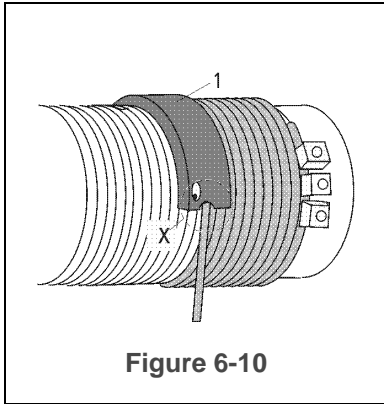


Figure 6-10

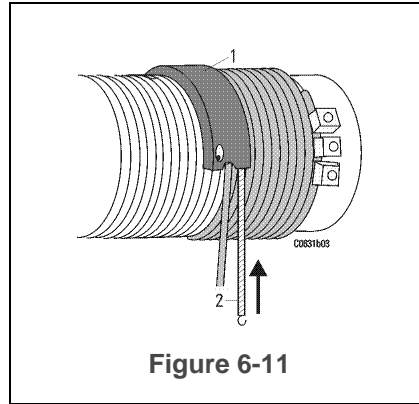


Figure 6-11

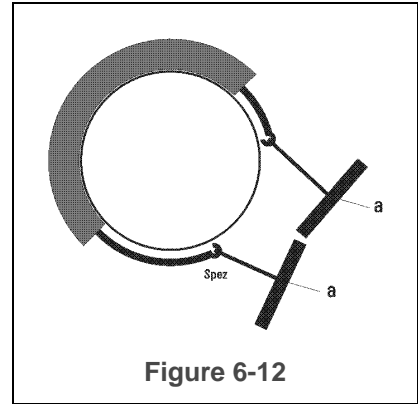


Figure 6-12

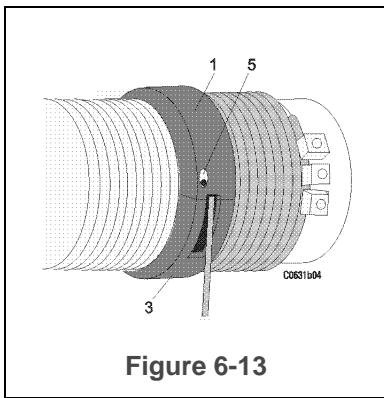


Figure 6-13

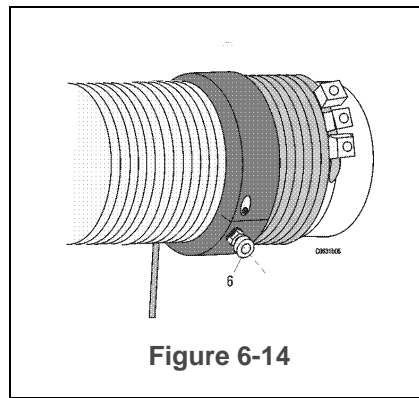


Figure 6-14

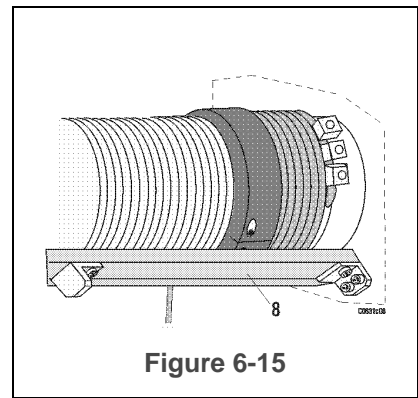


Figure 6-15

- 10) Carry out again all the sequences described in Section 6.6 "Reeving and Adjustments". Lubricate the Wire Rope, the Rope Guide and Drum (see Section 6.2).
- 11) Retighten clamping plates. Torque the Screws to the value shown in Table 6-1 for your hoist (see Figure 6-8).
- 12) Run rope in with a partial load.

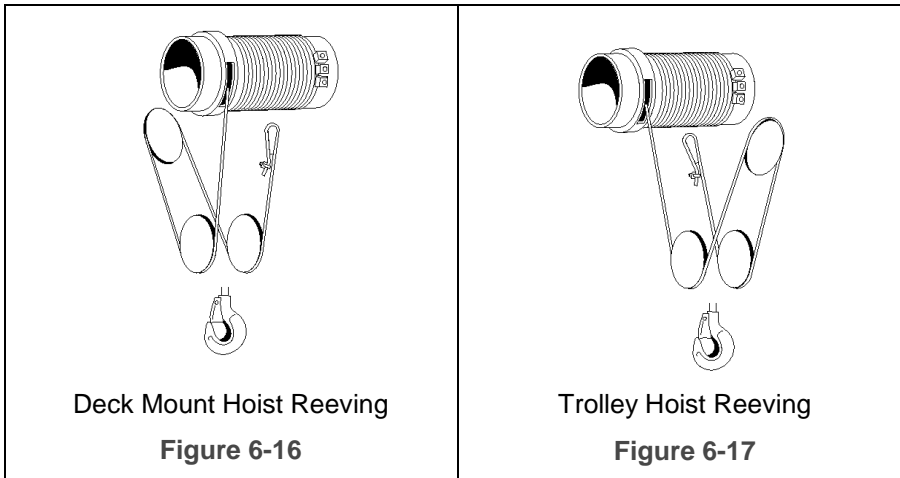
Table 6-1 Rope Clamp Torque Values				
Hoist Capacity Code	RHN02, RHN03	RHN05	RHN08, RHN10	RHN15, RHN20
Screw Dia (mm)	M10	M10	M12	M16
Screw Torque	30 ft-lbs. (40Nm)	39 ft-lbs. (50Nm)	64 ft-lbs. (87Nm)	155 ft-lbs (210Nm)

## 6.6 Reeving and Anchorage

### 6.6.1 Reeving the bottom block

Use a pliers to hold the rope securely.

1. The hoist must be energized in order to complete the reeving of the rope. Take extreme caution while performing this operation.
2. Lay out the end of the rope that is not wound on the drum. Let this end hang freely.
3. Make certain that the wire rope lies snugly on the rope drum. Avoid wire rope slack at all times. Slack will cause premature rope guide wear as well as wire rope wear.
4. Make a paint mark on the side of the wire rope. This mark will assist in detecting the presence of rope twist.
5. Reeve the end of the rope into the rope sheaves of the bottom block and return pulleys. (Figure 6-16 and 6-17) Do not allow rope to twist.



6. With the rope recess assembly removed, the rope can be installed on the rope wedge.
7. Place rope around rope wedge (2) and pull it into the tapered rope recess (1) until the loose end of the rope projects approx. 100mm.
8. Secure loose end of rope with rope clamp (3) approx. 50mm from the end of the rope. See Table 6-2 for torque specification.
9. Verify the maximum projection of the rope wedge "x" dimension. (See Figure 6-17 and Table 6-1).
10. Reinstall rope recess assembly according to the anchorage configuration determined by the hoist model. Refer to Figures 6-19 through Figures 6-23 for a visual aid. Replace split pin (4) with a new split pin.

Table 6-2 Anchorage Specifications			
Deck Mount Hoist	Rope Clamp Torque Setting ft lbs (Nm)	Rope Wedge Projection "x"	
RHN02 RHN03	7.4 (10.0)	6 mm	
RHN05	14.8 (20.0)		
RHN08 RHN10	29.7 (40.0)	15 mm	
RHN15	70.5 (95.0)		
Trolley Hoist	Rope Clamp Torque Setting ft lbs (Nm)	Rope Wedge Projection "x"	
RHN02 RHN03	7.4 (10.0)	6 mm	
RHN05	14.8 (20.0)		
RHN08 RHN10	29.7 (40.0)	15 mm	
RHN15 RHN20	96.5 (130.0)		

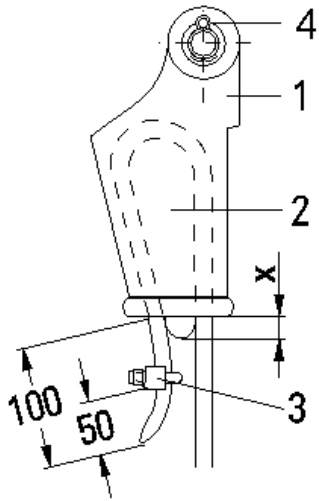
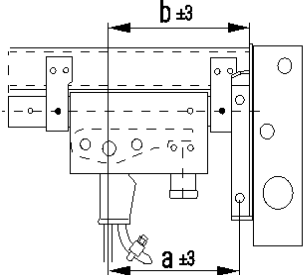


Figure 6-18

Anchorage Configurations	
<p>RHN02 Deck Mount and RHN03 Deck Mount</p> <p>Gear Side</p> <p>Figure 6-19</p>	<p>RHN05 Deck Mount</p> <p>Gear Side</p> <p>Figure 6-20</p>
<p>RHN08 Deck Mount and RHN10 Deck Mount</p> <p>Gear Side</p> <p>Figure 6-21</p>	<p>RHN15 Deck Mount and RHN20 Deck Mount RHN15 Trolley Hoist</p> <p>Gear Side</p> <p>Figure 6-22</p>

Anchorage Configurations (Continued)			
 <p style="text-align: center;">Figure 6-23</p>	<b>Table 6-3</b>		
	“a” and “b” dimensions (mm)		
	Hoist Model	a	b
	RHN02	216	241
	RHN03	216	241
	RHN05	265	290
	RHN08	334	366
RHN10	334	366	
RHN15	334	366	

11. Operate the hoist several times up and down (without a load) for the entire length of the lift.
12. Repeat with increasing loads
13. Inspect for twist while operating the hoist. Severe twist will cause the bottom block to turn. This is easily noticeable when there is no load on the hook. **Always make sure that the rope is free of twist prior to lifting a load to prevent permanent distortion, rope damage, or rope guide damage.**
14. If the wire rope has twisted, repeat steps 1-10 until twist is no longer present.

## 6.7 Storage

- 6.7.1 The storage location should be clean and dry.
- 6.7.2 Care should be take to not damage any of the electrical power cords or fittings.

## 6.8 Outdoor Installations

- 6.8.1 For trolley and hoist installations that are outdoors, the trolley and hoist **MUST** be covered and protected from the weather at all times.
- 6.8.2 Avoid trolley hoist oxidation by using suitable treatment and lubricating all mechanisms.
- 6.8.3 Possibility of corrosion on components of the trolley increases for installations where salt air and high humidity are present. The hoist and trolley may require more frequent lubrication. Make regular inspections of the unit's condition and operation.
- 6.8.4 For hoist installations where temperature variations introduce condensation into the hoist additional inspection and more frequent lubrication may be required.
- 6.8.5 Refer to Section 2.1.3 for allowable environmental conditions.

## 6.9 Operational Environment

- 6.7.1 Non-conforming environment  
A non-conforming environment is defined as one with any or all of the following.
  - Explosive gases or vapor.
  - Organic solvents or volatile powder
  - Excessive amounts of powder and dust of general substances
  - Excessive amount of acids or salts



## 7.0 Troubleshooting

### **WARNING**

HAZARDOUS VOLTAGES ARE PRESENT IN THE HOIST AND IN CONNECTIONS BETWEEN COMPONENTS.

Before performing ANY troubleshooting on the equipment, de-energize the supply of electricity 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 7-1 Troubleshooting Guide**

Symptom	Cause	Remedy
Hoist and/or Trolley moving in wrong direction	Power supply reversed phased	Switch two (2) of the three (3) power supply cord wires at the power source.
	Improper electrical connections	Refer to wiring diagram and check all connections.
Hoist and/or Trolley will not operate	Loss of power	Check circuit breakers, switches, fuses and connections on power lines/cable.
	Wrong voltage or frequency	Check voltage and frequency of power supply against the rating on the nameplate of the motor.
	Hoist overload	Reduce load to within rated capacity of hoist.
	Motor overheated and thermal overload protector has tripped	See Trouble Shooting Problem "Motor or brake overheating".
	Improper, loose, or broken wire in hoist electrical system	Shut off power supply, check wiring connections on hoist control panel and inside push-button pendant.
	Brake does not release	Check motor brake adjustment for proper clearance.
	Defect in control transformer	Check transformer coil for signs of overheating. Disconnect transformer and check for open winding.
	Faulty magnetic contactor	Check coil for open or short circuit. Check all connections in the control circuit. Check for open contactors. Replace as needed.
	Faulty Up or Down Limit Switch	Replace the Up and/or Down Limit Switch
Motor burned out	Replace motor frame/stator, shaft/rotor, and any other damaged parts.	

**Table 7-1 Troubleshooting Guide**

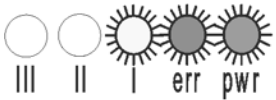
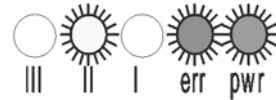


<b>Symptom</b>	<b>Cause</b>	<b>Remedy</b>
Hoist lifts but will not lower	Down circuit open	Check circuit for loose connections. Check down limit switch for malfunction.
	Broken conductor in pendant cord	Check the continuity for each conductor in the cable. If one is broken, replace entire cable.
	Faulty magnetic contactors	Check coils for open or short circuit. Check all connections on motor circuit. Check for burned contacts. Replace as needed.
	Faulty switch in pendant	Check electrical continuity. Check electrical connections. Replace or repair as needed.
	Faulty operational/emergency limit switch.	Check hoist limit switch.
	Hoist is in bottom hook position.	
Hoist lowers but will not lift	RPU load monitor has been actuated or is faulty.	See <b>Table 7-2</b> for error codes. Actions to eliminate an error may only be performed by trained personnel.
	Hoist overloaded	Reduce load to within rated capacity of hoist.
	Low voltage in hoist's power supply	Determine cause of low voltage and bring to within plus or minus 10% of the voltage specified on the motor nameplate. The voltage should be measured at the hoist contactor.
	Up circuit open	Check circuit for loose connections. Check up limit switch for malfunction.
	Faulty magnetic contactors	Check coils for open or short circuit. Check all connections on motor circuit. Check for burned contacts. Replace as needed.
	Broken conductor in pendant cord	Check the continuity of each conductor in the cable. If one is broken, replace entire cable.
	Faulty switch in pendant	Check electrical continuity. Check electrical connections. Replace or repair as needed.
Hoist will not lift rated load or does not have the proper lifting speed	Hoist overloaded	Reduce load to within rated capacity.
	Low voltage in hoist's power supply	Determine cause of low voltage and bring to within plus or minus 10% of voltage specified on the motor nameplate. The voltage should be measured at the hoist contactor.
	Brake drags	Check motor brake adjustment for proper clearance.
Load drifts excessively when hoist is stopped	Motor brake not holding	Clean and inspect brake lining. Check motor brake tolerances. Replace if necessary
Trolley drifts excessively when stopping	Motor brake not holding	Clean and inspect brake lining. Check motor brake tolerances. Replace if necessary
Hoist and/or Trolley Motor or brake	Excessive load	Reduce load to within rated capacity of hoist.
	Excessive duty cycle	Reduce frequency of lifts and/or trolley movement.

