INSTRUCTION, MAINTENANCE and PARTS MANUAL

CM METEOR®

SERIES S. A.

ELECTRIC HOIST

Equipped With Meteor Monitor™

CAPACITY: FROM ½ TO 5 TON

Caution — Important

If not properly installed, operated and maintained, the use of all mechanical equipment presents the possibility of personal injury or property damage. Before hoist use, all persons who will install, operate or maintain should read this manual thoroughly. For safe, dependable and economical performance, follow all instructions and recommendations contained herein. It is also important to retain this manual for future use.

CM HOIST

DIVISION COLUMBUS McKINNON CORPORATION
TONAWANDA, NEW YORK 14150 U.S.A.

83876

MANUAL NO. 81G
PRICE $2.50

DO'S AND DON'TS

Safe Operation of Hoists

The following are Do's and Don'ts for safe operation of overhead hoists. Taking precedence over any specific rule listed here, however, is the most important rule of all, USE COMMON SENSE. A few minutes spent reading these rules can make an operator aware of dangerous practices to avoid and precautions to take for his own safety and the safety of others. Frequent examinations and periodic inspections of the equipment as well as a conscientious observance of safety rules may save lives as well as time and money.

DON'TS — HOISTS

1. NEVER lift or transport a load until all personnel are clear.
2. DO NOT allow any unqualified personnel to operate hoist.
3. NEVER pick up a load beyond the capacity appearing on the hoist. Overloading can be caused by jerking as well as by static overload.
4. NEVER carry personnel on the hook or the load.
5. DO NOT operate hoist if you are not physically fit.
6. DO NOT operate hoist to extreme limits of chain or rope.
7. AVOID sharp contact between two hoists, between hoist and end post, and hooks and hoist body.
8. DO NOT tamper with any parts of the hoist.
9. NEVER use the hoist rope or chain as a sling.
10. DO NOT divert attention from load while operating hoist.
11. NEVER leave a suspended load unattended.
12. DO NOT attempt to lengthen load chain, or to repair damaged load chain.
13. DO NOT use chain or rope as ground for welding. NEVER touch a live welding electrode to the chain or rope.

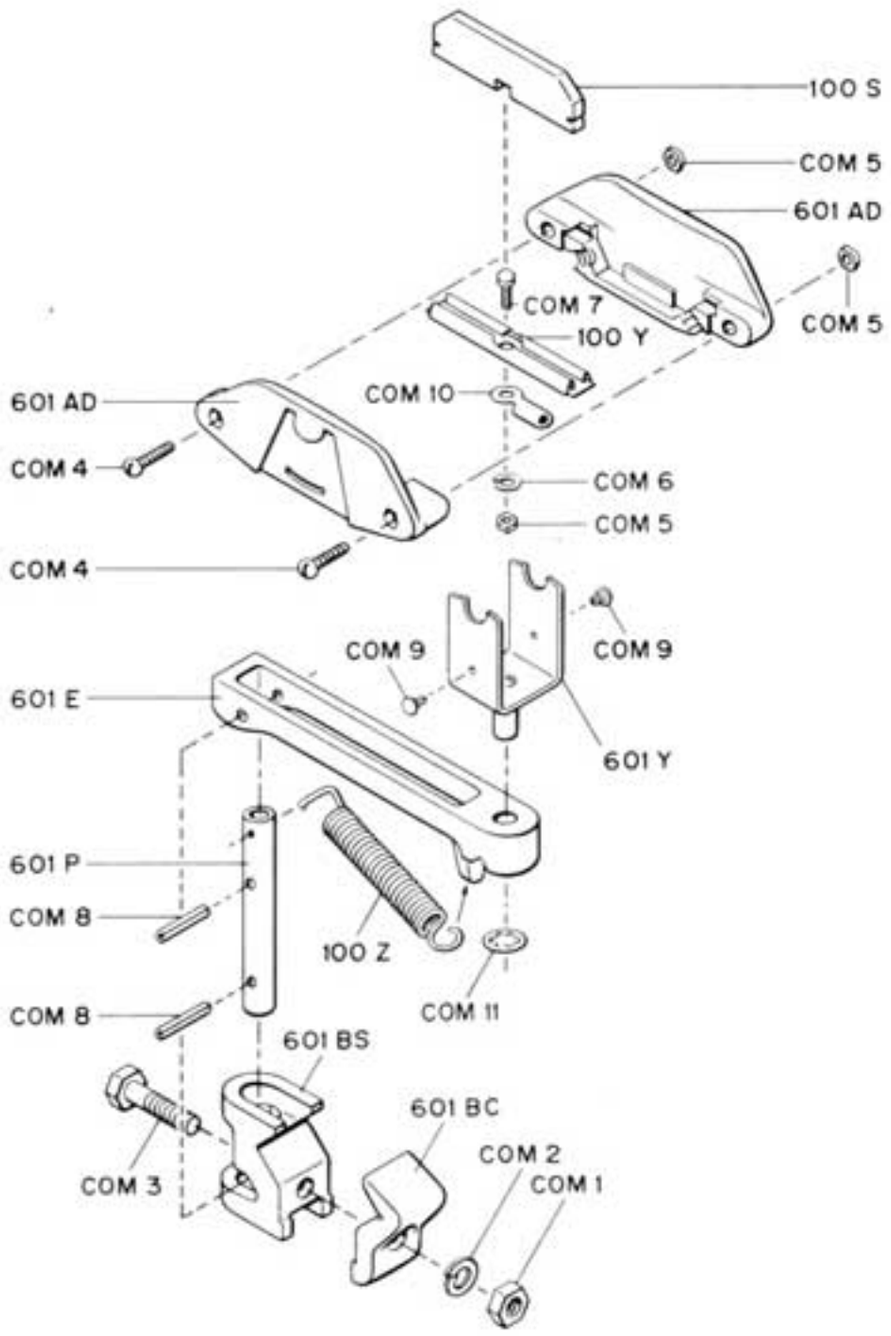
DO'S — HOISTS

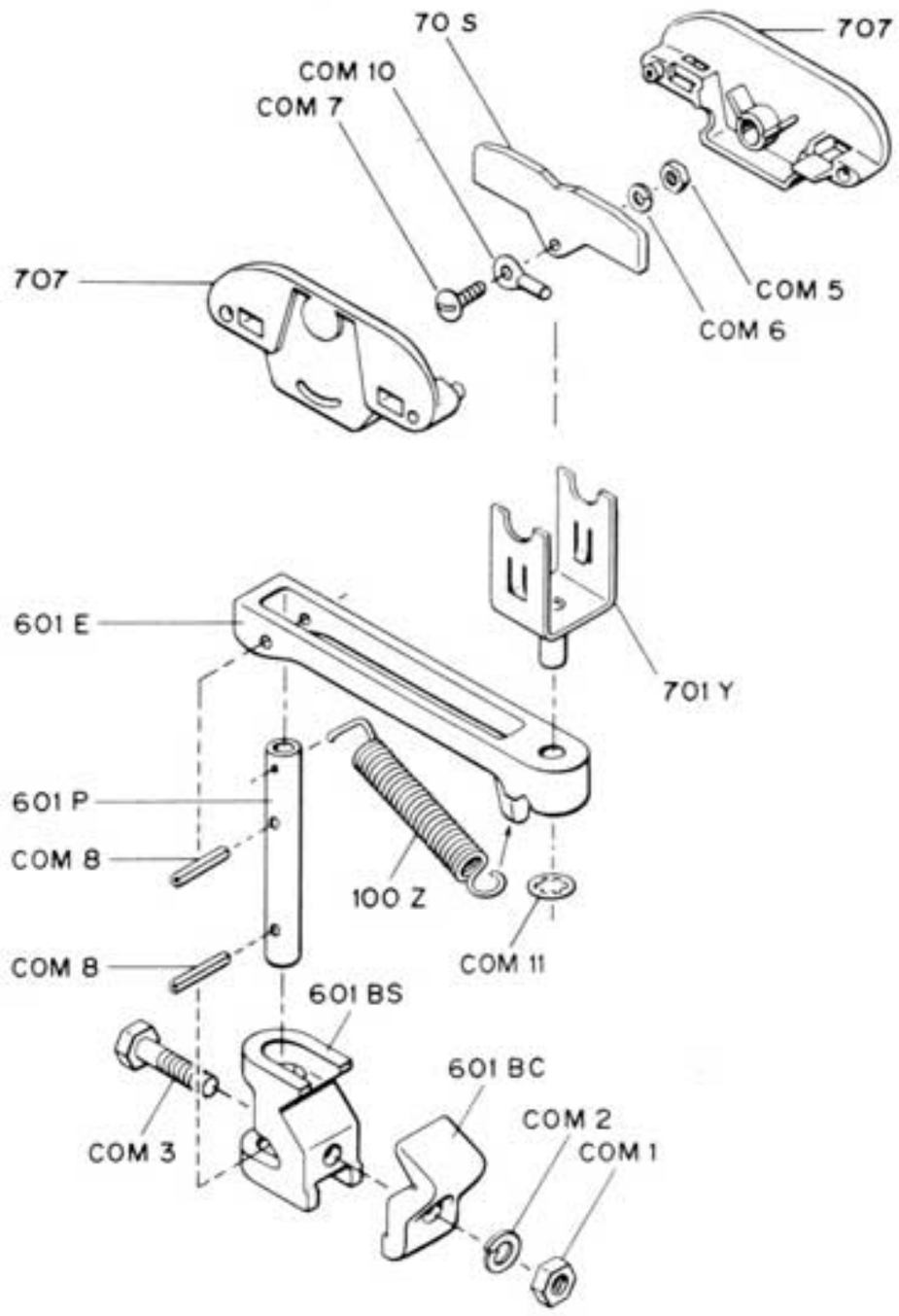
1. READ and follow manufacturer's instruction, installation and maintenance manuals. When repairing or maintaining a hoist, use only manufacturer's recommended parts and materials.
2. READ and follow all instruction and warning information on or attached to a hoist.
3. REMOVE the hoist from service and thoroughly inspect and repair as necessary if unusual performance or visual defects (such as peculiar noise, jerky operations, or travel in improper direction or obviously damaged parts) are noticed.
4. ESTABLISH a regular schedule of inspection and maintain records for all hoists with special attention given to hooks, ropes, chains, brakes and limit switches.
5. CHECK operation of brakes for excessive drift.
6. CHECK operation of limit switches.
7. CHECK for damaged hooks, ropes or chain.
8. KEEP load chain or rope clean and well lubricated.
9. CHECK the wire rope or chain for improper seating, twisting, kinking, wear or other defects before operating the hoists.
10. CHECK for broken wires in wire rope. Twelve randomly distributed broken wires in one rope lay or four broken wires in one strand in one rope lay are sufficient cause for replacement.
11. MAKE SURE a load clears neighboring stock piles, machinery, or other obstructions when raising, lowering, or traveling the load.
12. CENTER hoist over the load before operating.
13. AVOID swinging of load or load hook when traveling the hoist.
14. BE SURE the load attachment is properly seated in the saddle of the hook. Balance load properly before handling. Avoid tip loading.
15. PULL in a straight line, so that neither hoist body nor load chain or rope are angled around an object.
16. MAKE SURE you take up slack slowly.
17. ON LEVER OPERATED HOISTS, always release handle gradually when under load to avoid flying handle.

Above reprinted from Hoist Manufacturers Institute "Do's and Don'ts."

CONTENTS

Enclosed Conductor System
Current Collectors





*NUMBER 100E

COLLECTOR ASSEMBLY PARTS LIST

Part No.	No. Req'd.	Part Name
*100E	3	Collector Assembly
601 BC	1	Clamp only
601 BS	1	Swivel only
601 P	1	Post
601 E	1	Standard Arm
601 Y	1	Yoke
601 AD	2	Case Half
100 S	1	Shoe
100 Y	1	Shoe Clip
100 Z	1	Spring
COM 1	1	3/8 — 16 Hex Nut
COM 2	1	3/8 Lockwasher
COM 3	1	3/8 — 16 x 1 1/2 Bolt
COM 4	2	1/4 — 20 x 1 Machine Screw
COM 5	3	1/4 — 20 Hex Nut
COM 6	1	1/4 Lockwasher
COM 7	1	1/4 — 20 x 1/2 Bolt
COM 8	2	1/4 x 1 1/4 Roll Pin
COM 9	2	Dot Fastener
COM 10	1	No. 6 Non-Insulated Terminal
COM 11	1	1/2 Retaining Ring

NUMBER 70E

COLLECTOR ASSEMBLY PARTS LIST

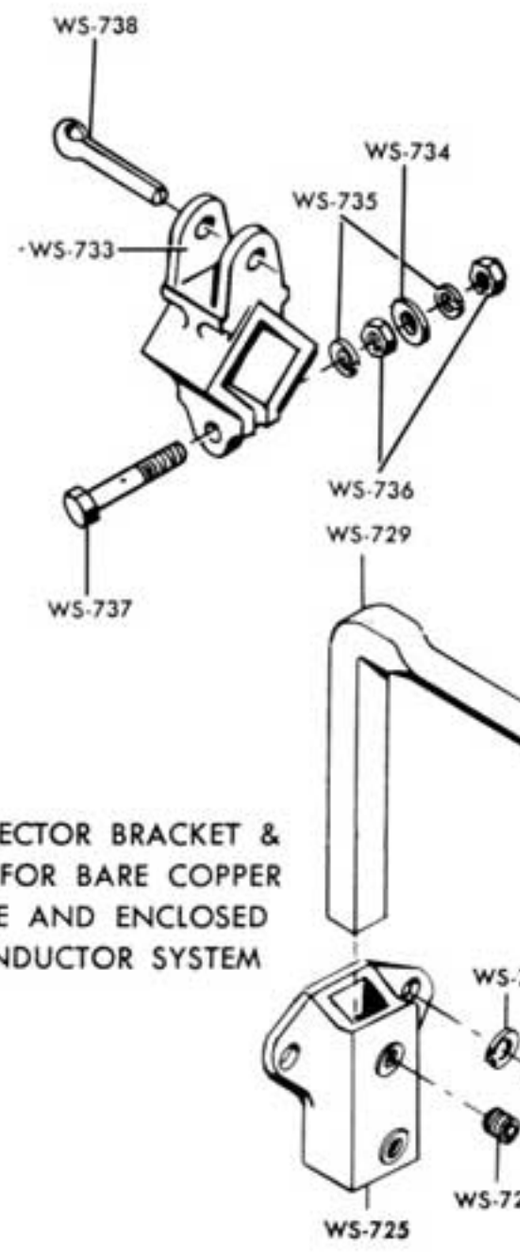
Part No.	No. Req'd.	Part Name
70 E	3	Collector Assembly
601 BC	1	Clamp only
601 BS	1	Swivel only
601 P	1	Post
601 E	1	Standard Arm
701 Y	1	Yoke
707	2	Case Half
70 S	1	Shoe
100 Z	1	Spring
COM 1	1	3/8 — 16 Hex Nut
COM 2	1	3/8 Lockwasher
COM 3	1	3/8 — 16 x 1 1/2 Bolt
COM 5	1	1/4 — 20 Hex Nut
COM 6	1	1/4 Lockwasher
COM 7	1	1/4 — 20 x 1/2 Bolt
COM 8	2	1/4 x 1 1/4 Roll Pin
COM 10	1	No. 6 Non-Insulated Terminal
COM 11	1	1/2 Retaining Ring

***ASSEMBLIES DISCONTINUED. INDIVIDUAL COMPONENTS AVAILABLE FOR REPAIRS ONLY.**

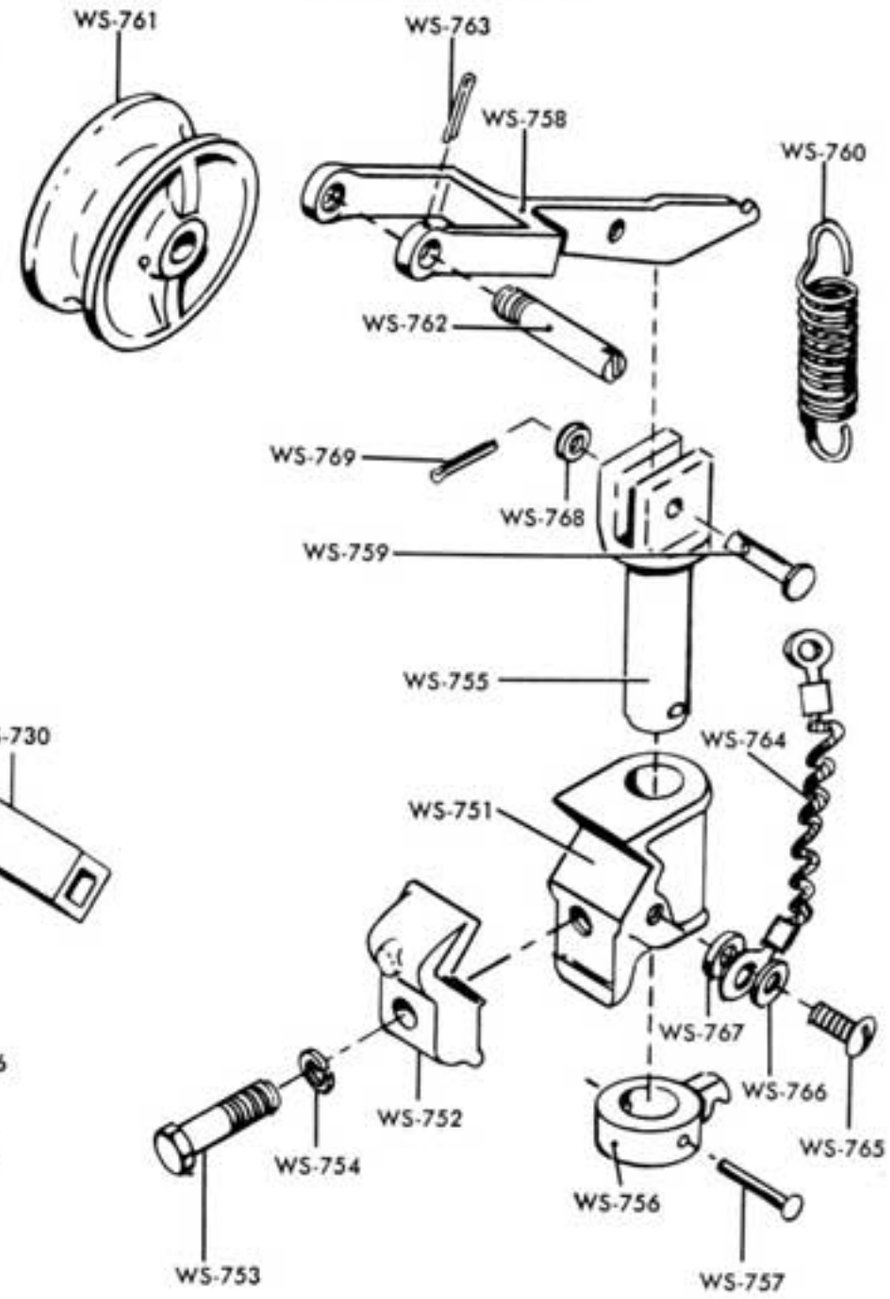
REFER TO PAGE 26 FOR ORDERING INSTRUCTIONS

Current Collectors

*SHOE COLLECTOR FOR BARE COPPER WIRE CONDUCTOR SYSTEM



*WHEEL COLLECTOR FOR BARE COPPER WIRE CONDUCTOR SYSTEM



*ASSEMBLIES DISCONTINUED. INDIVIDUAL COMPONENTS AVAILABLE FOR REPAIRS ONLY. REFER TO PAGE 41 FOR MOUNTING INSTRUCTIONS.

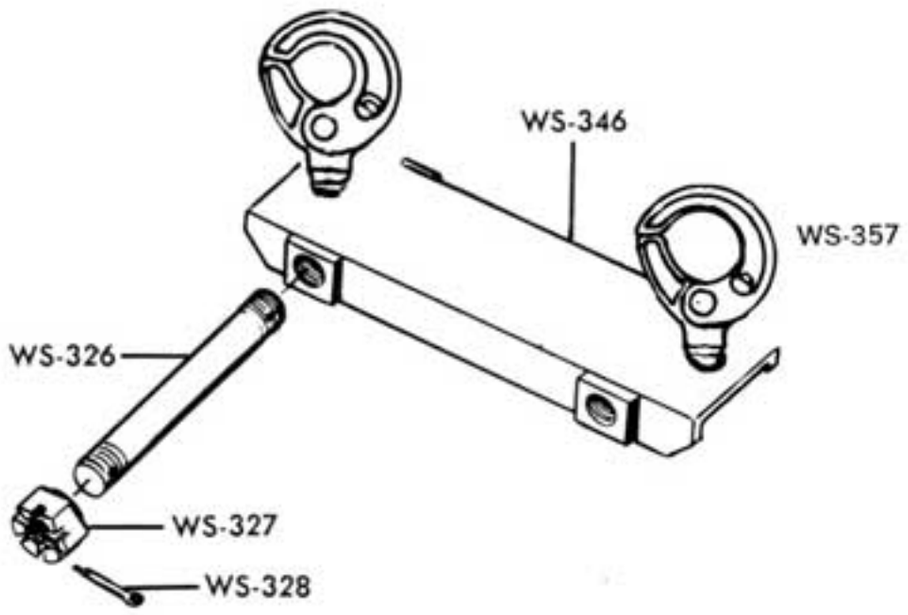
**INDIVIDUAL PART NOT AVAILABLE. CONTACT FACTORY FOR REPLACEMENT.

Parts List

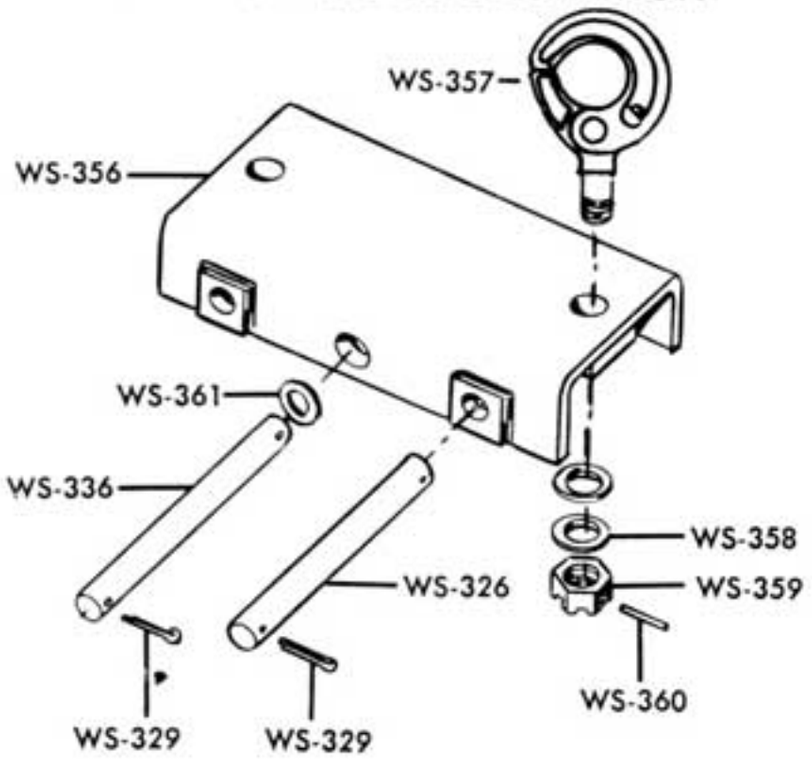
Key No.	No. Req'd.	Part Name
*WS-723	1	Shoe Collector Assembly (Items WS-725 Thru WS-730 & Three WS-732; Specify Size of I-Beam & Capacity of Hoist)
*WS-724	1	Wheel Collector Assembly (Items WS-725 Thru WS-730 & Three WS-750; Specify Size of I-Beam & Capacity of Hoist)
WS-725	1	Collector Bar Bracket
WS-726	2	Collector Bar Bracket Attaching Screw
WS-727	2	Collector Bar Bracket Attaching Screw Lockwasher
WS-728	2	Collector Bar Bracket Set Screw
WS-729	1	Collector Bar (Specify Whether for Shoe or Wheel Collector, Size of I-Beam & Capacity of Hoist)
WS-730	1	Collector Bar Insulator
*WS-732	3	Shoe Collector (Items WS-733 Thru WS-738)
WS-733	1	Collector Shoe
WS-734	1	Collector Shoe Clamp Screw Washer
WS-735	2	Collector Shoe Clamp Screw Lockwasher
WS-736	2	Collector Shoe Clamp Screw Nut
WS-737	1	Collector Shoe Clamp Screw
WS-738	1	Collector Shoe Cotter Pin
*WS-750	3	Wheel Collector (Items WS-751 Thru WS-769)
WS-751	1	Clamp Bearing and Rivet
WS-752	1	Clamp
WS-753	1	Clamp Screw
WS-754	1	Clamp Screw Lockwasher
WS-755	1	Clevis Pin & Rivet
WS-756	1	Collar & Rivet
WS-757	1	Rivet
**WS-758	1	Harp
WS-759	1	Harp Pin, Washer & Cotterpin
WS-760	1	Spring
WS-761	1	Wheel
WS-762	1	Wheel Pin
WS-763	1	Wheel Pin Cotter Pin
WS-764	1	Copper Shunt
WS-765	3	Shunt and Terminal Screw
WS-766	3	Shunt and Terminal Screw Lockwasher
WS-767	3	Shunt and Terminal Screw Washer
WS-768	1	Harp Pin Washer
WS-769	1	Harp Pin Cotter Pin

REFER TO PAGE 26 FOR ORDERING INSTRUCTIONS

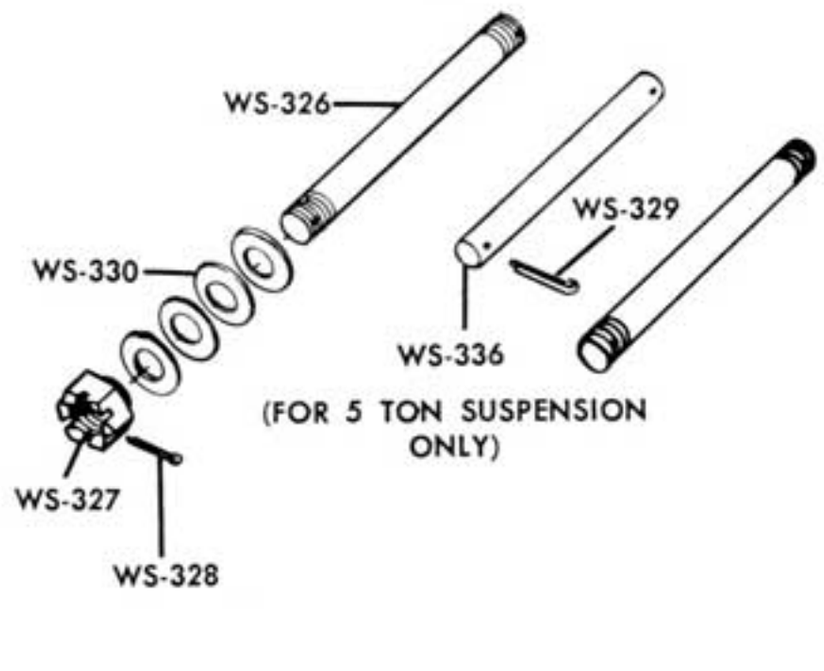
Hook and Lug Suspension



½-3 TON HOOK SUSPENSION



5 TON HOOK SUSPENSION



(FOR 5 TON SUSPENSION ONLY)

