EFFECTIVE: July 1, 2008

OWNER'S MANUAL

MANUAL
TROLLEY
TF2/TS2 SERIES

1/2 Ton through 5 Ton Capacity

Code, Lot 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

Table of Contents

Section **Page Number**

1.0 Important Information and Warnings

1.1 Terms and Summary

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

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

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

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

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

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

⚠ CAUTION

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

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

Record your trolley's Code, Lot 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”.

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

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

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 HOIST 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 or 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 is installed as part of a total lifting system, such as an overhead crane or monorail, it is also the responsibility of the owner/user to comply with the applicable ANSI/ASME B30 volume that addresses that type of equipment.

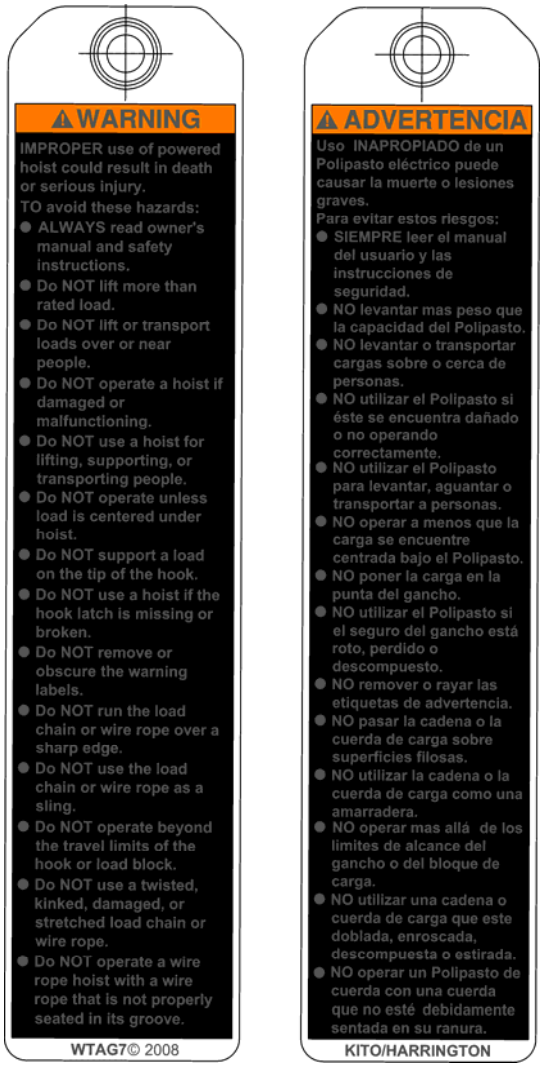
It is the responsibility of the owner/user to have all personnel that will install, inspect, test, maintain, and operate a hoist read the contents of this manual and applicable portions of ANSI/ASME B30.16, “Safety Standard for Overhead Hoists”, OSHA Regulations and ANSI/NFPA 70, “National Electric Code”. 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 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 unless this information is fully understood.

A regular schedule of inspection of the trolley 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 trolley 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. Tag is not shown actual size.



English Spanish

Warning Tag for Harrington powered products

English Spanish

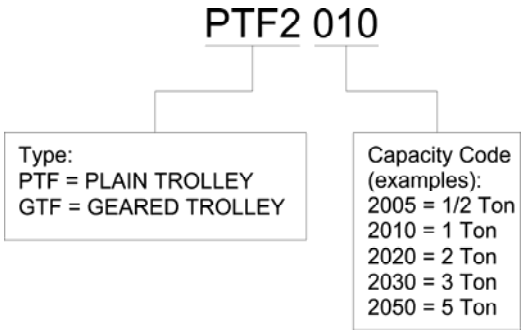
Warning Tags for Harrington Manual Chain products

Figure 1-1 Warning Tag Attached to Trolley

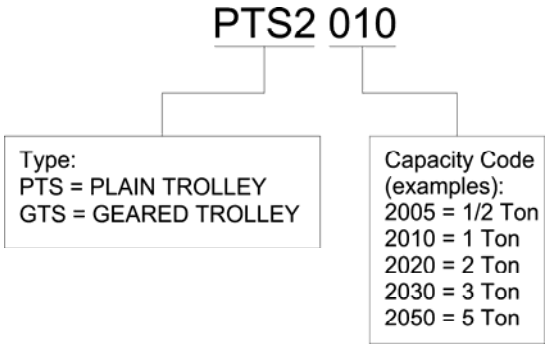
2.0 Technical Information

2.1 Specifications

2.1.1 Product Code for TF2 Trolley:



2.1.2 Product Code for TS2 Trolley:



2.1.3 Operating Conditions and Environment

Temperature Range: -4° to +104°F (-20° to +40°C)
Humidity: 85% or less

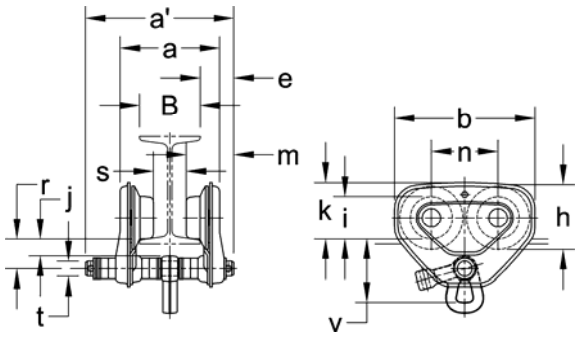
2.2 Specification & Dimensions

2.2.1 PTF2 Specification & Dimensions

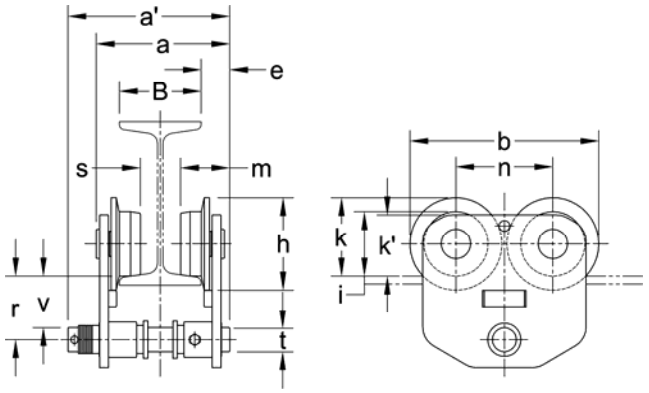
Table 2-1 PTF2 Trolley Specifications

Cap. (Tons)	Product Code	Min. Radius for Curve (in)	Flange Width Adjustability B (in)		Approx. Net Weight (lbs)
			Standard	Option	
1/2	PTF2005	13.8	2.28 to 4.00	4.01 to 8.00 or 8.01 to 12.00	9
1	PTF2010	17.7	2.28 to 5.00	5.01 to 8.00 or 8.01 to 12.00	15
1 1/2-2	PTF2020	21.7	3.23 to 6.02	6.03 to 12.00	29
2 1/2-3	PTF2030	25.6			46
5	PTF2050	78.7	4.92 to 7.02	7.03 to 12.00	95

Table 2-2 PTF2 Trolley Dimensions



PTF2005 to PTF2030



PTF2050

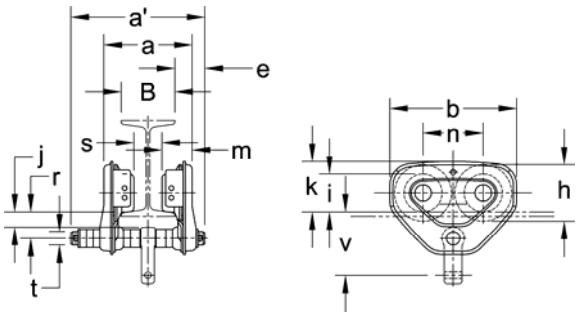
Cap. (Tons)	Product Code	a max (in)	a' (in)	b (in)	e (ft)	h (in)	i (in)	j (in)	k (in)	m (in)	n (in)	r (in)	s (in)	t (in)	v (in)
1/2	PTF2005	6.8	8.0	7.2	1.8	3.2	2.36	0.80	3.0	2.7	3.3	1.5	B-1.8	0.87	3.7
1	PTF2010	8.5	9.8	9.3	2.2	4.2	2.80	1.1	3.7	3.1	4.4	2.0	B-1.9	0.98	4.2
1 1/2-2	PTF2020	10.4	11.8	11.0	2.7	5.0	3.35	1.4	4.4	3.8	5.2	2.4	B-2.3	1.26	5.1
2 1/2-3	PTF2030	11.0	12.6	12.8	3.1	5.8	3.94		5.3	4.3	6.0	2.7	B-2.3	1.42	6.7
5	PTF2050	10.7	11.7	13.7	2.1	6.7	4.65	-	5.7	3.6	7.0	3.5	B-3.0	2.1	3.7

2.2.2 PTS2 Specifications & Dimensions

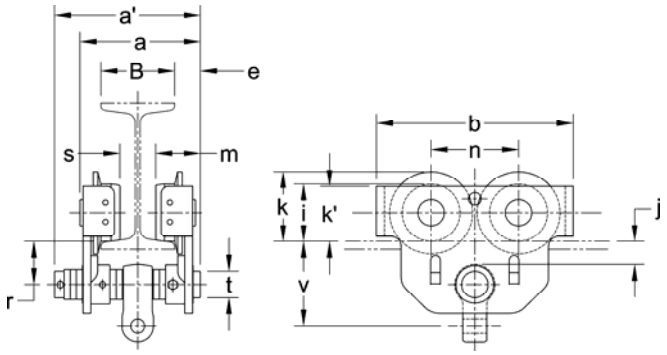
Table 2-3 PTS2 Trolley Specifications

Cap. (Tons)	Product Code	Min. Radius for Curve (in)	Flange Width Adjustability B (in)		Approx. Net Weight (lbs)
			Standard	Option	
1/2	PTS2005	43.3	2.28 to 4.00	4.01 to 8.00 or 8.01 to 12.00	10
1	PTS2010	51.2	2.28 to 5.00	5.01 to 8.00 or 8.01 to 12.00	18
1 1/2-2	PTS2020	59.1	3.23 to 6.02	6.03 to 12.00	31
2 1/2-3	PTS2030	66.9			51
5	PTS2050	90.6	4.92 to 7.02	7.03 to 12.00	110

Table 2-4 PTS2 Trolley Dimensions



PTS2005 to PTS2030



PTS2050

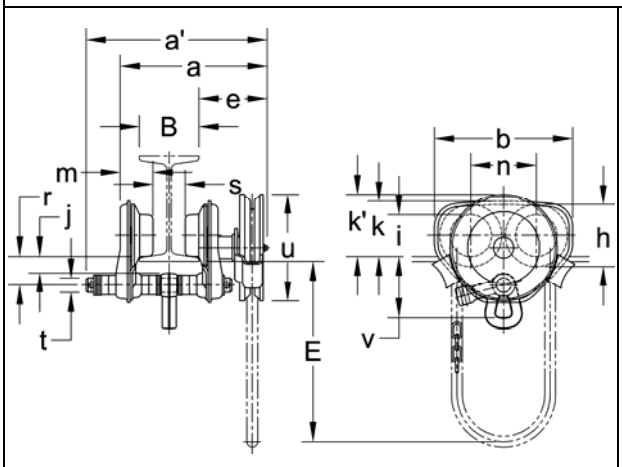
Cap. (Tons)	Product Code	a max (in)	a' (in)	b (in)	e (ft)	h (in)	i (in)	j (in)	k (in)	m (in)	n (in)	r (in)	s (in)	t (in)	v (in)
1/2	PTS2005	6.8	8.0	7.2	1.8	3.2	2.36	0.7	3.0	2.7	3.3	1.5	B-1.8	0.87	3.7
1	PTS2010	8.5	9.8	9.3	2.2	4.2	2.80	1.1	3.7	3.1	4.4	2.0	B-1.9	0.98	4.2
1 1/2-2	PTS2020	10.4	11.8	11.0	2.7	5.0	3.35	1.3	4.4	3.8	5.2	2.4	B-2.3	1.26	5.1
2 1/2-3	PTS2030	11.0	12.6	12.8	3.1	5.8	3.94	1.4	5.3	4.3	6.0	2.7	B-2.3	1.42	6.7
5	PTS2050	10.7	11.7	15.8	2.1	6.7	4.65	1.8	5.7	3.2	7.0	3.5	B-3.0	2.1	3.7

2.2.3 GTF2 Specification & Dimensions

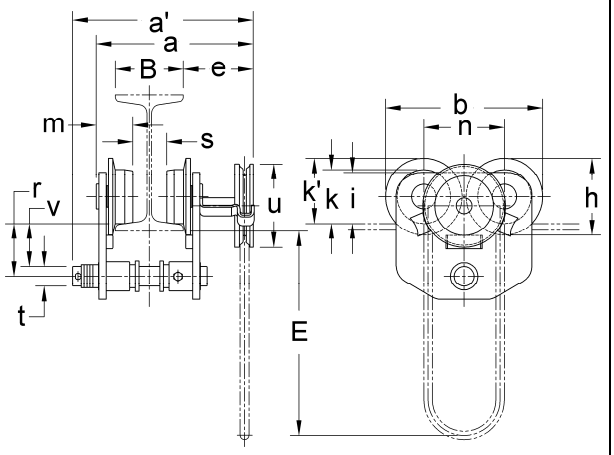
Table 2-5 GTF2 Trolley Specifications

Cap. (Tons)	Product Code	Min. Radius for Curve (in)	Flange Width Adjustability B (in)		Approx. Net Weight (lbs)
			Standard	Option	
1	GTF2010	17.7	2.28 to 5.00	5.01 to 8.00 or 8.01 to 12.00	24
1 1/2-2	GTF2020	21.7	3.23 to 6.02	6.03 to 12.00	38
2 1/2-3	GTF2030	25.6			55
5	GTF2050	78.7	4.92 to 7.02	7.03 to 12.00	104

Table 2-6 GTF2 Trolley Dimensions



GTF2010 to GTF2030



GTF2050

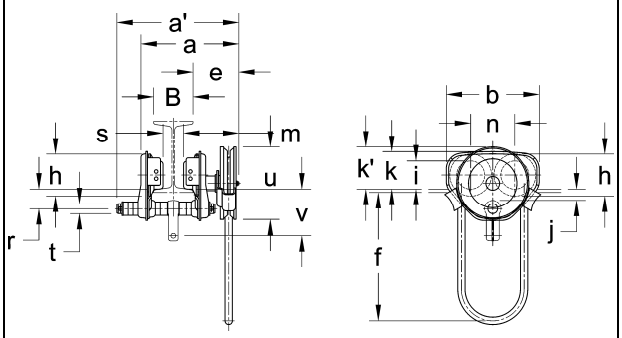
Cap. (Tons)	Product Code	a max (in)	a' (in)	b (in)	e (in)	E (ft.)	h (in)	i (in)	j (in)	k (in)	k' (in)	m (in)	n (in)	r (in)	s (in)	t (in)	u (in)	v (in)
1/2-1	GTF2010	10.8	13.6	9.3	6.0	8	4.2	2.80	1.1	3.7	4.2	2.2	4.4	2.0	B-1.8	0.98	7.2	4.2
1 1/2-2	GTF2020	13.7	15.2	11.0	6.1		5.0	3.35	1.3	4.4	4.3	2.8	5.2	2.4	B-1.9	1.26		5.1
2 1/2-3	GTF2030	14.1	15.7	12.8	6.2		5.8	3.94	1.4	5.3	4.5	3.1	6.0	2.7	B-2.3	1.42		6.7
5	GTF2050	14.8	15.8	13.7	6.1		6.7	4.65	-	5.7	5.2	3.2	7.0	3.5		2.13		3.7

2.2.4 GTS2 Specification & Dimensions

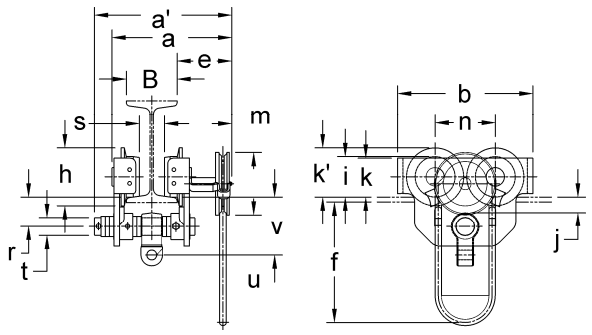
Table 2-7 GTS2 Trolley Specifications

Cap. (Tons)	Product Code	Min. Radius for Curve (in)	Flange Width Adjustability B (in)		Approx. Net Weight (lbs)
			Standard	Option	
1	GTS2010	51.2	2.28 to 5.00	5.01 to 8.00 or 8.01 to 12.00	27
1 1/2-2	GTS2020	59.1	3.23 to 6.02	6.03 to 12.00	42
2 1/2-3	GTS2030	66.9			60
5	GTS2050	90.6	4.92 to 7.02	7.03 to 12.00	124

Table 2-8 GTS2 Trolley Dimensions



GTS2010 to GTS2030



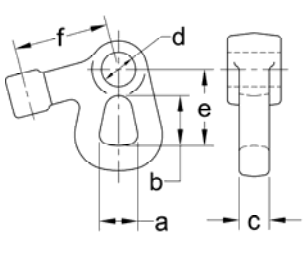
GTS2050

Cap. (Tons)	Product Code	a max (in)	a' (in)	b (in)	e (in)	E (ft.)	h (in)	i (in)	j (in)	k (in)	k' (in)	m (in)	n (in)	r (in)	s (in)	t (in)	u (in)	v (in)
1/2-1	GTS2010	10.8	13.6	9.3	6.0	10.5	4.2	2.80	1.1	3.7	4.2	2.2	4.4	2.0	B-1.8	0.98	7.2	4.2
1 1/2-2	GTS2020	13.7	15.2	11.0	6.1		5.0	3.35	1.3	4.4	4.3	2.8	5.2	2.4	B-1.9	1.26		5.1
2 1/2-3	GTS2030	14.1	15.7	12.8	6.2	11.0	5.8	3.94	1.4	5.3	4.5	3.1	6.0	2.7	B-2.3	1.42		6.7
5	GTS2050	14.8	15.8	15.8	6.1	11.4	6.7	4.65	1.8	5.7	5.2	3.2	7.0	3.5		2.13		3.7

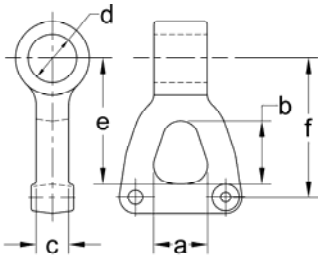
2.3 Optional Equipment

2.3.1 Suspender C

Table 2-9 Suspender C Dimensions



C (1/2 to 2 1/2 Ton)

