Form OMMSE
Edition 2
January 1989

OPERATION AND MAINTENANCE MANUAL
for

MODEL SE1-005
1/2 TON ELECTRIC CHAIN HOIST

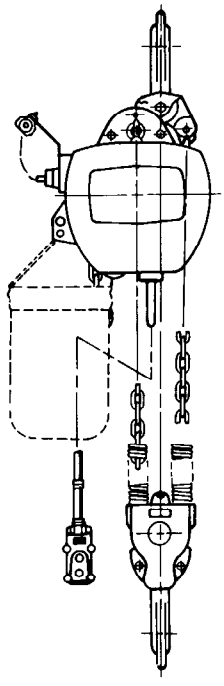
MODEL SE2-010
1 TON ELECTRIC CHAIN HOIST

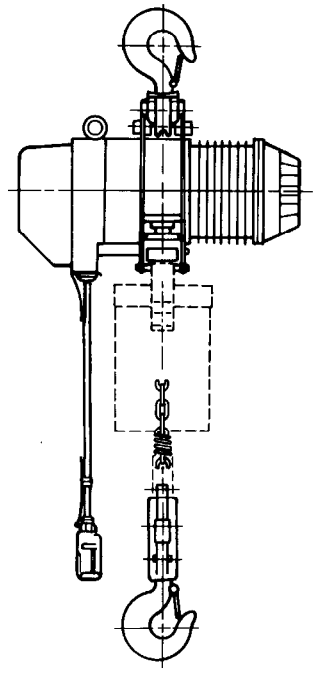
MODEL SE3-020
2 TON ELECTRIC CHAIN HOIST

MODEL SE4-030
3 TON ELECTRIC CHAIN HOIST

MODEL SE5-050
5 TON ELECTRIC CHAIN HOIST

(Including SEMT, UTP and UTG trolleys)





WARNING:

Do not use this hoist for lifting, supporting, or transporting people or lifting or supporting loads over people.

Always operate, inspect and maintain this Hoist in accordance with American National Standards Institute Safety Code (ANSI B30.16) and any other applicable safety codes and regulations.

Read all the enclosed instructions and warning labels before installing, operating or repairing this hoist.

Refer All Communications to the Nearest
Ingersoll-Rand Material Handling Products
Office or Distributor.

INGERSOLL-RAND®
MATERIAL HANDLING PRODUCTS

TABLE OF CONTENTS

SAFETY SUMMARY

WARNING: Do not use this hoist for lifting, supporting, or transporting people or lifting or supporting loads over people.
WARNING: The supporting structures and load-attaching devices used in conjunction with this hoist must provide an adequate safety factor to handle the rated load, plus the weight of the hoist. If in doubt, consult a qualified structural engineer.
WARNING: Electrical installation should be performed by licensed electricians in accordance with the latest edition of the National Electrical Code (ANSI/NFPA 70) and any applicable local, state and national electrical codes and ordinances.

The National Safety Council, Accident Prevention Manual for Industrial Operations, Eighth Edition and other recognized safety sources make a common point: Employees who work near cranes or assist in hooking on or arranging a load should be instructed to keep out from under the load. From a safety standpoint, one factor is paramount: conduct all lifting operations in such a manner that if there were an equipment failure, no personnel would be injured. This means keep out from under a raised load and keep out of the line of force of any load.

To the best of our knowledge, INGERSOLL-RAND Material Handling Products hoists are manufactured in accordance with the latest standards in effect at time of manufacture.

However, contrary to common belief, the Occupational Safety and Health Act of 1970, as we understand it, generally places the burden of compliance with the user, not the manufacturer. Many OSHA requirements are not concerned or connected with the manufactured product but are, rather, connected with the final installation: "It is the owner's responsibility and user's responsibility to determine the suitability of a product for any particular use. Check all applicable industry, trade association, federal, state and local regulations. Read all operating instructions and warnings before operation."

Rigging: It is the responsibility of the operator to exercise caution, use common sense and be familiar with proper rigging techniques. See ANSI/ASME B30.9 for rigging information, American National Standards Institute, 1430 Broadway, New York, NY 10018.

NOTICE: Using other than genuine INGERSOLL-RAND Material Handling Products parts will result in the void of warranty.

Hoist returned with opened, bent or twisted hooks, or without chain and hooks, will not be repaired or replaced under warranty.

PARTS ORDERING INFORMATION

The use of replacement parts other than INGERSOLL-RAND Material Handling Products will invalidate the Company's warranty. For prompt service and genuine INGERSOLL-RAND Material Handling Products parts, provide your nearest Distributor with the following:

1. Complete model number and serial number as it appears on the nameplate. For:
   Electric chain hoist, SE plus capacity.
   Motorized trolley, SEMT plus capacity.
   Plain trolley, UTP plus capacity.
   Geared trolley, UTG plus capacity.
2. Part number and part name as shown in manual.
3. Quantity required.

NOTE: All SE electric chain hoists have two chain falls.

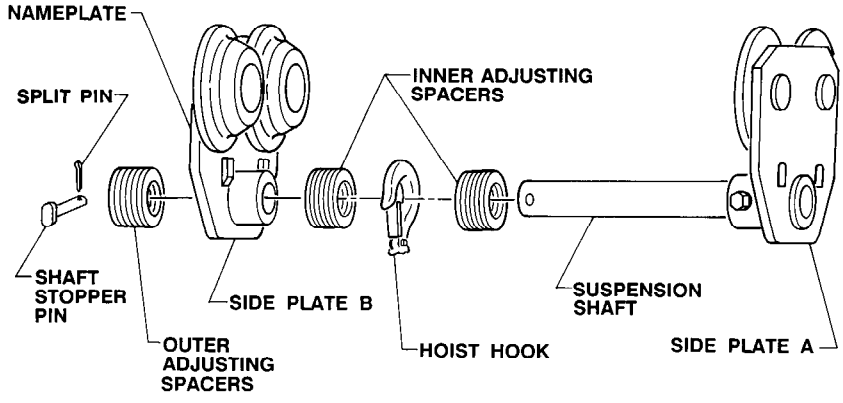
INSTALLATION

WARNING: Before installing, read "SAFETY SUMMARY".
Before using, remove the solid plug from the top of the hoist gear case and replace it with the vent plug attached to the unit. With the hoist level, make sure the gear case oil is level with the bottom of the level plug hole on the side of the gear case.

Hook Mounted Hoist Installation
Place hook over mounting structure. Make sure safety latch is engaged.

Installing Over the Open End of the Beam
Preadjust trolley width for the beam flange measurement, remove the rail stop and slide it onto the end of the beam. If the previous procedure can not be used, due to insufficient space or fixed limit stops, the hoist must be installed from underneath the beam.

Plain or Geared Trolley Installation (See Assembly Drawing for UTP and UTG Trolleys)
1. If a suspender (30) is used to mount the hoist to the trolley, remove split pin (3, Hoist Hook Parts), slotted nut (4, Hoist Hook Parts) and top pin L (8, Hoist Hook Parts). Remove the top hook (1, Hoist Hook Parts) and replace with suspender (30). Reverse procedure to secure suspender to hoist.
2. Remove fasteners (16 and 18) and spacers (12) from the suspension shaft (17).



3. Insert suspension shaft into side plate A (1) on plain trolley, or side plate G (23) on geared trolley. Align holes in suspension shaft (17) and side plate (1 or 23). Secure with bolt (16), slotted nut (14) and split pin (13).

CAUTION: The hoist must be centered under the trolley by the spacers.

CAUTION: On geared trolleys, mount the hoist so that the power supply cable is on the opposite side of the trolley as the hand wheel.

4. Slide enough spacers (12) on the suspension shaft (17) to fill the space between the side plates with the hook or suspender installed. Center the hoist under the trolley with, as near as possible, equal amounts of spacers on each side of the hook. See the table below.

Number of Adjusting Spacers (Plain and Geared Trolley)

Beam Width	(in.)	2.31	2.50 • 2.63	2.88 • 2.94	3.25	3.56	3.88	3.94	4.19	4.31	4.44	4.69 • 4.75	4.94	5.19	5.31 • 5.38	5.50	5.63	5.88 • 5.94	6.13	6.31	6.69	6.88
Cap. (ton)	(mm)	58	64 • 66	73 • 74	82	90 • 91	98	100	106	110	113	119 • 120	125	131	135 • 137	140	143	149 • 150	155	160	170	175
1/2•1	Inner	1+2	2+3	4+4	5+6	6+7	8+8	8+8	9+9	9+10	10+10	11+11	12+12									
	Outer	21	19	16	13	11	8	8	6	5	4	2	0									
2•3	Inner							1+2	2+3	3+3	3+3	4+5	5+6	6+6	7+7	7+8	8+9	9+9				
	Outer							15	14	12	12	9	8	6	4	3	2	0				
5	Inner												1+2	2+3	3+3	4+4	4+5	5+6	6+7	7+7	8+9	9+9
	Outer												15	13	12	10	9	7	5	4	1	0

NOTE: For the number of spacers on Inner side; numbers on the left show the number on side plate A and numbers on the right show the number on side plate B.

Example 1 + 2

Number on side plate A — Number on side plate B

5. Adequately support the hoist and side plate (1 or 23) and raise into place on the beam flange.

NOTE: Trolley wheels ride on the top of the lower flange of the beam.

6. Slide side plate B (10) over the suspension shaft (17) and push both side plates together. The correct total clearance between the beam and the trolley wheel flanges is 3/32 to 5/32 in. (2 to 4 mm) for 1/2 to 5 ton hoists. To obtain total clearance, add the clearance on both sides of the trolley together.
7. Slide all extra spacers (12) over the free end of the suspension shaft (17). Insert shaft stopper pin (18) into the hole in the suspension shaft (17), place flat side of head flush against spacers. Secure with split pin (15).

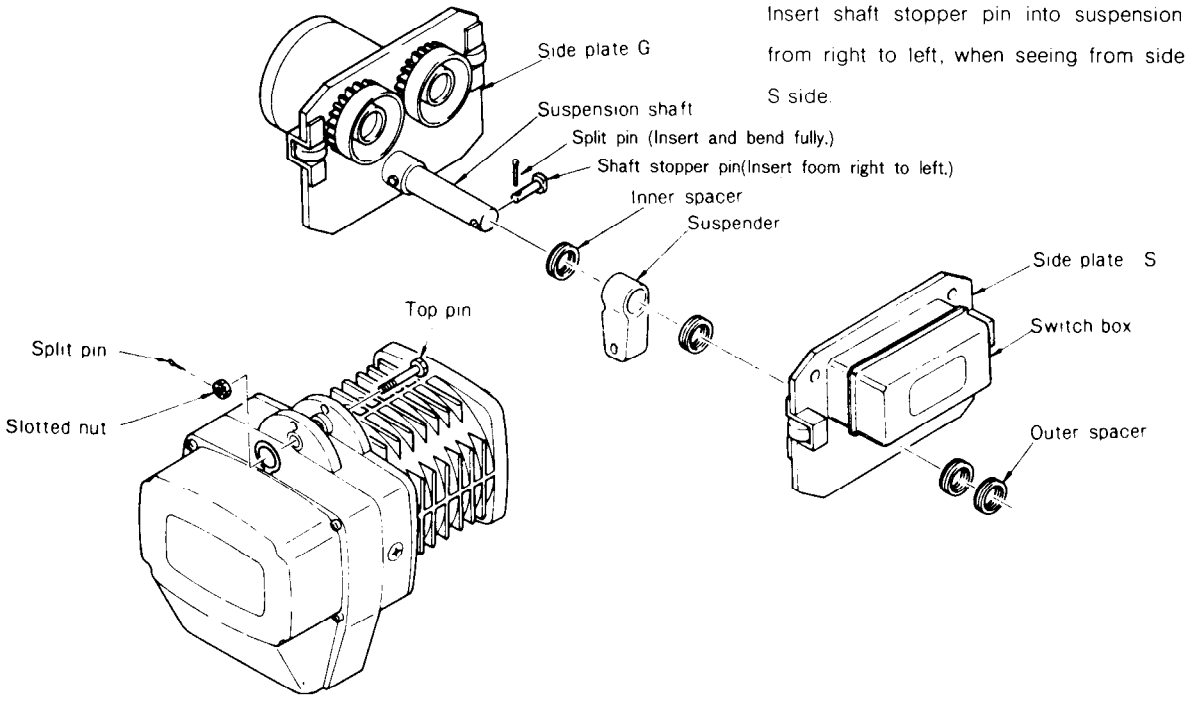
The stopper (18) and outside spacers must hold the trolley to the adjustment in step 6. If the side plates can be spread farther apart, install more spacers between side plate B (10) and the shaft stopper pin (18).

Motorized Trolley Installation (See Trolley Housing and Motor Parts Drawing)

CAUTION: Mount the trolley, then attach the hoist.

A suspender is used to mount the hoist to the trolley.

1. Remove trolley side plate S assembly (48) from suspension shaft (61) and pull off suspender (56).
2. Slide enough spacers (58) on the suspension shaft (61) to fill the space between the side plates with the suspender (56) installed. Center the hoist under the trolley with, as near as possible, equal amounts of spacers on each side of the suspender. See the table below.



Number of Adjusting Spacers (Motorized Trolley)																							
Beam Width	(in.)	2.31	2.50 • 2.63	2.88 • 2.94	3.25	3.56	3.88	3.94	4.19	4.31	4.44	4.69 • 4.75	4.94	5.19	5.31 • 5.38	5.50	5.63	5.88 • 5.94	6.13	6.31	6.69	6.88
Cap. (tons)	(mm)	58	64 • 66	73 • 74	82	90 • 91	98	100	106	110	113	119 • 120	125	131	135 • 137	140	143	149 • 150	155	160	170	175
1/2•1	Inner	1+2	2+3	4+4	5+6	6+7	8+8	8+8	9+9	9+10	10+10	11+11	12+12									
	Outer	21	19	16	13	11	8	8	6	5	4	2	0									
2•3	Inner							0+0	1+1	1+2	2+2	3+3	4+4	5+5	6+6	6+7	7+7	8+8				
	Outer							16	14	13	12	10	8	6	4	3	2	0				
5	Inner												0+0	1+1	2+2	2+3	3+3	4+4	5+5	5+6	7+7	7+8
	Outer												16	14	12	11	10	8	6	5	2	1

NOTE: For the number of spacers on Inner side; numbers on the left show the number on side plate G and numbers on the right show the number on side plate S.

Example 1 + 2

Number on side plate G — Number on side plate S

3. Adequately support side plate G assembly (48) and raise into place on the beam flange.

NOTE: Trolley wheels ride on the top of the lower flange of the beam.

4. Slide side plate S (48) over the suspension shaft (61) and push both side plates together. The correct total clearance between the beam and the trolley wheel flanges is 3/32 to 5/32 in. (2 to 4 mm) for 1/2 to 5 ton hoists. To obtain total clearance, add the clearance on both sides of the trolley together.
5. Slide all extra spacers (58) over free end of the suspension shaft (61). Insert shaft stopper pin (64) into the hole in the suspension shaft (61), place flat side of pin head flush against spacers. Secure with split pin (63).

The stopper (64) and outside spacers must hold the trolley to the adjustment in step 4. If the side plates can be spread farther apart, install more spacers between side plate S (48) and the shaft stopper pin (64).

6. Remove split pin (3, Hoist Hook Parts), slotted nut (4, Hoist Hook Parts), top pin L (8, Hoist Hook Parts) and top hook assembly (1, Hoist Hook Parts).
7. Lift the hoist into place and attach to suspender with top pin L, slotted nut, and cotter pin removed in step 6.

Orientation of the hoist with respect to the trolley: when facing the trolley connecting station, the hoist motor and brake must be on the right side.

Electrical Connections

WARNING: Before connecting, read "SAFETY SUMMARY".

Wires (leads) can be identified by color, or in the case of motor wires, by numbers taped to each wire. Terminals are identified by raised letters or labels on the terminal blocks. Manufacturer-supplied cables have crimp terminals, ring tongue type, on the end of each wire.

NOTE: Wiring diagrams are located on pages 19, 20 and 21.

Some terminals have more than one wire attached. When changing the connections of wires, it is recommended that only one wire be changed at a time to avoid confusion. See the appropriate wiring diagram for specific connections.

To make the electrical connections hoist and/or trolley, perform the following steps:

1. If 230 V power is used, convert the motor terminal block(s) and the control circuit transformer. See "Hoist Conversion for 230 V Power Supply."
2. If a motorized trolley is used, connect the two trolley cables, which provide hoist power and hoist control, to the hoist. See "Hoist to Motorized Trolley Electrical Connections." See the cabling diagram for the general layout of the cables.
3. Connect the power supply. See "Power Supply Connection."

Hoist Conversion for 230 V Power Supply

CAUTION: The hoist is wired to operate with 460 V, 60 Hz, 3 Phase power. The hoist may be rewired for 230 V, 60 Hz, 3 Phase. Do not use with any other power type.

If the hoist is to be used with 460V power, skip this procedure.

For steps 1 through 4 below, refer to the appropriate 230 V wiring diagram:
Hoist Without Motorized Trolley
Hoist With Motorized Trolley

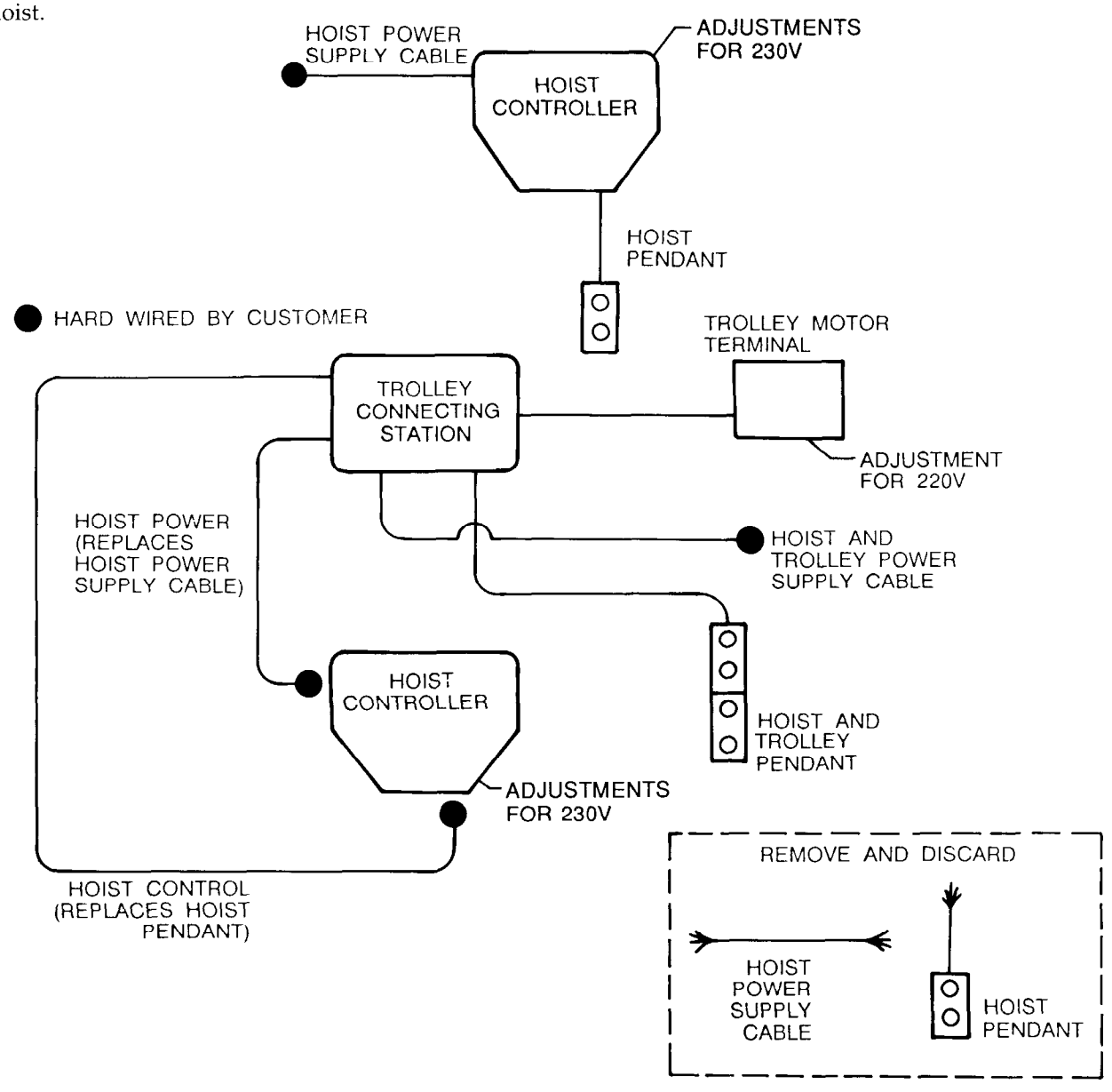
1. Reconnect hoist motor leads U2, V2, W2, Y1 and Z1.
2. Reconnect transformer leads U1 and V.
3. Reconnect white lead from nonreverse relay on transformer.

