ELECTRIC CHAIN HOIST

MODELS: ☐ CH-E-1005-M
☐ CH-H-101-M
☐ CH-R-102-M

Cook/Chill Systems

Cleveland Standard Features

- 1/2, 1, & 2 ton capacity Chain Hoist
- 8 feet per minute Hoist lifting speed
- Motor driven, low head room trolley with four special crown tread wheels
- Heavy-duty Hoist motor with multiple disc brake
- Overload Protection automatically stops the lift when overload is being sensed
- Lifetime lubricated gears which require no oil in the transmission
- Impact resistant Control Station with snap action contacts for positive control
- Internal cable strain relief for Control Station
- Complete with lifting Chain, bottom Hook,Safety Lock and Chain Container
- Stainless steel Rail with End-Stops

Options & Accessories

- ❒ Hanger Rods (specify length)
- ❒ Rail Clamps
- ❒ Universal Beam Clamps
- ❒ Remote Control System
- ❒ Curved sections
- ❒ Rail Coupling to support Rail at joint
- ❒ Automatic Cord Reel
- ❒ Festooned stainless steel cable for power cord

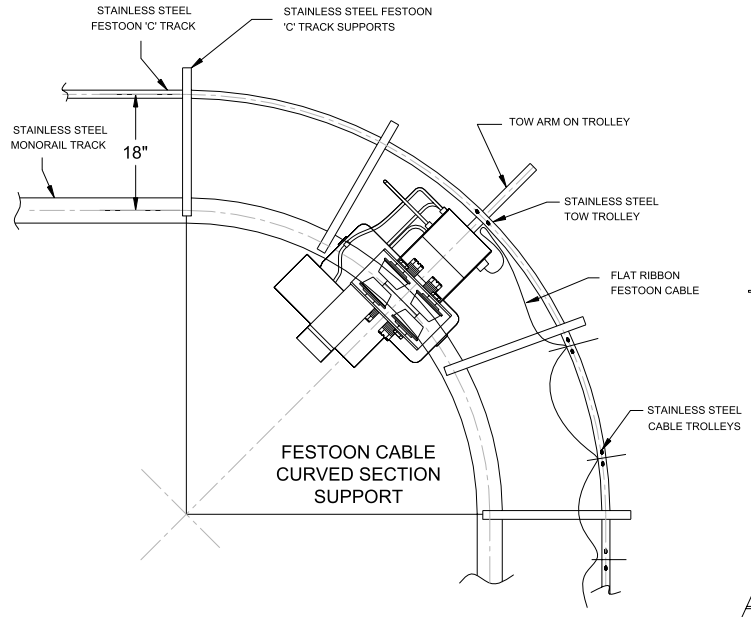
ITEM NUMBER _____

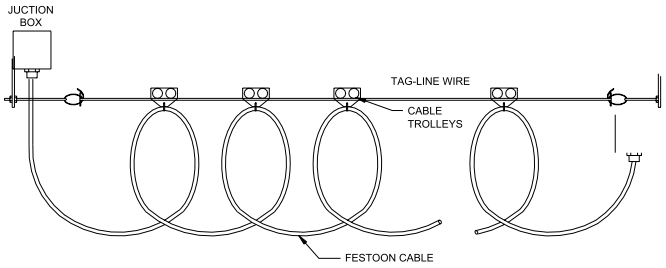
JOB NAME / NUMBER _____

Short Form Specifications

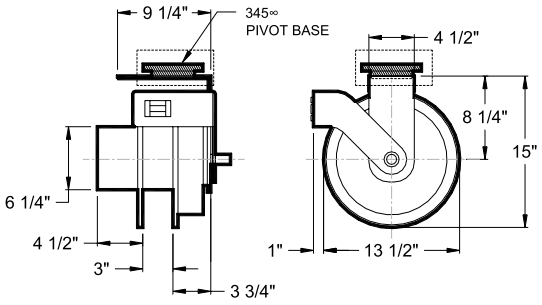
Shall be CLEVELAND Model CH- _____ , Electric CHAIN HOIST and MONORAIL SYSTEM. ___ ton capacity, motor driven Trolley with special crown tread wheels, 8 feet per minute lifting speed, overload protection, disk brakes,lifetime lubricated gears, impact resistant Control Station, lifting Chain with safety-lock hook and chain container.