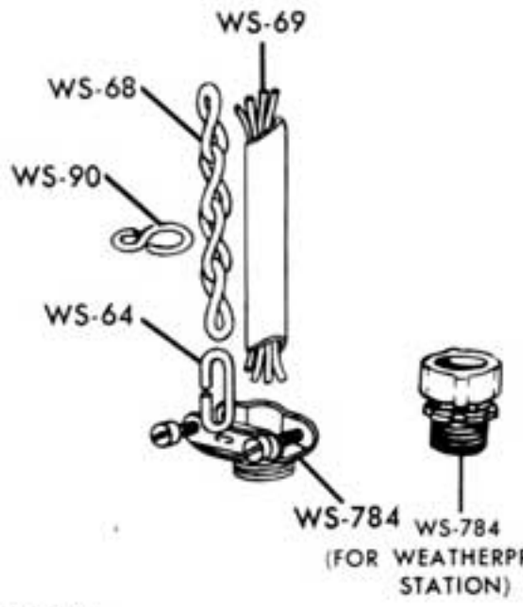
½-5 TON LUG SUSPENSION

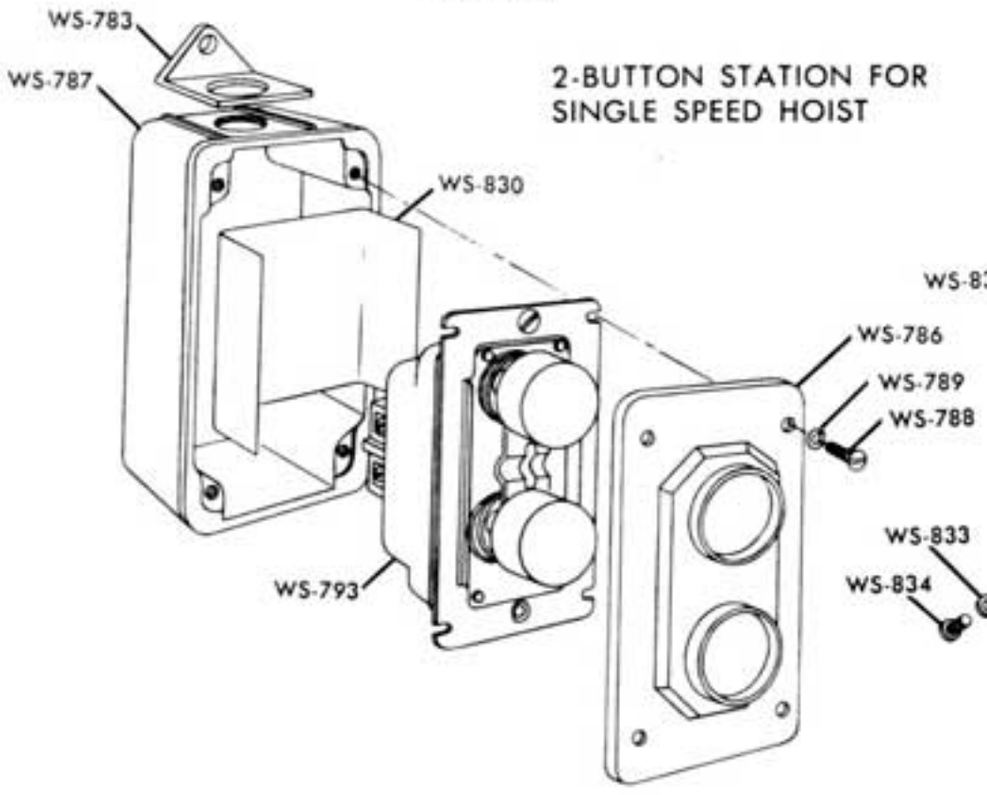
Parts List

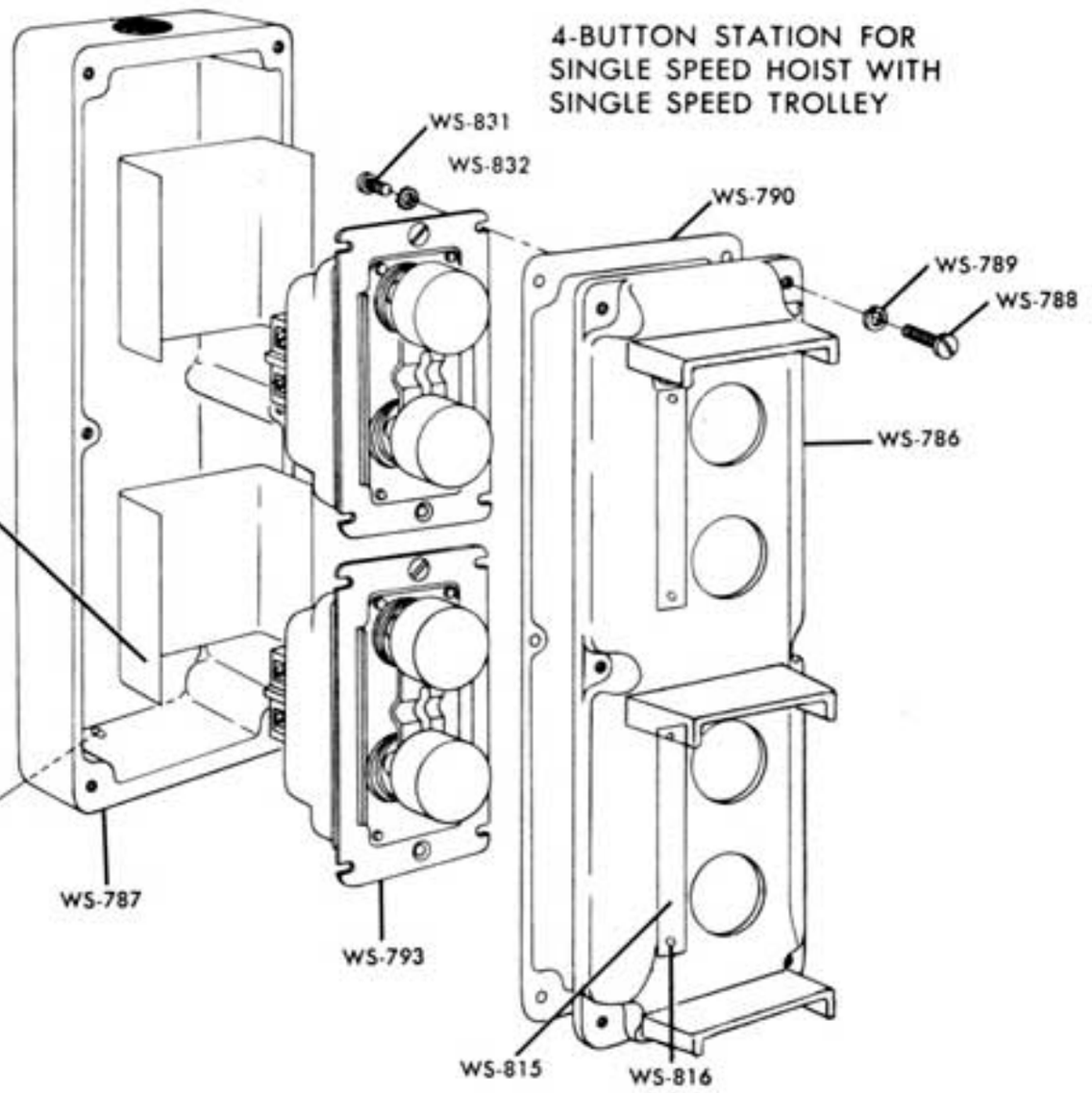
Key No.	No. Req'd.	Part Name
WS-269	2	Latch Kit (½-3 Ton #7 Latch Kit, 5 Ton #8 Latch Kit), Specify Hook Size (Not Shown)
WS-325	1	Lug Suspension — ½-3 Ton Units (Items WS-326 Thru WS-328 & WS-330)
WS-326	2	Hoist Suspension Bolt (Specify Length of Bolt)
WS-326	2	Hoist Suspension Pin (5 Ton Hook Suspension)
WS-327	4	Hoist Suspension Bolt Nut
WS-328	4	Hoist Suspension Bolt Nut Cotter Pin
WS-329	4	Hoist Suspension Pin Cotter Pin
WS-329	2	Idler Sheave Housing Support Pin Cotter Pin
WS-330	76	Spacer Washer — ½-3 Ton Units
WS-330	36	Spacer Washer — 5 Ton Units
WS-335	1	Lug Suspension — 5 Ton Units (Items WS-326 Thru WS-330 & WS-336)
WS-336	1	Idler Sheave Housing Support Pin (Specify Length of Pin). For other type Pin see Page 28.
WS-345	1	Hook Suspension — ½-3 Ton Units (Items WS-326 Thru WS-328 & WS-346)
WS-346	1	Upper Hooks and Channel Assembly
WS-355	1	Hook Suspension — 5 Ton Units (Items WS-326, WS-329, WS-336 & WS-356 Thru WS-361)
WS-356	1	Hook Suspension Channel
WS-357	2	Upper Hook—Latchlok
WS-358	4	Upper Hook Washer
WS-359	2	Upper Hook Nut
WS-360	2	Upper Hook Nut Pin
WS-361	2	Idler Sheave Housing Support Pin Washer

REFER TO PAGE 26 FOR ORDERING INSTRUCTIONS

Push Button Stations Series D





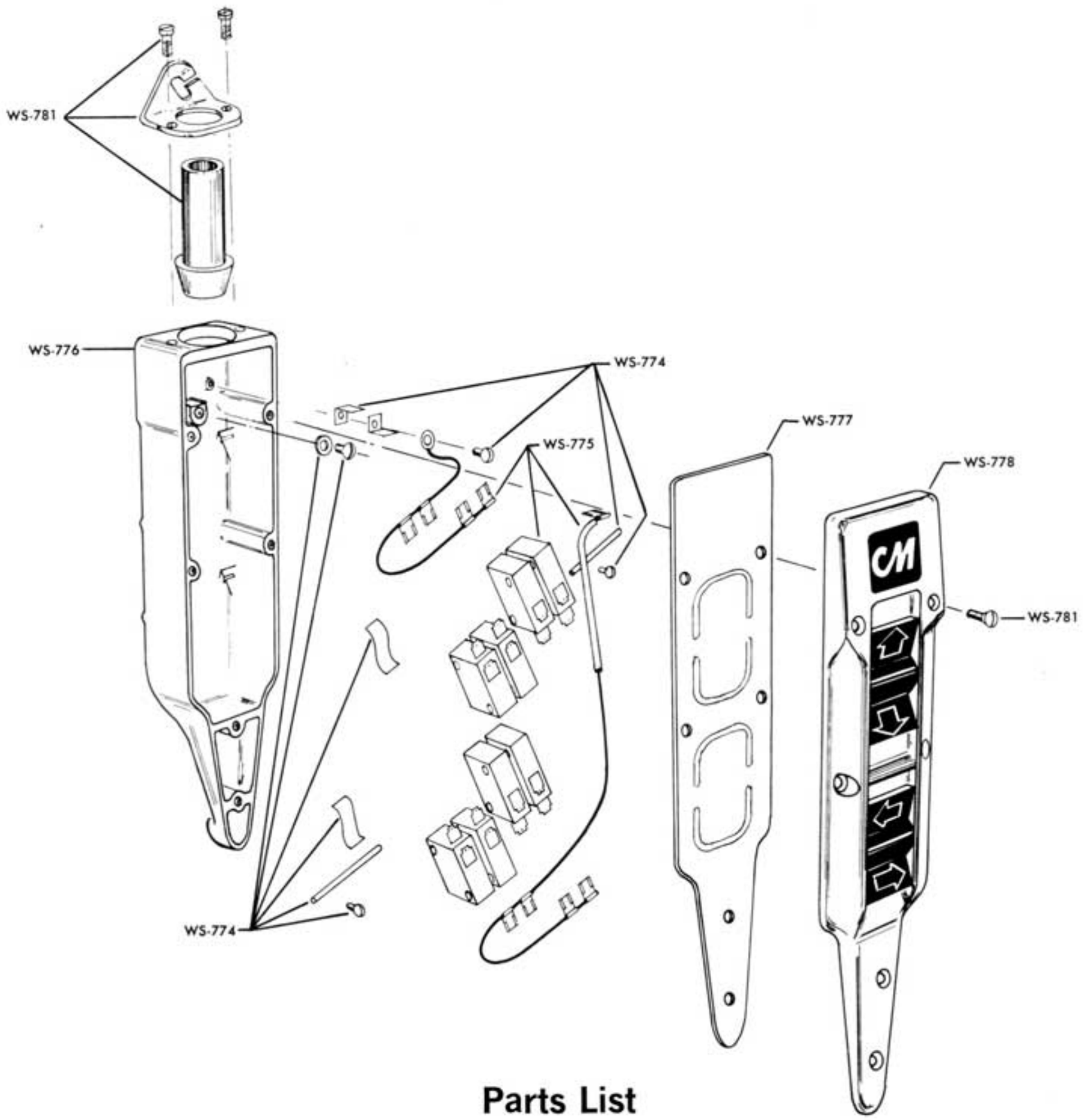


Parts List

Key No.	No. Req'd.	Part Name
WS-64	2	Push Button Chain Attaching Link
WS-68		Push Button Chain (Specify Length Req'd.)
WS-69		Push Button Cable (Specify Length Req'd.)
WS-90		Push Button Cable Clip (Specify No. Req'd.)
WS-783	1	Push Button Chain Clip
WS-784	1	Push Button Box Connector
WS-785	1	2-Push Button Station (Specify Button Markings Req'd.) (Items WS-786 Thru WS-789, WS-793 & WS-830)
WS-785	1	4-Push Button Station (Items WS-786 Thru WS-789, WS-793, WS-815, WS-816, WS-830 Thru WS-834)
WS-786	1	Cover (For 2-Button Station)
WS-786	1	Cover With Name Plates (For 4-Button Station)
WS-787	1	Box
WS-788	4 or 6	Cover Attaching Screw
WS-789	4 or 6	Cover Attaching Screw Lockwasher
WS-790	1	Cover Gasket (For Weatherproof Station)
WS-793	1 or 2	Switch Unit (Specify Button Markings Req'd.; State Whether for "Hoist" or "Trolley")
WS-815	2	Name Plate (Specify Markings Req'd.)
WS-816	4	Name Plate Drive Screw
WS-830	1 or 2	Liner
WS-831	8	Switch Attaching Screw
WS-832	8	Switch Attaching Screw Lockwasher
WS-833	1	External Ground Screw Washer
WS-834	1	External Ground Screw

REFER TO PAGE 26 FOR ORDERING INSTRUCTIONS

Control Station – Hoist Trolley Combination



Parts List

Key No.	No. Req'd.	Part Name
WS-774	1	Control Station Parts Kit consists of: 2—Terminal Attaching Screw 1—Strain Cable Attaching Screw 1—Strain Cable Attaching Screw Washer 4—Pin Retainer Screw 8—Switch Leaf Spring 2—Switch Mounting Pin 4—Terminal
WS-775	1	Control Station Switch Kit consists of: 8—Switch 1—Jumper 2—Jumper
WS-776	1	Case
WS-777	1	Gasket
WS-778	1	Cover Assembly (Decal & Rocker Included)
WS-781	1	Control Station Kit consists of: 1—Grommet 1—Control Station Chain Clip 2—Chain Clip Attaching Screw 6—Cover Screw
WS-785	1	Control Station (Items WS-774 thru WS-778 & WS-781)

REFER TO PAGE 26 FOR ORDERING INSTRUCTIONS

Control Station – Two Speed Hoist
Parts List

Key No.	No. Req'd.	Part Name
WS-774	1	Control Station Parts Kit consists of: 1—Spring 1—Strain Cable Attaching Screw 1—Strain Cable Attaching Screw Washer 2—Switch Attaching Pin 1—Sliding Cam 2—Spring End Support 3—Switch Mounting Plate & Rocker Assembly Attaching Screw 1—Switch Mounting Plate & Rocker Assembly 1—Cam Return Spring
WS-775	1	Control Station Switch Kit consists of: 3—Switch 2—Insulator 1—Jumper
WS-776	1	Case
WS-777	1	Gasket
WS-778	1	Cover Assembly (Decal & Rocker Included)
WS-781	1	Control Station Kit consists of: 1—Grommet 1—Control Station Chain Clip 2—Chain Clip Attaching Screw 6—Cover Attaching Screw
WS-785	1	Control Station (Items WS-774 thru WS-778 & WS-781)

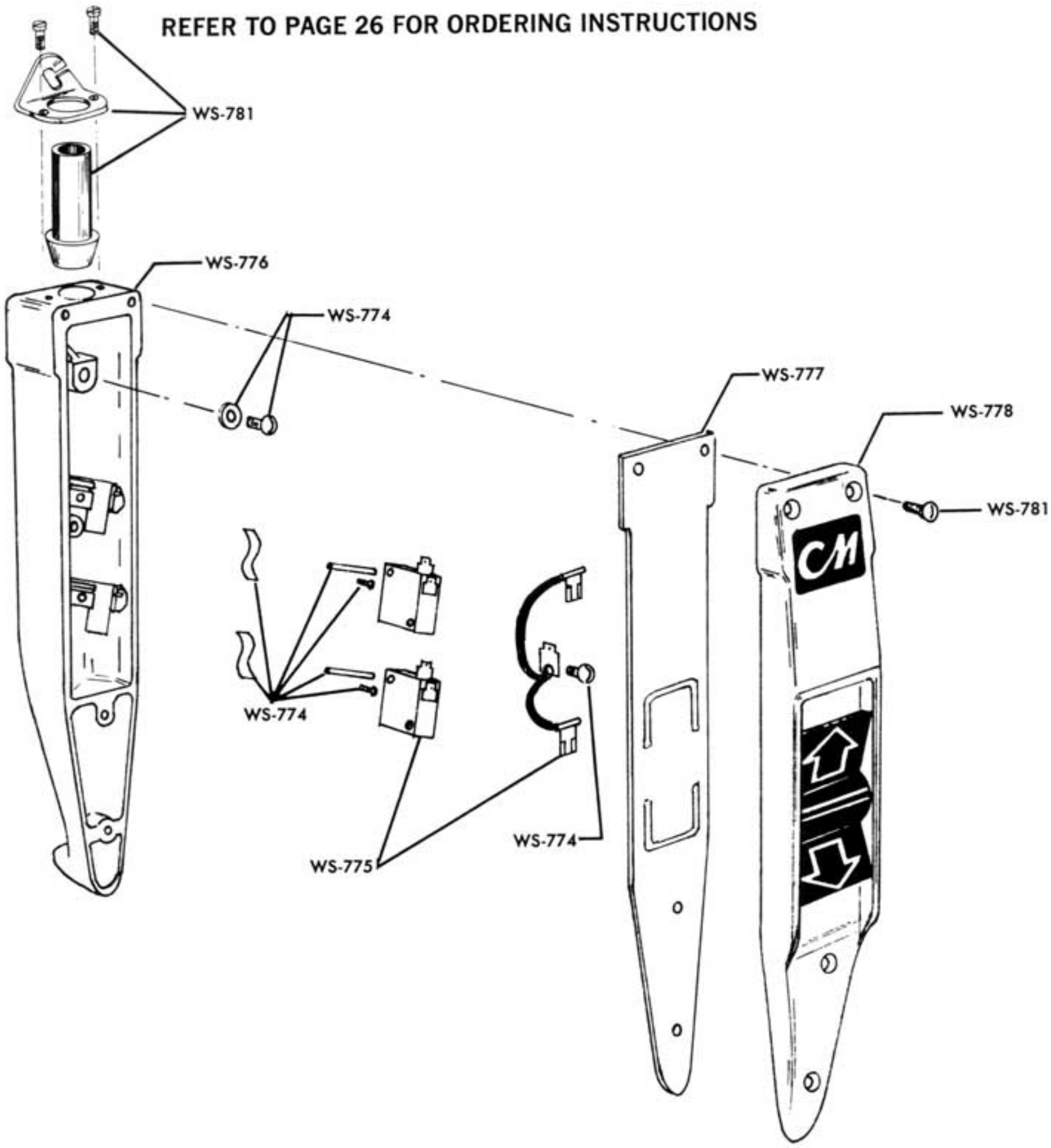
REFER TO PAGE 26 FOR ORDERING INSTRUCTIONS

Control Station – Single Speed Hoist

Parts List

Key No.	No. Req'd.	Part Name
WS-774	1	Control Station Parts Kit consists of: 1—Strain Cable Attaching Screw 1—Strain Cable Attaching Screw Washer 2—Switch Mounting Pin 3—Pin & Jumper Retainer Screw 2—Switch Leaf Spring
WS-775	1	Control Station Switch Kit consists of: 2—Switch 1—Jumper
WS-776	1	Case
WS-777	1	Gasket
WS-778	1	Cover Assembly (Decal & Rocker Included)
WS-781	1	Control Station Kit consists of: 1—Grommet 1—Control Station Chain Clip 2—Chain Clip Attaching Screw 4—Cover Attaching Screw
WS-785	1	Control Station (Items WS-774 thru WS-778, & WS-781)

REFER TO PAGE 26 FOR ORDERING INSTRUCTIONS

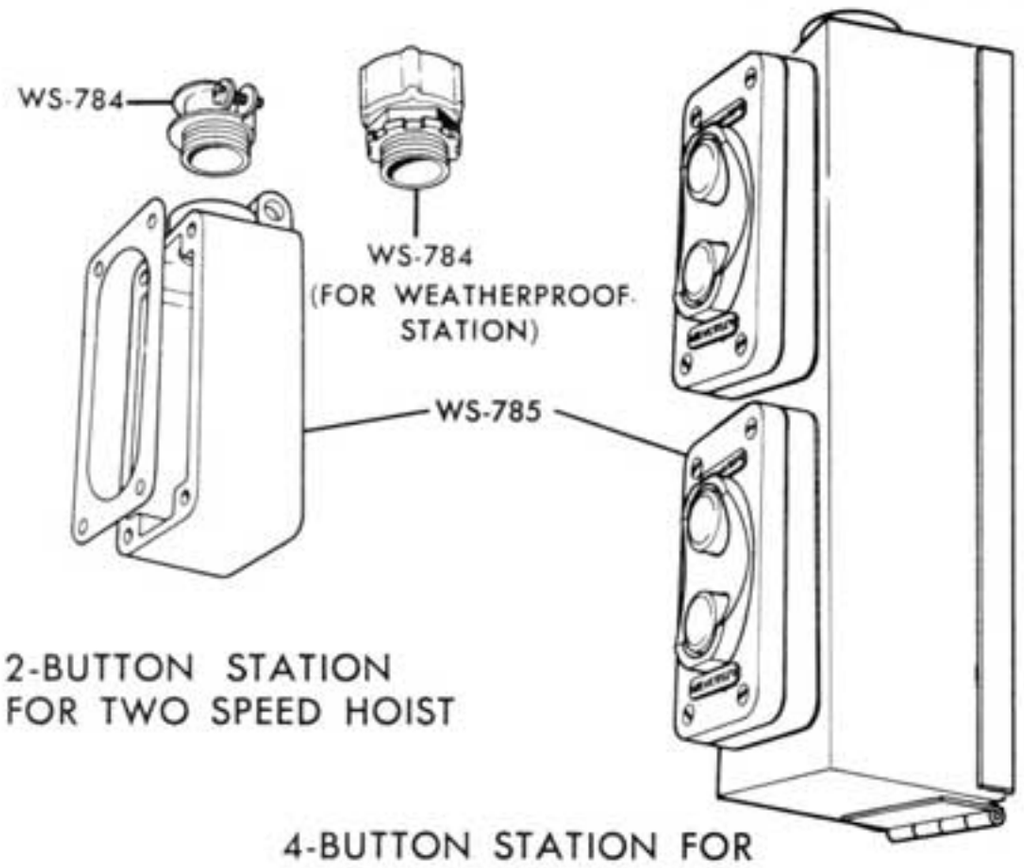


Parts List

Key No.	No. Required Reversing Contactor	No. Required Selecting Contactor	Part Name
WS-610	1		Reversing Contactor
WS-611		1	Speed Selecting Contactor
WS-612	1	1	Back Plate, Side Plates and Screws
WS-613	2	1	Coil
WS-614	2	1	Yoke Spring, Right Hand
WS-615	2	1	Yoke Spring, Left Hand
WS-616	0 or 1	1	Terminal Block Kit (Block, Terminals & Screws)
WS-617	2	0	Rocker Arm With Bracket
WS-618	2	0	Mechanical Interlock Bar
WS-619	0 or 2	2	N. C. Contact Kit
WS-620	6	2	N. O. Contact Kit
WS-621	0 or 4	0	Dummy Contact Kit
WS-622	2	1	Stationary Contact Block
WS-623	2	1	Upper and Lower Movable Contact Blocks and Screw (WS-642)
WS-624	4	2	Movable Contact Block Assembly Screw
WS-625	4	2	Movable Contact Block Assembly Screw Lockwasher
WS-626	3 or 4	0	Connector
WS-627	4	2	Coil Retainer
WS-628	4	2	Yoke Trunnion, Screw and Lockwasher
WS-629	0	2	Jumper
WS-630	8	4	Stationary Contact Block Attaching Screw
WS-631	2	1	Armature
WS-632	4	2	Wire Retainer
WS-633	3	3	Contactor Attaching Screw
WS-634	3	3	Contactor Attaching Screw Washer
WS-635	3	3	Grommet, large
WS-636	2	1	Field With Brackets & Shading Coils
WS-637	8	4	Field Attaching Screw, Washer and Nut
WS-638	8	4	Grommet, small
WS-639	0	1	Reinforcing Bar
WS-640	16	10	Quick Connect Terminal
WS-641	16	8	Quick Connect Terminal Screw
WS-642	2	1	Movable Contact Block Screw
WS-643	2	1	Yoke
WS-644	4	2	Shading Coil

REFER TO PAGE 26 FOR ORDERING INSTRUCTIONS

Push Button Stations Series R



2-BUTTON STATION
FOR TWO SPEED HOIST

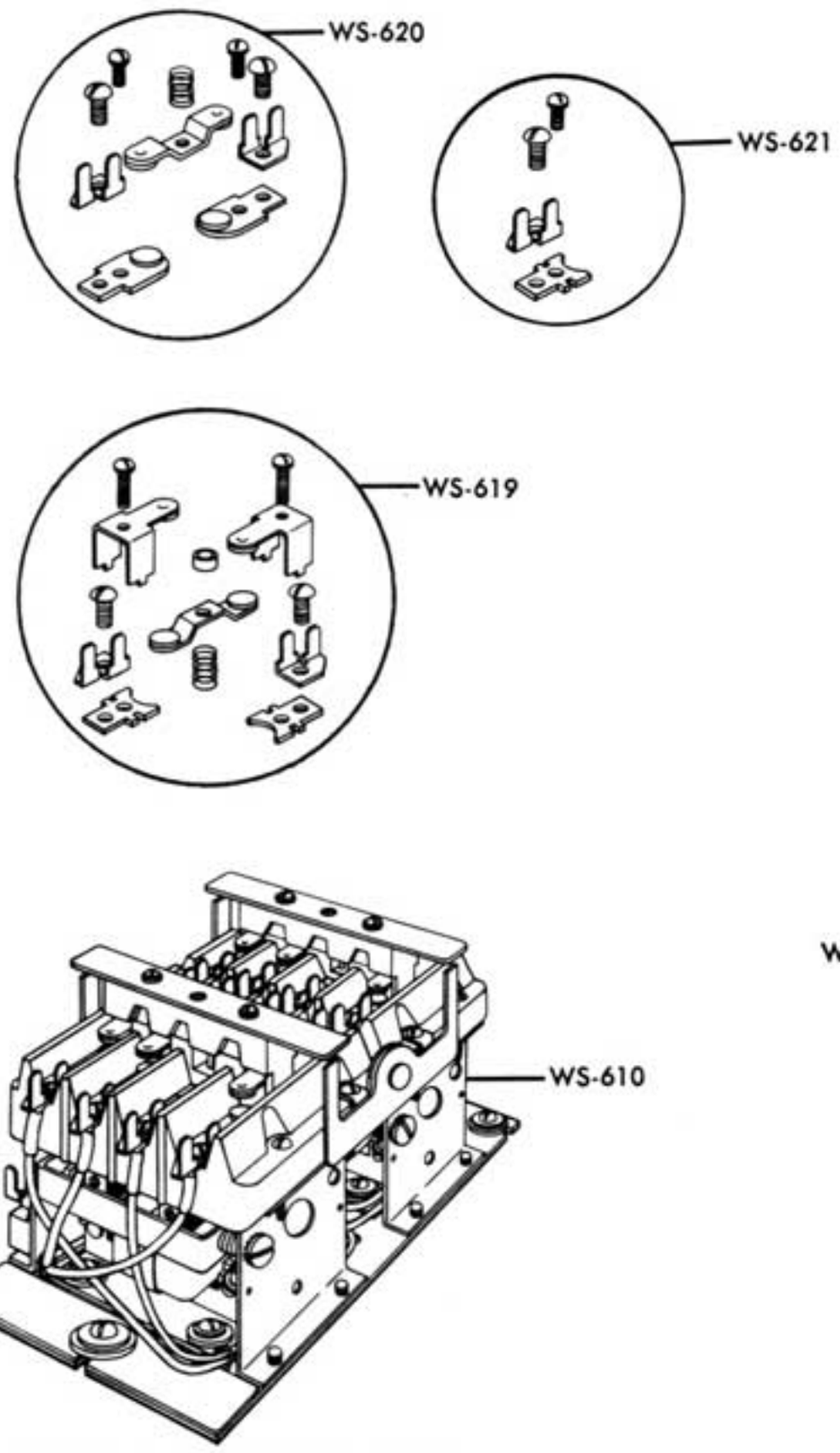
4-BUTTON STATION FOR
SINGLE OR TWO SPEED HOIST
WITH SINGLE OR TWO SPEED TROLLEY

Parts List

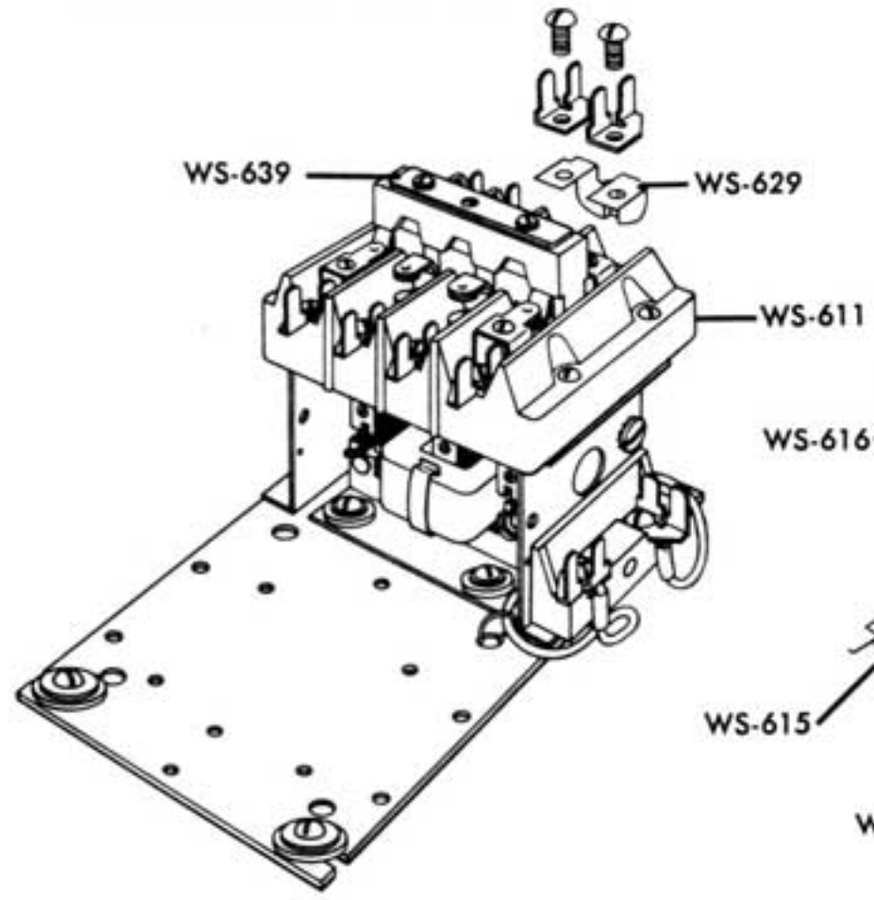
Key No.	No. Req'd.	Part Name
WS-784	1	Push Button Box Connector
WS-785	1	2-Push Button Station Discontinued — Control Station Page 35 will be furnished
WS-785	1	4-Push Button Station Discontinued — Control Station Page 36 will be furnished

ALSO, INDIVIDUAL COMPONENTS FOR THESE STATIONS ARE **NOT** AVAILABLE.