For motorized trolley, also:

4. Reconnect trolley motor leads U2, V2, W2, Y1 and Z1.

Hoist to Motorized Trolley Electrical Connections

When a motorized trolley is used with a hoist, the existing hoist power supply cable and pendant are removed. The power and control cables must be wired from the trolley connecting station (19, Trolley Power Supply Parts) into the hoist.



Hoist Control Connection: (See Trolley Control Station Parts)

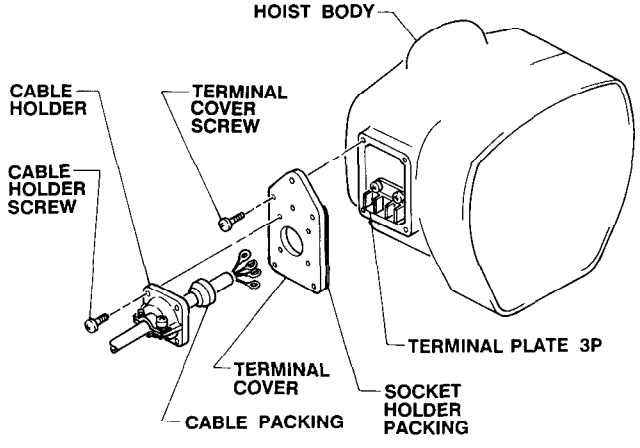
1. Remove socket bolts (37, Hoist Housing and Motor Parts) and controller cover (35, Hoist Housing and Motor Parts).
2. Disconnect the hoist pendant wires at the electromagnetic contactor and transformer. See the appropriate wiring diagram.
3. Remove machine screws (21) attaching cable holder (15 or 18) to the hoist body.
4. Remove hoist pendant. Keep socket holder packing B (20, Hoist Control Station Parts).
5. Place socket holder packing B (20, Hoist Control Station Parts) over cable 5C (10). When facing the trolley connecting station cover, the control cable is the upper cable on the left side. Insert cable 5C (10) into the hoist body.
6. Connect the control cable 5C (10) wires to the appropriate terminals on the electromagnetic contactor and transformer. See the wiring diagram.

NOTE: If it becomes necessary to increase the length of the wires, loosen and slide clamp (14) down cable 5C (10). Cut the outer insulation of cable 5C (10) back to free the enclosed wires. Retighten clamp (14).

7. Align the screw holes in the socket holder packing B (20, Hoist Control Station Parts) and the cable holder (15 or 18).
8. Position cable holder (15 or 18) on hoist body and secure with machine screws (21).

Hoist Power Connection: (See Trolley Power Supply Parts and figure below)

1. Removing the existing hoist power supply cable requires accessing terminal plate 3P. Unscrew terminal cover machine screws. Loosen cable clamp, located on the cable holder, and pull the terminal cover away from the hoist body.
2. Remove the power supply cable wires from terminal plate 3P. See the appropriate wiring diagram.
3. Unscrew the cable holder screws attaching the cable holder. Remove the existing hoist power cable from the cable holder.
4. Loosen cable clamp (6) on cable 4C (5).
5. Position cable holder (7) of cable 4C on terminal cover. Attach with cable holder machine screws (20). Place the socket holder packing over the end of cable 4C (5).
6. Connect wires of cable 4C (5) to terminal plate 3P.
7. Position terminal cover and socket holder packing on the hoist body. Secure by installing terminal cover screws.



Power Supply Connection

CAUTION: When installing the power cable, make sure it does not become twisted.
On a straight beam less than 50 feet (15.2 m) long, install a messenger wire system to support the power supply cable. On geared trolleys, install the messenger wire on the opposite side of the trolley as the trolley hand chain. An 1/8 to 1/4 inch (3 to 6 mm) wire rope is usually used to support the power supply cable hangers. On long straight beams or curved beams where the wire cannot be attached to the beam, install a cable trolley system to support the power supply cable.

Connect the hoist to the power supply in accordance with National Electric Code (ANSI/NFPA 70) and any applicable local, state and national electrical codes and ordinances.

1. Make sure there are adequate circuit breakers or fuses. Ampere values of hoist circuit protective devices are:

Model	Time Delay Fuse		Inverse Time Circuit Breaker	
No.:	230V	460V	230V	460V
SE1-005	6(10)	3(6)	10(15)	10(10)
SE2-010	10(15)	10(10)	15(20)	10(10)
SE3-020	15(20)	10(10)	20(30)	10(15)
SE4-030	30(40)	15(20)	40(60)	20(30)
SE5-050	30(40)	15(20)	40(60)	20(30)

NOTE: Values in parenthesis are for hoist with motorized trolley.

2. Make sure all junction boxes and the disconnect switch enclosure are adequately sealed and protected for its environmental conditions.
3. Connect and ground the pig-tailed end of the power supply cable.

NOTE: The power supply cable has four wires.
Red, black and white for power.
Green and yellow striped for ground.

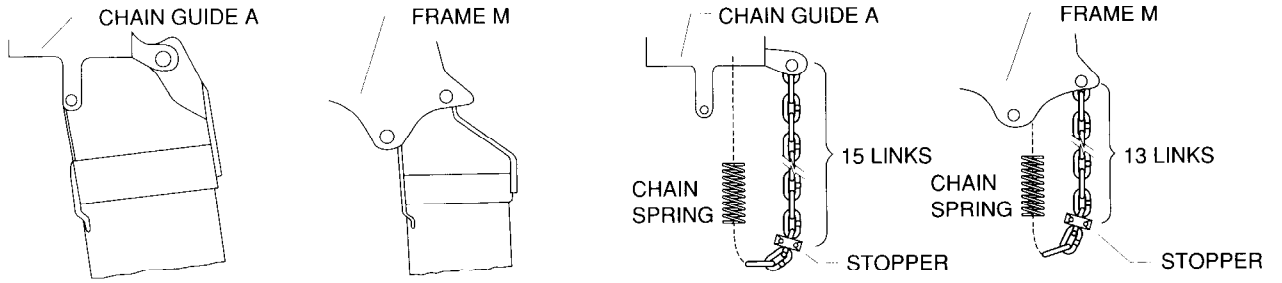
A special non-reversing relay protects the hoist from damage due to incorrect connections of the power supply. If the three power wires are connected incorrectly or if the motor is wired single phase (only two power wires are connected), the motor will not start. Make sure all three power wires are connected. If the hoist still does not start, reverse any two of the three power wires for a correct three phase connection.

Chain Container (See Hoist Chaining Parts)

CAUTION: Do not pile chain in the chain container. Piling the chain into the container by hand may lead to kinking or twisting that will jam the hoist.

To attach the chain container: run bottom block to lowest point, attach chain container to hoist and operate hoist in up direction to feed the chain back into the container.

1. Check the chain bucket label to make sure the length of load chain is within the capacity of the chain bucket. Replace with a larger chain bucket, if required.
2. Slide chain spring (22) over the end of chain and attach stopper (23) to third link from end of the load chain.
3. Install the chain bucket with the socket bolts (1 and 2). For installation, see the appropriate figure below.



SE1-005 to SE3-020 SE4-030 to SE5-050 SE1-005 to SE3-020 SE4-030 to SE5-050

Attaching Free End of Load Chain

If a chain bucket is not used, attach free end of load chain to hoist with socket bolt (1, Hoist Chaining Parts) as illustrated above.

Hoist or Trolley Pendant Cord Modification

To shorten or install new pendant cord:

WARNING: Disconnect electric power before performing any maintenance.

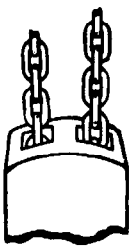
1. Remove the pendant cord and strain relief cable from the hoist.
2. Cut the pendant cord and strain relief cable one foot longer than the desired cord length.
3. Strip back one foot of the outer insulation, exposing the colored wires.
4. Position each colored wire at its correct terminal and cut to required length. Strip back the insulation,exposing the inner copper wire 1/4 in. (7 mm). See the appropriate wiring diagram.
5. Crimp new ring connectors on the copper end of each colored wire and fasten to the correct terminals. See the appropriate wiring diagram.
6. Strip back the strain relief cable 3-1/8 in. (80 mm).
7. Slip a fixing sleeve (38, Trolley Control Station Parts) over the exposed end of the strain relief cable. Insert the end of the strain relief cable into the fixing sleeve until the end of the strain relief cable is flush with the end of the fixing sleeve to create a 1-1/4 in. (32 mm) loop. Crimp the fixing sleeve.

CAUTION: To avoid damaging the pendant cord, make sure the strain relief cable, not the pendant cord, is supporting the weight of the pendant.

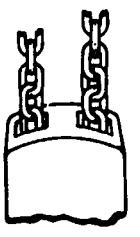
Post-Installation Test

1. After installation, make sure the chain is not twisted, kinked or capsized. Fix before using. For a capsized bottom hook, pass the hook between the two chain falls until the chain is untwisted.

APPEARANCE OF CHAIN THAT HAS NOT BEEN TWISTED



APPEARANCE OF CHAIN THAT HAS BEEN TWISTED



2. Check that the trolley side plates are parallel and vertical. Raise a load equal to the rated capacity of the hoist a few inches off the floor and operate the trolley along the entire length of the beam.

SAFETY INSTRUCTIONS

1. Only allow qualified people (trained in safety and operation) to operate the hoist.
2. Only operate a hoist if you are physically fit.
3. Only allow qualified people (trained in safety, electrical maintenance and troubleshooting) to perform electrical service on hoists.
4. When a "DO NOT OPERATE" sign is placed on the hoist controls, do not operate the hoist until the sign has been removed by designated personnel.
5. Before each shift, the operator should inspect the hoist for wear or damage.
6. Never use a hoist which inspection indicates is defective.
7. Periodically, inspect the hoist thoroughly and replace worn or damaged parts.
8. Lubricate the hoist regularly.
9. Do not use hoist if safety latch on a hook has been sprung or broken.
10. Check that the safety latches are engaged before using.
11. Never splice a hoist chain by inserting a bolt between links.
12. Only lift loads less than or equal to the rated capacity of the hoist. See warning labels attached to the hoist.
13. Never use the hoist chain as a sling.
14. Only operate a hoist when the load chain is centered over the hook. Do not "side pull" or "yard."
15. Never operate a hoist with twisted, kinked, "capsized" or damaged load chain.
16. Do not force a chain or hook into place by hammering.
17. Never insert the point of the hook into a chain link.
18. Be certain the load is properly seated in the saddle of the hook.
19. Do not support the load on the tip of the hook.
20. Never run the load chain over a sharp edge. Use a sheave.
21. When using two hoists to suspend one load, select two hoists each having a rated capacity equal to or more than the load. This provides adequate safety in the event of a sudden load shift or failure of one hoist.
22. Pay attention to the load at all times when operating the hoist.
23. Make sure all people are clear of the load path. Do not lift a load over people.
24. Never use the hoist for lifting or lowering people, and never allow anyone to stand on a suspended load.
25. Ease the slack out of the chain and sling when starting a lift. Do not jerk the load.
26. Do not swing a suspended load.
27. Never suspend a load for an extended period of time.
28. Never leave a suspended load unattended.
29. Never weld or cut a load suspended by the hoist.
30. Never use the hoist chain as a welding electrode.
31. Do not operate hoist if chain jumping, excessive noise, jamming, overloading, or binding occurs.
32. Keep the load from hitting the load chain.
33. Do not use the up and down emergency stop limit switches as a normal means of stopping the hoist.
34. Avoid unnecessary jogging of hoist and/or trolley controls.
35. Before reversing direction, allow the hoist and/or trolley motor to come to a complete stop.
36. Always rig the hoist properly and carefully.
37. Disconnect the electrical power before performing any maintenance.
38. Avoid collision or bumping of hoist.
39. After use, properly secure hoist and loads.

OPERATION

The three most important aspects of hoist operation are: (1) Follow all safety instructions when operating hoist, (2) Allow only qualified people to operate a hoist and (3) Subject each hoist to a regular inspection and maintenance procedure.

Hoist and Motorized Trolley Movement

Lifting and lowering a load is controlled by the two pendant push buttons marked with arrows. Motorized trolley movement is controlled by the bottom two buttons on a four push button pendant.

Plain and Geared Trolley Movement

For plain trolley, movement is controlled by pushing on the hook or load. For geared trolley:

Pull down on right side of hand chain (Clockwise rotation) to move left.

Pull down on left side hand chain (Counterclockwise rotation) to move right.

TROUBLESHOOTING

CAUTION: Interrupt operation immediately if the motor hums or does not rotate.

SYMPTOM: **Trouble:**	**Remedy:**
HOIST WILL NOT OPERATE:	
No power to hoist.	Check connections, fuses, circuit breakers and switches in power supply lines.
Hoist is wired wrong or phasing is reversing causing nonreversing relay to stop hoist.	Check connections. Interchange any two power leads.
Incorrect voltage or frequency.	Compare voltage and frequency rating on the hoist nameplate with the power supply, with and without a load on the hoist.
Loose or broken connections in hoist, power supply or push button.	Disconnect hoist from power source. Remove control cover and pendant cover. Check all connections and check continuity of each wire.
Contactor failure.	Check contactors for wear or burn marks. Replace if necessary. See also "EXCESSIVE CONTACTOR PITTING."
Defective transformer.	Check for proper voltage at primary and secondary terminals. If voltage is measured at primary, but not at secondary, transformer is defective. Replace transformer.
Hoist is overloaded.	Reduce load to within rated capacity.
Motor is burned out.	Replace stator. See "MAINTENANCE."
Motor brake is not releasing. (Motor will not rotate.)	Motor brake lining is "frozen" in drum. Remove motor cover and remove rust, etc. from brake.
LOAD CONTINUES TO MOVE WHEN HOIST IS STOPPED:	
Motor brake is slipping.	Adjust brake. See "MAINTENANCE."
Hoist is overloaded.	Reduce load to within rated capacity.
HOIST WILL NOT LIFT LOAD, IS OVERHEATING, AND/OR DOES NOT LIFT AT RATED SPEED:	
Hoist is overloaded.	Reduce load to within rated capacity.
Rotor is dragging in stator.	Check for worn motor bearings.
Motor brake is too tight.	Adjust brake. See "MAINTENANCE."
Low voltage.	Check voltage at hoist power supply connection with hoist under load. Raise voltage to within 4% of specified hoist voltage.
Starting and stopping the hoist too frequently.	Jog pendant push buttons less frequently.
HOOK RAISES BUT WILL NOT LOWER:	
Hoist down circuit is open.	Check circuit for loose connections. Check down limit switch for proper operation.
Broken or loose conductor in pendant cable.	Disconnect power supply. Check each conductor in cable. If loose, tighten. If broken, replace cable.

HOOK LOWERS, BUT WILL NOT RAISE:

Hoist is overloaded.	Reduce load to within rated capacity.
Low voltage.	Check voltage at hoist power source connection with hoist under load. Raise voltage to within 4% of specified hoist voltage.
Hoist up circuit is open.	Check circuit for loose connections. Check upper limit switch for proper operation.
Broken or loose conductor in pendant cable.	Disconnect power supply. Check each conductor in the cable. If loose, tighten; if broke, replace cable.

MOTOR BRAKE NOISE:

Motor brake needs adjustment.	Adjust brake. See "MAINTENANCE."
Broken brake lining.	Replace part with brake lining attached. See "MAINTENANCE."

LOAD CHAIN JUMPS ON SHEAVE OR MAKES A SNAPPING SOUND:

Worn or rusted chain.	See "INSPECTION" to determine wear limit. Replace if necessary.
Wrong size of chain.	Replace with correct chain.
Worn sheave or chain guide.	Replace worn parts.
No oil on load chain.	Lubricate load chain.

TROLLEY WON'T STOP OR TROLLEY WHEELS SLIP:

Poor braking (motorized trolley).	Repair and adjust brake.
Damaged beam.	Repair or replace beam.
Oil or grease on track of beam.	Clean off oil or grease.

EXCESSIVE CONTACTOR PITTING:

Low voltage.	Check voltage at hoist power supply connection with hoist under load. Raise voltage to within 4% of specified hoist voltage.
Starting and stopping the hoist too frequently.	Jog pendant push buttons less frequently.
Hoist is frequently overloaded.	Reduce loads to within rated capacity.

ELECTRICAL SHOCK:

Poor grounding.	Correct grounding of power supply. Check wiring for broken wires.
Tread of beam is painted causing poor grounding.	Remove paint.
Foreign matter or moisture.	Dry or remove foreign materials deposited on electrical parts.
Short in power supply system.	Check all switches, connections, and circuit breakers in power supply line for damaged insulation or contact with hoist frame.

OIL LEAK:

Wrong oil plug.	Install correct oil plug and gasket.
Oil plug is loose or gasket is missing.	Tighten plug. Install a new gasket if missing.
If leak occurs at place other than plug.	Check for loose bolts and tighten. If oil still leaks, disassemble hoist gear case. Replace gaskets and seals, and reassemble.

INSPECTION

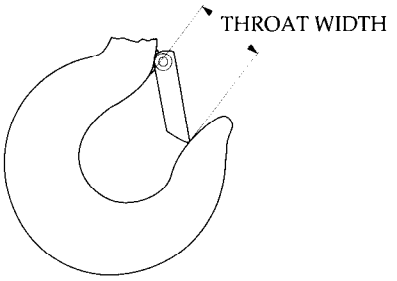
There are two types of inspection, the frequent inspection performed by the operator and periodic inspections performed by qualified personnel.

Frequent Inspection

On hoists in continuous service, frequent inspection should be made at the beginning of each shift. In addition, visual inspections should be conducted during regular service for any damage or evidence of malfunction.

1. OPERATION. Check for visual signs or abnormal noises which could indicate a defect. Make sure all controls function properly and return to neutral when released. Check chain feed through the hoist and bottom block. If chain binds, jumps, or is excessively noisy or "clicks," clean and lubricate the chain. If problem persists, replace the chain. Do not operate the hoist until all defects have been corrected.
2. UPPER AND LOWER LIMIT SWITCH. Test operation with no load. Upward travel should stop before bottom block or stopper on chain hits hoist directly. If the hook does not stop in its normal position for either its upper or lower limits, repair or replace damaged parts.
3. HOOK. Check for wear or damage, increase throat width, bent shank or bending of hook. Replace hooks with any increase in throat width or 10% bend. If the hook latch snaps past the tip of the hook, the hook is sprung and must be replaced.