Cleveland Range Inc.
1333 East 179th St., Cleveland, Ohio, U.S.A. 44110
Ph: 1-216-481-4900 **Fx**: 1-216-481-3782
Visit our Web Site at **www.clevelandrange.com**

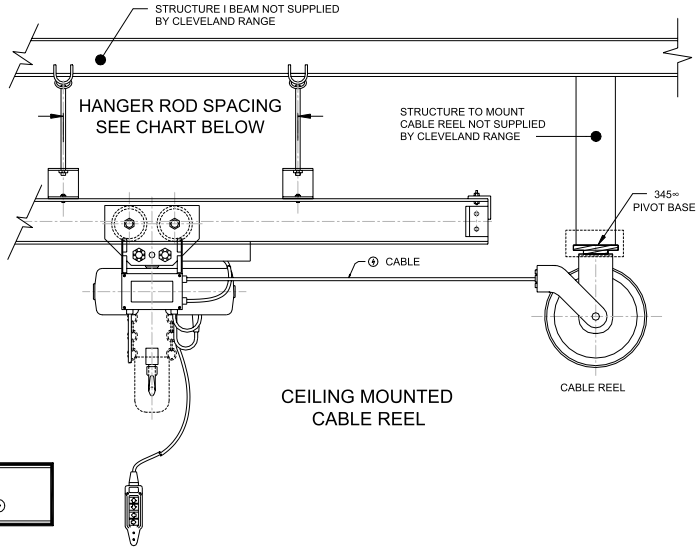




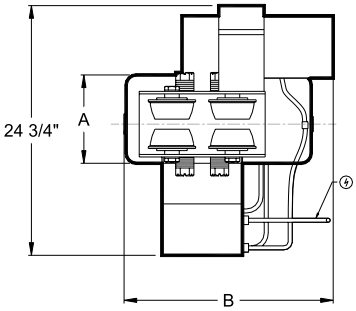
STRAIGHT LINE FESTOON CABLE SUPPORT



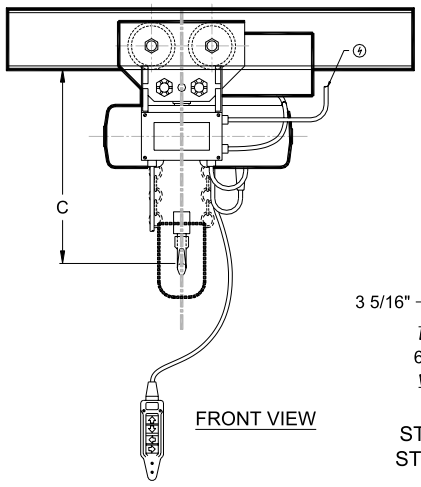
CABLE REEL



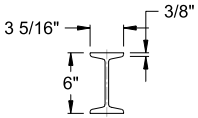
CEILING MOUNTED CABLE REEL



PLAN VIEW

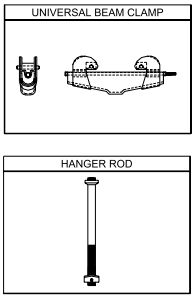


FRONT VIEW

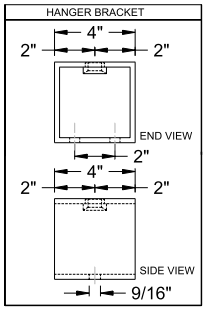


STAINLESS STEEL RAIL

CLAMP AND HANGER ROD



HANGER BRACKET FOR STAINLESS STEEL RAIL



MOTORIZED HOIST

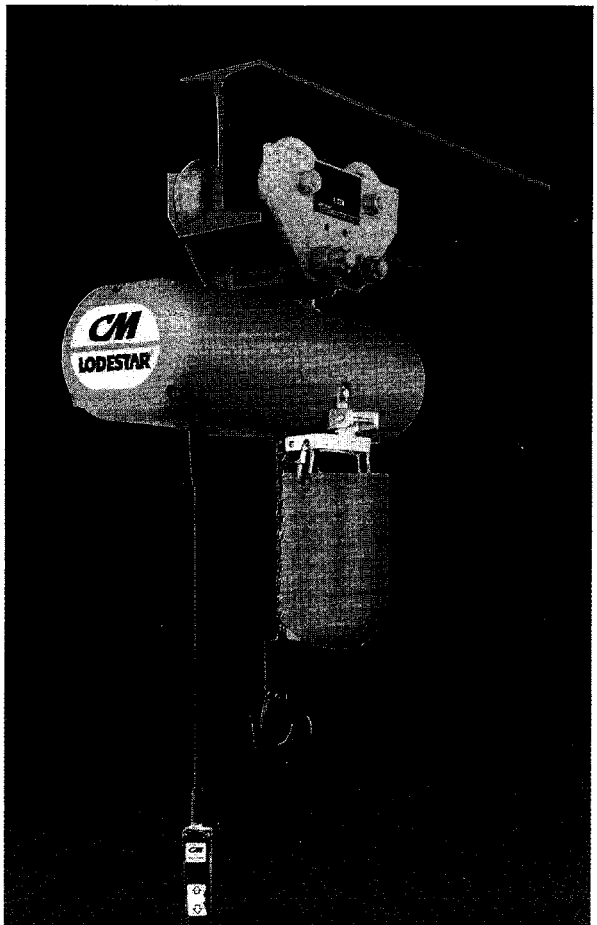
MODEL	DIMENSIONS A	B	C	CAPACITY TONS	⚡ ELECTRIC 208V-3PH AMPS	ROD SPACING STAINLESS STEEL RAIL
CH-E-1005-M	8 3/4"	18 3/4"	18 1/8"	1/2	4.9	10'-0"
CH-H-101-M	8 3/4"	18 3/4"	18 1/2"	1	6.1	10'-0"
CH-R-102-M	12 11/16"	20 13/16"	21 15/16"	2	9.3	5'-0"

(NOT TO SCALE)

1201
Litho in USA

OPERATING, MAINTENANCE & PARTS MANUAL

ELECTRIC CHAIN HOIST



CM® LODESTAR®

Rated loads 1/8 through 3 tons/ 125 through 3000 kg

Before installing hoist, fill in the information below. Refer to the hoist identification plate.

