
OWNER'S MANUAL

MOTORIZED TROLLEY SMR SERIES

MODELS MP1A & MP1B

1 Ton through 3 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



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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 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.

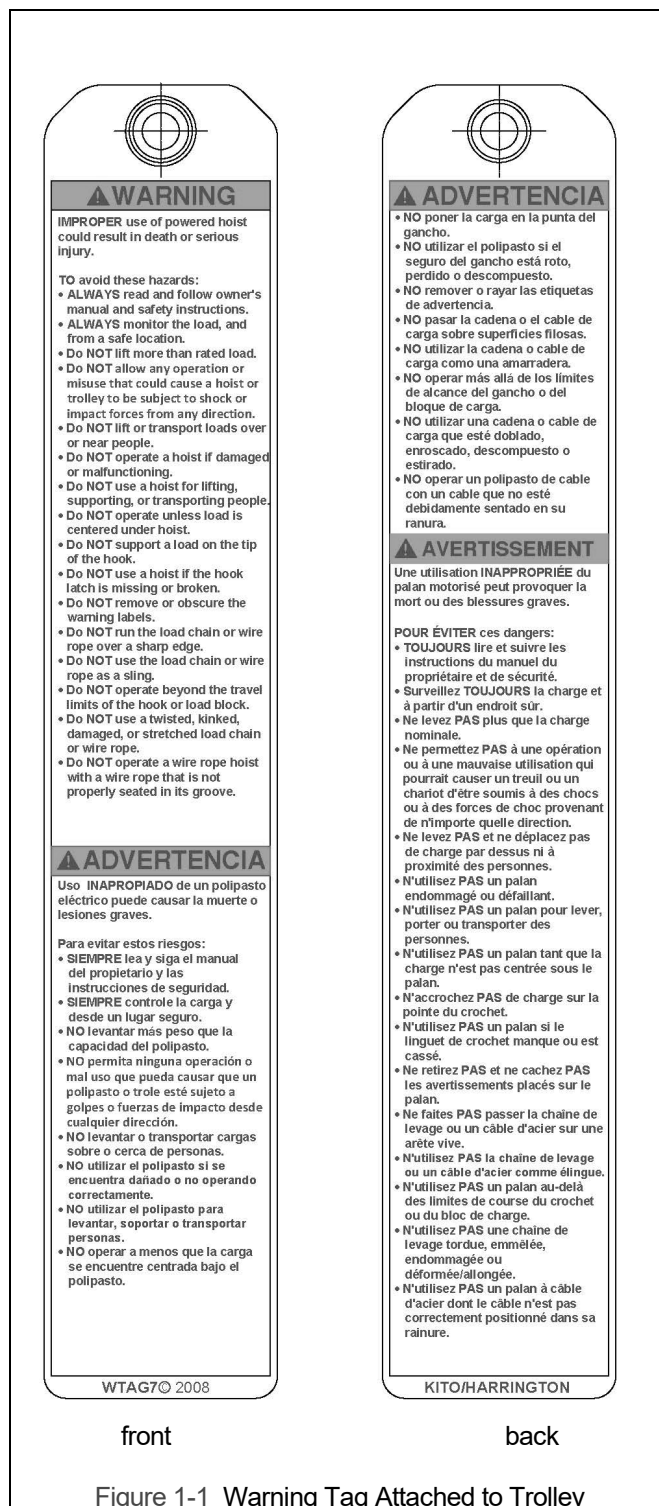
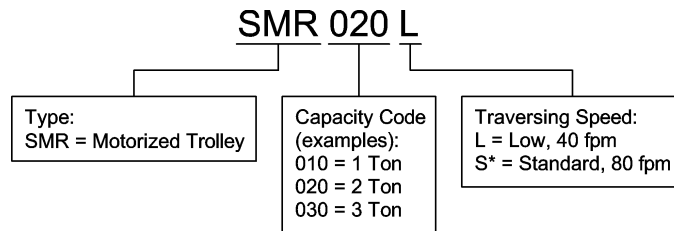


Figure 1-1 Warning Tag Attached to Trolley

2.0 Technical Information

2.1 Specifications

2.1.1 Product Code for SMR Trolley Alone:



2.1.2 Product Code for SMR Trolley with SNER Series Electric Hoist:

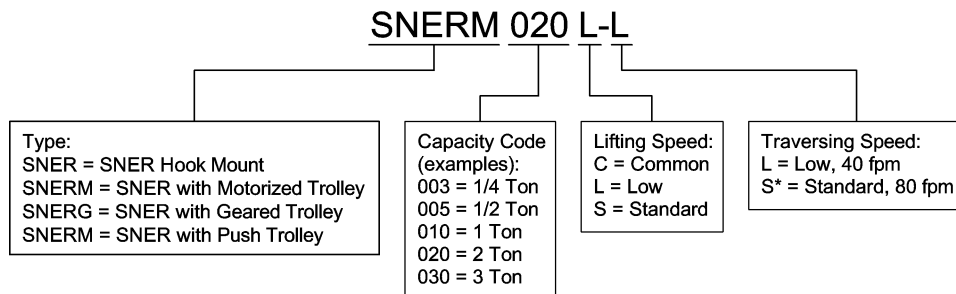


Table 2-1 Trolley Specifications

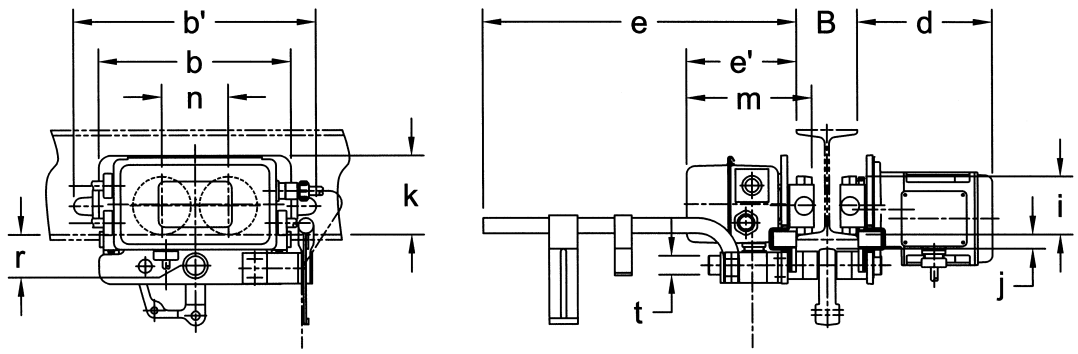
Table 2-1 Trolley Specifications								
Capacity (Ton)	Product Code	Standard Beam Flange Range (in)	Optional Beam Flange Range (in)	Min. Allowable Radius for Curve (in)	Motor			Approx. Net Weight (lbs)
					Output (Hp)	Current Draw* (amps)		
						115V	230V	
1	SMR010L/S	2.28 to 5.00	5.01 to 6.02 <u>OR</u> 6.03 to 12.00	31.5	0.54	Model: MP1A=8.1 MP1B=6.2	Model: MP1A=4.1 MP1B=3.1	86
2	SMR020L/S	3.23 to 6.02	6.03 to 7.02 <u>OR</u> 7.03 to 12.00	31.5				102
3	SMR030L/S	3.23 to 6.02	6.03 to 7.02 <u>OR</u> 7.03 to 12.00	39.4				115

* Models MP1A are only available at 40 fpm. Models MP1B are available at 40 and 80 fpm.

2.1.3 Operating Conditions and Environment

Temperature range:	-4° to +104°F (-20° to +40°C)
Humidity:	85% or less
Enclosure Rating:	Trolley Meets IP 55, Pendant Meets IP65
Supply Voltage:	Standard 115/230V-1-60 (Single Phase)
Speed*:	L=40 FPM, S=80 FPM.
Intermittent Duty Rating:	40% ED
Maximum Number Starts per Hour:	240
Short Time Duty Rating:	30 Minute

2.2 Dimensions

Table 2-2 Trolley Dimensions												
												
Code	b	b'	d	e	e'	i	j	k	m	n	r	t
SMR010L/S	12.4	15.6	10.6	20.3	7.0	3.74	0.9	5.1	8.0	4.3	2.0	1.22
SMR020L/S	12.8	16.4	10.7	20.5	7.2	4.33	1.1	4.9	8.3	4.6	2.4	1.42
SMR030L/S	13.4	17.4	10.8	20.5	7.3	4.92	1.1	5.2	8.5	5.2	2.7	1.69

3.0 Pre-operational Procedures

3.1 Assembly and Adjustment

- 3.1.1 When the SMR trolley is combined with a hoist, follow and complete all pre-operational procedures provided with the hoist. For Harrington SNER model hoists, follow the pre-operational procedures in the SNER Owner's Manual in conjunction with all information provided in this section for mounting and electrical connections.
- 3.1.2 In addition to the information and procedures provided in this section for the SMR trolley, there are specific details for using SNER hoists with SMR trolleys. Special mounting and wiring considerations must be taken if the trolley is used with a hoist other than an SNER model.

- 3.1.3 **⚠ WARNING** Never attempt to hook mount a hoist directly to the Suspension Shaft on the SMR 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.

- 3.1.4 Preparing SNER hoists for use with SMR trolley.

¼ to 2 Ton SNER – The standard suspension configuration uses Suspender T which orients the hoist perpendicular to the trolley beam. Optional two-piece suspension method uses a Connection Yoke and Suspender G, which orients the hoist parallel to the trolley beam. If the hoist is not equipped with Suspender T or the Connection Yoke from the factory, remove the Top Hook Assembly from the hoist and install Suspender T or the Connection Yoke as follows:

- 1) Refer to Figure 3-1.
- 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) Place Suspender T or the Connection Yoke on the top of the hoist. Line up the holes for the Connection Shaft and the Hoist Fixing Shaft and reinsert the shafts.
- 7) Reassemble the remaining hoist components in reverse order of disassembly.
- 8) If installing the Connection Yoke, place the Connection Yoke Rubber and Suspender G in the top of the Connection Yoke. Attach Suspender G to the Connection Yoke with the Yoke Bolt, Slotted Nut and Split Pin (cotter pin).

3 Ton (030C) SNER – The 3 Ton (030C) SNER hoists (double fall) always use a Connection Yoke. The standard suspension configuration uses Suspender T which orients the hoist perpendicular to the trolley beam. Suspender G is available as an option and orients the hoist parallel to the trolley beam. If the hoist is not equipped with Suspender T or G from the factory, remove the Top Hook Assembly from the Connection Yoke and install the Suspender T or G as shown in Figure 3-2.