Model No.:	Top Hook Throat Width: in.	(mm)	Bottom Hook Throat Width: in.	(mm)
SE1-005	1.22	31.0	1.10	28.0
SE2-010	1.32	33.5	1.32	33.5
SE3-020	1.57	40.0	1.57	40.0
SE4-030	1.87	47.5	1.87	47.5
SE5-050	1.97	50.0	1.97	50.0



Check hook support bearings for lubrication and damage. Make sure they swivel easily and smoothly. Repair and lubricate as necessary.

4. HOOK LATCH. Make sure the hook latch is present and operating. Replace if necessary.
5. CHAIN. Examine each of the links for bending, cracks in weld areas or shoulders, transverse nicks and gouges, weld splatter, corrosion pits, striation — minute parallel lines and chain wear, including bearing surfaces between chain links. Replace a chain that fails any of the inspections. Check chain lubrication and lubricate if necessary. See "Load Chain" under "LUBRICATION."

NOTE: Excessive wear or stretching may not be apparent from visual observation. Also, inspect chain by measuring five links in accordance with instructions under "Periodic Inspection."

NOTE: A worn load chain may cause the load sheave to wear rapidly. Inspect the load sheave and replace if damaged or worn.

6. CHAIN REEVING. Ensure welds on standing links are away from load sheave. Reinstall chain if necessary. Make sure chain is not capsized, twisted or kinked. Adjust as required.

Periodic Inspection

According to ANSI/ASME B30.16-1987, frequency of periodic inspection depends on the severity of usage: NORMAL, yearly; HEAVY, semiannually; SEVERE, quarterly. Disassembly may be required for HEAVY or SEVERE usage. Keep accumulative written records of periodic inspections to provide a basis for continuing evaluation.

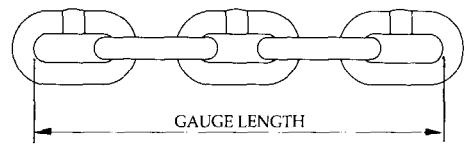
Inspect all the items in a frequent inspection. Also inspect the following:

1. FASTENERS. Check rivets, split pins, cap screws and nuts on hook, chain bucket and hoist body. Replace if missing and tighten if loose.
2. ALL COMPONENTS. Inspect for wear, damage, distortion, deformation and cleanliness. If external evidence indicates the need, disassemble. Check gears, shafts, bearings, sheaves, chain guides, springs and covers. Replace worn or damaged parts. Clean, lubricate and reassemble.
3. HOOK. Inspect hook for cracks using magnetic particle or other suitable method. Inspect hook retaining parts. Tighten or repair, if necessary.
4. CHAIN SHEAVES. Check for damage or excessive wear. Replace if necessary.
5. MOTORS. If performance is poor, disassembly the components and check for worn gearing, bearings and shafts. The parts should be cleaned, lubricated and reassembled. Replace worn or damaged parts.

CAUTION: When lubricating motor parts, lubricant must not be allowed on the brake lining.

6. BRAKES. Raise a load equal to the rated capacity of the hoist a few inches off the floor and check ability of brake to stop and hold the load without excessive drift. If excessive drift exists, disassemble. Check brake lining thickness per "Hoist Brake Lining Measurement" under "MAINTENANCE." Check friction surface of brake plates for wear, deformation or foreign deposits. On load brake, check that gear teeth are undamaged and pawl springs hold pawls engaged with teeth of ratchet gear. Clean or replace if necessary.
7. ELECTRICAL APPARATUS. Check for loose wires, corrosion, or other signs of deterioration. Check for abnormal amounts of pitting, loss of contact material and burning (blackening) of contactor housing and contacts. Some discoloration and pitting of contactor contacts is normal with extensive service. Replace contactor if necessary. Contactor damage indicates a problem that must be corrected. See "EXCESSIVE CONTACTOR PITTING:" under "TROUBLESHOOTING."
8. SUPPORTING STRUCTURE. Check for distortion, wear and continued ability to support load.
9. TROLLEY. Check that the trolley wheels track the beam properly and clearance between wheels and beam is correct, 3/32 to 5/32 in. (2 to 4 mm). Check side plates for spreading due to bending. Check trolley for smoothness of operation. Adjust or repair as necessary.
10. LABELS. Check for presence and legibility. Replace if necessary.
11. LOAD CHAIN END ANCHORS. Ensure both ends of load chain are securely attached. Secure if loose, repair if damaged, replace if missing.
12. LOAD CHAIN. Measure the chain for stretching by suspending a light load (50 to 100 pounds) from the hoist and measuring across five links sections all along the chain. When any five links in the working length reaches or exceeds the discard length, replace the entire chain. Always use a genuine INGERSOLL-RAND Material Handling Products replacement chain. For regular and nickel-diffused load chains:

Model No.:	Part No.:	Size (mm)	Normal Length: in.	Normal Length: (mm)	Discard Length: in.	Discard Length: (mm)
SE1-005	LCES003	5.0	2.97	75.5	3.06	77.0
SE2-010	LCES005	6.3	3.76	95.5	3.84	97.4
SE3-020	LCES010	7.1	4.17	106.0	4.26	108.1
SE4-030	LCES020	10.0	5.94	151.0	6.06	154.0
SE5-050	LCES025	11.2	6.73	171.0	6.86	174.4



13. CHAIN CONTAINER. Check for excessive wear. Replace if necessary.

LUBRICATION

Geared Wheels (Geared or Motorized Trolley Only)

Lubricate exposed trolley drive pinion and wheel teeth. Brush with grease as often as necessary to keep teeth liberally covered. If the grease becomes contaminated with sand, dirt or other abrasive materials, clean off old grease and brush on new. For temperatures -20 to 50 F (-29 to 10 C) use EP 1 grease or equivalent. For temperatures 30 to 120 F (-1 to 49 C) use EP 2 grease or equivalent.

Guide Roller Pin (Motorized Trolley Only)

Lubricate pin with SAE 50 to 90 EP oil as often as necessary to keep guide rollers rotating freely.

Load Chain

WARNING: Failure to maintain clean and well lubricated load chain will void the manufacturer's warranty.

1. Lubricate load chain weekly, or more frequently, depending on severity of service.
2. In an corrosive environment, lubricate more frequently than normal.
3. Lubricate each link of the chain and apply new lubricant over existing layer.
4. Lubricate hook and safety latch pivot points.
5. Clean chain with an acid free solvent to remove rust or abrasive dust build-up and lubricate the chain.
6. Use BEEBE Lubri-Link or a SAE 50 to 90 EP oil.

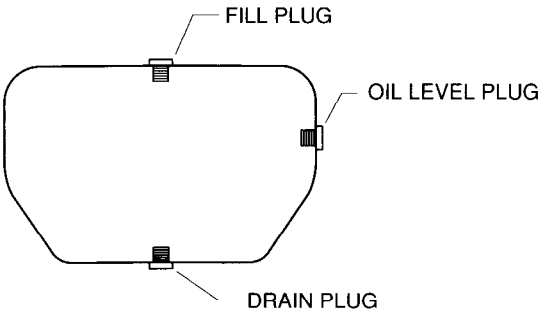
Gear Box (Motorized Trolley Only)

Change grease around gear no. 2 (27, Trolley Housing and Motor Parts) at least every two years. Disassemble, remove old grease and replace with new. See "Accessing Trolley Gear (27)" under "MAINTENANCE." For temperatures -20 to 50 F (-29 to 10 C) use EP 1 grease or equivalent. For temperatures 30 to 120 F (-1 to 49 C) use EP 2 grease or equivalent.

Gear Case (Hoist)

To check gear case oil level, remove oil level plug located on the side of the gear case. If the oil level is below the level plug hole, remove the vented fill plug on the top of the gear case and add oil until the oil begins to come out the level plug hole. Replace oil level and fill plugs. Change oil at least every two years. Use industrial-grade, SAE 20 EP, non-lead, non-hypoid gear oil or equivalent.

Model No.:	Amount of Oil: Quart	(Liter)
SE1-005	0.63	0.6
SE2-010	0.63	0.6
SE3-020	1.06	1.0
SE4-030	2.11	2.0
SE5-050	2.11	2.0



Trolley Wheels and Hand Chain

Trolley wheel bearings cannot be lubricated on SEMT, UTP and UTG trolleys. On the SEMT trolley, the entire wheel must be replaced. On the UTP and UTG trolleys, the wheel bearings can be replaced. Trolley hand chain, used on geared trolleys, normally requires no lubrication.

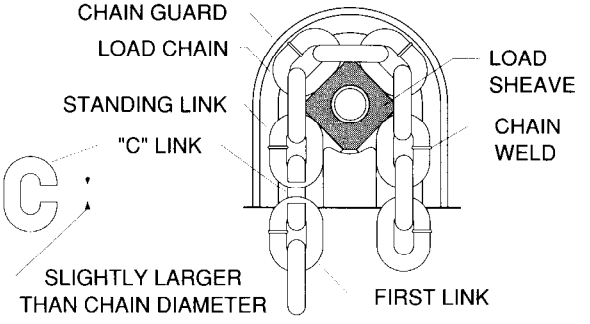
MAINTENANCE

WARNING: Never perform maintenance on the hoist while it is supporting a load.
WARNING: Before performing maintenance, tag controls: DANGER - DO NOT OPERATE - EQUIPMENT BEING REPAIRED.
WARNING: Disconnect electric power before performing any maintenance.
WARNING: Only allow qualified service personnel to perform maintenance.
WARNING: Test hoist to 125% of its rated capacity before returning to service.

Chain Replacement

NOTE: Do not remove the old chain from the hoist. The old chain is used to install the new chain.
CAUTION: When facing the brake and motor side of the hoist, the hook must be on the two left falls of the load chain, the right fall must have a chain anchor attached, and if a chain bucket is not used, be fastened to the hoist.

1. Run bottom hook to lowest point of travel and support bottom hook.
2. Remove chain bucket, if used.
3. Remove free end of chain from hoist body, if attached. Remove chain stopper.
4. Make a "C" link in NEW chain by grinding through one side of the end link.
5. Hook "C" link to old chain joining old and new chains. (If old chain was installed correctly, the "C" link assures end link of new chain will be correctly reeved through the hoist.) BE SURE WELDS of "standing" links on the new chain are facing away from the hoist load sheave.



6. Check the first link of the new chain to make sure it will correctly attach to connection yoke on top hook.
7. Run the new chain 24 to 36 in. (610 to 914 mm) out the other side of the hoist.
8. Manually pull new chain through bottom hook using old chain.
9. Attach end of chain to connection yoke on top hook. Check that chain is not twisted, kinked, "capsized" or damaged. Remove one link to untwist, if required.
10. Attach chain stopper on the free end of the load chain, 15 links from end on models SE 1 and SE2 and 13 links from end on models SE3, SE4 and SE5.
11. Attach chain container.

Motor Brake Adjustment (See Hoist Housing and Motor Parts)

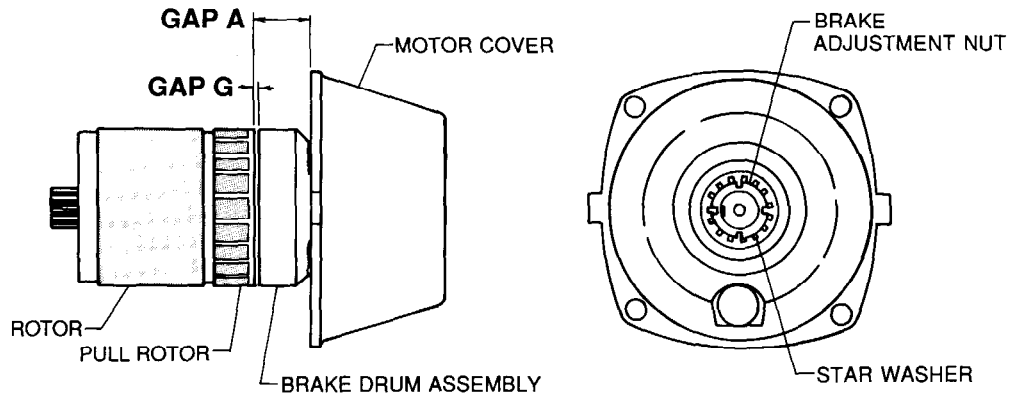
CAUTION: To avoid having the load chain fall out of the hoist when the motor and brake is disassembled, secure the position of the load chain with a tie wire.

1. Remove socket bolts (10) from motor cover (9).
2. Remove motor cover (9) with brake drum and rotor assembly attached.
3. Remove rubber cover (1) to access brake adjustment nut (2).
4. Bend down outer tooth of lock washer (3) to free brake adjustment nut (2).
5. If lock washer (3) is damaged, remove nut (2) and replace lock washer (3). Make sure inner tooth on lock washer (3) is inserted in the keyway on motor shaft (18).
6. Measure brake gap G with a feeler gauge and adjust if necessary by turning the brake adjustment nut (2). See table below. Clockwise decreases the gap and counterclockwise increases the gap.

NOTE: Pressing down on the motor cover (9) releases the spring tension, making it easier to turn nut (2). When nut (2) will no longer turn by hand, place the tip of a screwdriver in a groove on the nut (2) and tap gently on the handle to turn nut (2).

Model No.:	Gap G: in.	(mm)
SE1-005	.020 to .031	.51 to 0.79
SE2-010	.020 to .031	.51 to 0.79
SE3-020	.031 to .043	.79 to 1.09
SE4-030	.031 to .043	.79 to 1.09
SE5-050	.031 to .043	.79 to 1.09

7. After the brake has been properly adjusted, secure the position of nut (2) by aligning one of the four grooves on nut (2) with one of the outer teeth on lock washer (3). If the positions do not align, rotate nut (2) clockwise. Bend the tooth up into the groove to secure nut (2).
8. Install rubber cover (1) over the brake adjustment nut (2).
9. Install motor cover, brake drum and rotor assembly into the motor frame w/stator (19). Secure with socket bolts (10). Use Loctite 242 or equivalent on the bolt threads.



Hoist Brake Lining Measurement (See Hoist Housing and Motor Parts)

With the brake adjusted properly per "Brake Adjustment" under "MAINTENANCE," measure dimension "A." If "A" is smaller than the value specified in the table below, the brake lining must be replaced. Replace the motor cover (6) on model SE1-005 and the brake drum (12) on models SE2-010 through SE5-050.

NOTE: One method of measuring "A" is to place a steel rule between the pull rotor and the moveable core. Measure the distance between the steel rule and the edge of the motor cover.

Model No.:	Minimum Dimension A: in.	(mm)
SE1-005	.71	18.0
SE2-010	.67	17.0
SE3-020	.62	15.8
SE4-030	.57	14.5
SE5-050	.57	14.5

Accessing Trolley Gear No 2. (27) (See Trolley Housing and Motor Parts)

1. Disconnect cable 4C (7, Trolley Power Junction Parts) from the trolley connecting station (18, Trolley Power Supply Parts). See appropriate schematic.
2. While adequately supporting motor frame w/stator (17), unscrew socket bolts (28) attaching gear box A (30) to side plate G assembly (40).
3. Unscrew socket bolts (32 and 38) and carefully pry gear box A (30) off gear box B (24).
4. Inspect gear (27). Repair or replace if necessary. Lubricate as needed.
5. Replace gear box packing (25) if damaged.
6. With gear no. 2 (27) and gear no. 3 (35) aligned, position gear box A (30) on gear box B (24). Secure with socket bolts (32 and 38)
7. Position motor frame w/stator (17) on side plate G assembly (40) and secure with socket bolts (28).
8. Attach cable 4C (7, Trolley Power Junction Parts) to trolley connecting station (18, Trolley Power Supply Parts). See appropriate schematic.

Hoist Stator Replacement (See Hoist Housing and Motor Parts)

If the motor stator (windings) is burned out, replace the motor frame (19) which includes the stator.

1. Remove the socket bolts (10) attaching the motor cover (9) to the motor frame (19).
2. Remove motor cover (9) with brake drum and rotor assembly attached.
3. To access the motor wires, remove socket bolts (37) and the controller cover (35).
4. Disconnect the wires attached to the motor stator. See the appropriate wiring diagram. The wires must be disconnected before the motor frame (19) can be removed.
5. While adequately supporting the motor frame (19), remove the socket bolts (21) and remove motor frame (19).
6. If the motor windings are burned or otherwise damaged, replace the motor frame with stator (19).
7. Support the motor frame (19) and lift into place on hoist body. Use set pins (20) to align. Secure by installing socket bolts (21).
8. Insert the motor wires through the hoist body into the terminal block for connection.
9. Insert motor cover (9) with brake drum and rotor assembly attached into the motor frame (19). Alignteeth on the end of the motor shaft (18) with the teeth inside the coupling attached to pinion (4, Hoist Gearing Parts).
10. Align the screw holes in the motor cover (9) and motor frame (19). Rotate the motor cover (9) if necessary.
11. Secure the motor cover (9) to the motor frame (19) by installing socket bolts (21). Use Loctite 242 or equivalent on the bolt threads.
12. Reconnect the motor wires. See the appropriate wiring diagram.

CAUTION: Make sure motor wires are connected to the correct terminals for power supply used (230 V or 460 V).

13. Replace the controller cover (35) and secure with socket bolts (37).

Trolley Stator Replacement (See Trolley Housing and Motor Parts)

If the motor stator (windings) is burned out, replace the motor frame (17) which includes the stator.

1. Remove the socket bolt (3) attaching the motor cover (5) to the motor frame (17).
2. Remove the motor cover (5), brake drum (7), brake spring (8), bumper (9) and rotor (10).
3. To access the motor wires, unscrew machine screws (22) and remove the terminal cover (21).
4. Disconnect the wires from cable 4C (7, Trolley Power Junction Parts) on the terminal block. The wires must be disconnected before the motor frame (17) can be removed. See the appropriate wiring diagram.
5. Unscrew the machine screws (5, Trolley Power Junction Parts) attaching cable holder M (9, Trolley Power Junction Parts) to the motor frame (17). Remove cable 4C (7, Trolley Power Junction Parts) from the motor frame with stator (17).
6. While supporting the motor frame (17), remove the socket bolts (18) and remove the motor frame (17) .
7. If the motor windings are burned or otherwise damaged, replace the motor frame (17).
8. Support the motor frame (17) and lift into place on side plate G (40). Secure by installing socket bolts (18).
9. Insert motor shaft with rotor (10) into the motor frame. If necessary, rotate shaft with rotor (10) until it meshes with the teeth on gear no. 2 (27).
10. Place bumper (9) and brake spring (8) over the rotor (10).
11. Place brake drum (7) over the rotor (10) and position so that teeth mesh.
12. Position motor cover (5) and secure with socket bolts (3).
13. Insert cable 4C (7, Trolley Power Junction Parts) into junction box on motor frame (17).
14. Connect wires on cable 4C (7, Trolley Power Junction Parts) to the terminal block. See the appropriate wiring diagram.

CAUTION: Make sure motor wires are connected to the correct terminals for power supply used (230 V or 460 V).

15. Position terminal cover (21) over the opening on the junction box and secure with machine screws (22).
16. Position cable holder M (9, Trolley Power Junction Parts) on the junction box and secure with the machine screws (5, Trolley Power Junction Parts).

Pendant Replacement

If the pendant contactors or inserts need replacement, the entire pendant body will have to be replaced.

1. Remove screws and spring washers attaching back of pendant.
2. Remove screws connecting all wires to contactor.

CAUTION: Do not remove the screws which attach the contactor to the pendant.