Model no. _____

Serial no. _____

Purchase date _____

Voltage _____

Rated load _____

Follow all instructions and warnings for inspecting, maintaining and operating this hoist. The use of any hoist presents some risk of personal injury or property damage. That risk is greatly increased if proper instructions and warnings are not followed. Before using this hoist, each operator should become thoroughly familiar with all warnings, instructions and recommendations in this manual. **Retain this manual for future reference and use.**

Forward this manual to operator. Failure to operate equipment as directed in manual may cause injury.

CM HOIST PARTS AND SERVICES ARE AVAILABLE IN THE UNITED STATES AND IN CANADA

As a CM Hoist user, you are assured of reliable repair and parts services through a network of Master Parts Depots and Service Centers that are strategically located in the United States and Canada. These facilities have been selected on the basis of their demonstrated ability to handle all parts and repair requirements promptly and efficiently.

Below is a list of the Master Parts Depots in the United States and Canada. To quickly obtain the name of the U.S. Service Center located nearest you, call (800) 888-0985. Fax: (716) 689-5644. In the following list, the Canadian Service Centers are indicated.

UNITED STATES MASTER PARTS DEPOT

CALIFORNIA
OTTO SYSTEMS, INC.
12010 Bloomfield Ave.
Santa Fe Springs, CA 90670
562/462-1612 or 800/596-7392
Fax 562/462-1617
or
2439 Verna Court
San Leandro, CA 94577
510/667-3730 or 800/508-6886
Fax 510/667-3726

COLORADO
MATERIALS HANDLING EQUIPMENT CO.
1740 W. 13th Ave.
Denver, CO 80204
303/573-5333 or 800/873-5333
Fax 303/893-3854

FLORIDA
TAMPA ARMATURE WORKS, INC.
440 South 78th Street
Tampa, FL 33619
813/621-5661 or 800/333-9449
Fax 813/622-7040

GEORGIA
ACE INDUSTRIES, INC.
6295 McDonough Drive
Norcross, GA 30093
770/441-0898 or 800/733-2231
Fax 770/441-0326

ILLINOIS
CM CHICAGO PARTS & SERVICE
7747 West Van Buren Street
Forest Park, IL 60130
877/511-3170
Fax 708/771-7326

TORRANCE ELECTRIC COMPANY
415-31st Ave.
Rock Island, IL 61204-6008
309/786-7777 or 800/747-8374
Fax 309/786-8705

INDIANA
HORNER ELECTRIC COMPANY, INC.
1521 East Washington Street
Indianapolis, IN 46201
317/639-4261
Fax 317/639-4344

LOUISIANA
BEERMAN PRECISION, INC.
4206 Howard Ave.
New Orleans, LA 70125
504/486-9391
Fax 504/486-7482

MASSACHUSETTS
ABEL DISTRIBUTORS, INC.
50 Parker Street, Unit 2
Newburyport, MA 01950
978/463-0700
Fax 978/463-5200

MICHIGAN
GAYLORD HOIST SALES & SERVICE
34471 Industrial Road
Livonia, MI 48150
734/261-1910
Fax 734/261-1788

MISSOURI
INDEPENDENT ELECTRIC MACHINERY
310 West 20th Street
Kansas City, MO 64108
816/471-2610
Fax 816/421-3054

NEW YORK
VOLLAND ELECTRIC EQUIPMENT CO.
75 Innsbruck Drive
Buffalo, NY 14227
716/656-9900
Fax 716/656-8898/8899

NORTH CAROLINA
SOUTHERN ELECTRIC SERVICE CO., INC.
2225 Freedom Drive
Charlotte, NC 28208
704/372-4832 or 800/487-3726
Fax 704/342-2604

OHIO
MAZZELLA WIRE ROPE & SLING COMPANY
14600 Brookpark Road
Cleveland, OH 44135
216/362-4600 or 800/362-4601
Fax 216/362-4952

PENNSYLVANIA
AMICK ASSOCIATES, INC.
11 Sycamore Street
Carnegie, PA 15106-0529
412/429-1212 or 800/445-9456
Fax 412/429-0191

RAM MOTORS & CONTROLS, INC.
Route 61
Leesport, PA 19533
610/916-3939 or 800/999-8183
Fax 610/916-0156

TEXAS
ABEL EQUIPMENT CO., INC.
3710 Cavalier Drive
Garland, TX 75042
972/272-7706
Fax 972/272-6955