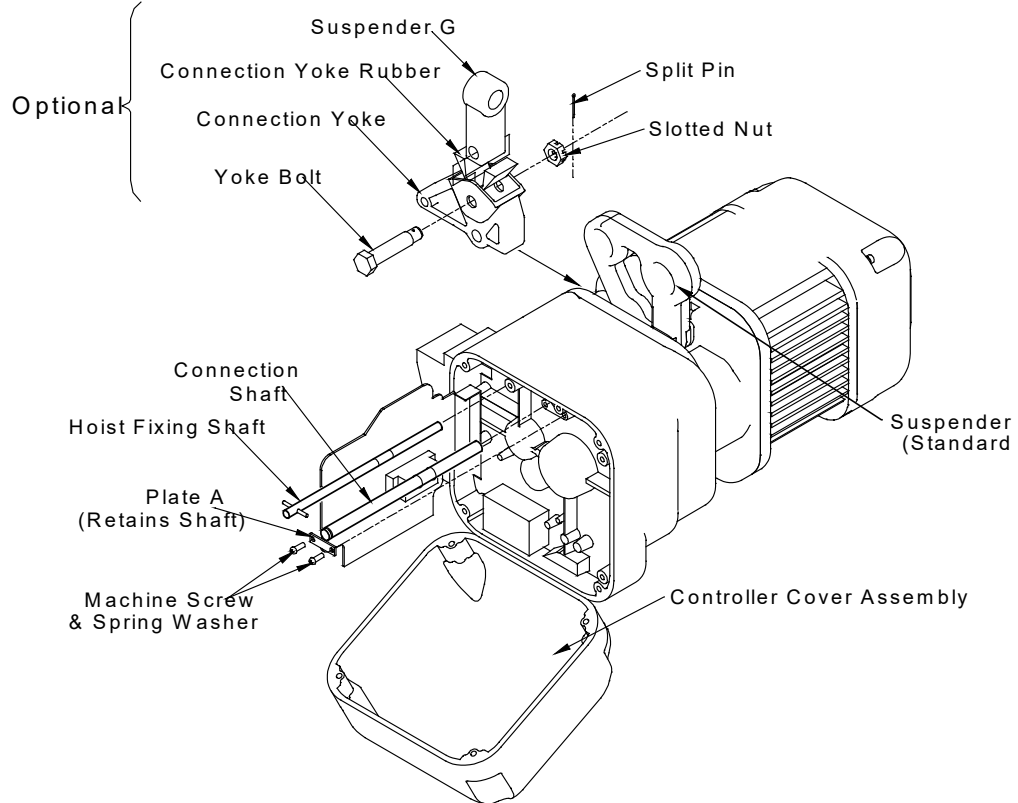
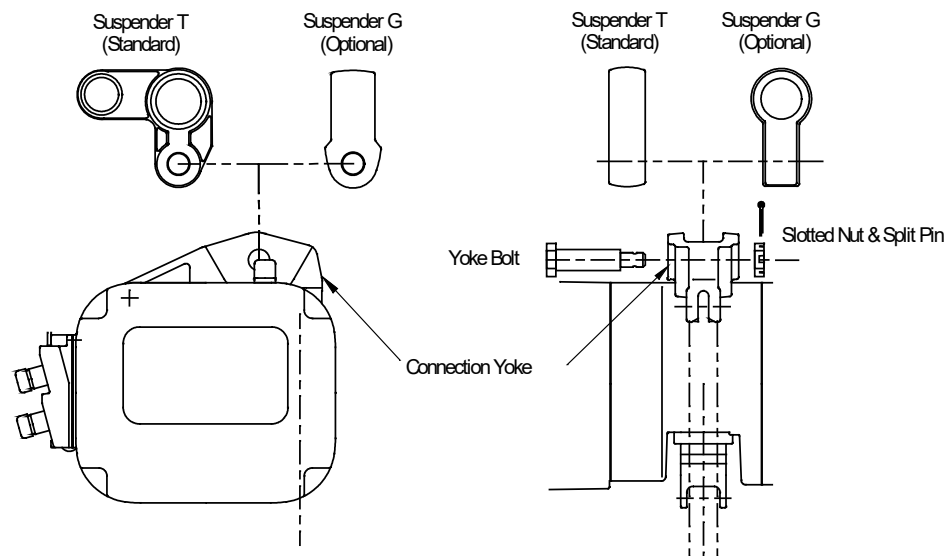


Figure 3-1 Installing Suspenders T or Connection Yoke on SNER Hoists – Up Through 1/4 to 2 Ton Capacity

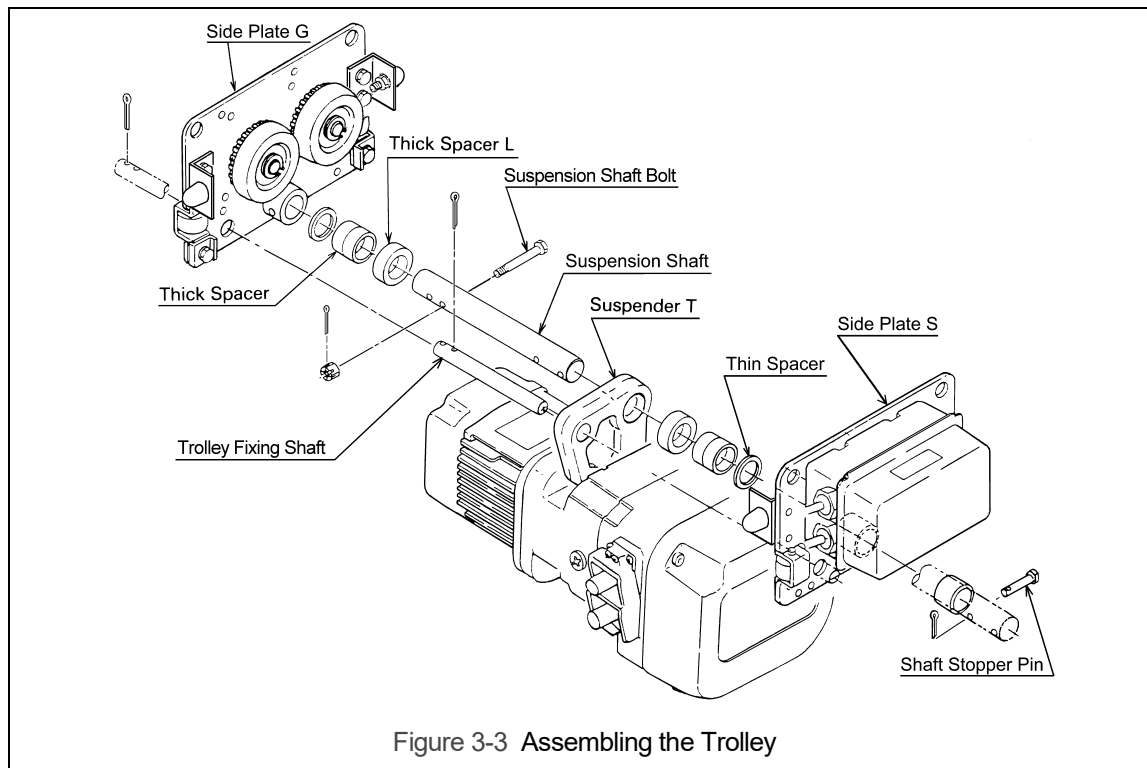


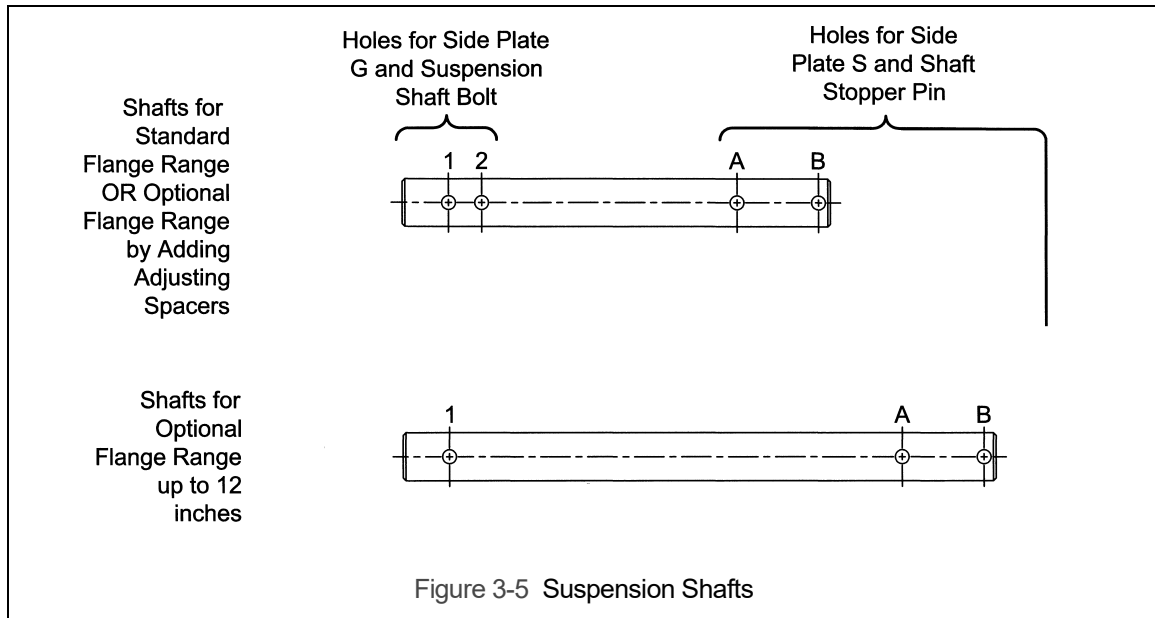
Note: Suspenders G for 3 Ton (030C) connects directly to the Connection Yoke without the Connection Yoke Rubber.