3. Loosen or remove the two screws securing the cable clamp, located inside the pendant.
4. Remove the screws attaching the top of pendant to pendant body.
5. Slide top of pendant off bottom of packing.
6. Pull the pendant off the pendant cord.

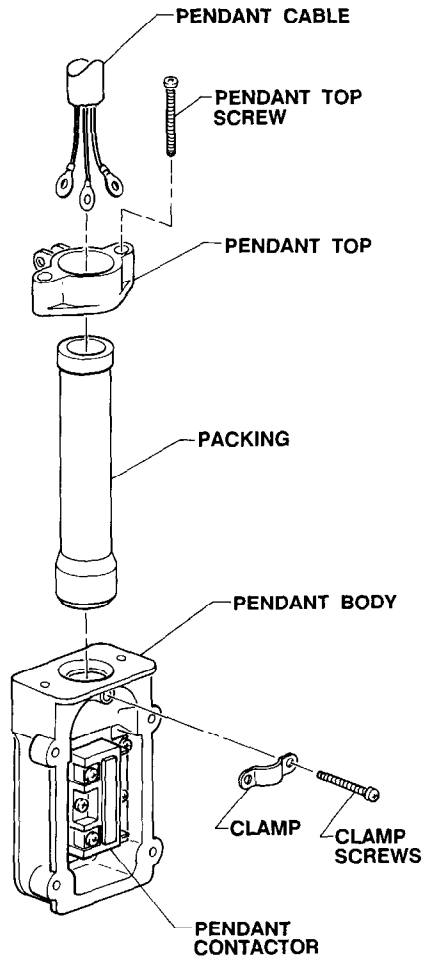
NOTE: If the pendant top and packing is not going to be replaced, the pendant can now be attached.

7. Slide the pendant top and packing off the cord, if they are going to be re placed.
8. Remove the split pin and chain pin attaching the strain relief cable to the pendant top.
9. Remove the back, top and cord packing of the new pendant.
10. Slide pendant top over the packing.
11. Insert pendant cord through the narrow end of the cord packing.

NOTE: If it is difficult to slide the cord through the packing, lubricate the cord with bar soap.

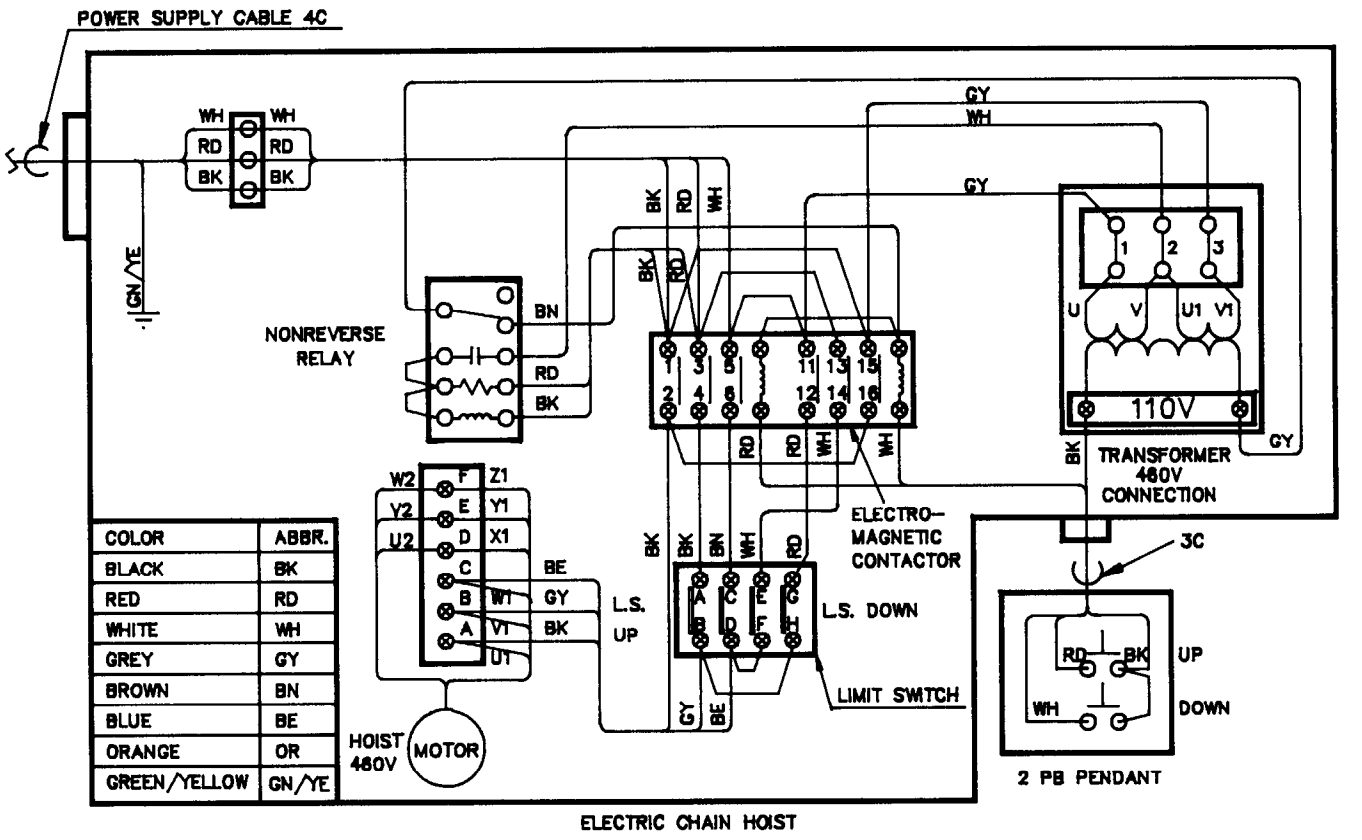
CAUTION: Do not use oil as a lubricant as it will damage the rubber packing.

12. Connect wires to contactor. See appropriate wiring diagram.
13. Seat the cord on the inside of the pendant. Secure cord to pendant by in stalling clamp with the two clamp screws.
14. Slide pendant top down cable packing onto top of pendant and secure with the two pendant top screws.
15. Position back of pendant. Secure with screws.
16. Secure strain relief cable to pendant top with chain pin. Insert split pin into chain pin and bend ends back.



CAUTION: To avoid damaging the pendant cord, make sure the strain relief cable, not the pendant cord, is supporting the weight of the pendant.

460 V Wiring Diagram, Hoist Without Motorized Trolley



COLOR	ABBR.
BLACK	BK
RED	RD
WHITE	WH
GREY	GY
BROWN	BN
BLUE	BE
ORANGE	OR
GREEN/YELLOW	GN/YE

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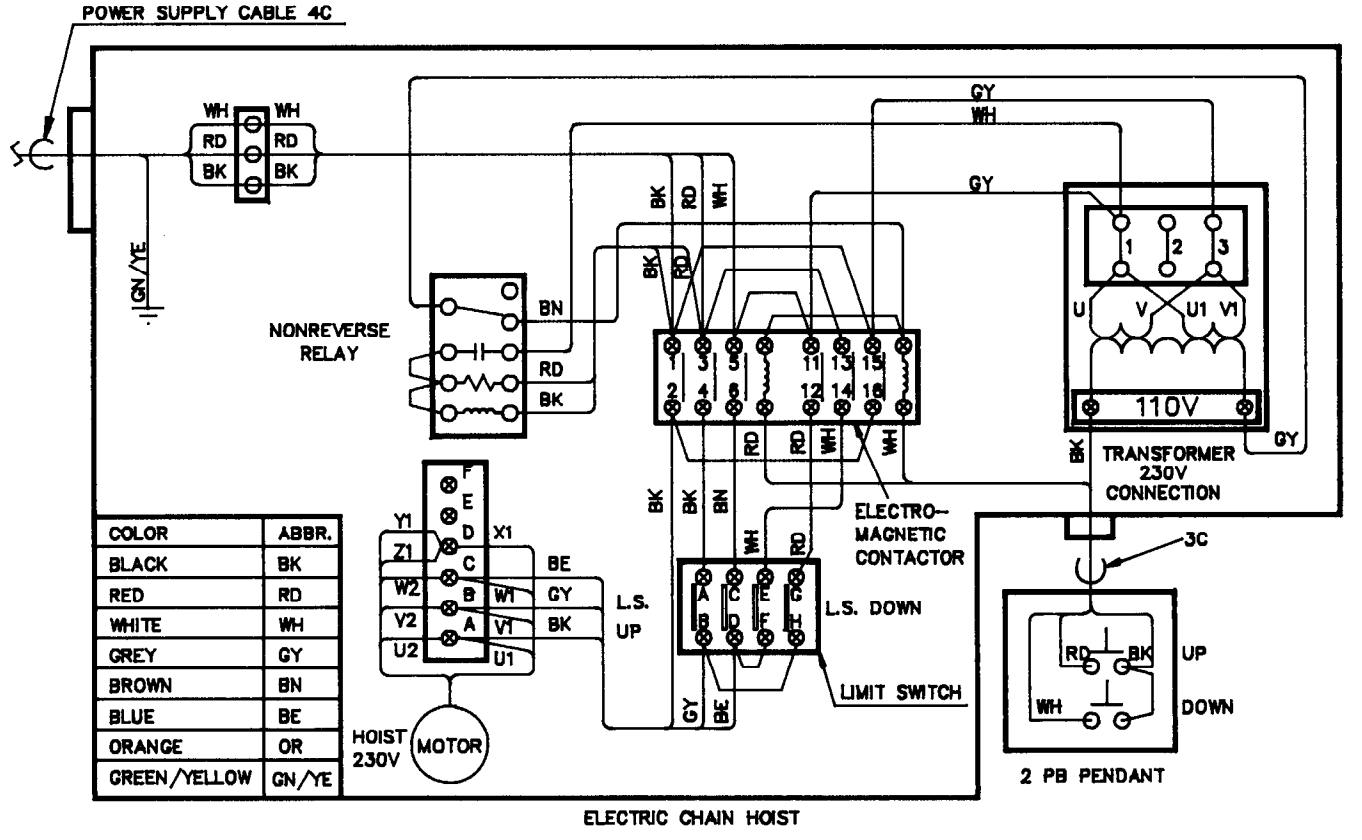
230 V Wiring Diagram, Hoist Without Motorized Trolley



COLOR	ABBR.
BLACK	BK
RED	RD
WHITE	WH
GREY	GY
BROWN	BN
BLUE	BE
ORANGE	OR
GREEN/YELLOW	GN/YE

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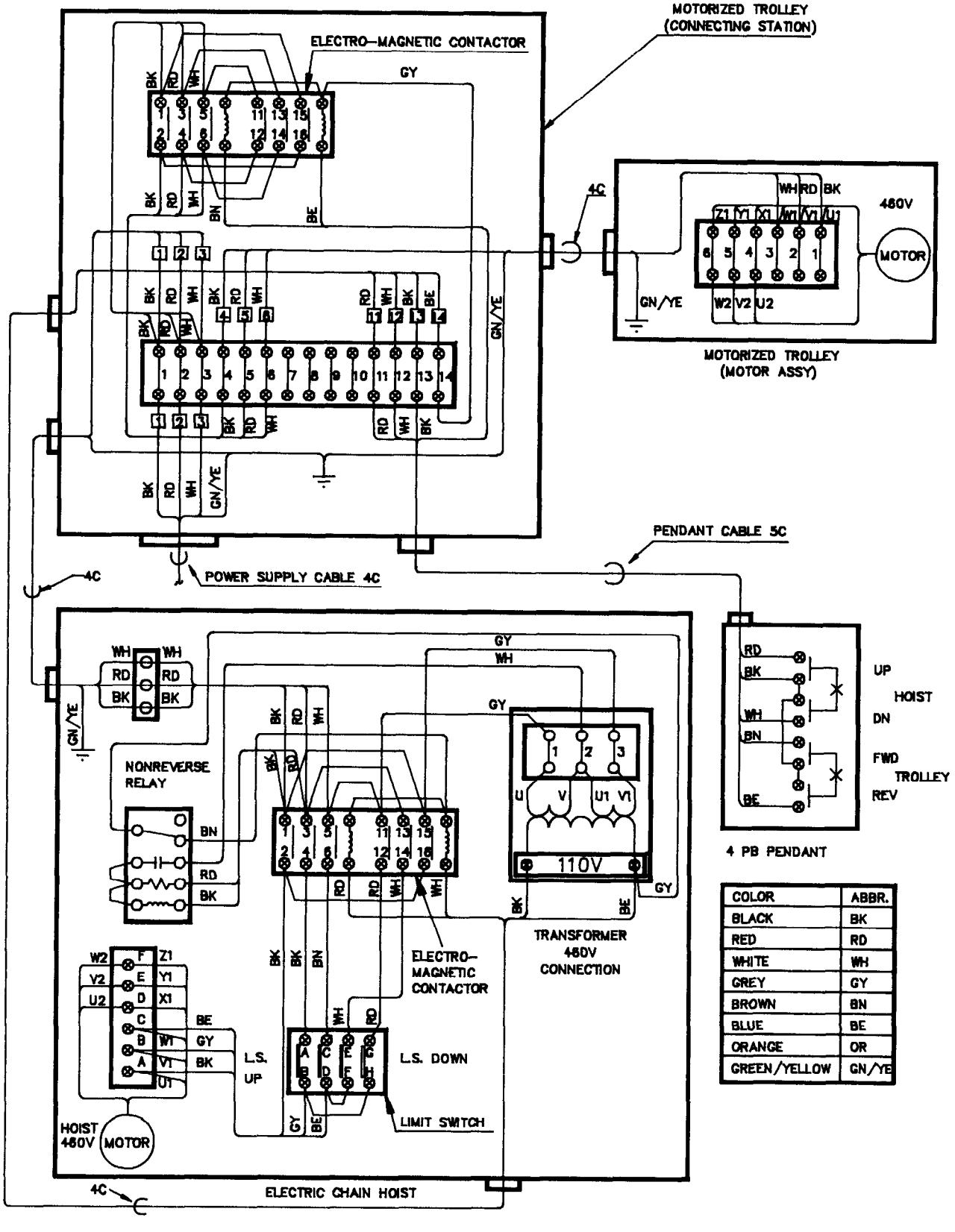
460 V Wiring Diagram, Hoist With Motorized Trolley



COLOR	ABBR.
BLACK	BK
RED	RD
WHITE	WH
GREY	GY
BROWN	BN
BLUE	BE
ORANGE	OR
GREEN/YELLOW	GN/YE

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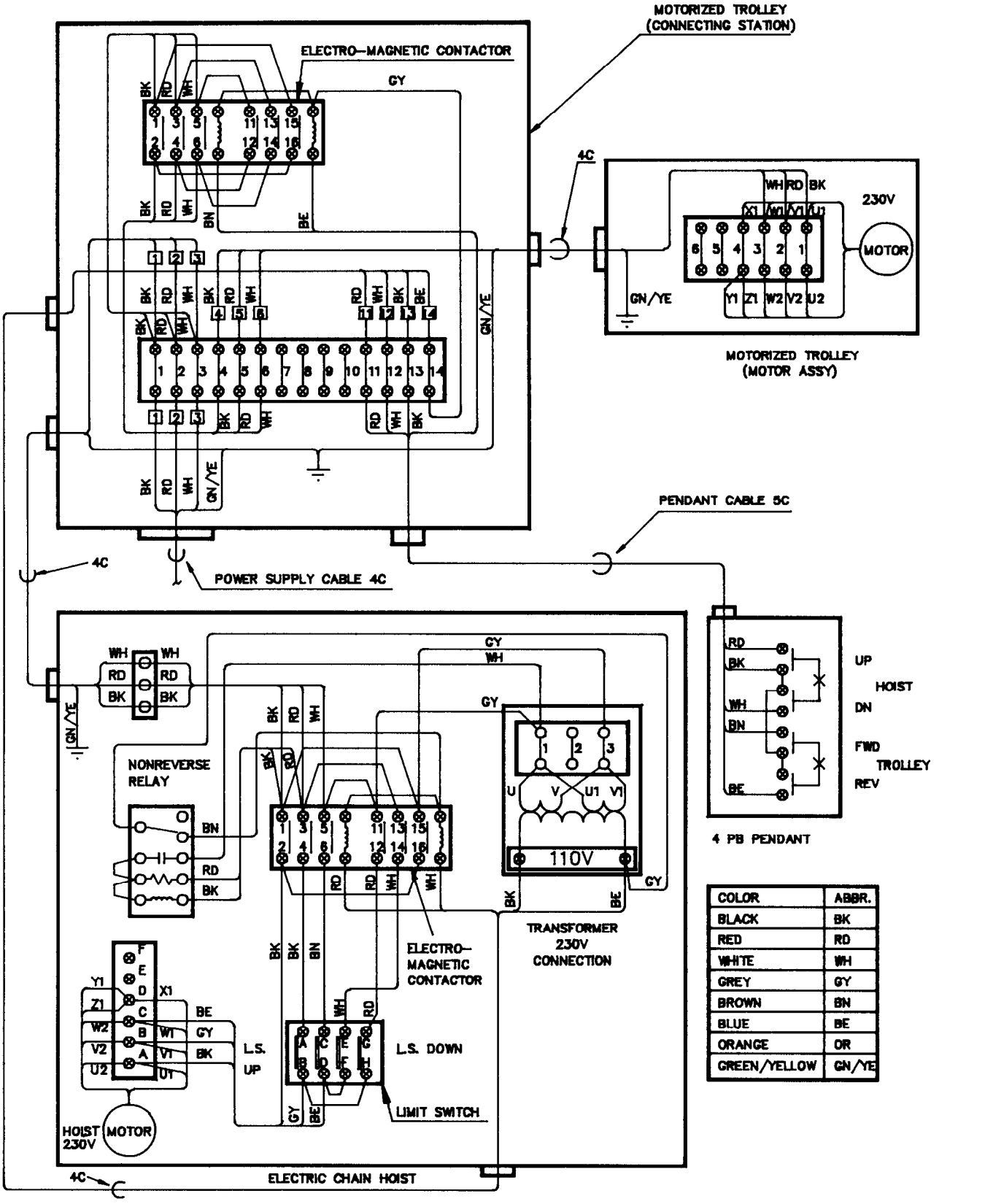
230 V Wiring Diagram, Hoist With Motorized Trolley