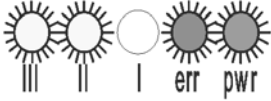
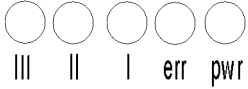
**Table 7-1 Troubleshooting Guide**

Symptom	Cause	Remedy
Overheating	Wrong voltage or frequency	Check voltage and frequency of power supply against the rating on the nameplate on the motor.
	Brake drags	Check motor brake adjustment for proper clearance.
	Extreme external heating	Above an ambient temperature of 104°F, the frequency of hoist operation must be reduced to avoid overheating of the motor. Special provisions should be made to ventilate the hoist or otherwise shield it from the heat.

Hoist and/or Trolley operates intermittently	Contactors contacts arcing	Check for burned contacts. Replace as needed.
	Loose connection in circuit	Check all wires and terminals for bad connections. Replace as needed.
	Broken conductor in Pendant Cord	Check for intermittent continuity in each conductor of the Pendant Cord. Replace entire Pendant Cord if continuity is not constant.
Trolley making loud noise.	Trolley wheel maladjusted on beam	Readjust the gap between the trolley wheel flange and the beam flange.
Trolley will not move	Trolley wheel spacing on beam too tight	Readjust the gap between the trolley wheel flange and the beam flange.
	Hoist is in highest hook position	Lower bottom hook block until motion is possible again.
Abnormal noise from wire rope and/or drum	Lack of lubrication, worn wire rope/drum/sheaves	Lubricate or replace wire rope/drum/sheaves

**Table 7-2 Load Monitoring Device Error Code Guide**

LED Error Code	Cause	Remedy
	Sensor current <1mA or >24mA	<ul style="list-style-type: none"> <li>• Check voltage supply</li> <li>• Check sensor current (terminal 21)</li> <li>• Check sensor cable</li> <li>• Replace sensor</li> </ul>
	Overload	<ul style="list-style-type: none"> <li>• Remove load from hoist</li> </ul>
	Over temperature (hoisting motion not possible)	<ul style="list-style-type: none"> <li>• Allow motor to cool down – check PTC thermistors</li> </ul>
	Control error	<ul style="list-style-type: none"> <li>• Check wiring (Lifting terminal 3 and lowering terminal 4 are activated simultaneously)</li> </ul>

	<p>System error</p>	<ul style="list-style-type: none"> <li>• Check voltage (terminal 6)</li> <li>• Switch RPU off/on</li> <li>• Replace RPU</li> </ul>
	<p>No control voltage, faulty fuse, faulty Load Monitor</p>	<ul style="list-style-type: none"> <li>• Check voltage (terminal 6)</li> <li>• Switch RPU off/on</li> <li>• Replace RPU</li> </ul>

## 8.0 Warranty

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

**Manual Hoists, Trolleys, & Beam Clamps – 2 years**  
**NER2/ER2 Hoists Enhanced Features Models – 3 Years**  
**(N)ER030L(D), All Other Electric and Air Hoists, Trolleys, Crane Components – 1 year**  
**Spare / Replacement Parts – 1 year**  
**NER2/ER2 “The Guardian” Smart Brake – 10 years**

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

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

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

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

## 9.0 Parts List

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

Reminder: Per **Sections 1.1** and **3.9.1** to aid in ordering Parts and Product Support, record the Hoist product number and serial number in the space provided on the cover of this manual.

Product		Manufacturing month	
Duty class	Hoisting speed	Manufacturer's ref	
-	-/-	/5	
Load	Trolley speed		
-	-/-		
Height of lift	Main voltage	Control voltage	Frequency
-	-	-	-

The parts list is arranged into the following sections:

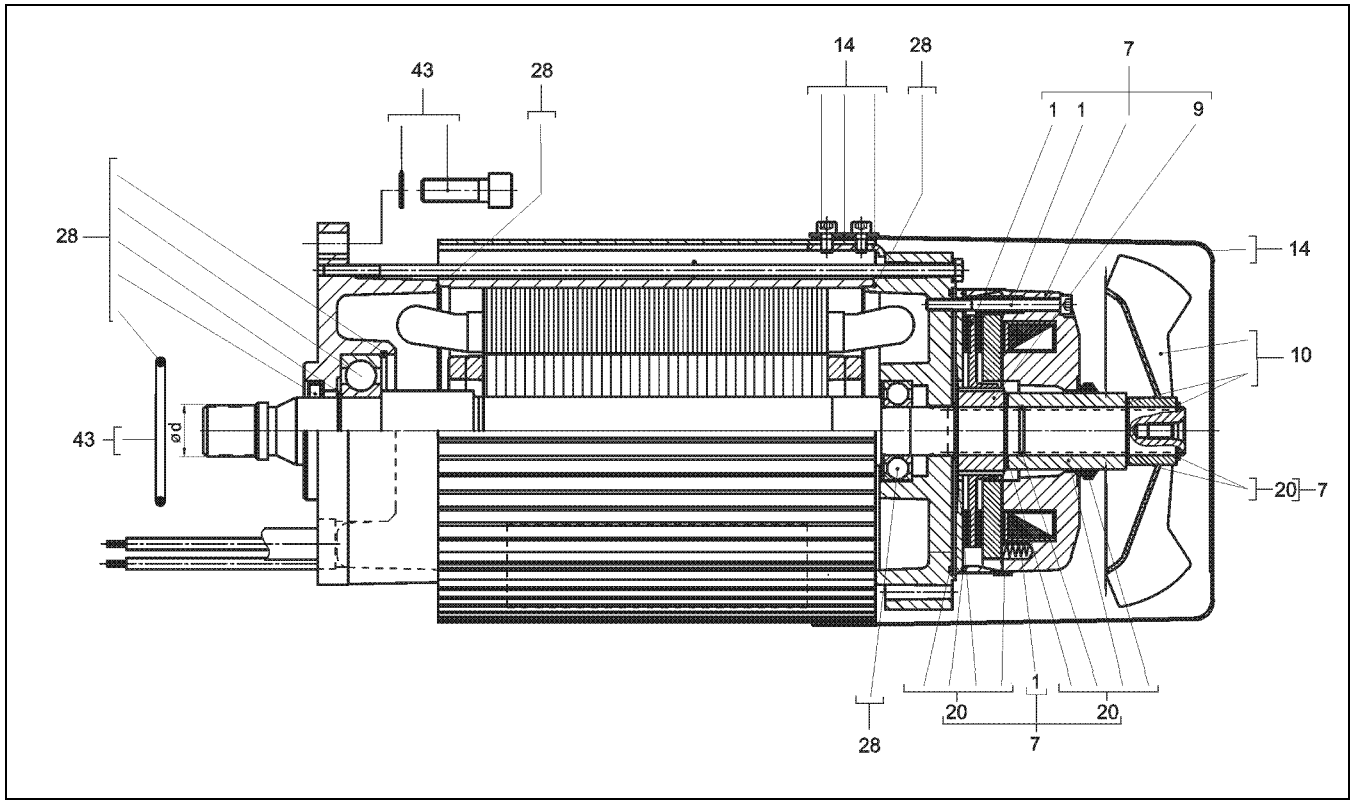
Section	Page
9.1 Hoist Motor Parts .....	71
9.2 Gearing Parts .....	73
9.3 Rope Drum Parts .....	77
9.4 Rope Suspension Parts .....	81
9.5 Hook Block Parts .....	87
9.6 Terminal Box Parts .....	93
9.7 Trolley Parts .....	105
9.8 Trolley Motor & Gear Box Assembly Parts .....	107

In the column "Parts Per Hoist" a designator is used for parts that apply only to a particular model or option. Refer to **Section 2** for hoist model numbers and additional descriptions. The designators are:

- 1V = 208 Volt Models
- 2V = 230 Volt Models
- 4V = 460 Volt Models
- 5V = 575 Volt Models

## 9.1 Hoist Motor Parts

RHN02, RHN03, RHN05, RHN08, RHN10, RHN15, RHN20



50

Figure 9-1-1 Hoist Motor Parts (Dual Speed)

## 9.1 Hoist Motor Parts

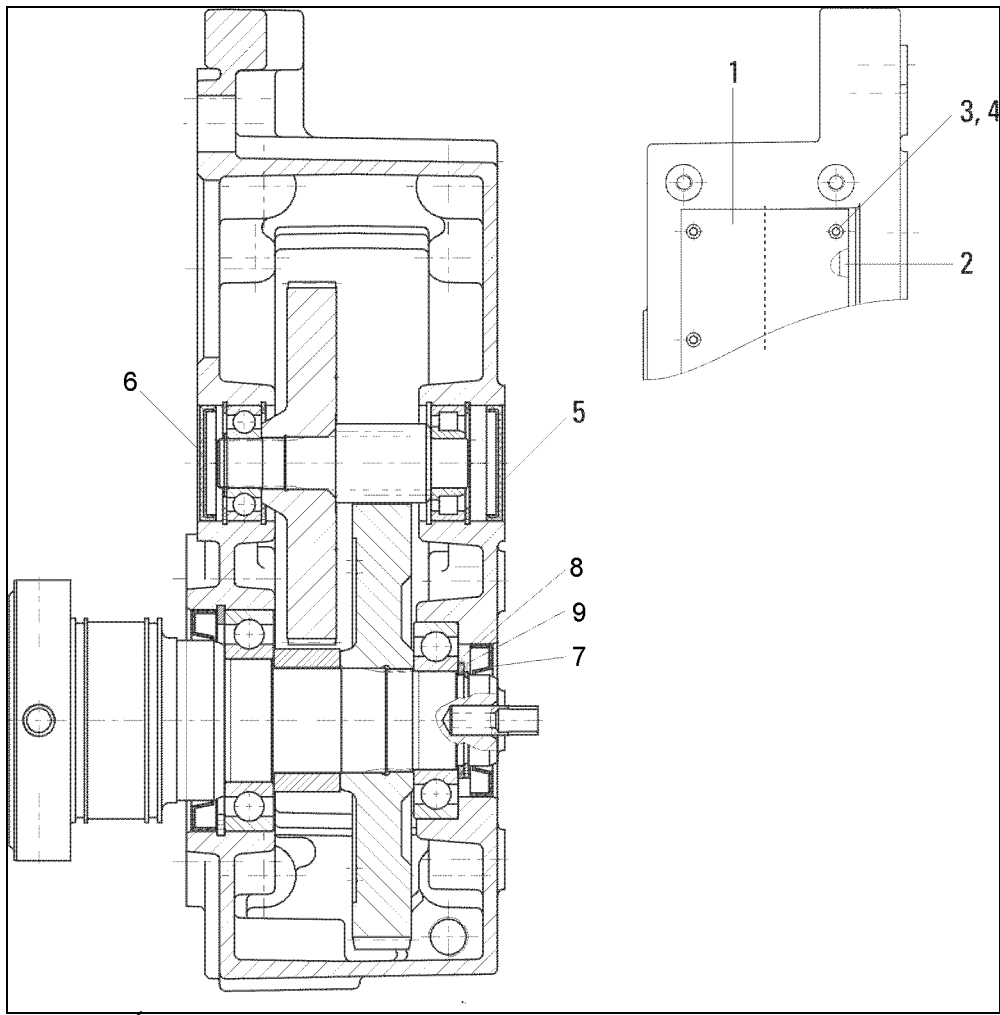
Figure No.	Part Name	Parts Per Hoist	RHN02	RHN03	RHN05	RHN08	RHN10	RHN15U	RHN15D	RHN20D
50	<b>HOIST MOTOR, Dual Speed<sup>1</sup></b>	1V, 2V	1	RHN0702	RHN0705	RHN0708	RHN0711	RHN0714		
		4V		RHN0356	RHN0366	RHN0371	RHN0381	RHN0382		
		5V		RHN0703	RHN0706	RHN0709	RHN0712	RHN0715		
	7	Brake assembly	1V	1	RHN0358	RHN0368	RHN0373		RHN0384	
			2V		RHN0359	RHN0369	RHN0374		RHN0385	
			4V							
			5V							
	1	Brake rotor kit <sup>2</sup>	1	RHN0357	RHN0367	RHN0372				
	9	Hub	1	RHN0360	RHN0370	RHN0375				
	20	Brake seal kit <sup>3</sup>	1	RHN0363			RHN0378			
10	Fan wheel kit <sup>4</sup>	1	RHN0361			RHN0376				
14	Fan cover kit <sup>5</sup>	1	RHN0362			RHN0377				
28	Bearing kit <sup>6</sup>	1	RHN0364			RHN0379				
43	Gear motor screw kit <sup>7</sup>	1	RHN0365			RHN0380				

- 1 Item #43 should be ordered with this part
- 2 Item #20 should be ordered with this part
- 3 Brake seal kit includes o-rings, bushing, snap rings, plug
- 4 Fan wheel kit includes fan wheel and snap rings
- 5 Fan cover kit includes fan cover, lock washers, screws, and tread block
- 6 Bearing kit includes bearings, o rings, snap rings
- 7 Gear motor screw includes screws, lock washers, and o-ring