Figure 3-2 Installing Suspenders T or G on 3 Ton (030C) SNER Hoists

3.1.5 Trolley Assembly

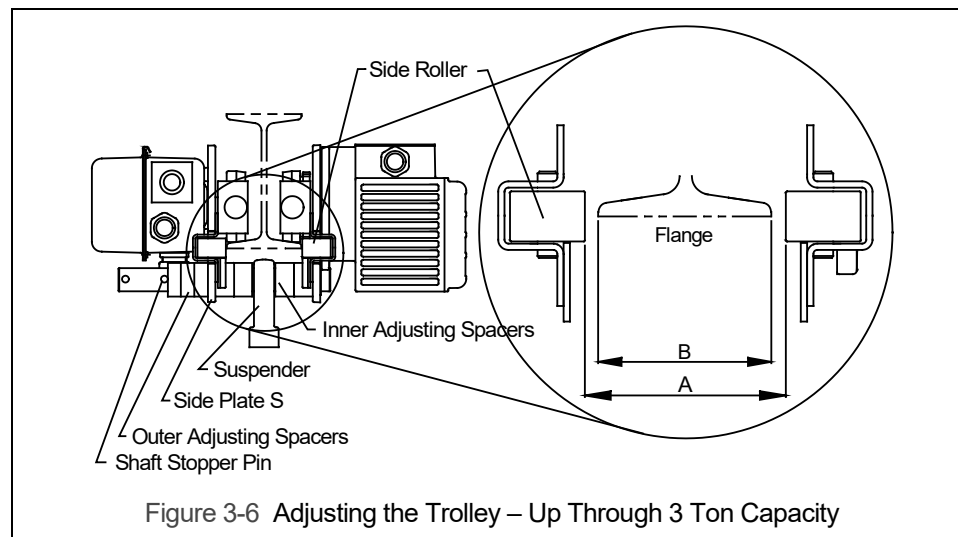
- 1) Refer to Figure 3-3.
- 2) Remove the Shaft Stopper Pin, Side Plate S, and Spacers from the Suspension Shaft. For beam flanges that are wider than the standard range, different suspension shaft and/or spacer arrangements are provided. Refer to Table 3-1.
- 3) Insert the Suspension Shaft to Side Plate G and attach it with the Suspension Shaft Bolt, Slotted Nut and Split Pin (cotter pin). Refer to Figure 3-5 and insure that correct Suspension Shaft holes are used. Securely bend both branches of the Split Pin after insertion.
- 4) Referring to Figure 3-8, 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 3.1.6.
- 5) Place Side Plate S into the Suspension Shaft.
- 6) Install the outer adjusting Spacers on the Suspension Shaft outside of Side Plate S. Insert the Shaft Stopper Pin into Hole "A" so that Split Pin is to the left when seen from the front side of trolley switch box. 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.
- 7) Insert the Trolley Fixing Shaft through Side Plate G, Suspender T and Side Plate S. Secure it to Side Plate G with the two split pins. Securely bend both branches of the Split Pin after insertion.





3.1.6 Adjusting the trolley width - After assembling trolley per Section 3.1.5, check the adjustment as follows:

- 1) Refer to Figure 3-6.
- 2) Make sure both side plates are spread fully outward and Measure Dimension "A". Dimension "A" must be $\frac{1}{8}$ to $\frac{3}{16}$ " greater than "B". For trolleys up through 3 Ton.
- 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 in Hole A, insert the Split Pin into the Shaft Stopper Pin, and securely bend both branches of the split pin.



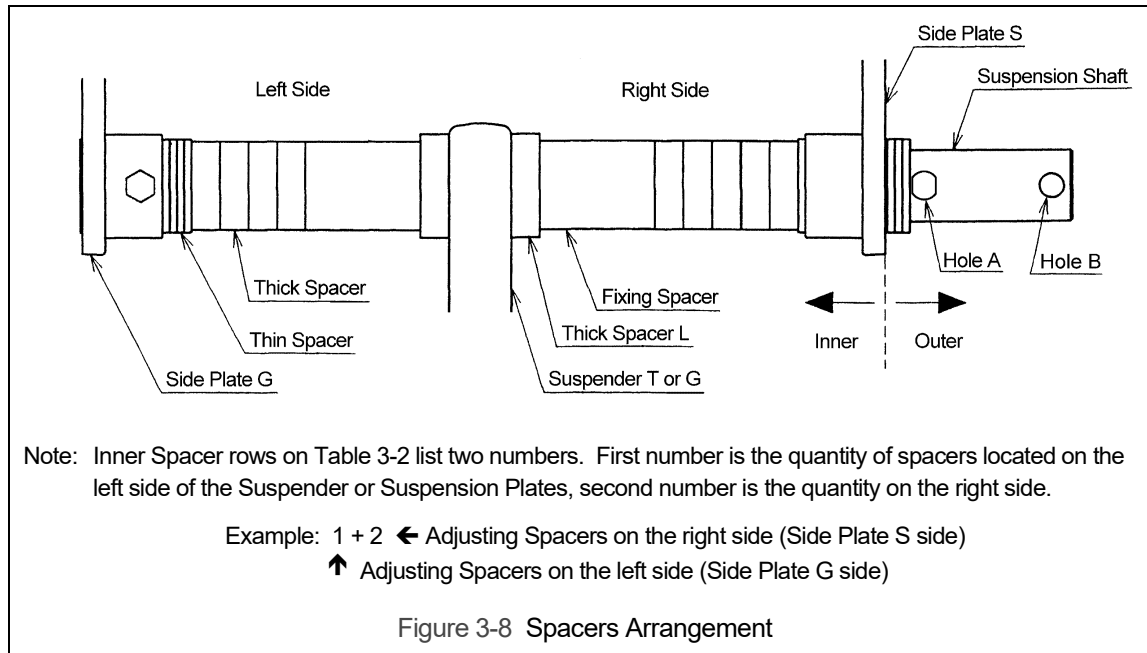
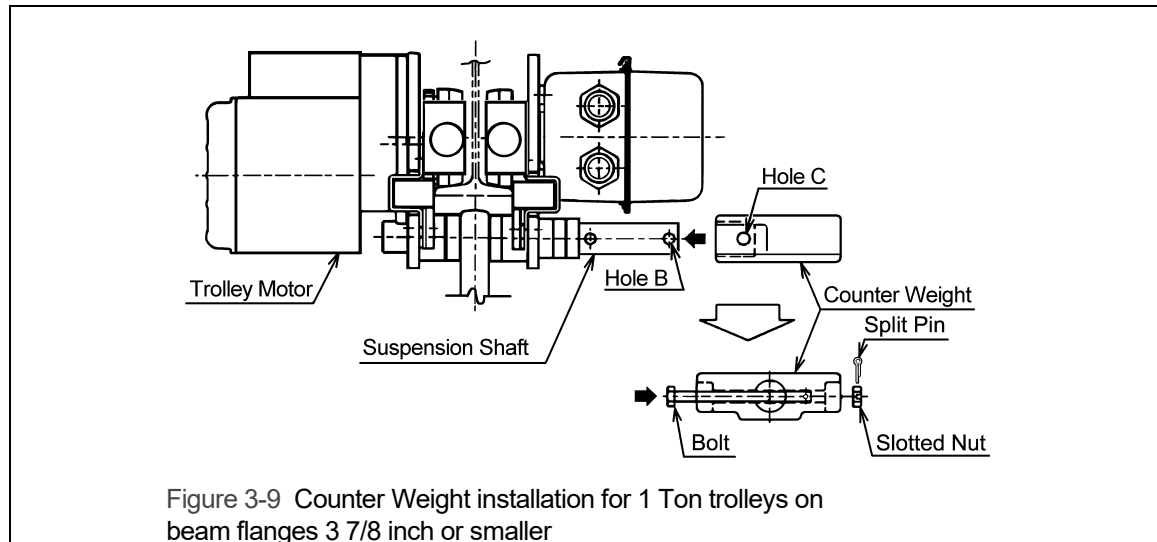


Table 3-1 Suspension Shaft Adjusting Spacers, and Suspension Shaft Bolt						
Capacity (Tons)	Flange Range (in)	Total Number of Spacers Supplied				Suspension Shaft Bolt Location
		Thin	Thick	Fixing	Thick L	
1	2.28 to 5.00	8	3	—	2	Hole 2
	5.01 to 6.02	8	5	—	2	Hole 1
	6.03 to 12.00	8	9	2	2	Hole 1
2 & 3	3.23 to 6.02	8	3	—	2	Hole 2
	6.03 to 7.02	8	5	—	2	Hole 1
	7.03 to 12.00	8	9	2	2	Hole 1

- 3.1.7 Counter Weight – For proper balance 1 Ton, SMR trolleys require a Counter Weight when installed on a 3 7/8 inch or smaller beam flange. The Counter Weight mounts on the Suspension Shaft as shown in Figure 3-9 and is held in place with a Bolt, Slotted Nut and Split Pin. The bolt is installed through holes B and C. Make sure the weight is securely fastened to the shaft and that the split pin is properly bent. All other trolley capacities do NOT require a counter weight.



3.2 Mounting Location

- 3.2.1 **⚠ 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.

- 3.2.2 **NOTICE** See Section 6.4 for outdoor installation considerations.

3.3 Installation of Trolley onto Beam

- 3.3.1 Assemble and adjust the trolley before attempting to install the trolley on the beam.
- 3.3.2 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.
- 3.3.3 Optional Method If the trolley cannot be mounted from the end of the beam, complete the installation as follows:
- 1) Move the Shaft Stopper Pin to Hole B (see Figure 3-10).
 - 2) Spread the trolley side plates apart.
 - 3) Lift the trolley onto the beam so that the geared wheels (motor side of trolley) rest on the beam's flange.
 - 4) Hold Side Plate 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) Remove the Shaft Stopper Pin from Hole B and re-install in Hole A (see Figure 3-5). Bend the Split Pin securely. Never use trolley with Shaft Stopper Pin in Hole B. Hole B is ONLY used when installing the trolley on the beam.

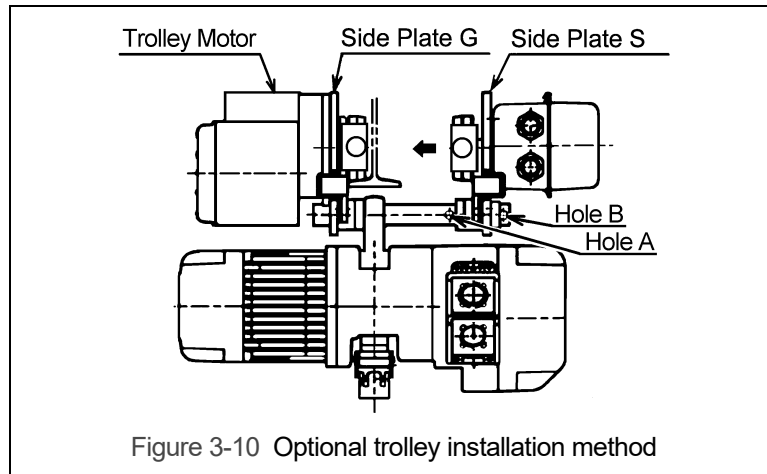


Figure 3-10 Optional trolley installation method

3.4 Electrical Connections

- 3.4.1 **⚠ CAUTION** Ensure that the voltage of the electric power supply is proper for the hoist or trolley.
- 3.4.2 **⚠ CAUTION** Do NOT apply electronic soft-start control or voltage varying controls to the SMR trolley. Use of such devices may cause the motor brake and other electrical components to malfunction.
- 3.4.3 **⚠ 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".
- 3.4.4 **⚠ WARNING** Make sure all power supply components (plugs, wires, breakers, fuses etc.) are adequately rated for the voltage and amperage draw of the trolley and hoist.
- 3.4.5 This instruction applies to installations where an SNER model electric hoist is installed on an SMR trolley. In this case the hoist and trolley are controlled by a pendant with four push buttons – two for the hoist motion and two for the trolley motion. Special wiring considerations must be taken if the trolley is used with a hoist other than an SNER model.