COLOR	ABBR.
BLACK	BK
RED	RD
WHITE	WH
GREY	GY
BROWN	BN
BLUE	BE
ORANGE	OR
GREEN/YELLOW	GN/YE

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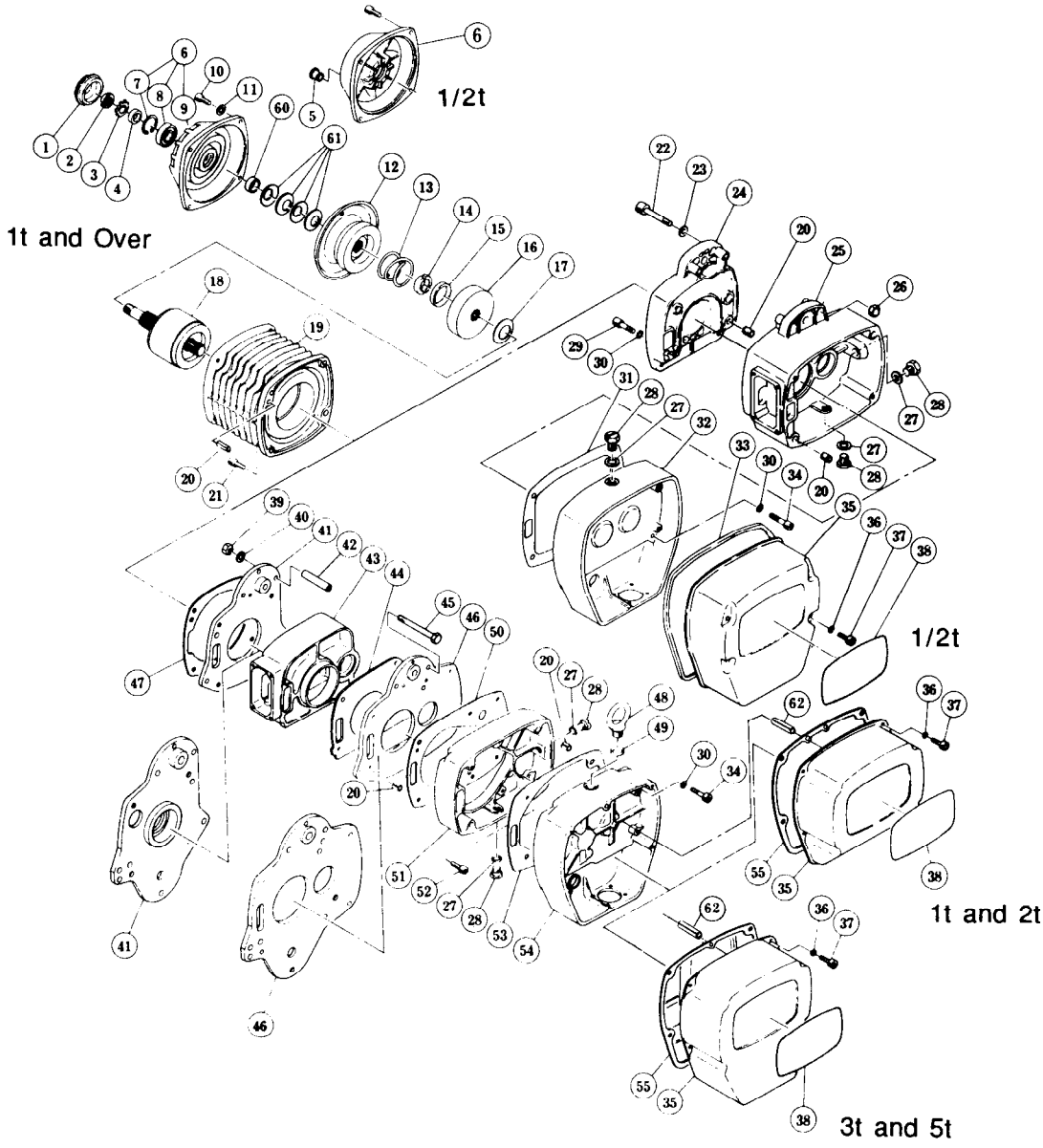
HOIST HOUSING AND MOTOR ASSEMBLY AND PARTS LIST

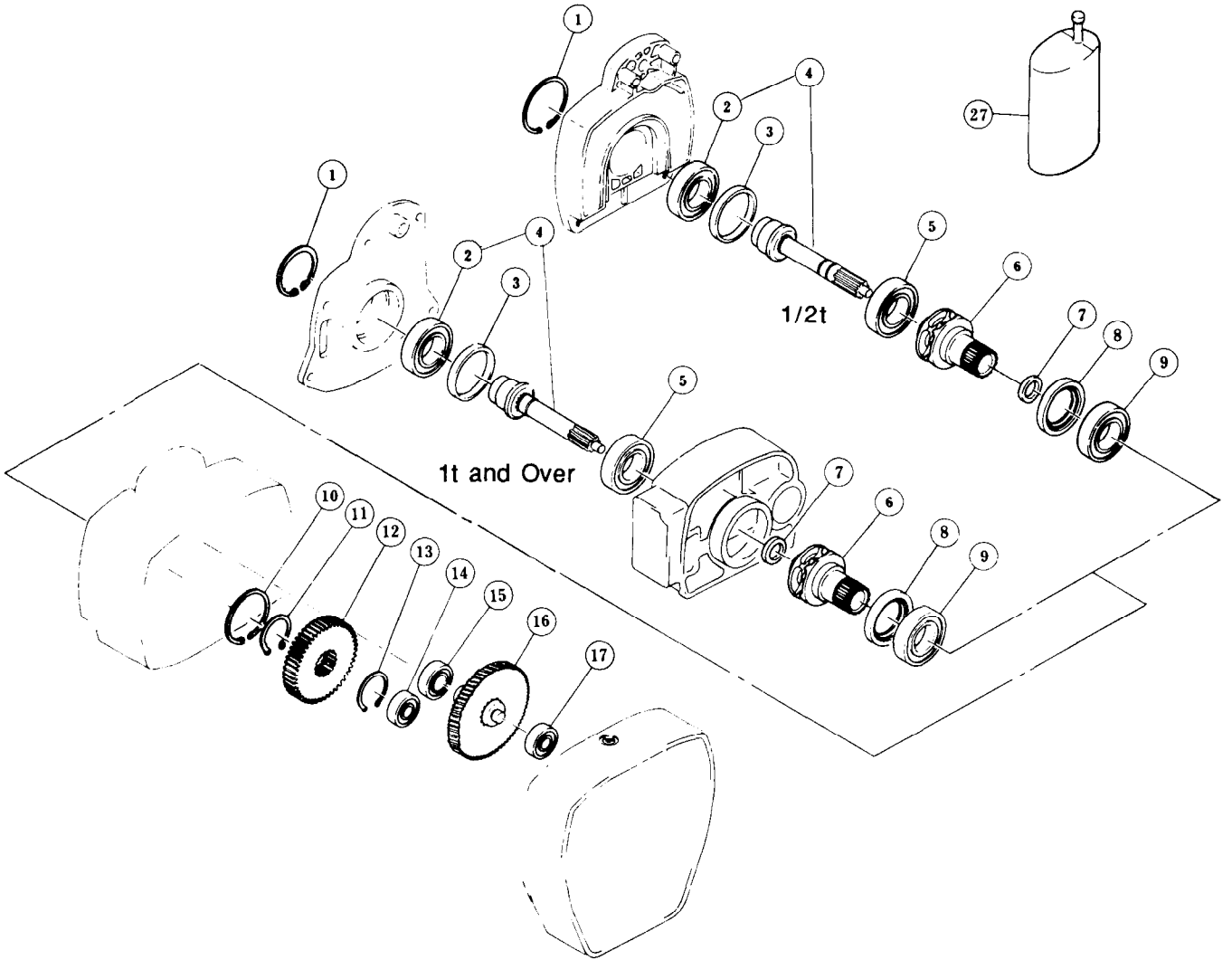


ITEM NO.	DESCRIPTION OF PART	QTY. TOTAL	CAPACITY PART NO.				
			1/2 ton	1 ton	2 ton	3 ton	5 ton
1	Cover	1	70000		70001	70002	
2	Nut	1	70003	70004	70005	70006	
3	Lock Washer	1	70007	70008	70009	70010	
4	Spacer	1	70011	70012	70013	70014	
5	Plug	1	70015	---			
6	Motor Cover Assembly (Includes Pc's 7,8 & 9)	1	70016	70017	70018	70019	
7	Snap Ring	1	---	70024	70025	70026	
8	Ball Bearing	1	---	70027	70028	70029	
9	Motor Cover	1	Not Sold Separately				
10	Socket Bolt	4	70036	70037	70038	70039	
11	Spring Washer	4	---	70041	70042	70043	
12	Brake Drum Assembly	1	70044	70045	70046	70047	
13	Brake Spring	1	70052	70053	70054	70055	
14	Thrust Disc	2	70060	70061	70062	70063	

HOIST HOUSING AND MOTOR PARTS LIST (Continued)

ITEM NO.	DESCRIPTION OF PART	QTY. TOTAL	CAPACITY PART NO.				
			1/2 ton	1 ton	2 ton	3 ton	5 ton
15	Thrust Collar	1	70064	70065	70066	70067	
16	Pull Rotor	1	70068	76069	70070	70071	
17	Coned-Disc Spring	1	70072	70073	70074	70075	
18	Motor Shaft W/Rotor	1	70076	70077	70078	70079	
19	Motor Frame W/Stator	1	73328	73329	73330	73331	
20	Set Pin	4	70092	---			
		6	---	70092	70093		
21	Socket Bolt	4	70095	70096	70097	70098	
22	Socket Bolt	2	70099	---			
23	Washer	2	70100	---			
24	Body M	1	73332	---			
25	Body G	1	73333	---			
26	U-Nut W/Cap	2	70103	---			
27	Plug Packing	3	70104	---			
		2	---	70104			
28	Oil Plug	3	70105	---			
		2	---	70106			
29	Socket Bolt	2	70107	---			
30	Toothed Lock Washer	6	70108	---			
		4	---	70108	70109	---	
		5	---			70109	
31	Gear Case Packing	1	70112	---			
32	Gear Case	1	70113	---			
33	Controller Cover Packing	1	70114	---			
34	Socket Bolt	4	70115	70116	70117		
		5	---			70118	
35	Controller Cover	1	70119	70120	70121	70122	
36	Spring Washer	4	70125			70126	
37	Socket Bolt	4	70127			70128	
38	Nameplate	1	73262	73263	73264	73265	73266
39	Nut	4	---	70130	70131	70132	
40	Spring Washer	4	---	70133	70134	70135	
41	Frame M Assembly	1	---	73334	73335	73336	
42	Collar F	4	---	70139	70140	70141	
43	Body	1	---	70142	70143	70144	
44	Packing G	1	---	70145	70146	70147	
45	Bolt	4	---	70148	70149	70150	
46	Frame G Assembly	1	---	73337	73338	73339	
47	Packing M	1	---	70154	70155	70156	
48	Fill Plug	1	---	70157			
49	Eye Bolt Packing	1	---	70158			
50	Gear Case Packing A	1	---	70159	70160	70161	
51	Gear Case A	1	---	70162	70163	70164	
52	Socket Bolt	6	---	70165	70166		
53	Gear Case Packing B	1	---	70167	70168	70169	
54	Gear Case B	1	---	70170	70171	70172	
55	Controller Cover Packing	1	---	70176	70177	70178	
60	Collar M	1	70189	70190	70191	70192	
61	Coned Disc Spring M	4	70193	70194	70195	70196	
62	Spring Pin	1	---	70198			

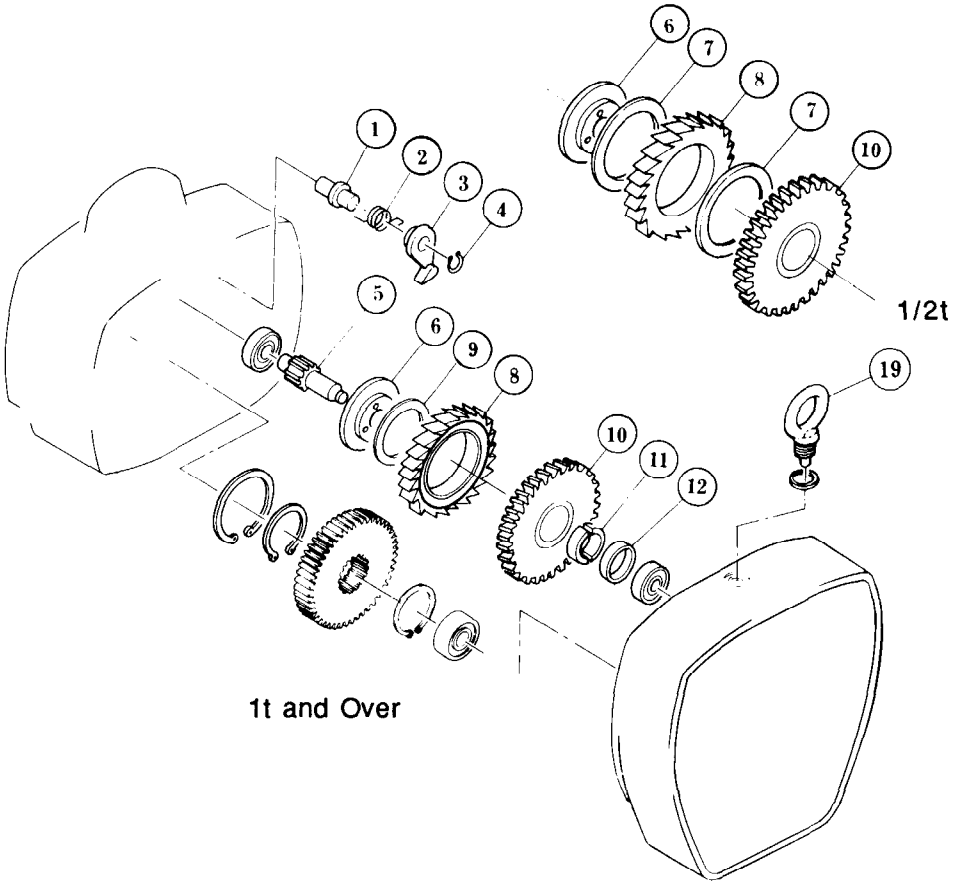
HOIST GEARING ASSEMBLY AND PARTS LIST



ITEM NO.	DESCRIPTION OF PART	QTY. TOTAL	CAPACITY PART NO.				
			1/2 ton	1 ton	2 ton	3 ton	5 ton
1	Snap Ring	1	70110	70111	70199		
2	Ball Bearing	1	70200	70201	70202		
3	Collar B	1	70203	70204	70205	---	
4	Pinion Assembly	1	70206	70207	70208	70209	
5	Ball Bearing	1	70210	70211	70212	70213	
6	Load Sheave	1	70214	70215	70216	70217	70218
7	Oil Seal	1	70219	70220	70221	70222	
8	Oil Seal	1	70223	70224	70225	70226	
9	Ball Bearing	1	70227		70228	70229	
10	Snap Ring	1	70230	---			
11	Snap Ring	1	70231	---			
12	Load Gear	1	70232	70223	70234	70236	70237
13	Snap Ring	1	70239		70240	70241	
14	Ball Bearing	1	70242		70243	70244	
15	Ball Bearing	1	70245	70246	70247	70248	
16	Gear 2 Assembly	1	70249	70250	70251	70252	70254
17	Ball Bearing	1	70261	70262	70263	70264	
•27	Gear Oil	1	73309		50039	---	
		2	---			50039	

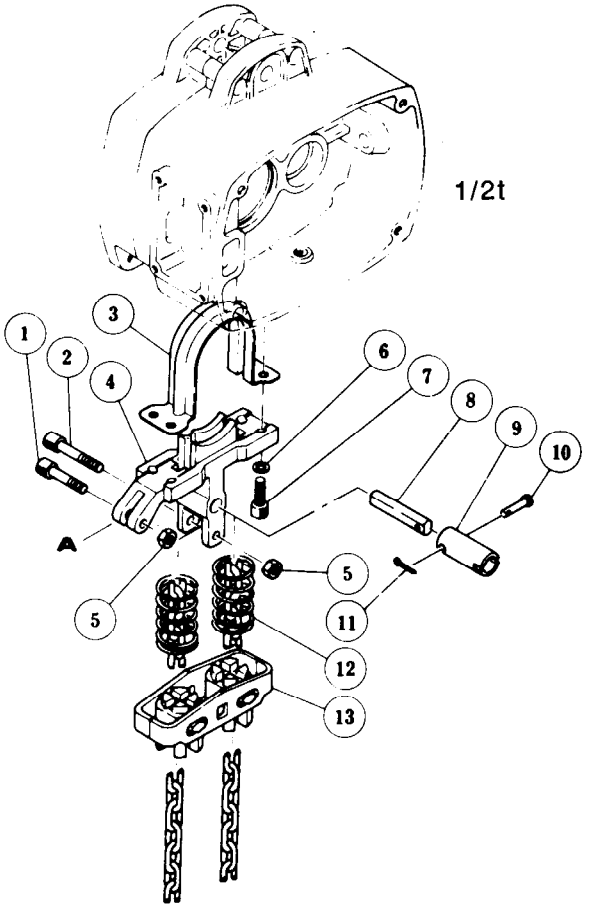
• Recommended spares.

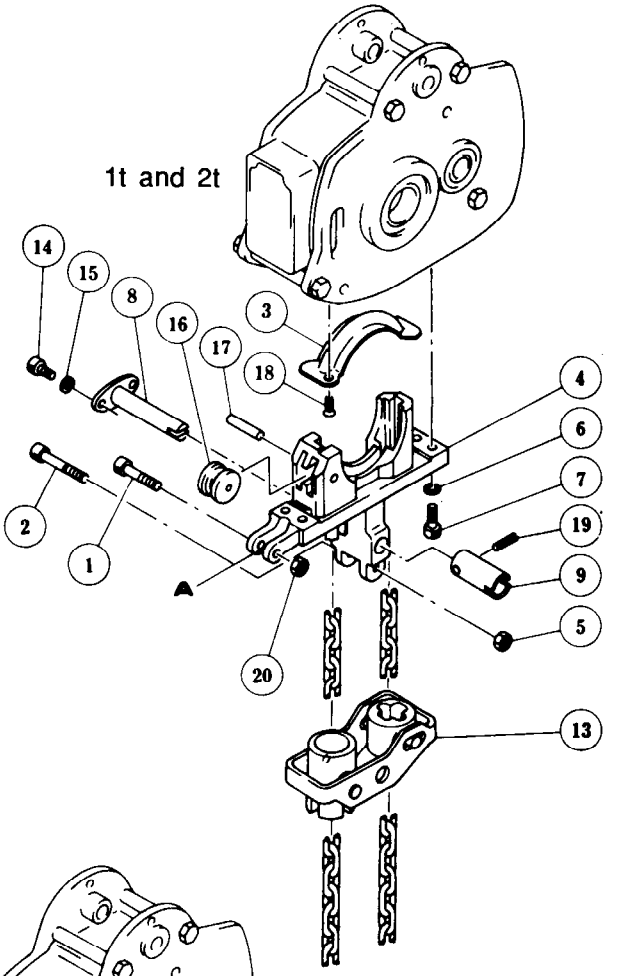
HOIST MECHANICAL BRAKE ASSEMBLY AND PARTS LIST

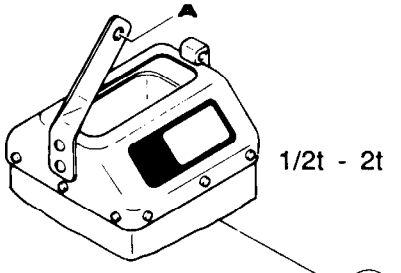


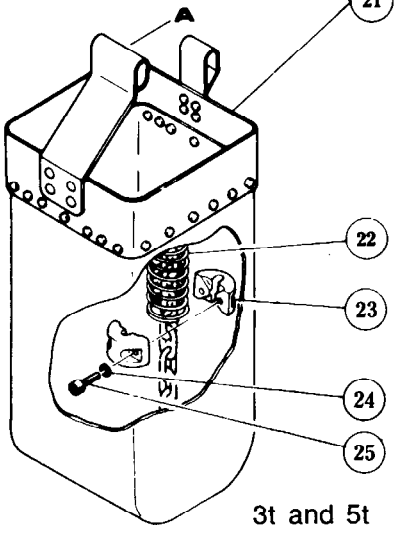
ITEM NO.	DESCRIPTION OF PART	QTY. TOTAL	CAPACITY PART NO.				
			1/2 ton	1 ton	2 ton	3 ton	5 ton
1	Pawl Pin	1	70582		70583		
2	Pawl Spring	1	70584		70585		
3	Pawl	1	70586		70587		
4	Snap Ring	1	70588		70589		
5	Gear No.3	1	70590	70591	71503	71595	70595
6	Friction Disc	1	70597	70598	70599	70600	
7	Friction Plate	2	70601	---			
8	Ratchet Disc	1	70602	---			
	Ratchet Disc Assembly	1	---	70603	70604	70605	
9	Bush	1	---	70606	70607	70608	
10	Gear No.2	1	70609	70610	70611	70612	
11	Thrust Disc	2	70616	70617	70618	70619	
12	Thrust Collar	1	70620	70621	70622	70619	
19	Eye Bolt M Assembly	1	---	70633			