HYDRAULIC EQUIPMENT SERVICES, INC.
1021 North San Jacinto Street
Houston, TX 77002
713/228-9601 or 713/228-8117 (purchasing)
Fax 713/228-0931

WASHINGTON
UNITED ELECTRIC MOTORS
308 9th Ave. North
Seattle, WA 98109
206/624-0044
Fax 206/624-4894

WISCONSIN
TRESTER HOIST & EQUIPMENT, INC.
4465 North 124th Street, Unit C
Brookfield, WI 53005
414/790-0700 or 800/234-6098
Fax 414/790-1009

CANADIAN SERVICE CENTERS

ALBERTA
**COLUMBUS McKINNON, LTD.
10311-174th Street
Edmonton, Alberta T8H 1N3

NOVA SCOTIA
*W & A MOIR
95 Ilsley Ave.
Dartmouth, Nova Scotia B3B 1L5
902/468-7720
Fax 902/468-3777

ONTARIO
*R & W HOIST REPAIR, LTD.
790 Redwood Square
Units 5, 6, & 7
Oakville, Ontario L6L 6N3
905/825-5500
Fax 905/825-5315

*TORONTO ELECTRIC HOIST
SALES & SERVICE
72 Crockford Blvd.
Scarborough, Ontario M1R 3C4
416/755-7716
Fax 800/461-0290

*MASLACK SUPPLY, LTD.
488 Falconbridge Road
Sudbury, Ontario P3A 4S4
705/566-1270
Fax 705/566-4208

*COLUMBUS McKINNON, LTD.
P.O. Box 1106
10 Brook Road, North
Cobourg, Ontario K9A 4W5
905/372-0153
Fax 905/372-3078

QUEBEC
*HERCULES SLING & CABLE
2525 Louis A. Amos
Lachine, Quebec H8T 1C3
514/631-5511
Fax 514/636-1084

*LEGER HOIST EQUIPMENT CO.
7995-17th Ave.
Montreal, Quebec H1Z 3R2
514/376-3050
Fax 514/376-0657

*ARE ALSO MASTER PARTS DEPOTS

**MASTER PARTS DEPOT ONLY

SAFETY PRECAUTIONS

Each Lodestar Electric Hoist is built in accordance with the specifications contained herein and at the time of manufacture complied with our interpretation of applicable sections of the *American Society of Mechanical Engineers Code B30.16 "Overhead Hoists," the National Electrical Code (ANSI/NFPA 70) and the Occupational Safety and Health Act. Since OSHA states the National Electrical Code applies to all electric hoists, installers are required to provide current overload protection and grounding on the branch circuit section in keeping with the code. Check each installation for compliance with the application, operation and maintenance sections of these articles.

The safety laws for elevators, lifting of people and for dumbwaiters specify construction details that are not incorporated in CM industrial hoists. For such applications, refer to the requirements of applicable state and local codes, and the American National Safety Code for elevators, dumbwaiters, escalators and moving walks (ASME A17.I). Columbus McKinnon Corporation cannot be responsible for applications other than those for which CM equipment is intended.

*Copies of this Standard can be obtained from ASME Order Department, 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300, U.S.A.

THIS SYMBOL POINTS OUT IMPORTANT SAFETY INSTRUCTIONS WHICH IF NOT FOLLOWED COULD ENDANGER THE PERSONAL SAFETY AND/OR PROPERTY OF YOURSELF AND OTHERS. READ AND FOLLOW ALL INSTRUCTIONS IN THIS MANUAL AND ANY PROVIDED WITH THE EQUIPMENT BEFORE ATTEMPTING TO OPERATE YOUR LODESTAR HOIST.

⚠ WARNING

Usage of hoists that do not involve lifting of the load on the lower hook or using hoists in the inverted position without special precaution may cause an accident resulting in injury and/or property damage.

TO AVOID INJURY:
Consult Columbus McKinnon for information concerning using hoists in these applications.

⚠ WARNING

Improper operation of a hoist can create a potentially hazardous situation which, if not avoided, could result in death or serious injury. To avoid such a potentially hazardous situation, the operator shall:

1. NOT operate a damaged, malfunctioning or unusually performing hoist.
2. NOT operate the hoist until you have thoroughly read and understood this Operating, Maintenance and Parts Manual.
3. NOT operate a hoist which has been modified.
4. NOT lift more than the rated load for the hoist.
5. NOT use hoist with twisted, kinked, damaged or worn load chain.
6. NOT use the hoist to lift, support, or transport people.
7. NOT lift loads over people.
8. NOT operate a hoist unless all persons are and remain clear of the supported load.
9. NOT operate unless load is centered under hoist.
10. NOT attempt to lengthen the load chain or repair damaged load chain.
11. Protect the hoist's load chain from weld splatter or other damaging contaminants.
12. NOT operate hoist when it is restricted from forming a straight line from hook to hook in the direction of loading.
13. NOT use load chain as a sling, or wrap load or chain around load.
14. NOT apply the load to the tip of the hook or to the hook latch.
15. NOT apply load unless load chain is properly seated in the chain wheel(s) or sprocket(s).
16. NOT apply load if bearing prevents equal loading on all load chains.
17. NOT operate beyond the limits of the load chain travel.
18. NOT leave load supported by the hoist unattended unless specific precautions have been taken.
19. NOT allow the load chain or hook to be used as an electrical or welding ground.
20. NOT allow the load chain or hook to be touched by a live welding electrode.
21. NOT remove or obscure the warnings on the hoist.
22. NOT operate a hoist on which the safety placards or decals are missing or illegible.
23. NOT operate a hoist unless it has been securely attached to a suitable support.
24. NOT operate a hoist unless load slings or other approved single attachments are properly sized and seated in the hook saddle.
25. Take up slack carefully - make sure load is balanced and load holding action is secure before continuing.
26. Shut down a hoist that malfunctions or performs unusually and report such malfunction.
27. Make sure hoist limit switches function properly.
28. Warn personnel of an approaching load.

⚠ CAUTION

Improper operation of a hoist can create a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. To avoid such a potentially hazardous situation, the operator shall:

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

Hoist safety is up to you...

⚠WARNING — DO NOT LIFT MORE THAN RATED LOAD.

1 CHOOSE THE RIGHT HOIST FOR THE JOB . . .

Choose a hoist with the capacity for the job. Know the capacities of your hoists and the weight of your loads. Then match them.

The application, the size and type of load, the attachments to be used and the period of use must also be taken into consideration in selecting the right hoist for the job.

Remember the hoist was designed to ease our burden and carelessness not only endangers the operator, but in many cases, a valuable load.

⚠WARNING — DO NOT OPERATE DAMAGED OR MALFUNCTIONING HOIST
— DO NOT OPERATE WITH TWISTED, KINKED OR DAMAGED CHAIN.

2 INSPECT

All hoists should be visually inspected before use, in addition to regular, periodic maintenance inspections.

Inspect hoists for operations warning notices and legibility.

Deficiencies should be noted and brought to the attention of supervisors. Be sure defective hoists are tagged and taken out of service until repairs are made.

Under no circumstances should you operate a malfunctioning hoist.

Check chain for gouged, twisted, distorted links and foreign material. Do not operate hoists with twisted, kinked or damaged links.

Load chain should be properly lubricated.

Hooks that are bent, worn or whose openings are enlarged beyond normal throat opening should not be used. If latch does not engage throat opening of hook, hoist should be taken out of service.

Check for misphasing—hook travel should correspond to control direction.

Carefully check limit switches without a load. Care should be taken not to damage the hoist.

⚠WARNING — DO NOT PULL AT AN ANGLE. BE SURE HOIST AND LOAD ARE IN A STRAIGHT LINE.
— DO NOT USE LOAD CHAIN AS A SLING.

3 USE HOIST PROPERLY

Be sure hoist is solidly held in the uppermost part of the support hook arc.

Be sure hoist and load are in a straight line. Do not pull at an angle.

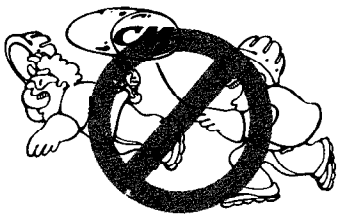
Be sure load is hooked securely. Do not tip load the hook. Do not load hook latch. Hook latch is to prevent detachment of load under slack chain conditions only.

Do not use load chain as a sling. Such usage damages the chain and makes the limit switch setting ineffective.

Do not operate with hoist head resting against any object. Lift the load gently. Do not jerk it.

⚠WARNING — DO NOT LIFT PEOPLE OR LOADS OVER PEOPLE.

4



Do not lift co-workers with a hoist.

Make sure everyone is clear of the load when you lift.

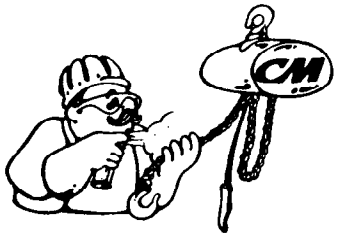
Do not remove or obscure operational warning notices.

5

CLEANING
Hoists should be kept clean and free of dust, dirt, moisture, etc., which will in any way affect the operation or safety of the equipment.

LUBRICATION
Chain should be properly lubricated.

AFTER REPAIRS
Carefully operate the hoist before returning it to full service.



VIOLATION OF ANY OF THE WARNINGS LISTED MAY RESULT IN SERIOUS PERSONAL INJURY TO THE OPERATOR OR NEARBY PERSONNEL BY RELEASED LOAD OR BROKEN HOIST COMPONENTS.

FOREWORD

This manual contains important information to help you properly install, operate and maintain your 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 preventive maintenance suggestions, you will experience 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 hoist and does not comprise a hand book on the broad subject of 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 study is essential to safe rigging operations. For rigging information, we recommend consulting a standard textbook on the subject.