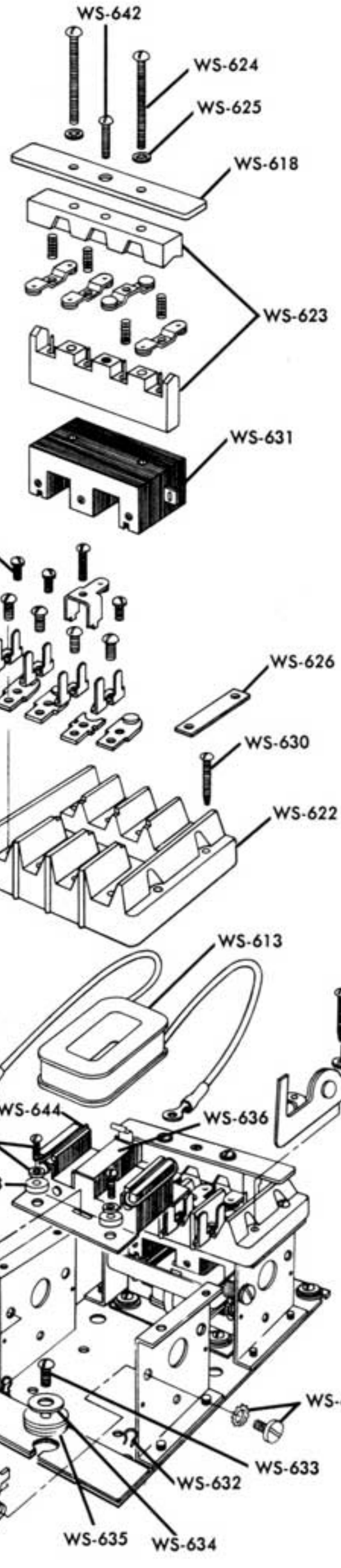
Contactor Type BW



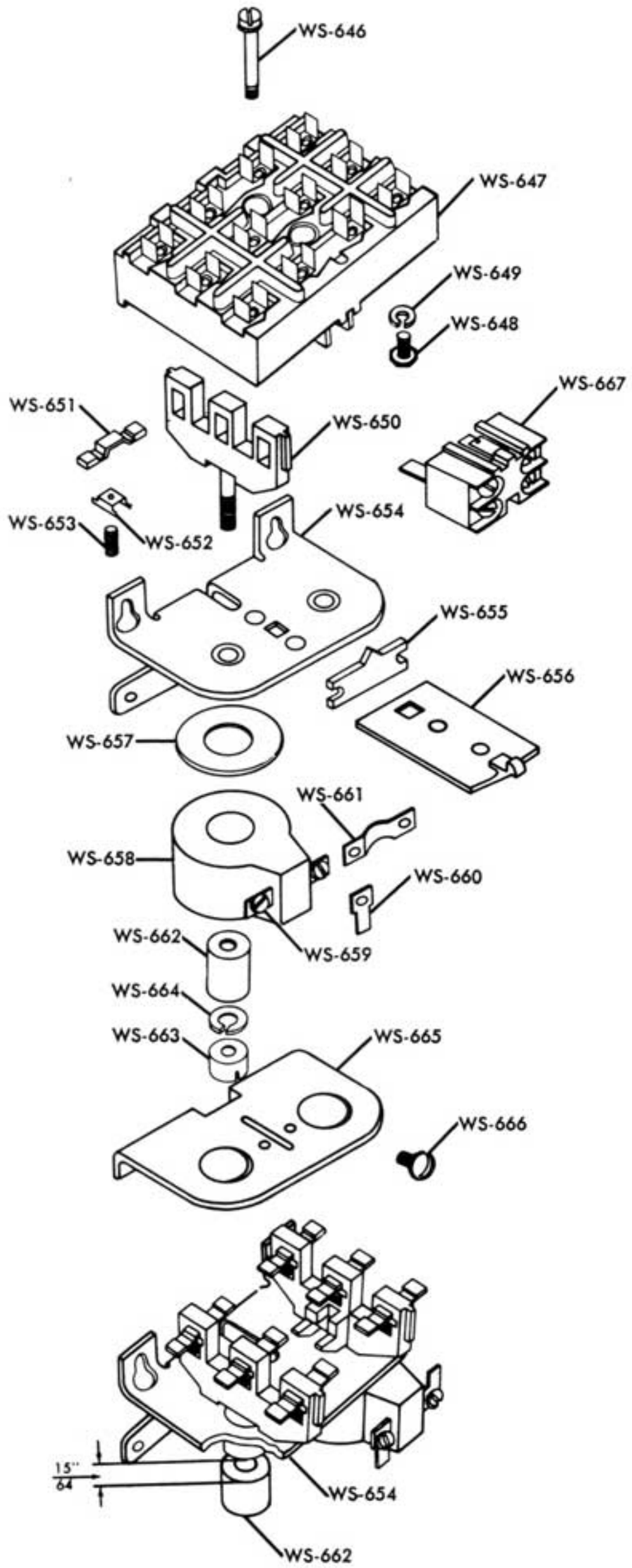
REVERSING CONTACTOR



SPEED SELECTING CONTACTOR



Contactor Type D



Parts List

Key No.	No. Req'd.	Part Name
WS-645	1	Contactor (Items WS-646 Thru WS-666)
WS-646	2	Contact Block Screw With Lockwasher
WS-647	1	Contact Block With Stationary Contact Screws & Lockwashers
WS-648	12	Stationary Contact Screw
WS-649	12	Stationary Contact Screw Lockwasher
WS-650	2	Contact Carrier
WS-651	6	Movable Contact
WS-652	6	Contact Spring Retainer
WS-653	6	Contact Spring
WS-654	1	Base With Bushings
WS-655	1	Mechanical Interlock
WS-656	1	Interlock Latch
WS-657	2	Coil Washer
WS-658	2	Magnet Coil
WS-659	4	Coil Terminal Screw With Lockwasher
WS-660	4	Slip-on Connector
WS-661	1	Coil Jumper
WS-662	2	Armature With Lockwasher & Nut
WS-663	2	Armature Slotted Nut
WS-664	2	Armature Nut Lockwasher
WS-665	1	Bottom Plate
WS-666	2	Bottom Plate Screw With Lockwasher
WS-667	1	Electrical Interlock Assembly (N.C. Contacts)
WS-668	1	Contact Kit (Items WS-648, WS-649, WS-651 & WS-653)

ADJUSTMENT — If armature solenoid is removed, it should be adjusted when reassembled by screwing armature within 15/64 of magnet core and locking with slotted nut to 20 in.-lbs. torque.

REFER TO PAGE 26 FOR ORDERING INSTRUCTIONS

SECTION E – REPAIR PARTS LIST

Ordering Instructions

The following information must accompany all correspondence or repair parts orders:

1) Hoist Model Number.
2) Serial Number of Hoist and/or Motor Driven Trolley.
3) Voltage, Phase, Hertz.

This information is stamped on the hoist name plate. Hoist serial number is also stamped on control end of right suspension lug.

The Motor Driven Trolley serial number is stamped on end of motor side frame.

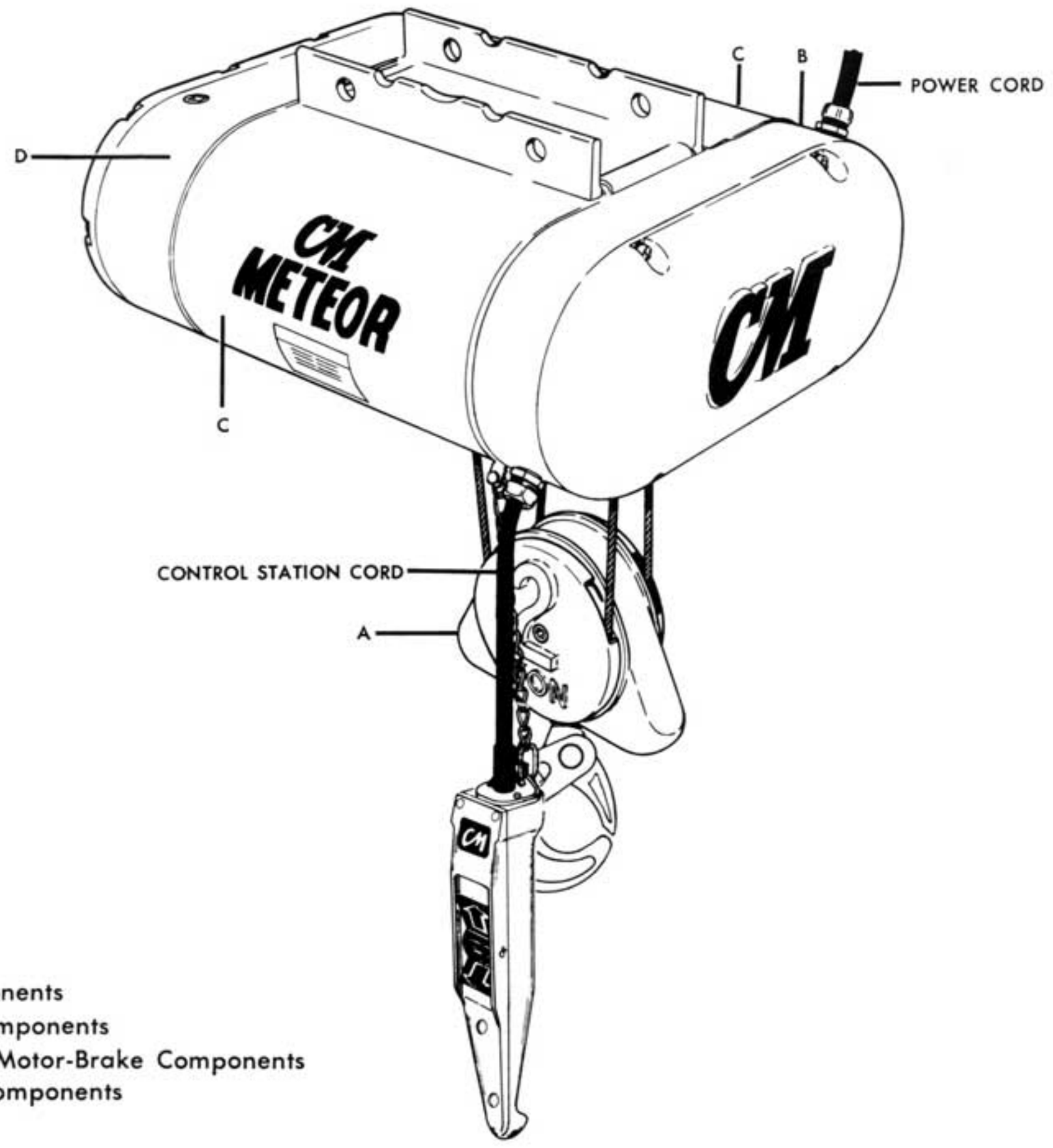
When ordering hoist and/or trolley motor parts, give the motor name plate data in addition to the above.

For parts orders specify:

1) Quantity desired.
2) Key number of part.
3) Part name.

NOTE: When ordering replacement parts, it is suggested that the individual also consider the need (if he has not done so already) for such items as gaskets, oil seals, fasteners, etc. These items may be damaged or lost during the disassembly or may be just unfit for future service because of deterioration from age or service conditions.

Hoist Arrangement



A — Reeving Components
B — Control End Components
C — Hoist Frame & Motor-Brake Components
D — Gearing End Components

Electrical Data

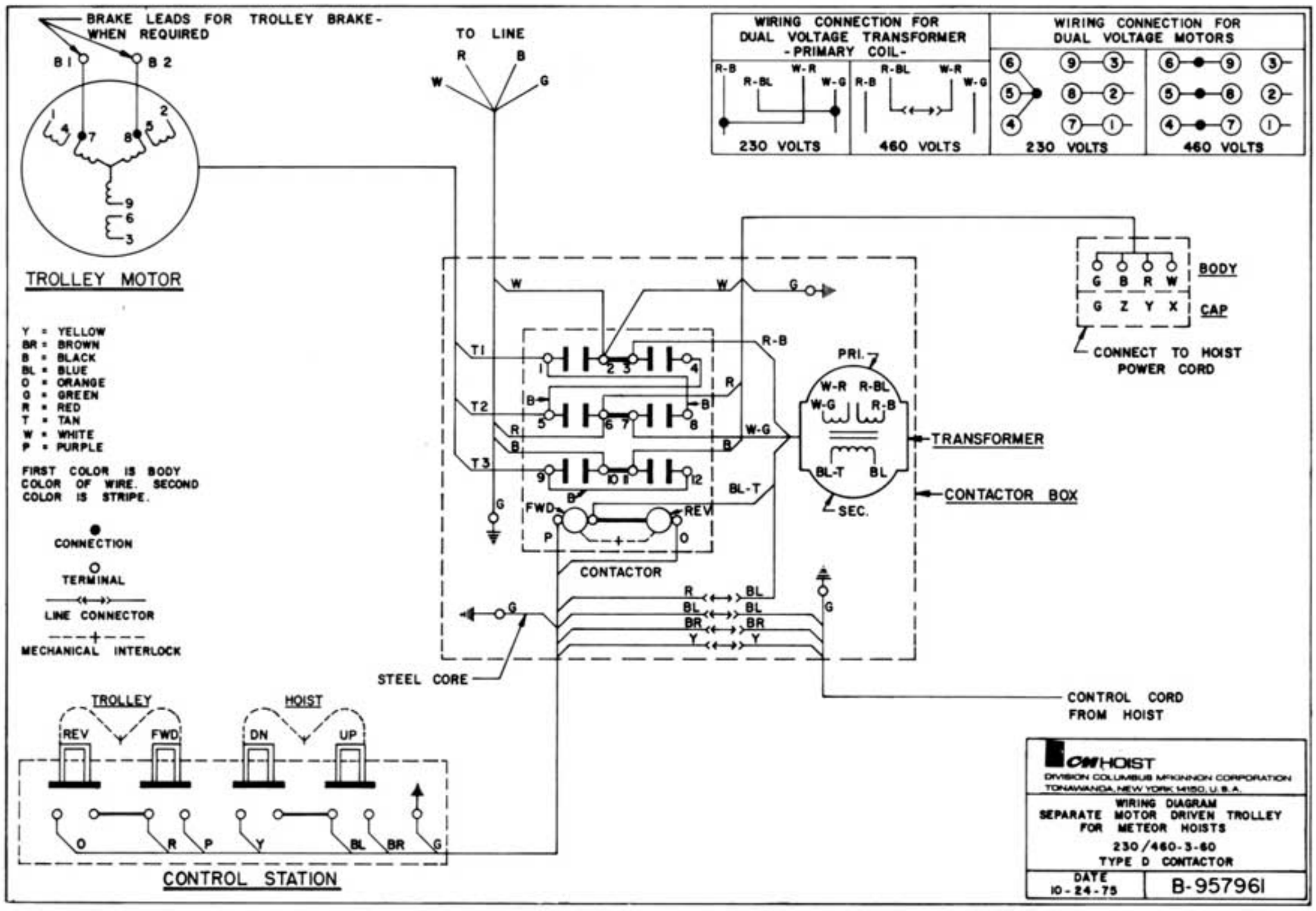
MOTORS Voltage-Phase-Hertz	H. P.	Current (Amps.) Starting	Full Load	Lead No.	D. C. Resistance (Ohms)
230/460-3-60	2	29/14.5	6.2/3.1	T1-T4 T2-T5 T3-T6	2.3
				T7-T8 T7-T9 T8-T9	4.7
230/460-3-60	3	44/22	9/4.5	T1-T4 T2-T5 T3-T6	1.7
				T7-T8 T7-T9 T8-T9	3.3
230/460-3-60	4	66/33	10.6/5.3	T1-T4 T2-T5 T3-T6	1.3
				T7-T8 T7-T9 T8-T9	2.4
230/460-3-60	4.5	66/33	12/6	T1-T4 T2-T5 T3-T6	1.3
				T7-T8 T7-T9 T8-T9	2.4
230-3-60	2/.67	25/9.6	6/5.2	T1-T2 T1-T3 T2-T3	6.3
				T11-T12 T11-T13 T12-T13	3.5
460-3-60	2/.67	12.5/4.8	3/2.6	T1-T2 T1-T3 T2-T3	24.5
				T11-T12 T11-T13 T12-T13	12.2
230-3-60	3/1	32/14	8.5/8.0	T1-T2 T1-T3 T2-T3	4.6
				T11-T12 T11-T13 T12-T13	2.3
460-3-60	3/1	16/7	4.3/4.0	T1-T2 T1-T3 T2-T3	17.2
				T11-T12 T11-T13 T12-T13	8.4

MOTORS Voltage-Phase-Hertz	H. P.	Current (Amps.) Starting	Full Load	Lead No.	D. C. Resistance (Ohms)
230-3-60	4/1.33	74/27	13.6/11.6	T1-T2 T1-T3 T2-T3	2.6
				T11-T12 T11-T13 T12-T13	1.3
230-3-60	4.5/1.5	74/27	14.4/12	T1-T2 T1-T3 T2-T3	2.6
				T11-T12 T11-T13 T12-T13	1.3
460-3-60	4/1.33	37/13.5	6.5/5.8	T1-T2 T1-T3 T2-T3	11.5
				T11-T12 T11-T13 T12-T13	5.2
460-3-60	4.5/1.5	37/13.5	7.2/6	T1-T2 T1-T3 T2-T3	11.5
				T11-T12 T11-T13 T12-T13	5.2

TRANSFORMER Voltage	Leads		D.C. Resistance (Ohms)
230/460 to 115	Secondary:	R - R	15
	Primary:	16 - 17	50
		18 - 19	50

BRAKE COIL Voltage	Normal Current (Amps.)	D.C. Resistance (Ohms)
230	1.8	2.4
460	.9	9.3

CONTACTOR COIL Type Contactor	Voltage	Normal Current (Amps.)	D.C. Resistance (Ohms)
BW	115	.2	56
D	115	.2	105



CM HOIST
DIVISION COLUMBUS McKINNON CORPORATION
TONAWANDA, NEW YORK 14150, U.S.A.

WIRING DIAGRAM
SEPARATE MOTOR DRIVEN TROLLEY
FOR METEOR HOISTS
230/460-3-60
TYPE D CONTACTOR

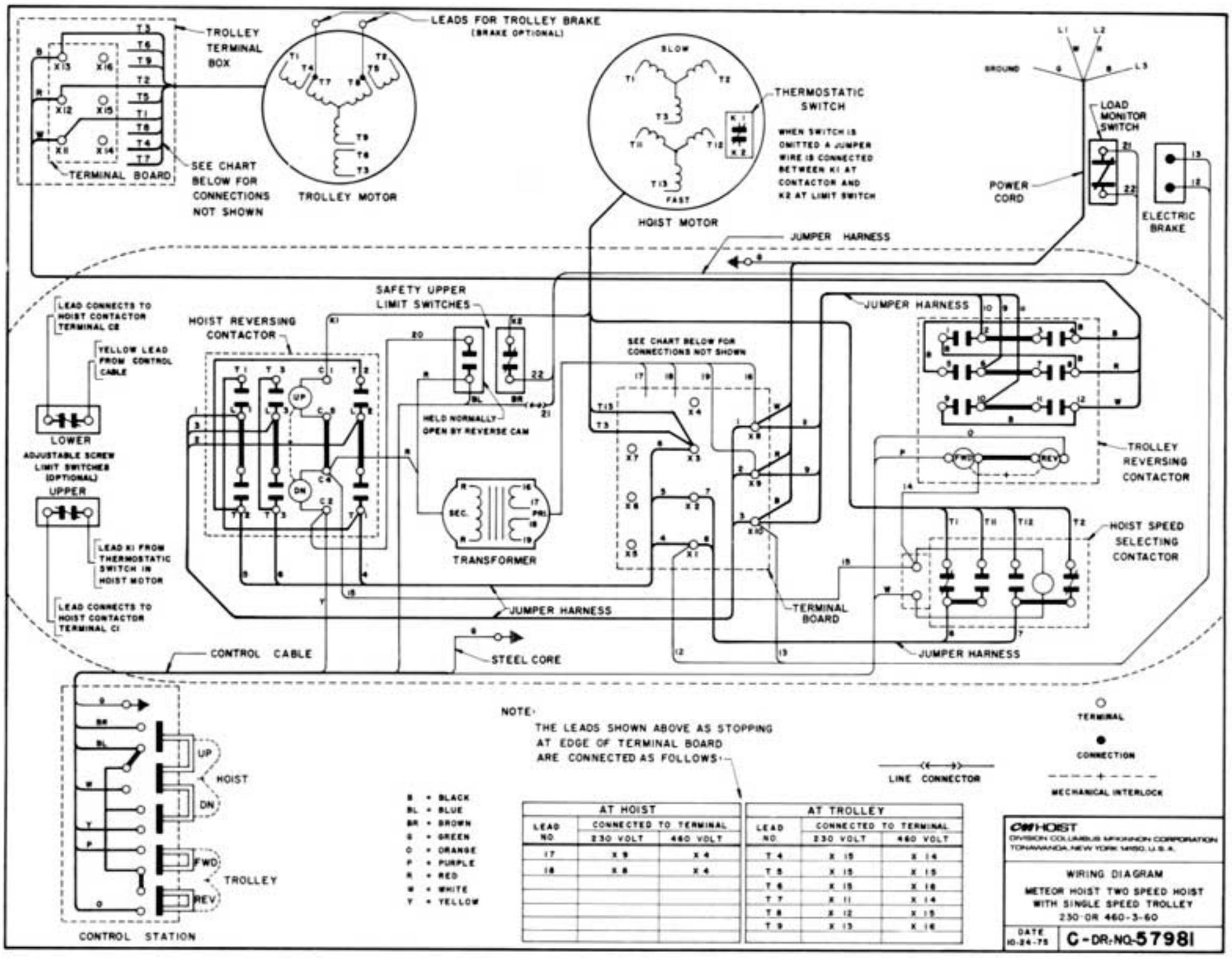
DATE 10-24-75 | B-957961

To Detect Open and Short Circuits In Electrical Components

Open circuits in the coils of electrical components may be detected by isolating the coil and checking for continuity with an ohmmeter or with the component in series with a light or bell circuit.

Shorted turns are indicated by a current draw substantially above normal (connect ammeter in series with suspected element and impose normal voltage) or D.C. resistance substantially below normal. The current method is recommended for coils with very low D.C. resistance.

Motor current draw in the stator should be measured with the motor running. Brake and contactor coil current should be measured with the core iron in operating position.



NOTE:
THE LEADS SHOWN ABOVE AS STOPPING AT EDGE OF TERMINAL BOARD ARE CONNECTED AS FOLLOWS:

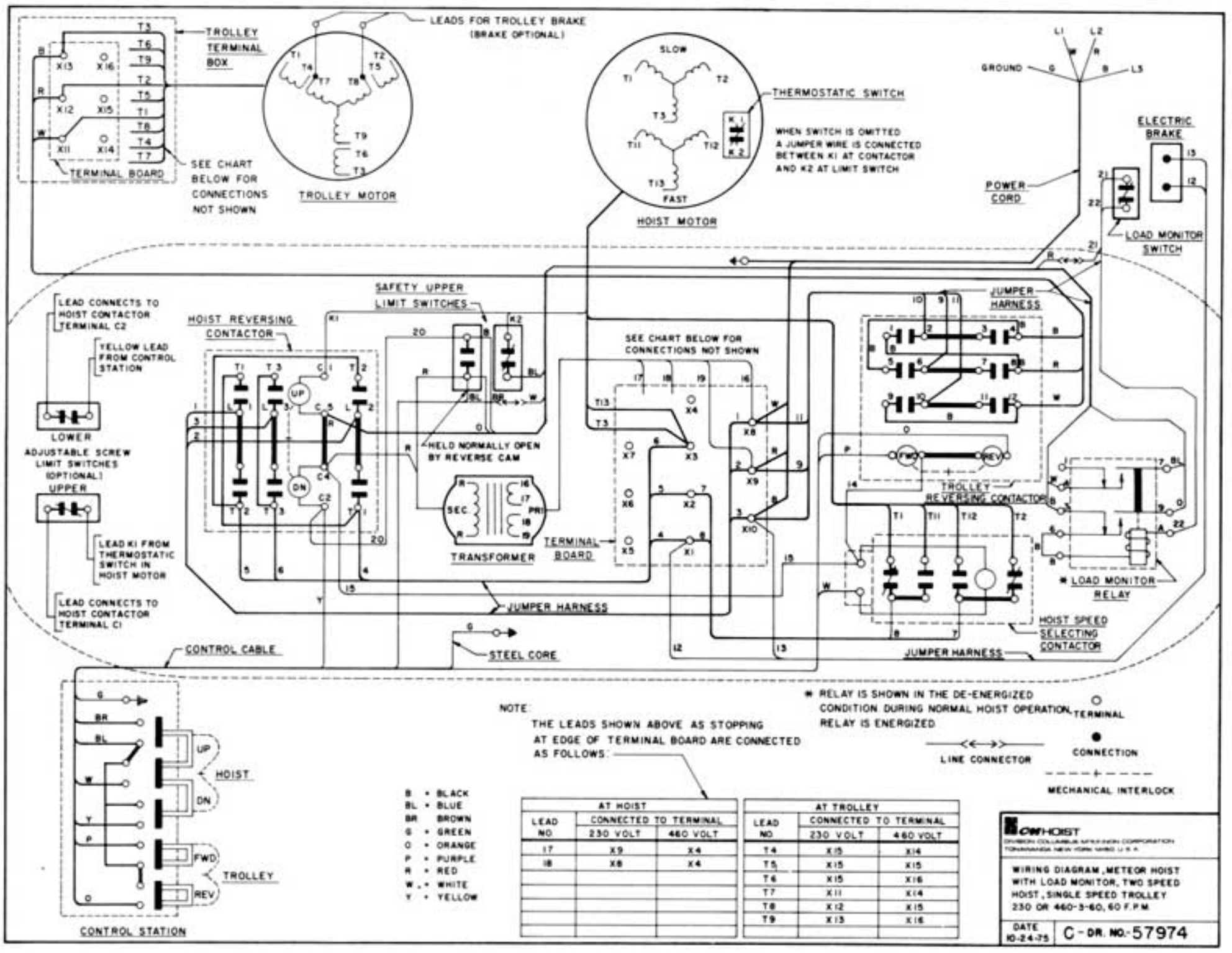
AT HOIST		
LEAD NO	CONNECTED TO TERMINAL	
	230 VOLT	460 VOLT
17	X9	X4
18	X8	X4

AT TROLLEY		
LEAD NO	CONNECTED TO TERMINAL	
	230 VOLT	460 VOLT
T4	X15	X14
T5	X15	X15
T6	X15	X16
T7	X11	X14
T8	X12	X15
T9	X13	X16

CM HOIST
DIVISION COLUMBUS MCKINNON CORPORATION
TONAWANDA, NEW YORK 14150, U.S.A.

WIRING DIAGRAM
METEOR HOIST TWO SPEED HOIST
WITH SINGLE SPEED TROLLEY
230 OR 460-3-60

DATE 10-24-75 | C-DR-NO-57981



NOTE:
THE LEADS SHOWN ABOVE AS STOPPING AT EDGE OF TERMINAL BOARD ARE CONNECTED AS FOLLOWS:

* RELAY IS SHOWN IN THE DE-ENERGIZED CONDITION. DURING NORMAL HOIST OPERATION, RELAY IS ENERGIZED.

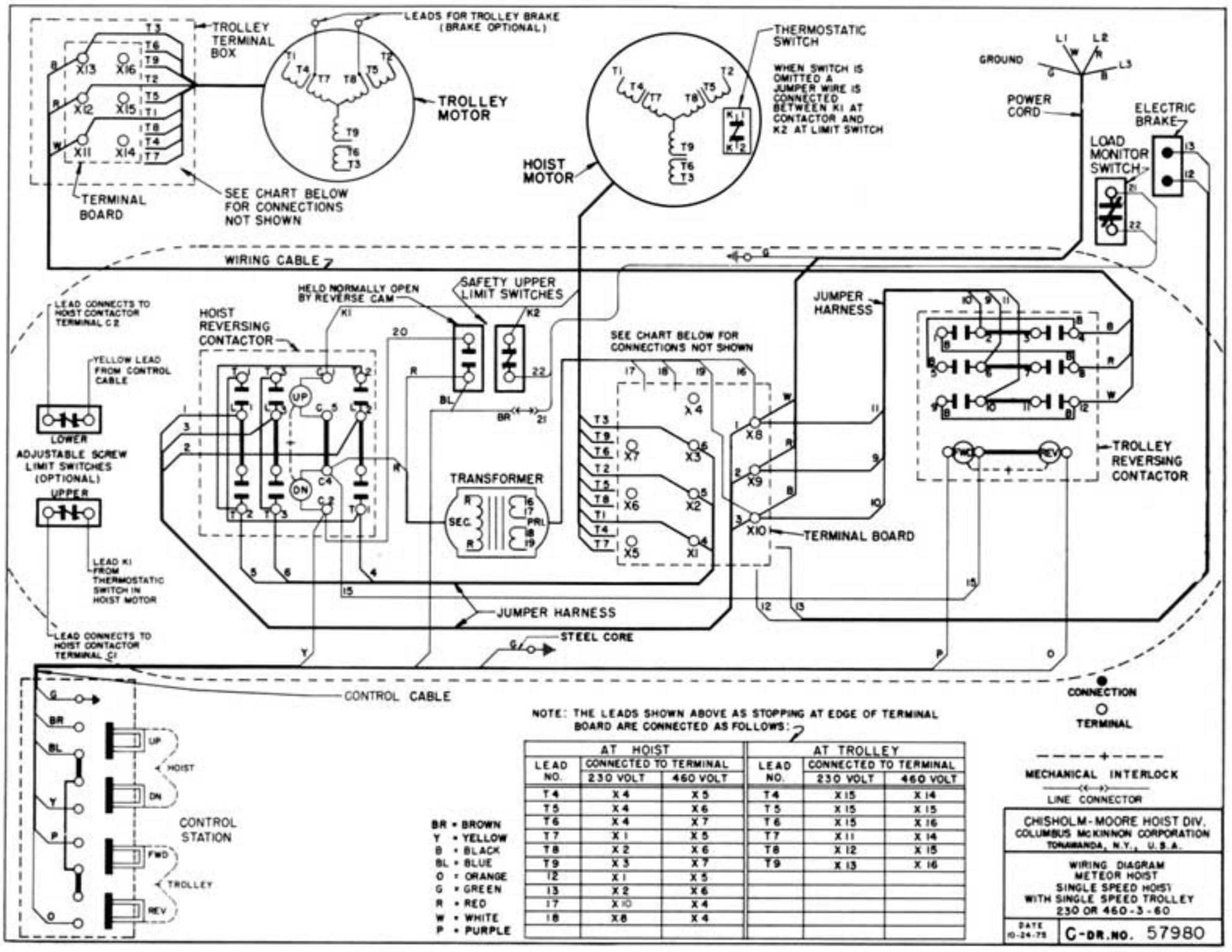
AT HOIST		
LEAD NO	CONNECTED TO TERMINAL	
	230 VOLT	460 VOLT
17	X9	X4
18	X8	X4

AT TROLLEY		
LEAD NO	CONNECTED TO TERMINAL	
	230 VOLT	460 VOLT
T4	X15	X14
T5	X15	X15
T6	X15	X16
T7	X11	X14
T8	X12	X15
T9	X13	X16

CM HOIST
DIVISION COLUMBUS MCKINNON CORPORATION
TONAWANDA, NEW YORK 14150, U.S.A.

WIRING DIAGRAM, METEOR HOIST
WITH LOAD MONITOR, TWO SPEED
HOIST, SINGLE SPEED TROLLEY
230 OR 460-3-60, 60 F.P.M.