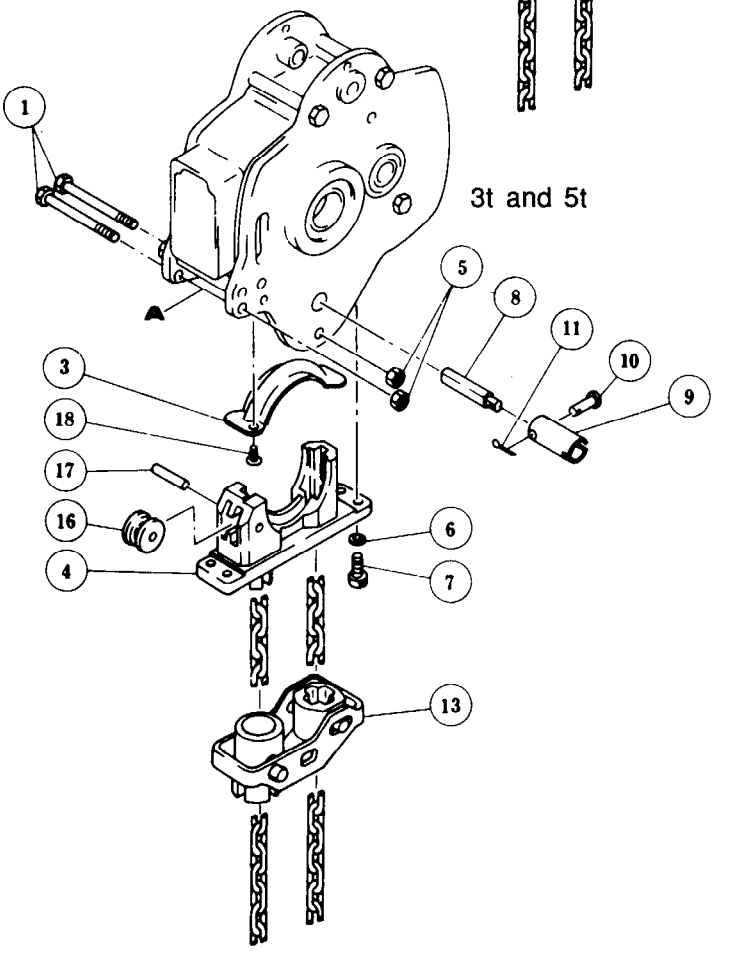
HOIST CHAINING ASSEMBLY







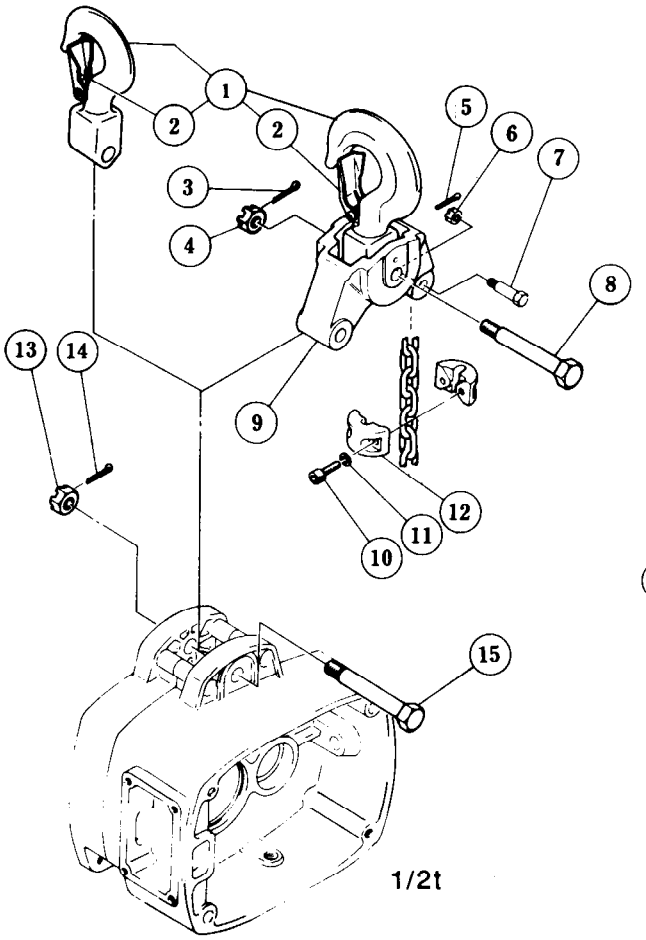


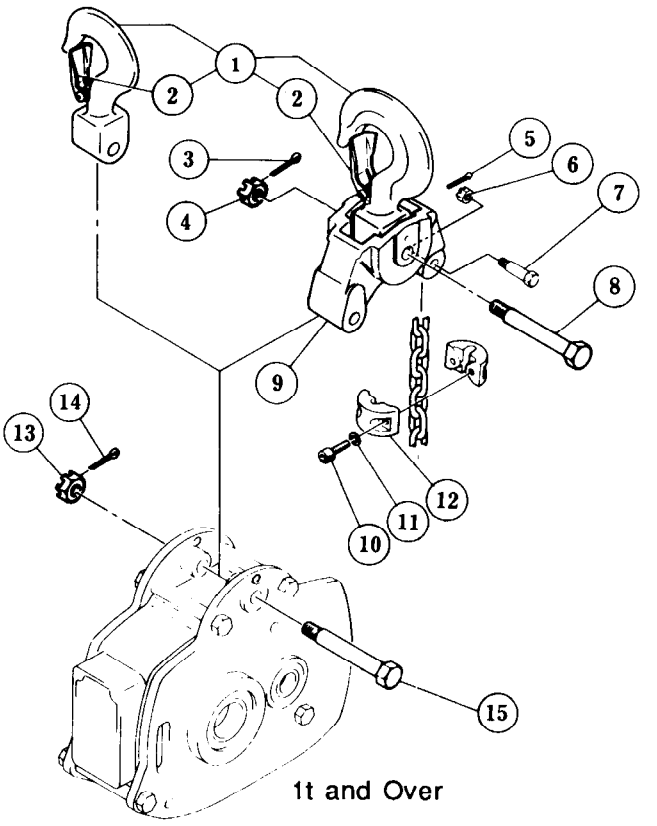


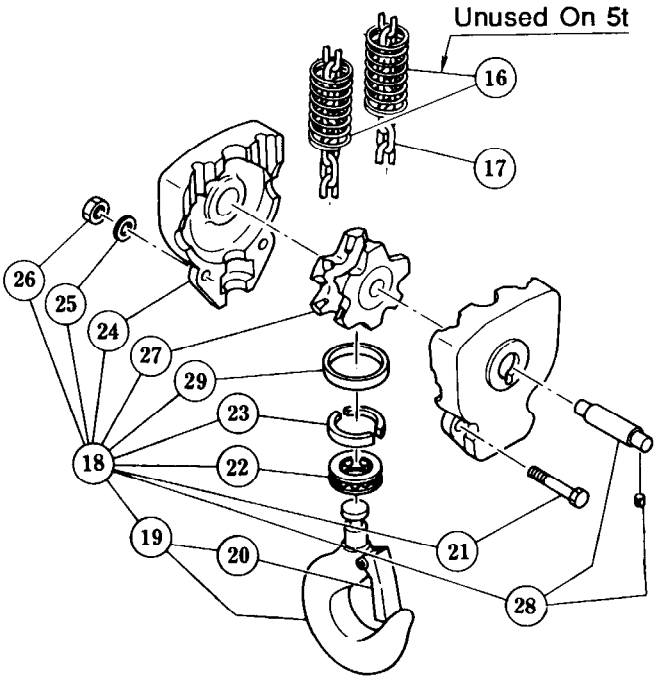
HOIST CHAINING PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY. TOTAL	CAPACITY PART NO.				
			1/2 ton	1 ton	2 ton	3 ton	5 ton
1	Socket Bolt	1	70282	70283		---	
	Bolt	2	---			70284	
2	Socket Bolt	1	70285			---	
3	Chain Guide B	1	70286	70287	70288	70289	70290
4	Chain Guide A	1	70291	70292	70293	70294	70295
5	U Nut	2	70296	---		70297	
		1	---	70296		---	
6	Spring Washer	4	70298			70299	
7	Socket Bolt	4	70300	70301	70302	70303	
8	Limit Lever Pin	1	70304	---		70305	
	Limit Lever Pin Assembly	1	---	70306		---	
9	Lever Pin Coupling	1	70307	70308	70309	70310	
10	Coupling Pin	1	70313	---		70314	
11	Split Pin	1	70315	---		70315	
12	Guide Spring	2	70317	---			
13	Limit Lever Assembly	1	73267	73268	73269	73270	73271
14	Socket Bolt	2	---	70323		---	
15	Spring Washer	2	---	70324		---	
16	Guide Roller	1	---	70325	70326	70327	70328
17	Roller Pin	1	---	70329	70330	70331	
18	Flat Head Machine Screw		---	70332		---	
	Machine Screw W/Spring Washer	2	---			70333	
19	Spring Pin	1	---	70334		---	
20	U Nut	1	---	70335		---	
21	Chain Container L	1	CC-2	CC-3	CC-4	CC-6	CC-6
22	Chain Spring	1	70343	70344	70345	70346	70347
23	Stopper	2	70353	70354		70355	70356
24	Spring Washer	2	70357	70358		70359	
25	Socket Bolt	2	70360	70361		70362	

HOIST HOOK ASSEMBLY





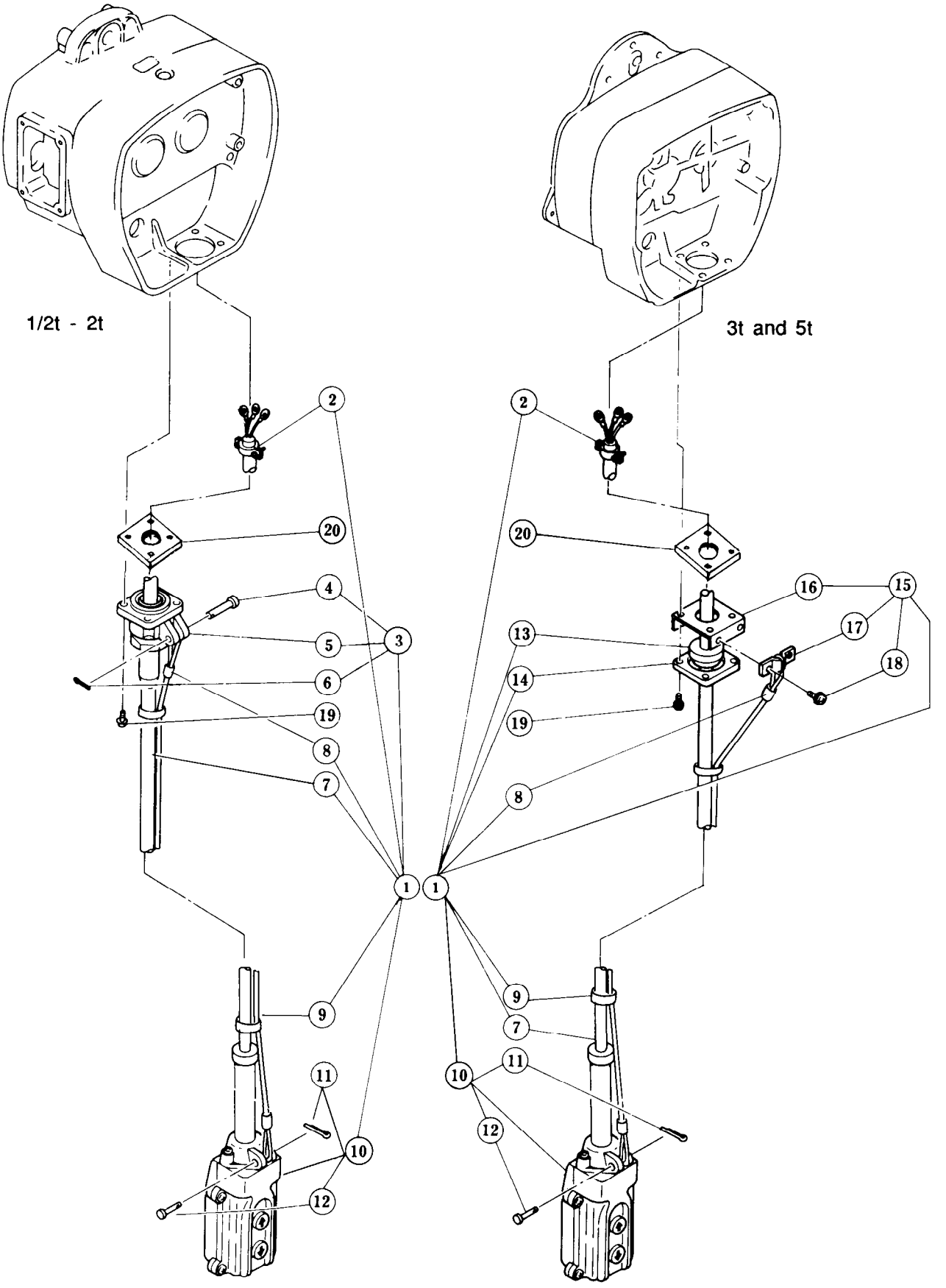


HOIST HOOK PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY. TOTAL	CAPACITY PART NO.				
			1/2 ton	1 ton	2 ton	3 ton	5 ton
1	Top Hook Assembly	1	70316	70363	70364	70365	70366
• 2	Safety Latch Assembly	1	70367	70368	70369	70370	70371
3	Split Pin	1	70372		70373		70374
4	Slotted Nut	1	70375		70376		70377
5	Split Pin	1	70378		70379		70380
6	Slotted Nut	1	70381		70382	70383	70384
7	Chain Pin	1	70385	70386	70387	70388	70389
8	Top Pin L	1	70390		70391		70392
9	Connection Yoke	1	70393	70394	70395	70396	70397
10	Socket Bolt	2	70360	70361		70362	---
11	Spring Washer	2	70357	70358		70359	---
12	Stopper	2	70353	70354		70355	---
13	Slotted Nut	1	70398		70399		
14	Split Pin	1	70400		70401		
15	Top Pin	1	70402	70403	70404	70405	
16	Chain Spring	2	70343	70344	70345	70346	70347
17	Load Chain	1	LCES003	LCES005	LCES010	LCES020	LCES025
18	Bottom Hook Complete Set	1	70412	70414	70416	70418	70421
19	Bottom Hook Assembly	1	70423	70424	70425	70427	70429
• 20	Safety Latch Assembly	1	70430	70431	70432	70434	70435
21	Bolt	2	70440	70441		---	
		3	---			70442	70443
22	Thrust Bearing	1	70444	70445	70446	70447	70448
23	Hook Stopper	2	70449	70450	70451	70452	70453
24	Bottom Yoke	2	70455	70457	70459	70461	70464
25	Spring Washer	2	70465	70466		---	
		3	---			70467	70468
26	Nut	2	70469	70470		---	
		3	---			70471	70472
27	Idle Sheave Assembly	1	70473	70474	70475	70476	70477
28	Bottom Shaft Assembly	1	70478	70479	70480	70481	70482
29	Thrust Collar A	1	70483	70484	70485	70486	70487

• Recommended spares.

HOIST CONTROL STATION ASSEMBLY

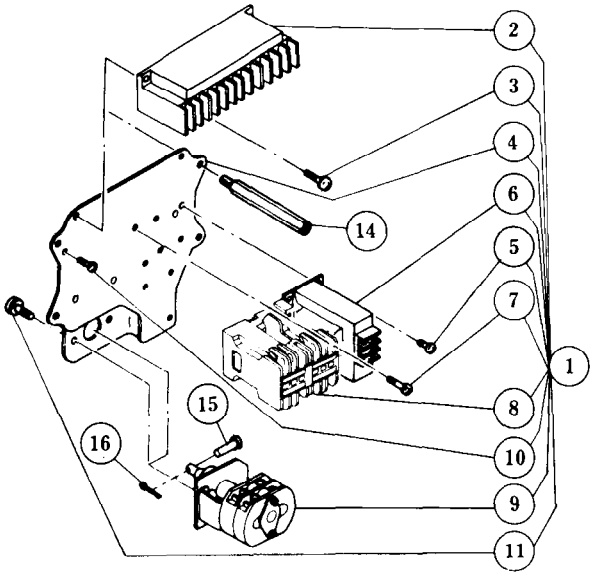


HOIST CONTROL STATION PARTS LIST

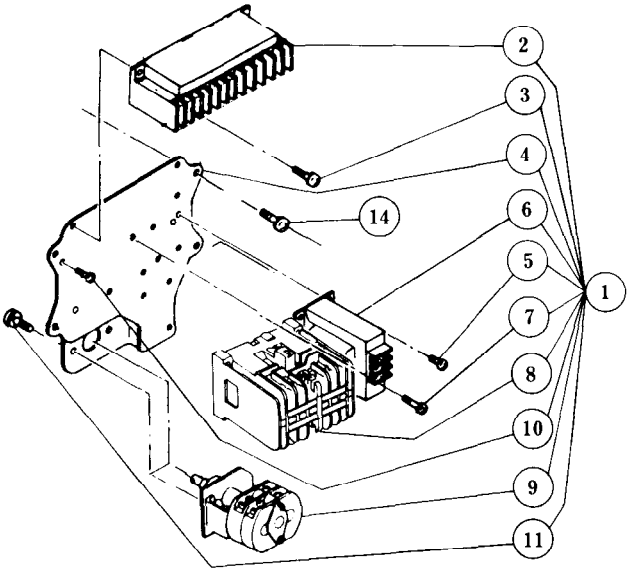
ITEM NO.	DESCRIPTION OF PART	QTY. TOTAL	CAPACITY PART NO.				
			1/2 ton	1 ton	2 ton	3 ton	5 ton
1	2 Push Button Pendant and Cord, Complete Set * (Includes Pc's 2 through 18)	1	73212			73213	
2	Cord Clamp 12 Assembly	1	73214			---	
	Cord Clamp 14 Assembly		---			73215	
3	Cord Holder A Complete Set (Includes Pc's 4,5 & 6)	1	70535			---	
4	Cord Chain Pin	1	70536			---	
5	Cord Holder A Assembly	1	70537			---	
6	Split Pin	1	73538			---	
7	Push Button Cord 3C	1	73216				
8	Fixing Sleeve	2	73217				
9	Lock-Belt	2	73218				
10	2 Push Button Pendant Assembly (Includes Pc's 11 & 12)	1	70555				
11	Split Pin	1	70557				
12	Cord Chain Pin	1	70558				
13	Packing 12	1	---			73219	
14	Cord Holder 42	1	---			73220	
15	Holder Plate U Assembly (Includes Pc's 16,17 & 18)	1	---			73272	
16	Holder Plate U	1	---			73273	
17	Chain Cord Stopper	1	---			70562	
18	Machine Screw W/Spring Washer	2	---			70563	
19	Machine Screw W/Spring Washer	4	73221			73222	
20	Socket Holder Packing B	1	70559			70560	

* Specify length.