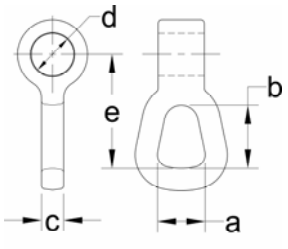


C (3 to 5 Ton)

Capacities (Tons)	a (in)	b (in)	c (in)	d (in)	e (in)	f (in)
1/2	1.0	1.3	0.6	0.87	2.1	2.6
1	1.1	1.5	0.7	0.99	2.2	2.7
2	1.3	1.6	0.9	1.27	2.7	3.2
2 1/2	1.4	1.7	1.0	1.43	3.0	3.6
3	1.6	1.9	1.2	1.43	4.0	4.5
5	2.4	2.8	1.4	2.13	5.5	6.1

2.3.2 Suspender H

Table 2-10 Suspender H Dimensions

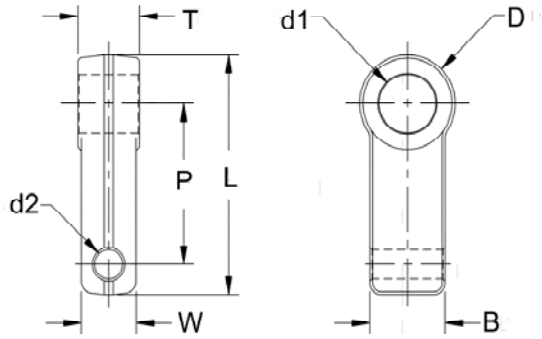


H

Capacities (Tons)	a (in)	b (in)	c (in)	d (in)	e (in)
1/4-1/2	1.0	1.3	0.4	0.91	2.3
1	1.1	1.5	0.5	1.02	2.6
1 1/2-2	1.4	1.8	0.7	1.30	3.3
2 1/2-3	1.7	2.1	0.9	1.46	3.9

2.3.3 Suspender E & G

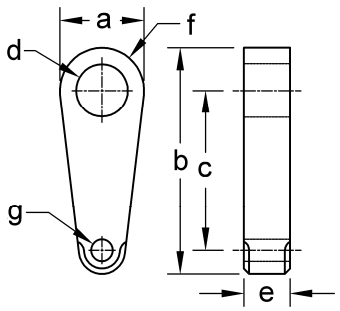
Table 2-11 Suspender E & G Dimensions



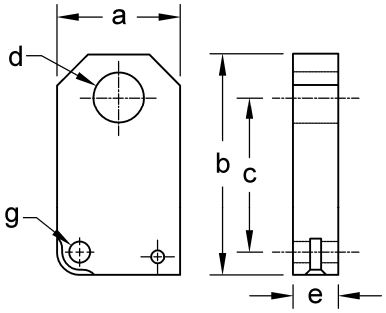
Suspender	Capacities (Ton)	d1	D	d2	B	P	L	T	W
E	1/8 to ½	0.874	1.46	0.480	1.30	2.36	3.60	1.06	0.94
	1	0.992	1.65	0.480	1.30	2.72	4.06	1.06	0.94
	1 1/2 to 2	1.268	2.13	0.795	1.73	2.99	4.84	1.54	1.42
	2 1/2 to 3	1.425	2.48	0.795	1.73	3.35	5.47	1.54	1.77
G	5	2.13	3.23	1.11	1.93	3.35	6.22	2.32	2.52

2.3.4 TCR Suspender (used for Air Hoist)

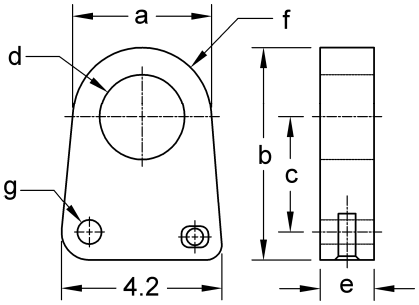
Table 2-12 TCR Suspender Dimensions



TCR250, TCR500, TCR1000, TCR3000



TCR1000-2, TCR2000-2



TCR6000-2

Model Hoist	Suspender P/N	Cap (Ton)	a (in)	b (in)	c (in)	d (in)	e (in)	f (in)	g (in)
TCR250 TCR500	6040204	¼ TO ½	2.00	5.33	3.78	.875	1.10	R 1.00	.512
TCR1000	6040201	1	2.00	5.33	3.78	1.230	1.10	R 1.00	.512
TCR1000-2	60403	1	3.00	5.38	3.78	1.230	1.10	--	.512
TCR2000-2	6040401	2	3.25	5.56	3.54	1.703	1.10	--	.512
TCR3000	TF26K531030S	3	2.44	4.80	2.83	1.42	1.77	R 1.22	.795
TCR6000-2	60405	6	4.48	6.91	3.75	2.761	1.75	R 2.25	.787

3.0 Pre-operational Procedures

3.1 Assembly and Adjustment for Manual Hoist

3.1.1 Harrington's Model CB Series chain hoist can be Hook mounted to the TF2 Trolley using suspender "C" as shown in Figure 3-1 or Lug mounted to suspender "C" as shown in Figure 3-2.

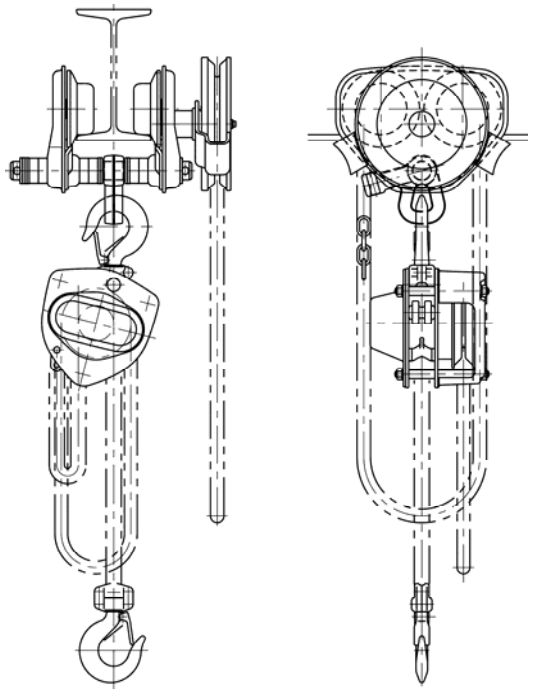


Figure 3-1 CB Hook Mount

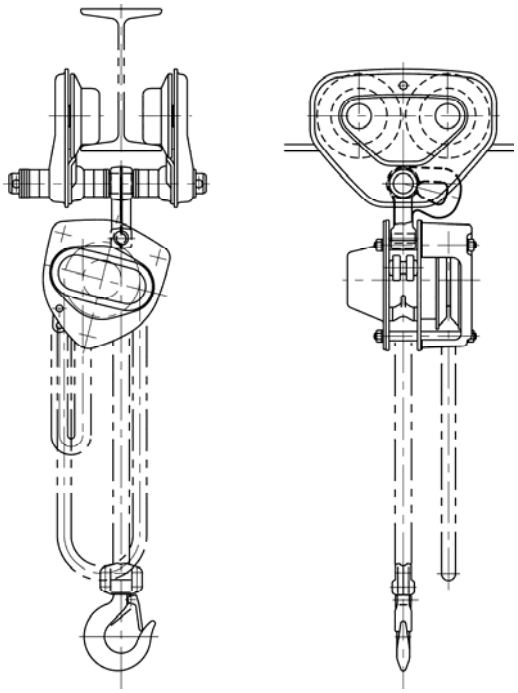


Figure 3-2 CB Lug Mount

3.1.2 Direct coupling lug mounted method for CB Series.

1) For ½ to 2 ½ ton capacity Refer to Figure 3-3.
2) Remove the wheel cover nuts and lock washers, then remove wheel cover.
3) Straighten and remove the spit pin in the top shaft pin and remove the top shaft pin, remove the top hook.
4) Mount suspender "C" (small) in place of the top hook, insert the top shaft pin and re-insert the split pin.
5) Replace the wheel cover.
6) Attach Hoist to Trolley.

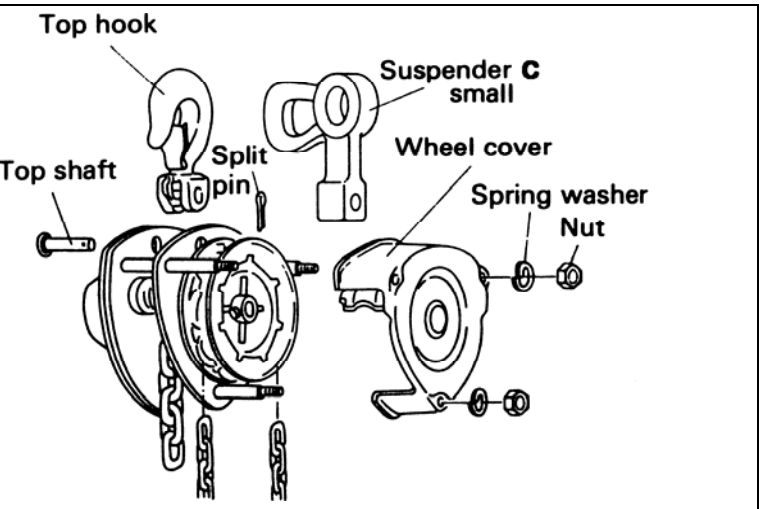


Figure 3-3 Installing suspender "C" ½ ton to 2 ½ ton capacity

7) For 3 to 5 ton capacity Refer to Figure 3-4.

8) Remove the wheel cover nuts and lock washers, then remove wheel cover.

9) Straighten and remove the spit pin in the top shaft pin and remove the top shaft pin, remove the top hook.

10) Mount suspender "C" (large) in place of the top hook, insert the top shaft pin and re-insert the split pin.

11) Replace the wheel cover.

12) Attach Hoist to Trolley.

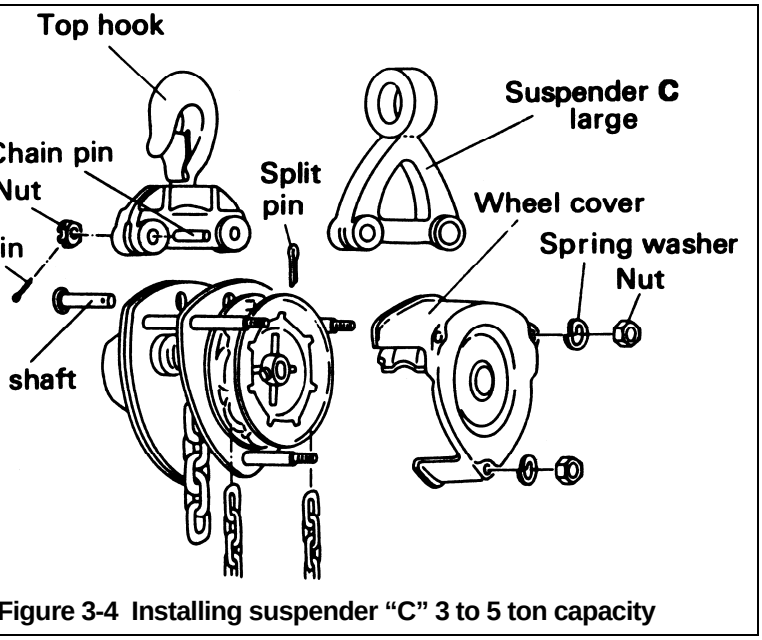


Figure 3-4 Installing suspender "C" 3 to 5 ton capacity

3.1.3 Harrington Model CF Series hoists can be hook mounted to the TF2 trolley using suspender "C" or optional suspender "H" ½ ton to 3 ton, as shown in Figure 3-5. 5 ton models hook to the trolley shaft, as shown in Figure 3-6.

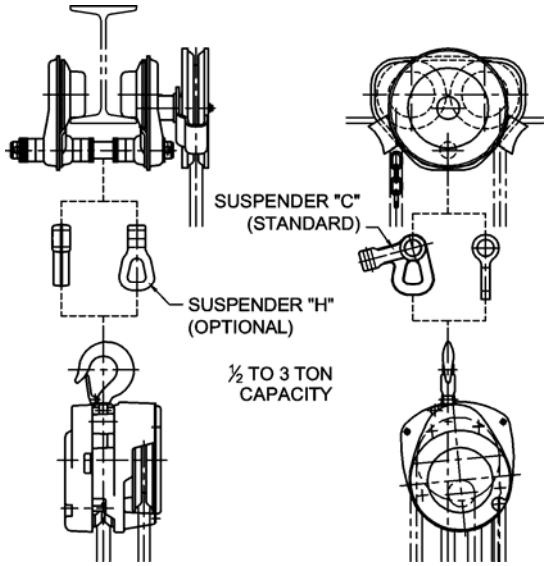


Figure 3-5 CF Hook Mounting

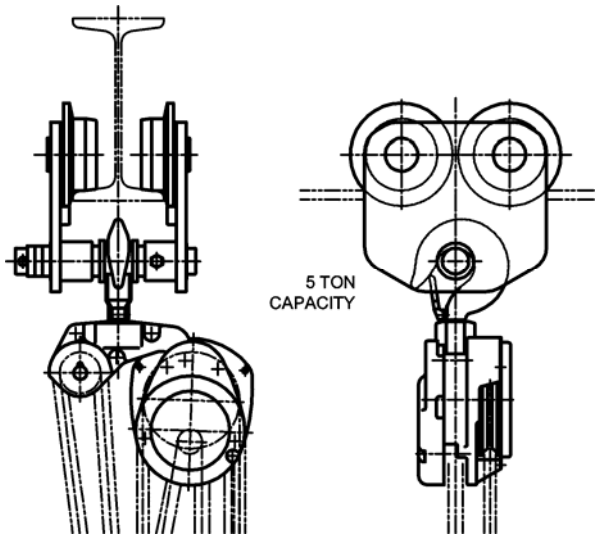


Figure 3-6 CF Hook Mounting

3.2 Assembly and Adjustment for Electric Hoist

⚠ DANGER

HAZARDOUS VOLTAGES ARE PRESENT IN THE HOIST CONTROL BOX, IN THE SUPPLY OF ELECTRICAL POWER TO THE HOIST MOTOR.

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.

3.2.1 **⚠ DANGER** Never attempt to hook mount an Electric chain hoist directly to the Suspension Shaft on trolleys up to and including 3 Ton. These trolleys are designed to be used with a suspender only and do not have the vertical clearance required for a hook to fit between the Suspension Shaft and trolley beam.

3.2.2 When the TS2 trolley is combined with a hoist, follow and complete all pre-operational procedures provided with the hoist. For Harrington SH, ES and NES model hoists, follow the pre-operational procedures in the SH, ES/NES Owner's Manual in conjunction with all information provided in this section for mounting and electrical connections.

3.2.3 In addition to the information and procedures provided in this section for the TS2 trolley, there are specific details for using SH, ES and NES hoists with TS2 trolleys. Special mounting and wiring considerations must be taken if the trolley is used with a hoist other than an SH, ES or NES model.

3.2.4 Preparing SH, ES and NER hoists for use with TS2 trolley.

1) These instructions pertain to the mechanical coupling of the hoist to the trolley. Refer to the hoists owners manual for the Electrical connections.

2) SH & ES Series Hoists couple directly to the trolley with suspender “E”, as shown in Figure 3-7 and Figure 3-8.

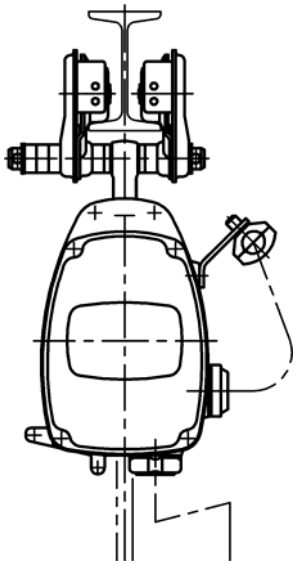


Figure 3-7 Model SH

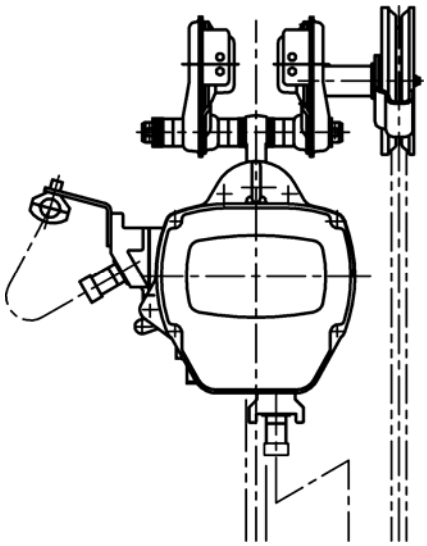


Figure 3-8 Model ES

3) Refer to the appropriate product owners manual parts list and associated diagrams for the hoist.

4) Single Fall Units – Remove the Top Hook assembly by removing the Split Pin from the Slotted Nut. Remove the Slotted Nut, pull out the Top Pin, and remove the Top Hook. Replace with Suspender E, replace Top Pin, Slotted Nut and Split Pin. Be sure to bend Split Pin ends of the Split Pin away from each other sufficiently so the Split Pin remains captive in the Top Pin. Refer to Figures 3-9 or Figure 3-10 for the appropriate product. Attach hoist to the trolley.

5) Double Fall Units (except 5 ton ES) – Remove the Top Hook assembly by removing the Spilt Pin from the Slotted Nut. Remove the Slotted Nut, pull out the Top Pin L from the Connection Yoke, and remove Top Hook. Replace with Suspender E, replace Top Pin, Slotted Nut and Split Pin. Be sure to bend Split Pin ends of the Split Pin away from each other sufficiently so the Split Pin remains captive in the Top Pin. Refer to Figures 3-9 or Figure 3-10 for the appropriate product. Attach hoist to the trolley.

6) 5 Ton ES – This hoist couples to the trolley by hook mounting the hoist to the trolley’s suspension shaft. As shown in Figure 3-11.