DATE 10-24-75 | C-DR. NO.-57974



NOTE: THE LEADS SHOWN ABOVE AS STOPPING AT EDGE OF TERMINAL BOARD ARE CONNECTED AS FOLLOWS:

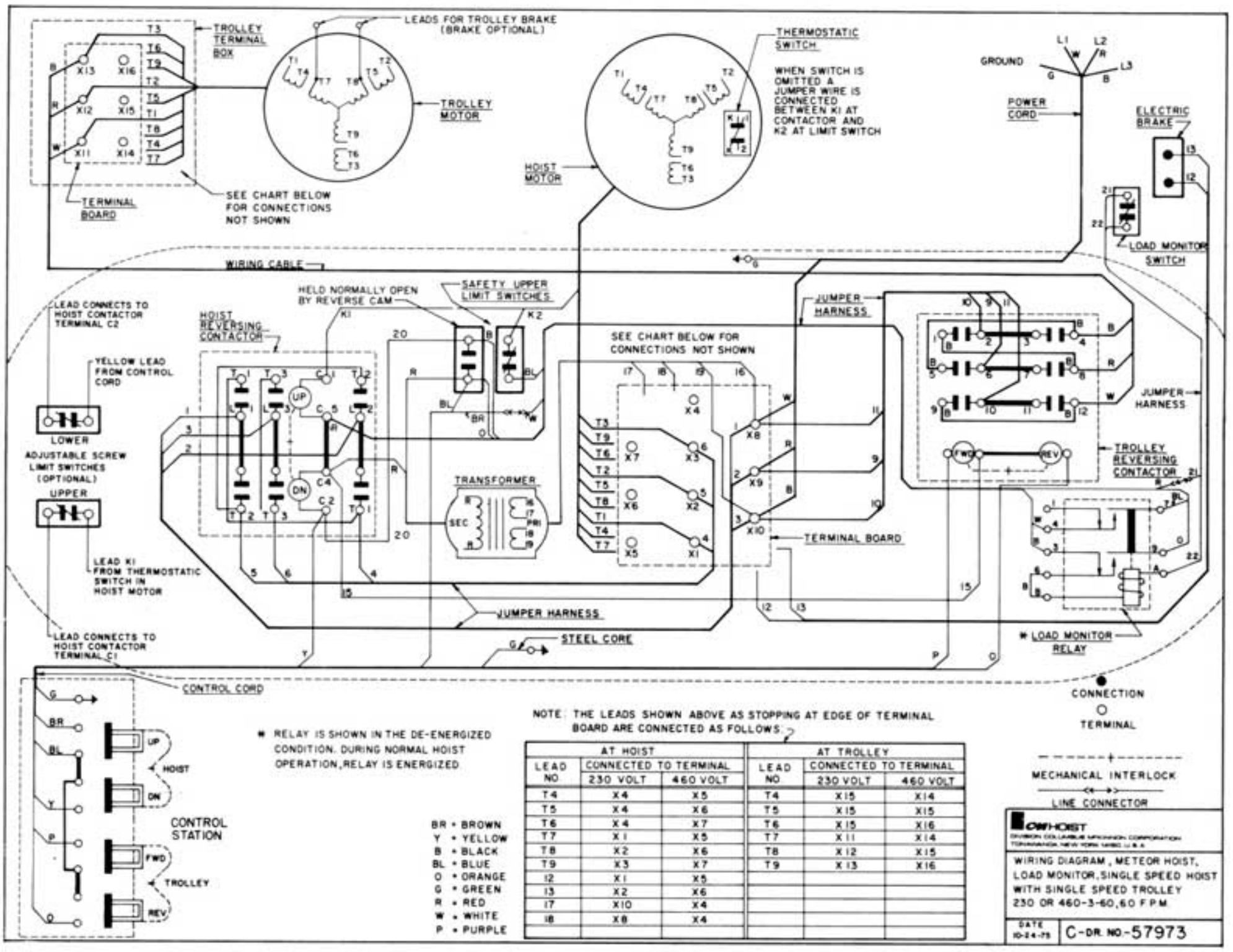
AT HOIST			AT TROLLEY		
LEAD NO.	CONNECTED TO TERMINAL 230 VOLT	460 VOLT	LEAD NO.	CONNECTED TO TERMINAL 230 VOLT	460 VOLT
T4	X4	X5	T4	X15	X14
T5	X4	X6	T5	X15	X15
T6	X4	X7	T6	X15	X16
T7	X1	X5	T7	X11	X14
T8	X2	X6	T8	X12	X15
T9	X3	X7	T9	X13	X16
12	X1	X5			
13	X2	X6			
17	X10	X4			
18	X8	X4			

BR = BROWN
Y = YELLOW
B = BLACK
BL = BLUE
O = ORANGE
G = GREEN
R = RED
W = WHITE
P = PURPLE

CHISHOLM-MOORE HOIST DIV.
COLUMBUS McKINNON CORPORATION
TONAWANDA, N.Y., U.S.A.

WIRING DIAGRAM
METEOR HOIST
SINGLE SPEED HOIST
WITH SINGLE SPEED TROLLEY
230 OR 460-3-60

DATE 10-24-75 | C-DR. NO. 57980



* RELAY IS SHOWN IN THE DE-ENERGIZED CONDITION. DURING NORMAL HOIST OPERATION, RELAY IS ENERGIZED

NOTE: THE LEADS SHOWN ABOVE AS STOPPING AT EDGE OF TERMINAL BOARD ARE CONNECTED AS FOLLOWS:

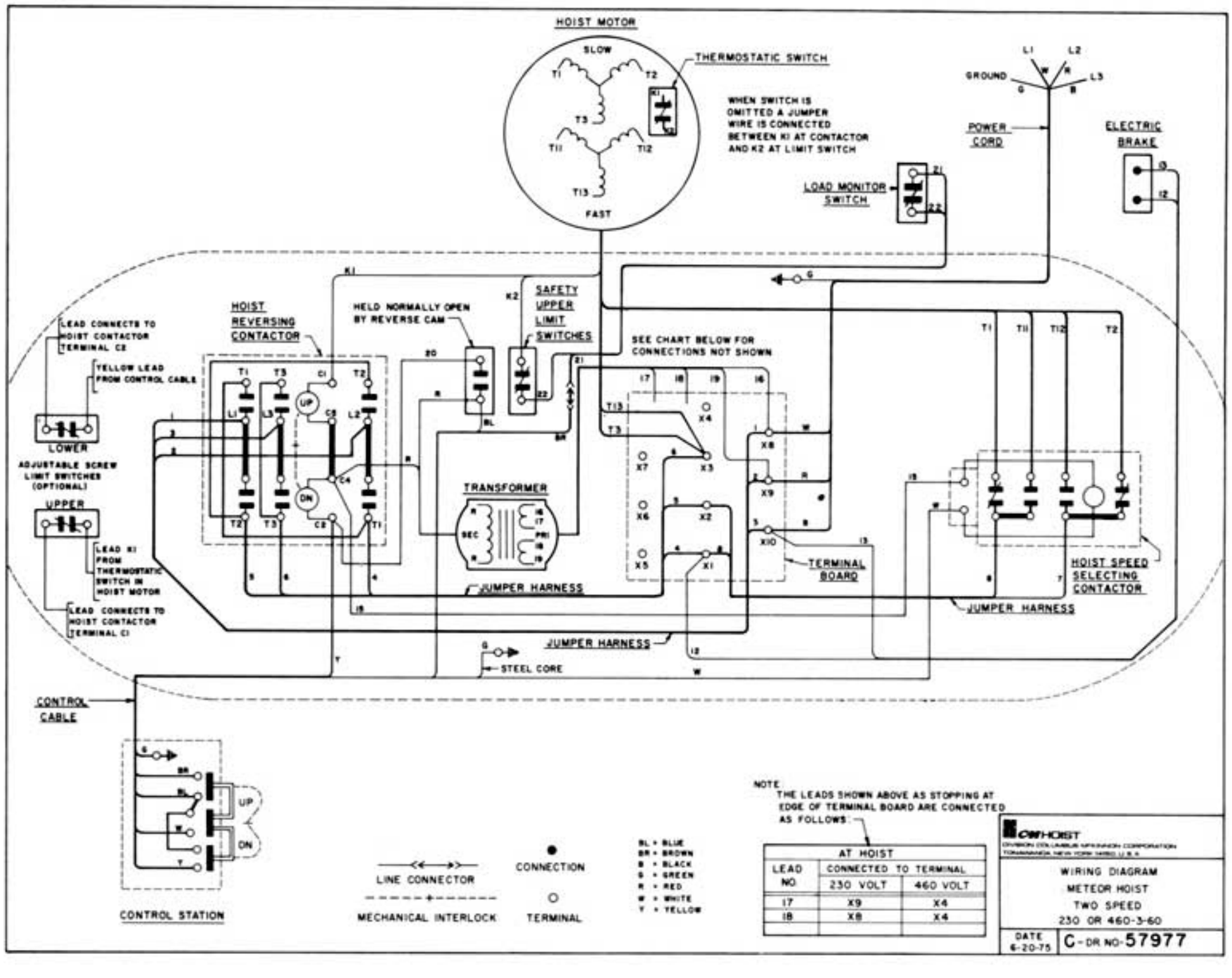
AT HOIST			AT TROLLEY		
LEAD NO	CONNECTED TO TERMINAL 230 VOLT	460 VOLT	LEAD NO	CONNECTED TO TERMINAL 230 VOLT	460 VOLT
T4	X4	X5	T4	X15	X14
T5	X4	X6	T5	X15	X15
T6	X4	X7	T6	X15	X16
T7	X1	X5	T7	X11	X14
T8	X2	X6	T8	X12	X15
T9	X3	X7	T9	X13	X16
12	X1	X5			
13	X2	X6			
17	X10	X4			
18	X8	X4			

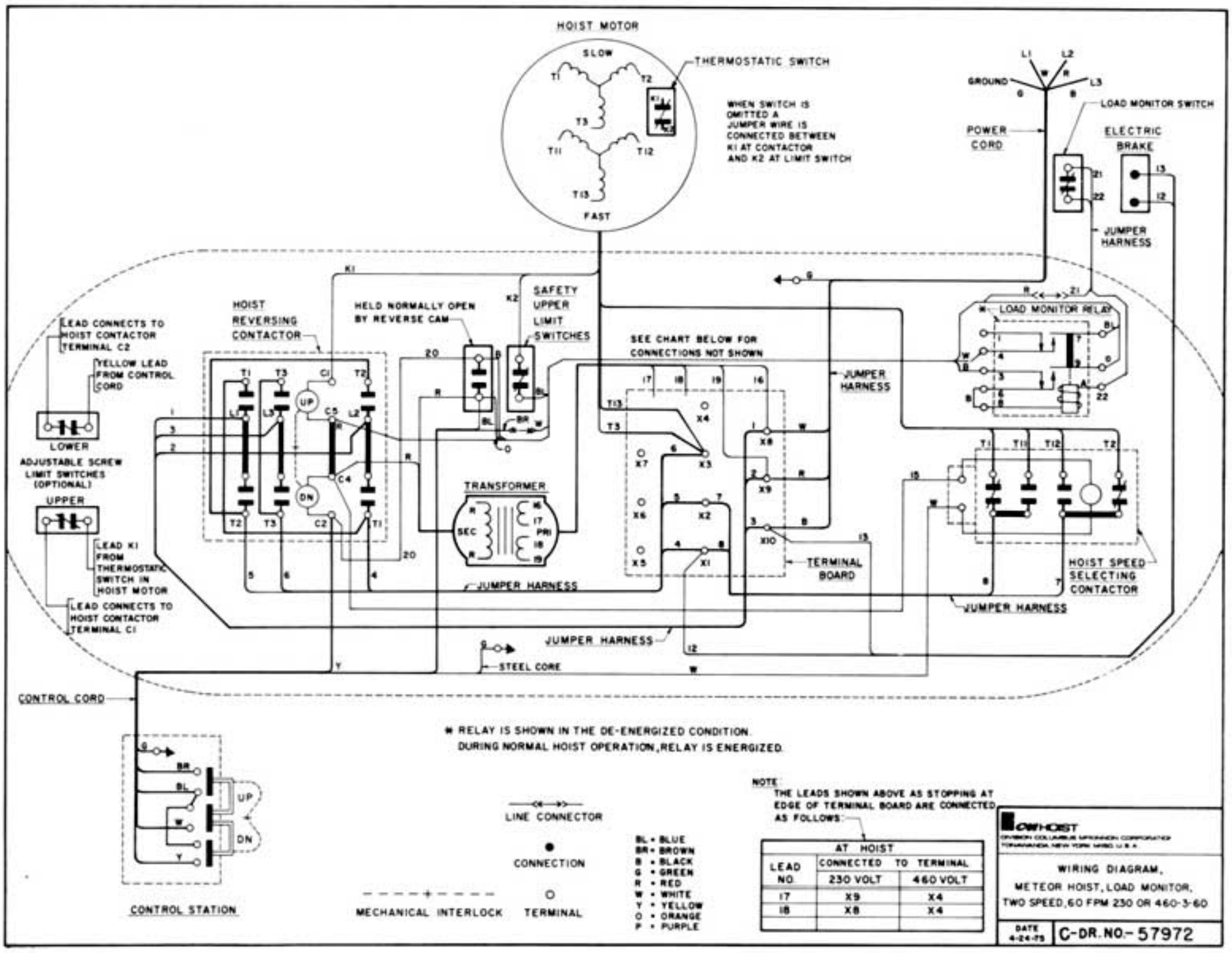
BR = BROWN
Y = YELLOW
B = BLACK
BL = BLUE
O = ORANGE
G = GREEN
R = RED
W = WHITE
P = PURPLE

CHISHOLM-MOORE HOIST DIV.

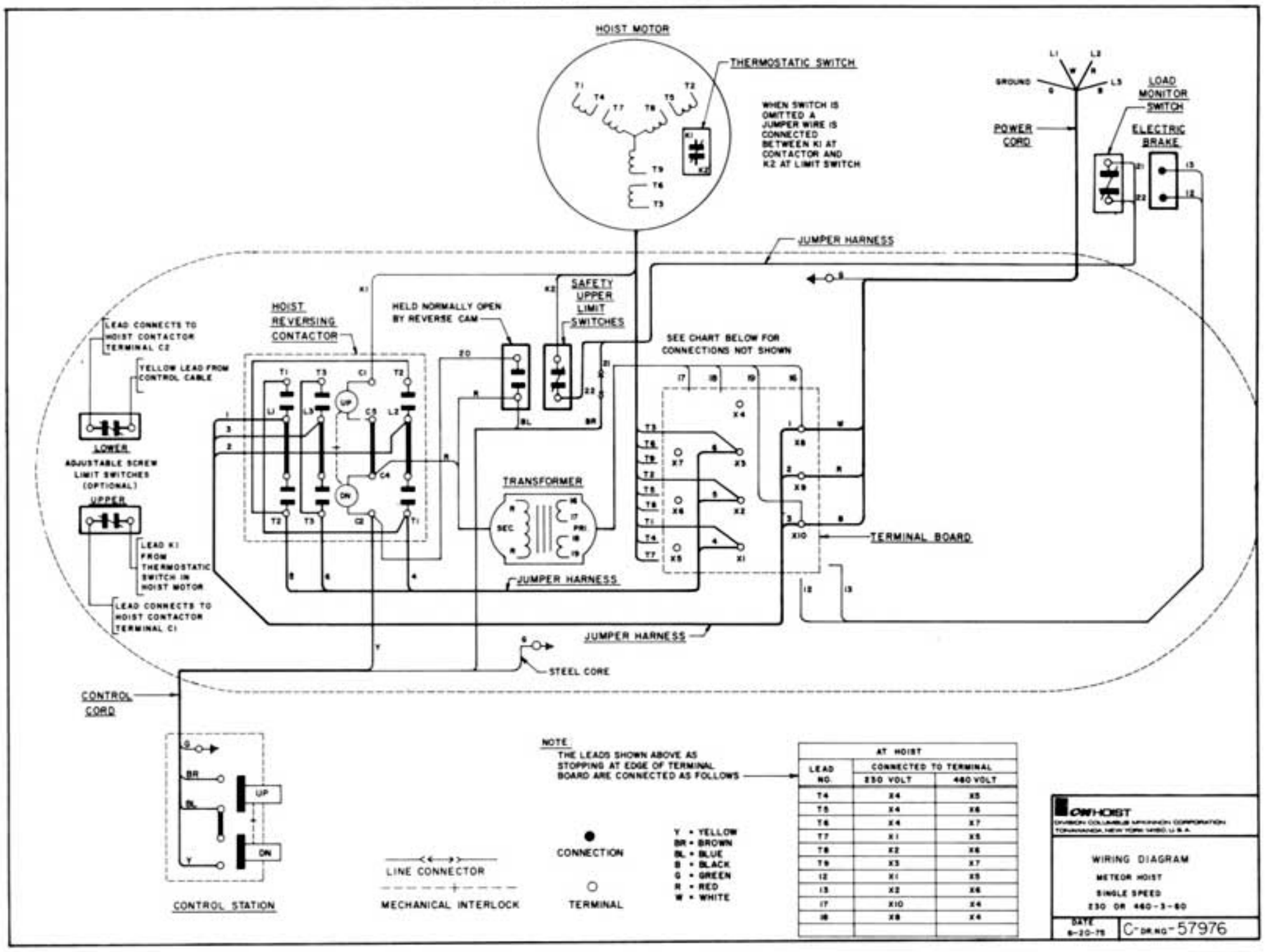
WIRING DIAGRAM, METEOR HOIST, LOAD MONITOR, SINGLE SPEED HOIST WITH SINGLE SPEED TROLLEY 230 OR 460-3-60, 60 F.P.M.

DATE 10-24-75 | C-DR. NO. 57973


HOIST MOTOR
SLOW
FAST
THERMOSTATIC SWITCH
WHEN SWITCH IS OMITTED A JUMPER WIRE IS CONNECTED BETWEEN K1 AT CONTACTOR AND K2 AT LIMIT SWITCH
GROUND
POWER CORD
ELECTRIC BRAKE
LOAD MONITOR SWITCH
HOIST REVERSING CONTACTOR
HELD NORMALLY OPEN BY REVERSE CAM
SAFETY UPPER LIMIT SWITCHES
SEE CHART BELOW FOR CONNECTIONS NOT SHOWN
LEAD CONNECTS TO HOIST CONTACTOR TERMINAL C2
YELLOW LEAD FROM CONTROL CABLE
LOWER
ADJUSTABLE SCREW LIMIT SWITCHES (OPTIONAL)
UPPER
LEAD K1 FROM THERMOSTATIC SWITCH IN HOIST MOTOR
LEAD CONNECTS TO HOIST CONTACTOR TERMINAL C1
TRANSFORMER
JUMPER HARNESS
TERMINAL BOARD
HOIST SPEED SELECTING CONTACTOR
CONTROL CABLE
STEEL CORE
CONTROL STATION
UP
DN
LINE CONNECTOR
CONNECTION
MECHANICAL INTERLOCK
TERMINAL
BL = BLUE
BR = BROWN
B = BLACK
G = GREEN
R = RED
W = WHITE
Y = YELLOW
NOTE
THE LEADS SHOWN ABOVE AS STOPPING AT EDGE OF TERMINAL BOARD ARE CONNECTED AS FOLLOWS:
AT HOIST
LEAD NO
CONNECTED TO TERMINAL
230 VOLT
460 VOLT
17 X9 X4
18 X8 X4
OWHOIST
WIRING DIAGRAM
METEOR HOIST
TWO SPEED
230 OR 460-3-60
DATE 6-20-75
C-DR NO-57977

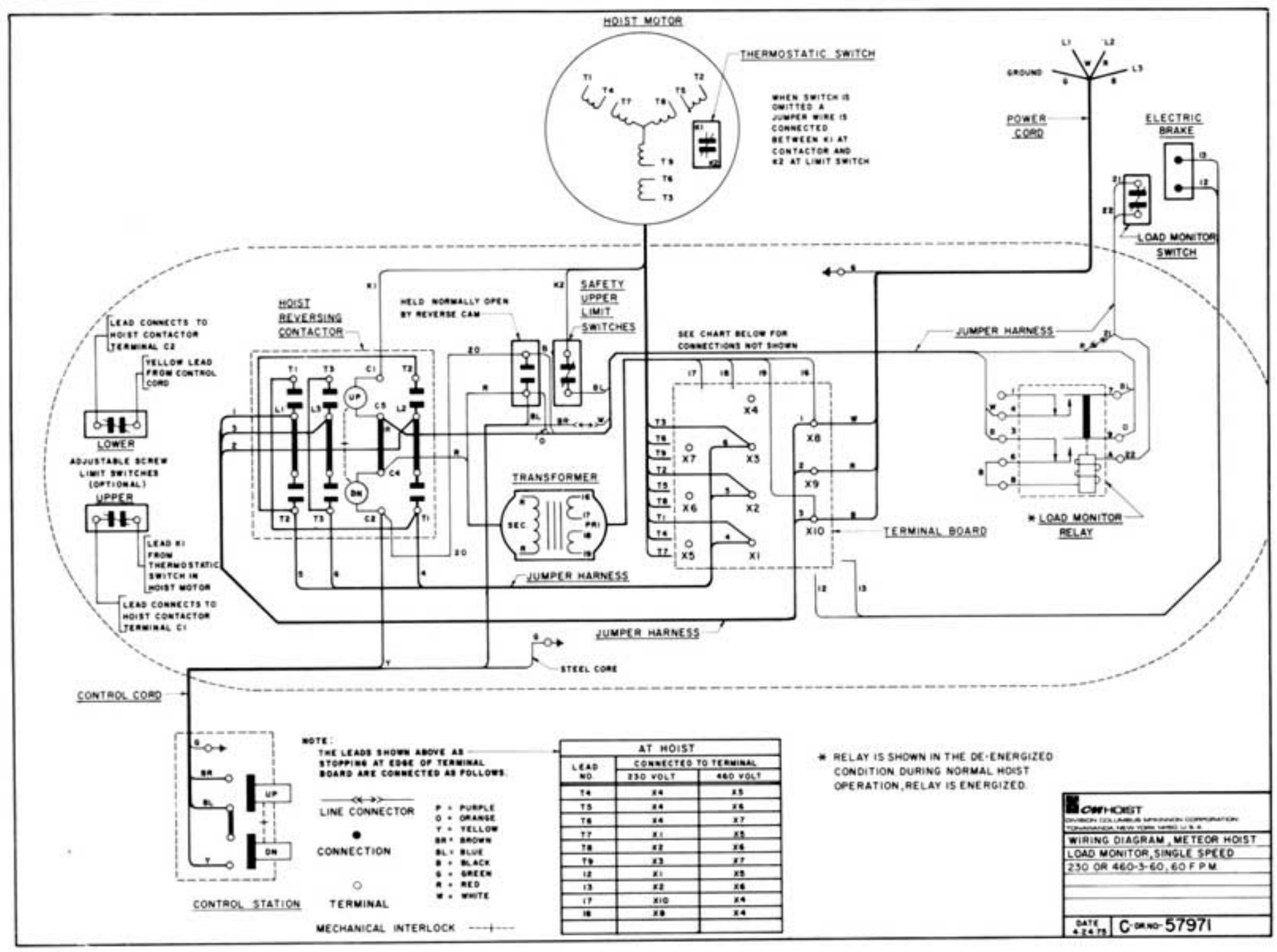

HOIST MOTOR
SLOW
FAST
THERMOSTATIC SWITCH
WHEN SWITCH IS OMITTED A JUMPER WIRE IS CONNECTED BETWEEN K1 AT CONTACTOR AND K2 AT LIMIT SWITCH
GROUND
POWER CORD
LOAD MONITOR SWITCH
ELECTRIC BRAKE
JUMPER HARNESS
LOAD MONITOR RELAY
HOIST REVERSING CONTACTOR
HELD NORMALLY OPEN BY REVERSE CAM
SAFETY UPPER LIMIT SWITCHES
SEE CHART BELOW FOR CONNECTIONS NOT SHOWN
LEAD CONNECTS TO HOIST CONTACTOR TERMINAL C2
YELLOW LEAD FROM CONTROL CORD
LOWER
ADJUSTABLE SCREW LIMIT SWITCHES (OPTIONAL)
UPPER
LEAD K1 FROM THERMOSTATIC SWITCH IN HOIST MOTOR
LEAD CONNECTS TO HOIST CONTACTOR TERMINAL C1
TRANSFORMER
TERMINAL BOARD
HOIST SPEED SELECTING CONTACTOR
CONTROL CORD
STEEL CORE
CONTROL STATION
UP
DN
* RELAY IS SHOWN IN THE DE-ENERGIZED CONDITION.
DURING NORMAL HOIST OPERATION, RELAY IS ENERGIZED.
LINE CONNECTOR
CONNECTION
MECHANICAL INTERLOCK
TERMINAL
BL = BLUE
BR = BROWN
B = BLACK
G = GREEN
R = RED
W = WHITE
Y = YELLOW
O = ORANGE
P = PURPLE
NOTE
THE LEADS SHOWN ABOVE AS STOPPING AT EDGE OF TERMINAL BOARD ARE CONNECTED AS FOLLOWS:
AT HOIST
LEAD NO
CONNECTED TO TERMINAL
230 VOLT
460 VOLT
17 X9 X4
18 X8 X4
OWHOIST
WIRING DIAGRAM,
METEOR HOIST, LOAD MONITOR,
TWO SPEED, 60 FPM 230 OR 460-3-60
DATE 4-24-75
C-DR. NO.- 57972

NOTE: WIRING DIAGRAMS SHOWN ARE REPRESENTATIVE. CONSULT DIAGRAM IN HOIST OR FURNISHED WITH UNIT.



LEAD NO.	AT HOIST CONNECTED TO TERMINAL 230 VOLT	460 VOLT
T4	X4	X5
T5	X4	X6
T6	X4	X7
T7	X1	X5
T8	X2	X6
T9	X3	X7
I2	X1	X5
I3	X2	X6
I7	X10	X4
I8	X8	X4

ORHOIST
WIRING DIAGRAM
METEOR HOIST
SINGLE SPEED
230 OR 460-3-60
DATE 6-20-75
C-DR.NO-57976



LEAD NO.	AT HOIST CONNECTED TO TERMINAL 230 VOLT	460 VOLT
T4	X4	X5
T5	X4	X6
T6	X4	X7
T7	X1	X5
T8	X2	X6
T9	X3	X7
I2	X1	X5
I3	X2	X6
I7	X10	X4
I8	X8	X4

* RELAY IS SHOWN IN THE DE-ENERGIZED CONDITION DURING NORMAL HOIST OPERATION, RELAY IS ENERGIZED.

ORHOIST
WIRING DIAGRAM, METEOR HOIST
LOAD MONITOR, SINGLE SPEED
230 OR 460-3-60, 60 F.P.M.
DATE 4-24-75
C-DR.NO-57971

Motor Driven Trolley

19) Trolley does not operate in either direction	a) No voltage at motor	Open circuit, grounded or faulty connection in hoist wiring.
	b) Phase failure	See Item 1b.
	c) Open control circuit	See Item 1c.
	d) Low voltage	See Item 1e.
	e) Wrong voltage or frequency	See Item 1d.
20) Trolley operates in one direction only	a) Open control circuit	See Item 1c.
21) Trolley operates sluggishly	a) Excessive load	See Item 1g.
	b) Low voltage	See Item 1e.
	c) Unbalanced current in the phases	See Item 1b.
	d) Brake dragging	See Page 12.
22) Trolley motor overheats		See Item 8.

IF	CAUSE MAY BE	REMEDY
	b) Phase failure	See Item 1b.
10) Hoist will not operate at fast speed in **either** direction	a) Open circuit	See Item 9a.
	b) Open speed selecting—control circuit	Open or shorted winding in speed selecting contactor coil. Loose connection or broken wire in circuit. Mechanical binding in contactor. Control station contacts not making or opening.
	c) Phase failure	See Item 1b.
11) Hook will not raise at slow speed	a) Excessive load	See Item 6b.
	b) Phase failure	See Item 1b.
	c) Open speed selecting control circuit	See Item 9a.
	d) Brake not releasing	See Page 12.
	e) Open hoisting circuit	Open or defective thermal switch. Replace switch.
12) Hook will not lower at slow speed	a) Phase failure	See Item 1b.
	b) Open circuit	See Item 9a.
	c) Brake not releasing	See Page 12.
13) Hook will not raise at fast speed		See Item 11.
14) Hook will not lower at fast speed		See Item 12.
15) Hook moves in proper direction at one speed—wrong direction at other speed	a) Phase reversal	Wiring reconnected improperly. Interchange two leads of motor winding that is out of phase at the speed selecting contactor.
16) Hook fails to stop at upper limit	a) Slow acting brake	See Page 12.
	b) Upper limit switch not working	See Page 12.

Hoist Equipped with Adjustable Screw Limit Switch

17) Hook fails to stop at either or both ends of travel	a) Shaft not rotating	Drive pin or gear key damaged or omitted; gears damaged. Install or replace as necessary.
	b) Nut not moving along shaft	Guide screw damaged or missing; shaft or nut threads damaged. Install or replace as necessary.
	c) Switches not opening circuit	Check for electrical continuity and mechanical operation.
18) Hook stopping point varies	a) Not holding adjustment	See Item 17.
	b) Brake not holding	See Page 12.

IF	CAUSE MAY BE	REMEDY
		Check continuity, repair or replace defective part. Check operation of upper limit switch (see Page 12) and adjustable screw limit switch (Page 12).
	c) Phase failure	See Item 1b.
	d) Monitor relay not energized	See Page 8. (60 FPM units only).
	e) Monitor switch tripped	Lower load to floor to reset switch.
4) Hook raises but will not lower	a) Open lowering circuit	Open or shorted winding in reversing contactor coil; loose connection or broken wire in lowering circuit; control station contacts not making. Check continuity and repair or replace defective part. Check operation of adjustable screw limit switch Page 12.
5) Hook lowers when hoist control is operated	a) Phase failure	See Item 1b.
6) Hook does not stop promptly	a) Brake slipping	See Page 12.
	b) Excessive load	Reduce loading to the capacity limit of hoist as indicated on the identification plate.
7) Hoist operates sluggishly	a) Excessive load	See Item 6b.
	b) Low voltage	See Item 1e.
	c) Phase failure or unbalanced current in the phases	See Item 1b.
	d) Brake dragging	See Page 12.
8) Motor overheats	a) Excessive load	See Item 6b.
	b) Low voltage	See Item 1e.
	c) Extreme external heating	Above an ambient temperature of 104°F., the frequency of hoist operation must be limited to avoid overheating of motor. Special provisions should be made to ventilate the space or shield the hoist from radiation.
	d) Frequent starting or reversing	Excessive inching, jogging or plugging should be avoided since this type of operation will drastically shorten the life of motor and contactor and cause excessive wear on the brake.
	e) Phase failure	See Item 1b.
	f) Brake dragging	See Page 12.

Two Speed Hoist

9) Hoist will not operate at slow speed in **either** direction	a) Open circuit	Open or shorted motor winding, loose or broken wire in circuit. Speed selecting contactor stuck in opposite speed mode. Replace motor, repair wire and/or repair speed selecting contactor.