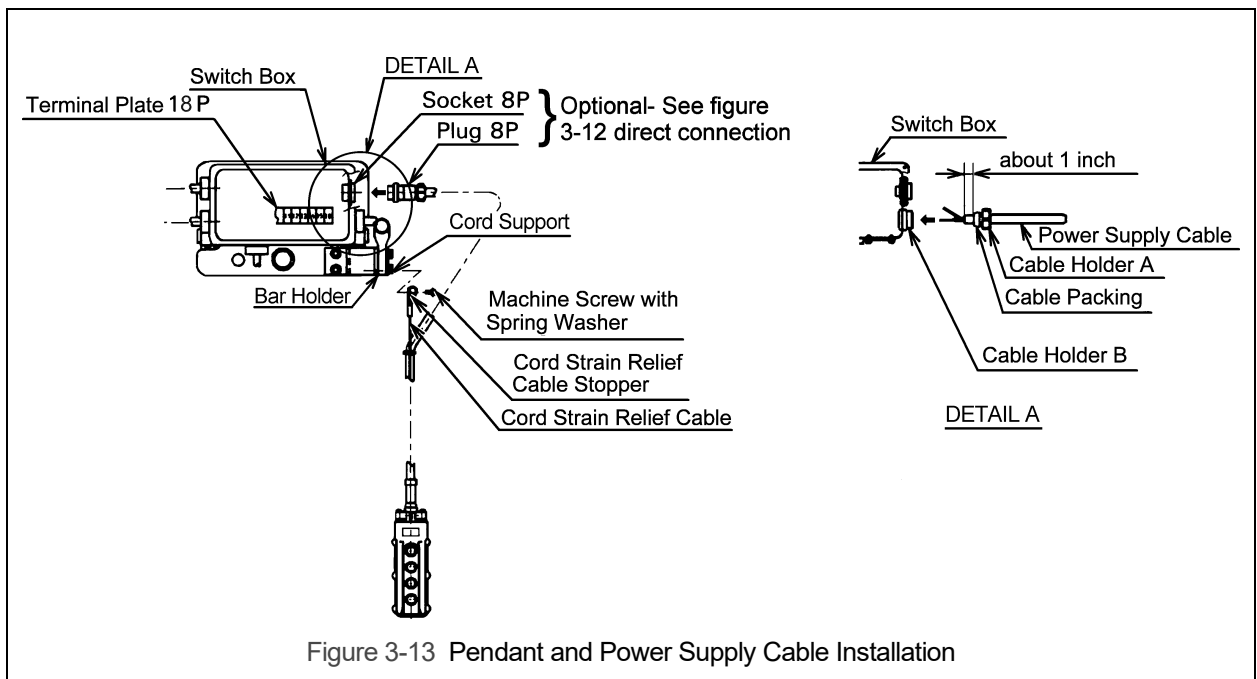
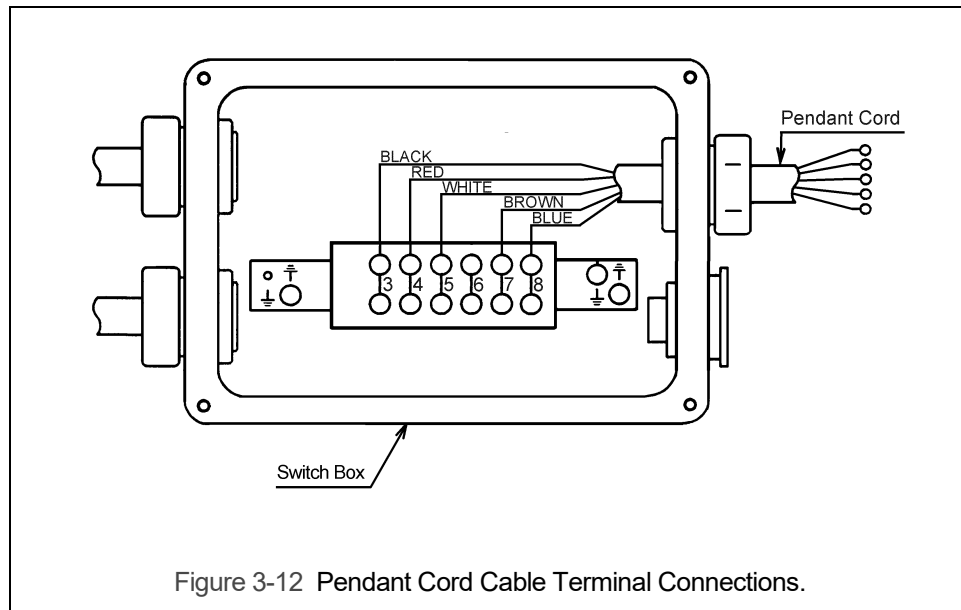
Pendant Cord - The Pendant Cord connects to the trolley via a hard wire connection or optional 8-pin (8P) Plug and Socket.

Make the hard wire connection as follows:

- 1) Refer to Figure 3-12.
- 2) Attach the UP pendant wire to terminal number 4 (Red trolley pendant wire).
- 3) Attach the DOWN pendant wire to terminal number 5 (White trolley pendant wire).
- 4) Attach the RIGHT pendant wire to terminal number 7 (Brown trolley pendant wire).
- 5) Attach the LEFT pendant wire to terminal number 8 (Blue trolley pendant wire).
- 6) Attach the pendant COMMON wire to terminal number 3 (Black trolley pendant wire).
- 7) Install the Cord Strain Relief Cable to the Cord Support on the Bar Holder.

Make the plug connection (optional) as follows:

- 1) Refer to Figure 3-13.
- 2) Insert the 8P Plug into the 8P Socket on the Switch Box and hand tighten the Screw Coupling.
- 3) Install the Cord Strain Relief Cable to the Cord Support on the Bar Holder.



Power Supply Cable Hoist Connection – The Power Supply Cable connects directly to the trolley's Switch Box using Cable Holder Assembly. Make this connection as follows:

- 1) Refer to Figure 3-14
- 2) With 1 inch of the outer cable insulation extending beyond the cable packing, insert the cable into the switch box and screw together Cable Holder A and B.
- 3) Refer to Figure 3-14 and connect the black and white wires to terminals 1 and 2 on the terminal strip inside the Switch Box. Connect the ground wire (green with yellow stripe or solid green) to the ground terminal next to the terminal strip.
- 4) Install the Cable Support Assembly (pre-installed on the Power Supply Cable) onto the Cable Support Arm Assembly as shown in Figure 3-16.
- 5) Use care to avoid twisting or kinking the Power Supply Cable.

Trolley to Hoist Connections – The trolley connects to the hoist via short cables that are factory installed into the trolley Switch Box. The Cables are hard wired into the hoist, but can be fitted with plug assemblies that match sockets in the hoist bodies. Make these connections as follows:

Make the hard wire connection as follows:

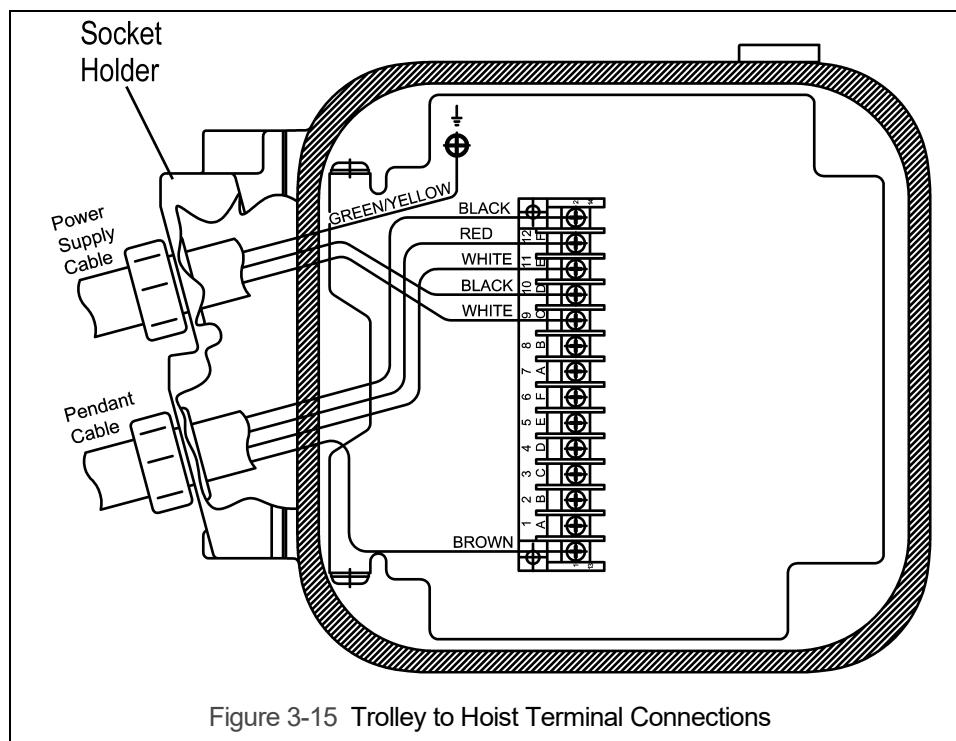
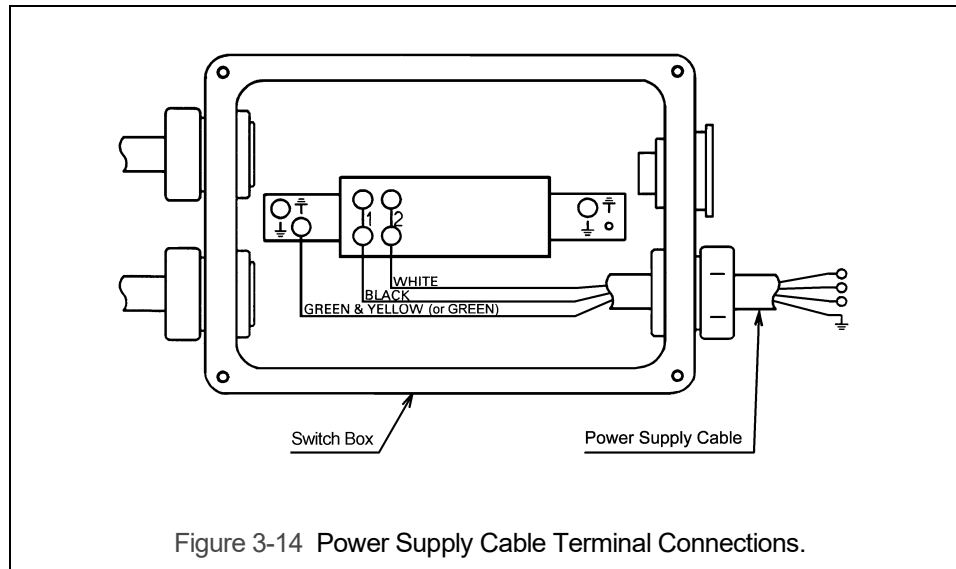
- 1) Refer to Figure 3-15.
- 2) Insert the power supply and pendant cords in to the socket holder then fasten the square cable holder mounting plates to the socket holder.
- 3) For the 3-conductor cord, connect the black and white wires to terminals 10D and 9C on the terminal strip inside the hoist body. Connect the ground wire (green with yellow stripe or solid green) to the ground terminal next to the terminal strip.
- 4) For the 4-conductor cord, connect the black, red, white, and brown wires to terminals 2-14, 12F, 11E, and 1-13 on the terminal strip inside the hoist body.
- 5) Use care to avoid twisting or kinking the Trolley to Hoist Cables.