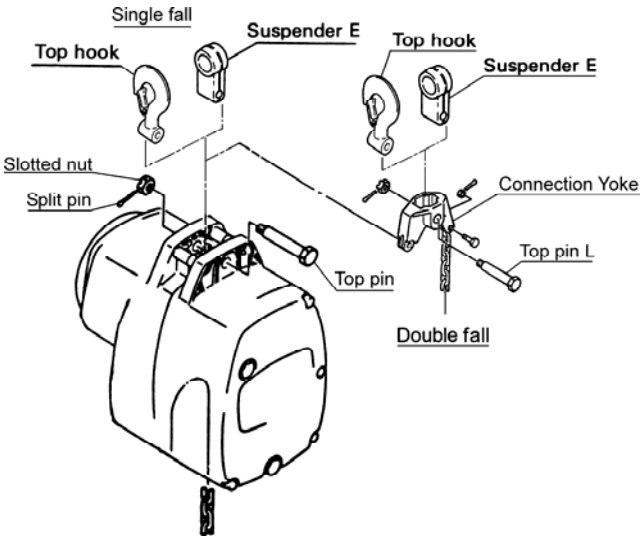


Figure 3-9 Model SH

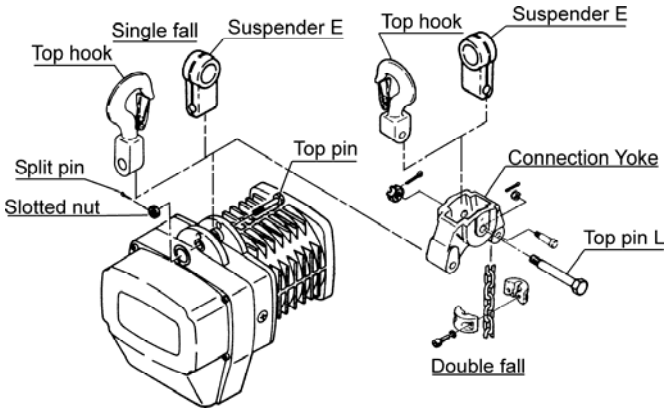


Figure 3-10 Model ES

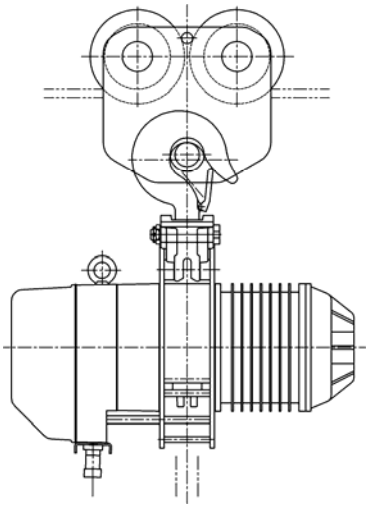


Figure 3-11 Model 5 Ton ES

3.2.5 To Couple a Model ER Electric chain hoist to a TS2 trolley, access to the ER Electrical controls is required. Refer to Figure 3-12 or Figure 3-13, proceed as follows.

⚠ DANGER

HAZARDOUS VOLTAGES ARE PRESENT IN THE HOIST CONTROL BOX, IN THE SUPPLY OF ELECTRICAL POWER TO THE HOIST MOTOR.

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.

3.2.6 When the TS2 trolley is combined with a hoist, follow and complete all pre-operational procedures provided with the hoist. For Harrington ER and NER model hoists, follow the pre-operational procedures in the ER/NER Owner's Manual in conjunction with all information provided in this section for mounting and electrical connections.

3.2.7 In addition to the information and procedures provided in this section for the TS2 trolley, there are specific details for using ER and NER hoists with TS2 trolleys. Special mounting and wiring considerations must be taken if the trolley is used with a hoist other than an ER or NER model.

3.2.8 Preparing ER and NER hoists for use with TS2 trolley.

1/8 to 3 Ton ER/NER (EXCEPT 030C) – Assuming the hoist has an existing Top hook.

1) Refer to Figure 3-12.
2) Remove the four Controller Cover socket head bolts and allow the cover to swing fully open.
3) Loosen the three or four captive screws holding the electrical component mounting Plate against the main body of the hoist and swing the plate out to access the required components.
4) Loosen one of two Machine Screws attaching Plate A and remove the second Machine Screw. Allow Plate A to rotate out from the retaining slot in the bottom side of the Connection Shaft. Pull out the Connection Shaft and remove the Top Hook Assembly.
5) Remove the Hoist Fixing Shaft.
6) Installing the Connection Yoke, place the Connection Yoke Rubber and Suspender E in the top of the Connection Yoke. Attach Suspender E to the Connection Yoke with the Yoke Bolt, Slotted Nut and Split Pin (cotter pin).
7) Place Connection Yoke with Suspender E on the top of the hoist. Line up the holes for the Connection Shaft and the Hoist Fixing Shaft and reinsert the shafts.
8) Reassemble the remaining hoist components in reverse order of disassembly.

3 Ton (030C) and 5 Ton ER/NER – The 3 Ton (030C) and 5 Ton ER/NER hoists (double fall) always use a Connection Yoke. Remove the Top Hook Assembly from the Connection Yoke and install the Suspender E shown in Figure 3-13.

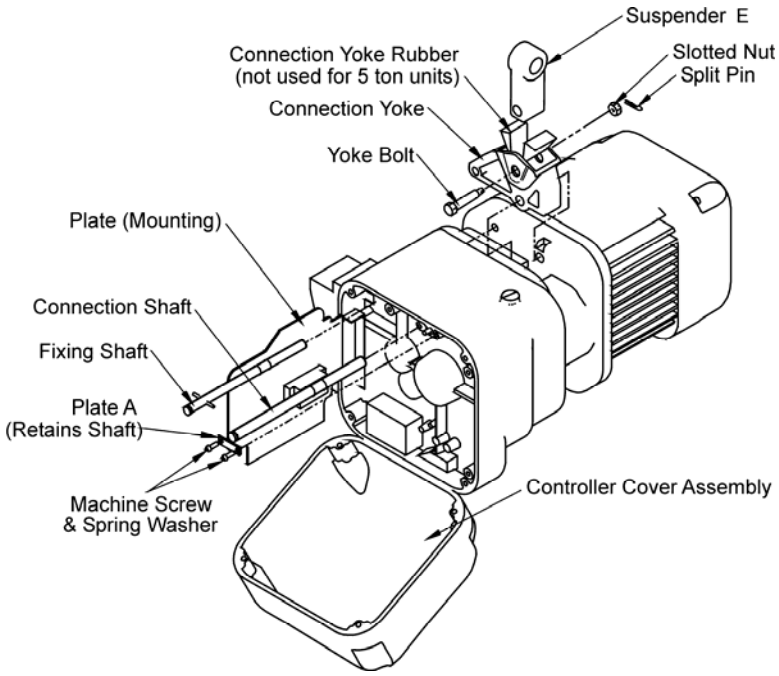
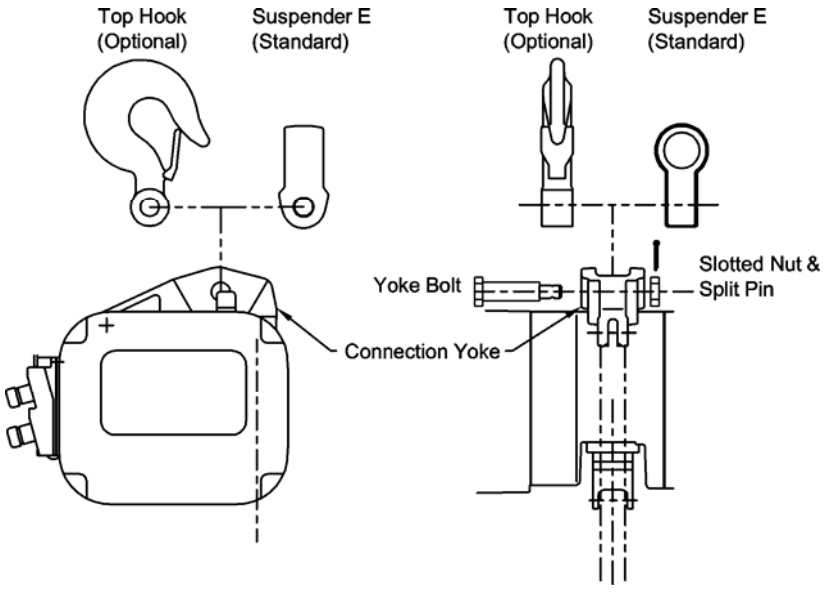


Figure 3-12 Installing Connection Yoke with Suspender E on ER Hoists – Connection Yoke standard on 030C & 050 models



Note: Unlike 3 Ton (Single Fall) and below (see Figure 3-12), Suspender G for 3 Ton (030C) and 5 Ton connects directly to the Connection Yoke without the Connection Yoke Rubber.

Figure 3-13 Installing Suspender E or G on 3 Ton (030C) and 5 Ton ER Hoists

3.2.9 Preparing ED1050S/DS hoists for use with TS2 trolley.

1) These instructions pertain to the mechanical coupling of the hoist to the trolley. Refer to the hoist's owners manual for the electrical connections.

2) The standard configuration for ED1050S/DS hoists is to couple the hoist directly to the trolley with Suspender “E”, as shown in Figure 3-12.

3) Refer to the appropriate product owners manual parts list and associated diagrams for the hoist.

4) Refer to Figures 3-12. Remove the Top Hook assembly by removing the Split Pin from the Slotted Nut. Remove the Slotted Nut, pull out the Top Pin, and remove the Top Hook. Replace with Suspender E, replace Top Pin, Slotted Nut and Split Pin. Be sure to bend Split Pin ends of the Split Pin away from each other sufficiently so the Split Pin remains captive in the Top Pin. Attach hoist to the trolley.

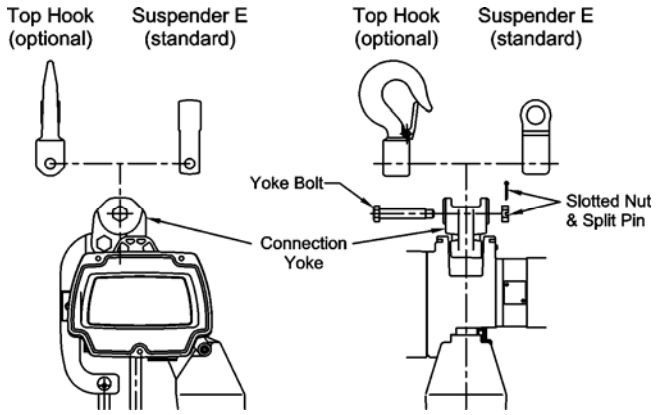


Figure 3-14 Model ED1050 – Installing Suspender E

3.2.10 Prepare the ER2 and NER2 hoists for use with TS2 trolley for the following hoists:

001H, 003S, 003H, 005L, 005S, 010L, 010S, 015S, 020C, 020L, 020C, 030C

1) Refer to Fig. 3-15a.

2) Remove the Shaft Retainer Clip from the two Connection Shafts.

3) Remove the Socket Bolt from the Shaft Retainer.

4) Remove the two Connection Shafts.

5) Remove the Top Hook and replace it with the Connection Yoke.

6) Re-insert the two Connection Shafts, so that both pass through the main body and the shaft holes of Connection Yoke.

7) Re-install the Shaft Retainer, Socket Bolt, and Shaft Retainer Clip.

8) Install the appropriate Suspender for the application, securing it to the Connection Yoke with the Yoke Bolt, Slotted Nut, and Split Pin. **Note: (See Fig 3-15a) Double Fall applications require a Chain Pin, small Slotted Nut, and small Split Pin, in addition to the Yoke Bolt, Slotted Nut, and Split Pin.**

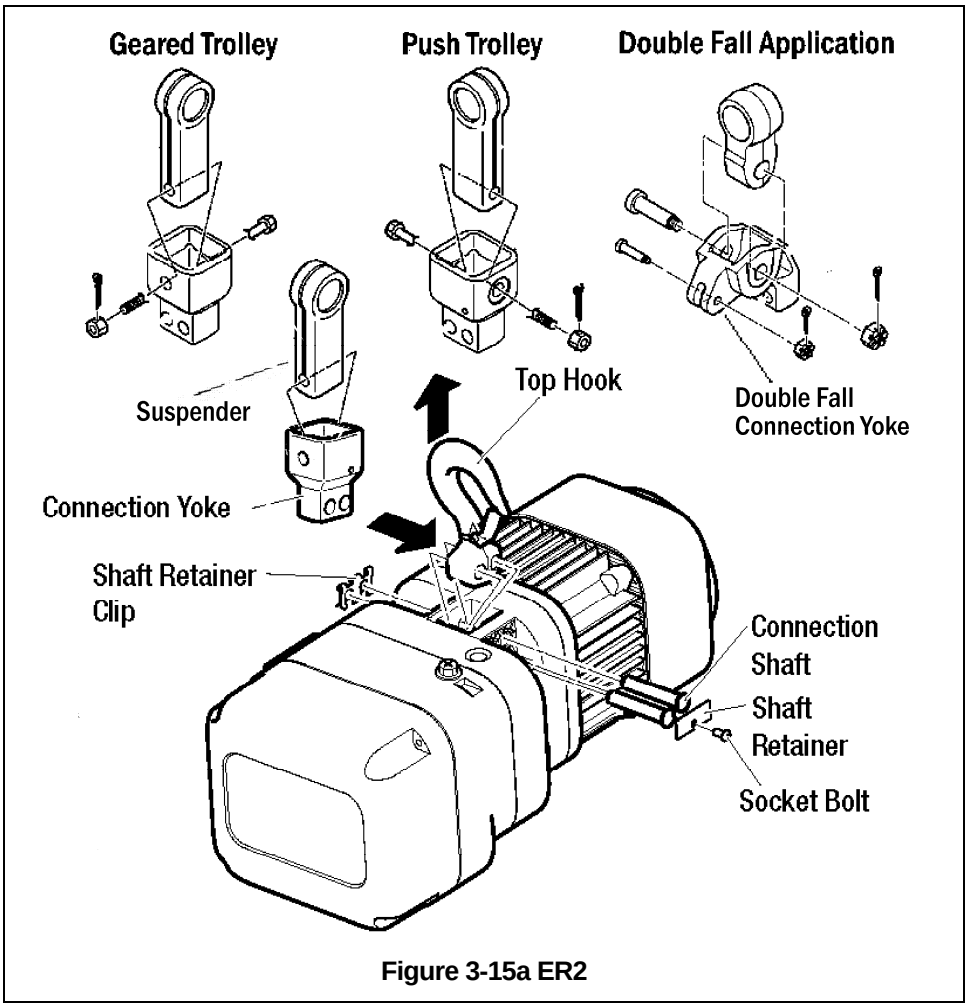


Figure 3-15a ER2

3.2.11 Prepare ER2 and NER2 hoists for use with TS2 trolley for the following hoists:

025S and 050L

1) Refer to Fig. 3-15b

2) Remove the four Socket Bolts that hold the Controller Cover to the hoist body. Now the Controller Cover can be lowered and left to hang by the cover belt.

3) Remove the four pan head screws and the two Shaft Retainers. This will allow the Bracing Shaft and the Connection Shaft to be removed by sliding them out of the hoist body.

4) With the Connection Shaft and Bracing Shaft removed, the Top Hook can be removed and replaced with the appropriate Connection Yoke.

5) Re-insert the Connection Shaft and Bracing Shaft ensuring both pass through the Connection Yoke flange.

6) Fix the Connection Shaft and Bracing Shaft with their respective Shaft Retainer and pan head screws.

7) Install appropriate Suspender for the application, securing it to the Connection Yoke with the Yoke Bolt, Slotted Nut, and Slit Pin. . **Note: (See Fig. 3-15b) Double Fall applications require a Chain Pin, small Slotted Nut, and small Split Pin, in addition to the Yoke Bolt, Slotted Nut, and Split Pin.**

8) Re-install Controller Cover with the four Socket Bolts.

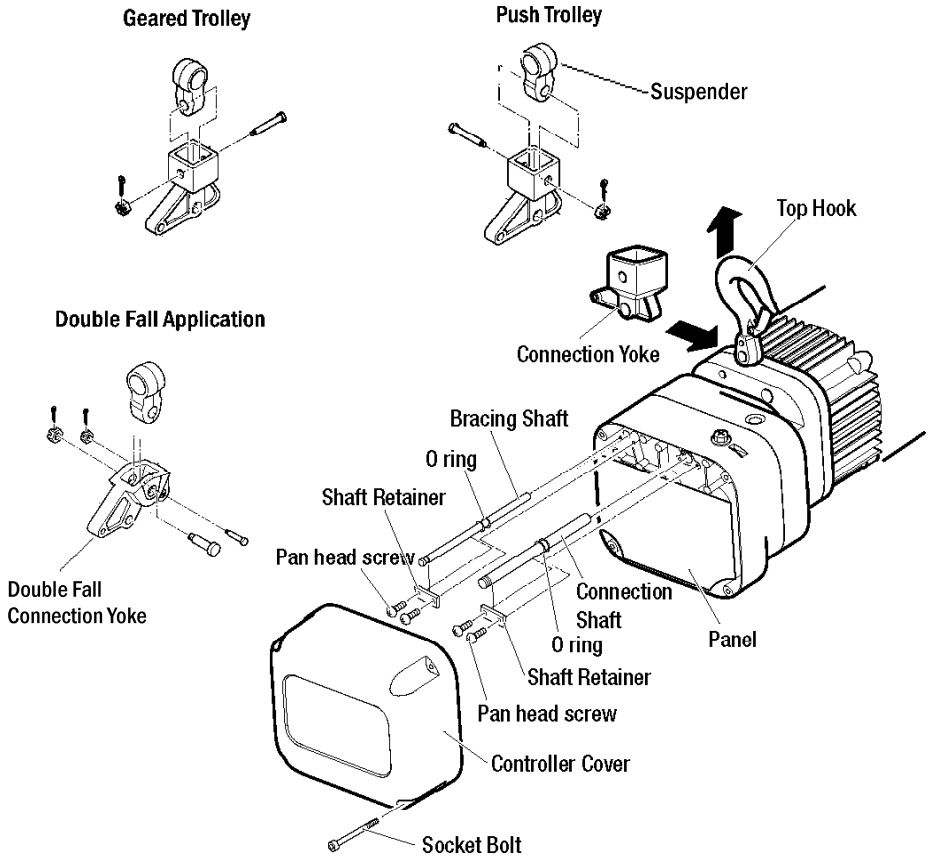


Figure 3-15b ER2

3.3 Assembly and Adjustment for Air Powered Hoist

3.3.1 Coupling a TCR Air Hoist to a TS2 Trolley.

3.3.2 When the TS2 trolley is combined with a hoist, follow and complete all pre-operational procedures provided with the hoist. For Harrington TCR model hoists, follow the pre-operational procedures in the TCR Owner's Manual in conjunction with all information provided in this section for mounting and air hose connections.

3.3.3 In addition to the information and procedures provided in this section for the TF2 trolley, there are specific details for using TCR hoists with TF2 trolleys. Special mounting and air hose considerations must be taken if the trolley is used with a hoist other than a TCR model.