# Gearing Parts

RHN02, RHN03, RHN05, RHN08, RHN10



10

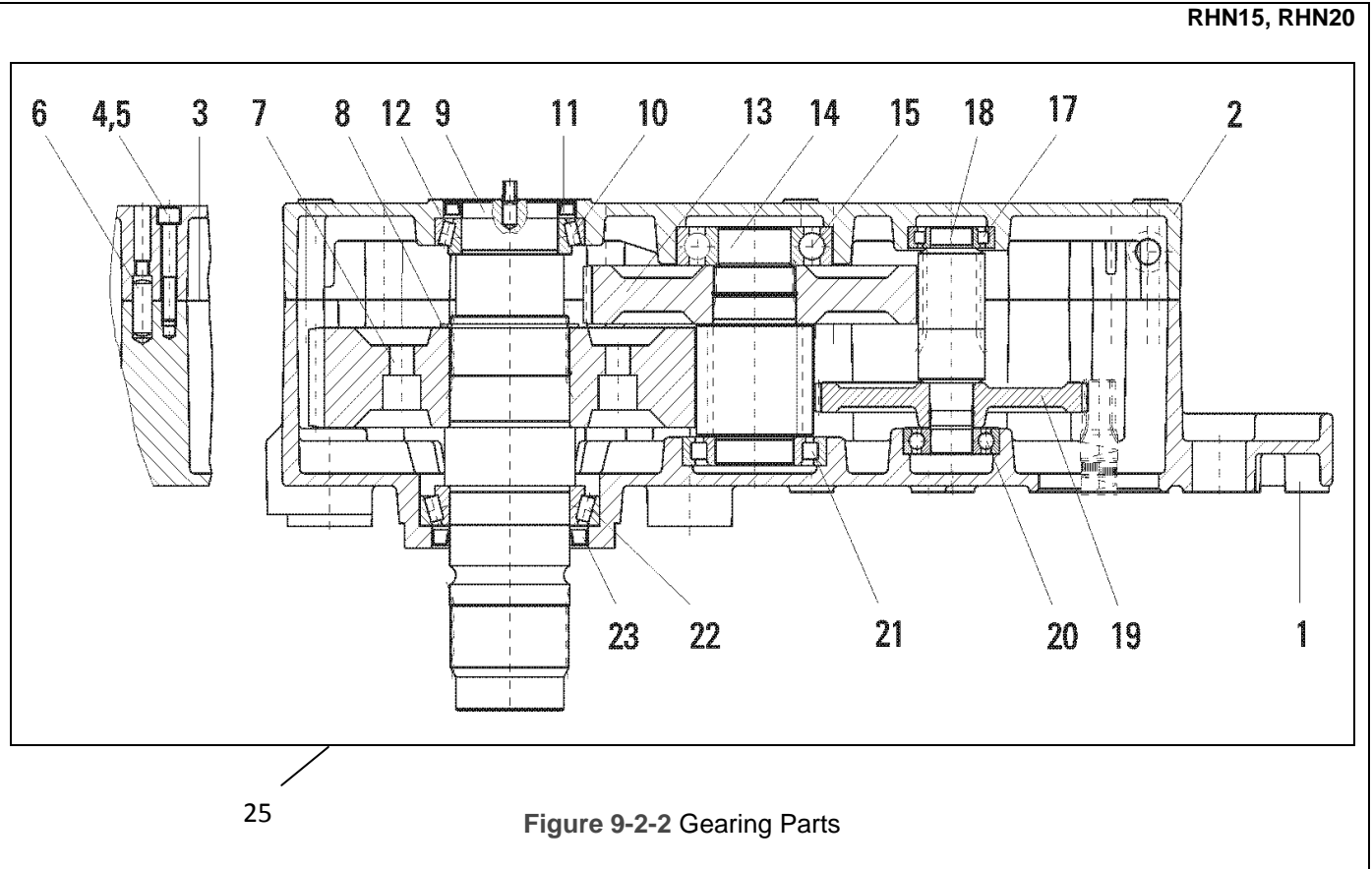
Figure 9-2-1 Gearing Parts

## 9.2 Gearing Parts

Figure No.	Part Name	Parts Per Hoist	RHN02	RHN03	RHN05	RHN08	RHN10
10	<b>2-10 Ton Gear Assembly, Standard</b>	1	RHN0304		RHN0306		RHN0308
1	Cover	1	RHN0001		RHN0085		RHN0146
2	Seal	1	RHN0002		RHN0086		RHN0147
3	Socket head cap screw	8			9691201		
4	Lock washer	8			9012709		
5	End cap	1	RHN0003		RHN0045		RHN0132
6	End cap	1	RHN0003		RHN0088		RHN0149
7	Shaft seal	1	RHN0004		RHN0089		RHN0150
8	Shap Ring, external	1	9047120		9047148		9047175
9	Supporting ring	1	9098801		9098803		9098805

## 9.2 Gearing Parts

RHN15, RHN20



25

Figure 9-2-2 Gearing Parts

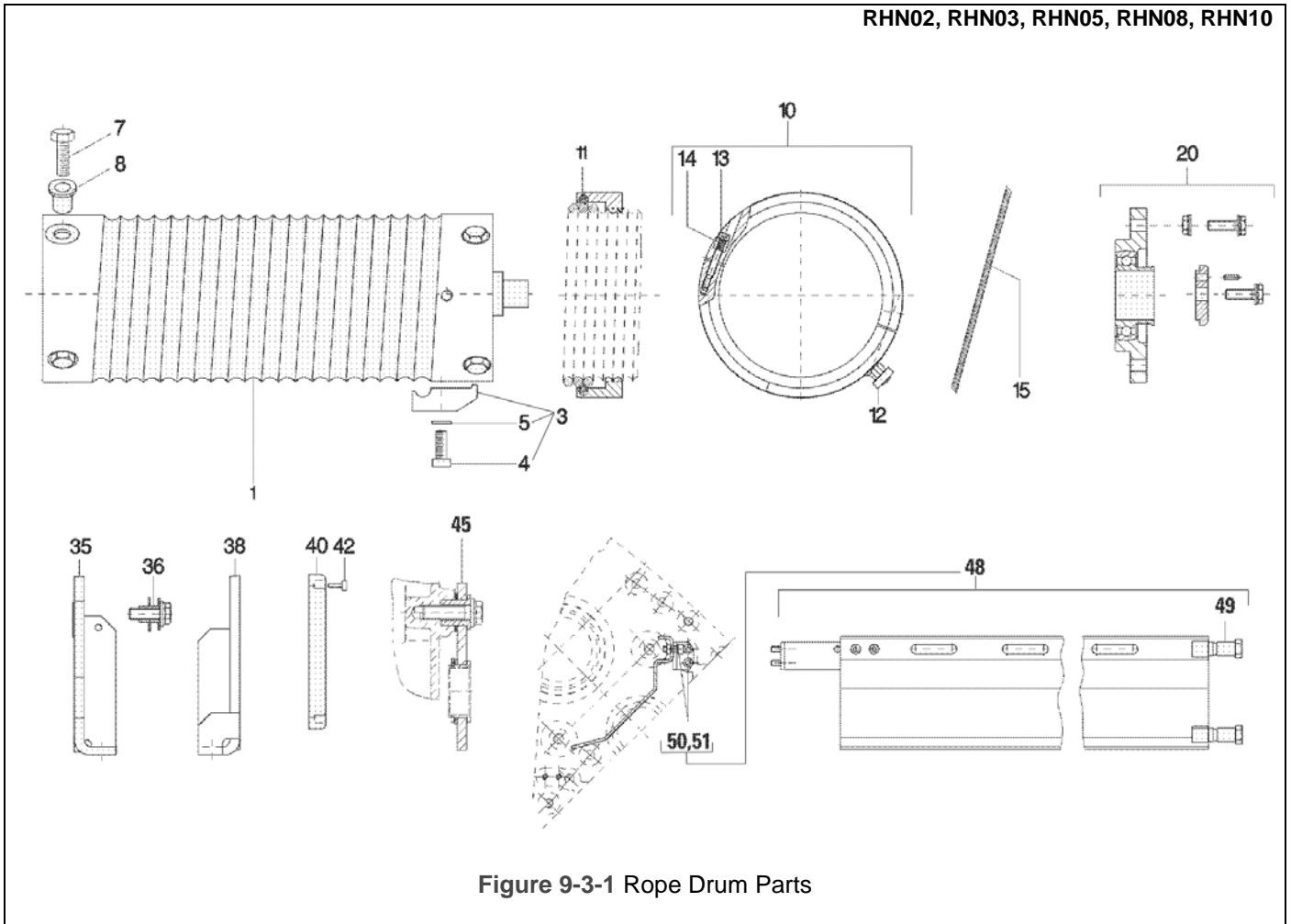
## 9.2 Gearing Parts

Figure No.	Part Name	Parts Per Hoist	RHN15U	RHN15D	RHN20D
25	<b>GEAR BOX ASSEMBLY</b> <sup>1</sup>	1	RHN0310	RHN0312	
1	Gear box	1	RHN0223		
2	Gear cap	1	RHN0224		
3	Seal	1	RHN0225		
4	Socket head cap screw	12	90912124		
5	Lock washer	12	9098511		
6	Dowel pin	2	RHN0226		
7	Gear wheel	1	RHN0227		
8	Retainer ring	1	9047192		
9	Drive shaft	1	RHN0228		
10	Bearing	1	9001223		
11	Shaft seal	1	RHN0229		
12	Shim <sup>2</sup> , 110 x 125 x 0.3 mm	1	RHN0230		
	Shim <sup>2</sup> , 110 x 125 x 0.2 mm		RHN0252		
13	Gear	1	RHN0231		
14	Pinion shaft	1	RHN0232		
15	Grooved ball bearing	1	9000313		
17	Cylindrical roller bearing	1	RHN0233		
18	Pinion shaft	1	RHN0315	RHN0234	
19	Gear wheel	1	RHN0316	RHN0235	
20	Grooved ball bearing	1	9000307		
21	Cylindrical roller bearing	1	RHN0236		
22	Bearing	1	9001224		
23	Shaft seal	1	RHN0237		

1 Gear oil is not included – see Owner's Manual for required amount.

2 As required/measured

## 9.2 Rope Drum Parts

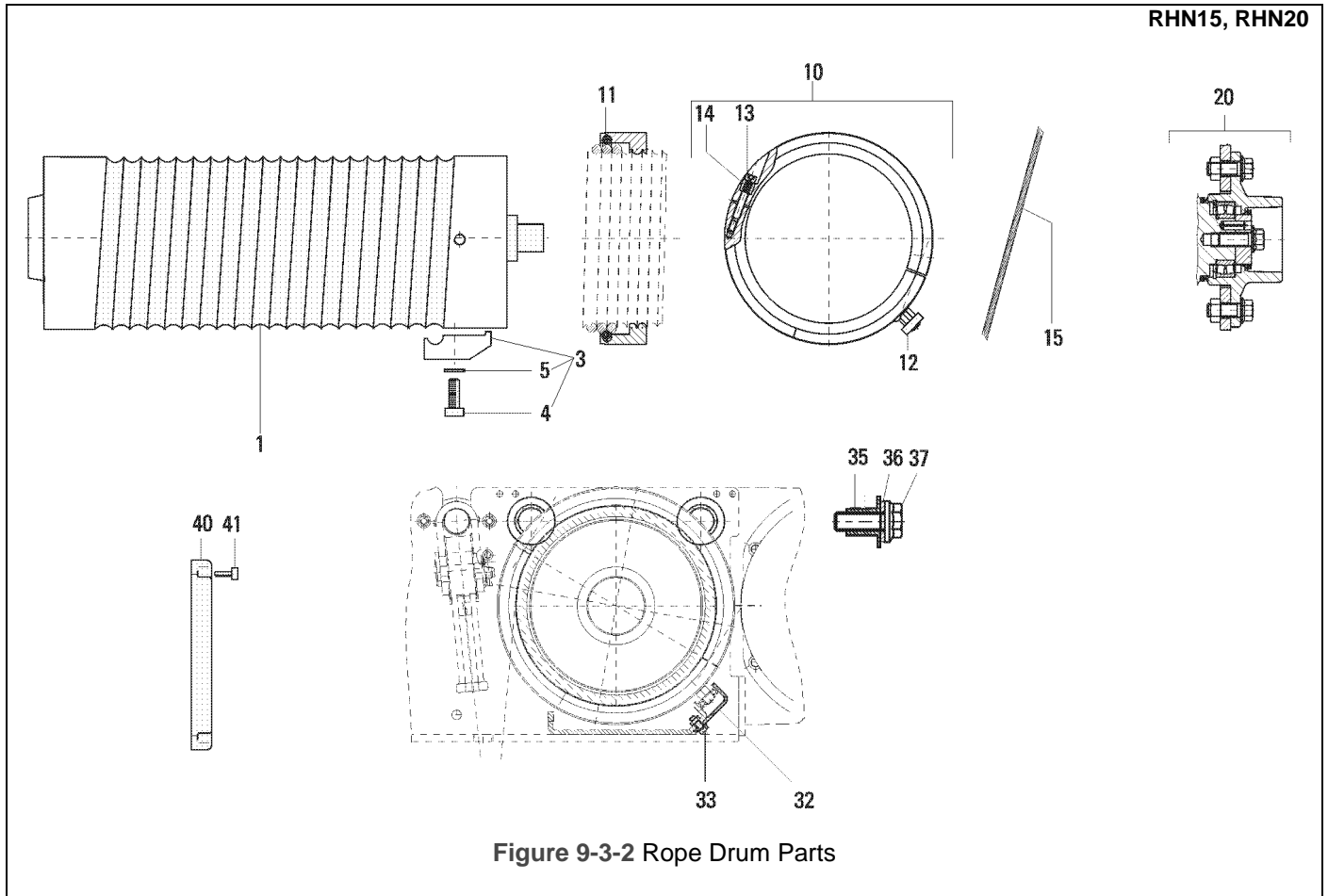


### 9.3 Rope Drum Parts

Figure No.	Part Name	Parts Per Hoist	RHN02	RHN03	RHN05D	RHN05U	RHN08	RHN10
1	Rope Drum <sup>1</sup> – 20 ft. lift	1	RHN0005		RHN0090		RHN0151	RHN0153
	Rope Drum <sup>1</sup> – 33 ft. lift		RHN0006		RHN0091		RHN0152	RHN0154
3	Clamping Plate	3	RHN0007		RHN0092		RHN0155	
4	Socket head cap screw	3	9691202				9091204	
5	Lock washer	3	9012712				9012713	
7	Screw	8*	9796801				RHN0156 (*Qty=6)	
8	Bushing	6					RHN0157	
10	Rope Guide	1	RHN0008		RHN0093		RHN0158	
11	Tension spring	1	RHN0009		RHN0094		RHN0159	
12	Guide part	1	RHN0010				RHN0160	
13	Screw	2	RHN0011					
14	Pressure spring	2	RHN0012					
15	Wire rope <sup>2</sup> – 20ft. lift	1	RHN0013	RHN0098	RHN0095		RHN0161	
	Wire rope <sup>2</sup> – 33ft. lift		RHN0016	RHN0096	RHN0097		RHN0164	
20	Flange bearing <sup>3</sup>	1	RHN0014		RHN0099		RHN0162	
35	Support plate gear side (Deck/Base Mount)	1	RHN0015		RHN0100		RHN0163	
36	Bushing	2	RHN0017		RHN0102		RHN0165	
38	Support plate bearing side (Deck/Base Mount)	1	RHN0018		RHN0103		RHN0166	
40	End cover	1	RHN0020		RHN0168		RHN0170	
42	Screw	4	9750001					
45	Bearing plate <sup>4</sup>	1			RHN0106		RHN0169	
48	Grease box – 20 ft. lift	1	RHN0021		RHN0107		RHN0171	
	Grease box – 33 ft. lift		RHN0022		RHN0108		RHN0172	
49	Screw	2	RHN0023				-	
50	Socket head cap screw	4*	9091249				9091249 (*Qty=8)	
51	Lock washer	4*	9012709				9012709 (*Qty=8)	

- 1 Item #20 should be ordered with this part
- 2 See test certificate
- 3 Flange bearing includes screws, nuts, holding disc, and clamping sleeve
- 4 Bearing plate includes bushings

### 9.3 Rope Drum Parts



### 9.3 Rope Drum Parts

Figure No.	Part Name	Parts Per Hoist	RHN15U	RHN15D	RHN20D
1	Rope Drum <sup>1</sup> – 20ft lift (*28 ft. lift)	1	RHN0317*	RHN0238	
	Rope Drum <sup>1</sup> – 33ft lift (*46 ft. lift)		RHN0318*	RHN0239	
3	Clamping Plate	3	RHN0319	RHN0240	
	4 Socket head cap screw	3	9691207	90912142	
	5 Lock washer	3	9012715		
10	Rope Guide	1	RHN0322	RHN0241	
	11 Tension spring	1	RHN0242		
	12 Guide part	1	RHN0243		
	13 Screw	2	RHN0244		
	14 Pressure spring	2	RHN0245		
15	Wire rope <sup>2</sup> – 20ft lift (*28 ft. lift)	1	RHN0323*	RHN0246	
	Wire rope <sup>2</sup> – 33ft lift (*46 ft. lift)		RHN0321*	RHN0256	
20	Drum bearing <sup>3</sup>	1	RHN0247		
32	Guide rail – For 20ft* length (*28 ft. - RHN15U)	1	RHN0248		
	Guide rail – For 33ft* length (*46 ft. - RHN15U)		RHN0249		
33	Safety bolt	9	RHN0250		
35	Bushing	2	RHN0251		
36	Lock washer	2	9012730		
37	Hexagon head cap screw	2	90933178		
40	End cover	1	RHN0170		
41	Screw	4	9750001		