Power Supply Cable Festooning – The SMR trolley is standardly supplied with Cable Hangers for the Power Supply Cable. Make this connection as follows:

- 1) Refer to Figure 3-16.
- 2) Install the Cable Hangers onto the Power Supply Cable spacing them every 5 feet.
- 3) Install a Guide Wire system parallel to the beam. Pass the Guide Wire through the Cable Hangers and Wire Guide.
- 4) Make sure the Guide Wire is properly tensioned and the Power Supply Cable is not twisted or kinked.

3.4.6 Connection to Electrical Power Source - The black and white wires of the Power Supply Cable should be connected to an Electric Power Disconnect Switch or Circuit Breaker. This connection should be made so that the, SNER or other hoist is phased properly. Refer to Section 3.5.5 for instructions on how to check for correct power supply phase connection.

3.4.7 Fuse/Breaker Capacity -The power supply for the trolley and hoist 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. Refer to the motor nameplates on the trolley and hoist for the full load amperage draw of each and added the two values together for the total amperage.



3.4.8

⚠ 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.

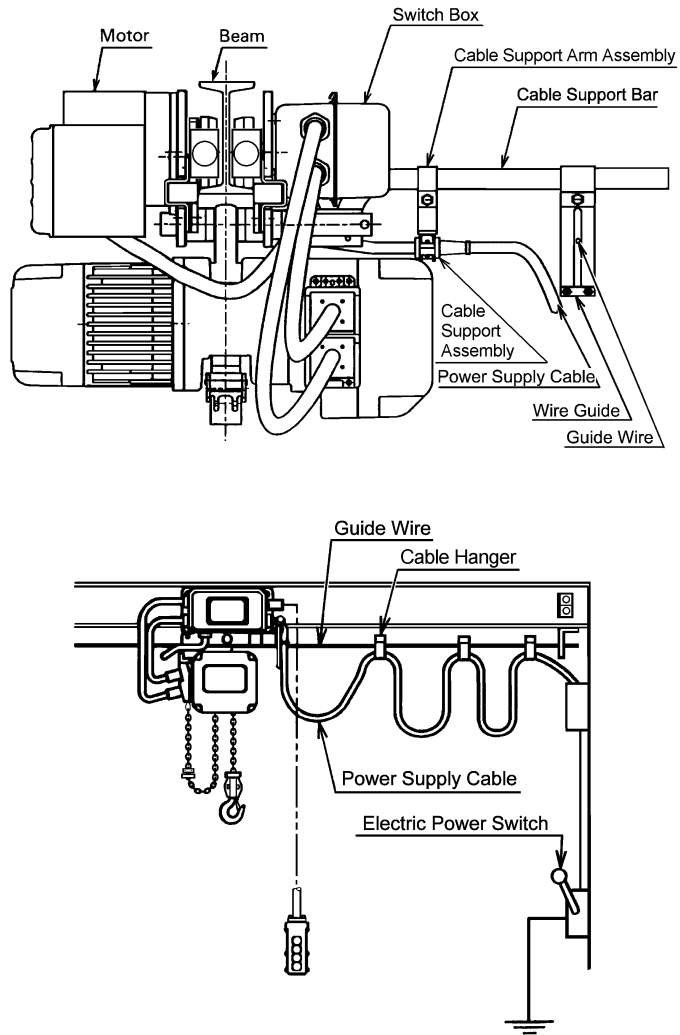


Figure 3-16 Power Supply Cable installation and Guide Wire location.

3.5 Pre-operational Checks and Trial Operation

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

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

3.5.3 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.
- 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.

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

3.5.5 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 load chain and depression of the Down button lowers the load chain hook. If the load chain does not move in the correct direction when the push buttons are pushed, the power supply is phased incorrectly. If the hoist does not operate correctly, shut off and lockout/tagout the main power source to the hoist. Disconnect and switch the black and white input power leads at the power source to correct the hoist's motor phasing.
- 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.
- 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).
- **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 and Hoist Controls

4.3.1 Hoist and trolley with 4 button Pendant Control - When using the pendant control depress 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.

4.3.2 Trolley with Two Button Pendant – When a motorized trolley is supplied with a two button pendant, the pendant buttons control the trolley's horizontal motion in the forward and reverse directions.

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

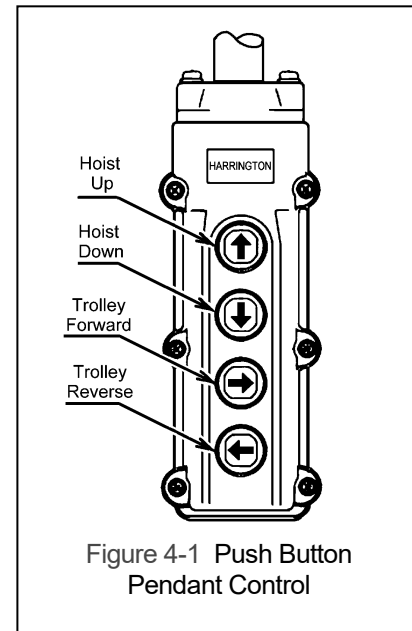


Figure 4-1 Push Button Pendant Control

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.
Trolley braking system for proper operation
Hoist(s) in accordance with ANSI/ASME B30.16
Upper Limit Devices in accordance with ANSI/ASME B30.16
Hook(s) and hook latches in accordance with ANSI/ASME B30.10

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.
Excessive wear of brake system parts
Deterioration of electrical components such as controllers, switches, contacts, pushbuttons.
Proper function of motion limit devices that interrupt power or cause a warning to be activated.
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.

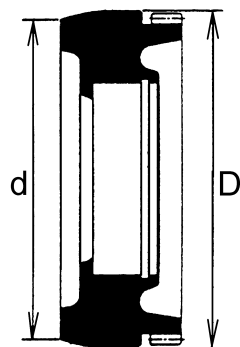
Table 5-3 Trolley Inspection Methods and Criteria

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.
Braking System Operation	Function	Trolley must come to a smooth stop within 10% of its traveling speed when the pendant button is released.	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.
Side Rollers - Wear	Visual, Measure	Diameter should not be less than the discard value shown in Table 5-5 .	Replace.
Suspension Shaft	Visual, Measure	Suspension shaft should not be bent. Diameter should not be worn by 10% or more.	Replace.
Motor Brake	Visual, Measure	Brake lining dimension "A" should not be less than discard value listed in Table 5-6 . Refer to Section 6.2 for gaining access to motor brake and inspection procedures. Braking surfaces should be clean, free of grease/oil and should not be glazed.	Replace.
Contactor Contacts	Visual	Contacts should be free of significant pitting or deterioration.	Replace

Table 5-3 Trolley Inspection Methods and Criteria

Item	Method	Criteria	Action
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 energization of circuits for opposing motions (e.g. forward and reverse).	Repair or replace as necessary.
Pendant - Housing	Visual	Pendant housing should be free of cracks and mating surfaces of parts should seal without gaps.	Replace.
Pendant - 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 all of the load associated with forces applied to the pendant.	Replace.
Electrical Plugs, Sockets and Fittings	Visual	Electrical Plugs, Sockets and Fittings should not be cracked or damaged.	Repair or replace as necessary.
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.

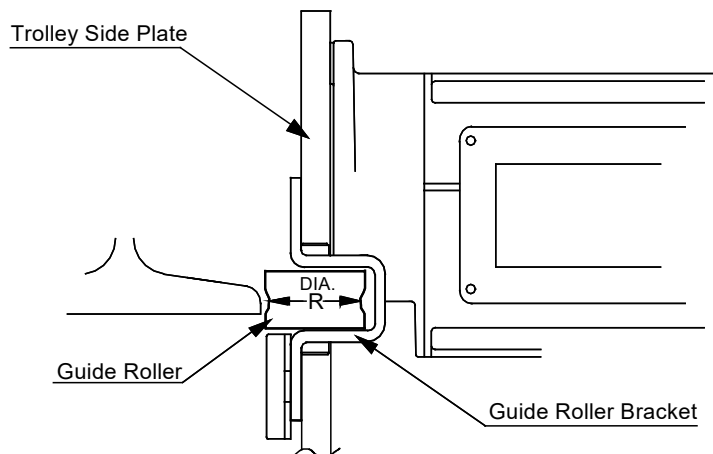
Table 5-4 Track Wheel Wear Dimensions



Note: Track wheels are for flat and tapered flanges.

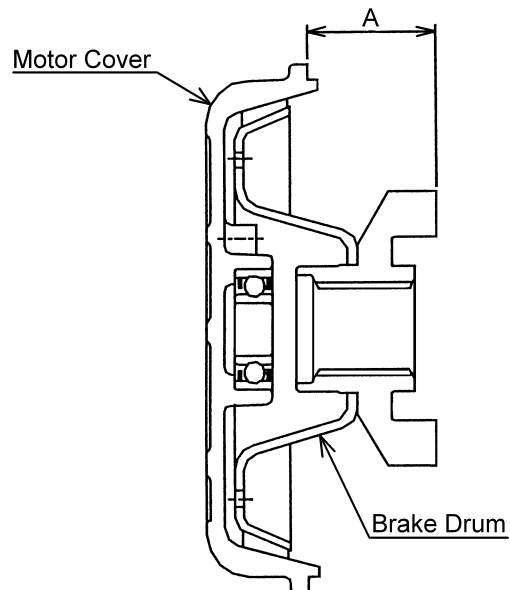
Capacity (Ton)	“d” Dimension inch (mm)		“D” Dimension inch (mm)	
	Standard	Discard	Standard	Discard
1	3.60 (91.5)	3.44 (87.5)	3.74 (95)	3.58 (91)
2	4.17 (106)	3.98 (101)	4.33 (110)	4.13 (105)
3	4.76 (121)	4.49 (114)	4.92 (125)	4.65 (118)

Table 5-5 Side Roller Wear Dimensions



Capacity (Ton)	“R” Dimension inch (mm)	
	Standard	Discard
1	1.50 (38)	1.46 (37)
2 and 3	1.69 (43)	1.65 (42)

Table 5-6 Motor Brake Wear Dimensions



Capacity (Ton)	Model	"A" Dimension - inch (mm)	
		Standard	Discard
1, 2 and 3	MP1A	1.45 (36.8)	1.38 (35.3)
	MP1B	1.25 (31.8)	1.19 (30.3)

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 motor 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 Gear Box – The reduction gearing in the motor should be cleaned and lubricated at least once per year for normal usage. Clean and lubricate the reduction gear assembly more frequently for heavier usage or severe conditions. Gain access to the gears by removing the four bolts that mount the motor assembly to the trolley Side Plate. Make sure to properly orient and reuse the neoprene gasket between the motor and Side Plate.
- 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 Brake

- 6.2.1 The trolley motor brake is NOT adjustable.
- 6.2.2 Motor Brake Removal – Remove the four Bolts that attach the Motor Cover to the Motor Frame. Carefully remove the Motor Cover, brake components, and Stator.
- 6.2.3 Brake Lining Inspection – The brake lining is designed for a long life and should provide years of trouble-free service. If the brake lining is being inspected due to excessive trolley drift during operation (see Section 5.7), disassemble the motor brake and inspect all motor brake parts. Braking surfaces should be clean, free of grease/oil and should not be glazed. Replace the Brake Drum and/or Motor Cover if necessary. For normal inspections, the Brake Lining and Motor Cover wear should be measured as follows.
 - 1) Refer to Table 5-6.
 - 2) Measure the distance "A" using calipers and a straight edge. Make sure the Brake Drum is square against the Motor Cover. Place the straight edge across the edge of the Brake Drum and measure from the straight edge to the mounting face of the Motor Cover.
 - 3) Compare the measurement with the values listed in Table 5-6. Replace the Brake Drum and/or Motor Cover if the "A" measurement is smaller than the discard limit.
- 6.2.4 Motor Brake Installation - After the brake is inspected, carefully place the Stator and brake components into the Motor Frame. Be sure to reseat the Motor Cover to Motor Frame surface using a small bead of liquid (hi-temperature) sealant. Install the Motor Cover attachment bolts.