3.3.4 Standard configuration for a TCR hoists is lug mounted to the trolley using a TCR Suspender. As shown in Figure 3-16a or Figure 3-16b. Optional configurations for a TCR hoist is, hook mount to suspender C. As shown in Figure 3-17.

3.3.5 Preparing TCR hoists for use with TF2 trolley.

<u>For Single fall hoists (*TCR250P, *500P, 1000P, 3000P)</u>

* TCR250 & 500 use a TF2010 trolley. Hoists WILL NOT FIT on TF2005 trolley.

Remove the Top Hook Assembly from the hoist and install the suspender as follows:

1) Refer to Figure 3-18.
2) Remove the top pin, yoke and top hook.
3) To remove the top pin, yoke and top hook on the TCR1000P loosen and remove the 3 bolts holding the gear section onto the main body. Rotate the gear section clockwise to allow the top pin to be removed.
4) Place the suspender on the top of the hoist. Line up the holes for the hoist main body and suspender. Reinsert the top pin.
5) Reassemble the remaining hoist components in reverse order of disassembly.

<u>For Double fall hoists (TCR1000P2, 2000P2)</u>

Remove the Top Hook Assembly and Load Chain from the hoist and install the suspender as follows:

1) Refer to Figure 3-19.
2) Loosen and remove the bolt attaching the load chain to the top hook yoke.
3) Remove the load chain from the top hook yoke.
4) Remove the top pin, yoke and top hook.
5) To remove the top pin, yoke and top hook on the TCR2000P2 loosen and remove the 3 bolts holding the gear section onto the main body. Rotate the gear section clockwise to allow the top pin to be removed.
6) Place the suspender on the top of the hoist. Line up the holes for the hoist main body and suspender. Reinsert the top pin.
7) Reassemble the remaining hoist components in reverse order of disassembly
8) Reattach the no load side of the load chain to the load chain mounting hole in the suspender.

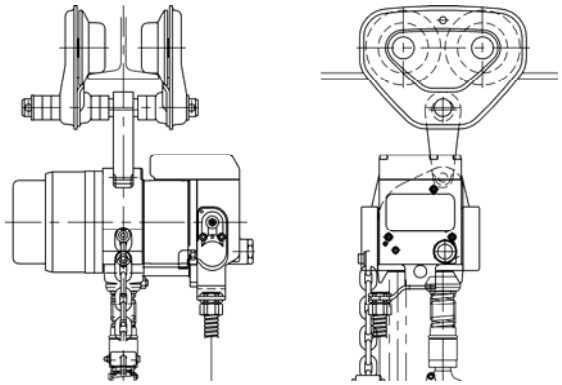


Figure 3-16a Lug mount on TF2

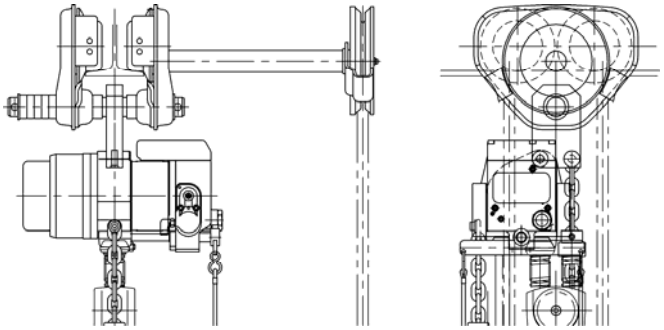


Figure 3-16b Lug mount on Geared TS2 Extended Hand Wheel

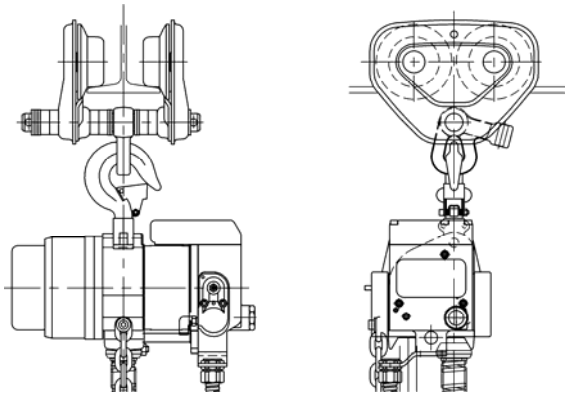


Figure 3-17 Hook mounted on Suspender C

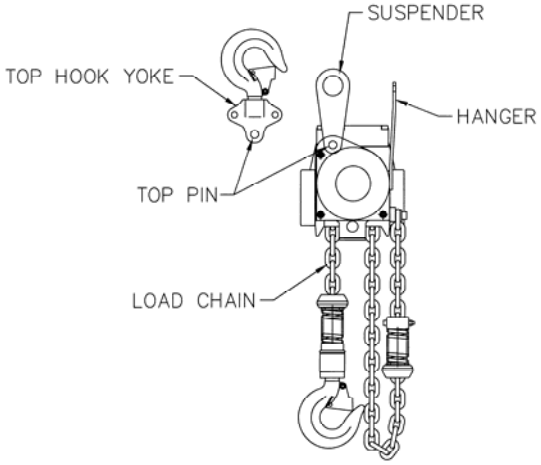


Figure 3-18 Installing Suspender on single fall hoists TCR250P, 500P and 3000P

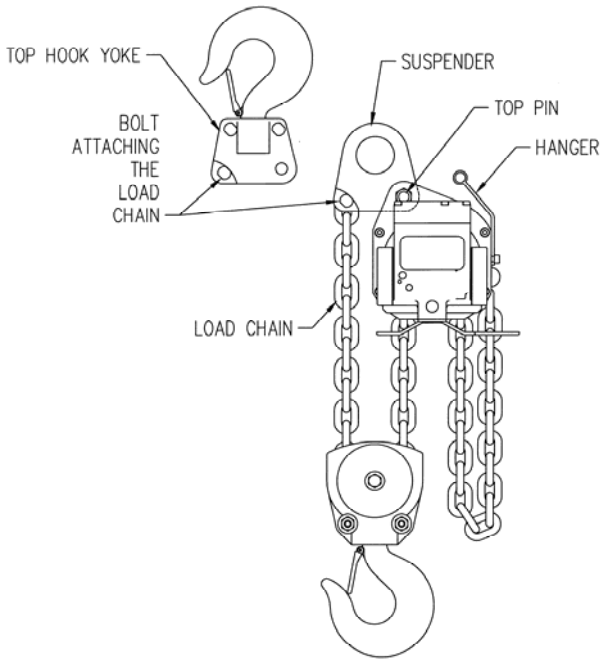


Figure 3-19 Installing Suspender on double fall hoists TCR1000P & TCR2000P2

3.3.6 When using an optional steel chain container, refer to the assembly drawing and instructions provided with the container for correct assembly and attachment.

3.3.7 Trolley Assembly

1) ½ through 3 Ton Refer to Figure 3-20.

2) Remove the Shaft Stopper Pin, Side Plate SN, and Spacers from the Suspension Shaft. For beam flanges that are wider than the standard range, different suspension shaft and/or spacer arrangements are provided. Refer to Table 3-1.

3) Insert the Suspension Shaft to Side Plate G or S and attach it with the Shaft Stopper Pin and Split Pin (cotter pin). Refer to Figure 3-20. Securely bend both branches of the Split Pin after insertion.

4) Referring to Figure 3-23, Table 3-1 and Table 3-2 install the inner adjusting Spacers and Suspender on the Suspension Shaft. Use all of the Spacers provided with the trolley. If the beam width is not listed in Table 3-2, use the next size smaller and make adjustments in accordance with Section 3.3.8.

5) Place Side Plate SN into the Suspension Shaft.

6) Install the outer adjusting Spacers on the Suspension Shaft outside of Side Plate SN. Insert the Shaft Stopper Pin into Suspension Shaft. Temporarily install the split pin in the Shaft Stopper Pin and bend the split pin slightly to hold it in place. The split pin should be fully bent after checking and attaining the proper beam flange adjustment.

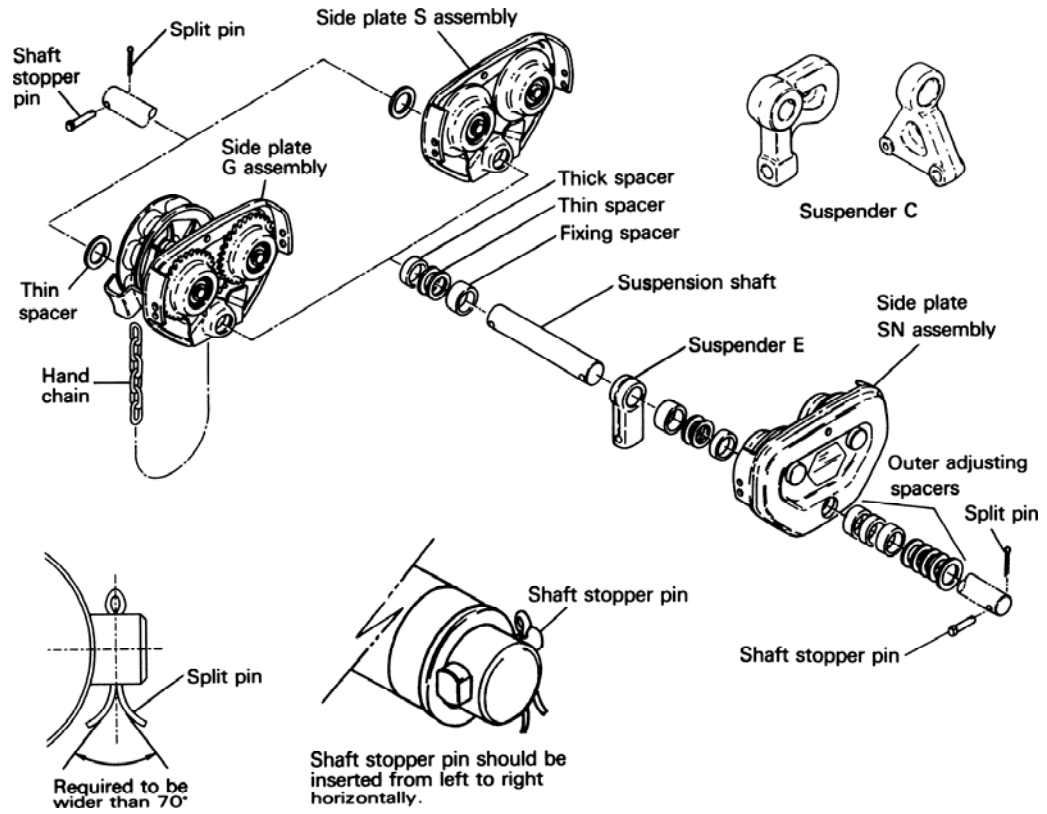


Figure 3-20 Assembling the Trolley – Up Through 3 Ton Capacity

7) 5 Ton Refer to Figure 3-21.

8) Remove the Shaft Stopper Pin, Side Plate SN, and Spacers from the Suspension Shaft. For beam flanges that are wider than the standard range, different suspension shaft and/or spacer arrangements are provided. Refer to Table 3-1.

9) Insert the Suspension Shaft to Side Plate S or G and attach it with the Suspension Shaft Bolt, Slotted Nut and Split Pin (cotter pin). Refer to Figure 3-21 Securely bend both branches of the Split Pin after insertion.

10) Referring to Figure 3-23, Table 3-1 and Table 3-2 install the inner adjusting Spacers and Suspender on the Suspension Shaft. Use all of the Spacers provided with the trolley. If the beam width is not listed in Table 3-2, use the next size smaller and make adjustments in accordance with Section 3.3.8.

11) Place Side Plate SN into the Suspension Shaft.

12) Install the outer adjusting Spacers on the Suspension Shaft outside of Side Plate SN. Insert the Shaft Stopper Pin into Suspension Shaft. Temporarily install the split pin in the Shaft Stopper Pin and bend the split pin slightly to hold it in place. The split pin should be fully bent after checking and attaining the proper beam flange adjustment.

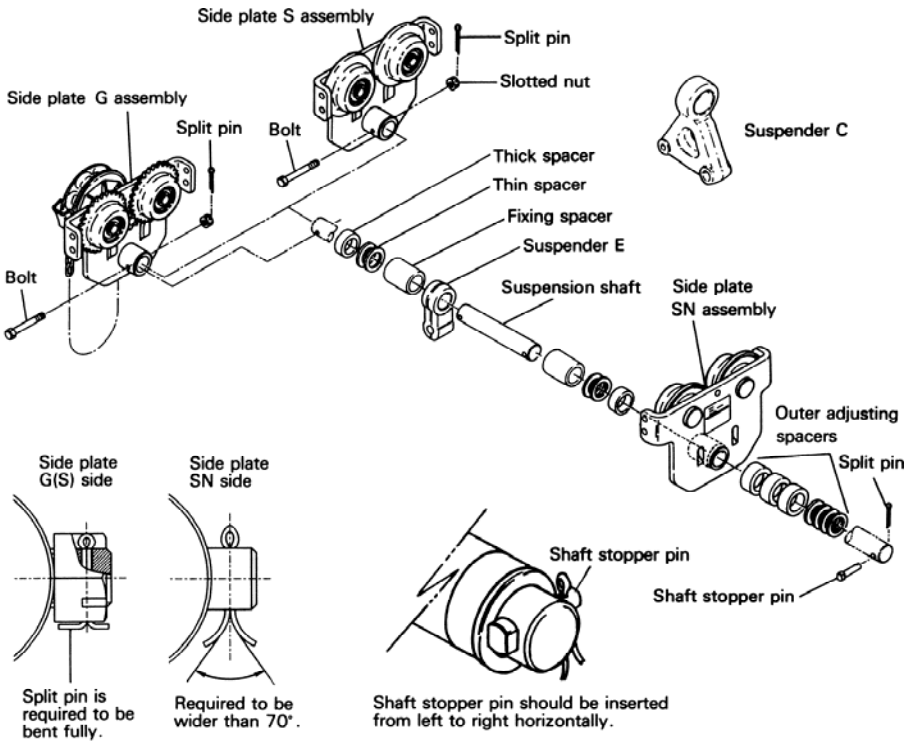


Figure 3-21 Assembling the Trolley – 5 Ton Capacity

3.3.8 Adjusting the trolley width – After assembling trolley per section 3.1.16, check the adjustment as follows:

1) Refer to Figure 3-22.

2) Make sure both side plate are spread fully outward and measure dimension “A”. Compare dimension “A” with dimension “B”. “A” must be 3/32” to 5/32” greater than “B”.

3) If “A” does not fall within the specified range, move spacers from inner to outer or from outer to inner as necessary to obtain the proper “A” dimension, irrespective of the numbers in table 3-2.

4) After obtaining the proper adjustment, install the Shaft stopper Pin, insert the Split Pin into the Stopper Shaft Pin, and securely bend both branches of the Split Pin.

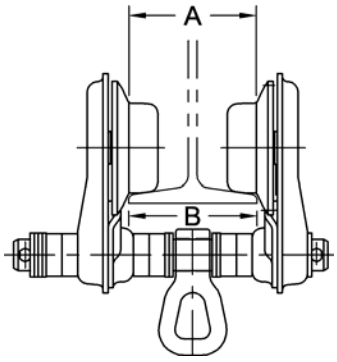
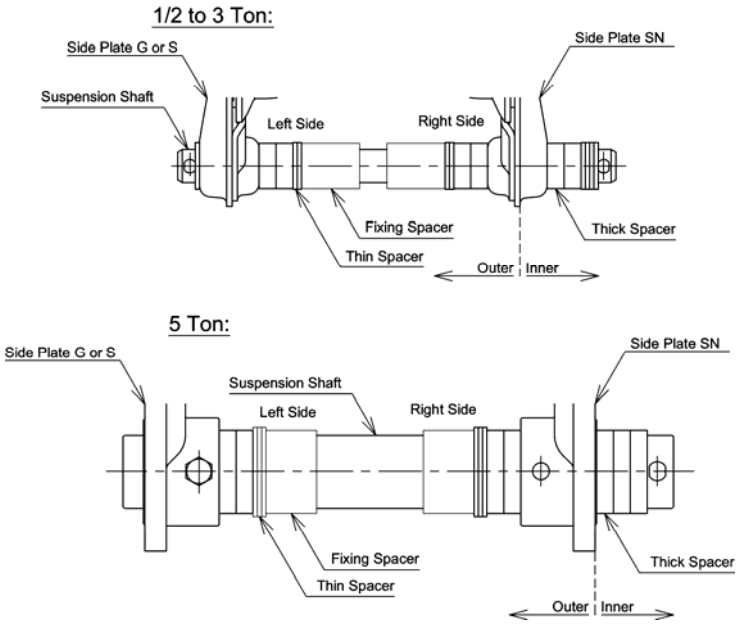


Figure 3-22 Adjusting the Trolley



Note: Inner Spacer rows on Table 3-2 list two numbers. First number is the quantity of spacers located on the left side of the Suspender or Suspension Plates, second number is the quantity on the right side.