Key No.	Req'd. No.	Part Name
WS-194	△ 2	Hook Block Sheave Bearing Washer
WS-195	* 1	Hook Block Sheave Snap Ring
WS-195	△ 2	Hook Block Sheave Snap Ring
WS-195	△ 1	Idler Sheave Snap Ring
WS-195	Σ 6	Hook Block Sheave Snap Ring
WS-195	Σ 2	Idler Sheave Snap Ring
WS-196	1	Lower Hook—Latchlok
WS-197	1	Lower Hook Nut Washer
WS-198	1	Lower Hook Nut
WS-199	1	Lower Hook Nut Pin
WS-200	1	Lower Hook Thrust Bearing
WS-220	1	Hook Block Assembly Items WS-186, WS-187, WS-189, WS-191, WS-193 Thru WS-196, WS-198 Thru WS-200, WS-221 & WS-222)
WS-221	1	Hook Block Center Cover
WS-222	2	Hook Block Sheave Shaft Snap Ring
WS-230	1	Idler Sheave Assembly (Items WS-191, WS-193, WS-195 & WS-231 Thru WS-234)
WS-231	1	Idler Sheave Shaft Keeper Plate
WS-232	1	Idler Sheave Shaft Keeper Plate Screw
WS-233	1	Idler Sheave Shaft Keeper Plate Screw Lockwasher
WS-234	1	Idler Sheave Shaft
WS-245	1	Hook Block Assembly (Items WS-190, WS-191, WS-193, WS-195, WS-196, WS-198 Thru WS-200, WS-246 Thru WS-256)
WS-246	2	Hook Block Side Plate
WS-247	2	Hook Block Sheave Shaft Nut
WS-248	2	Hook Block Sheave Shaft Nut Lockwasher
WS-249	2	Hook Block Sheave Bearing Spacer (End)
WS-250	2	Hook Block Sheave Bearing Spacer (Center)
WS-251	1	Hook Block Trunnion
WS-252	2	Hook Block Bolt and Nut
WS-253	4	Hook Block Bolt Lockwasher
WS-254	2	Hook Block Spacer
WS-255	2	Hook Block Capacity Plate
WS-256	1	Lower Hook Sleeve
WS-269	2	Latch Kit—Specify Hook Size (not shown)
WS-270	1	Idler Sheave Housing Assembly (Items WS-191, WS-193, WS-195, WS-231 Thru WS-234 & WS-271)
WS-271	1	Idler Sheave Housing
WS-280	1	Upper Limit Switch (Items WS-281 & WS-293 Thru WS-297)
WS-281	1	Upper Limit Switch Sub-Assembly (Items WS-282, WS-284 Thru WS-289)
WS-282	1	Limit Switch Housing With Bearing and Bracket
WS-283	1	Limit Switch Housing Bearing
WS-284	1	Limit Switch Cam Shaft
WS-285	1	Limit Switch Cam Shaft Return Spring
WS-286	1	Limit Switch Spring Retainer Screw
WS-287	1	Limit Switch Arm
WS-288	1	Limit Switch Arm Pin
WS-289	1	Limit Switch Housing Plug
WS-290 †	1	Limit Switch Bracket
WS-291 †	2	Limit Switch Bracket Screw
WS-292 †	2	Limit Switch Bracket Screw Lockwasher
WS-293	1	Limit Switch Bracket Insulating Shield
WS-294	2	Limit Switch
WS-295	2	Limit Switch Attaching Screw
WS-296	2	Limit Switch Attaching Screw Lockwasher
WS-297	2	Limit Switch Attaching Screw Nut
WS-308	2	Limit Switch Weight Screw
WS-309	2	Limit Switch Weight Screw Lockwasher
WS-310	1	Limit Switch Weight Sub-Assembly (Items WS-311 Thru WS-315)
WS-311	1	Limit Switch Open Link
WS-312	1	Limit Switch Weight Chain

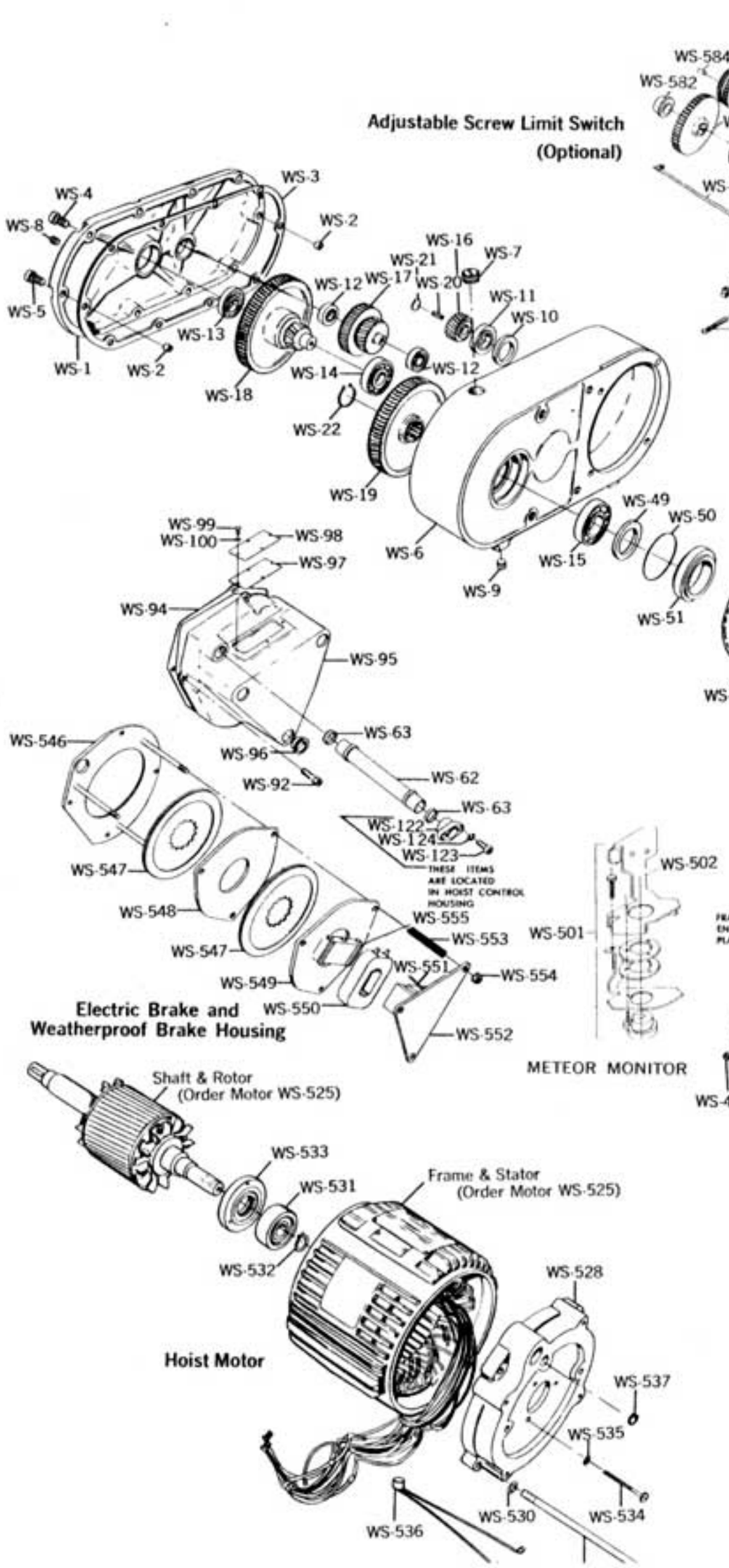
* For 2 Part Rope
△ For 4 Part Rope
Σ For 6 Part Rope
† Discontinued — For Repairs Only

Key No.	Req'd. No.	Part Name
WS-313	1	Limit Switch Weight Ring
WS-314	1	Limit Switch Screw Eyebolt
WS-315	2	Limit Switch Weight
WS-336	1	Idler Sheave Housing Support Pin (Pin shown is for a hoist with Motor Driven Trolley. For other type pins see page 38)
WS-451	1	Power Cable
WS-452	1	Power Cable Connector
WS-501	1	Monitor Switch Assembly. (Includes WS-126, WS-504, WS-505 and WS-506)
WS-502	1	Mounting Plate SA (Includes WS-126, WS-504, WS-505 and WS-506)
		Replacement of this part requires the Re-Calibration of the Monitor switch assembly. Refer to page 12. NOTE: Micro Switch is Special and Should Not Be Substituted.
WS-503	1	Monitor Relay (Includes Jumpers) 60 FPM Units Only.
WS-504	1	Slipper
WS-505	1	Slipper Spring
WS-506	1	Jumper Harness — Numbered 21 & 22
WS-525	1	Motor (Frame & Stator, Shaft & Rotor, Items WS-527 and WS-529 Thru WS-537)
.....	1	Frame & Stator (Order Motor WS-525)
.....	1	Shaft & Rotor (Order Motor WS-525)
WS-528	1	End Bell and Plug
WS-529	4	Mounting Bolt and Lockwasher
WS-530	4	Mounting Bolt Lockwasher
WS-531	1	Bearing
WS-532	1	Bearing Snap Ring
WS-533	1	Bearing Retainer
WS-534	3	Bearing Retainer Screw
WS-535	3	Bearing Retainer Screw Lockwasher
WS-536	1	Thermal Overload Switch
WS-537	1	End Bell Expansion Plug
WS-545	1	Electric Brake (Items WS-546 Thru WS-554)
WS-546	1	Brake Base Plate With Studs
WS-547	2	Brake Friction Disc
WS-548	1	Brake Intermediate Plate
WS-549	1	Brake Armature With Plate & Shading Coils
WS-550	1	Brake Coil
WS-551	1	Brake Coil Retainer Strap
WS-552	1	Brake Field With Plate
WS-553	3	Brake Spring
WS-554	3	Brake Stud Nut
WS-555	2	Shading Coil
WS-575	1	Adjustable Screw Limit Switch (Items WS-55 see page 27, WS-576 Thru WS-594)
WS-576	1	Limit Switch Bracket With Bushing
WS-577	1	Limit Switch Bracket Bushing
WS-578	1	Limit Switch Shaft
WS-579	2	Limit Switch Shaft Nut
WS-580	1	Limit Switch Gear
WS-581	1	Limit Switch Gear Key
WS-582	1	Drum Cover Bushing
WS-583	1	Limit Switch Drive Pinion With Pin
WS-584	1	Drum Shaft Drive Pin
WS-585	1	Limit Switch Drive Pinion Attaching Screw
WS-586	1	Limit Switch Guide Screw
WS-587	1	Limit Switch Guide Screw Lockwasher
WS-588	2	Limit Switch
WS-589	4	Limit Switch Attaching Screw
WS-590	4	Limit Switch Attaching Screw Lockwasher
WS-591	4	Limit Switch Attaching Screw Nut
WS-592	2	Limit Switch Bracket Attaching Screw
WS-593	2	Limit Switch Bracket Attaching Screw Lockwasher
WS-594	2	Jumper Wire
WS-610	1	Reversing Contactor
WS-611	1	Speed Selecting Contactor
WS-645	1	Trolley Reversing Contactor
WS-785	1	Control Station

REFER TO PAGE 26 FOR ORDERING INSTRUCTIONS

Meteor Hoist Series SA
Parts List

Key No.	Req'd. No.	Part Name
WS-1	1	Gear Housing Cover
WS-2	2	Gear Housing Cover Dowell
WS-3	1	Gear Housing Cover Gasket
WS-4	8	Gear Housing Cover Screw — 1¼" Lg.
WS-5	2	Gear Housing Cover Screw — 1½" Lg.
WS-6	1	Gear Housing
WS-7	1	Oil Filler Plug
WS-8	1	Oil Level Plug
WS-9	1	Oil Drain Plug
WS-10	1	Motor Shaft Oil Seal
WS-11	1	Motor Shaft Ball Bearing
WS-12	2	Primary Intermediate Gear & Pinion Ball Bearing
WS-13	1	Secondary Intermediate Gear & Pinion Ball Bearing — Cover End
WS-14	1	Secondary Intermediate Gear & Pinion Ball Bearing — Housing End
WS-15	1	Drum Shaft Ball Bearing
WS-16	1	Motor Pinion
WS-17	1	Primary Intermediate Gear & Pinion
WS-18	1	Secondary Intermediate Gear & Pinion
WS-19	1	Drum Gear
WS-20	1	Motor Pinion Key
WS-21	1	Motor Shaft Snap Ring
WS-22	1	Drum Shaft Snap Ring
WS-39	1	Warning Label
WS-40	1	Frame With Motor Cover Pins (Includes WS-39)
WS-41	4	Frame Screw
WS-42	2	Frame Screw Lockwasher
WS-43	1	Motor Cover
WS-44	2	Motor Cover Pin
WS-45	2	Motor Cover Clamp Screw
WS-46	2	Motor Cover Clamp Screw Lockwasher
WS-47	1	Drum Shroud
WS-48	4	Drum Shroud Attaching Screw
WS-49	1	Drum Shaft Oil Seal
WS-50	1	Gear Housing Dowel O-Ring
WS-51	1	Gear Housing Dowel
WS-52	1	Drum With Rope Anchor Insert & Screw
WS-53	1	Rope Anchor Insert
WS-54	1	Rope Anchor Insert Screw
WS-55	1	Drum Cover (Specify if unit is equipped with screw limits)
WS-56	6	Drum Cover Screw
WS-57	6	Drum Cover Screw Lockwasher
WS-58	1	Drum Shaft Ball Bearing
WS-59	1	Drum Cover Snap Ring
WS-60	1	Hoist Identification Plate
WS-61	4	Identification Plate Attaching Screw
WS-62	1	Wiring Conduit
WS-63	2	Packing Ring
WS-64	1	Control Station Chain Attaching Link
WS-65	1	Control Station Chain Attaching Screw
WS-66	1	Control Station Chain Attaching Screw Lockwasher
WS-67	1	Control Station Chain Attaching Screw Nut
WS-68		Control Station Chain (Specify Length Req'd.)
WS-69		Control Station Cord (Specify Length Req'd.)
WS-70	1	Motor Brake Hub Snap Ring — Inboard
WS-71	1	Motor Brake Hub
WS-72	1	Motor Brake Hub Snap Ring — Outboard
WS-73	4	Motor Brake Attaching Screw Lockwasher
WS-74	4	Motor Brake Attaching Screw
WS-83	1	Cable Return Ring With Screws and Lockwashers (Not Shown)
WS-84	2	Cable Return Ring Screw (Not Shown)
WS-86	2	Cable Return Ring Set Screw (Not Shown)
WS-90		Control Station Cable Clip (Specify Number Req'd.)
WS-92	4	Brake & Housing Attaching Screw
WS-93	1	Brake Base Plate Gasket (Weatherproof Hoist Only)
WS-94	1	Brake Housing Gasket
WS-95	1	Brake Housing
WS-96	3	Brake Housing Plug
WS-97	2	Brake Housing Cover Gasket
WS-98	2	Brake Housing Cover
WS-99	8	Brake Housing Cover Screw
WS-100	8	Brake Housing Cover Screw Lockwasher
WS-111	1	Control Housing
WS-112	1	Control Housing & Limit Switch Housing Gasket
WS-112	2	Control Housing & Limit Switch Housing Gasket (Weatherproof Hoist Only)
WS-113	5	Control Housing Screw
WS-114	5	Control Housing Screw Lockwasher
WS-115	1	Control Housing Cover
WS-116	1	Control Housing Cover Gasket
WS-116	2	Control Housing Cover Gasket (Weatherproof Hoist Only)
WS-117	4	Control Housing Cover Screw
WS-118	4	Control Housing Cover Screw Lockwasher
WS-119	2	Conduit Retaining Screw
WS-120	2	Conduit Retaining Screw Washer
WS-121	2	Conduit Retaining Screw Lockwasher
WS-122	1	Conduit Packing Flange
WS-123	2	Packing Flange Screw
WS-124	2	Packing Flange Screw Lockwasher
WS-125	1	Control Housing Plug (Not Shown) (Weatherproof Hoist Only)
WS-126	1	Brake Lead Grommet
WS-127	1	Transformer
WS-128	2	Transformer Spacer
WS-129	2	Transformer Attaching Screw
WS-130	2	Transformer Attaching Screw Lockwasher
WS-131	1	Terminal Board
WS-132	4	Terminal Board Spacer
WS-133	4	Terminal Board Mounting Screw
WS-134	4	Terminal Board Mounting Screw Nut
WS-135	4	Terminal Board Mounting Screw Lockwasher
WS-136	3	Contactor Attaching Screw With Lockwasher
WS-138	3	Control Housing Plug Screw #8-3UNC x ⅜" Lg.
WS-139	3	Control Housing Plug Screw #10-32UNF x ⅜" Lg. (Not Shown)
WS-140	2	Limit Switch Housing Screw
WS-141	2	Limit Switch Housing Screw Lockwasher
WS-142	1	Jumper Harness — Numbered 1, 2, 3
WS-143	1	Jumper Harness — Numbered 4, 5, 6
WS-144	1	Jumper Harness — Numbered 12, 13
WS-145	1	Jumper Harness — Numbered 7, 8
WS-146	1	Jumper — Numbered 14
WS-148	1	Jumper Harness —Numbered 9, 10 & 11
WS-149	1	Jumper — Numbered 15
WS-151	1	Jumper — Numbered 20
WS-153	3	Contactor Jumper — Black, 4¼" Lg.
WS-160	1	Power Cable Connector
WS-161	1	Power Cable
WS-162	1	Control Station Cord Connector
WS-177	1	Hoisting Rope With End Fittings
WS-183	1	Dead End Spool Screw
WS-184	1	Dead End Spool Screw Lockwasher
WS-185	1	Hook Block Assembly (Items WS-186 Thru WS-200)
WS-186	2	Hook Block Cover
WS-187	2	Hook Block Cover Screw
WS-188	2	Hook Block Cover Screw Lockwasher
WS-189 *	1	Hook Block Yoke
WS-189 △	1	Hook Block Yoke With Shaft
WS-190	1	Hook Block Sheave Shaft
WS-191 *	1	Hook Block Sheave
WS-191 △	2	Hook Block Sheave
WS-191 △	1	Idler Sheave
WS-191 Σ	3	Hook Block Sheave
WS-191 Σ	2	Idler Sheave
WS-192	2	Hook Block Sheave Spacer
WS-193 *	1	Hook Block Sheave Ball Bearing
WS-193 △	2	Hook Block Sheave Ball Bearing
WS-193 △	1	Idler Sheave Ball Bearing
WS-193 Σ	3	Hook Block Sheave Ball Bearing
WS-193 Σ	2	Idler Sheave Ball Bearing
WS-194 *	1	Hook Block Sheave Bearing Washer


Adjustable Screw Limit Switch
(Optional)
WS-1
WS-2
WS-3
WS-4
WS-5
WS-6
WS-7
WS-8
WS-9
WS-10
WS-11
WS-12
WS-13
WS-14
WS-15
WS-16
WS-17
WS-18
WS-19
WS-20
WS-21
WS-22
WS-49
WS-50
WS-51
WS-94
WS-95
WS-96
WS-97
WS-98
WS-99
WS-100
WS-62
WS-63
WS-92
WS-122
WS-123
WS-124
THESE ITEMS ARE LOCATED IN HOIST CONTROL HOUSING
WS-546
WS-547
WS-548
WS-549
WS-550
WS-551
WS-552
WS-553
WS-554
WS-555
Electric Brake and
Weatherproof Brake Housing
WS-501
WS-502
METEOR MONITOR
WS-580
WS-581
WS-582
WS-583
WS-584
WS-585
WS-586
WS-587
WS-588
WS-589
WS-590
WS-591
WS-592
WS-593
WS-594
WS-576
WS-577
WS-578
WS-579
Upper Limit Switch
WS-282
WS-283
WS-284
WS-285
WS-286
WS-287
(ARM FOR 1½ 2 TON UNITS SHOWN)
WS-288
WS-289
WS-290
WS-291
WS-292
WS-293
WS-294
WS-295
WS-296
WS-297
WS-504
WS-525
(SEE BELOW)
WS-39
WS-40
WS-43
WS-44
WS-45
WS-46
WS-52
WS-53
WS-54
WS-60
WS-61
WS-62
WS-65
WS-66
WS-67
WS-70
WS-71
WS-72
WS-73
WS-74
WS-93
WS-183
WS-184
WS-505
WS-545
(SEE BELOW)
WS-64
WS-68
WS-90
PARTS LOCATED INSIDE HOIST FRAME
FRAME END PLATE
WS-41
WS-42
WS-47
WS-48
Shaft & Rotor
(Order Motor WS-525)
WS-531
WS-532
WS-533
Frame & Stator
(Order Motor WS-525)
WS-528
WS-530
WS-534
WS-535
WS-536
WS-537
Hoist Motor
WS-308
WS-309
WS-311
WS-312
WS-313
WS-314
WS-315
Exploded View Meteor
Hoist Series SA
WS-503
WS-506
WS-55
WS-56
WS-57
WS-58
WS-59
WS-69
WS-111
WS-112
WS-160
WS-161
WS-162
WS-781
(SEE PAGE 34)
WS-785
WS-111
WS-120
WS-121
WS-119
WS-126
WS-138
WS-114
WS-113
WS-141
WS-146
WS-151
WS-140
WS-131
WS-128
WS-611
(SEE PAGE 32)
WS-144
WS-149
WS-145
WS-130
WS-129
WS-127
WS-133
WS-132
WS-134
WS-135
WS-610
(SEE PAGE 32)
WS-142
WS-143
WS-118
WS-117
WS-116
WS-115
ADJUSTABLE SCREW LIMIT SWITCH
(SEE ABOVE)
(SEE ABOVE)
Upper Limit Switch
WS-452
WS-451
WS-645
(SEE PAGE 31)
WS-136
WS-153
WS-148
WS-149
ADDITIONAL COMPONENTS FOR HOIST WITH MOTOR DRIVEN TROLLEY
Reeving Components – 2 Part Rope Hoist
WS-198
WS-199
WS-197
WS-200
WS-189
WS-196
WS-177
Rope With End Fittings
WS-195
WS-194
WS-193
WS-191
WS-192
WS-190
WS-186
WS-188
WS-187
WS-191
WS-336
WS-193
WS-195
WS-232
WS-233
WS-231
WS-234
WS-271
Reeving Components – 6 Part Rope Hoist
WS-177
WS-252
WS-191
WS-193
WS-195
WS-250
WS-246
WS-248
WS-249
WS-190
WS-247
WS-254
WS-255
WS-253
WS-252
WS-198
WS-199
WS-256
WS-200
WS-251
WS-196
WS-232
WS-231
WS-191
WS-233
WS-193
WS-234
WS-195
WS-177
Rope With End Fittings
WS-199
WS-200
WS-198
WS-189
WS-191
WS-193
WS-195
WS-194
WS-222
WS-187
WS-186
WS-221
WS-196
Reeving Components – 4 Part Rope Hoist

Key No.	No. Req'd.	Part Name
WS-454	1	Contactor Box, Cover, Gasket and Screws
WS-456	3	Contactor Box Attaching Screw
WS-457	3	Contactor Box Attaching Screw Lockwasher
WS-458	2	Contactor Box Cover Attaching Screw
WS-470	1	Power Cable (To Line)
WS-471	1	Power Cable (Contactor Box to Hoist)
WS-472		Control Station Cord (Specify Length Req'd.)
WS-473	3	Contactor Attaching Screw
WS-474	3	Contactor Attaching Screw Lockwasher
WS-475	3	Contactor Attaching Screw Nut
WS-476	1	Transformer
WS-477	2	Transformer Attaching Screw
WS-478	2	Transformer Attaching Screw Lockwasher
WS-479	2	Transformer Attaching Screw Nut
WS-480	2	Power Cable Connector, O-Ring, and Locknut
WS-482	1	Control Station Cord Connector, O-Ring, and Locknut
WS-483	1	Control Station Cord Connector, O-Ring, and Locknut
WS-484*	1	Plug and Body (Power Cable to Hoist)
WS-485*	1	Plug and Body (Control Station Cord to Hoist)
WS-488	1	Control Station Cord (Contactor Box to Hoist)
WS-489	4	Control Station Cable Connector
WS-490	1	Transformer Lead Connector (460 Volt Unit Only)
WS-491	1	Control Station Chain Eyebolt
WS-492	2	Control Station Chain Eyebolt Washer
WS-493	2	Control Station Chain Eyebolt Nut
WS-494	2	Ground Screw
WS-495	2	Ground Screw Lockwasher
WS-496	2	Ground Screw Nut
WS-497		Motor Lead Connector (1 Req'd. for 230V. Unit) (3 Req'd. for 460V. Unit)
WS-645	1	Trolley Reversing Contactor

Key No.	No. Req'd.	Part Name
WS-675	1	Motor and Pin (Frame & Stator, Shaft & Rotor, Items WS-678 Thru WS-688 & WS-415)
	1	Frame and Stator (Order Motor WS-675)
	1	Shaft and Rotor (Order Motor WS-675)
WS-678	1	End Bell (Pulley End)
WS-679	1	Spring Washer
WS-680	1	Bearing (Pulley End)
WS-681	1	End Bell (Brake End)
WS-682	1	Bearing (Brake End)
WS-683	1	Snap Ring
WS-684	1	Bearing Cap
WS-685	4	Bearing Cap Screw
WS-686	4	Motor Thru Bolt With Lockwasher
WS-687	4	Motor Thru Bolt Lockwasher
WS-688	1	Brake Lead Grommet
WS-700	1	Trolley Motor Brake (Items WS-430 Thru WS-433, WS-435, WS-436 & WS-701)
WS-701	1	Electric Brake (Items WS-702 Thru WS-710)
WS-702	1	Brake Base Plate With Studs
WS-703	1	Brake Friction Disc
WS-704	1	Brake Armature With Plate
WS-705	1	Brake Coil
WS-706	1	Brake Coil Retainer Strap
WS-707	1	Brake Field With Plate and Shading Coils
WS-708	2	Brake Spring
WS-709	10	Brake Spacer Washer
WS-710	2	Brake Stud Nut
WS-711	2	Shading Coil
WS-785	1	Control Station (See Page 36)
WS-784	1	Push Button Box Connector
WS-785	1	2-Push Button Station Discontinued — Control Station Page 35 will be furnished
WS-785	1	4-Push Button Station Discontinued — Control Station Page 36 will be furnished

*Discontinued for repairs only.

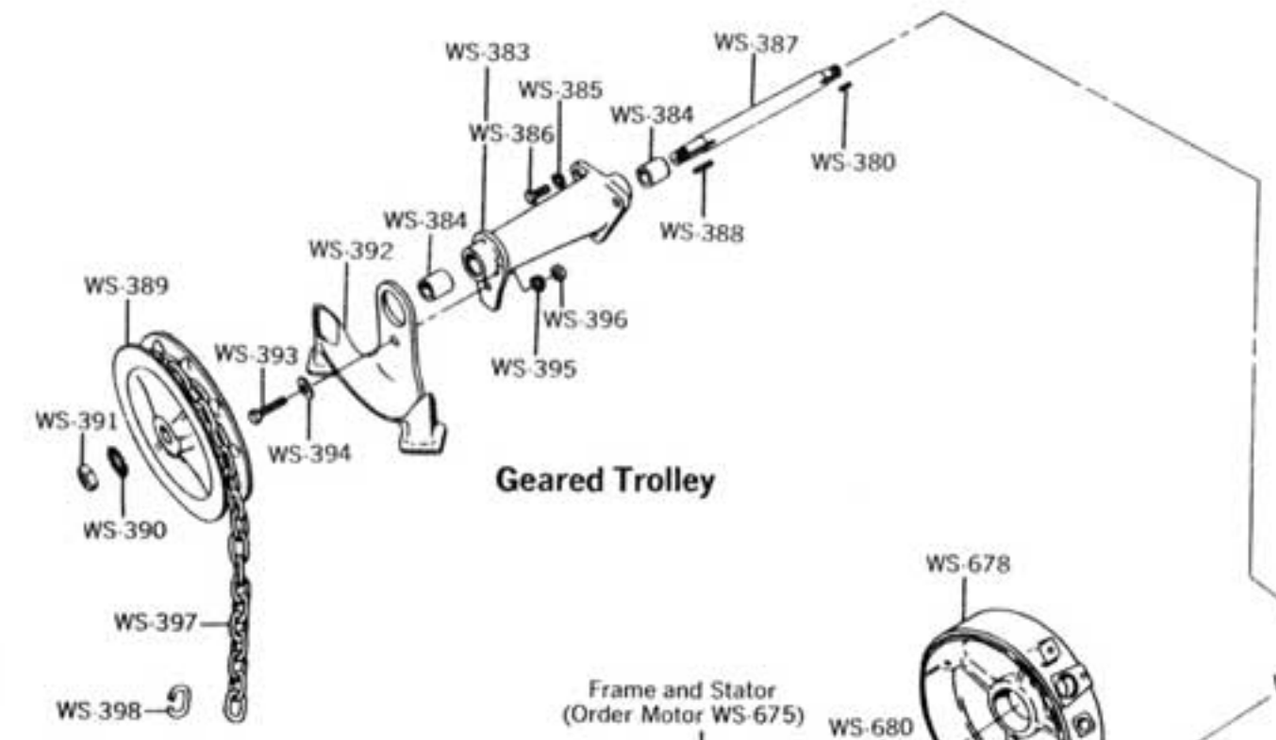
Note: The Terminal Box and associated parts shown on the opposite page as mounting on side of motor, plus the additional control parts shown mounting on Control Panel are for a Hoist with Single Speed Trolley.