6.3 Storage

- 6.3.1 The storage location should be clean and dry.
- 6.3.2 Care should be taken to not damage any of the electrical power cords or fittings.

6.4 Outdoor Installation

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

WARNING

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

Before performing ANY maintenance 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
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.
	Motor overheated and optional thermal overload protector has tripped	See Trouble Shooting Problem "Motor or brake overheating".
	Improper, loose, or broken wire in trolley electrical system	Shut off power supply, check wiring connections in the trolley switch box, on hoist control panel and inside push-button pendant.
	Faulty magnetic contactor	Check coil for open or short circuit. Check all connections in the control circuit. Check for open contactors. Replace as needed.
	Motor burned out	Replace motor frame/stator, shaft/rotor, and any other damaged parts.
	Faulty Start Switch (model MP1A only)	Disconnect Start Switch from motor. The resistance between the Start Switch terminals 2 and 3 should be greater than 500K ohms. If not, contact factory for detailed Start Switch troubleshooting.
	Faulty Start or Run Capacitor	Check capacitor(s) for open or short circuit. Check connection. Replace as needed.
Trolley drifts excessively when stopping	Motor brake not holding	Clean and inspect brake lining. Replace if necessary
Motor or brake overheating	Excessive duty cycle	Reduce frequency of trolley movement.
	Extreme external heating	Above an ambient temperature of 140°F, the frequency of trolley operation must be reduced to avoid overheating of the motor. Special provisions should be made to ventilate the trolley or otherwise shield it from the heat.
Trolley operates intermittently	Collectors making poor contact	Check movement of spring loaded arm, weak spring, connections, and shoe. Replace as needed.
	Contactor 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 the Pendant Cord. Replace entire Pendant Cord if continuity is not constant.

8.0 Warranty

Buyer must notify HHI in writing within sixty (60) days of discovery of any alleged defect, if within the applicable warranty period.

All products sold by HHI are warranted to be free from defects in material and workmanship from date of shipment by HHI for the following periods:

- 1 year – Electric and Air Powered Hoists (excluding (N)ER2 Hoists and EQ/SEQ Hoists), Powered Trolleys, Powered Tiger Track Jibs and Gantries, Crane Components, Below the Hook Devices, Spare / Replacement Parts**
- 2 years – Manual Hoists & Trolleys, Beam Clamps**
- 3 years – (N)ER2 Hoists, EQ/SEQ Hoists, (T)EM/(T)SEM hoists, and RY Hoists**
- 5 years – Manual Tiger Track Jibs and Gantries, Hoist Motor Brakes for EQ/SEQ, (T)EM/(T)SEM, and RY**
- 10 years – (N)ER2 Brake, TNER Hoist Motor Brake, Tiger Track Workstation Cranes and Monorails**

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 HHI's inspection of the product, HHI agrees, at its discretion, either to replace (not including installation) or repair the part or product free of charge. For customers in the U.S., delivery shall be made F.O.B. HHI's place of business. For international customers, delivery shall be made FCA HHI place of business, United States of America (Incoterms 2010).

No warranty claim will be honored without a valid proof of purchase. Customer must obtain a Return Goods Authorization as directed by HHI or its 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 HHI's warranty, the customer will be responsible for the costs of returning the product.

HHI DISCLAIMS ANY AND ALL OTHER WARRANTIES OF ANY KIND, EXPRESSED OR IMPLIED, AS TO THE PRODUCT'S MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. HHI 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 MISUSE OF THE PRODUCTS, REGARDLESS OF WHETHER THE DAMAGE, LOSS OR EXPENSE RESULTS FROM ANY ACT OR FAILURE TO ACT BY HHI, WHETHER NEGLIGENT OR WILLFUL, OR FROM ANY OTHER CAUSE.

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9.0 1/8 to 3 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.



The parts list is arranged into the following sections:

Section	Page
9.1 Electric Parts.....	38
9.2 Pendant Parts.....	40
9.3 Power Supply Parts.....	42
9.4 Side Plates and Suspension Parts.....	44
9.5 Motor Parts.....	46

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 SMR Trolley model numbers and additional descriptions.

The designators are:

- S = Single speed, Standard, 80 fpm
- L = Single Speed, Low, 40 fpm

9.1 Electric Parts

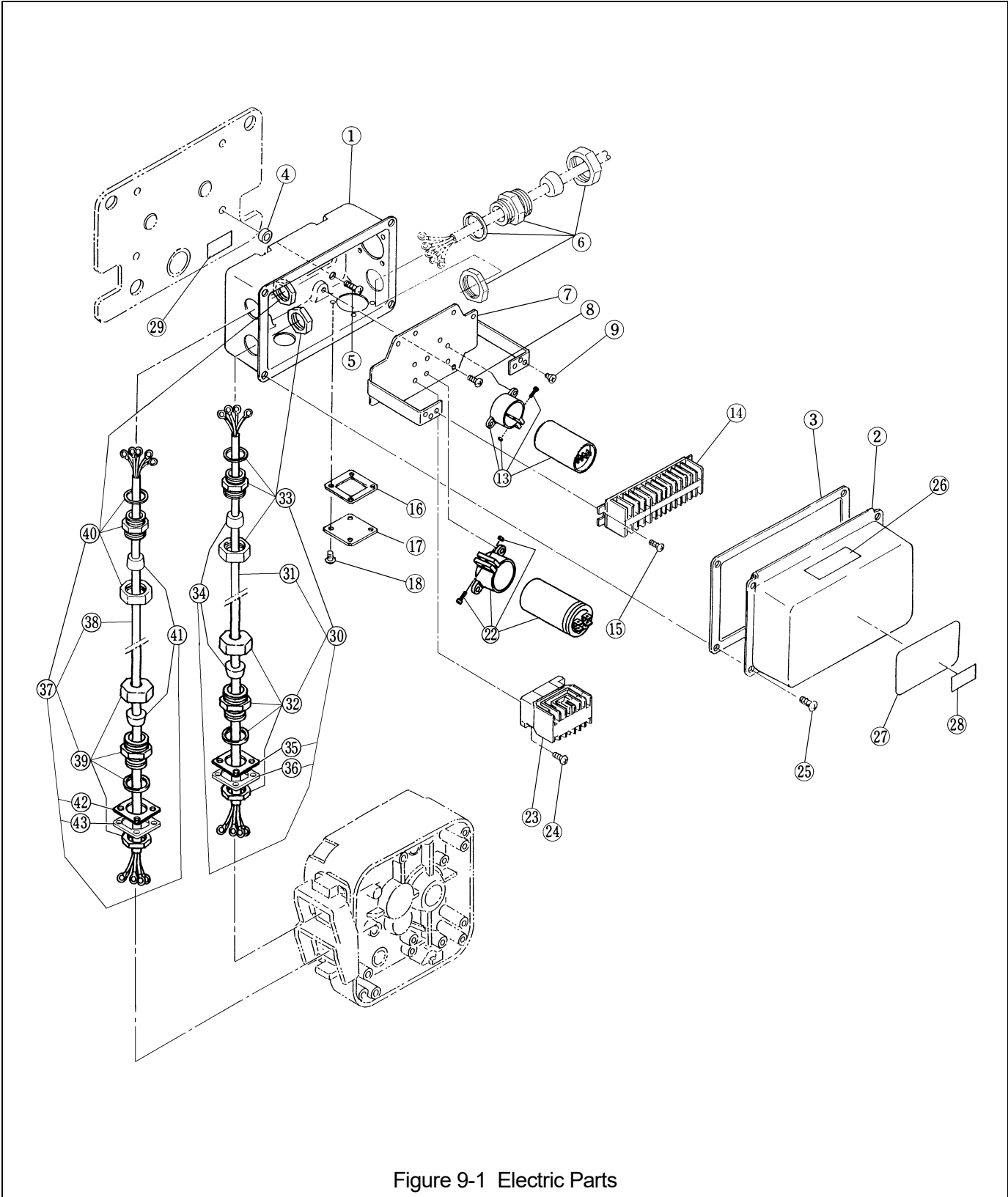


Figure 9-1 Electric Parts

9.1 Electric Parts

Figure No.	Part Name	Parts Per Trolley	1 Ton	2 Ton	3 Ton
1	Connection Box	1	MR1DS9401		
2	Connection Box Lid	1	MR1DS9411		
3	Packing	1	MR1DS9421		
4	Spacer	4	MS517010		
5	Machine Screw	4	60704		
6	Cable Holder A Assembly	1	ECP5924BB		
7	Plate Assembly	1	MP1DS9447		
8	Machine Screw w/Spring Washer	4	MS554010		
9	Machine Screw w/Spring Washer	2	MS555010		
10	Holder 46	1	ECP99BK02		
11	Nut	1	9093414		
12	Machine Screw w/Spring Washer	1	MS557010		
13	Starter Switch Assembly	1	EP1CS2472		
14	Terminal Plate 18P	1	ECP1518AE		
15	Machine Screw w/Spring Washer	2	MS556010		
16	Cord Cover Support Packing	1	MS527010		
17	Lid 42	1	E6F630010S		
18	Machine Screw w/Spring Washer	4	MS554010		
22	Capacitor Assembly – Model MP1A	1	EP1BS2473		
	Capacitor Assembly – Model MP1B	1	MP1DS2535		
23	Electromagnetic Contactor	1	MGC23306D		
24	Machine Screw w/Spring Washer	2	MS556010		
25	Machine Screw	4	MS554010		
26	Warning Label EE	1	E2D866125		
27	Nameplate B	1	MR2SHM10S9A8		
28	Nameplate C	1	MR2SHM10S9A7	MR2SHM20S9A7	MR2SHM30S9A7
	Nameplate C – 1/4 Ton	1	MR2SHM03S9A7		
	Nameplate C – 1/2 Ton	1	MR2SHM05S9A7		
29	Warning Seal TM	1	T6PD0059865		
30	Cable 3C Assembly	1	MP1DS2745		MP1FS2745
31	P/S Cord 4C	1	12/4		
32	Cable Holder A Assembly	1	60704		
33	Cable Holder A Assembly	1	60704		
34	Cable Packing	2	ECP6916AA		
35	Holder Plate	1	ECP5924AI		
36	Plate Packing	1	ECP5924AJ		
37	Cable 4C Assembly	1	MP1DS2746		MP1FS2746
38	P/B Cord 5C	1	16/6		
39	Cable Holder A Assembly	1	60704		
40	Cable Holder A Assembly	1	60704		
41	Cable Packing	2	ECP6912AA		
42	Holder Plate	1	ECP5924AI		
43	Plate Packing	1	ECP5924AJ		