Example: 1 + 2 ← Adjusting Spacers on the right side (Side Plate SN side)
↑ Adjusting Spacers on the left side (Side Plate G or S side)

Figure 3-23 Spacers Arrangement

Table 3-1 Suspension Shaft Adjusting Spacers								
Capacity (Tons)		Flange Range (in)	Total Number of Spacers Supplied					
			Thin	Thick	Fixing	Thick L	Balancing Collar (5 ton only)	
1/2		2.28 to 4.00	10	4	—	—	—	
		4.01 to 8.00	10	7	2	—	—	
		8.01 to 12.00	10	7	2	—	—	
1		2.28 to 5.00	9	6	—	—	—	
		5.01 to 8.00	10	5	2	—	—	
		8.01 to 12.00	10	7	2	—	—	
2		3.23 to 6.02	8	6	—	—	—	
		6.03 to 12.00	10	11	2	—	—	
3		3.23 to 6.02	11	9	—	—	—	
		6.03 to 12.00	10	11	2	—	—	
TF	5	3.94 to 7.02	8	3	—	2	—	
		7.03 to 12.00	8	11	—	2	2	
TS	5	3.94 to 7.02	8	5	—	—	—	
		7.03 to 12.00	8	9	2	—	—	

Table 3-2 Number of Adjusting Spacers

Beam Flange Width		(in)	2	2 5/16	2 1/2 / 2 5/8	2 7/8 / 2 15/16	3	3 1/4	3 9/16	3 7/8	3 15/16	4	4 3/16	4 15/16	4 7/16	4 11/16 / 4 3/4	4 15/16	5	5 3/16	5 5/16	5 3/8	5 1/2	5 5/8	5 7/8 / 5 15/16	6	6 1/8	6 5/16	6 7/16
Cap (Ton)	Spacer Type	(mm)	50	58	64 / 66	73 / 74	75 / 76	82	90 / 91	98	100	102	106	110	113	119 / 120	125	127	131	135	137	140	143	149 / 150	153	155	160	163
1/2	Thin	Inner	2+3	3+4	0+1	1+2	2+2	3+3	0+1	1+2	2+2	2+3	1+1	1+2	2+2	3+3	0+0	0+1	1+1	1+2	2+2	2+3	3+3	0+0	0+1	1+1	1+2	2+2
		Outer	4	2	8	6	5	3	8	6	5	4	7	6	5	3	9	8	7	6	5	4	3	9	8	7	6	5
	Thick	Inner	0+0	0+0	1+1	1+1	1+1	1+1	2+2	2+2	2+2	2+2	0+0	0+0	0+0	0+0	1+1	1+1	1+1	1+1	1+1	1+1	1+1	2+2	2+2	2+2	2+2	2+2
		Outer	4	4	2	2	2	2	0	0	0	0	7	7	7	7	5	5	5	5	5	5	5	3	3	3	3	3
	Fixing	Inner	-	-	-	-	-	-	-	-	-	-	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1 +1
I	Thin	Inner		3+3	0+0	1+1	1+2	2+3	0+0	1+1	1+2	1+2	2+3	3+3	3+4	0+1	1+2	2+2	1+1	1+2	2+2	2+3	3+3	0+0	0+1	1+1	1+2	2+2
		Outer		2	8	6	5	3	8	6	5	4	3	2	1	7	5	4	7	6	5	4	3	9	8	7	6	5
	Thick	Inner		0+0	1+1	1+1	1+1	1+1	2+2	2+2	2+2	2+2	2+2	2+2	2+2	3+3	3+3	3+3	0+0	0+0	0+0	0+0	0+0	1+1	1+1	1+1	1+1	1+1
		Outer		6	4	4	4	4	2	2	2	2	2	2	2	0	0	0	5	5	5	5	5	3	3	3	3	3
	Fixing	Inner		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1+1	1+1	1+1	1+1	1+ 1	1+1	1+1	1+1	1+1	1+1
2	Thin	Inner						2+2	3+4	6+1	1+1	1+2	2+2	2+3	3+3	0+0	1+1	1+2	2+2	2+3	3+3	3+4	0+0	1+1	1+2	1+1	1+2	2+2
		Outer						3	0	6	5	4	3	2	I	7	5	4	3	2	I	0	7	5	4	7	6	5
	Thick	Inner						0+0	0+0	1+1	1+1	1+1	1+1	1+1	1+1	2+2	2+2	2+2	2+2	2+2	2+2	2+2	3+3	3+3	3+3	0+0	0+0	0+0
		Outer						6	6	4	4	4	4	4	4	2	2	2	2	2	2	2	0	0	0	11	11	11
	Fixing	Inner									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1+1	1+1	1+1
3	Thin	Inner						1+2	3+3	0+0	0+1	1+1	1+2	2+2	2+3	3+4	0+1	1+1	1+2	2+2	2+3	3+3	3+4	1+4	1+5	1+1	1+2	2+2
		Outer						7	4	10	9	8	7	6	5	3	9	8	7	6	5	4	3	5	4	7	6	5
	Thick	Inner						2+2	2+2	3+3	3+3	3+3	3+3	3+3	3+3	3+3	4+4	4+4	4+4	4+4	4+4	4+4	4+4	5+4	5+4	0+0	0+0	0+0
		Outer						5	5	3	3	3	3	3	3	3	I	I	I	I	I	1	I	0	0	11	11	11
	Fixing	Inner						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1+1	1+1	1+1
5	Thin L	Inner															1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1
	Thin	Inner															0+0	0+1	1+1	1+2	2+2	2+3	3+3	0+0	0+1	1+1	1+2	2+2
		Outer															8	7	6	5	4	3	2	8	7	6	5	4
	Thick	Inner															0+0	0+0	0+0	0+0	0+0	0+0	1+1	1+1	1+1	1+1	1+1	1+1
		Outer															3	3	3	3	3	3	3	1	I	I	I	1
	Balanc-ing Collar	Inner															-	-	-	-	-	-	-	-	-	-	-	-

Table 3-2 Number of Adjusting Spacers (continued)

Beam Flange Width		(in)	6 11/16	6 7/8	7	7 1/16 / 7 1/8	7 1/4 / 7 5/16	7 7/8	8	8 7/8	8 11/16	9	9 1/8	9 7/8	10	10 1/8	10 1/4	10 3/8	10 1/2	11	11 1/8	11 1/4	11 3/8	11 5/8	11 3/4	11 13/16	11 7/8	12
Cap (Ton)	Spacer Type	(mm)	170	175	178	180 / 181	184 / 185	200	203	215.	220	229	232	250	254	257	260	264	267	279	283	286	289	295	298	300	302	305
1/2	Thin	Inner	3+3	0+0	0+1	1+1	1+2	4+4	4+5	2+3	3+3	4+5	1+1	0+0	0+1	1+1	1+2	2+2	3+3	4+5	1+1	1+2	2+2	3+3	3+4	4+4	4+5	4+5
		Outer	3	9	8	7	6	1	0	4	3	0	7	9	8	7	6	5	4	0	7	6	5	3	2	1	0	3
	Thick	Inner	2+2	3+3	3+3	3+3	3+3	3+3	3+3	0+0	0+0	0+0	1+1	2+2	2+2	2+2	2+2	2+2	2+2	2+2	3+3	3+3	3+3	3+3	3+3	3+3	3+3	4+3
		Outer	3	I	I	1	1	1	1	7	7	7	5	3	3	3	3	3	3	3	1	1	1	1	1	1	1	0
	Fixing	Inner	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1
I	Thin	Inner	3+3	0+0	0+1	1+1	1+2	4+4	4+5	2+3	3+3	4+5	1+1	0+0	0+1	1+1	1+2	2+2	2+3	4+5	1+1	1+2	2+2	3+3	3+4	4+4	4+5	1+5
		Outer	3	9	8	7	6	1	0	4	3	0	7	9	8	7	6	5	4	0	7	6	5	3	2	1	0	3
	Thick	Inner	1+1	2+2	2+2	2+2	2+2	2+2	2+2	0+0	0+0	0+0	1+1	2+2	2+2	2+2	2+2	2+2	2+2	2+2	3+3	3+3	3+3	3+3	3+3	3+3	3+3	4+3
		Outer	3	1	I	1	1	1	1	7	7	7	5	3	3	3	3	3	3	3	1	1	1	1	1	1	1	0
	Fixing	Inner	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1
2	Thin	Inner	3+3	0+0	0+1	1+1	1+2	0+0	0+1	2+3	3+3	4+5	1+1	0+0	0+1	1+1	1+2	2+2	2+3	4+5	1+1	1+2	2+2	3+3	3+4	4+4	4+5	1+5
		Outer	3	9	8	7	6	9	8	4	3	0	7	9	8	7	6	5	4	0	7	6	5	3	2	1	0	3
	Thick	Inner	0+0	1+1	1+1	1+1	1+1	2+2	2+2	2+2	2+2	2+2	3+3	4+4	4+4	4+4	4+4	4+4	4+4	4+4	5+5	5+5	5+5	5+5	5+5	5+5	5+5	6+5
		Outer	11	9	9	9	9	7	7	7	7	7	5	3	3	3	3	3	3	3	1	1	1	1	1	1	1	0
	Fixing	Inner	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1
3	Thin	Inner	3+3	0+0	0+0	1+1	1+2	0+0	0+1	2+3	3+3	4+5	1+1	0+0	0+1	1+1	1+2	2+2	2+3	4+5	1+1	1+2	2+2	3+3	3+4	4+4	4+5	1+5
		Outer	3	9	8	7	6	9	8	4	3	0	7	9	8	7	6	5	4	0	7	6	5	3	2	1	0	3
	Thick	Inner	0+0	1+1	1+1	1+1	1+1	2+2	2+2	2+2	2+2	2+2	3+3	4+4	4+4	4+4	4+4	4+4	4+4	4+4	5+5	5+5	5+5	5+5	5+5	5+5	5+5	5+6
		Outer	11	9	9	9	9	7	7	7	7	7	5	3	3	3	3	3	3	3	1	1	1	1	1	1	1	0
	Fixing	Inner	1+1	1+1	1+ 1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1
5	Thin L	Inner	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1
	Thin	Inner	3+3	0+4	4+4	1+1	1+2	0+0	0+1	2+3	3+3	0+1	1+1	0+0	0+1	1+1	1+2	2+2	2+3	0+1	1+1	1+2	2+2	3+3	3+4	4+4	1+4	1+5
		Outer	2	4	3	6	5	8	7	3	2	7	6	8	7	6	5	4	3	7	6	5	4	2	1	0	3	2
	Thick	Inner	1 +1	2+1	2+1	0	0	1+1	1+1	1+1	1+1	2+2	2+2	4+4	4+4	4+4	4+4	4+4	4+4	5+5	5+5	5+5	5+5	5+5	5+5	5+5	6+5	6+5
		Outer	I	0	0	11	11	9	9	9	9	7	7	3	3	3	3	3	3	1	1	1	1	1	1	1	1	0
	Balancing Collar	Inner	-	-	-	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1

3.4 Mounting Location

3.4.1 **⚠WARNING** Prior to mounting the trolley (and hoist) ensure that the trolley beam and its supporting structure are adequate to support the trolley, hoist and its loads. If necessary consult a professional that is qualified to evaluate the adequacy of the suspension location and its supporting structure.

3.4.2 **NOTICE** See Section 6.3 for outdoor installation considerations.

3.5 Installation of Trolley onto Beam

3.5.1 Assemble and adjust the trolley before attempting to install the trolley on the beam.

3.5.2 Preferred Method – Sliding the trolley connected with an electric chain hoist onto the traversing beam from the beam end is the most convenient and recommended method. If the trolley can be mounted from the end of the beam then: Remove the trolley end-stop from the beam and set the trolley on the beam from the end. Securely re-install the trolley end stop on the beam.

3.5.3 Optional Method for Trolleys – If the trolley cannot be mounted from the end of the beam, complete the installation as follows:

1) Remove the Shaft Stopper Pin from Suspension Shaft (See Figure 3-24).
2) If possible remove the outside Adjusting spacers and Reinsert the Shaft Stopper Pin. Spread the trolley side plates apart.
3) Lift the trolley onto the beam so that Side Plate S or G rests on the beam's flange.
4) Hold Side Plate S or G securely so that it does not come off the beam then push the side plates together so that all four wheels rest on the beam's flange.
5) Replace the Outside Adjusting Spacers and the Shaft Stopper Pin. Insert Split Pin, Bend the Split Pin securely.

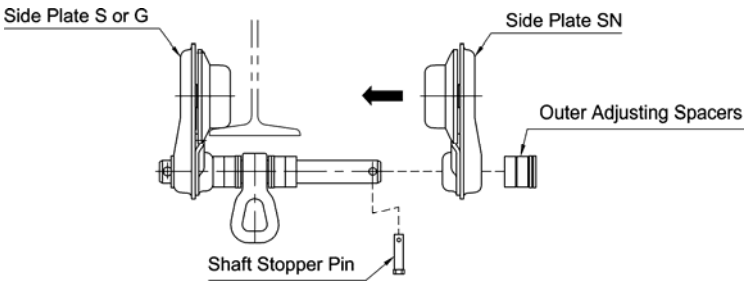


Figure 3-24 Optional trolley installation method

3.6 Electrical/Air Connections

3.6.1 This instruction applies to a Harrington Powered hoist attached to a Push or Geared Trolley. Refer to the appropriate hoist's owners manual for the Electrical or Air connections.

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

3.6.3 **⚠ DANGER** Before proceeding, ensure that the air supply for the hoist has been de-energized (disconnected). Lock out and tag out in accordacne with ANSI Z244.1 "Personnel Protection-Lockout of Energy Sources".

Power Supply Cable/Air Supply – Installation

Cable must be installed along the beam that the trolley runs on. For curved beams a special cable suspension system will be needed, and this instruction does not apply. For straight beams install the power supply cable as follows:

- Install a guide wire system parallel to the beam. (See Figure 3-25)
- The guide wire should be positioned slightly outside the hoist's Cable Support.
- Use the Cable Trolleys supplied with the hoist to suspend the Power Supply Cable/Air Supply Hose from the guide wire. Space the Cable Trolleys every 5 feet.
- Make sure the Guide Wire is properly tensioned and the Power Supply Cable/Air Supply Hose is not twisted or kinked.

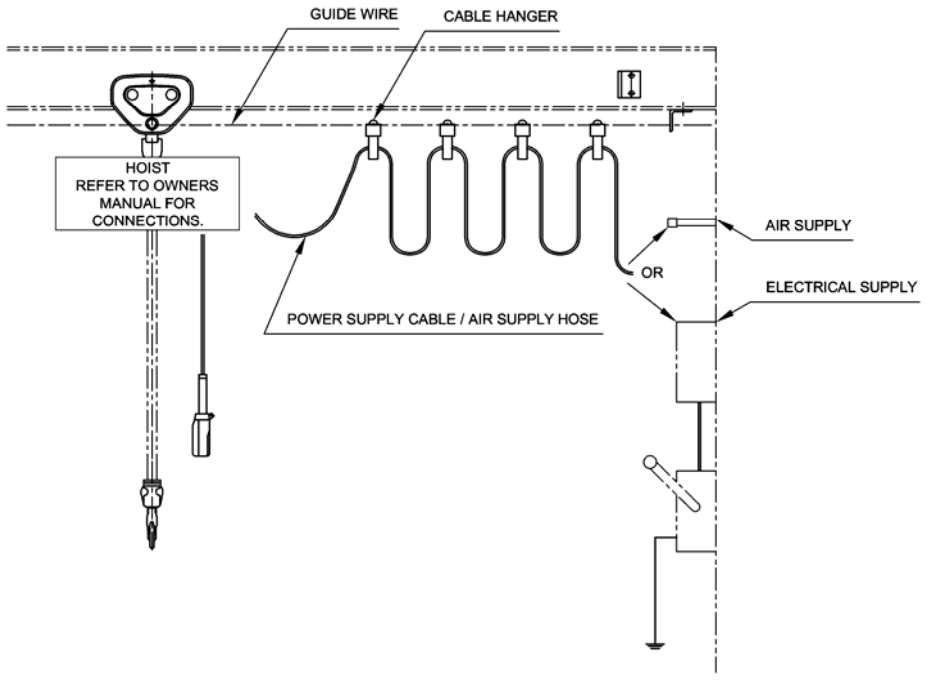


Figure 3-25 Power Supply Cable/Air Supply Hose installation and Guide Wire location.

3.7 Pre-operational Checks and Trial Operation

3.7.1 Refer to the trolley's Nameplate and record the Code, Lot and Serial Number in the space provided on the cover of this manual.

3.7.2 Refer to the hoist's owner's manual and perform all pre-operational checks for the hoist.

3.7.3 Perform pre-operational checks for the trolley:

- **⚠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.
- 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.

3.7.4 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 trolley's (and hoist's) operation.

3.7.5 Proceed with trial operation to confirm proper operation.

- Operate the trolley though it's full range of motion. Make sure the trolley runs smoothly and does not bind. If applicable check the power/Air supply and festoon system for proper operation
- Perform inspections per Section 5.3, "Frequent Inspections".

4.0 Operation

4.1 Introduction

⚠ DANGER

DO NOT WALK UNDER A SUSPENDED LOAD

⚠ WARNING

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

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

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

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

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

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

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

NOTICE

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

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

4.2 Shall's and Shall Not's for Operation

⚠ WARNING

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

- **NOT** lift more than rated load for the hoist.
- **NOT** operate unless load is centered under hoist.
- **NOT** use damaged hoist or hoist that is not working properly.
- **NOT** use hoist with twisted, kinked, damaged, or worn chain.
- **NOT** use hoist if the bottom hook is capsized (double fall hoists - see **Section 3.2**).
- **NOT** use the hoist to lift, support, or transport people.
- **NOT** lift loads over people.
- **NOT** apply load unless load chain is properly seated in the load sheave (and idle sheave for hoist with two chain falls).
- **NOT** use the hoist in such a way that could result in shock or impact loads being applied to the hoist.
- **NOT** attempt to lengthen the load chain or repair damaged load chain.
- **NOT** operate hoist when it is restricted from forming a straight line from hook to hook in the direction of loading.
- **NOT** use load chain as a sling or wrap load chain around load.
- **NOT** apply the load to the tip of the hook or to the hook latch.
- **NOT** apply load if binding prevents equal loading on all load-supporting chains.
- **NOT** operate beyond the limits of the load chain travel.
- **NOT** operate hoist with missing/damaged chain springs, cushion rubbers, stoppers or striker plates.
- **NOT** leave load supported by the hoist unattended unless specific precautions have been taken.
- **NOT** allow the chain, or hook to be used as an electrical or welding ground.
- **NOT** allow the chain, or hook to be touched by a live welding electrode.
- **NOT** remove or obscure the warnings on the hoist.
- **NOT** operate a hoist on which the safety placards or decals are missing or illegible.
- Be familiar with operating controls, procedures, and warnings.
- Make sure the unit is securely attached to a suitable support before applying load.
- Make sure load slings or other approved single attachments are properly sized, rigged, and seated in the hook saddle.
- Take up slack carefully - make sure load is balanced and load-holding action is secure before continuing.
- Make sure all persons stay clear of the supported load.
- Protect the hoist's load chain from weld splatter or other damaging contaminants.
- Report Malfunctions or unusual performances (including unusual noises) of the hoist and remove the hoist from service until the malfunction or unusual performance is resolved.
- Make sure hoist limit switches function properly.
- Warn personnel before lifting or moving a load.
- Warn personnel of an approaching load.

⚠ CAUTION

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

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

4.3 Trolley Controls

4.3.1 For Plain Trolley, movement is controlled by pushing/pulling on the load or the hook of the attached hoist.

4.3.2 For Geared Trolley, when facing Trolley Hand Wheel:

- Pull down on the right side of Hand Chain (Clockwise Rotation) to move the Trolley left.
- Pull down on the left side of Hand Chain (Counterclockwise Rotation) to move the Trolley right.

4.3.3 **⚠ CAUTION** Avoid collisions with the end stops or other Trolleys. Damage may result.

5.0 Inspection

5.1 General

5.1.1 The inspection procedure herein is based on ANSI/ASME B30.16. The following definitions are from ANSI/ASME B30.16 and pertain to the inspection procedure below.