REFER TO PAGE 26 FOR ORDERING INSTRUCTIONS

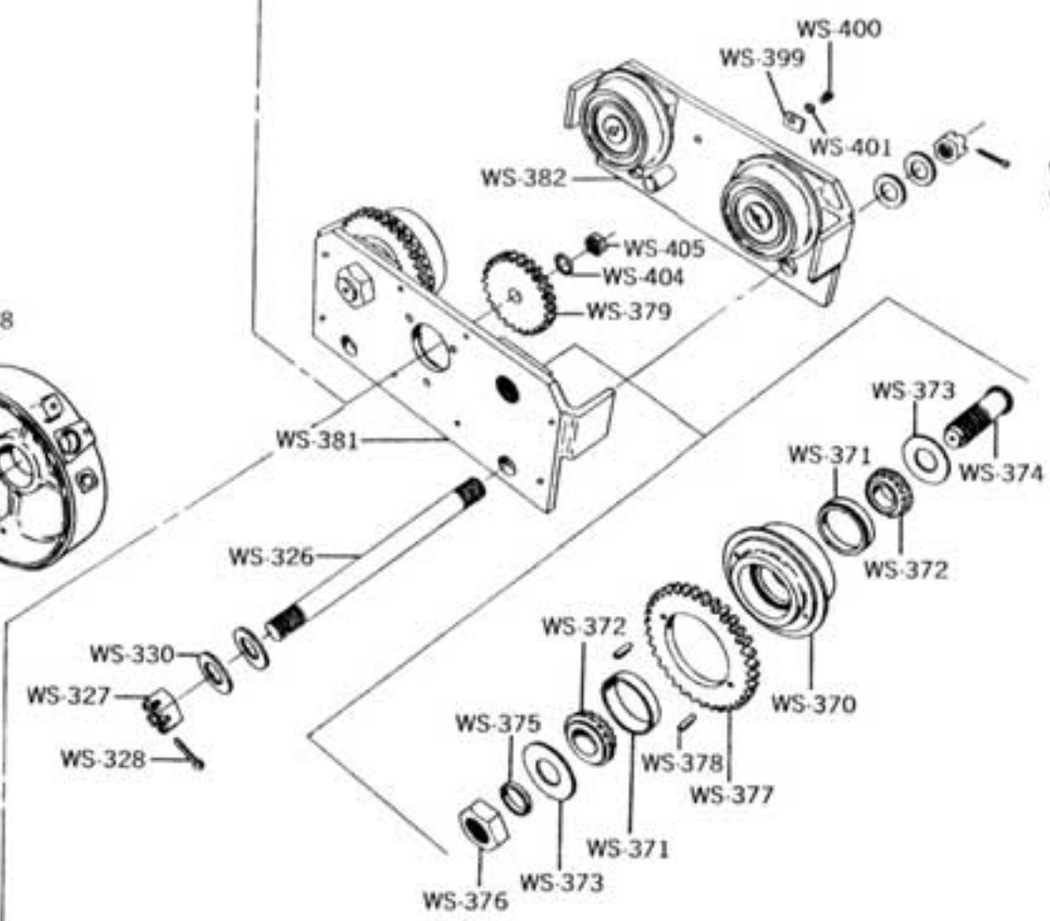
Plain, Geared and Motor Driven Trolleys
Parts List

Key No.	No. Req'd.	Part Name
WS-64	2	Control Station Chain Attaching Link
WS-68		Control Station Chain (Specify Length Req'd.)
WS-90		Control Station Cord Clip (Specify No. Req'd.)
WS-153	3	Contactor Jumper
WS-326	2	Hoist Suspension Bolt
WS-327	4	Hoist Suspension Bolt Nut
WS-328	4	Hoist Suspension Bolt Nut Cotter Pin
WS-330	52	Spacer Washer (For ½-2 Ton Capacity)
WS-330	36	Spacer Washer (For 3 Ton Capacity)
WS-330	32	Spacer Washer (For 5 Ton Capacity)
WS-370	4	Trackwheel With Bearing Cups
WS-371	8	Trackwheel Bearing Cup
WS-372	8	Trackwheel Bearing Cone
WS-373	8	Trackwheel Bearing Seal Washer
WS-374	4	Trackwheel Stud
WS-375	4	Trackwheel Stud Collar
WS-376	4	Trackwheel Stud Nut
WS-377	2	Trackwheel Gear And Pins
WS-378	4	Trackwheel Gear Pin
WS-379	1	Trackwheel Gear Pinion
WS-380	1	Trackwheel Pinion Key
WS-381	1	Geared Side Frame (Does Not Include Wheels)
WS-382		Plain Side Frame (Does Not Include Wheels) 1 Req'd. for Geared & Motor Driven Trolleys 2 Req'd. for Plain Trolley
WS-383	1	Handwheel Bracket With Bushings
WS-384	2	Handwheel Bracket Bushing
WS-385	3	Handwheel Bracket Screw Lockwasher
WS-386	3	Handwheel Bracket Screw
WS-387	1	Handwheel Shaft
WS-388	1	Hand Chain Wheel Key
WS-389	1	Hand Chain Wheel
WS-390	2	Handwheel Shaft Nut Lockwasher
WS-391	2	Handwheel Shaft Nut
WS-392	1	Hand Chain Guide
WS-393	1	Chain Guide Screw
WS-394	1	Chain Guide Screw Washer
WS-395	1	Chain Guide Screw Nut Lockwasher
WS-396	1	Chain Guide Screw Nut
WS-397		Hand Chain And Connecting Link (Specify Length Req'd.)
WS-398	1	Hand Chain Connecting Link
WS-399	1	Idler Sheave Housing Support Pin Keeper Plate (For 5 Ton Capacity Only)
WS-400	1	Idler Sheave Housing Support Pin Keeper Plate Screw (For 5 Ton Capacity Only)
WS-401	1	Idler Sheave Housing Support Pin Keeper Plate Screw Lockwasher (For 5 Ton Capacity Only)
WS-402		Trackwheel Pinion Spacer Washer (3 Ton Only—Specify No. Req'd.) (Not Shown)
WS-403	1	Trackwheel Pinion Shaft
WS-404	1	Trackwheel Pinion Lockwasher
WS-405	1	Trackwheel Pinion Nut
WS-406	1	Trackwheel Pinion Spacer
WS-407	1	Pinion Bearing Sleeve
WS-408	2	Pinion Shaft Ball Bearing
WS-409	1	Intermediate Shaft Ball Bearing (Side Frame End)
WS-410	1	Intermediate Shaft Ball Bearing (Motor End)
WS-411	1	Driven Gear
WS-412	1	Intermediate Pinion
WS-413	1	Intermediate Gear
WS-414	1	Motor Pinion And Pin
WS-415	1	Motor Pinion Pin
WS-416	1	Driven Gear Key
WS-417	1	Pinion Bearing Spacer
WS-418	1	Intermediate Bearing Spacer
WS-419	1	Intermediate Pinion Nut
WS-420	1	Intermediate Pinion Nut Lockwasher
WS-421	1	Gear Housing
WS-422	1	Gear Housing Gasket
WS-423	4	Gear Housing Screw
WS-424	4	Gear Housing Screw Lockwasher
WS-425	1	Motor End Bell Gasket
WS-430	1	Brake Hub
WS-431	1	Brake Hub Snap Ring
WS-432	2	Brake Attaching Screw
WS-433	2	Brake Attaching Screw Lockwasher
WS-434	2	Brake or Motor Cover Gasket (Weatherproof Units Only)
WS-435	1	Brake Cover
WS-436	3	Brake Cover Screw
WS-437	3	Brake Cover Screw Lockwasher
WS-438	1	Motor End Cover
WS-439	3	Motor End Cover Screw
WS-440	3	Motor End Cover Screw Lockwasher
WS-441	1	Terminal Box
WS-441	1	Terminal Box, Cover & Gasket (Weatherproof Unit Only) (Not Shown)
WS-442	1	Terminal Box Cover
WS-443	1	Terminal Board
WS-444	1	Terminal Box Attaching Screw
WS-445	1	Terminal Box Attaching Screw Lockwasher
WS-446	2	Terminal Board Spacer
WS-447	2	Terminal Box & Board Attaching Screw
WS-448	2	Terminal Box & Board Attaching Screw Lockwasher
WS-450	1	Power Cable Connector
WS-451	1	Power Cable
WS-453	1	Junction Box Gasket

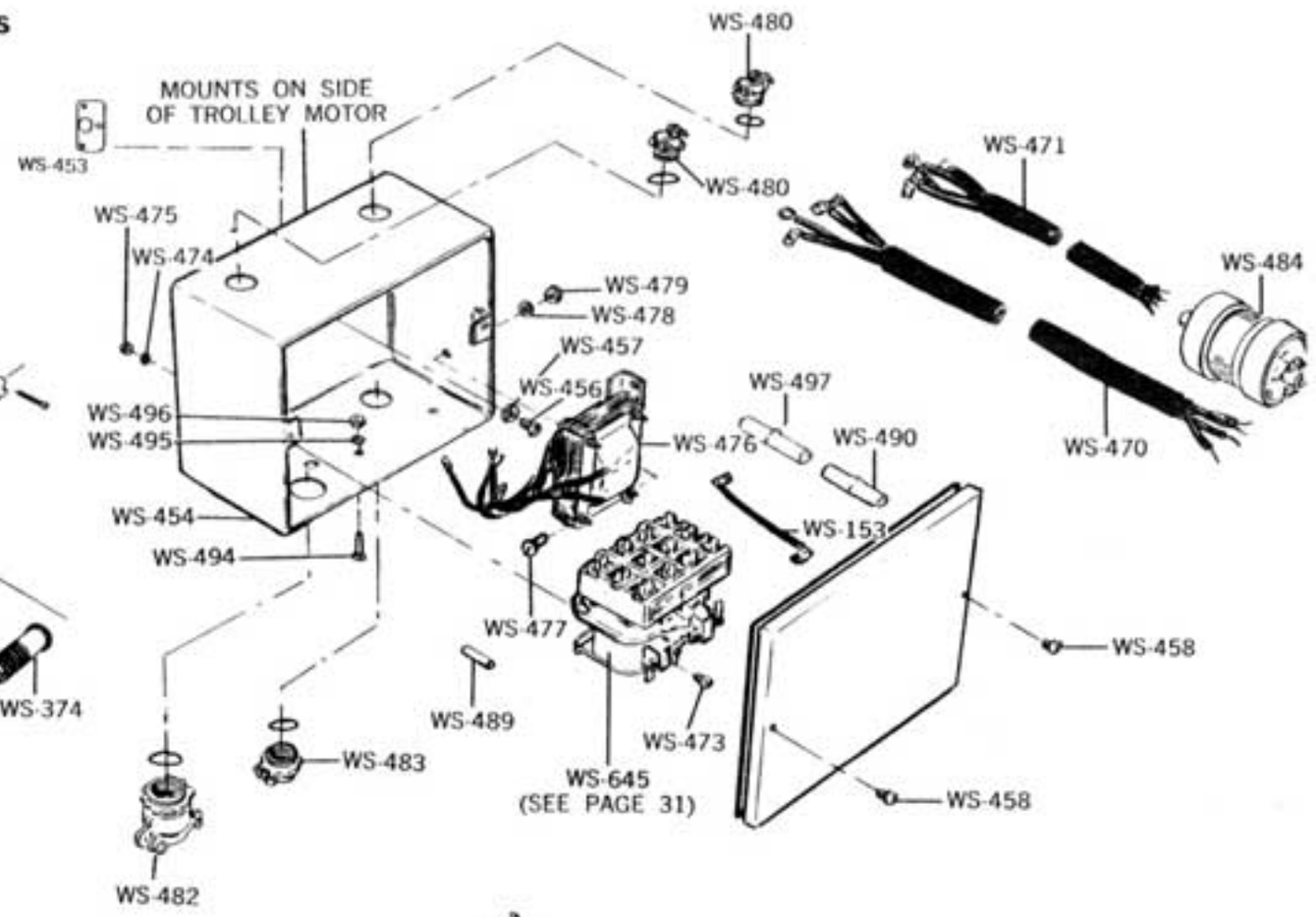
Exploded View – Trolley Components For Meteor Hoist SA

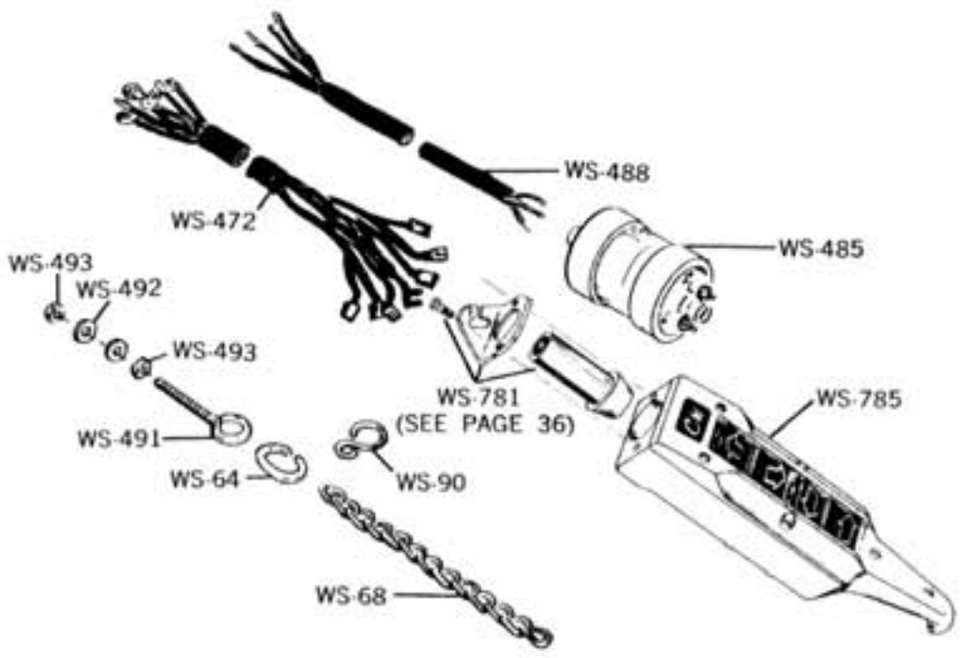


Geared Trolley

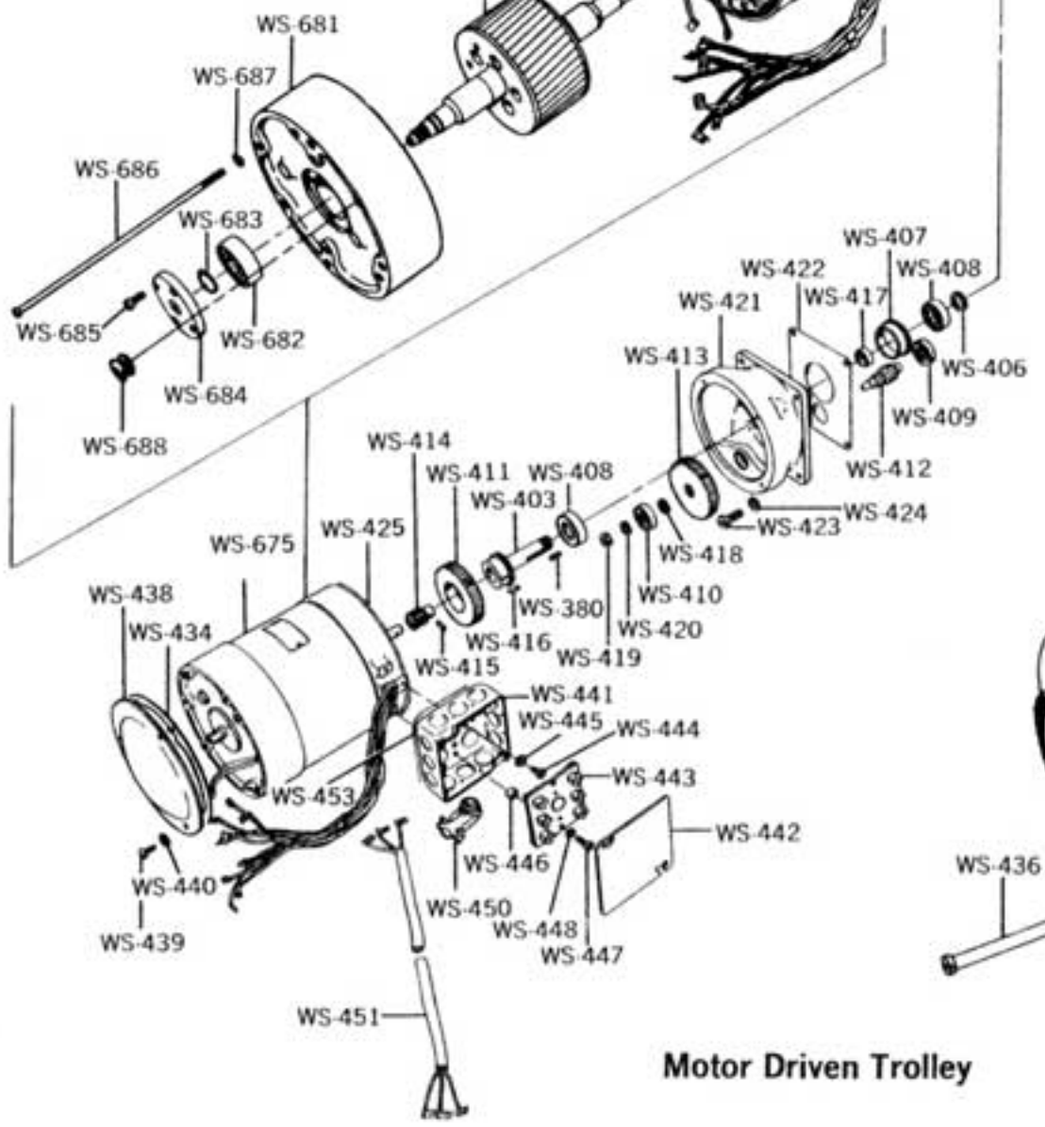


Plain, Geared & Motor-Driven Trolley

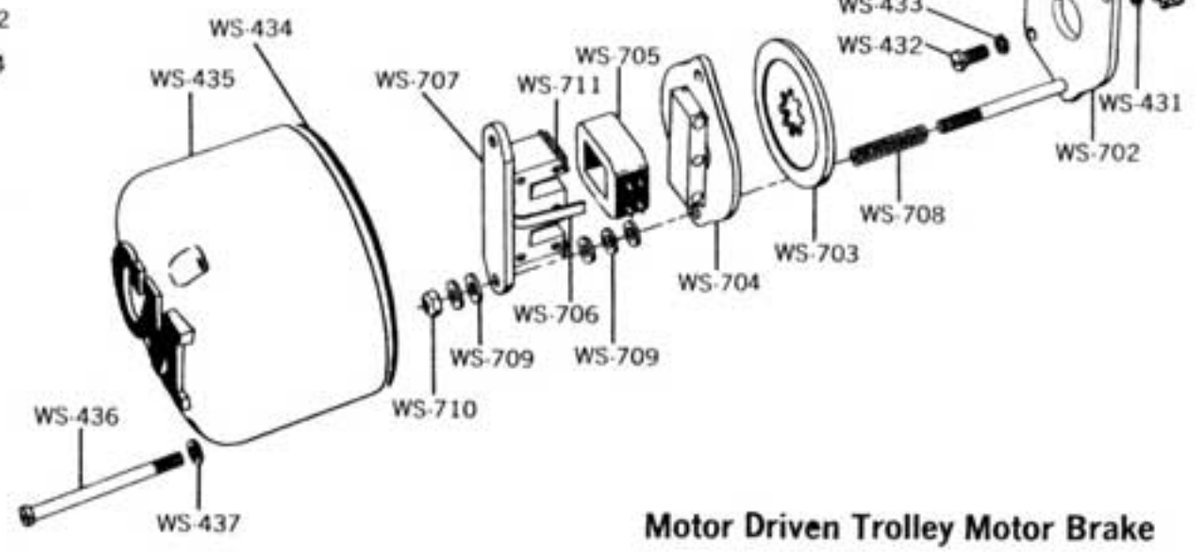




Separate Motor Driven Trolley Control Components



Motor Driven Trolley



Motor Driven Trolley Motor Brake

METEOR HOIST MONITOR IDENTIFICATION COLOR CODE

MODEL	5842 5842-2 5814 5814-2 5834 5834-2	5862 5862-2	5843 5843-2 5815 5815-2 5835 5835-2	5863 5863-2	5844 5844-2 5826 5826-2 5836 5836-2	5864 5864-2	5845 5845-2 5827 5827-2	5830 5830-2
COLOR CODE	BLACK	ORANGE	YELLOW	PURPLE	RED	WHITE	GREEN	BLUE

SECTION D – TROUBLE SHOOTING

All Hoists

IF	CAUSE MAY BE	REMEDY
1) Hook does not raise or lower	a) No voltage at hoist	Main line or branch circuit switch open; branch line fuse blown or circuit breaker tripped. Close, replace or re-set. Grounded or faulty connection in supply lines or current collectors.
	b) Phase failure (Single phasing)	Open circuit, grounded or faulty connection in one line of supply system, collectors, hoist wiring, reversing contactor, motor leads or windings. Check for electrical continuity.
	c) Open control circuit	Open or shorted winding in transformer or reversing contactor coil; loose connection or broken wire in circuit; mechanical binding in contactor; control station contacts not making. Check continuity and repair or replace defective parts.
	d) Wrong voltage or frequency	The voltage and frequency must be the same as shown on hoist identification plate.
	e) Low voltage	Read voltage at the plug end of hoist power cable while operating hoist in ◆ UP direction with full load. Reading should be as follows: UNIT RATING — MINIMUM VOLTAGE 208-240/3/60 — 187 440-460/3/60 — 396 Branch line overloaded, install separate line to hoist or use proper wire size for branch line.
	f) Brake not releasing	Open or shorted coil winding; open wiring harness circuit. Check continuity and repair or replace defective part. Armature binding; brake not properly adjusted. See Page 12.
	g) Excessive load	Reduce loading to the capacity limit of hoist as indicated on the identification plate.
2) Hook moves in the wrong direction	a) Phase reversal	See Page 3.
	b) Reverse winding of rope	Rope has been wound on wrong side of drum. Rewind and check rope for damage.
3) Hook lowers but will not raise	a) Excessive load	Reduce loading to the capacity limit of the hoist as indicated on the identification plate.
	b) Open hoisting circuit	Open or defective motor thermal switch. Switch automatically resets when motor has cooled sufficiently to resume operation, in approximately one hour. Check continuity in the switch after motor has cooled and replace if it shows an open circuit. Open or shorted winding in reversing contactor coil; loose connection or broken wire in hoisting circuit; control station contacts not making.

rope anchor through switch assembly, insert anchor bushing in Monitor assembly, seat rope anchor into bushing recess, allow assembly to seat against anchor plate by releasing grasp on rope anchor.
Pull rope until end anchor seats properly on the underside of Monitor assembly.
Check to be sure everything is properly seated and that Monitor is properly nested in its protected position between the z-bars of the hoist frame.
Tighten up dead end spool screw. Be sure that screw is not binding on rope.
Place sheaves, assembled on hook block sheave shaft, on the lower loops of rope.
Install hook block side plates over sheave shaft and hook block trunnion.
With hook block spacers in position, slide hook block bolts through capacity plates, side plates and spacers.
Lock in position with nuts.

8. Place the two halves of limit switch weight around rope just below dead end spool. Lock in position with screws. Limit switch weight must be free to slide on rope.
9. Check rope to make sure there are no twists. Twists can be removed as follows:
   a) Operate the lowering control until hook has reached its lower limit of travel. There should be at least 2 wraps of rope remaining on drum.
   b) Disconnect hoist from power supply.
   c) Now pull the dead end of hoisting rope downward until the hook is within several feet of bottom of hoist.
   d) Then return hoisting rope to its operating position making sure the rope anchor is seated properly on the underside of anchor bushing, and Monitor assembly.
   e) Repeat above pulling on the dead end if twist remains. While pulling, a twisting motion imparted to the dead end fitting by hand will expedite removal of hoisting rope twists.

Instructions For Installing Meteor Monitor

1. Disconnect lower hook from any loads, disconnect power supply, remove motor cover.
2. Remove dead end spool screw and lockwasher. Slide molded slipper between wire rope and dead end spool until slot in slipper is centered over screw hole, slot should be open toward motor. Slide slipper spring over dead end spool screw and lockwasher. Re-install screw so that the tangs of the spring fit into the grooves in the slipper and tighten screw securely. Refer to Fig. 4.
3. **Do Not Take Switch Assembly Apart.** Grasp the dead end rope anchor and pull down several inches of wire rope. Thread rope anchor through switch assembly, insert anchor bushing in Monitor assembly, seat rope anchor into bushing recess, allow assembly to seat against anchor plate by releasing grasp on rope anchor. Check to be sure everything is properly seated and that Monitor is properly nested in its protected position between the z-bars of the hoist frame. Refer to Fig. 4.
4. Run Monitor leads along inboard side of motor power conduit and secure leads with two cable ties. (This step should be omitted on 5-ton model hoists).
5. Remove control housing covers, remove rubber brake lead grommet. Pass Monitor leads through grommet hole, slip grommet over the four brake and Monitor leads and install grommet in control housing. Seal wires passing through grommet by forcing Silastic, RTV, Permatex, glazing compound or other non-hardening sealant between wires and into grommet.
6. Mount the relay using the screw and sealing washer. Be sure locating boss on relay rests in drilled hole. Connect relay per wiring diagram. (60 FPM units only).
7. Re-assemble control housing cover and gasket, re-assemble motor cover.
8. Operate hoist in "down" direction (to energize relay on 60 FPM unit) and then check for proper hoist operation under no load condition.

NOTE:

1. Although the Monitor is weather resistant, it is not recommended for use in severe acid environments.
2. Do not disassemble or re-calibrate the Monitor Assembly.
3. Check color code on chart Page 16 to make sure Monitor is for proper hoist model.

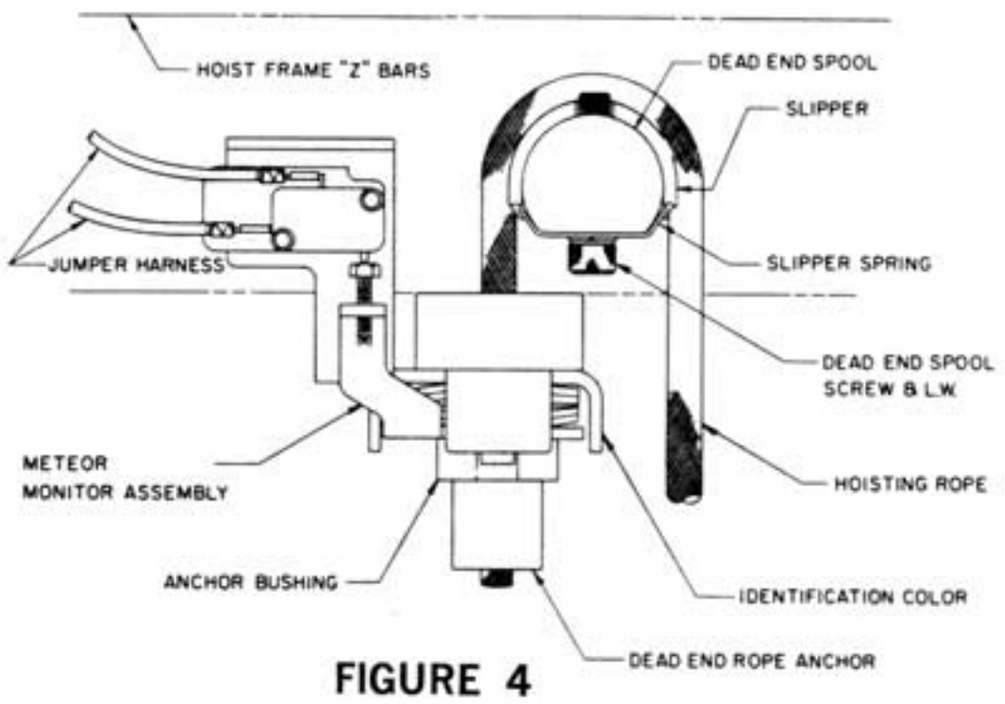


FIGURE 4

3. Remove dead end spool screw, lockwasher, and slipper spring. Grasp the dead end rope anchor and pull down several inches of wire rope. Remove anchor bushing and pull anchor through Monitor assembly. Slide molded slipper and wire rope out of slot and off of dead end spool.
4. Using heavy canvas or leather gloves, operate hoist in the lowering direction keeping the rope under tension until it is completely unwound from drum.
5. Unscrew drum anchor insert screw and re-thread it into the tapped hole in drum anchor insert to provide a grip for removing the insert.
6. Pry out insert and withdraw the rope end.

INSTALLING ROPE

1. Uncoil the rope and straighten it out along the floor to remove all twists. Keep rope clean.
2. Insert rope end anchor into hole in drum.
3. Move rope sideways into slot. A straight pull on rope should not release it.
4. Secure rope in this position with drum anchor insert.
5. Lock insert in place with screw.
6. Wind the rope on drum under tension, by operating ◆ UP Control, leaving about 10 feet hanging for two-part rope, about 15 feet for four-part rope and about 20 feet for six-part rope.
7. **Two-part rope unit**

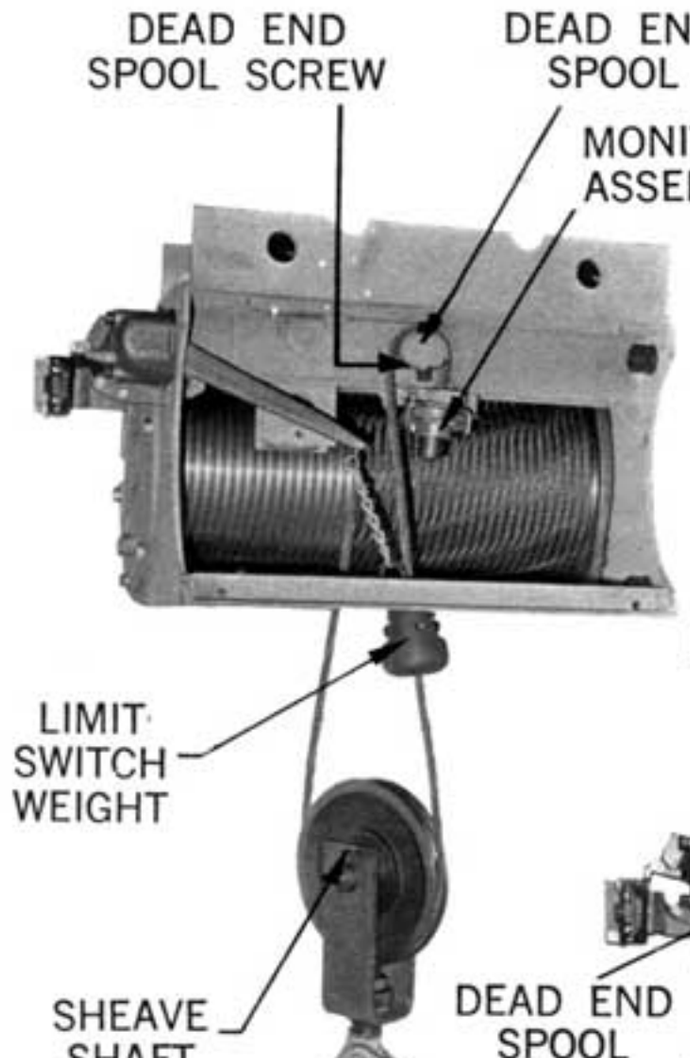
   Loop the end of rope over dead end spool while sliding molded slipper between wire rope and dead end spool until slot in slipper is centered over screw hole, slot should be open toward motor. Slide slipper spring over dead end spool screw and lockwasher. Reinstall screw so that the tangs of the spring fit into the grooves in the slipper.
   Grasp the dead end rope anchor and pull down several inches of wire rope. Thread rope anchor through switch assembly, insert anchor bushing in Monitor assembly, seat rope anchor into bushing recess, allow assembly to seat against anchor plate by releasing grasp on rope anchor.
   Pull rope until end anchor seats properly on the underside of Monitor assembly.
   Check to be sure everything is properly seated and that Monitor is properly nested in its protected position between the z-bars of the hoist frame.
   Tighten up dead end spool screw. Be sure that screw is not binding on rope.
   Place hook block sheave on the rope.
   Place sheave with two spacers in position into hook block yoke.
   Insert sheave shaft.
   Re-assemble covers.