9.2 Pendant Parts

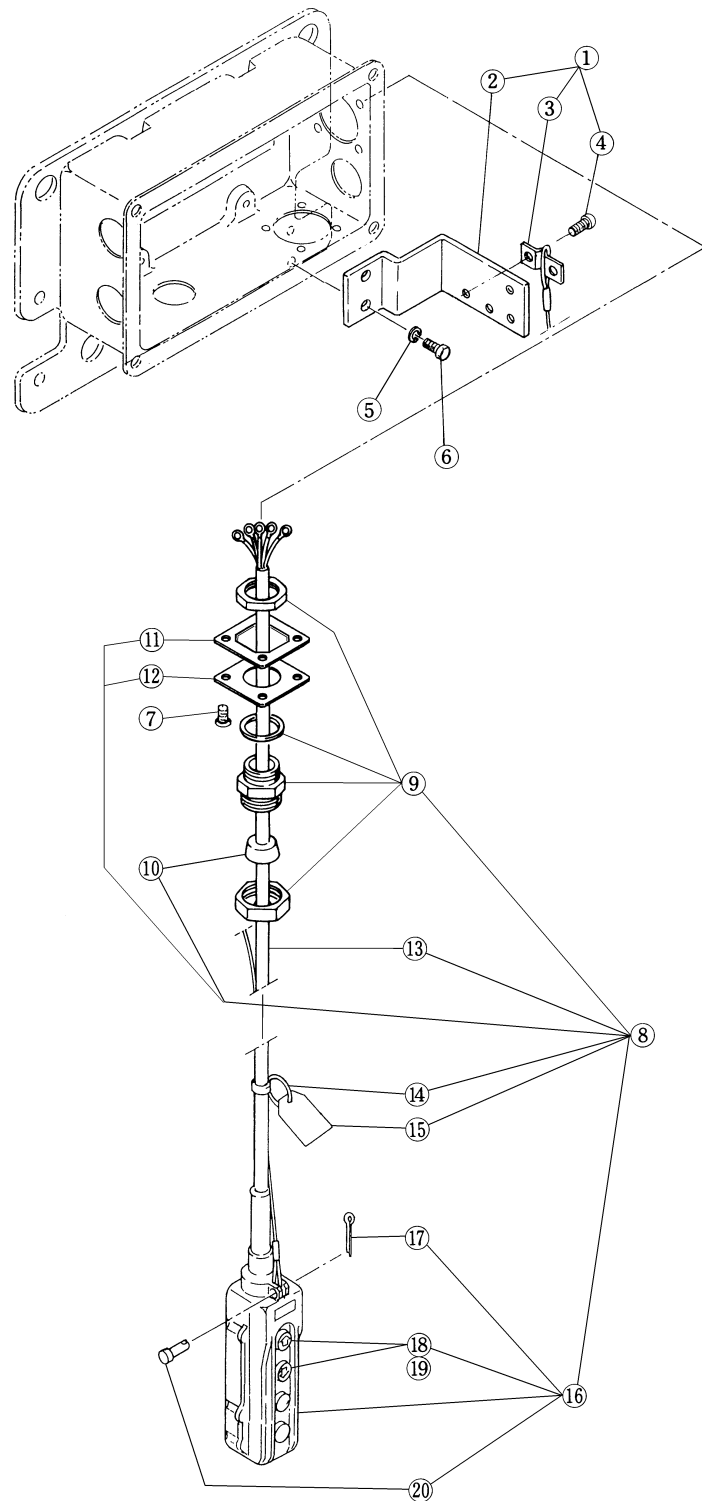


Figure 9-2 Pendant Parts

9.2 Pendant Parts

Figure No.	Part Name	Parts Per Trolley		1 Ton	2 Ton	3 Ton
1	Bar Holder Assembly		1	MR1DS1481		
2	Bar Holder		1	MR1DS9481		
3	Cord Chain Stopper		1	E6L614010S		
4	Machine Screw w/Spring Washer		2	E6F151003		
5	Spring Washer		2	9012712		
6	Socket Bolt		2	9091295		
7	Machine Screw w/Spring Washer		4	MS554010		
8	4 Button Pendant		1	MP1DSS2781		MP1FSS2781
9	Cable Holder A Assembly		1	60704		
10	Cable Packing		1	ECP6912AA		
11	Plate Packing		1	ECP5924AJ		
12	Holder Plate		1	ECP5924AF		
13	P/B Cord 5C		1	16/6P		
14	Tag Holder		1	E3S787003		
15	Warning Tag LD		1	WTAG7		
16	4 Push Button Switch Assembly		1	ECP311EAB		
17	Split Pin		1	9009402		
18	Cap		4	CAP		
19	Arrow Set of 2		4	ARROWS		
20	Cord Chain Pin B		1	ES628003		

This exploded view diagram illustrates the assembly of a power supply system. The components are identified by numbered callouts:

- 1:** Main power supply unit.
- 2:** Mounting bracket for the power supply unit.
- 3:** Cable or hose connecting the power supply to the rest of the system.
- 4:** Connector or plug for the main power supply.
- 5:** Small electrical component, possibly a fuse or relay.
- 6:** Mounting plate or base for the power supply.
- 7:** Cable or hose connecting the power supply to the rest of the system.
- 8:** Cable or hose connecting the power supply to the rest of the system.
- 9:** Cable or hose connecting the power supply to the rest of the system.
- 10:** Mounting bracket or plate.
- 11:** Mounting bracket or plate.
- 12:** Mounting bracket or plate.
- 13:** Mounting bracket or plate.
- 14:** Mounting bracket or plate.
- 15:** Cable or hose connecting the power supply to the rest of the system.
- 16:** Cable or hose connecting the power supply to the rest of the system.
- 17:** Connector or plug for the power supply.
- 18:** Connector or plug for the power supply.

Figure 9-3 Power Supply Parts

9.3 Power Supply Parts

Figure No.	Part Name	Parts Per Trolley		1 Ton	2 Ton	3 Ton
1	Power Supply Cable 4C Assembly		1	MP1ES1771		
2	Power Supply Cable 4C		1	10/4		
3	Cable Support 14 Assembly		1	M3EN010-17242		
4	Cable Packing		1	ECP6918AA		
5	Cable Hanger 14 Assembly		6	MS1733020		
6	Cable Support Bar Complete Assembly		1	MR1DS1491		
7	Cable Support Arm		1	MR1DS9492		
8	Cable Support Bar		1	MR1DS9491		
9	Wire Guide Assembly		1	MR1DS1493		
10	Support Bar Holder		1	MR1DS9501		
11	Spring Washer		2	9012711		
12	Hex Head Cap Screw		2	9093329		
13	Spring Washer		2	9012712		
14	Socket Bolt		2	9091293		
15	Trolley Cable Assembly 6C		1	MP1DS1796		
16	Trolley Cable 6C		1	14/6		
17	Cable Holder A Assembly		2	60704		
18	Cable Packing		2	ECP6914AA		