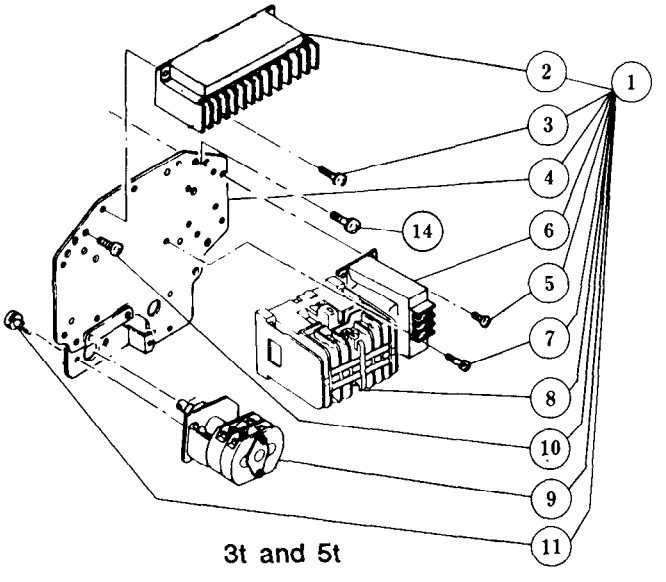
HOIST ELECTRIC ASSEMBLY AND PARTS LIST



1/2t



1t and 2t

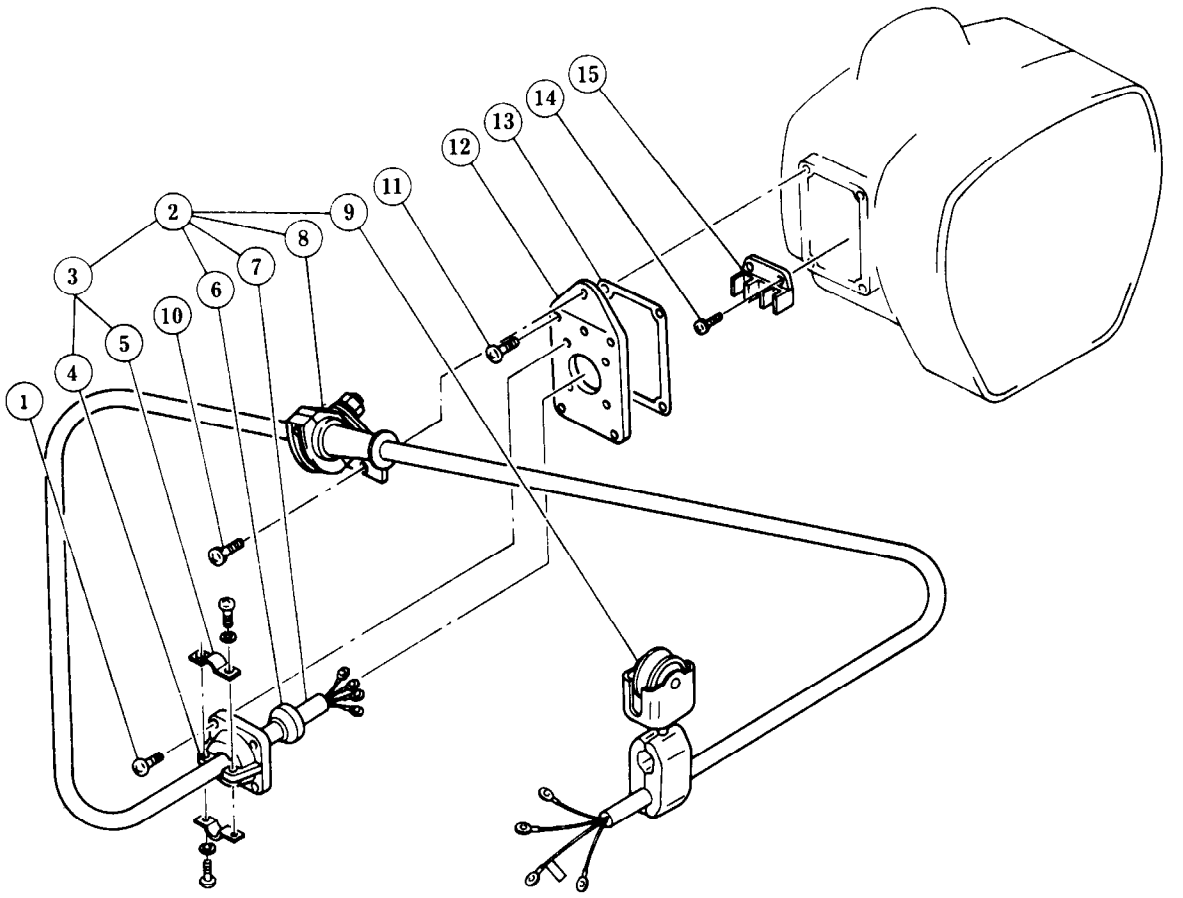


3t and 5t

ITEM NO.	DESCRIPTION OF PART	QTY. TOTAL	CAPACITY PART NO.				
			1/2 ton	1 ton	2 ton	3 ton	5 ton
1	Plate Complete Set	1	70488	70489	70490	70491	
• 2	Non-Reverse Relay	1	73310			73311	
3	Machine Screw W/Spring Washer	2	70500				
4	Plate Assembly	1	70501	70502	70503	70507	
5	Machine Screw W/Spring Washer	4	70509				
• 6	Transformer	1	70511			70512	
7	Machine Screw W/Spring Washer	2	70516			---	
		3	---			70516	
• 8	Electromagnetic Contactor S	1	70518			70519	
9	Limit Switch Complete Set	1	73312	73313		73314	
10	Machine Screw W/Spring Washer	1	70525			70526	
11	Machine Screw W/Spring Washer	2	70527				
14	Stay Bolt	4	70532	---			
	Machine Screw W/Spring Washer	4	---	70533			
15	Coupling Pin	1	70313	---			
16	Split Pin	1	70315	---			

• Recommended spares.

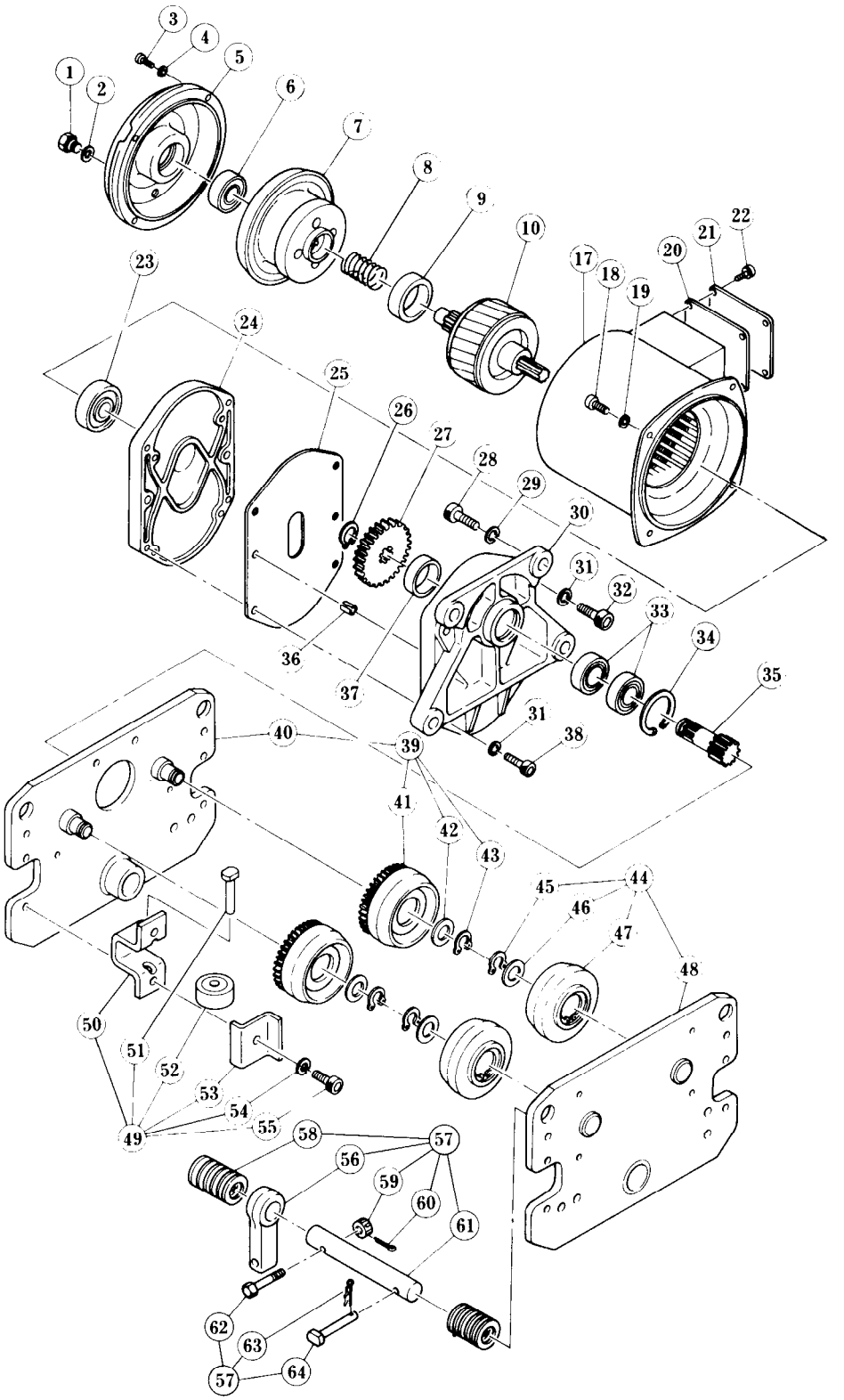
HOIST POWER SUPPLY ASSEMBLY AND PARTS LIST



ITEM NO.	DESCRIPTION OF PART	QTY. TOTAL	CAPACITY PART NO.				
			1/2 ton	1 ton	2 ton	3 ton	5 ton
1	Machine Screw W/Spring Washer	4	73223				
2	Power Supply Cable Complete Set (Includes Pc's 3,4,5,6,7,8 & 9)	1	73224			73225	
3	Cable Holder M Assembly (Includes Pc's 4 &5)	1	73226				
4	Cable Holder M	1	73227				
5	Cable Clamp 14 Assembly	1	73228				
6	Cable Packing 13		73229			---	
	Cable Packing 14	1	---			73230	
7	Power Supply Cable 4C	1	70568			73274	
8	Cable Clamp Arm Assembly	1	70570			73275	
9	Cable Hanger Assembly	3	70574				
10	Machine Screw W/Spring Washer	2	70564				
11	Machine Screw W/Spring Washer	4	73231				
12	Terminal Cover	1	73232				
13	Socket Holder Packing A	1	70580	70581			
14	Machine Screw W/Spring Washer	2	73233				
15	Terminal Plate 3P Assembly	1	73234				

Note: For 230/460V, 460V-60Hz and other voltages.

TROLLEY HOUSING AND MOTOR ASSEMBLY



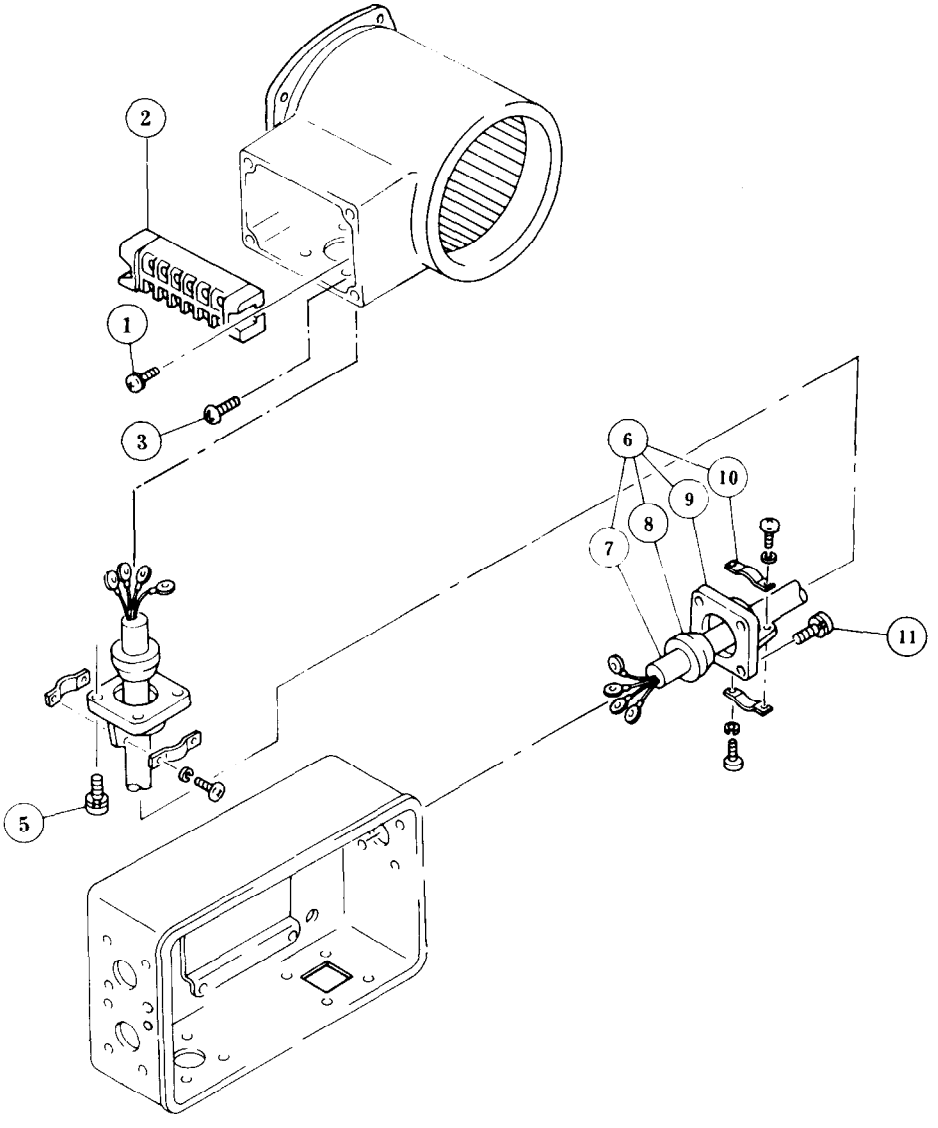
TROLLEY HOUSING AND MOTOR PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY. TOTAL	CAPACITY PART NO.				
			1/2 ton	1 ton	2 ton	3 ton	5 ton
1	Inspection Screw	1	70634				
2	Plug Packing	1	70635				
3	Socket Bolt	4	70636				
4	Spring Washer	4	70637				
5	Motor Cover	1	70638				
6	Ball Bearing	1	70639				
7	Brake Drum Assembly	1	70640				
8	Brake Spring	1	70641				
9	Bumper	1	70642				
10	Motor Shaft W/ Rotor	1	70643			70644	
17	Motor Frame W/ Stator	1	70645			70646	
18	Socket Bolt	4	70647				
19	Spring Washer	4	70648				
20	Terminal Cover Packing	1	70649				
21	Terminal Cover	1	70650				
22	Machine Screw W/ Spring Washer	4	70651				
23	Ball Bearing	1	70652				
24	Gear Box B	1	70653				
25	Gear Box Packing	1	70654				
26	Snap Ring	1	70655				
27	Gear No. 2	1	70656				
28	Socket Bolt	4	70658				
29	Spring Washer	4	70659				
30	Gear Box A	1	70660				
31	Spring Washer	4	70648				
32	Socket Bolt	2	70661				
33	Ball Bearing	2	70662				
34	Snap Ring	1	70663				
35	Gear No.3	1	70664		70665		70666
36	Set Pin	2	70667				
37	Spacer	1	70668				
38	Socket Bolt	2	70647				
39	Side Plate G (Includes Pc's 40,41,42 & 43)	1	70669		70670	70671	70672
40	Side Plate G Assembly	1	70673		70674	70675	70676
41	Track Wheel G Assembly	2	70677		70678	70679	70680
42	Washer	2	70681		70682	70683	70684
43	Snap Ring	2	70685		70686	70687	70688
44	Side Plate S Assembly (Includes Pc's 45,46,47 & 48)	1	70689		70690	70691	70692
45	Snap Ring	2	70685		70686	70687	70688
46	Washer	2	70681		70682	70683	70684
47	Track Wheel S Assembly	2	70693		70694	70695	70696
48	Side Plate S Assembly	1	70697		70698	70699	70700
49	Side Roller Assembly (Includes Pc's 50,51,52 & 53)	4	70701		70702		70703
50	Side Roller Holder	4	70704		70705		70706
51	Roller Pin	4	70707		70708		70709
52	Side Roller	4	70710		70711		70712
53	Stopper Plate	4	70713		70714		70715

TROLLEY HOUSING AND MOTOR PARTS LIST (Continued)

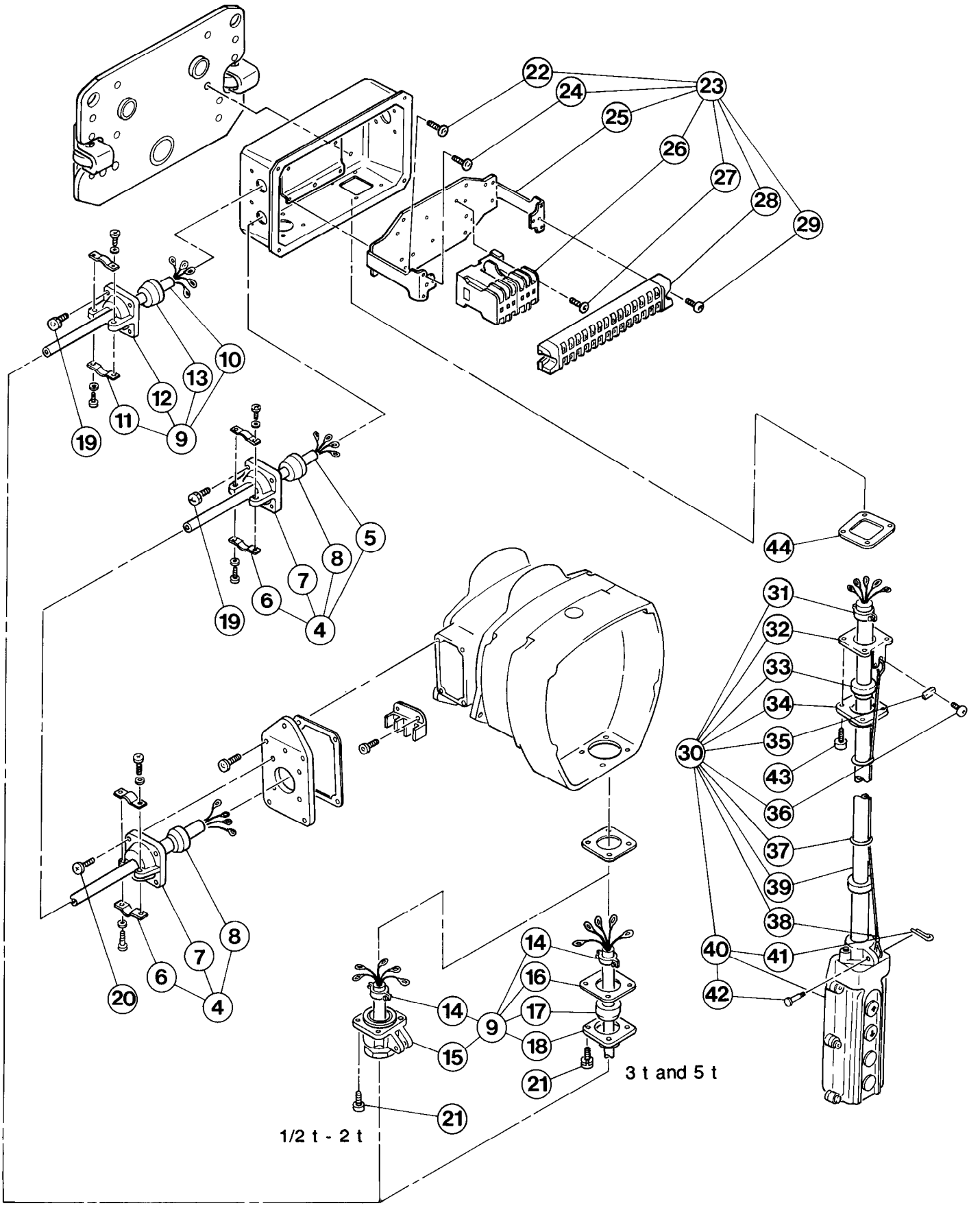
ITEM NO.	DESCRIPTION OF PART	QTY. TOTAL	CAPACITY PART NO.				
			1/2 ton	1 ton	2 ton	3 ton	5 ton
54	Spring Washer	8	70716		70717		70718
55	Socket Bolt		70719		70720		---
	Bolt	8	---				70721
56	Suspender	1	70726		70727	70728	70729
57	Suspension Shaft Assembly (Includes Pc's 58,59,60,61,62,63 & 64)	1	73258		73259	73260	73261
58	Adjusting Spacer	24	70722		---		
		16	---		70723	70724	70725
59	Slotted Nut	1	70730			70731	
60	Split Pin	1	70732			70733	
61	Suspension Shaft	1	70734		70735	70736	70737
62	Bolt	1	70738		70739	70740	70741
63	Split Pin	1	70742			70743	
64	Shaft Stopper Pin	1	70744		70745	70746	70747