   Four-part rope unit

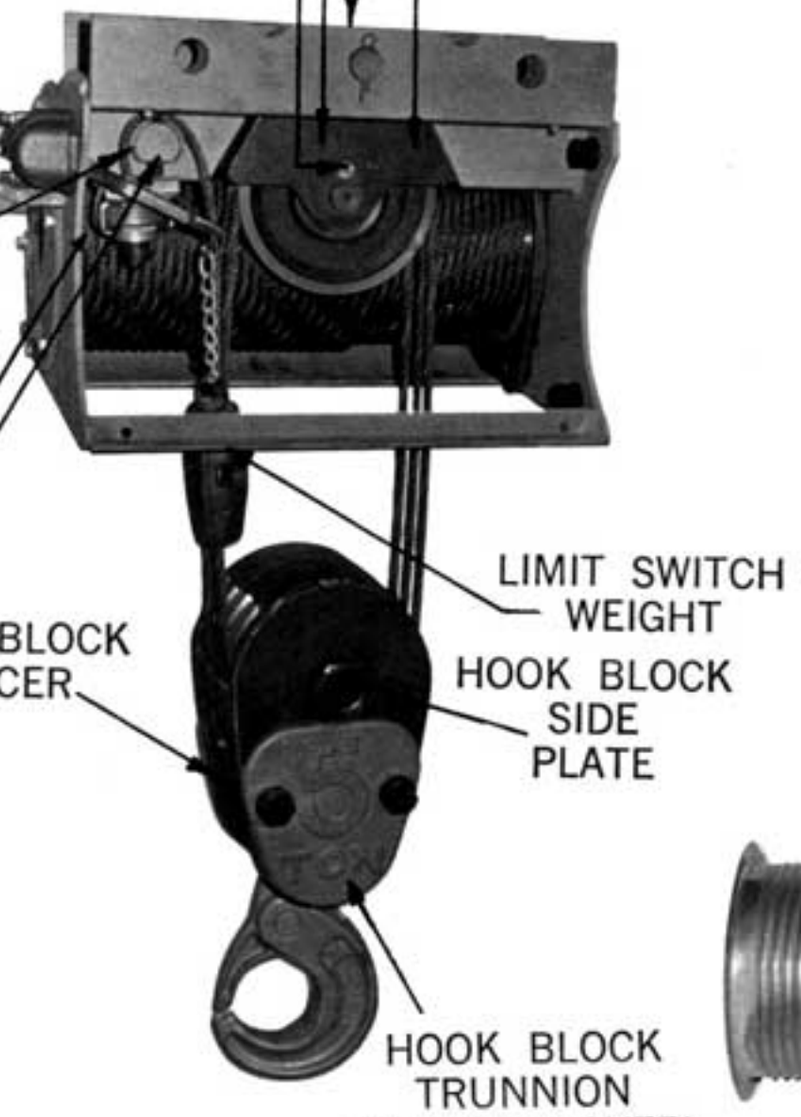
   Make a three-foot loop in the rope in the counter-clockwise direction looking from motor side.
   Place idler sheave in top of loop.
   Insert sheave between the two plates hanging from z-bars. The free end of rope should be next to the side of sheave furthest from dead end spool.
   Insert idler sheave shaft.
   Lock in place with keeper plate.
   Loop the end of rope over dead end spool while sliding molded slipper between wire rope and dead end spool until slot in slipper is centered over screw hole, slot should be open toward motor. Slide slipper spring over dead end spool screw and lockwasher. Reinstall screw so that the tangs of the spring fit into the grooves in the slipper.
   Grasp the dead end rope anchor and pull down several inches of wire rope. Thread rope anchor through switch assembly, insert anchor bushing in Monitor assembly, seat rope anchor into bushing recess, allow assembly to seat against anchor plate by releasing grasp on rope anchor.
   Pull rope until end anchor seats properly on the underside of Monitor assembly.
   Check to be sure everything is properly seated and that Monitor is properly nested in its protected position between the z-bars of the hoist frame.
   Tighten up dead end spool screw. Be sure that screw is not binding on rope.
   Place sheaves, assembled on hook block yoke and shaft, on the lower loops of rope.
   When re-assembling covers, tighten each cover screw an equal amount to align the sheaves below the cover openings.

   Six-part rope unit

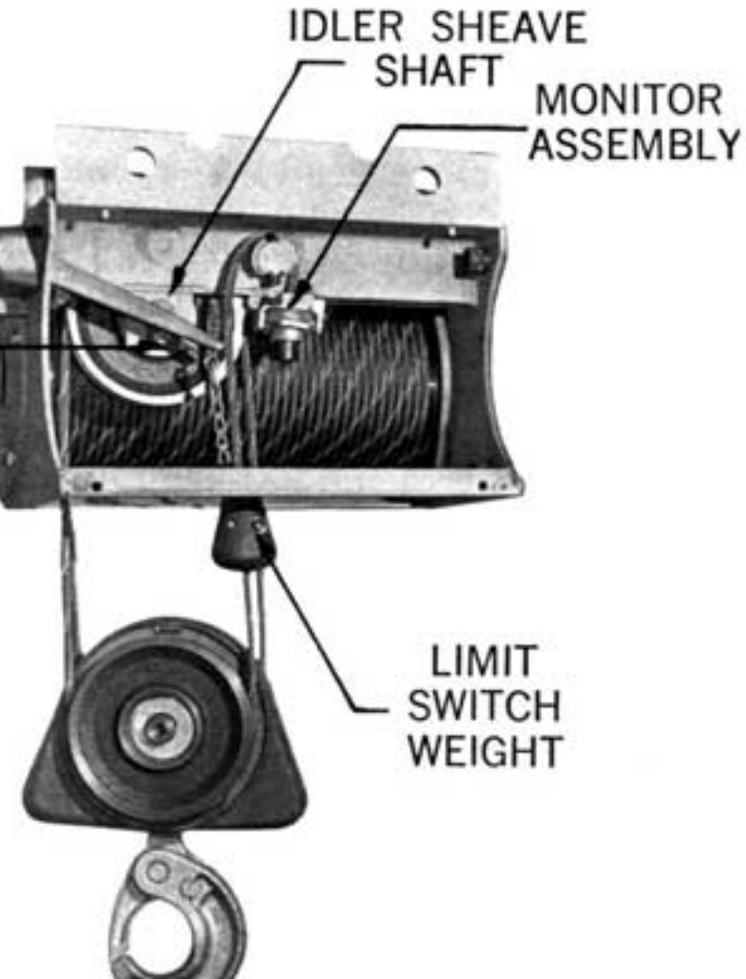
   Make two three-foot loops in the rope in the clockwise direction looking from motor side.
   Place two idler sheaves in the top of loops.
   Insert sheaves between sides of idler sheave housing in the same order the loops were made.
   Insert idler sheave shaft through housing and sheaves.
   Lock in place with keeper plate.
   With idler sheave housing held under the hoist in approximate position, check the reeving of unit as shown in diagram on Page 13.
   If correct, secure in position with idler sheave housing support pin.
   Loop the end of rope over dead end spool while sliding molded slipper between wire rope and dead end spool until slot in slipper is centered over screw hole, slot should be open toward motor. Slide slipper spring over dead end spool screw and lockwasher. Reinstall screw so that the tangs of the spring fit into the grooves in the slipper.
   Grasp the dead end rope anchor and pull down several inches of wire rope. Thread



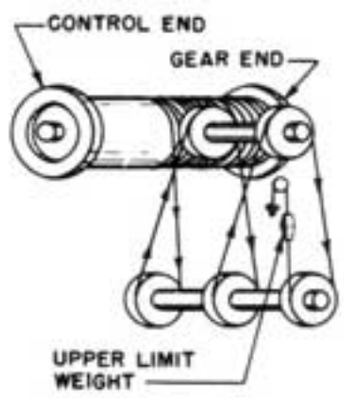
TWO PART REEVING

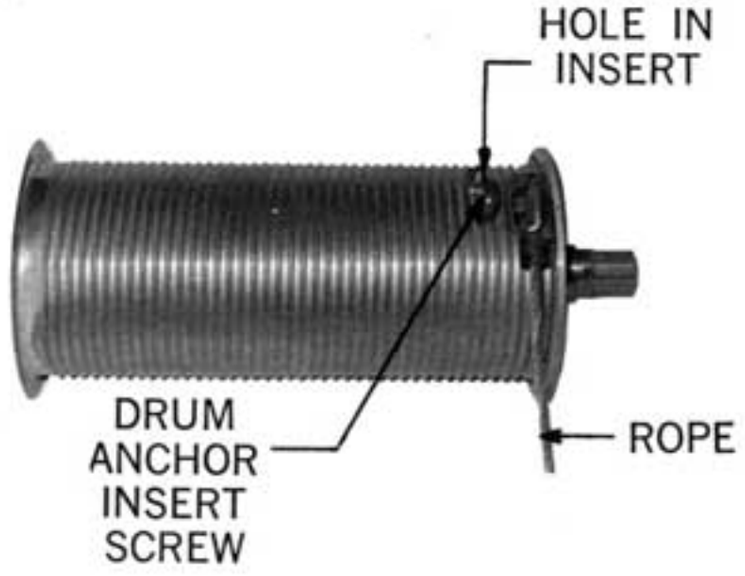


SIX PART REEVING



FOUR PART REEVING





Adjustments (Cont'd)

HOISTING ROPE

Rope is furnished complete with assembled end fittings. The ends are interchangeable and the rope can be reversed to distribute wear and obtain longer life.

Refer to the following illustrations for assistance in removing and installing rope.

CAUTION: If replacement wire rope is not purchased from Columbus McKinnon Corporation, extreme care must be used in attaching the end fittings. Apply for further information. When removing or installing rope on hoists equipped with screw limit switch, first remove limit switch guide screw. After installation, then re-set limits.

REMOVING ROPE

1. Remove limit switch weight from rope.
2. **Two-part rope hoist**
   Remove hook block covers.
   Pull out sheave shaft.
   Remove rope from sheave.

   Four-part rope hoist
   Remove hook block covers.
   Remove rope from sheaves.
   Remove idler sheave shaft keeper plate.
   Push out idler sheave shaft.
   Remove rope from sheave.

   Six-part rope hoist
   Remove hook block plates.
   Remove rope from sheaves.
   Remove idler sheave housing support pin allowing idler sheave housing to be removed from the hoist.
   Remove idler sheave shaft keeper plate.
   Push out idler sheave shaft.
   Remove rope from sheaves.

Trolley Lubrication

GEARED TROLLEY

- Once a month lubricate trackwheel gears with Texaco Novatex No. 2 or an equivalent heavy cup grease or graphite grease.
- Every six months lubricate handwheel shaft bearings with 3-in-1 or light machine oil.

MOTOR DRIVEN TROLLEY

- Once a month lubricate trackwheel gears with Texaco Novatex No. 2 or an equivalent heavy cup grease or graphite grease.
- The motor bearings and reduction gears require no additional lubrication. However, if gears are disassembled upon reassembly use Texaco Novatex No. 1 or an equivalent medium cup grease.

Adjustments

ELECTRIC BRAKE ASSEMBLY

The correct air gap between armature and field, when brake is not energized, is 0.025 inch and need not be adjusted until the gap reaches 0.045 inch.

To adjust the brake, proceed as follows:

1. Disconnect hoist from power supply.
2. Remove motor cover.
3. Before adjusting the gap, back off the stud nuts and examine friction linings and friction surfaces for wear, scoring or warpage. Also check shading coils to be sure they are in place and not broken. A missing or broken shading coil will cause the brake to be noisy when hoist is operated.
   On units having a weatherproof brake housing, remove the two rectangular covers on side of housing to check parts and measure air gap, and remove the three plugs in end of housing to reach adjusting nuts.
4. Turn adjusting nuts clockwise gaging the air gap at both ends.
5. Replace cover(s), reconnect the power and check operation.

UPPER LIMIT SWITCH

If switch operation has been checked as described on Page 3 and is not operating correctly, proceed as follows:

1. Disconnect hoist from power supply.
2. Remove control housing cover.
3. Lift limit switch weight slowly — a sharp click when cam lifts the roller of right hand switch indicates that the hoisting control circuit is interrupted. Continue to lift the weight and the left hand switch should click when its roller drops into the cam depression — indicating that the lowering circuit is energized to reverse motor.
4. If either or both switches fail to operate, loosen the two screws that hold the limit switches to bracket. Move right hand switch until the clearance between the cam and switch roller is 1/32 inch. Make sure left hand switch roller is in contact with its cam. Tighten screws, replace cover, reconnect the power and check operation.

LOWER HOOK

When replacing a hook, allow 1/8 inch clearance between hook shoulder and bottom of hook yoke sub-assembly or hook trunnion.

ADJUSTABLE SCREW LIMIT SWITCH

To adjust hook travel, proceed as follows:

1. Disconnect hoist from power supply.
2. Remove control housing cover.
3. Withdraw guide screw from between limit switch nuts.
4. Turning the limit switch nut one notch changes hook position approximately 2½ inches on two-part rope, 1¼ inches on four-part rope or 13/16 inch on six-part rope hoists.
   Moving one nut toward the other increases hook travel and away from the other decreases the travel.
   The nut nearest cover operates at upper hook position and the nut nearest hoist operates at lower limit of hook travel.
   The screw limit switch should be adjusted so that at least 2 wraps of rope remain on the drum at the lower limit of travel.
5. Replace guide screw and cover. Reconnect the power and check operation.

MONITOR CALIBRATION

When Re-Calibration becomes necessary due to repair of the Monitor switch assembly proceed as follows:

1. After repairs are completed and hoist is reassembled, place a load of 140% hoist capacity on unit.
2. Raise load approximately 1" off floor and adjust Monitor switch adjusting screw until switch operates and load cannot be raised.
3. Lower load, disconnect lower hook from load, and disconnect power supply.
4. Grasp the dead end rope anchor and pull down until Monitor adjusting screw is accessible. Apply Loctite 242 to adjusting screw at trip plate and let dry.

   NOTE: The Meteor Monitor is intended to allow handling of rated loads. If, in the case of some high speed hoists, the above procedure prevents lifting a rated capacity load, the Monitor should be readjusted to permit handling the rated load.

at an angle. These edges should be smoothed and rounded.

h) Inspect trolley trackwheels for external wear on the tread and flange, and for wear on internal bearing surfaces as evidenced by a looseness on the stud.

i) Inspect the complete unit for wear or damage to adjacent parts, corrosion, loose fastenings, bent or cracked covers or housings, damaged wires or insulation, loose or dirty connections.

j) Inspect collector shoes for wear. Badly worn parts should be replaced.

TESTING:

Prior to initial use, all altered or repaired hoists or used hoists that have not been operated for the previous 12 months shall be tested by the user for proper operation. Test the unit first in the unloaded state and then with a light load of 50 pounds times the number of load supporting parts of wire rope to be sure it operates properly and the brake holds the load when the control is released; then test with a load of * 125% of rated capacity.

In addition, hoists in which load sustaining parts have been replaced shall be tested with * 125% of rated capacity by or under the direction of an appointed person and a written report prepared for record purposes.

After this test, the function of the Monitor is to be tested. If the Monitor permits lifting a load in excess of 140% of rated load it should be adjusted as described on page 12.

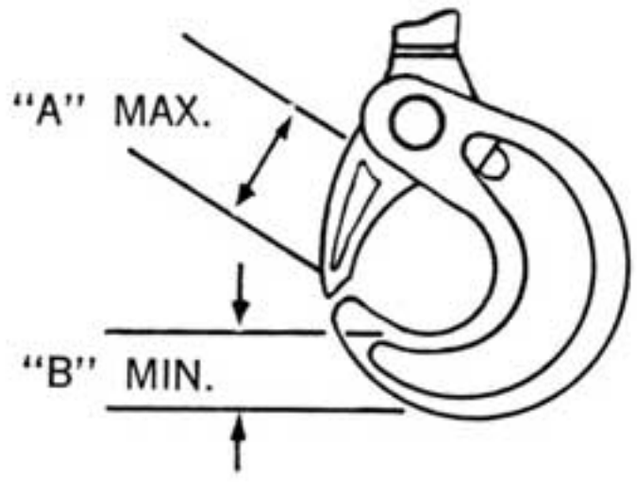
NOTE: For additional information on inspection and testing, refer to Code B30.16 "Overhead Hoists," obtainable from American National Standards Institute, 1430 Broadway, New York, N. Y. 10018 U.S.A.

** If the Monitor prevents lifting of a load of 125% of rated capacity, reduce load to rated capacity.*

HOOKS:

Hooks damaged from chemicals, deformations or cracks, or that have more than a 10 degree twist from the plane of the unbent hook or excessive opening or seat wear must be replaced.

Any hook that is twisted or has excessive throat opening indicates abuse or overloading of the unit. Other load sustaining components of the hoist should be inspected for damage.



HOOK USE	Unit Capacity Tons	Parts of Rope	Replace Hook When Opening or Seat Are:	
			"A" Max.	"B" Min.
LOWER	½—1½	2	1 57/64	57/64
	1—3	4	2 15/32	1 3/16
	5	6	2 57/64	1½
UPPER	½—5	——	2 15/32	1 3/16

Hoist Lubrication

GEARS

- Check oil level in gear housing at least once a month, maintaining it at the bottom of oil level hole in gear housing cover.
- Drain housing every 2-3 years and refill with a good grade of SAE 80 or 90 gear lubricating oil — 2 quarts are required.

BEARINGS

- All bearings except the lower hook thrust bearings are pre-lubricated or are in an oil bath and need no lubrication. The lower hook thrust bearing should be lubricated at least once a month.

WIRE ROPE

- A small amount of lubricant will greatly increase the life of hoisting rope, therefore, the rope should not be allowed to run dry.
- Keep it clean and lubricate at regular intervals with a commercial wire rope lubricant or 600W oil. Under ordinary conditions, monthly lubrication is satisfactory but under hot and dirty conditions, it may be necessary to clean the hoisting rope at least once a day and lubricate it several times between cleanings.
- Particular attention should be directed to lubrication of the rope where it passes around the dead end spool as well as that section which passes over the sheaves.

LIMIT SWITCH ASSEMBLY

- Every six months remove the control housing cover and oil the limit switch cam shaft, cams and switch rollers using 3-in-1 or light machine oil.
- If hoist is equipped with an adjustable screw limit switch, oil the screw, bushings at each end, gear teeth and switch rollers.

SECTION C – MAINTENANCE

Inspection

To maintain continuous and satisfactory operation, a regular inspection procedure must be initiated so that worn or damaged parts can be replaced before they become unsafe. The intervals of inspection must be determined by the individual application and are based upon the type of service to which the hoist will be subjected and the nature of the critical components and the degree of their exposure to wear, deterioration or malfunction. The inspection of hoists is divided into two general classifications designated as "frequent" and "periodic."

The type of service to which the hoist is subjected can be classified as "Normal," "Heavy," and "Severe."

Normal service involves operating the hoist at less than 85% of its rated capacity and not more than 10 lift cycles per hour, except for isolated instances.

Heavy service involves operating the hoist at 85% to 100% of rated capacity or in excess of 10 lift cycles per hour as a regular specified procedure.

Severe service is normal or heavy service coupled with the possibility of abnormal, unforseen conditions.

Below is the recommended, minimum intervals of inspection. When the unit is subjected to extra heavy usage or dusty, gritty, moist, or other adverse atmospheric conditions, shorter time intervals must be assigned. During the Periodic Inspection, inspection must be made of all parts for unusual wear, corrosion effect, or damage, in addition to those specifically mentioned.

Any deficiencies noted are to be corrected before the hoist is put into service.

Periodic Inspection & Maintenance Procedure

CAUTION: **The outboard bearings supporting the intermediate gears are located in gear housing cover, therefore, it should be carefully removed.**
It is suggested, in order to retain the gears in gear housing, that the hoist be tipped slightly upward or positioned on end, then carefully lift cover.
A small wedge should be inserted between hoist drum and frame to prevent the hoisting rope from unreeling, in case any of the gears are removed during or after cover removal.

Minimum Inspection Schedule

FREQUENT INSPECTIONS:

These inspections are usually visual examinations by the operator or other designated personnel and records of such inspections are not required. For Normal, Heavy and Severe Service, the frequent inspections are to be performed daily or monthly and shall include the following items:

a) Brake for evidence of slippage — daily.
b) Limit switches for proper operation — daily (refer to page 3).
c) Inspect hoisting rope for kinks, crushed strands, frayed or broken wires and corrosion — daily (refer to page 11).
d) Hooks for damage, cracks, twists, excessive opening, latch engagement and latch operation — daily (refer to chart on page 11).

PERIODIC INSPECTIONS:

These inspections are visual inspections of external conditions by an appointed person and records of periodic inspections are to be kept to provide the basis for continuing evaluation of the condition of the hoist. For Normal and Heavy Service, the periodic inspections are to be performed yearly with the hoist in place. For Severe Service, the periodic inspections are to be performed quarterly.

Periodic Inspections are to include those items listed under frequent inspections as well as the following:

a) Check upper limit switch for operation as described on Page 3.
b) Inspect contactor(s) and control station for burnt or pitted contacts and loose or corroded terminals.
c) Inspect control station cord and power cables for damaged wires or insulation.
d) Check oil level in gear housing as described on Page 3.
e) Inspect electric brake friction linings and friction surfaces for wear, scoring or warpage. Check air gap between armature and field and if the gap exceeds 0.045 inch adjust as described on Page 12.
f) Inspect sheaves for wear — a deepening and narrowing of the groove, which causes pinching and severe abrasion of hoisting rope; spiral ridges or flutes in bottom of groove which cause chafing of the rope. This can be corrected by machining the sheave groove until the ridges are removed using a 3/16 inch radius cutter. Replace sheave when groove diameter has been reduced to 5½ inches.
g) Inspect hoisting rope drum for burrs or sharp edges between grooves, caused by pulling loads

4. The control station used on two speed hoist is similar to the single speed unit, except that either of two definite speeds may be selected by the operator in both hoisting and lowering. Each control when partially depressed provides **slow** speed and when fully depressed gives **fast** speed. Partial release of control returns hoist to **slow** speed, while full release allows hoist to stop. Rated lifting speeds are shown on hoist identification plate.

   Slow speed is intended as a means of carefully controlling or "spotting" the load, although the hoist may be operated solely at this speed if desired. It is not necessary to operate in the **slow** speed position as the hoist will pick up a capacity load at **fast** speed from a standing start. In other words, it is not necessary to hesitate at the **slow** position when moving control from **Stop** to **Fast** position or vice versa.
5. If material being handled must be immersed in water, pickling baths, any liquid, dusty or loose solids, use a sling chain of ample length so that the hook is always above the surface. Bearings in the hook block are shielded only against ordinary atmospheric conditions.

Operating Instructions

HOIST

1. Before picking up a load, check to see that the hoist is directly overhead and that the hoisting rope is properly arranged in drum grooves. If rope has been displaced, unwind it as far as necessary and rewind correctly.
2. The hoist is designed to raise a load vertically and should not be used for pulling at an angle. **When applying a load it should be directly under hoist or trolley. Avoid off center loading of any kind.** Pulling to the side causes tipping of hoist, allows hoisting rope to foul upper limit switch and to chafe against hoist frame. Pulling toward the end permits rope to climb out of drum grooves and overwind at one end, causing severe chafing and wear to the rope. Trolley mounted hoists may jump suddenly along runway beam if the load is not directly beneath hoist when slack is taken up.
3. Take up a slack rope carefully and start load easily to avoid shock and jerking of hoist ropes. If there is any evidence of overloading, immediately lower the load and remove the excess load.
4. Do not allow the load to swing while hoisting as rope will not wind properly on drum.
5. When hook is lowered the full length of its rated lift, there are at least 2 wraps of rope remaining on drum. The hook must not be lowered beyond this point unless load is removed. Continued operation with lowering control depressed after hook reaches the lowest position causes hook to raise by winding the rope onto reverse side of drum. Severe damage to rope occurs by chafing against hoist frame; upper limit switch will be inoperative and will cause breaking of hoisting rope or burning out of motor when the hook block reaches it. **The rope must always wind on and off drum on the side nearest hoist motor—never on the outside.**

HOIST WITH PLAIN TROLLEY

This unit should be moved by pushing on the suspended load or by pulling the empty hook. The pendant chain supporting control station should not be used for this purpose.

HOIST WITH GEARED TROLLEY

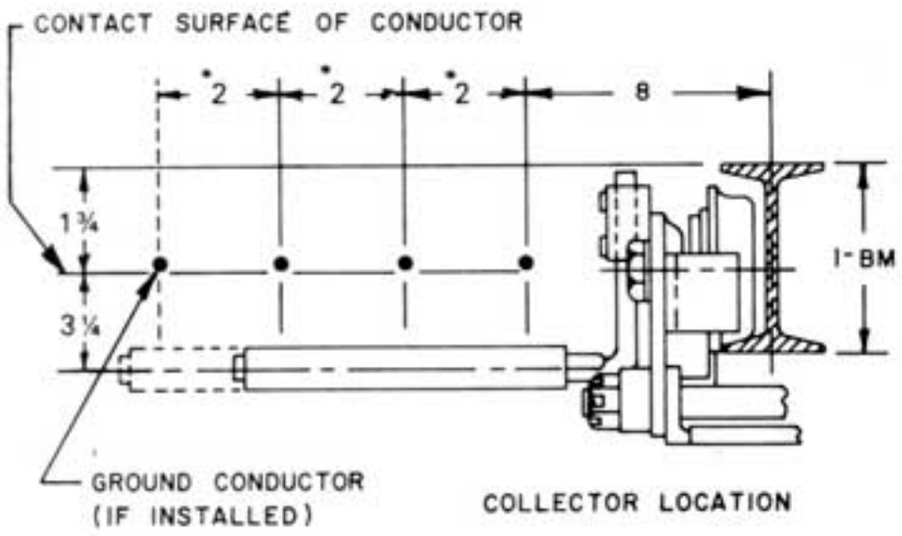
This unit should be moved by means of the pendant hand chain. Pull on the chain farthest from end toward which the unit is to travel.

HOIST WITH MOTOR DRIVEN TROLLEY

This unit should be moved by operating the controls marked ⧫ FORWARD and ⧫ REVERSE in control station. Unless altered by the erector, depressing ⧫ FORWARD control will move hoist toward gear housing end. Anticipate the stopping point and allow trolley to coast to a smooth stop. Reversing or "plugging" to stop trolley causes overheating of motor and swaying of load.

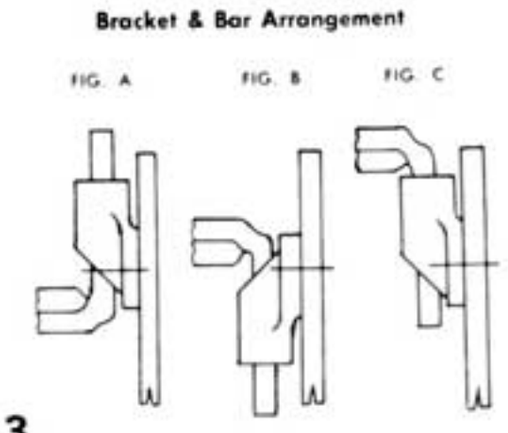
Safety Procedures

1. When preparing to lift a load, be sure that the attachments to the hook are firmly seated in hook saddle. Avoid off center loading of any kind, especially loading on the point of hook.
2. When lifting, raise the load only enough to clear the floor or support and check to be sure brake will hold the load and that the attachments to hook and load are firmly seated. Continue lift only after you are assured the load is free of all obstructions.
3. Do not load hoist beyond the rated capacity shown on hoist identification plate and on lower hook block. Overload can cause immediate failure of some load carrying part or create a defect causing future failure at less than rated capacity. When in doubt, use the next larger capacity of CM Meteor Hoist.
4. Do not use this or any other overhead **materials** handling equipment for lifting persons.
5. Stand clear of all loads and avoid moving a load over the heads of other personnel. Warn personnel of your intention to move a load in their area.
6. Do not leave the load suspended in the air unattended.
7. Permit only qualified personnel to operate unit.



*If conductor system includes transfer guides, conductors are spaced at 3" apart.

CAUTION: Trolley beam should always be electrically grounded. Be sure that there is good electrical contact between trolley beam and trackwheels. Avoid the use of paint or other coatings on the beam flange which might form an insulation.



AMER. STD. I-BMS	TROLLEY CAP.	
	½-2 T.	3 & 5 T.
6	A	-
7	A	-
8	B	B
10	B	B
12	C	C
15 & Over	C	C

FIGURE 3

ALTERNATE METHODS OF WIRING

A flexible conductor cable can be used to supply power to a trolley mounted hoist. The length of conductor should be adequate for the full travel of trolley. A long conductor will usually require a clamp or strain relief (available from factory) fitting at the hoist to prevent kinking where the conductor enters hoist. To keep the slack conductor away from the hoist and load, a messenger wire system, a counterweighted pulley or a spring loaded cord reel (available from manufacturer) can be used.

Adjustable Screw Limit Switch

This optional equipment device, if factory installed, is set for nearly full hook travel. If it is necessary to change the setting, instructions are given in Section C.

Where this device has been purchased separately, refer to the instructions packed with device.

SECTION B – OPERATION

General

1. The CM Meteor Monitor is designed to protect the Meteor Hoist from excessive, infrequent overloads. The device provides safety and protects against motor burnout.
   CAUTION: The Monitor is not intended to be used as a scaling device for purposes of determining what is an appropriate or safe load to be lifted on a regular basis.
   A make-before-break relay is required in the high speed (60 FPM) Meteors.
   The hoist will not operate in the hoisting direction unless the relay is energized. The relay, however, does not affect lowering, and the hoist will always lower. Pushing the "DOWN" control energizes the relay and closes the relay-maintain circuit which keeps the relay energized after the "DOWN" control is released. When a hoist overload trips the Monitor switch, this opens the relay-maintain circuit, making the hoist inoperable in the up direction. To restore the circuit, the overload must be lowered to the floor to reset the Monitor switch. Pushing the "DOWN" control to lower the load also resets the relay, once the Monitor switch resets.
   NOTE: It is only necessary to energize the hoist in the down direction at initial "start-up" or in the event of an overload. It is not necessary to depress the DOWN control each time the hoist is operated.
2. The hoist is equipped with an upper limit switch which opens the hoisting circuit. If hoist does not halt promptly, a second limit switch momentarily reverses the motor to stop the hook positively. This protection exists only when the power supply to the motor is correctly phased. On hoists equipped with the adjustable screw limit switch, this device automatically stops hook at any predetermined point in either hoisting or lowering and does not, in any way, affect the operation of upper limit switch. As above, this protection exists only when the power supply to motor is correctly phased.
3. The hoist motor normally is equipped with a thermal protection switch, which interrupts the hoisting operation when motor reaches its maximum safe temperature. If this switch opens while a load is suspended from hoist, the hook may be lowered to remove the load while motor is cooling off. The thermal switch automatically resets when motor has cooled sufficiently to resume operation, in approximately one hour under normal conditions.