9.4 Side Plates and Suspension Parts

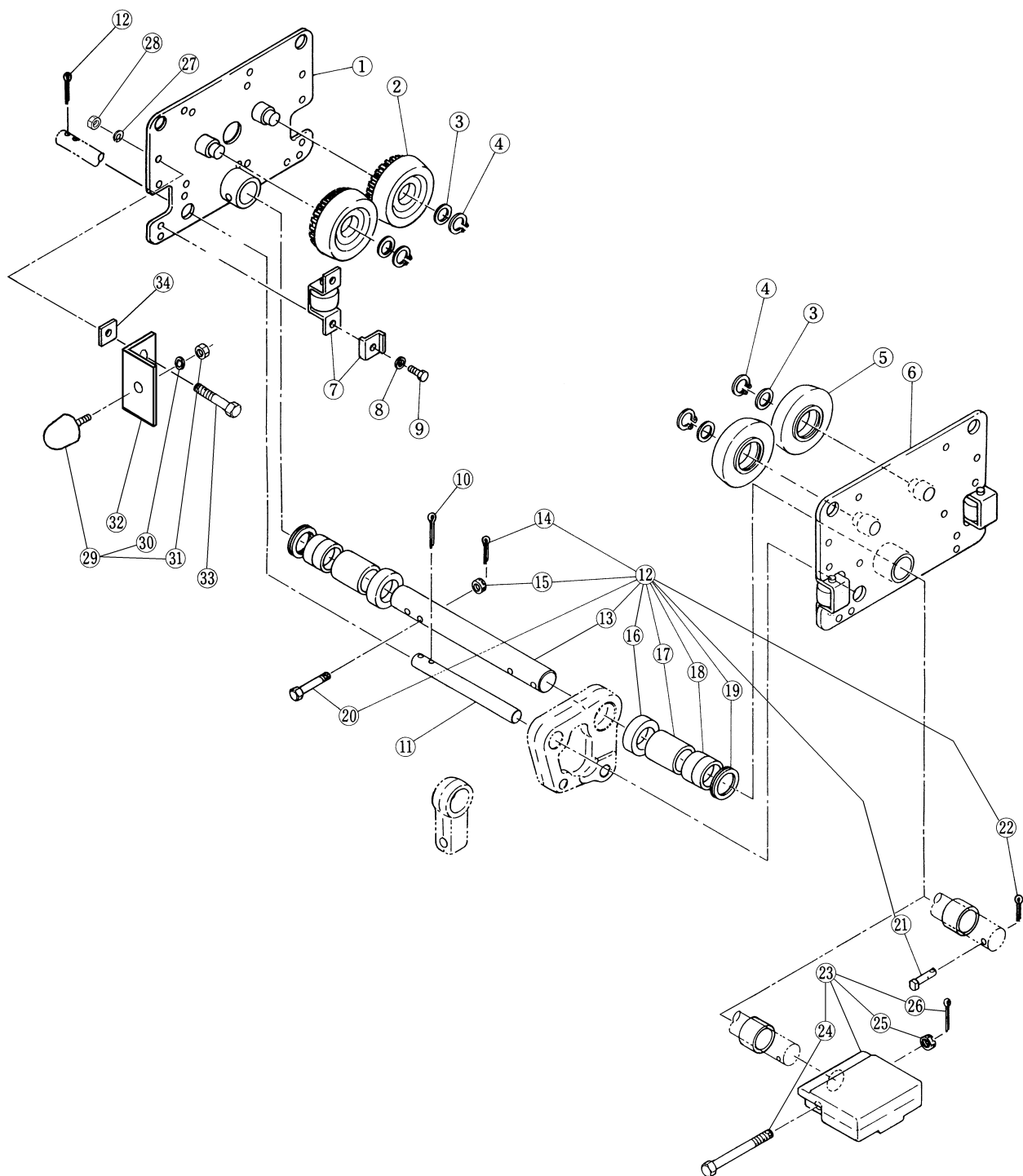


Figure 9-4 Side Plates and Suspension Parts

9.4 Side Plates and Suspension Parts – All Speeds

Figure No.	Part Name	Parts Per Trolley	1 Ton	2 Ton	3 Ton
1	Side Plate G Assembly	1	MR1DS5201	MR1ES5201	MR1FS5201
2	Track Wheel G Assembly	2	MS1101010	MS1101020	MS1101030
3	Washer	4	MS104010	MS104020	MS104030
4	Snap Ring	4	9047115	9047120	9047125
5	Track Wheel S Assembly	2	MS1102010	MS1102020	MS1102030
6	Side Plate S Assembly	1	MR1DS5202	MR1ES5202	MR1FS5202
7	Side Roller Complete Set	4	MR1DS1211	MR1ES1211	
8	Spring Lock Washer	8	9012711	9012712	
9	Bolt	4	9093329	9093351	
10	Split Pin	2	9009446		9009448
11	Fixing Shaft	1	MR1DS9131	MR1ES9131	MR1FS9131
12	Suspension Shaft Complete Set	1	MR1DS1111	MR1ES1111	MR1FS1111
13	Suspension Shaft	1	MSF115010	MSF115020	MR1FS9101
14	Split Pin	1	90094145		90094165
15	Slotted Nut	1	T3P154020		MS162030
16	Thick Spacer L	2	MR1DS9110	MR1ES9110	MR1FS9110
17	Fixing Spacer	0			
18	Thick Spacer	3	MSF116010	T7G116030	MSF116030
19	Thin Spacer	8	MSF117010	MSF117020	MSF117030
20	Bolt	1	MS161010	MS161020	MS161030
21	Shaft Stopper	1	T6G156020	MS164020	MS164030
22	Split Pin	1	9009432		9009433
23	Balance Weight Complete Set	1	MR1DB1621		
24	Weight Bolt	1	MR1DB9622		
25	Slotted Nut	1	MS162010		
26	Split Pin	1	9009413		
27	Spring Washer	8	9093424	9093427	
28	Nut	8	9012711	9012712	
29	Bumper	4	MR1DS9631	MR1FS9631	
30	Spring Washer	4	9012711		
31	Nut	4	9093424		
32	Angle	4	MR1DS9634	MR1ES9634	
33	Bolt	8	9093330	9093352	
34	Square Spacer	4	MS006010	MS006020	

EXTENDED FLANGE RANGE SUSPENSION SHAFT PARTS

Figure No.	Part Name	Parts Per Trolley	1 Ton	2 Ton	3 Ton
10	Split Pin	2	9009446		9009448
11	Fixing Shaft	1	MR1DS9141	MR1ES9141	MR1FS9141
12	Suspension Shaft Complete Set	1	MR1DS1112	MR1ES1112	MR1FS1112
13	Suspension Shaft	1	MSF181010	MSF181020	MR1FS9121
14	Split Pin	1	90094145		90094165
15	Slotted Nut	1	T3P154020		MS162030
16	Thick Spacer L	2	MR1DS9110	MR1ES9110	MR1FS9110
17	Fixing Spacer	2	MSF182010	MSF182020	MSF182030
18	Thick Spacer	9	MSF116010	T7G116030	MSF116030
19	Thin Spacer	8	MSF117010	MSF117020	MSF117030
20	Bolt	1	MS161010	MS161020	MS161030
21	Shaft Stopper	1	T6G156020	MS164020	MS164030
22	Split Pin	1	9009432		9009433

9.5 Motor Parts

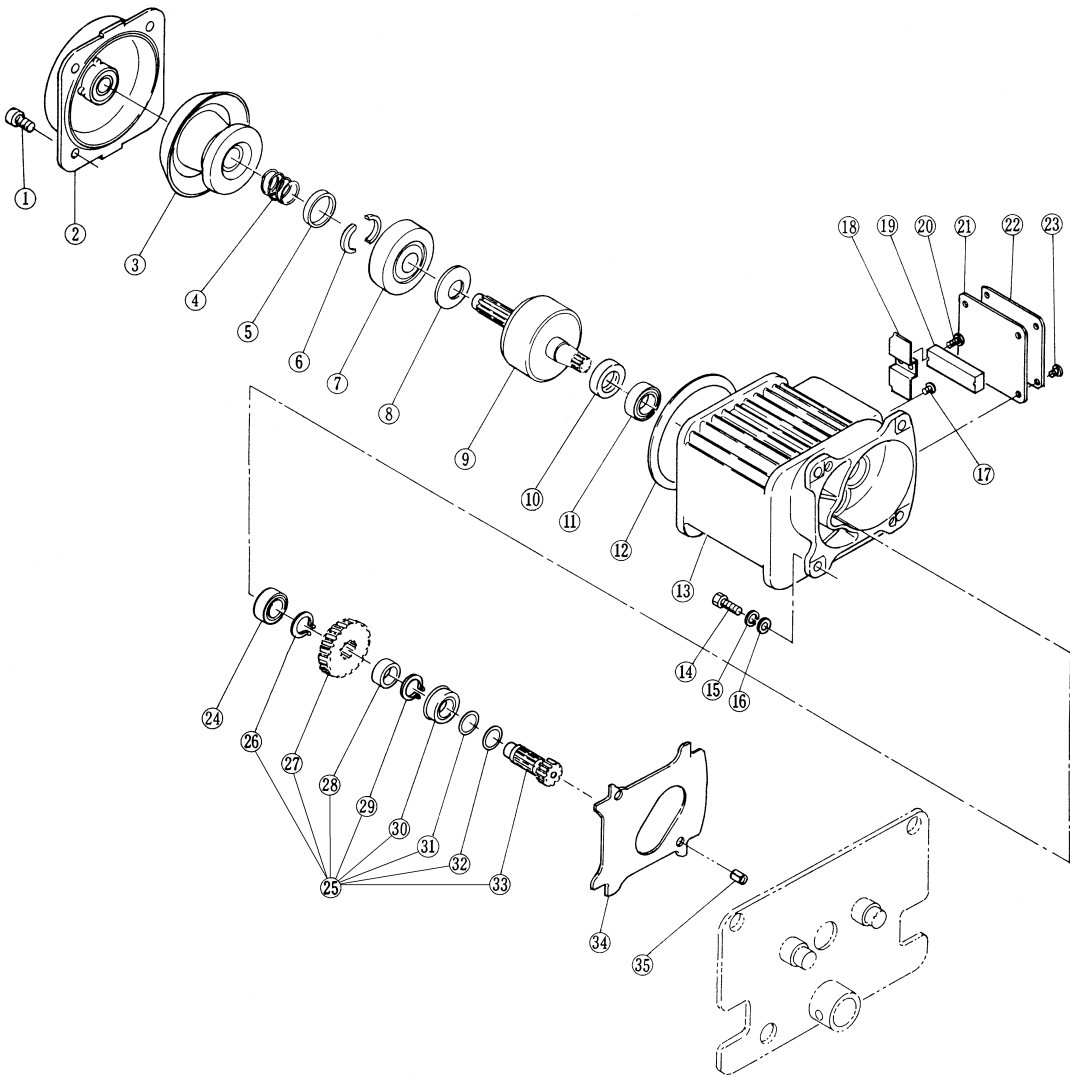


Figure 9-5 Motor Parts

9.5 Motor Parts

Figure No.	Part Name	Parts Per Hoist		1 Ton	2 Ton	3 Ton
1	Socket Bolt		4	90912134		
2	Motor Cover Assembly		1	MR1DS1301		
3	Brake Drum Assembly – Model MP1A		1	MP1DS5261		
	Brake Drum Assembly – Model MP1B		1	MP1DS5261R2		
4	Brake Spring		1	MP1DS9264		
5	Thrust Collar		1	ES506005S		
6	Thrust Disc		2	ES505005S		
7	Pull Rotor		1	ES503005S		
8	Coned Disc Spring		1	ES504005S		
9	Motor Shaft with Rotor – Model MP1A		1	MP1DS5291		
	Motor Shaft with Rotor – Model MP1B		1	MP1DS5291R2		
10	Oil Seal		1	MR1DS9293		
11	Ball Bearing		1	9001004		
12	Guard		1	MR1DS9281		
13	Motor Frame with Stator – Model MP1A		1	B1SHF10S5A2		
	Motor Frame with Stator – Model MP1B		1	B1SHF10S5R2		
	Motor Frame with Stator – Model MP1A – w/Optional Thermal Protection		1	B1SHF10S5TP		
	Motor Frame with Stator – Model MP1B – w/Optional Thermal Protection		1	B1SHF10S5TPR2		
14	Bolt		4	9093328		
15	Spring Washer		4	9012711		
16	Washer		4	9012513		
17	Machine Screw w/Spring Washer		1	MS555010		
18	Coil Cover		1	MR1DS9326		
19	Terminal Plate 6P		1	MS518010		
20	Machine Screw w/Spring Washer		2	MS556010		
21	Terminal Cover Packing		1	MR1GS9325		
22	Terminal Cover		1	M6F206D010		
23	Machine Screw w/Spring Washer		4	MS554010		
24	Ball Bearing		1	E2D238125		
25	Gear Set 80 FPM	S	1	MR1DS1241	MR1ES1241	
	Gear Set 40 FPM	L	1	MR1DL1241	MR1EL1241	
26	Snap Ring		1	9047120		
27	Gear #2 80 FPM – MODEL MP1B ONLY	S	1	MR1DS9241		
	Gear #2 40 FPM	L	1	MR1DL9241		
28	Spacer		1	MR1DS9244		
29	Snap Ring		1	9047120		
30	Ball Bearing		1	9001211		
31	O Ring		1	MR1DS9254		
32	O Ring		1	9013316		
33	Gear #3		1	MR1DS9242	MR1ES9242	
34	Gear Box Packing		1	MR1DS9248		
35	Set Pin		2	MR1DS9249		



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