1 Item #20 should be ordered with this part

2 See test certificate

3 Drum bearing includes o-rings, snap rings, dowel pins, safety bolt, holding disc, safety plugs



### 9.3 Rope Suspension Parts

RHN02, RHN03, RHN05, RHN08, RHN10

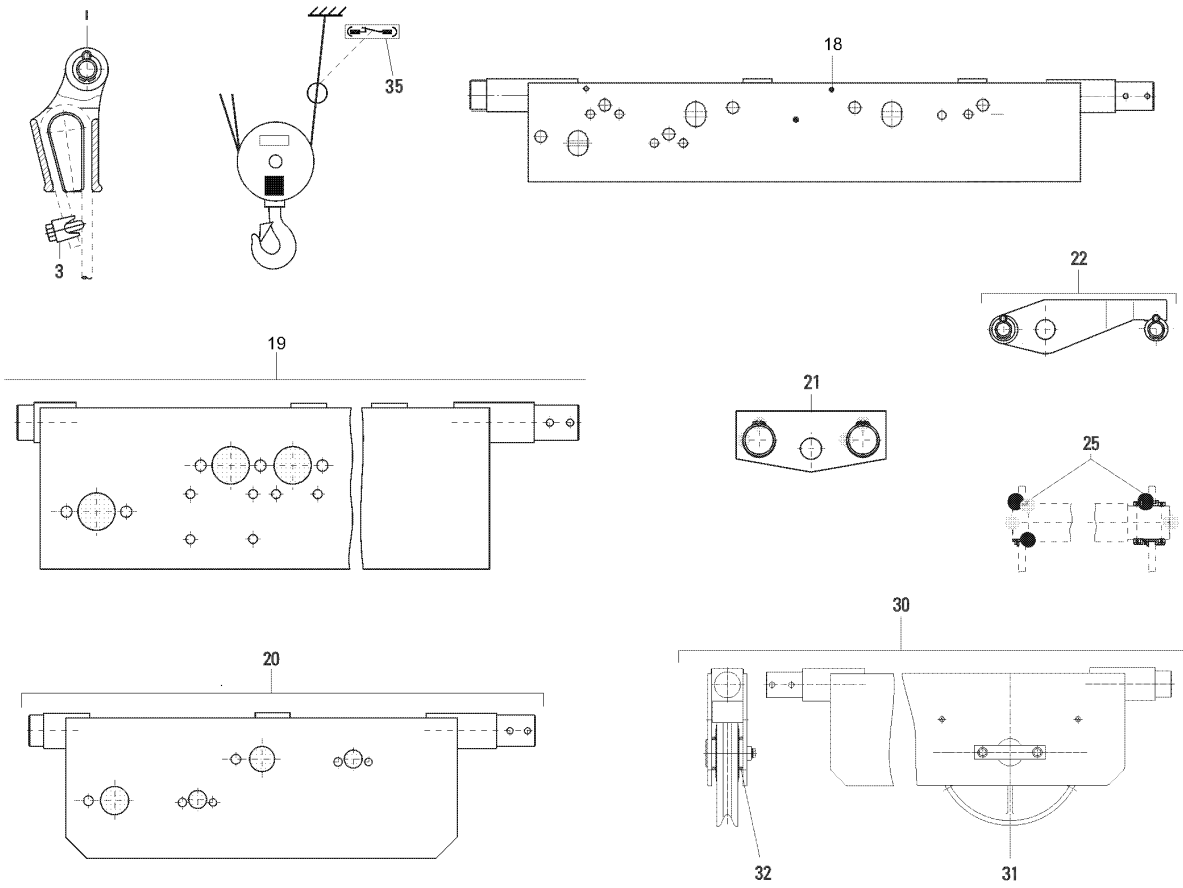


Figure 9-4-1 Rope Suspension Parts (Deck/Base Mounted)

## 9.4 Rope Suspension Parts

Figure No.	Part Name	Parts Per Hoist	RHN02	RHN03	RHN05	RHN08	RHN10	
1	Clamp	1	RHN0024		RHN0110		RHN0173	
3	Wire rope clamp	1	RHN0025		RHN0111		RHN0174	
18	Suspension traverse (20 ft lift), Deck Mounted	1	RHN0026					
	Suspension traverse (33 ft lift), Deck Mounted		RHN0027					
19	Suspension traverse (20 ft lift), Deck Mounted	1			RHN0112			
	Suspension traverse (33 ft lift), Deck Mounted				RHN0113			
20	Suspension traverse (20 ft lift), Deck Mounted	1					RHN0177	
	Suspension traverse (33 ft lift), Deck Mounted						RHN0178	
21	Suspension	1			RHN0114			
22	Suspension	1	RHN0028				RHN0179	
25	Bushing	1	RHN0029		RHN0115		RHN0180	
30	Deflection cross bar – 20ft lift	1	RHN0030		RHN0116		RHN0181	
	Deflection cross bar – 33ft lift		RHN0031		RHN0117		RHN0182	
31	Rope pulley	1	RHN0032		RHN0118		RHN0191	
32	Bushing	2	RHN0034		RHN0120		RHN0186	
35	Block operated limit switch (BLS)	1	RHN0550					

## 9.4 Rope Suspension Parts

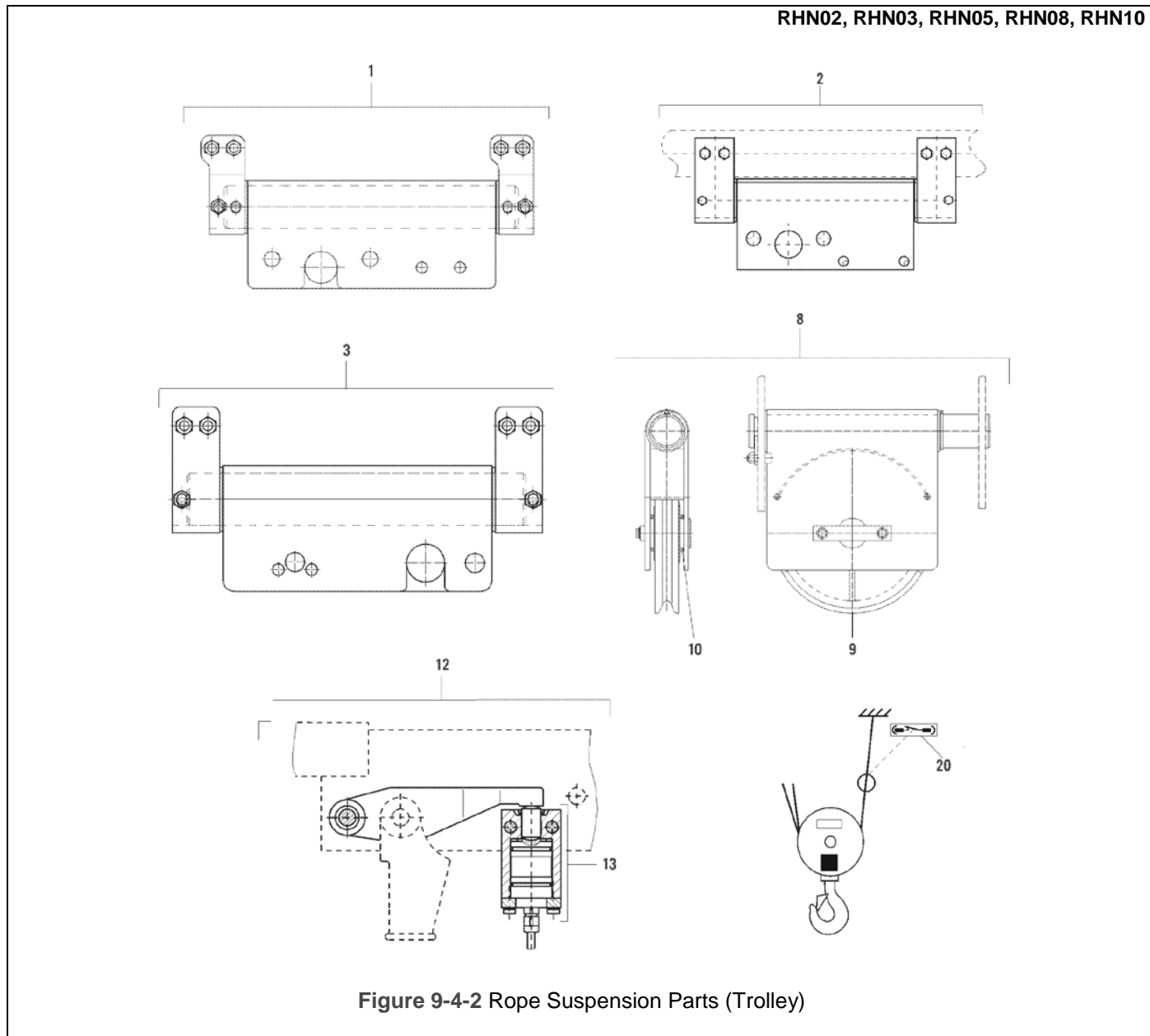


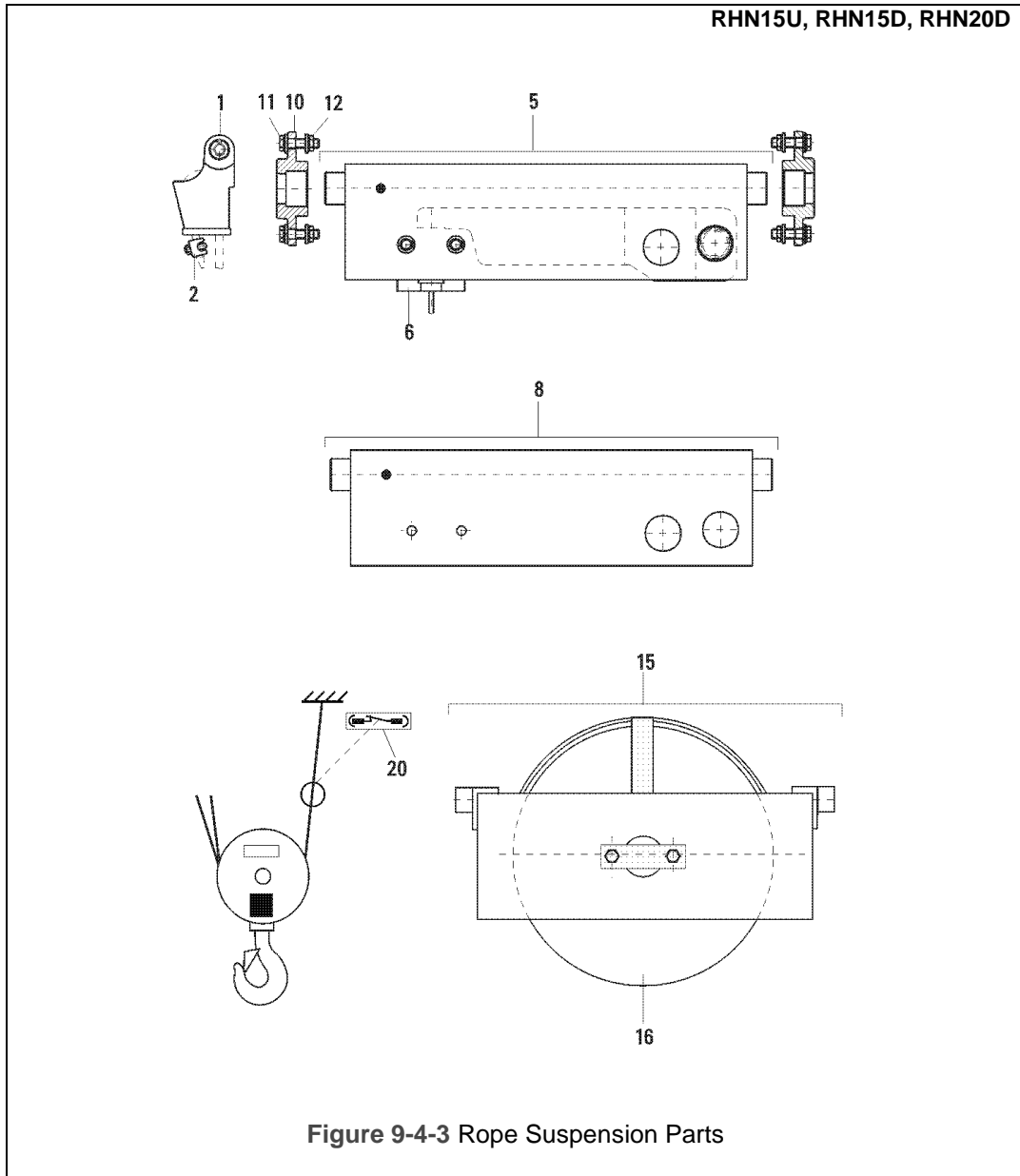
Figure 9-4-2 Rope Suspension Parts (Trolley)

## 9.4 Rope Suspension Parts

Figure No.	Part Name	Parts Per Hoist	RHN02	RHN03	RHN05	RHN08	RHN10
1	Suspension, 4/1	1	RHN0033				
2	Suspension, 4/1	1			RHN0119		
3	Suspension, 4/1	1				RHN0187	
8	Deflection cross bar	1	RHN0035		RHN0121		RHN0189
9	Rope pulley	1	RHN0032		RHN0118		RHN0191
10	Bushing	2	RHN0034		RHN0120		RHN0186
12	Load sensor assembly	1	RHN0037		RHN0123		RHN0194
13	Load sensor (SLE21 ONLY)	1	RHN0552		RHN0553		RHN0556
	Load sensor (SLE22 and SLE21 <sup>1</sup> )		RHN0562		RHN0563		RHN0566
20	Block operated limit switch (BLS)	1	RHN0550				