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

5.2 Inspection Classification

5.2.1 Initial Inspection - prior to initial use, all new, re-installed, altered, or modified 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 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 trolley and the degree of their exposure to wear, deterioration, or malfunction. The two general classifications are herein designated as FREQUENT and PERIODIC, with respective intervals between inspections as defined below.

5.2.3 FREQUENT Inspection - visual examinations by the operator or other designated personnel with intervals per the following criteria:

- Normal service - monthly
- Heavy service - weekly to monthly
- Severe service - daily to weekly
- Special or infrequent service - as recommended by a qualified person before and after each occurrence.

5.2.4 PERIODIC Inspection - visual inspection by a designated person with intervals per the following criteria:

- Normal service - yearly
- Heavy service - semiannually
- Severe service – quarterly
- Special or infrequent service - as recommended by a qualified person before the first such occurrence and as directed by the qualified person for any subsequent occurrences.

5.3 Frequent Inspection

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

Table 5-1 Frequent Inspection
All functional operating mechanisms for proper operation, proper adjustment, and unusual sounds.
Connection points between Hoist and Trolley in accordance with ANSI/ASME B30.16
Hook(s) and hook latches in accordance with ANSI/ASME B30.10
Hoist(s) attached to Trolley in accordance with ANSI/ASME B30.16

5.4 Periodic Inspection

5.4.1 Inspections should be made on a PERIODIC basis in accordance with Table 5-2, "Periodic Inspection." Evaluation and resolution of the results of PERIODIC Inspections shall be made by a designated person such that the trolley is maintained in safe working condition.

5.4.2 For inspections where load suspension parts of the trolley are disassembled, a load test per ANSI/ASME B30.16 must be performed on the trolley after it is re-assembled and prior to its return to service.

Table 5-2 Periodic Inspection
Requirements of frequent inspection.
Loose or missing bolts, nuts, pins or rivets.
Worn, cracked, or distorted parts such as pins, bearings, wheels, shafts, gears, rollers, yokes, and bumpers.
Function, instruction and warning labels for legibility and placement.

5.5 Occasionally Used Trolleys

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

- Trolley Idle More Than 1 Month, Less Than 1 Year: Inspect per FREQUENT Inspection criteria in Section 5.3.
- Trolley 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 trolley.

5.7 Inspection Methods and Criteria

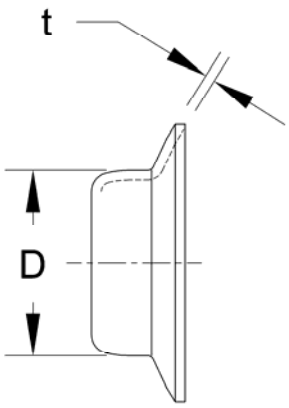
5.7.1 This section covers the inspection of specific items. The list of items in this section is based on those listed in ANSI/ASME B30.16 for Frequent and Periodic Inspection. In accordance with ANSI/ASME B30.16, these inspections are not intended to involve disassembly of the trolley. Rather, disassembly 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 trolley.

Table 5-3 Trolley Inspection Methods and Criteria

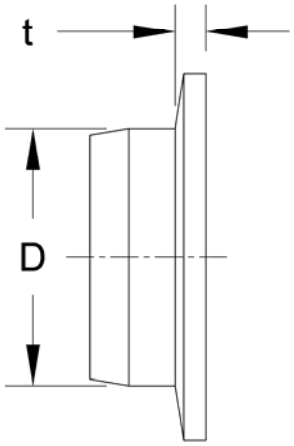
Item	Method	Criteria	Action
Functional operating mechanisms.	Visual, Auditory	Mechanisms should be properly adjusted and should not produce unusual sounds when operated.	Repair or replace as required.
Housing and Mechanical Components	Visual, Auditory, Vibration, Function	Trolley components including, suspension shafts, track wheels, track wheel axles, clevises, connection yokes, suspension bolts, 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.
Side Plates	Visual	Must be free of significant deformation	Replace.
Bolts, Nuts, Snap Rings, and Split Pins	Visual, Check with Proper Tool	Bolts, nuts, snap rings and split pins should not be loose.	Tighten or replace as required.
Track Wheel - Tread	Visual, Measure	Diameter of the inside and outside tread surface should not be less than the discard value shown in **Table 5-4**.	Replace.
Track Wheel - Gear	Visual	Teeth should not be cracked, damaged, or excessively worn.	Replace.
Suspension Shaft	Visual, Measure	Suspension shaft should not be bent. Diameter should not be worn by 10% or more.	Replace.
Suspenders	Visual, Measure	Never use the suspender if its dimension of D2 – D1, d or h exceed the limits of **Table 5-5**.	Replace.
Cable Hangers	Visual	Cable Hangers should not be damaged or significantly worn. Movement should be smooth and should not cause the Power Supply Cable to twist or kink.	Repair or replace as necessary.
Pendant - Labels	Visual	Labels denoting functions should be legible.	Replace.
Warning Labels	Visual	Warning Labels should be affixed to the pendant cord (see **Section 1.2**) and they should be legible.	Replace.
Trolley Capacity Label	Visual	The label that indicates the capacity of the trolley should be legible and securely attached to the trolley.	Replace.

Table 5-4 Track Wheel Wear Dimensions

1 to 3 Ton:



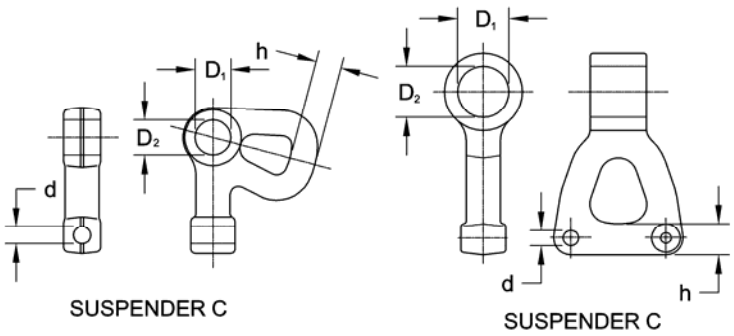
5 Ton:



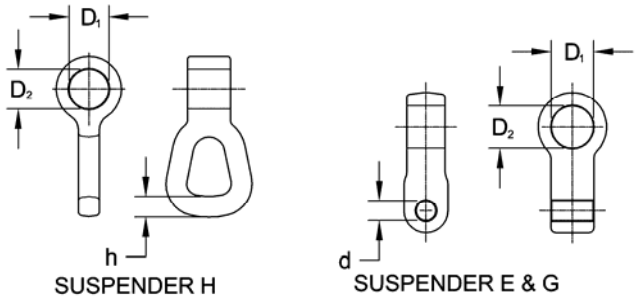
Note: Track wheels are for flat and tapered flanges.

Capacity (Ton)	"d" Dimension inch (mm)		"D" Dimension inch (mm)	
	Standard	Discard	Standard	Discard
1/2	2.36 (60)	2.30 (58.5)	0.126 (3.2)	0.098 (2.5)
1	2.80 (71)	2.74 (69.5)	0.157 (4.0)	0.130 (3.3)
2	3.35 (85)	3.29 (83.5)	0.177 (4.5)	0.150 (3.8)
3	3.94 (100)	3.88 (98.5)	0.197 (5.0)	0.169 (4.3)
5	4.65 (118)	4.41 (112)	0.378 (9.6)	0.264 (6.7)

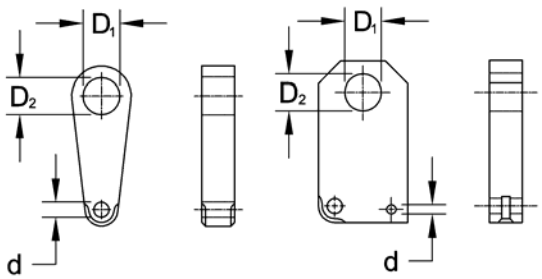
Table 5-5 Suspender Wear Measurements



Hoist Type	Trolley Capacity	Hoist Applied Capacity	D1 — D2 Limit	d in. (mm)		h in. (mm)	
				Standard	Limit	Standard	Limit
CF or CB	1/2	1/2	0.04 (1)	0.48 (12.2)	0.512 (13.0)	0.551 (14.0)	0.492 (12.5)
	1	1/2, 1				0.709 (18.0)	0.63 (16.0)
	2	1 1/2, 2		0.64 (16.2)	0.669 (17.0)	0.866 (22.0)	0.787 (20.0)
	3	2 1/2	0.06 (1.5)			1.063 (27.0)	0.945 (24.0)
		3		0.646 (16.4)		0.945 (24.0)	0.846 (21.5)
	5	5				1.299 (33.0)	1.181 (30.0)



Trolley Capacity	D2 – D1 Limit	h		d	
		Standard in. (mm)	Limit in. (mm)	Standard in. (mm)	Limit in. (mm)
1/2	0.04 (1)	0.40 (10)	0.33 (8.5)	0.48 (12.2)	0.51 (13)
1		0.51 (13)	0.45 (11.5)	0.49 (12.5)	
2		0.75 (19)	0.67 (17)	0.80 (20.2)	0.83 (21)
3	0.06 (1.5)	0.87 (22)	0.79 (20)		
5		–	–	1.11 (28.2)	1.18 (30)



TCR SUSPENDER

Trolley Capacity	D2 – D1 Limit	d	
		Standard in. (mm)	Limit in. (mm)
1/4	0.04 (1)	0.51 (13)	0.55 (13.9)
1/2 – 1			
2			
3	0.06 (1.5)	0.80 (20)	0.82 (20.8)

6.0 Maintenance & Handling

6.1 Lubrication

6.1.1 Lubricate the following trolley components with NLGI (National Lubricating Grease Institute) #2 or equivalent grease.

6.1.2 Track Wheel Gear – Clean and re-grease the Track Wheel gears and Hand Wheel output pinion every three months (more frequently for heavier usage or severe conditions). Do not use an excessive amount of grease and avoid getting any grease on the running surfaces of the Track Wheels or the beam.

6.1.3 Trolley Wheel Bearings do not need to be lubricated and must be replaced if worn or damaged.

6.1.4 Suspension Pins, Bolts and Shafts – Grease at least twice per year for normal usage (more frequently for heavier usage or severe conditions).

6.2 Storage

6.2.1 The storage location should be clean and dry.

6.3 Outdoor Installation

6.3.1 For trolley and hoist installations that are outdoors, the trolley and hoist should be covered and protected from the weather when not in use.

6.3.2 Possibility of corrosion on components of the trolley increases for installations where salt air and high humidity are present. The trolley may require more frequent lubrication. Make frequent and regular inspections of the unit's condition and operation.

7.0 Warranty

Warranty explanation and terms.

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

Manual Hoists & Trolleys - 2 years

Air and Electric Powered Hoists, Trolleys, and Crane Components - 1 year

Spare / Replacement Parts - 1 year

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. 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.

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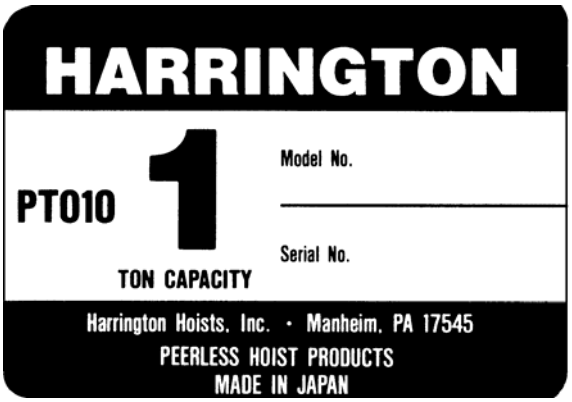
8.0 1/2 to 5 Ton Parts List

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

Reminder: Per sections 1.1 and 3.5.1 to aid in ordering Parts and Product Support, record the Hoist code number, lot number and serial number in the space provided on the cover of this manual.



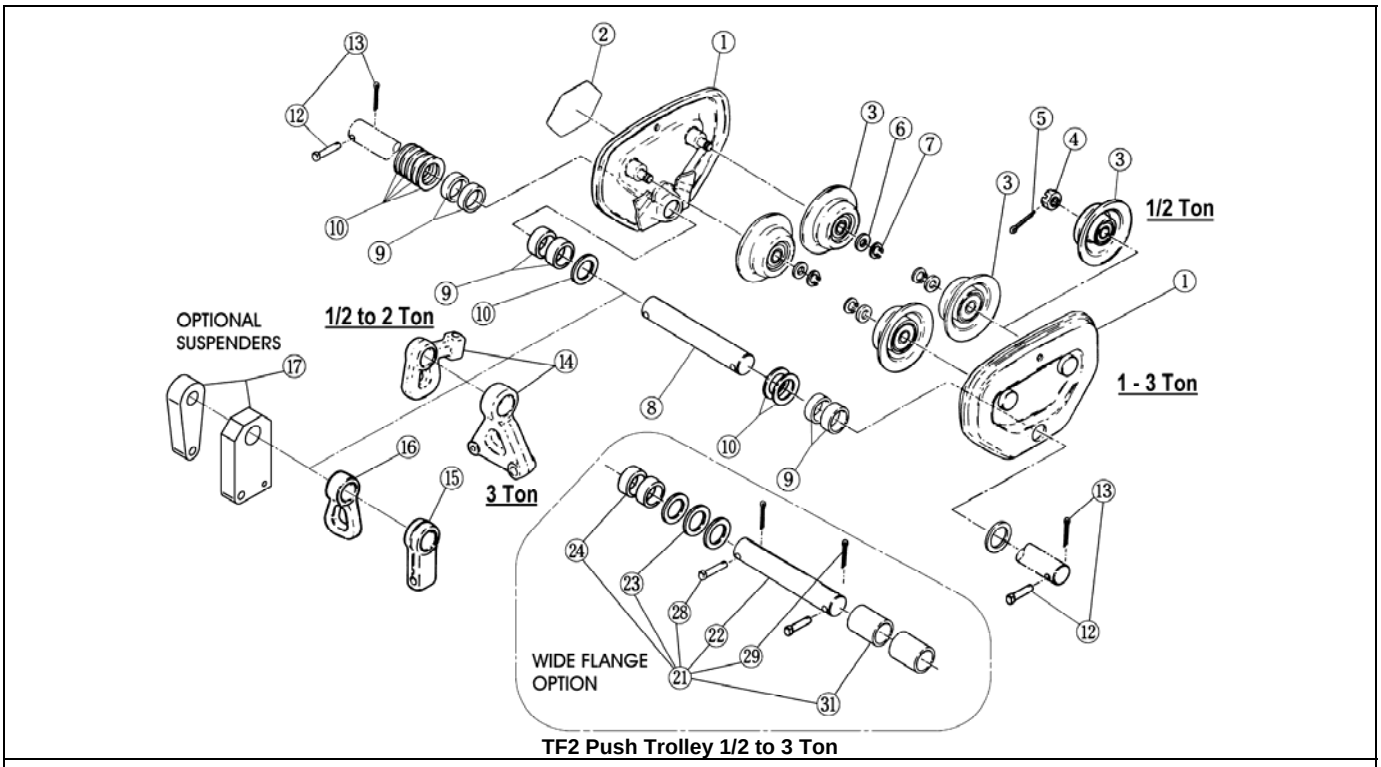
TF2/TS2 Series Nameplate

The parts list is arranged into the following sections:

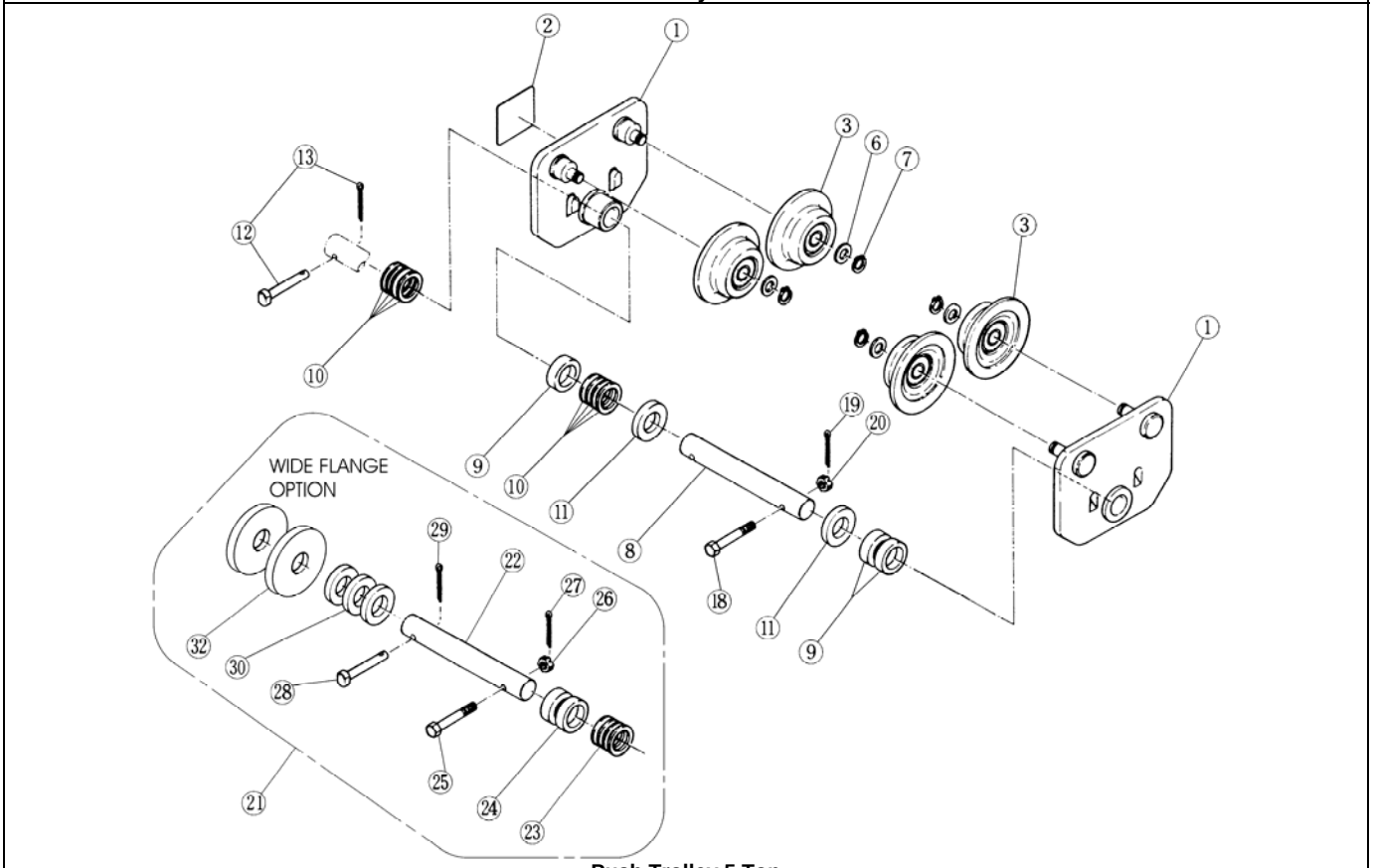
In the column "Parts Per Trolley" a designator is used for parts that apply only to a particular model or option.