Motor Driven Trolleys

The motor driven trolley is shipped assembled and wired to the hoist, however, spacing of trackwheels for the actual beam the unit is to be installed on must be checked.

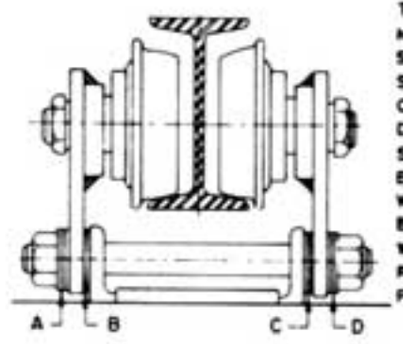
Before operating trolley, lubricate trackwheel gears with Texaco Novatex No. 2 or an equivalent heavy cup grease or graphite grease.

The motor driven trolley is wired in such a way that when the hoist motor is operating correctly, as described on Page 3, the trolley will move toward the gear housing end when ⧫ FORWARD control is depressed.

With a capacity load on hoist, operate trolley over the entire length of runway or monorail system to be sure that the adjustment and operation is satisfactory.

For Separate Motor Driven Trolley (trolley shipped separately from hoist), refer to the instructions packed with unit and the information given above.

IMPORTANT ADJUSTMENT INSTRUCTIONS
METEOR TROLLEYS



THE NUMBER OF WASHERS SHOWN BELOW IS NOMINALLY CORRECT. DUE TO VARIATIONS IN SIZE ENCOUNTERED ON STRUCTURAL STEEL SECTIONS, IT WILL BE NECESSARY IN SOME CASES TO VARY THE NUMBERS USED. THE DISTANCE BETWEEN TRACKWHEEL FLANGES SHOULD BE 1/8 TO 3/16 GREATER THAN THE BEAM FLANGE. WHEN USED ON MONORAIL WITH CURVES LIGHTLY LUBRICATE EDGES OF BEAM AT CURVE SECTION WITH GREASE. WARNING: SPECIAL TROLLEYS IN CHART REQUIRE SPECIAL SIDE FRAMES AND SUSPENSION BOLTS.

	AMER. STD. FLANGE WIDTH	1/2 TO 2 TON NO. OF WASHERS A	B	C	D	3 TON NO. OF WASHERS A	B	C	D	5 TON NO. OF WASHERS A	B	C	D
STANDARD TROLLEYS	3 3/8	13	0	0	13								
	3 5/8	11	2	2	11								
	3 7/8	10	3	4	9								
	4	9	4	4	9	9	0	0	9				
	4 1/8	8	5	5	8	8	1	1	8				
	4 5/8	5	8	8	5	5	4	4	5				
	5	3	10	10	3	3	6	6	3	8	0	0	8
	5 1/8	3	10	11	2	3	6	7	2	8	0	1	7
	5 1/4	2	11	12	1	2	7	8	1	7	1	2	6
	5 1/2	0	13	13	0	0	9	9	0	5	3	3	5
SPECIAL TROLLEYS	5 5/8	12	1	1	12	8	1	1	8	4	4	4	4
	6	10	3	3	10	6	3	3	6	2	6	6	2
	6 1/4	9	4	5	8	5	4	5	4	0	8	7	1
	6 3/8	8	5	6	7	4	5	6	3	0	8	8	0
	7	4	9	9	4	0	9	9	0	4	4	4	4
	7 1/8	3	10	10	3					4	4	5	3
	7 1/4	3	10	11	2					3	5	5	3
	7 3/8	2	11	12	1					2	6	6	2
	7 1/2	1	12	12	1					1	7	7	1
	7 5/8	0	13	13	0					0	8	8	0
* MINIMUM BEAM RADIUS		4'-0"				5'-6"							

* DIMENSION APPLIES TO MINIMUM I-BEAM AND WILL VARY WITH LARGER I-BEAMS

*Dimension applies to minimum I-beam and will vary with larger I-beams.

Enclosed Collectors and Wiring

Collectors can be installed on either side of a plain trolley and on plain side of a geared or motor driven trolley.

Installation Procedure —

1. Make sure that power supply to conductor system is shut off.
2. Refer to Figure 3 to determine the proper mounting position for the collector bar and bracket.
3. Attach the brackets by inserting the screws into tapped holes in the side frames. Tighten screws securely.
4. Place an insulator on collector bar.
5. Position the bar in the bracket and lock with set screws. Mount collectors on bar to match conductor system.
6. Again refer to Figure 3; position the collectors on the bar as shown.
7. Measure the length of power cable needed to reach the farthest collector. Allow for connecting the wire to the collector shunt screw and cut off the cable.
8. Strip back the insulation as required and cut off Green wire if no ground conductor is installed.
9. Attach wires to collector's shunt terminal, shunt terminal screw is internal (refer to Fig. 2 and Page 40).
10. Check installation to make sure that the collectors make proper contact throughout the entire length of trolley travel.
11. Energize conductor system. Check for proper direction of hook travel by following instructions on page 3.

Enclosed Collector

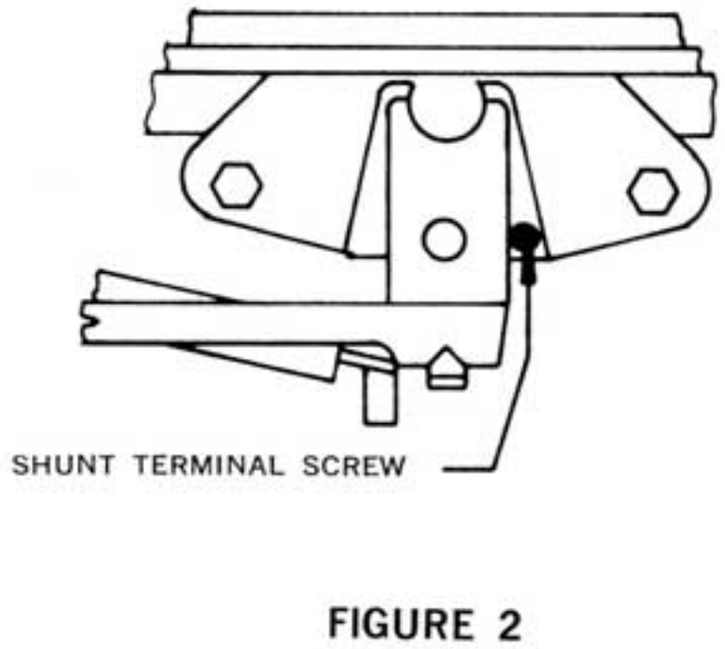
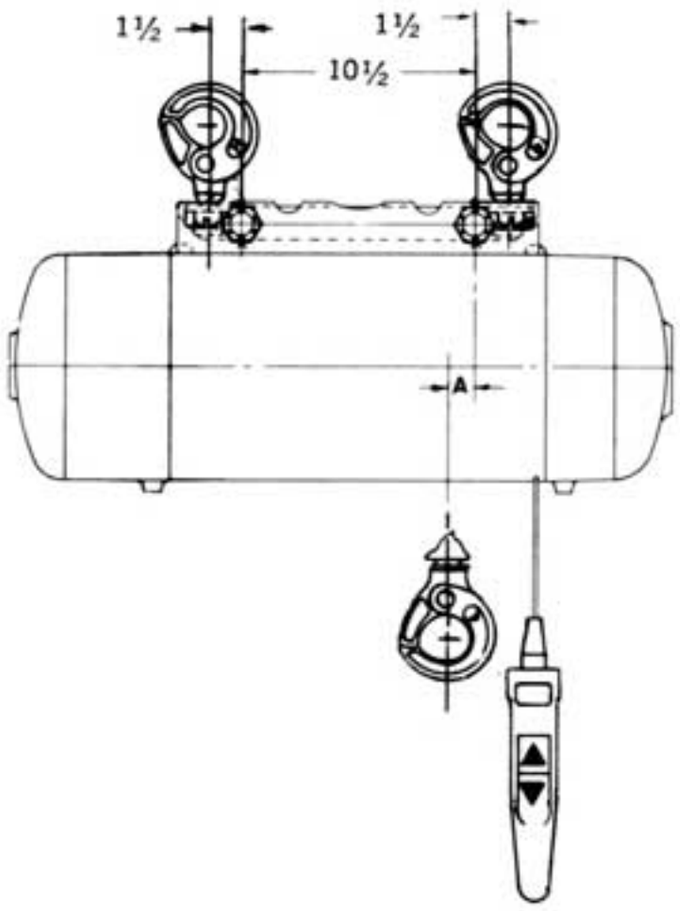


FIGURE 2

Hook Suspension



For hook suspension hoists, the supports for *each* hook must be capable of sustaining the hoist plus a capacity load, due to the fact that the load moves horizontally as it is raised and lowered.

HORIZONTAL TRAVEL OF LOWER HOOK BLOCK

PARTS OF ROPE	LIFT IN FEET	DIMENSION "A" IN INCHES HIGH HOOK	LOW HOOK
2	20	4½	8⅜
4	18	1¼	4¾
6	22	*5	5½

*Minimum dimension for "A" is 3″ when hook is 10 ft. from hoist.

Dimension "A" is measured from the center of suspension bolt at control end. Hook is on center when hoist is viewed from end.

All Trolleys

For all trolley supported hoists, rail stops must be installed. These stops must not be positioned to exert impact force on the hoist but should contact the trolley side frames.

A chart on page 7 shows the number of spacer washers to be installed between trolley side frames and hoist suspension lugs for the nominal beam sizes indicated. It is suggested that the beam flange width be measured and trolley side frames be temporarily installed on hoist before installation to determine the exact distribution of washers. The distance between trackwheel flanges should be 1/8 to 3/16 inch greater than the beam flange width for straight runway beams, and 3/16 to 1/4 inch if runway system includes sharp curves. The number of washers between side frames and hoist lugs should be the same or differ only by one washer, in order to keep the hoist hook centered under runway beam. The distribution of washers outside the trolley frames is unimportant except that the total number used must be sufficient to keep the slotted nuts and cotter pins in engagement.

When installing hoist and trolley on beam, tighten slotted nuts snugly so that the trolley frames are parallel and vertical. Do not overtighten.

The suspension bolts are made of heat treated steel and should not be replaced with ordinary medium carbon steel bolts.

WARNING: Deviation from CM washer adjustment recommendations could cause the trolley to fall from the beam. The trolley should be inspected periodically to assure its continued safe operation.

Plain and Geared Trolleys

These trolleys are shipped separately and must be properly adjusted by the customer to fit runway beam.

On a geared trolley, the hand chain wheel should be installed on drum side of hoist. The weight of hoist motor will then counterbalance hand chain pull when the hoist is moved without a load. Before operating trolley, lubricate trackwheel gears with Texaco Novatex No. 2 or an equivalent heavy cup grease or graphite grease. If it is necessary to change the length of the hand chain, find the unwelded link and open it by spreading with a chisel or twist one end with a wrench while holding the other end in a vise or another wrench. Remove an *even number* of links (2, 4, 6, etc.) as necessary to shorten the chain or add an even number to lengthen it (in this latter case, another open link will be required, which can be made from a welded link by cutting through the weld with a hacksaw). Make certain that the chain is not twisted — then re-install and close the open link.

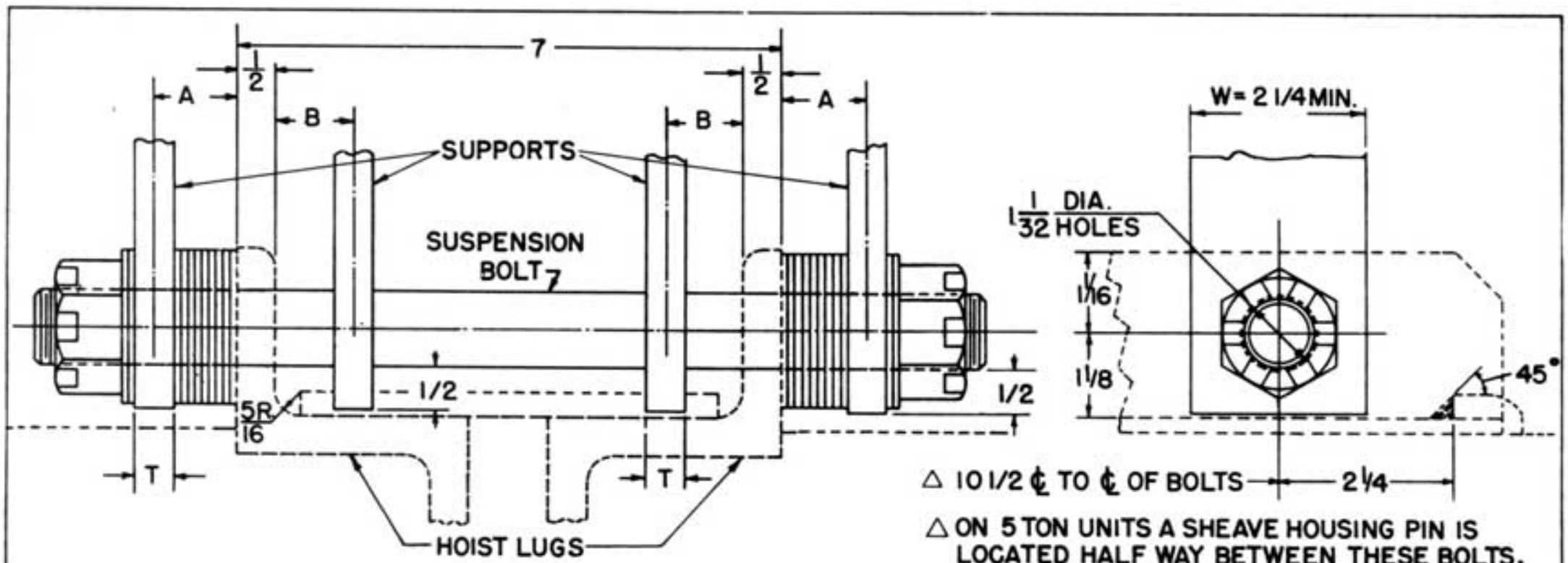
With a capacity load on hoist, operate trolley over the entire length of runway or monorail system to be sure that the adjustment and operation is satisfactory.

On the 5-ton unit, the two suspension bolts supplied with trolley fit the end holes of side frames. Center hole is for sheave housing support pin, which is supplied with hoist. Slide the pin until slot at the one end is just outside side frame. Lock pin in position by placing the keeper plate in slot and securing it in position with screw.

The suspension bolts are made of heat treated steel and should not be replaced with ordinary medium carbon steel bolts.

Lug Suspension

For lug suspension hoists, it is suggested that the unit be installed on supports of the following design and spacing.



✳ ON 5 TON UNITS THE SUPPORTS MUST BE LOCATED ON OUTSIDE OF LUGS.

△ ON 5 TON UNITS A SHEAVE HOUSING PIN IS LOCATED HALF WAY BETWEEN THESE BOLTS.

WHEN DESIGNING SUPPORTS A CLEARANCE OF 2 1/4" RAD. MUST BE ALLOWED FOR WITHDRAWAL OF THIS PIN IN ORDER TO REMOVE THE IDLER SHEAVE HANGER.

CAPACITY OF HOIST TONS	DIMENSION		
	A MAX.	B MAX.	T MIN.
1/2, 3/4, 1	15/16	1 1/2	1/4
1 1/2, 2	1 1/4	1 1/4	1/4
3	3/4	3/4	3/8
5	9/16	✳	1/2

MOUNTING DIMENSIONS FOR LUG SUSPENSION
C.M. METEOR HOIST

DWG. NO. C-1F-3853
DATE - 9-9-1968

If supports are to be located at A, remove a group of washers equal to thickness T.

If supports are to be located at B, keep all washers on the outside of hoist lugs and put spacers inside to keep hoist from shifting sideways. Spacers may be made from standard one inch pipe.

Both suspension members must be on the inside of hoist lugs, as at B, or both on the outside as at A. For proper balance and stress distribution, keep both A dimensions equal for outside suspension and both dimensions B equal for inside suspension.

The suspension bolts furnished with hoist are heat treated alloy steel and dimensions given in the above diagram are based on the use of these bolts. If other suspension bolts are used, these dimensions will no longer apply and the supports must be designed to avoid excessive bending stresses.

Dimensions W and T given for the supports are calculated for ordinary medium carbon steel with a safety factor of five. Each support is designed for the hoist plus a capacity load.

The one-half inch dimension for suspension members on the outside of hoist must be held in order to permit removal of the cover on motor side of hoist.

SHORTENING THE CONTROL CORD

If it is necessary to shorten the cord, it is recommended that a "Control Cord Alteration Kit" (WS-782) be obtained from the manufacturer. This kit contains all of the necessary solderless wiring terminals, insulators, clamp, and instructions for shortening the cord.

However, if the proper terminals, etc. are available the cord can be shortened by using the prepared end of the cord as a guide. After the hoist operates properly, disconnect the power supply, open control station, disconnect all wires and ground cable. Remove cord from control station and slide the grommet and retainer up on the cord.

Cut off the cord for a length equal to the distance the station is to be raised, measuring from the end of the longest wire. Using the cut off piece of cord as a guide, strip outer insulation jacket and shorten individual wires (except green wire) to the lengths previously used. Strip insulation from each wire for the distance required for the appropriate terminal.

On the green wire, cut and strip insulation for 2-5/16" from the end of the insulation jacket. Slide clamp sleeve onto ground cable and form a tight loop as shown in figure 1. Crimp sleeve to secure loop. Insert control cord into control station and attach ground cable and reconnect wires per wiring diagram. Reposition grommet and secure same with retainer ring.

Reassemble cover and gasket and operate hoist and/or trolley in both directions to check correctness of electrical connections.

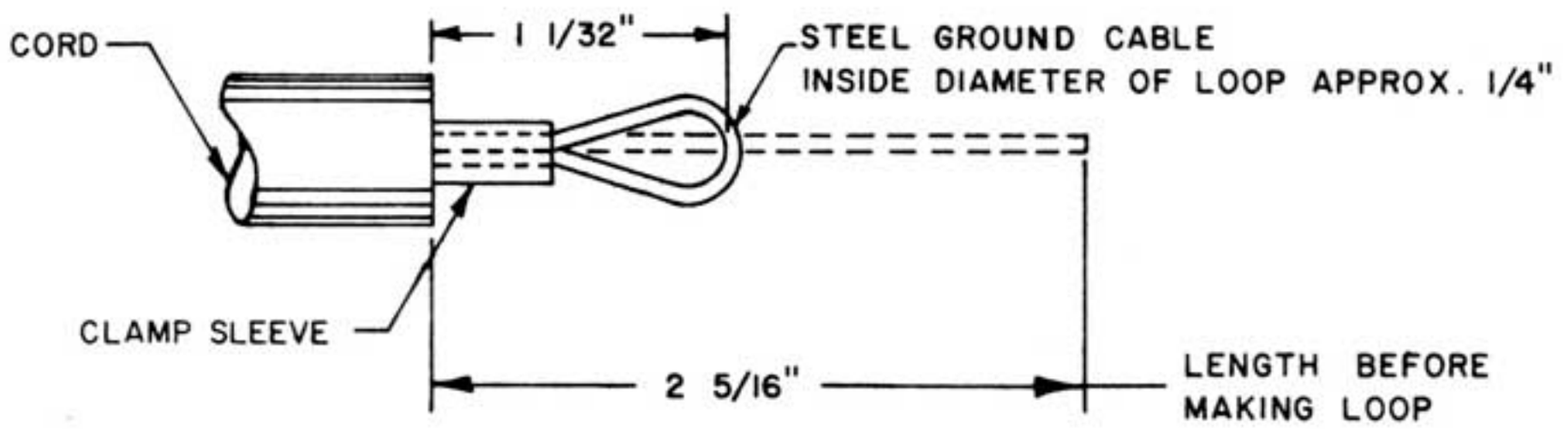


FIGURE 1

SHORTENING CONTROL CORD

study is essential to safe rigging operations. For rigging information, we recommend consulting a standard textbook on the subject.

The postage paid guarantee card included in the envelope with this manual should be filled in and mailed to the factory at once for recording and validating.

CM GUARANTEE

If any part proves defective within one year of shipment, we will replace the part at no charge, F.O.B. our factory, provided the part claimed defective is returned to our factory transportation prepaid.

We assume no responsibility for unauthorized repairs.

Use of materials or replacement parts other than CM manufacture may lead to dangerous operation. Accordingly, CM cannot be responsible in such cases and the guarantee would be void.

CM METEOR MONITOR

The Monitor is designed to protect the Meteor Hoist from excessive, infrequent overloads. The Monitor is not intended to be used as a scaling device for purposes of determining what is an appropriate or safe load to be lifted on a regular basis.

SECTION A – INSTALLATION

All Hoists

Before installing hoist, see that current to be used is same as that shown on hoist name plate.

Inspect external wiring for broken leads or damaged insulation which may have been caused during shipment or handling.

The hoist should be connected to a branch circuit which complies with the requirements of the National Electrical Code.

The I-beam or other suspension system should be permanently grounded.

Four bosses or feet are provided to support the hoist on the floor. These protect the hoisting rope and control station cord from chafing or cutting—also can be used to hold a rope or chain sling in place for lifting the hoist.

After hoist is mounted on its suspension system, remove large plug in top of gear housing and pour in the two 1-quart cans of SAE 80 oil furnished with hoist. Check oil level by removing small plug in gear housing cover. Oil level should be in line with bottom of hole. See that the oil filler plug in top, the drain plug in bottom of housing and the level plug in cover are tight.

Before operating hoist, remove shipping wedge located between hoist drum and frame.

Since a three-phase electric hoist motor can rotate in either direction, depending on the manner in which it is connected to the power supply, the direction of hook movement must be checked during original installation and each time hoist is moved to a new location. Serious damage can result if hook is run to the upper or lower limit of travel with hook operating in a direction opposite to that indicated by the control station. Therefore, proceed as follows:

Make temporary connections to power supply. Operate ⬆ UP control in control station momentarily. If hook raises, connections are correct and can be made permanent. If hook lowers, it is necessary to change direction by interchanging the RED lead—marked L2 and the BLACK lead—marked L3 of hoist power cable at power supply. Under no circumstance should internal wiring of control station be changed to reverse hook direction. Wiring is inspected and tested before leaving the factory.

CAUTION: (60 FPM Units Only)

The hoist will not operate in the hoisting direction unless the relay is energized. The relay, however, does not affect lowering, and the hoist will always lower. Pushing the "DOWN" control energizes the relay and closes the relay-maintain circuit which keeps the relay energized after the "DOWN" button is released. After relay is energized check power connections using same procedure as previously outlined.

NOTE: It is only necessary to energize the hoist in the down direction at initial "start-up" or in the event of an overload. It is not necessary to depress the DOWN control each time the hoist is operated.

If hoisting rope has been displaced from drum grooves during shipment or handling, operate lowering control until the rope is unwound as far as necessary. Rewind carefully, allowing it to seat properly in drum grooves.

Operate hoist over the full length of its rated lift, first checking the upper limit switch for correct operation. The hoisting operation should automatically stop when hook block contacts and slightly raises the limit switch weight. If adjustment is necessary see Page 12. At low hook position there should be at least 2 wraps of rope remaining on drum.

SAFETY CODES

"Each Meteor hoist is built in accordance with the specifications contained herein and at the time of manufacture complies with our interpretation of applicable sections of the American National Standard Institute Code B30.16-1973 "Overhead Hoists", the National Electrical Code (ANSI C-1) and the Occupational Safety and Health Act—1970. Since OSHA states that the National Electrical Code applies to all electric hoists, installers are required to provide current overload protection and grounding in keeping with the code. Users should check installation for compliance with the application, operation and maintenance requirements of this law.

"The safety laws for elevators where the lifting of people are involved and for dumbwaiters may specify construction details that are not necessarily incorporated in CM industrial hoists. We recommend the use of equipment that meets state and national safety codes. Columbus McKinnon Corporation cannot be responsible for applications other than those for which CM equipment is recommended."

FOREWORD

This manual contains important information to help you properly install, operate and maintain your Meteor Hoist for maximum performance, economy and safety.

Please study its contents thoroughly before putting your hoist into operation. By practicing correct operating procedures and by carrying out the recommended preventative maintenance suggestions, you will be assured of long, dependable and safe service.

After you have completely familiarized yourself with the contents of this manual, we recommend that you carefully file it for future reference.

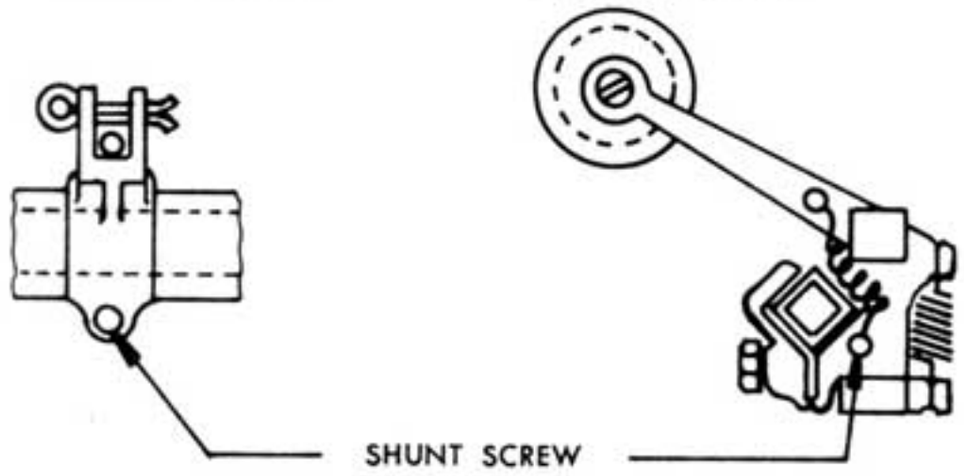
The information herein is directed to the proper use, care and maintenance of the Meteor Hoist and does not comprise a handbook on the broad subject of rigging.

A word about rigging. Rigging can be defined as the process of lifting and moving heavy loads using hoists and other mechanical equipment. Skill acquired through specialized experience and

Current Collector Mounting for Meteor Trolleys

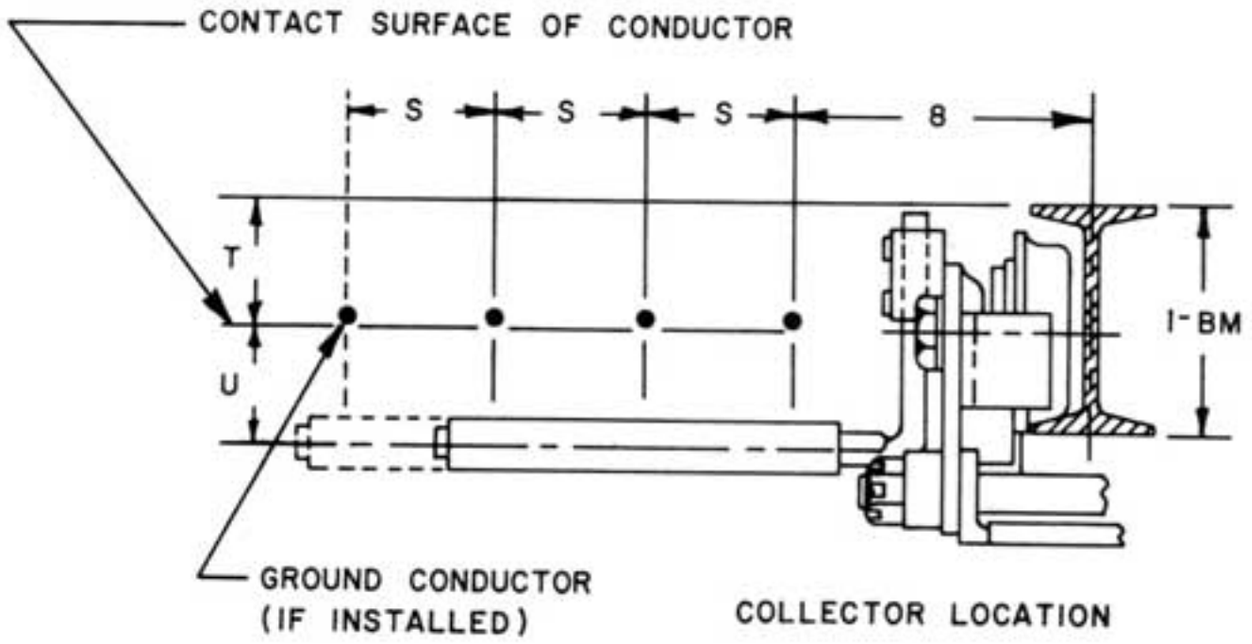
Bare Copper Wire Conductor System

Shoe Collector **Wheel Collector**



ATTACH HOIST POWER CORD TO COLLECTOR SHUNT SCREW

DIMENSION	COLLECTOR SYSTEM	
	SHOE	WHEEL
S	4	4
T	3¼	3¼
U	1¼	3

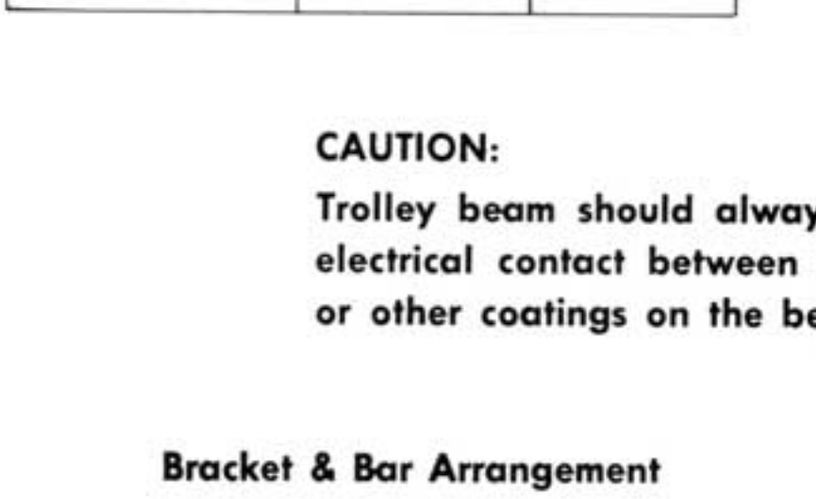


CAUTION:

Trolley beam should always be electrically grounded. Be sure that there is good electrical contact between trolley beam and trackwheels. Avoid the use of paint or other coatings on the beam flange which might form an insulation.

Bracket & Bar Arrangement

FIG. A FIG. B FIG. C



AMER. STD. I-BMS	COLLECTOR SYSTEM			
	SHOE		WHEEL	
	½-2 T	3 & 5	½-2 T	3 & 5
6	A	-	A	-
7	B	-	A	-
8	C	B	A	A
10	C	C	B	B
12	C	C	B	C
15 & Over	C	C	C	C