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LIST OF TABLES

LIST OF ILLUSTRATIONS

GENERAL INFORMATION

SPECIFICATIONS

The Lodestar Electric Chain Hoist is a highly versatile materials handling device that can be used to lift loads that are within its rated capacity. The mechanical features of these hoists include an alloy steel liftwheel, Load Protector, hardened steel chain guides, hardened steel load chain, hardened steel gear train, life-time lubrication, forged steel hooks, and lightweight aluminum frame. The electrical features include hoist-duty motor, rugged hoist brake, magnetic reversing contactor and voltage conversion board (dual voltage units). The hoist is available with hook or lug suspensions that are supplied separately. Table 1 summarizes the Lodestar Electric Chain Hoist models and the Series 635 Trolleys available. It should be noted that standard single speed hoists are available with 10, 15 and 20 foot lifts and the standard lift for two speed hoists is 10 feet. However, hoists with longer lifts are available on a special, per order basis.

CM REPAIR/REPLACEMENT POLICY

All Columbus McKinnon (CM) Lodestar Electric Chain Hoists are thoroughly inspected and performance tested prior to shipment. If any properly maintained hoist develops a performance problem due to a material or workmanship defect, as verified by CM, repair or replacement of the unit will be made to the original purchaser without charge. This repair/replacement policy applies only to Lodestar Hoists installed, maintained and operated as outlined in this manual, and specifically excludes parts subject to normal wear, abuse, improper installation, improper or inadequate maintenance, hostile environmental effects and unauthorized repairs/modifications.

We reserve the right to change materials or design if, in our opinion, such changes will improve our product. Abuse, repair by an unauthorized person, or use of non-CM replacement parts voids the guarantee and could lead to dangerous operation. For full Terms of Sale, see Sales Order Acknowledgement. Also, refer to the back cover for Limitations of Warranties, Remedies and Damages, and Indemnification and Safe Operation.

Table 1. Specifications

A. Lodestar Electric Chain Hoists

Maximum Capacity (Tons)	Model	*Lifting Speed Per Min. (Feet)	Motor H.P.	Shortest Distance Between Hooks (Inches)	Net Weight (Lbs.)
Single Speed 115-1-60					
1/8	A	32	1/4	14 1/4	53
1/8	AA	60	1/2	14 1/4	64
1/4	B	16	1/4	14 1/4	57
1/4	C	32	1/2	14 1/4	65
1/2	E	8	1/4	17 7/8	68
1/2	F	16	1/2	14 1/4	64
1/2	J	32	1	15 9/16	115
1	H	8	1/2	17 7/8	75
1	L	16	1	15 9/16	117
2	R	8	1	22 1/2	136
3	RT	5.5	1	25	161
Single Speed 230/460-3-60 or 220/380-3-50 or 220/415-3-50					
1/8	A	32	1/4	14 1/4	67
1/8	AA	60	1/2	14 1/4	74
1/4	B	16	1/4	14 1/4	68
1/4	C	32	1/2	14 1/4	74
1/2	E	8	1/4	17 7/8	79
1/2	F	16	1/2	14 1/4	74
1/2	J	32	1	15 9/16	113
1/2	JJ	64	2	15 9/16	120
1	H	8	1/2	17 7/8	85
1	L	16	1	15 9/16	114
1	LL	32	2	15 9/16	121
2	R	8	1	22 1/2	134
2	RR	16	2	22 13/16	136
3	RT	5.5	1	25	161
3	RRT	11	2	25	161
Two Speed 230-3-60 or 460-3-60 or 220-3-50 or 380-3-50 or 415-3-50					
1/8	A-2	10/32	1/4	14 1/4	69
1/8	AA-2	20/60	1/2	14 1/4	76
1/4	B-2	5/16	1/4	14 1/4	70
1/4	C-2	10/32	1/2	14 1/4	76
1/2	E-2	2.5/8	1/4	17 7/8	81
1/2	F-2	5/16	1/2	14 1/4	76
1/2	J-2	10/32	1	15 9/16	115
1/2	JJ-2	21/64	2	15 9/16	125
1	H-2	2.5/8	1/2	17 7/8	87
1	L-2	5/16	1	15 9/16	116
1	LL-2	10/32	2	15 9/16	126
2	R-2	2.5/8	1	22 1/2	136
2	RR-2	5/16	2	22 13/16	143
3	RT-2	1.75/5.5	1	25	175
3	RRT-2	3.5/11	2	25	177

*Lifting and travel speeds listed are for 60 Hertz units. For 50 Hertz units, these speeds will be 5/6 of those listed.