Refer to Section 2 for TF2/TS2 Trolley model numbers and additional descriptions.

8.1 TF2 Push Trolley Parts



TF2 Push Trolley 1/2 to 3 Ton



Push Trolley 5 Ton

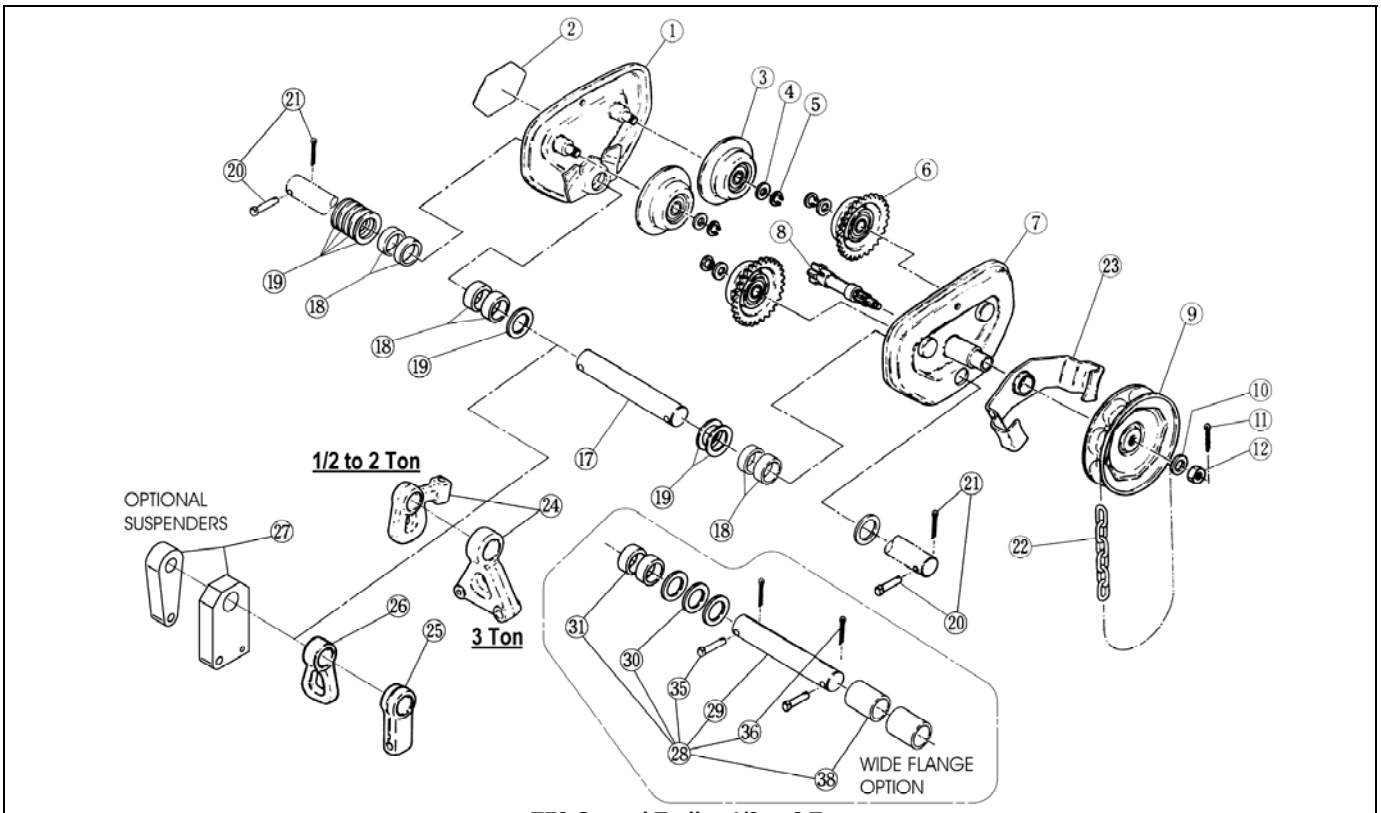
Figure 8-1 TF2 Push Trolley

8.1 TF2 Push Trolley Parts

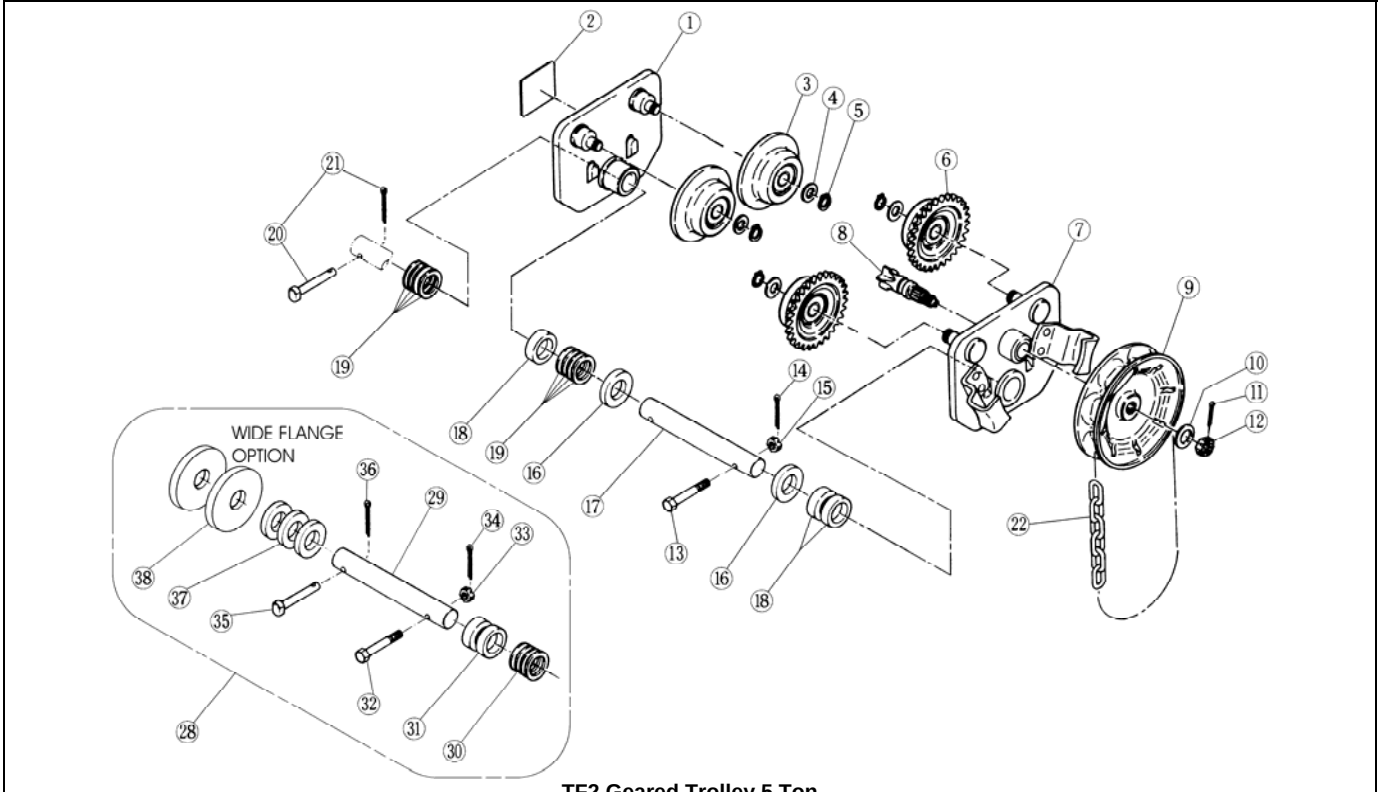
Figure No.	Part Name	Parts Per Trolley		1/2 Ton	1 Ton	2 Ton	3 Ton	5 Ton
1	Side Plate S Assembly	2		T6G5112005	T6G5112010	T6G5112020	T6G5112030	T3P110050
2	Name plate B	1		T6G800005P	T6G800010P	T6G800020P	T6G800030P	T3P800050
3	Track wheel S Assembly	4		T6G5102005	T6G5102010	T6G5102020	T6G5102030	T3P1102050
4	Slotted nut	4		L3183008				
5	Split pin	4		9009413				
6	Track wheel washer	4			MS104010	MS104020	MS104030	MS104050
7	Snap ring	4			9047115	9047120	9047125	9047135
	Suspension shaft assembly Standard	1		T7G1115005	T7G1115010	T7G1115020	T7G1115030	T6G1115050
8	Suspension shaft	1		T7G115005	T7G115010	T7G115020	T7G115030	T6G115050
9	Thick spacer (qty)	X		T7G116005(4)	T7G116010(6)	T7G116020(6)	T7G116030(9)	T6G116050(3)
10	Thin spacer (qty)	X		T7G117005(10)	T7G117010(9)	T7G117020(8)	T7G117030(11)	T6G120050(8)
11	Thin Spacer L	2						T6G119050
12	Shaft stopper pin	2*		T6G156005	T6G156010	T6G156020	MS164020	MS164030
13	Split pin	2*		9009424		9009432		
14	Suspender C	1		T7GC004005	T7GC004010	T7GC004020	T7GC004030 (T7GCO04025)**	
15	Suspender E & G	1		T7GB004005	T7GB004010	T7GB004020	T7GB004030	
16	Suspender H	1		T6G019005	T6G019010	T6G019020	T6G019030	
17	TCR Suspender	1		6040204	60403 (1 Fall Chain) 6040201 (2 Fall Chain)	6040401	TF26K531030S	
18	Bolt Assembly	1						T3P153050
19	Split pin	1						9009424
20	Slotted nut	1						T3P154050
21	Suspension Shaft Assembly Extended	1		T7PD136005 {4.01 to 8.00”} T7PD181005 {8.01 to 12.00”}	T7GD136010 {5.01 to 8.00”} T7GD181010 {8.01 to 12.00”}	T7GD181020 {6.03 to 12.00”}	T7GD181030 {6.03 to 12.00”}	T6GD181050 {7.03 to 12.00”}
22	Suspension Shaft	1		T7PA0059136 {4.01 to 8.00”} T7PA0059181 {8.01 to 12.00”}	T7GA0109136 {5.01 to 8.00”} T7GA0109181 {8.01 to 12.00”}	T7GA0209181 {6.03 to 12.00”}	T7GA0309181 {6.03 to 12.00”}	T6GA0509181 {7.03 to 12.00”}
23	Thin Spacer	X		T7G117005 (10)	T7G117010 (10)	T7G117020 (10)	T7G117030 (10)	T6G120050 (8)
24	Thick Spacer	X		T7G116005 (7)	T7G116010 {5.01 to 8.00”}-(5) {8.01 to 12.00”}-(7)	T7G116020 (11)	T7G116030 (11)	T6G116050 (11)
25	Bolt Assembly	1						T3P153050
26	Slotted Nut	1						T3P154050
27	Split Pin	1						9009424
28	Shaft Stopper Pin	*2		T6G156005	T6G156010	T6G156020	MS164020	MS164030
29	Split pin	*2		9009424		9009432		
30	Thin Spacer L	2						T6G119050
31	Fixing spacer	2		T7PA0059137 {4.01 to 8.00”} T7PA0059182 {8.01 to 12.00”}	T7GA0109137 {5.01 to 8.00”} T7GA0109182 {8.01 to 12.00”}	T7GA0209182	T7GA0309182	
32	Balancing Collar	2						T3GA0509137

* Quantity is 1 for 5 Ton.
** Suspender for use with model CB025, 2 ½ Ton.

8.2 TF2 Geared Trolley Parts



TF2 Geared Trolley 1/2 to 3 Ton



TF2 Geared Trolley 5 Ton
Figure 8-2

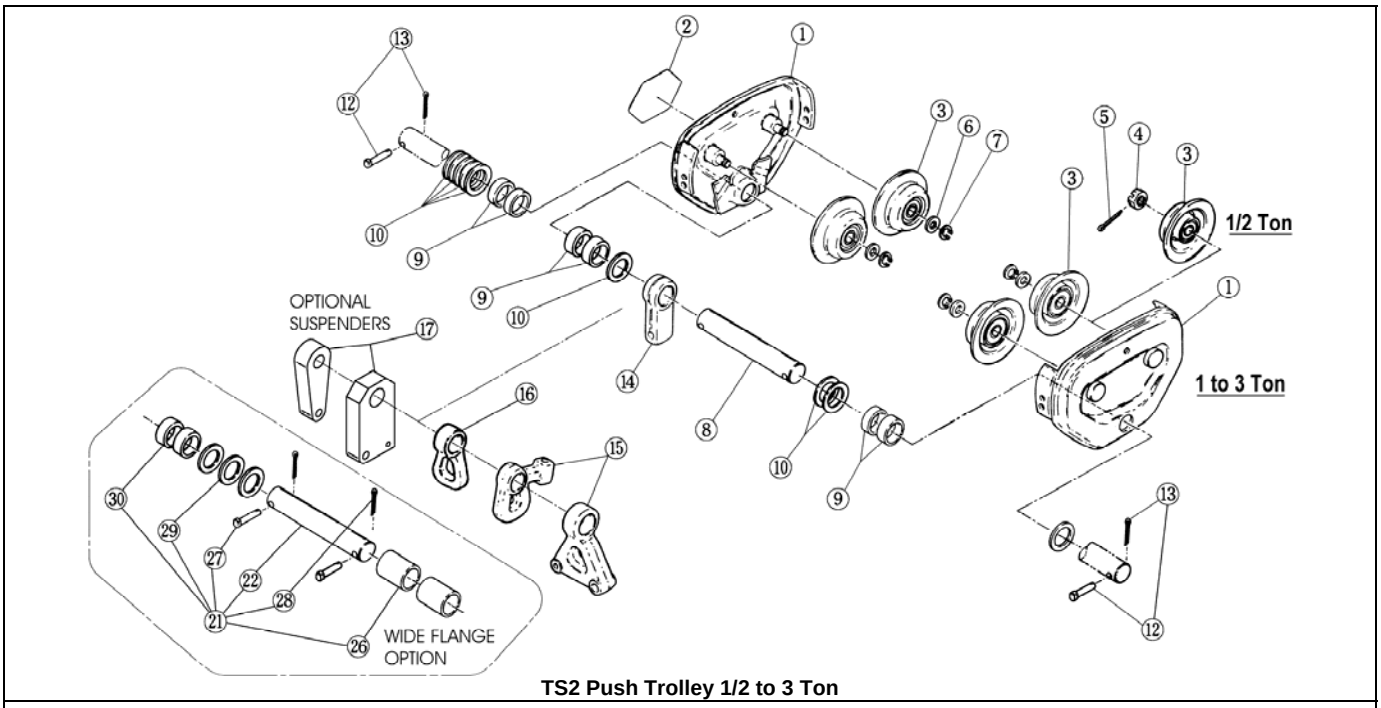
8.2 TF2 Geared Trolley Parts

Figure No.	Part Name	Parts Per Trolley		1 Ton	2 Ton	3 Ton	5 Ton
1	Sideplate S Assembly	1		T6G5112010	T6G5112020	T6G5112030	T3P110050
2	Name plate B	1		T6G800010G	T6G800020G	T6G800030G	T3G800050
3	Track wheel S Assembly	2		T6G5102010	T6G5102020	T6G5102030	T3P1102050
4	Track wheel washer	4		MS104010	MS104020	MS104030	MS104050
5	Snap ring	4		9047115	9047120	9047125	9047135
6	Track wheel G Assembly	2		T6G5101010	T6G5101020	T6G5101030	T3G1101050
7	Sideplate G Assembly	1		T6G5111010	T6G5111020	T6G5111030	T3G5111050
8	Pinion	1		T7GC121010	T7GB121020		T3G121020
9	Hand wheel	1		T6G123010			T3G123010
10	Washer	1		9012515			
11	Split pin	1		9009424			
12	Lever nut	1		L4082090			T3G259010
13	Bolt Assembly	1					T3P153050
14	Split pin	1					9009424
15	Slotted nut	1					T3P154050
16	Thin Spacer L	2					T6G119050
	Suspension shaft assembly Standard	1		T7G1115010	T7G1115020	T7G1115030	T6G1115050
17	Suspension shaft	1		T7G115010	T7G115020	T7G115030	T6G115050
18	Thick spacer (qty)	X		T7G116010(6)	T7G116020(6)	T7G116030(9)	T6G116050(3)
19	Thin spacer (qty)	X		T7G117010(9)	T7G117020(8)	T7G117030(11)	T6G120050(8)
20	Shaft stopper pin	2		T6G156010	T6G156020	MS164020	MS164030
21	Split pin	2		9009424	9009432		
22	Hand chain	1		HCCF005			
23	Hand chain guide Assembly	1		T6G5121010			
24	Suspender C	1		T7GC004010	T7GC004020	T7GC004030 (T7GCO04025)**	
25	Suspender E	1		T7GB004010	T7GB004020	T7GB004030	
26	Suspender H	1		T6G019010	T6G019020	T6G019030	
27	TCR Suspender	1		60403 (1 Fall Chain) 6040201(2 Fall Chain)	6040401	TF26K531030S	
28	Suspension Shaft Assembly Extended	1		T7GD136010 {5.01 to 8.00"} T7GD181010 {8.01 to 12.00"}	T7GD181020 {6.03 to 12.00"}	T7GD181030 {6.03 to 12.00"}	T6GD181050 {7.03 to 12.00"}
29	Suspension Shaft	1		T7GA0109136 {5.01 to 8.00"} T7GA0109181 {8.01 to 12.00"}	T7GA0209181 {6.03 to 12.00"}	T7GA0309181 {6.03 to 12.00"}	T6GA0509181 {7.03 to 12.00"}
30	Thin Spacer	X		T7G117010 (10)	T7G117020 (10)	T7G117030 (10)	T6G120050 (8)
31	Thick Spacer	X		T7G116010 {5.01 to 8.00"}-(5) {8.01 to 12.00"}-(7)	T7G116020 (11)	T7G116030 (11)	T6G116050 (11)
32	Bolt	1					T3P153050
33	Nut	1					T3P154050
34	Split Pin	1					9009424
35	Shaft Stopper Pin	*2		T6G156010	T6G156020	MS164020	MS164030
36	Split Pin	*2		9009424	9009432		
37	Thin Spacer L	2					T6G119050
38	Fixing Spacer	2		T7GA0109137 {5.01 to 8.00"} T7GA0109182 {8.01 to 12.00"}	T7GA0209182	T7GA0309182	
39	Balancing Collar	2					T3GA0509137