1 Not all leads utilized on SLE21

## 9.4 Rope Suspension Parts



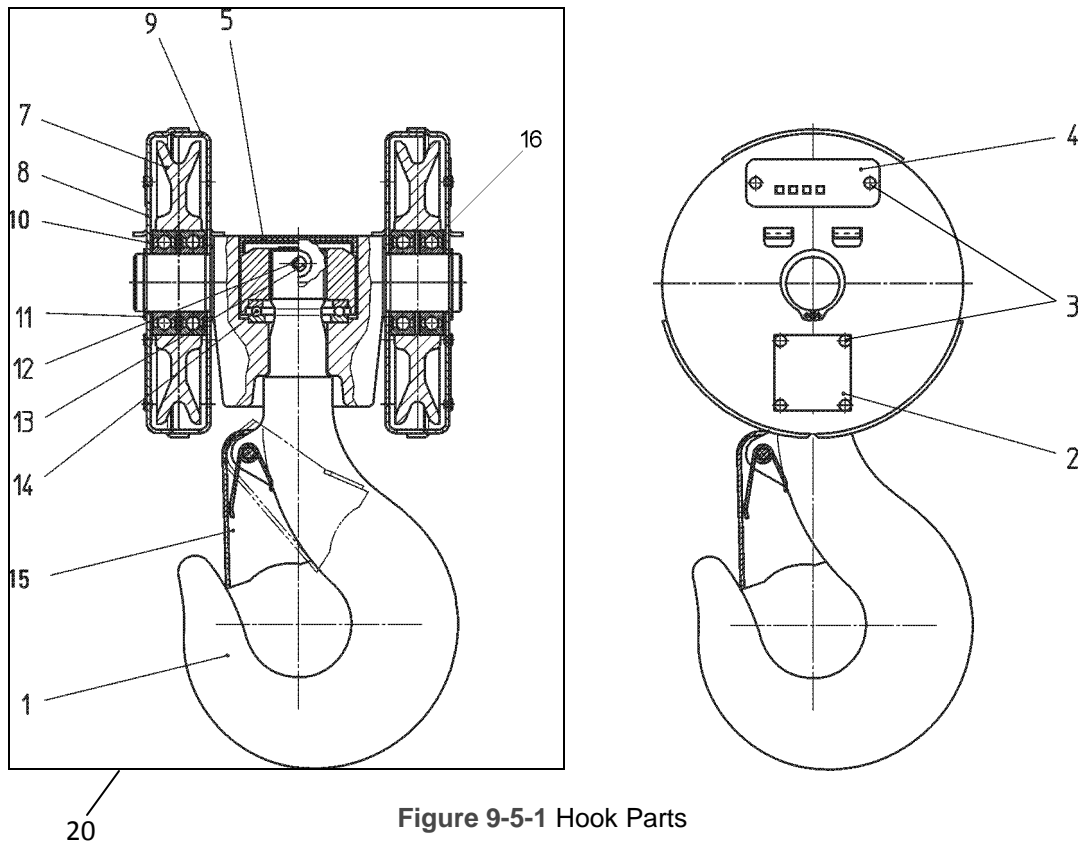
## 9.4 Rope Suspension Parts

Figure No.	Part Name	Parts Per Hoist	RHN15U	RHN15D	RHN20D
1	Clamp	1	RHN0324	RHN0253	
2	Wire rope clamp	1	RHN0329	RHN0254	
5	Load sensor assembly	1	RHN0332	RHN0255	
6	Load sensor (SLE21 ONLY)	1	RHN0559		
	Load sensor (SLE22 and SLE21 <sup>1</sup> )		RHN0569		
8	Rope suspension	1	RHN0334	RHN0257	
10	Bearing pedestal	4	RHN0325	RHN0258	
11	Safety bolt	8	9093372		
12	Locknut	8	9098511		
15	Deflection cross bar	1	RHN0326	RHN0259	
16	Rope pulley	1	RHN0327	RHN0260	
20	Block operated limit switch	1	RHN0550		

1 Not all leads utilized on SLE21

## 9.4 Hook Block Parts

RHN02, RHN03, RHN05, RHN08, RHN10



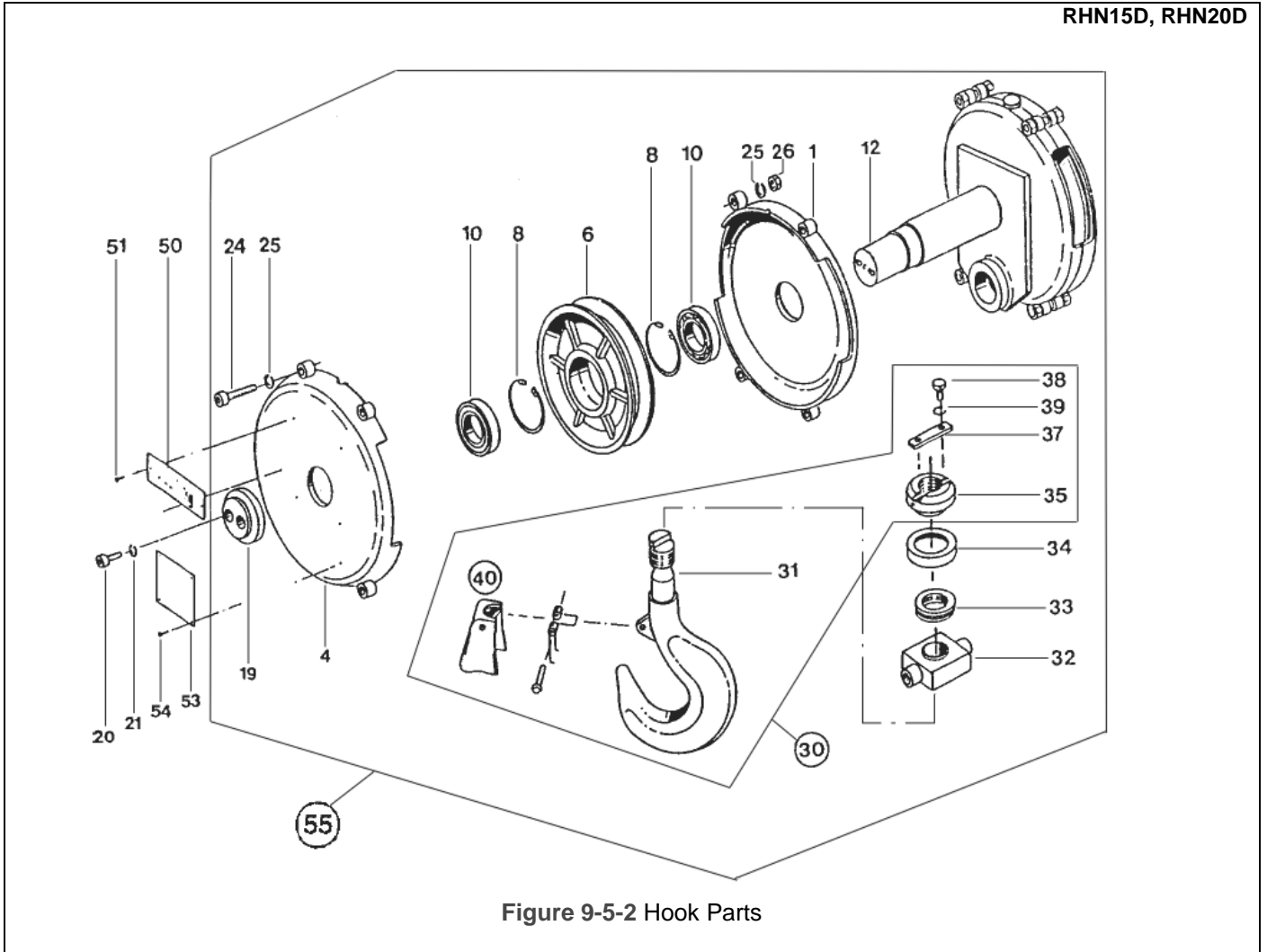
## 9.5 Hook Block Parts

Figure No.	Part Name	Parts Per Hoist	RHN02	RHN03	RHN05	RHN08	RHN10
20	<b>2-10 Ton Hook Block</b>	1	RHN0053		RHN0128		RHN0197
1	Load hook	1	RHN0054		RHN0130		RHN0201
5	End cap	1	RHN0057		RHN0132		
7	Rope pulley	2	RHN0032		RHN0118		RHN0191
8	Protection hood	2	RHN0059		RHN0133		RHN0198
9	Protection hood	2	RHN0060		RHN0134		RHN0199
10	Washer	4	9098802		9098804		
11	Snap Ring	2	9047130		9047145		9047150
12	Dowel sleeve*	1	91481172		91481173		*Included in Item #1
13	Plug	2	RHN0061		RHN0125		
14	Axial bearing*	1	9001219		9001220		*Included in Item #1
15	Safety catch	1	RHN0062		RHN0131		
16	Grooved ball bearing	4	RHN0063		9000509		9001226
2	Name plate	2	RHN0620				RHN0640
3	Blind rivet	8	RHN0050				
4	Capacity plate	2	RHN0049	RHN0056	RHN0135	RHN0202	RHN0203



## 9.5 Hook Block Parts

RHN15D, RHN20D

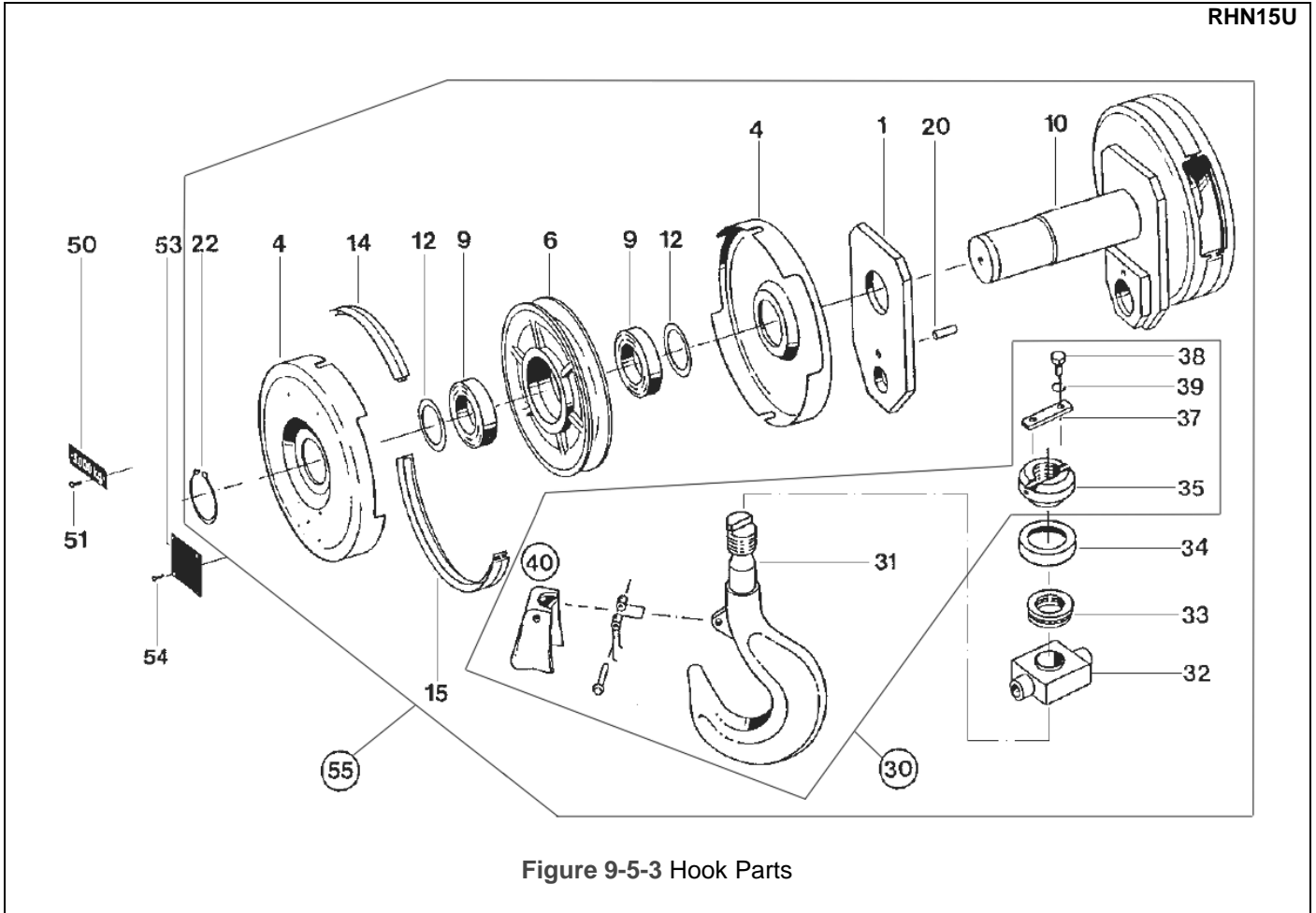


## 9.5 Hook Block Parts

Figure No.	Part Name	Parts Per Hoist	RHN15	RHN20
55	<b>RHN15D and RHN20D Bottom Hook Block</b>	1		RHN0271
1	Side cheek	2		RHN0272
4	Protection hood	2		RHN0273
6	Rope pulley	2		RHN0260
8	Locking ring	4		RHN0275
10	Grooved ball bearing	4		9001225
12	Axle	1		RHN0276
19	Retaining disc	2		RHN0277
20	Socket head cap screw	4		90912112
21	Spring washer	4		9798007
24	Socket head cap screw	8		9691206
25	Spring washer	16		9798007
26	Hexagonal nut	8		9093433
32	Traverse	1		RHN0280
33	Axial bearing	1		9001222
34	Guard plate	1		RHN0281
30	Load hook assembly	1		RHN0278
31	Load hook attachment	1		RHN0279
35	Nut	1		RHN0282
37	Locking plate	1		RHN0283
38	Hexagon head cap screw	2		9093348
39	Spring washer	2		9012712
40	Safety catch	1		RHN0284
50	Capacity Plate	2		RHN0285
51	Blind rivet	4		RHN0050
53	Name plate	2		RHN0620
54	Blind rivet	8		RHN0050

## 9.5 Hook Block Parts

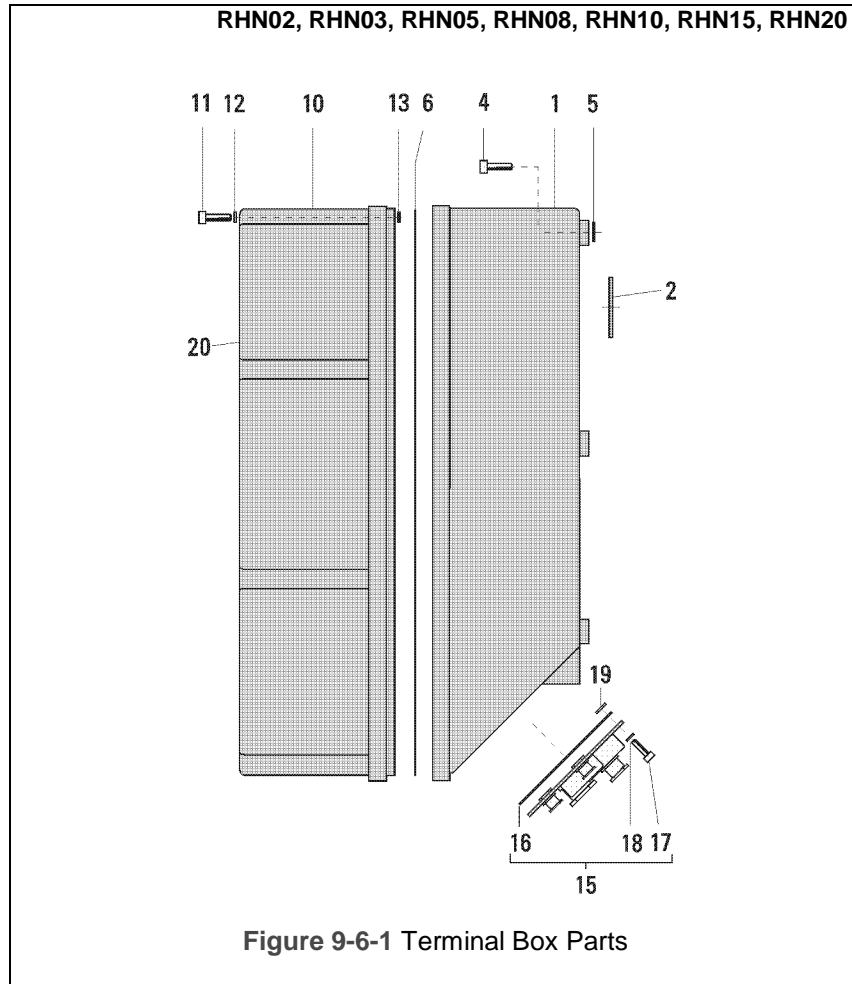
RHN15U



## 9.5 Hook Block Parts

Figure No.	Part Name	Parts Per Hoist	RHN15U
55	<b>RHN15U Bottom Hook Block</b>	1	RHN0335
1	Side cheek	2	RHN0336
4	Protection hood	4	RHN0337
6	Rope pulley	2	RHN0327
9	Grooved ball bearing	4	9000612
10	Axle	1	RHN0338
12	Adjusting washer	4	9098807
14	Joining element	2	RHN0340
15	Joining element	2	RHN0341
20	Pin	2	RHN0342
22	Locking ring	2	9047193
32	Traverse	1	RHN0346
33	Axial bearing	1	9001227
34	Guard plate	1	RHN0347
30	Load hook assembly	1	RHN0345
31	Load hook attachment	1	-
35	Nut	1	-
37	Locking plate	1	RHN0350
38	Hexagon head cap screw	2	9093347
39	Spring washer	2	9012712
40	Safety catch	1	RHN0353
50	Capacity Plate	2	RHN0354
51	Blind rivet	4	RHN0050
53	Name plate	2	RHN0620
54	Blind rivet	8	RHN0050