B. Series 635 Low Headroom Trolleys

Capacity (Tons)	For Use With Models	Adj. for STD S-Beams, Depth (In.)	Tread Dia. of Wheels (In.)	Min. Rad. Curve (In.)
1/8 to 1	A thru LL-2	4 thru 15	3 1/8	24
2	R thru RR-2	6 thru 18	4 3/4	24
3	RT thru RRT-2	8 thru 15	4	30

C. Series 635 Motor Driven Trolleys

Capacity (Tons)	For Use With Models	*Travel Speed (FPM)	Motor H.P.	Adj. for STD S-Beams, Depth (in.)	Min. Rad. Curve (in.)
1/8-2	A thru RR-2	75	1/4	6 thru 15	30
3	RT thru RRT-2	75	1/4	8 thru 15	30

ACCESSORIES

HOOK SUSPENSIONS

Swivel and rigid type hook suspensions (see Figure 1) are available for all Lodestar Electric Hoists. However, rigid type hook suspensions are normally recommended for most application. The hook suspensions are intended for suspending the hoist from a trolley which has a single load bar (such as CM's Series 632, 633 and 639 Trolleys) or for suspending the hoist from a fixed structure.

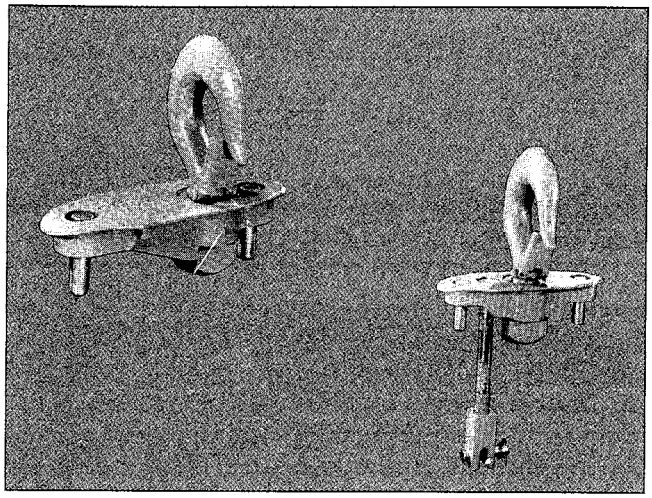


Figure 1. Hook Suspensions

LUG SUSPENSIONS

Lug suspensions (see Figure 2) are available for all Lodestar Electric Hoists. These are rigid type suspensions wherein the lug shown replaces the hook (Figure 1) in the suspension adapter. The lug suspensions are required for suspending the hoist from the Series 635 Low Headroom and Motor Driven Trolleys described below.

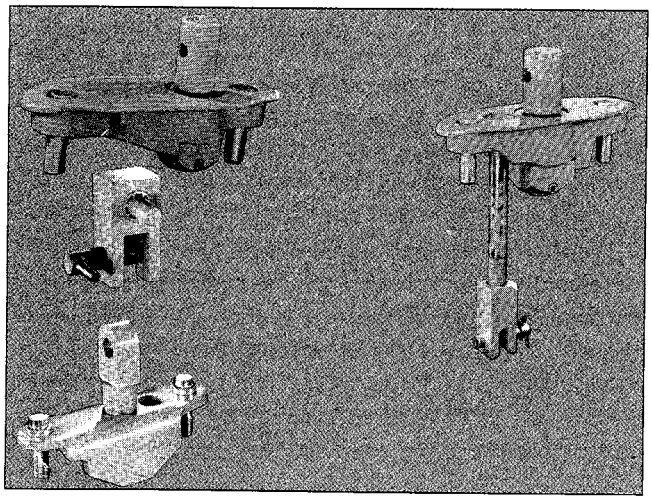


Figure 2. Lug Suspensions

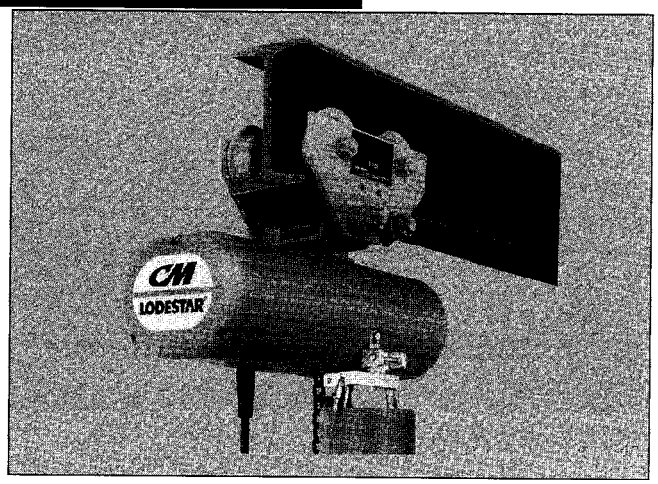


Figure 3. Series 635 Low Headroom Trolley

SERIES 635
LOW HEADROOM TROLLEYS

These are manual push type trolleys (see Figure 3) designed for use with the Lodestar Electric Hoists. A rigid lug suspension (see Figure 2) is required to suspend the hoist from the trolley. The trolley is adjustable for operation on a range of American Standard "S" beams as indicated in Table 1 and it will also operate on flat flanged beams.