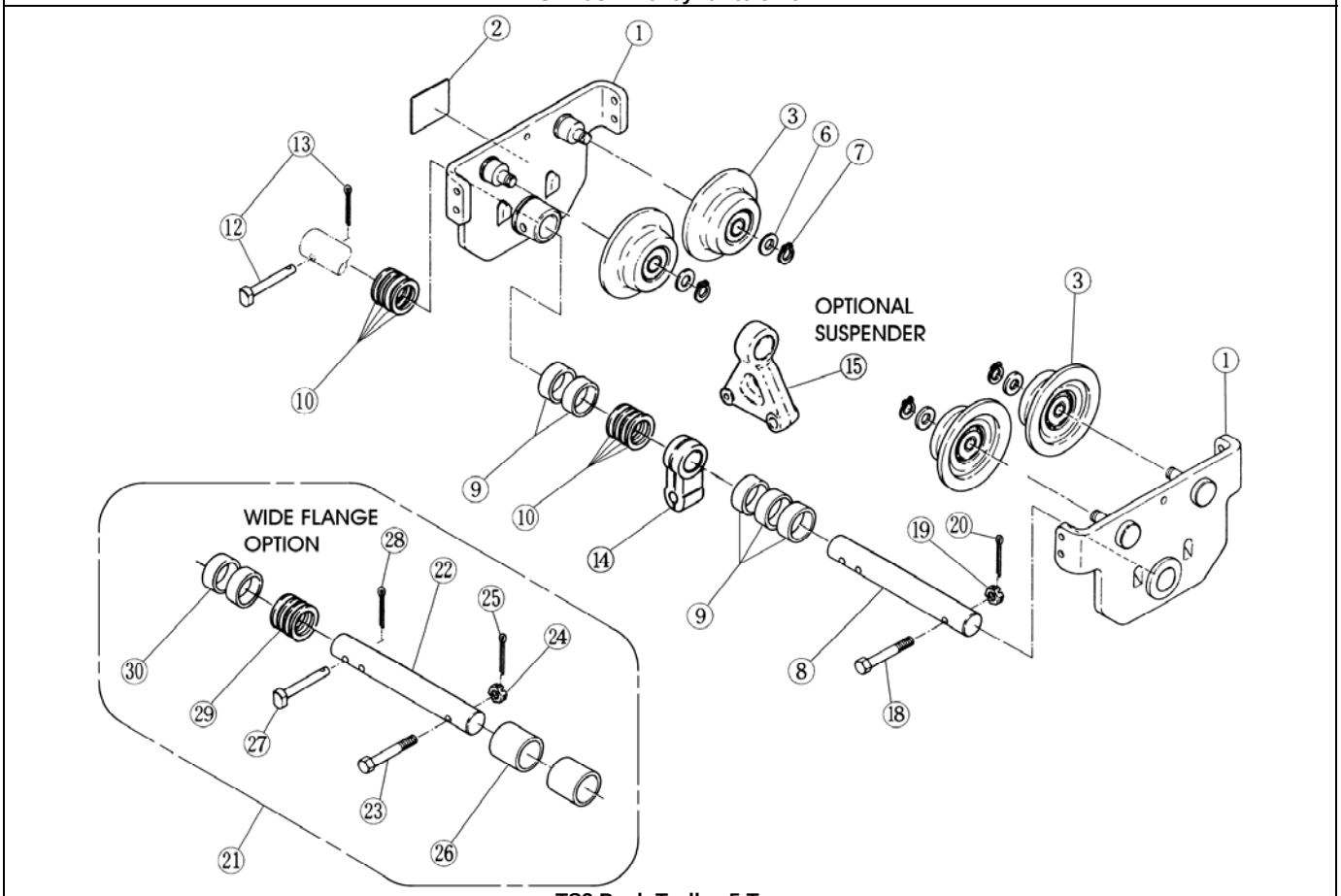
* Quantity is 1 for 5 Ton.

** Suspender for use with model CB025, 2 ½ Ton.

8.3 TS2 Push Trolley Parts



TS2 Push Trolley 1/2 to 3 Ton



TS2 Push Trolley 5 Ton

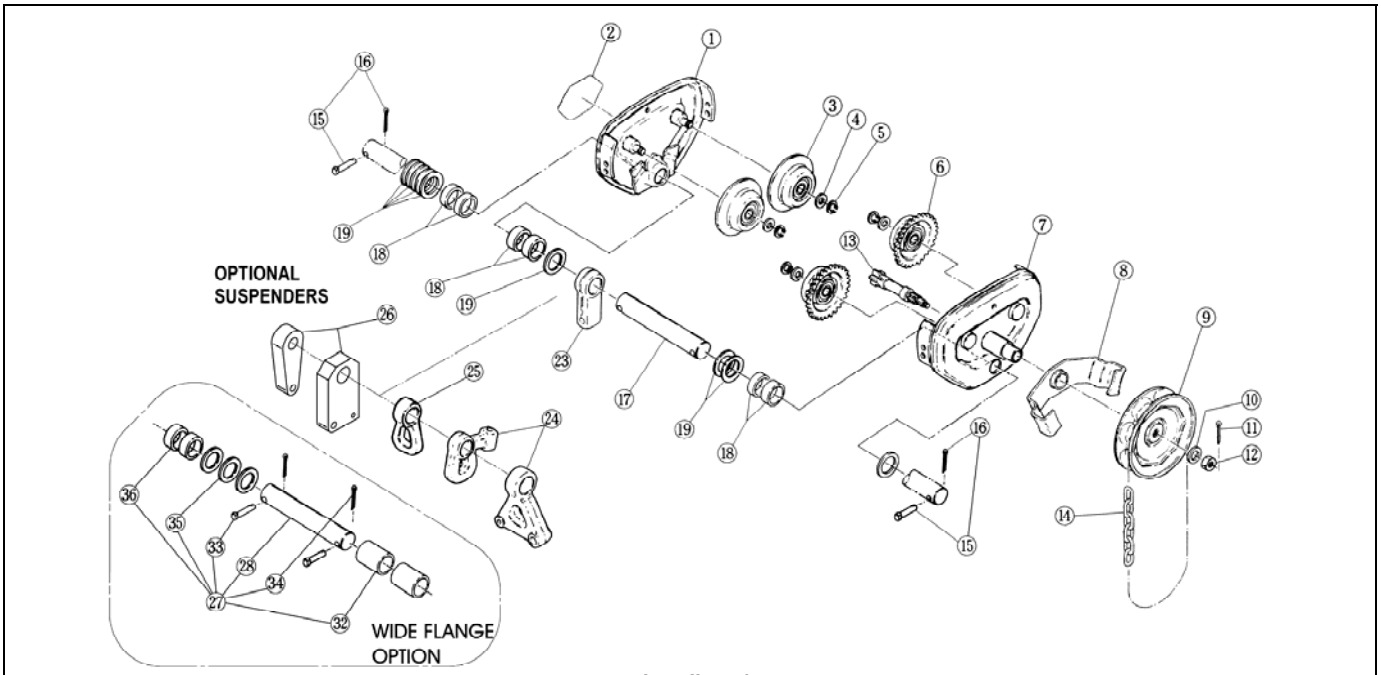
Figure 8-3

8.3 TS2 Push Trolley Parts

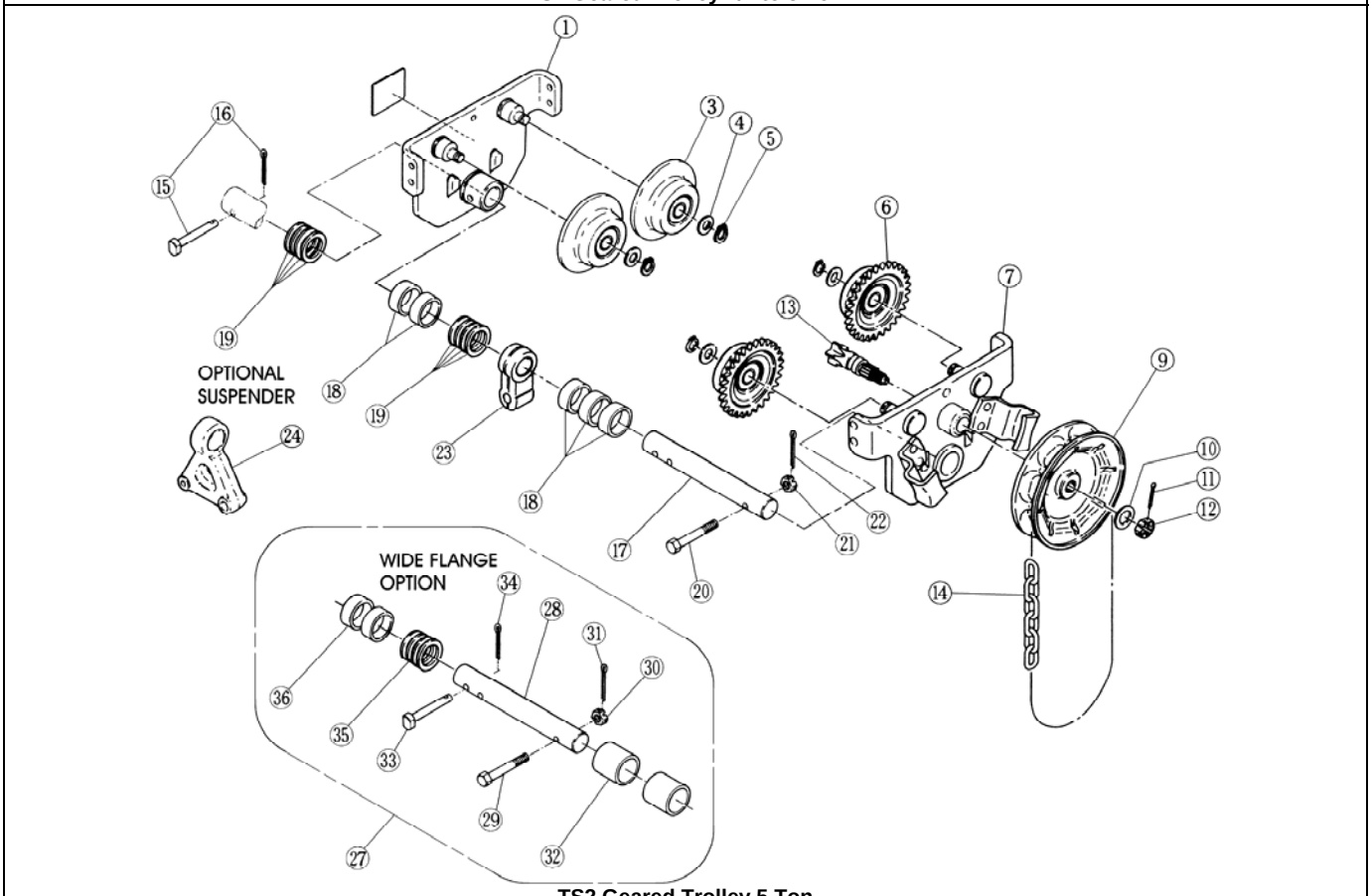
Figure No.	Part Name	Parts Per Trolley		1/2 Ton	1 Ton	2 Ton	3 Ton	5 Ton
1	Side Plate S Assembly	2		T7PA0055112	T7GA0105112	T7GA0205112	T7GA0305112	T5GA0505112
2	Name plate B	1		T6G800005P	T6G800010P	T6G800020P	T6G800030P	T3P800050
3	Track wheel S Assembly	4		T6G5102005	T6G5102010	T6G5102020	T6G5102030	T3P1102050
4	Slotted nut	4		L3183008				
5	Split pin	4		9009413				
6	Track wheel washer	4			MS104010	MS104020	MS104030	MS104050
7	Snap ring	4			9047115	9047120	9047125	9047135
	Suspension shaft assembly Standard	1		T7G1115005	T7G1115010	T7G1115020	T7G1115030	T7G1115050
8	Suspension shaft	1		T7G115005	T7G115010	T7G115020	T7G115030	T7GA0509115
9	Thick spacer (qty)	X		T7G116005(4)	T7G116010(6)	T7G116020(6)	T7G116030(9)	MSF116050(5)
10	Thin spacer (qty)	X		T7G117005(10)	T7G117010(9)	T7G117020(8)	T7G117030(11)	MSF117050(8)
12	Shaft stopper pin	2		T6G156005	T6G156010	T6G156020	MS164020	MS164050
13	Split pin	2		9009424		9009432		
14	Suspender E & G	1		T7GB004005	T7GB004010	T7GB004020	T7GB004030	M7S004050
15	Suspender C	1		T7GC004005	T7GC004010	T7GC004020	T7GC004030	M3004050
16	Suspender H	1		T6G019005	T6G019010	T6G019020	T6G019030	
17	TCR Suspender	1		6040204	60403 (1 Fall Chain) 6040201 (2 Fall Chain)	6040401	TF26K531030S	
18	Bolt Assembly	1						T3P153050
19	Split pin	1						9009424
20	Slotted nut	1						T3P154050
21	Suspension Shaft Assembly Extended	1		T7PD136005 {4.01 to 8.00"} T7PD181005 {8.01 to 12.00"}	T7GD136010 {5.01 to 8.00"} T7GD181010 {8.01 to 12.00"}	T7GD181020 {6.03 to 12.00"}	T7GD181030 {6.03 to 12.00"}	T7GD181050 {7.03 to 12.00"}
22	Suspension Shaft	1		T7PA0059136 {4.01 to 8.00"} T7PA0059181 {8.01 to 12.00"}	T7GA0109136 {5.01 to 8.00"} T7GA0109181 {8.01 to 12.00"}	T7GA0209181 {6.03 to 12.00"}	T7GA0309181 {6.03 to 12.00"}	T7GA0509181 {7.03 to 12.00"}
23	Bolt	1						T3P153050
24	Nut	1						T3P154050
25	Split Pin	1						9009424
26	Fixing Spacer	2		T7PA0059137 {4.01 to 8.00"} T7PA0059182 {8.01 to 12.00"}	T7GA0109137 {5.01 to 8.00"} T7GA0109182 {8.01 to 12.00"}	T7GA0209182	T7GA0309182	T7GA0509182
27	Shaft Stopper Pin	*2		T6G156005	T6G156010	T6G156020	MS164020	MS164050
28	Split Pin	*2		9009424		9009432		
29	Thin Spacer	X		T7G117005 (10)	T7G117010 (10)	T7G117020 (10)	T7G117030 (10)	MSF117050 (8)
30	Thick Spacer	X		T7G116005 (7)	T7G116010 {5.01 to 8.00"}-(5) {8.01 to 12.00"}-(7)	T7G116020 (11)	T7G116030 (11)	T6G116050 (11)

- Quantity is 1 for 5 Ton.

8.4 TS2 Geared Trolley Parts



TS2 Geared Trolley 1/2 to 3 Ton



TS2 Geared Trolley 5 Ton

Figure 8-4

8.4 TS2 Geared Trolley Parts

Figure No.	Part Name	Parts Per Trolley		1 Ton	2 Ton	3 Ton	5 Ton
1	Sideplate S Assembly	1		T7GA0105112	T7GA0205112	T7GA0305112	T5GA0505112
2	Name plate B	1		T6G800010G	T6G800020G	T6G800030G	T3G800050
3	Track wheel S Assembly	2		T6G5102010	T6G5102020	T6G5102030	T3P1102050
4	Track wheel washer	4		MS104010	MS104020	MS104030	MS104050
5	Snap ring	4		9047115	9047120	9047125	9047135
6	Track wheel G Assembly	2		T6G5101010	T6G5101020	T6G5101030	T3G1101050
7	Sideplate G Assembly	1		T7GB0105111	T7GA0205111	T7GA0305111	T5GA0505111
8	Hand chain guide Assembly	1		T6G5121010			
9	Hand wheel			T6G123010			T7GA0509123
10	Washer	1		9012515			
11	Split pin	1		9009424			
12	Lever nut	1		L4082090			T3P154050
13	Pinion	1		T7GC121010	T7GB121020		T4GB0109121
14	Hand chain	1		HCCF005			
	Suspension shaft assembly Standard	1		T7G1115010	T7G1115020	T7G1115030	T7G1115050
15	Shaft stopper pin	2		T6G156010	T6G156020	MS164020	MS164030
16	Split pin	2		9009424	9009432		
17	Suspension shaft	1		T7G115010	T7G115020	T7G115030	T7GA0509115
18	Thick spacer (qty)	X		T7G116010(6)	T7G116020(6)	T7G116030(9)	MSF116050(5)
19	Thin spacer (qty)	X		T7G117010(9)	T7G117020(8)	T7G117030(11)	MSF117050(8)
20	Bolt Assembly	1					T3P153050
21	Slotted nut	1					T3P154050
22	Split pin	1					9009424
23	Suspender E	1		T7GB004010	T7GB004020	T7GB004030	M7S004050
24	Suspender C	1		T7GC004010	T7GC004020	T7GC004030	M3004050
25	Suspender H	1		T6G019010	T6G019020	T6G019030	
26	TCR Suspender	1		60403 (1 Fall Chain) 6040201 (2 Fall Chain)	6040401	TF26K531030S	
27	Suspension Shaft Assembly Extended	1		T7GD136010 {5.01 to 8.00”} T7GD181010 {8.01 to 12.00”}	T7GD181020 {6.03 to 12.00”}	T7GD181030 {6.03 to 12.00”}	T7GD181050 {7.03 to 12.00”}
28	Suspension Shaft	1		T7GA0109136 {5.01 to 8.00”} T7GA0109181 {8.01 to 12.00”}	T7GA0209181 {6.03 to 12.00”}	T7GA0309181 {6.03 to 12.00”}	T7GA0509181 {7.03 to 12.00”}
29	Bolt	1					T3P153050
30	Nut	1					T3P154050
31	Split Pin	1					9009424
32	Fixing Spacer	2		T7GA0109137 {5.01 to 8.00”} T7GA0109182 {8.01 to 12.00”}	T7GA0209182	T7GA0309182	T7GA0509182
33	Shaft Stopper pin	*2		T6G156010	T6G156020	MS164020	MS164050
34	Split Pin	*2		9009424	9009432		
35	Thin Spacer	X		T7G117010 (10)	T7G117020 (10)	T7G117030 (10)	MSF117050 (8)
36	Thick Spacer	X		T7G116010 {5.01 to 8.00”}-(5) {8.01 to 12.00”}-(7)	T7G116020 (11)	T7G116030 (11)	T6G116050 (11)

* Quantity is 1 for 5 Ton.

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