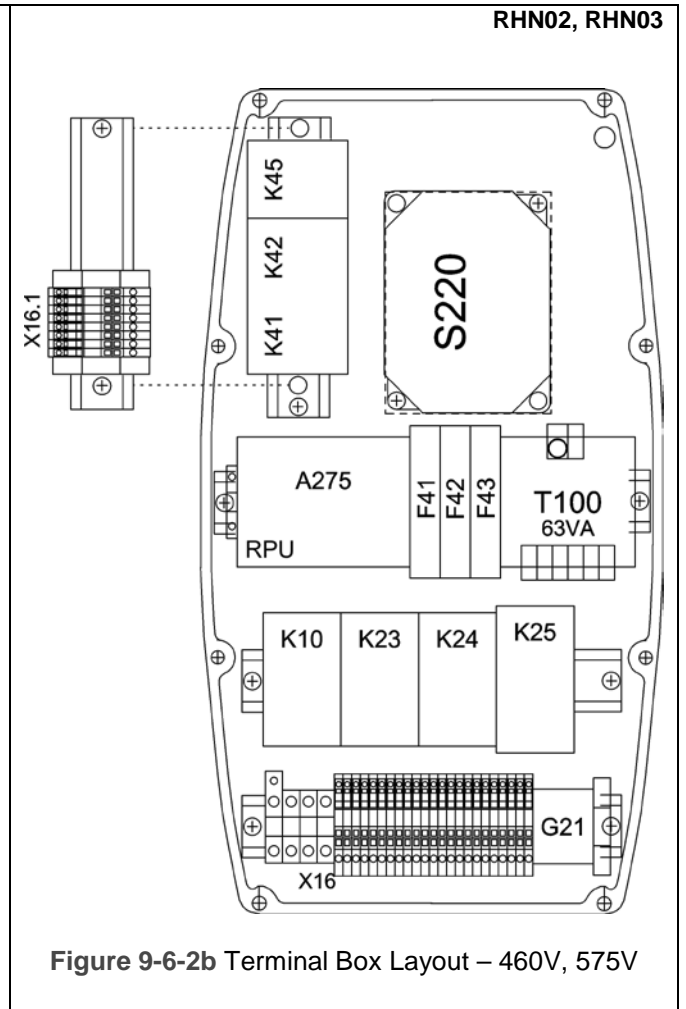
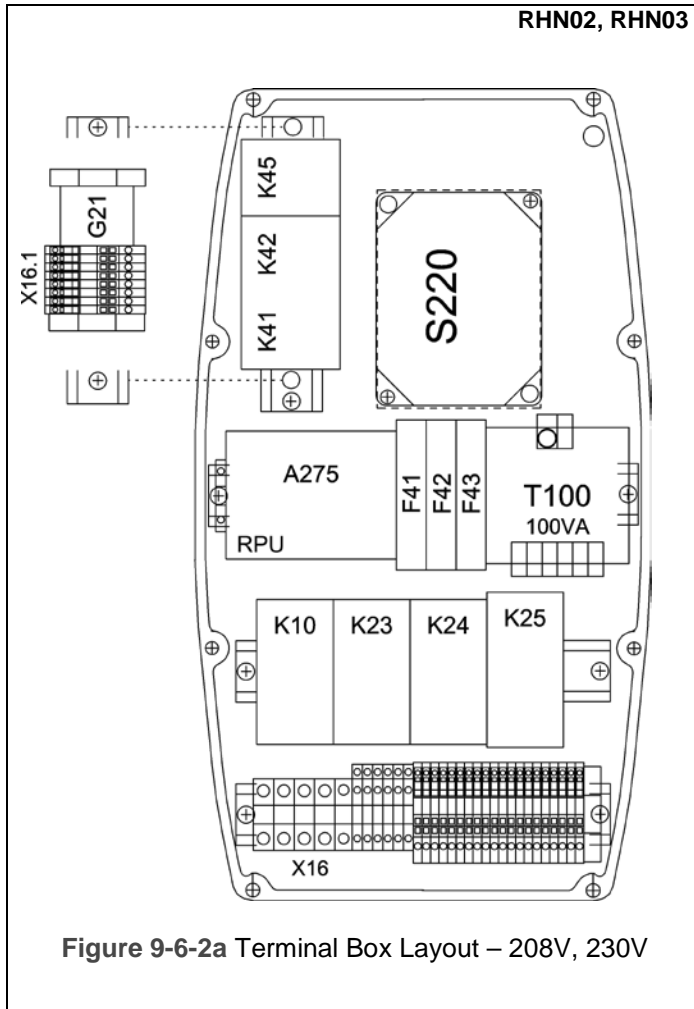
## 9.5 Terminal Box Parts



## 9.6 Terminal Box Parts

Figure No.	Part Name	Parts Per Hoist	RHN02	RHN03	RHN05	RHN08	RHN10	RHN15	RHN20
1	Terminal box	1	RHN0065		RHN0205		RHN0287		
2	Sealing ring	1	RHN0066		RHN0206		RHN0288		
4	Socket head cap screw	4 *	9093307		9091274 (*Qty=6)		9091273(*Qty=8)		
5	Round sealing ring	6			RHN0207		RHN0289		
6	Seal	1	RHN0067		RHN0208		RHN0290		
10	Box cover	1	RHN0068		RHN0209		RHN0291		
11	Socket head cap screw	8	9091229						
12	Lock washer	8	9012708						
13	Round sealing ring	8	RHN0069						
15	Flange plate	1	RHN0070	RHN0136	RHN0211		RHN0293		
16	Seal	1	RHN0071		RHN0212		RHN0288		
17	Socket head cap screw	7	9691203				9691205		
18	Washer	7	9012510				9012513		
19	Locking nut	7	9098503				9098506		
20	Capacity label	1	RHN0630	RHN0631	RHN0632	RHN0633	RHN0634	RHN0635	RHN0636

## 9.6 Terminal Box Parts

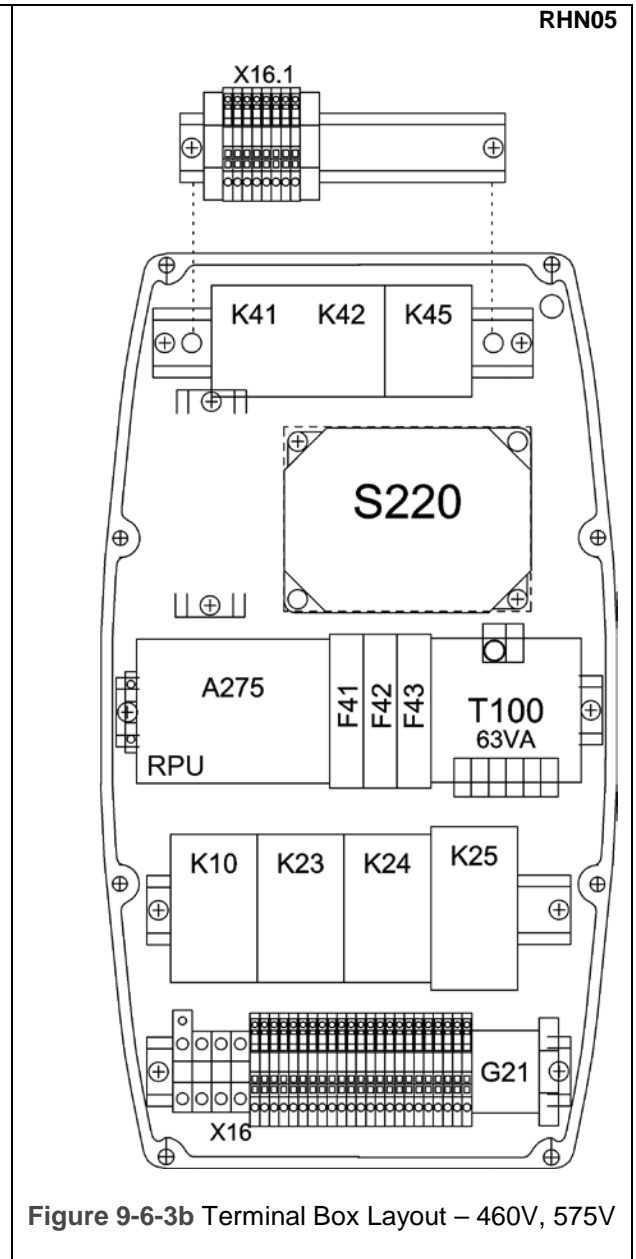
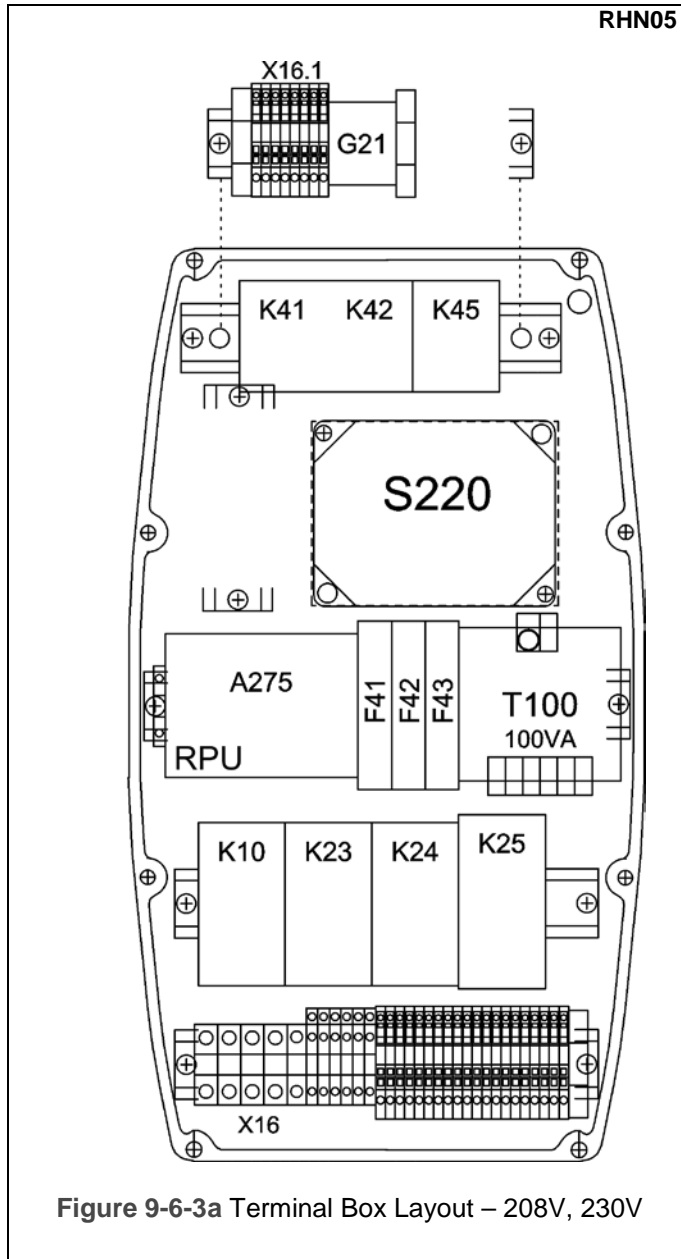


## 9.6 Terminal Box Parts

Component No.	Part Name	Parts Per Hoist	RHN02, RHN03	
			208, 230V	460, 575V
A275	RPU Overload Device (SLE21)	1	RHN0500	RHN0500
	RPU Overload Device (SLE22)		RHN0575	RHN0575
F41-F43	Fuse Holder	3	RHN0501	RHN0501
	Fuse Link	3	RHN0529	RHN0502
G21	Rectifier	1	RHN0503	RHN0503
K10	Contactor, Mainline	1	RHN0519	RHN0506
	Auxiliary Contact Block	1	RHN0505	RHN0505
K23-K24	Contactor, Hoist Directional	2	RHN0519	RHN0506
	Auxiliary Contact Block	2	RHN0507	RHN0507
K25	Contactor, Hoist Speed	1	RHN0520	RHN0508
K41-K42	Contactor, Trolley Directional	1	RHN0509	RHN0509
K45	Contactor, Trolley Speed	1	RHN0510	RHN0510
S220	Gear-Type Limit Switch	1	RHN0511	RHN0511
T100	Transformer*	1	RHN0539	RHN0512 (*460V)
				RHN0513 (*575V)
N/A	Transformer Fuse	1	9006279	
X16	PE-Terminal	1	RHN0527	RHN0514
	Terminal	3	RHN0526	RHN0515
	PE -Terminal	1	RHN0525	
	Terminal	6	RHN0540	
	PE -Terminal	4*	RHN0516 (*Qty=3)	RHN0516
	Terminal	19*	RHN0517 (*Qty=17)	RHN0517
X16.1	PE -Terminal	2	RHN0516	RHN0516
	Terminal	6	RHN0517	RHN0517



## 9.6 Terminal Box Parts



## 9.6 Terminal Box Parts

Component No.	Part Name	Parts Per Hoist	RHN05	
			208, 230V	460, 575V
A275	RPU Overload Device (SLE21)	1	RHN0500	RHN0500
	RPU Overload Device (SLE22)		RHN0575	RHN0575
F41-F43	Fuse Holder	3	RHN0501	RHN0501
	Fuse Link	3	RHN0529	RHN0502
G21	Rectifier	1	RHN0503	RHN0503
K10	Contactor, Mainline	1	RHN0519	RHN0506
	Auxiliary Contact Block	1	RHN0505	RHN0505
K23-K24	Contactor, Hoist Directional	2	RHN0519	RHN0506
	Auxiliary Contact Block	2	RHN0507	RHN0507
K25	Contactor, Hoist Speed	1	RHN0520	RHN0508
K41-K42	Contactor, Trolley Directional	1	RHN0509	RHN0509
K45	Contactor, Trolley Speed	1	RHN0510	RHN0510
S220	Gear-Type Limit Switch	1	RHN0511	RHN0511
T100	Transformer*	1	RHN0546	RHN0512 (*460V)
				RHN0513 (*575V)
N/A	Transformer Fuse	1	9006202	9006279
X16	PE -Terminal	1	RHN0527	RHN0514
	Terminal	3	RHN0526	RHN0515
	PE -Terminal	1	RHN0525	
	Terminal	6	RHN0540	
	PE -Terminal	4*	RHN0516 (*Qty=3)	RHN0516
	Terminal	19*	RHN0517 (*Qty=17)	RHN0517
X16.1	PE -Terminal	2	RHN0516	RHN0516
	Terminal	6	RHN0517	RHN0517