TROLLEY POWER JUNCTION ASSEMBLY AND PARTS LIST



ITEM NO.	DESCRIPTION OF PART	QTY. TOTAL	CAPACITY PART NO.				
			1/2 ton	1 ton	2 ton	3 ton	5 ton
1	Machine Screw W/Spring Washer	2	70748				
2	Terminal Plate 6P	1	70749				
3	Machine Screw W/Spring Washer	1	73315				
5	Machine Screw W/Spring Washer	1	70750				
6	Cable 4C Complete Set (Includes Pc's 7,8,9 & 10)	1	70753				
7	Cable 4C	1	70754				
8	Cable Packing 14	2	70755				
9	Cable Holder M	2	70756				
10	Cable Clamp 14 Assembly	2	70757				
11	Machine Screw W/Spring Washer	4	70758				

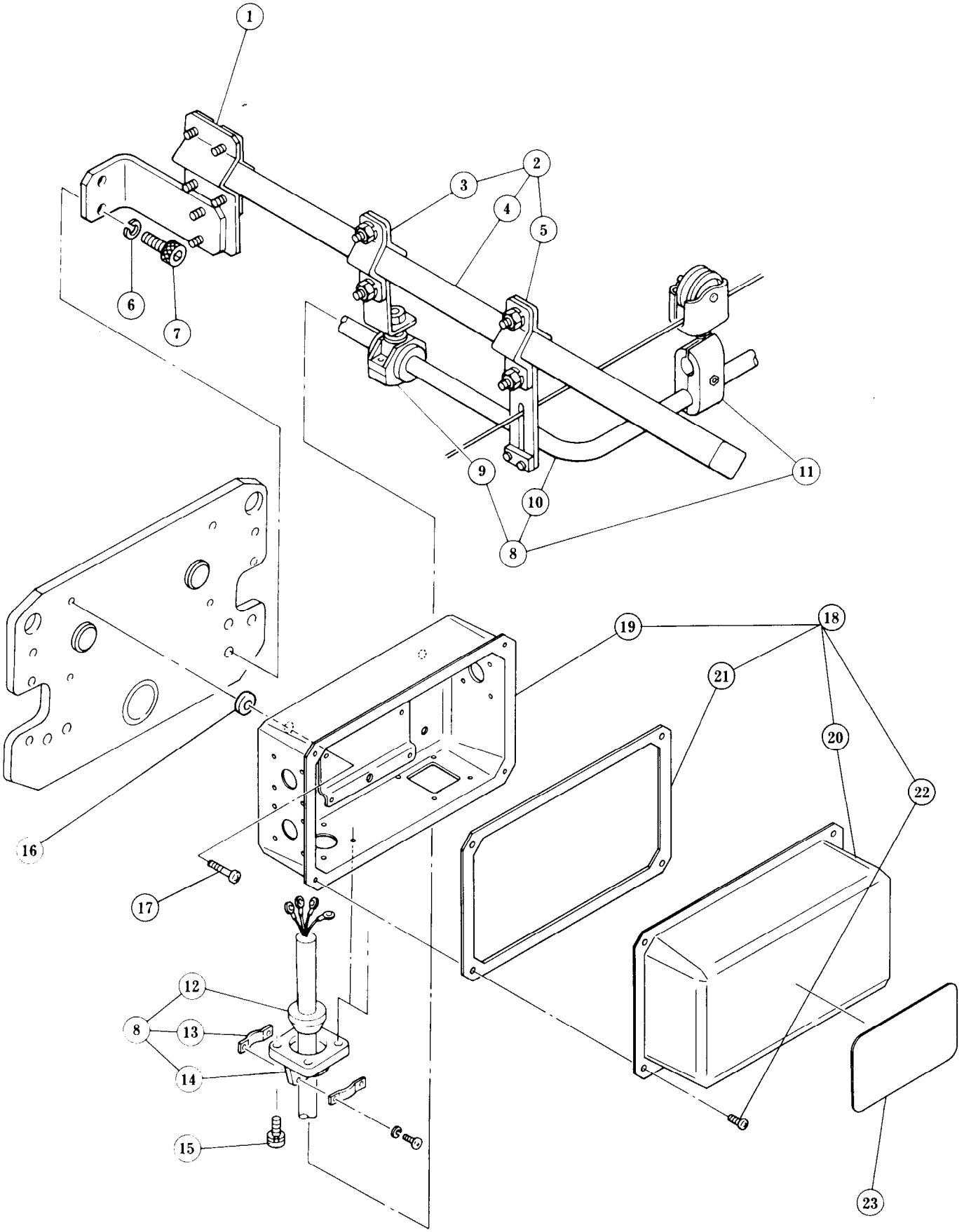
TROLLEY CONTROL STATION ASSEMBLY



TROLLEY CONTROL STATION PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY. TOTAL	CAPACITY PART NO.				
			1/2 ton	1 ton	2 ton	3 ton	5 ton
4	Cable 4C Complete Set (Includes Pc's 5,6,7 & 8)	1	73282		73283		
5	Cable 4C	1	73284		73285		
6	Cable Clamp 14 Assembly	1	70757				
7	Cable Holder M	1	70756				
8	Cable Packing 14	1	70755				
9	Cable 5C Complete Set (Includes Pc's 10,11,12,13,14,15,16,17 & 18)	1	73278		73279		
10	Cable 5C	1	73280		73281		
11	Cable Clamp 18 Assembly	1	70781				
12	Cable Holder M	1	70756				
13	Cable Packing 18	1	70782			70782	
14	Cable Clamp 19 Assembly	1	73303				
15	Cord Holder A Assembly	1	73304			---	
16	Holder Plate 42	1	---			73305	
17	Packing 18	1	---			73306	
18	Cable Holder 42	1	---			73307	
19	Machine Screw W/Spring Washer	8	70758				
20	Machine Screw W/Spring Washer	4	73223				
21	Machine Screw W/Spring Washer	4	73221			73222	
22	Machine Screw W/Spring Washer	4	73287				
23	Plate Complete Set (Includes Pc's 24,25,26,27,28 & 29)	1	73286				
24	Machine Screw W/Spring Washer	3	70759				
25	Plate Assembly	1	73288				
26	Electomagnetic Contactor	1	73289				
27	Machine Screw W/Spring Washer	2	73290				
28	Terminal Plate 14P	1	73291				
29	Machine Screw W/Spring Washer	2	70748				
30	4 Push Button Pendant and Cord Complete Set (Includes Pcs. 31,32,33,34, 35,36,37,38,39,40,41 & 42)	1	73292				
31	Cable Clamp 14 Assembly	1	73293				
32	Cord Holder Support 42	1	73294				
33	Packing 14	1	73295				
34	Cable Holder 42	1	73296				
35	Cord Chain Stopper	1	73297				
36	Machine Screw W/Spring Washer	2	73298				
37	Lock-Belt	2	73218				
38	Fixing Sleeve	2	73217				
39	Push Button Cord 5C	1	73299				
40	4 Push Button Pendant Assembly (Includes Pc's 41 & 42)	1	73300				
41	Split Pin	1	70557				
42	Cord Chain Pin	1	70558				
43	Machine Screw W/Spring Washer	4	73301				
44	Cord Holder Support Packing	1	73302				

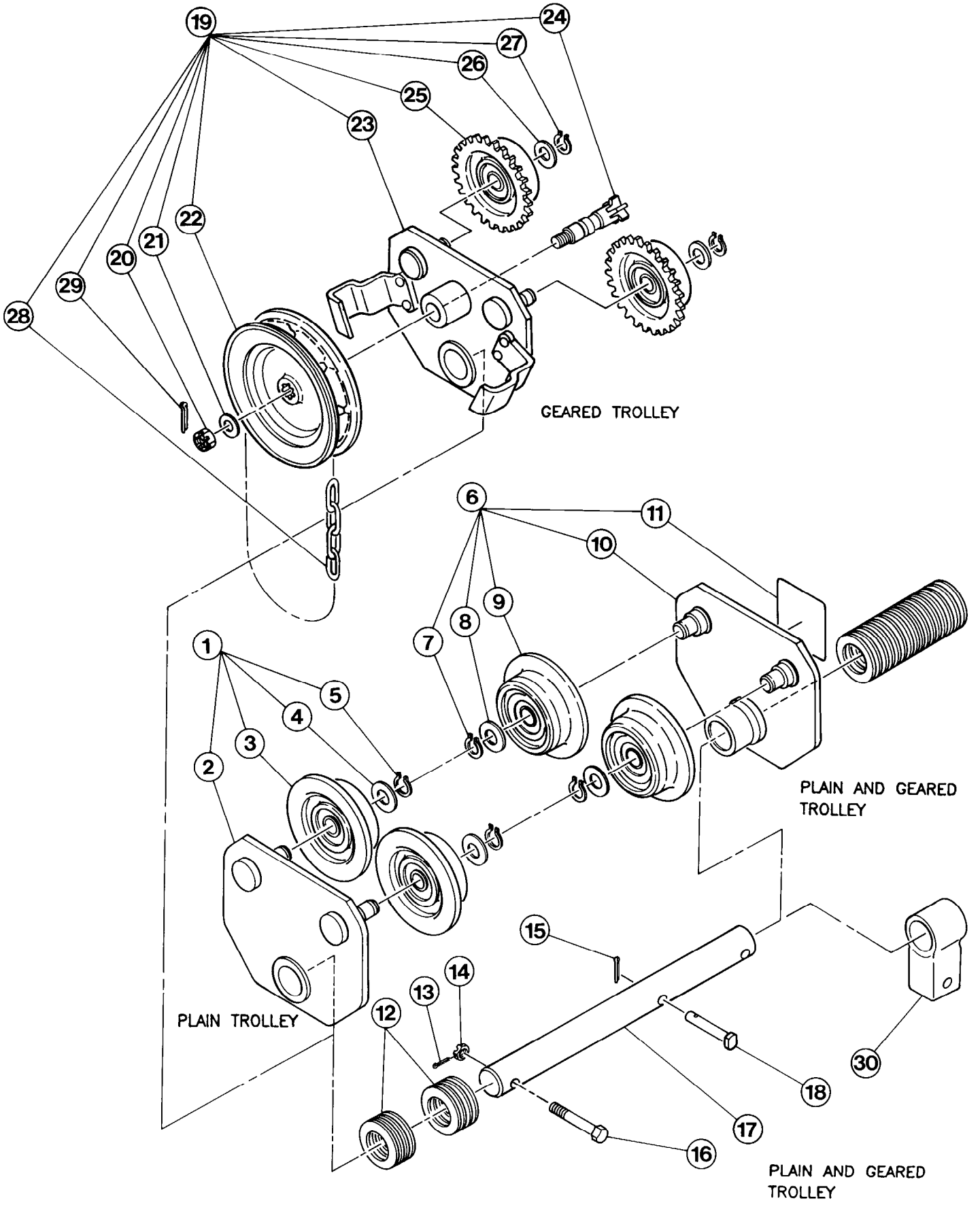
TROLLEY POWER SUPPLY ASSEMBLY



TROLLEY POWER SUPPLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY. TOTAL	CAPACITY PART NO.				
			1/2 ton	1 ton	2 ton	3 ton	5 ton
1	Bar Holder Assembly	1	70790				
2	Cable Support Bar Assembly (Includes Pc's 3,4 & 5)	1	70791				
3	Cable Support Arm Assembly	1	70792				
4	Cable Support Bar	1	70793				
5	Wire Guide Assembly	1	70794				
6	Spring Washer	2	70795				
7	Socket Bolt	2	70796				
8	Power Supply Cable 4C Assembly (Includes Pc's 9,10,11,12,13 & 14)	1	73235		73236		
9	Cable Support Assembly	1	73237		73238		
10	Power Supply Cable 4C	1	73239		73240		
11	Cable Hanger Assembly	6	73241		73242		
12	Cable Packing 14	1	73243		---		
	Cable Packing 16		---		73244		
13	Cable Clamp 14 Assembly	1	73245		---		
	Cable Clamp 16 Assembly		---		73246		
14	Cable Holder M	1	73247				
15	Machine Screw W/Spring Washer	4	73248				
16	Spacer	4	73276				
17	Machine Screw W/Spring Washer	4	73277				
18	Connecting Station Complete Set (Includes Pc's 19,20,21 & 22)	1	73249				
19	Connecting Station Assembly	1	73250				
20	Connecting Station Lid	1	73251				
21	Connecting Station Packing	1	73252				
22	Machine Screw W/Spring Washer	4	73253				
23	Nameplate	1	73254		73255	73256	73257

PLAIN AND GEARED TROLLEY ASSEMBLY



PLAIN AND GEARED TROLLEY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY. TOTAL	CAPACITY PART NO.				
			1/2 ton	1 ton	2 ton	3 ton	5 ton
1	Side Plate A, Complete	1	73317	70808	70809	70810	70811
2	Side Plate A	1	70812	70813	70814	70815	70816
3	Track Wheel P	2	70817	70818	70819	70820	70821
3A	Wheel Bearing	2	71887	71888	71889	71890	71891
3B	Retaining Ring	2	71892	71893	71894	70895	71896
4	Washer	2	---	70822	70823	70824	70825
	Slotted Nut	2	70826	---			
5	Snap Ring	2	---	70827	70828	70829	70830
	Split Pin	2	70831	---			
6	Side Plate B, Complete	1	70832	70833	70834	70835	70836
7	Snap Ring	2	---	70827	70828	70829	70830
	Split Pin	2	70826	---			
8	Washer	2	---	70822	70823	70824	70825
	Slotted Nut	2	70831	---			
9	Track Wheel P	2	70817	70818	70819	70820	70821
10	Side Plate B	1	70812	70813	70814	70815	70816
11	Name Plate, Plain	1	T-268	T-269	T-270	T-271	T-272
	Name Plate, Geared	1		T-273	T-274	T-275	T-276
12	Spacer	24	70842	70843	---		
	Spacer	18	---		70884	70845	70846
13	Split Pin	1	70847		70848		70849
14	Slotted Nut	1	73316	70850	70851		70852
15	Split Pin	1	70853		70841		70854
16	Bolt	1	70855	70856	70857	70858	70859
17	Standard Suspension (3 to 5 in.)	1	70860	70861	---		
	Standard Suspension (4 to 6 in.)	1	---		70862	70863	---
	Standard Suspension (5 to 7 in.)	1	---				70864
18	Shaft Stopper Pin	1	70865	70866	70867	70868	70869
19	Side Plate G, Complete	1	70871		70872	70873	70874
20	Nut	1	70875				
21	Washer	1	70876				
22	Hand Wheel	1	70877				
23	Side Plate G	1	70879		70880	70881	70882
24	Pinion	1	70883		70884		
25	Track Wheel G	2	70885		70886	70887	70888
25A	Wheel Bearing	2	71888		71889	71890	71891
25B	Retaining Ring	2	71893		71894	71895	71896
26	Washer	2	70822		70823	70824	70825
27	Snap Ring	2	70827		70828	70829	70830
28	Hand Chain	1	HCCF005				
29	Split Pin	1	70890				
30	Suspender, Plain Trolley	1	A17707	A17708	A17709	A17710	A17711
	Suspender, Geared Trolley	1	A17707		A17709	A17710	A17711

WARRANTY

INGERSOLL-RAND Material Handling Products ("Manufacturer") extends the following warranty to the original purchaser ("Purchaser") of each new product ("Product") manufactured or sold by it.

(a) Manufacturer warrants Product to be free from defects in material and workmanship under normal use and service for a period of one year from Manufacturer's original sale.

(b) Manufacturer's liability and Purchaser's sole remedy under this warranty, and for any and all other claims arising out of the purchase and use of Product, including any alleged negligence on the part of Manufacturer, is limited to repair or replacement, at Manufacturer's option, of such defective Product or part thereof, provided that the defective Product or part thereof is returned to Manufacturer's factory or authorized service center, transportation prepaid, and that examination by Manufacturer discloses that the Product is defective under the terms of this warranty.

(c) Manufacturer does not warrant components of products provided by other manufacturers. However, to the extent possible, Manufacturer will pass along to Purchaser applicable warranties of such other manufacturers.

(d) This warranty is conditioned upon installation and use of Product in accordance with Manufacturer's operating instructions. This warranty is IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Manufacturer shall have no liability or obligation as to any Product which has been misused, altered or changed in any way, including without limitation use of a "cheater" handle for extra leverage on hoists or pullers, conversion of hand winches or hoists to power operations* or use of any Product for lifting, lowering or moving persons.

(e) MANUFACTURER SHALL IN NO EVENT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES arising from the sale, delivery or use of Products.

Manufacturer neither assumes nor authorizes any person to assume for it any other liability or obligation in connection with sale and use of Products other than stated above. Caution: Purchaser and user are cautioned to examine specific, local or other regulations, including American National Standard Regulations, which may apply to a particular type of product before installing or putting to use.

*Except power rewinding pursuant to operating instructions

Please Note: Units purchased without chain and / or hooks must have Ingersoll-Rand Material Handling Products chain and hooks installed before the warranty is valid.

Shipping Damage

It is our policy to promote safe delivery of all orders.

This shipment has been thoroughly checked, packed and inspected before leaving our plant and receipt for it in good condition has been received from the carrier. Any loss or damage which occurs to this shipment while enroute is not due to any action or conduct of the manufacturer.

Visible Loss or Damage: If any of the goods called for on the bill of lading or express receipt are damaged or the quantity is short, do not accept them until the freight or express agent makes an appropriate notation on your freight bill or express receipt.

Concealed Loss or Damage: When a shipment has been delivered to you in apparent good condition, but upon opening the crate or container, loss or damage has taken place while in transit, notify the carrier's agent immediately.

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You may return products damaged in shipment to us for repair, which services will be for your account and form your basis for claim against the carrier.

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510 Hester Drive, P.O. Box 618,
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For Technical Support:
Ingersoll-Rand Material Handling Products
2724 Sixth Avenue South,
Seattle, Washington 98134-2102
Phone (206) 624-0466 Telex: 3723554 Fax: (206) 447-0715
P.O. Box 24046, Seattle, Washington 98124-0046

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