## 9.6 Terminal Box Parts

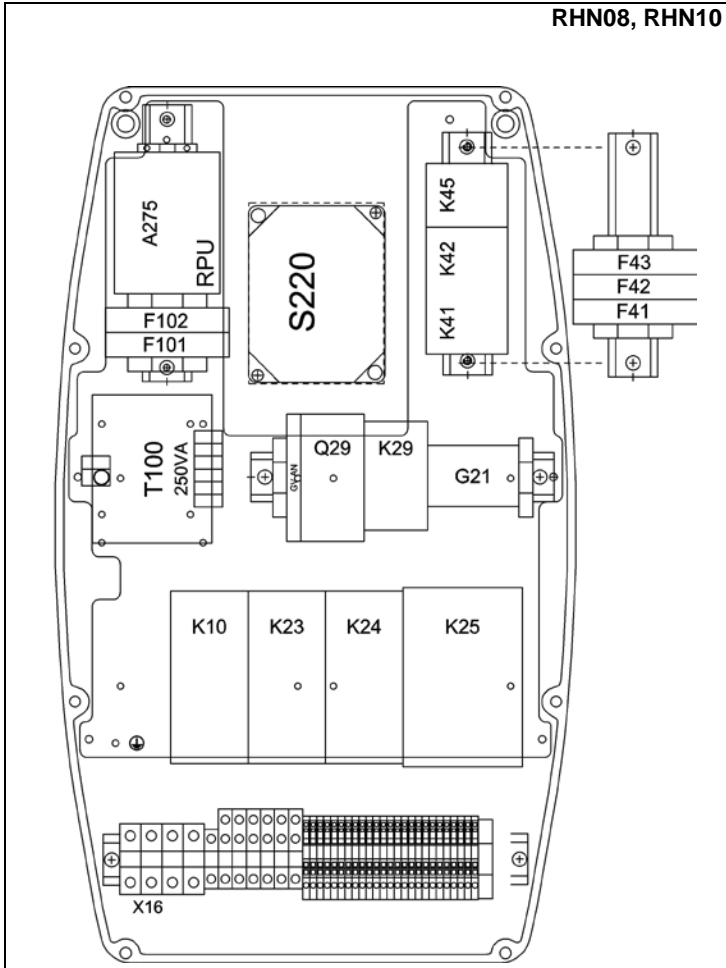


Figure 9-6-4a Terminal Box Layout – 208V, 230V

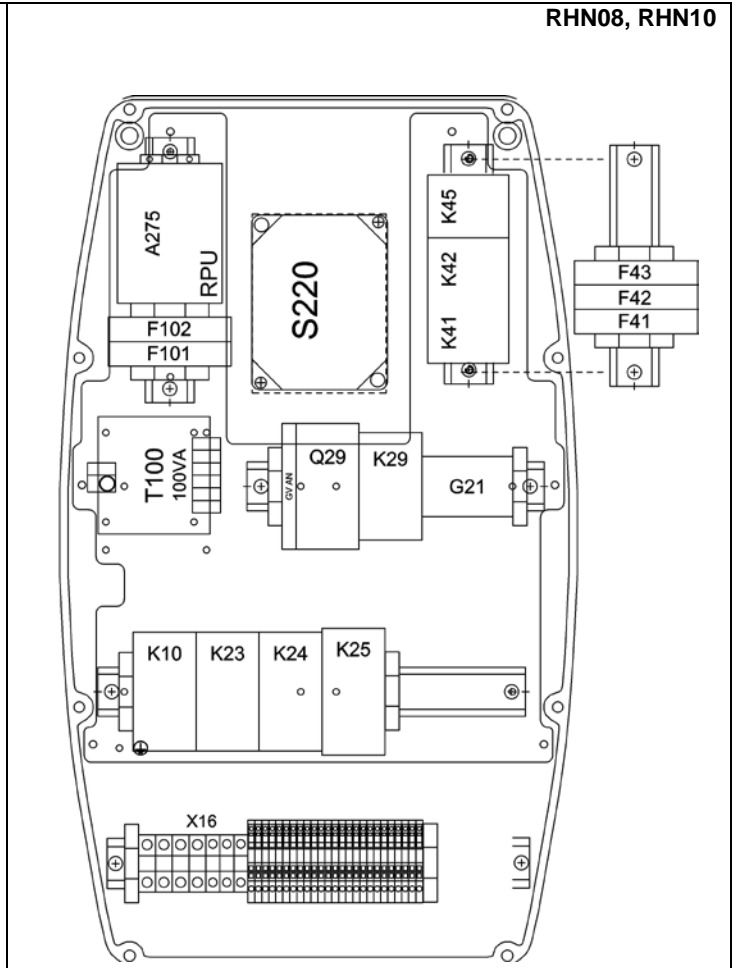
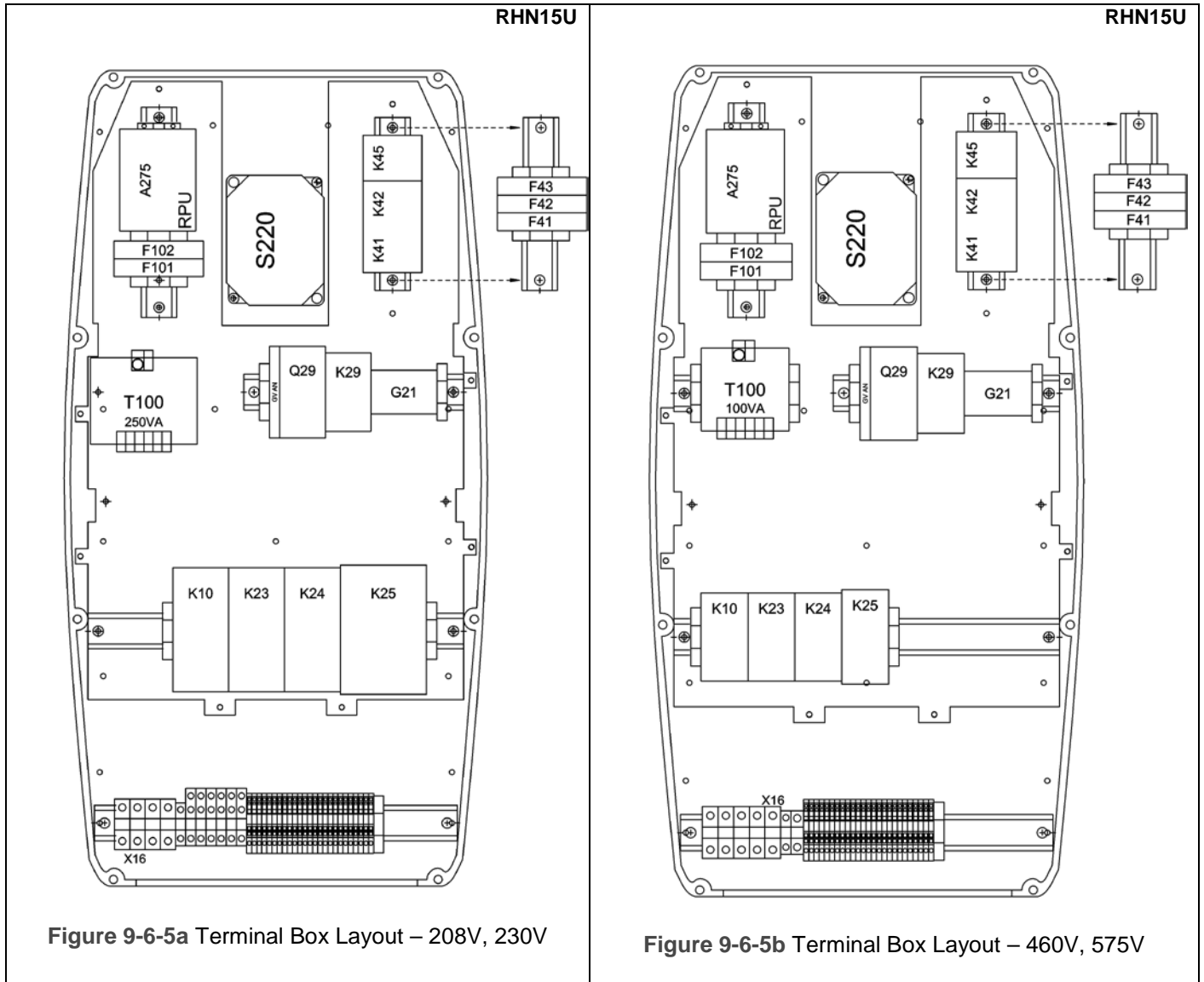


Figure 9-6-4b Terminal Box Layout – 460V, 575V

## 9.6 Terminal Box Parts

Component No.	Part Name	Parts Per Hoist	RHN08, RHN10	
			208, 230V	460, 575V
A275	RPU Overload Device (SLE21)	1	RHN0500	RHN0500
	RPU Overload Device (SLE22)		RHN0575	RHN0575
F41-F43	Fuse Holder	3	RHN0501	RHN0501
	Fuse Link	3	RHN0529	RHN0502
F101-F102	Fuse Holder	2	RHN0501	RHN0501
	Fuse Link	2	RHN0541	RHN0518
G21	Rectifier	1	RHN0542	RHN0504
K10	Contactora, Mainline	1	RHN0543	RHN0519
K23-K24	Contactora, Hoist Directional	2	RHN0543	RHN0519
	Auxiliary Contact Block	1	RHN0505	RHN0505
K25	Contactora, Hoist Speed	1	RHN0537	RHN0520
K29	Contactora, Hoist Brake	1	RHN0528	RHN0528
K41-K42	Contactora, Trolley Directional	1	RHN0509	RHN0509
K45	Contactora, Trolley Speed	1	RHN0510	RHN0510
Q29	Circuit Breaker	1	RHN0544	RHN0521
	Auxiliary Contact Block	1	RHN0521	RHN0522
S220	Gear-Type Limit Switch	1	RHN0511	RHN0511
T100	Transformer*	1	RHN0545	RHN0523 (*460V)
				RHN0524 (*575V)
N/A	Transformer Fuse	1	9006278	9006202
X16	PE -Terminal	1	RHN0530	RHN0527
	Terminal	3	RHN0531	RHN0526
	PE -Terminal	1	RHN0525	RHN0525
	Terminal	2*	RHN0533 (*Qty=6)	RHN0515
	PE -Terminal	5	RHN0516	RHN0516
	Terminal	20	RHN0517	RHN0517

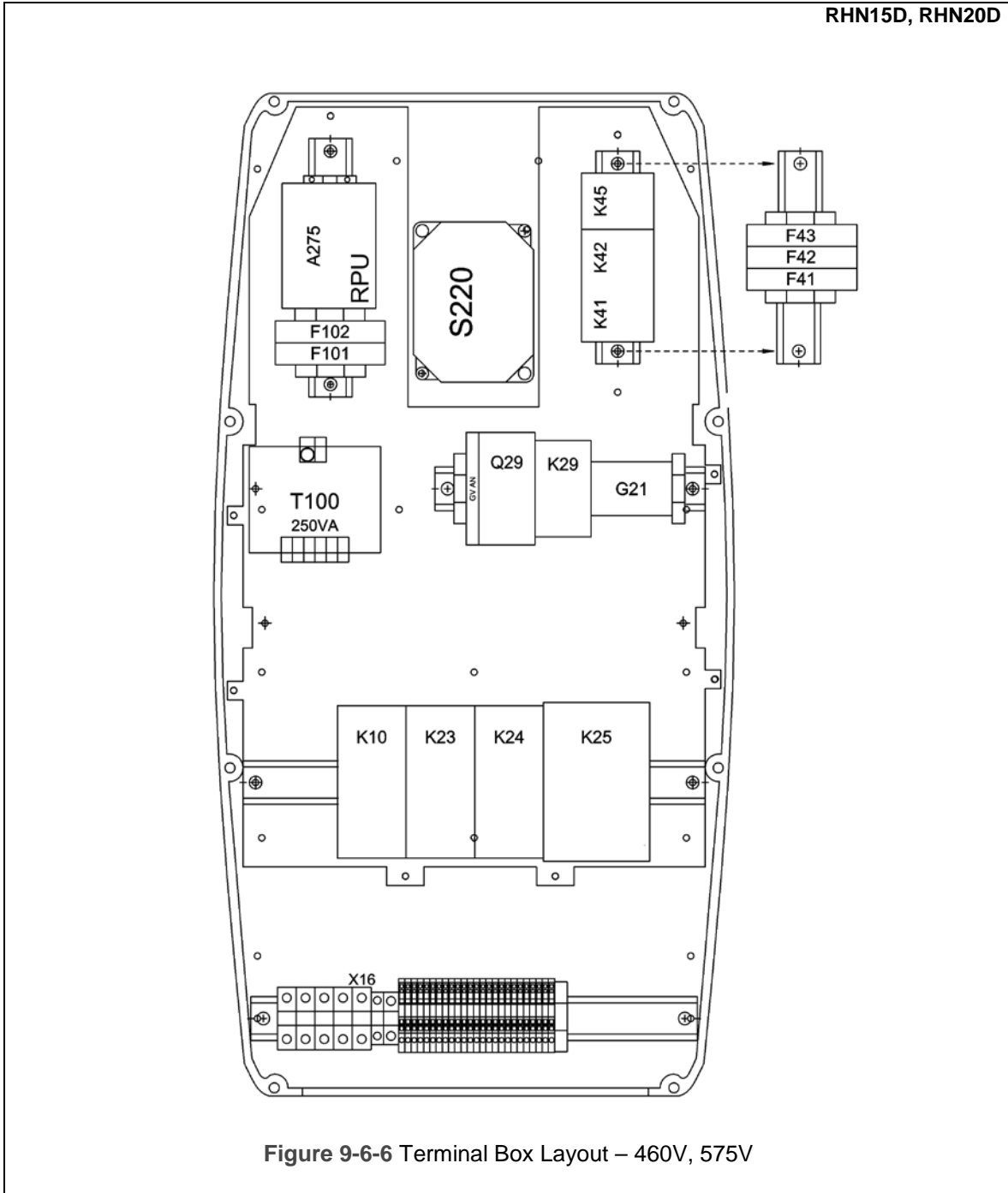
## 9.6 Terminal Box Parts



## 9.6 Terminal Box Parts

Component No.	Part Name	Parts Per Hoist	RHN15U	
			208, 230V	460, 575V
A275	RPU Overload Device (SLE21)	1	RHN0500	RHN0500
	RPU Overload Device (SLE22)		RHN0575	RHN0575
F41-F43	Fuse Holder	3	RHN0501	RHN0501
	Fuse Link	3	RHN0529	RHN0529
F101-F102	Fuse Holder	2	RHN0501	RHN0501
	Fuse Link	2	RHN0541	RHN0518
G21	Rectifier	1	RHN0542	RHN0504
K10	Contactora, Mainline	1	RHN0543	RHN0519
K23-K24	Contactora, Hoist Directional	2	RHN0543	RHN0519
	Auxiliary Contact Block	1	RHN0505	RHN0505
K25	Contactora, Hoist Speed	1	RHN0537	RHN0520
K29	Contactora, Hoist Brake	1	RHN0528	RHN0528
K41-K42	Contactora, Trolley Directional	1	RHN0509	RHN0509
K45	Contactora, Trolley Speed	1	RHN0510	RHN0510
Q29	Circuit Breaker	1	RHN0544	RHN0522
	Auxiliary Contact Block	1	RHN0521	RHN0521
S220	Gear-Type Limit Switch	1	RHN0511	RHN0511
T100	Transformer	1	RHN0545	RHN0523 (*460V)
				RHN0524 (*575V)
N/A	Transformer Fuse	1	9006278	9006202
X16	PE -Terminal	1	RHN0530	RHN0530
	Terminal	3	RHN0531	RHN0531
	PE -Terminal	1	RHN0525	RHN0527
	Terminal	2*	RHN0533 (*Qty=6)	RHN0515
	PE -Terminal	5	RHN0516	RHN0516
	Terminal	20	RHN0517	RHN0517

## 9.6 Terminal Box Parts



## 9.6 Terminal Box Parts

Component No.	Part Name	Parts Per Hoist	RHN15D, RHN20D	
A275	RPU Overload Device (SLE21)	1	RHN0500	
	RPU Overload Device (SLE22)		RHN0575	
F41-F43	Fuse Holder	3	RHN0501	
	Fuse Link	3	RHN0529	
F101-F102	Fuse Holder	2	RHN0501	
F101-F102	Fuse Link	2	RHN0502	
G21	Rectifier	1	RHN0504	
K10	Contactor, Mainline	1	RHN0536	
K23-K24	Contactor, Hoist Directional	2	RHN0536	
	Auxiliary Contact Block	1	RHN0505	
K25	Contactor, Hoist Speed	1	RHN0537	
K29	Contactor, Hoist Brake	1	RHN0528	
K41-K42	Contactor, Trolley Directional	1	RHN0509	
K45	Contactor, Trolley Speed	1	RHN0510	
Q29	Circuit Breaker	1	RHN0522	
Q29	Auxiliary Contact Block	1	RHN0521	
S220	Gear-Type Limit Switch	1	RHN0511	
T100	Transformer	4V	1	RHN0534
		5V		RHN0535
N/A	Transformer Fuse	1	9006278	
X16	PE-Terminal	1	RHN0532	
	Terminal	3	RHN0533	
	PE-Terminal	1	RHN0527	
	Terminal	2	RHN0515	
	PE-Terminal	5	RHN0516	
	Terminal	20	RHN0517	



## 9.6 Trolley Parts

RHN02, RHN03, RHN05, RHN08, RHN10, RHN15

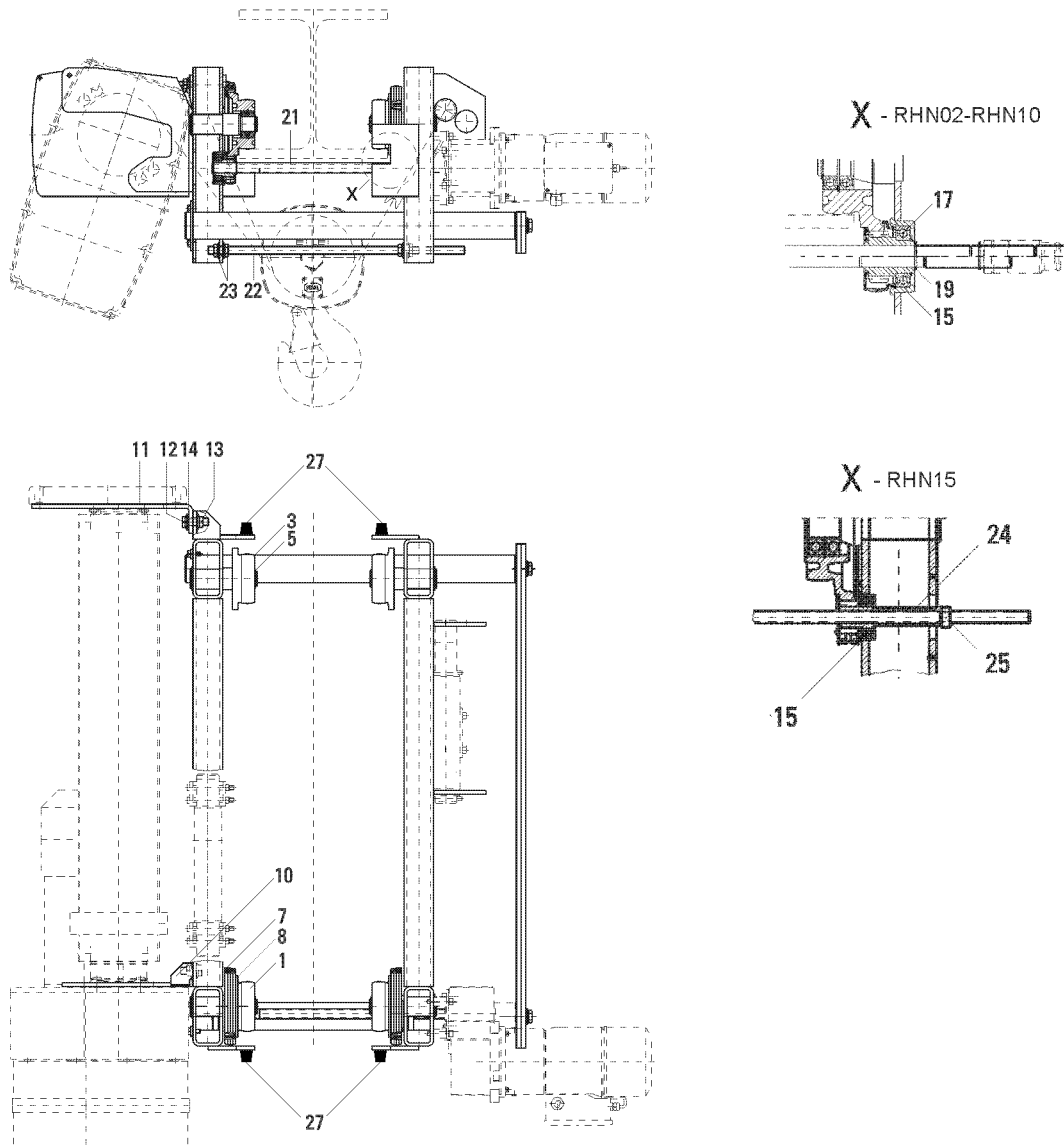
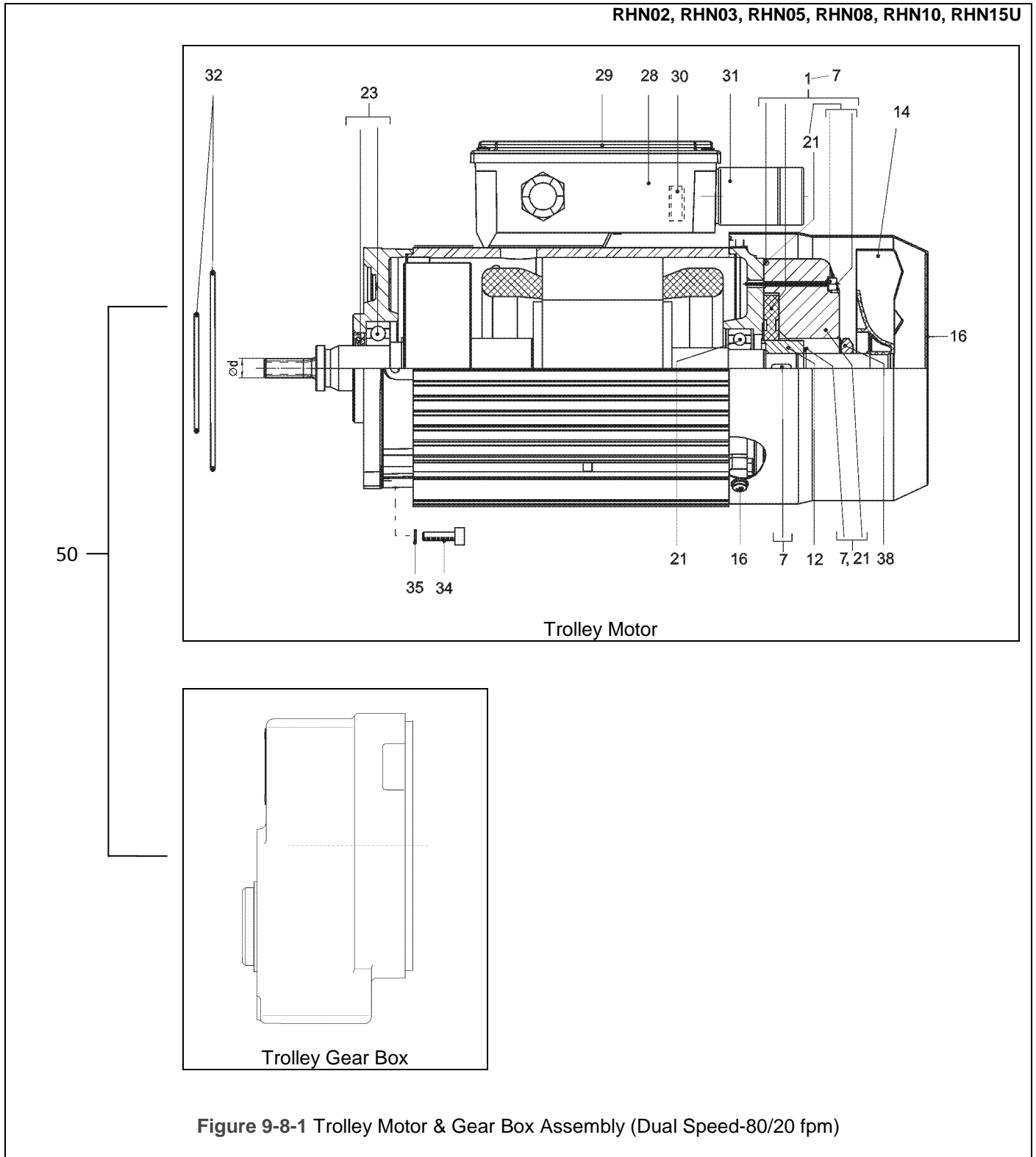


Figure 9-7-1 Trolley Parts

## 9.7 Trolley Parts

Figure No.	Part Name	Parts Per Hoist	RHN02	RHN03	RHN05	RHN08	RHN10	RHN15	
1	Wheel, Drive	2	RHN0072		RHN0138		RHN0213	RHN0295	
5	Snap ring, external	2	9047120		9047130		9047140	9047165	
3	Wheel, Non Drive	2	RHN0073		RHN0139		RHN0214	RHN0296	
5	Snap ring, external	2	9047120		9047130		9047140	9047165	
7	Wheel cover	2	RHN0074		RHN0140		RHN0215	RHN0297	
8	Wheel cover*	2	RHN0075		RHN0141		RHN0216	*Included in #7	
10	Support plate	1	RHN0076		RHN0142		RHN0217	-	
11	Support plate	1	RHN0077		RHN0143		RHN0218	-	
12	Screw	4	RHN0078		RHN0144		RHN0219		
13	Nut	4	9098516				9093452		
14	Lock washer	8					9012719		
15	Flange bearing complete	2	RHN0079						RHN0298
17	Grooved ball bearing	2	9000506						
19	Snap ring, external	4	9047191						
21	Drive shaft, length:390mm; flange:82-195mm (3.25-7.68")	1	RHN0080						
	Drive shaft, length:390mm; flange:92-195mm (3.63-7.68")			RHN0080					
	Drive shaft, length 495mm; flange:196-306mm (7.72"-12.05")			RHN0081					
	Drive shaft, length 595mm; flange: 307-400mm (12.09-15.71")			RHN0082					
	Drive shaft, length 695mm; flange: 401-500mm (15.75-19.69")			RHN0083					
	Drive shaft, length:505mm; flange:117-310mm (4.63-12.20")					RHN0221			
	Drive shaft, length:710mm; flange:311-500mm (12.24-19.69")					RHN0222			
	Drive shaft, length 510mm; flange:170-220mm (6.69"-15.75")							RHN0301	
	Drive shaft, length 740mm; flange: 221-400mm (8.70"-15.75")							RHN0302	
	Drive shaft, length:780mm; flange:401-500mm (15.79-19.69")							RHN0303	
22	Threaded bolt	2	RHN0084						
23	Locking nut	8	9098516						
24	Distance pipe	1						RHN0299	
25	Adjusting ring	1						RHN0300	
27	Trolley bumper	4	RHN0145			RHN0204		RHN0314	

## 9.7 Trolley Motor & Gear Box Assembly Parts



## 9.8 Trolley Motor & Gear Box Assembly Parts

Figure No.	Part Name	Parts Per Hoist	RHN02	RHN03	RHN05	RHN08	RHN10	RHN15
50	<b>TROLLEY MOTOR &amp; GEAR BOX ASSEMBLY<sup>1</sup>, DUAL SPEED – 80/20 fpm</b>	1V	RHN0725		RHN0728		RHN0731	
		2V	RHN0726		RHN0729		RHN0732	
		4V	RHN0425		RHN0426		RHN0427	
		5V	RHN0727		RHN0730		RHN0733	
7	Brake kit <sup>2</sup>	1V	RHN0388		RHN0403		RHN0407	
		2V	RHN0388		RHN0403		RHN0407	
		4V	RHN0388		RHN0403		RHN0407	
		5V	RHN0389		RHN0404		RHN0408	
1	Brake rotor kit <sup>3</sup>	1	RHN0387					
12	Nut	1	RHN0390				RHN0409	
14	Fan wheel	1	RHN0391				RHN0410	
16	Fan cover kit <sup>4</sup>	1	RHN0392				RHN0411	
21	Bearing kit (Inc. 3-5,8,9)	1	RHN0393				RHN0412	
23	Bearing kit <sup>5</sup>	1	RHN0394				RHN0413	
28	Terminal box	1	RHN0395					
29	Terminal box lid	1	RHN0396					
30	Rectifier	1V	RHN0397					
		2V	RHN0398					
		4V	RHN0398					
		5V	RHN0398					
31	Plug connector	1	RHN0399					
32	Round sealing ring	1	RHN0400					
34	Socket head cap screw	4	9091250				9091294	
35	Lock washer	4	9012709				9012712	
38	Sealing ring	1	RHN401				RHN0414	

1 Lubricant included

2 Brake kit includes brake rotor kit, brake, snap ring, and key

3 Brake rotor kit includes brake rotor, screws, and o-rings

4 Fan cover kit includes fan cover, screws, and lock washers

5 Bearing kit includes bearing and shaft seal

## NOTES

## NOTES

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