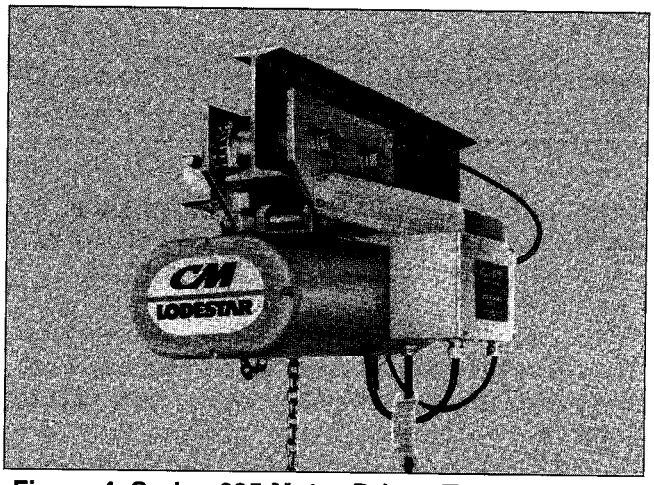


Figure 4. Series 635 Motor Driven Trolley

SERIES 635
MOTOR DRIVEN TROLLEYS

The motor driven trolleys (see Figure 4) are self-contained and supplied complete with independent controls and wiring, including a four directional control station. A rigid lug suspension (see Figure 2) is required to suspend the hoist from the Motor Driven Trolley. The hoist and trolley are joined electrically by connecting the hoist control and power cords (supplied) into the hoist or trolley. The trolley is adjustable for operation on a range of American Standard "S" beams as indicated in Table 1 and it will also operate on flat flanged beams.

LATCHLOK® HOOKS

CM's Latchlok hooks (see Figure 5) are available to replace the standard upper and lower hooks used on the Lodestar Electric Hoists.

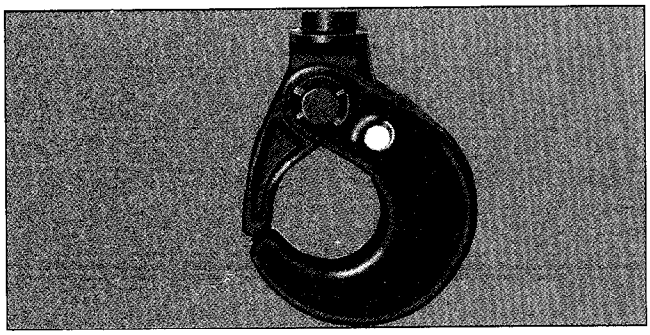


Figure 5. Upper or Lower Latchlok ® Hook

CHAIN CONTAINER

This accessory (see Figure 6) is used to hold the slack chain and it is supplied complete with mounting hardware and instructions. The chain container is recommended for those applications where the slack chain would interfere with the load or drag on the floor as may be the case with double or triple reeved units. Chain containers can be furnished for units already in use.

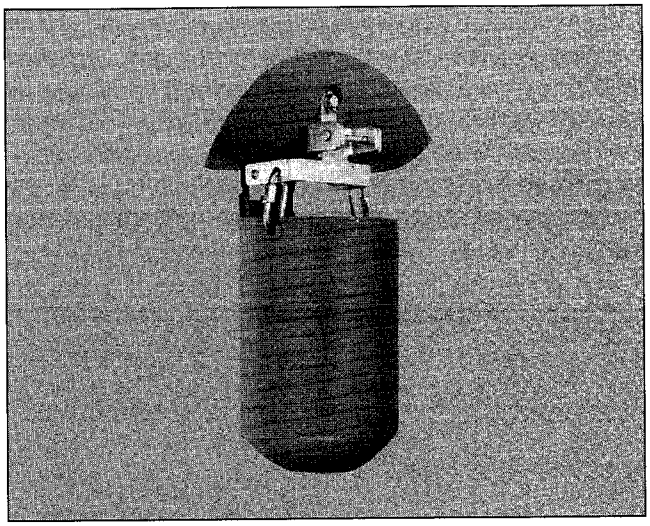


Figure 6. Chain Container

INSTALLATION

UNPACKING INFORMATION

When received, the hoist should be carefully inspected for damage which may have occurred during shipment or handling. Check the hoist frame for dents or cracks, the external cords for damaged or cut insulation, the control station for cut or damaged enclosure, and inspect the load chain for nicks and gouges. If shipping damage has occurred, refer to the packing list envelope on the carton for claim procedure.

Before installing the hoist, make sure that the power supply to which it will be connected is the same as that shown on the nameplate located on the side of the hoist.

NOTE: To assure long life and top performance, be sure to follow the load chain lubricating instructions on page 16.

INSTALLING THE SUSPENSION

A. Single Reeved Units:

Remove the hook or lug suspension from its carton and the two suspension screws. Place the suspension assembly into the recess on top of the hoist so that the adapter body follows the contour of the hoist. Insert the suspension screws through the holes in the adapter and thread these into the self locking nuts enclosed in the hoist. The screws will turn freely into the nuts until the last 1/4" of travel, during which the resistance of the nut locking collar will be encountered. Securely tighten the screws to the recommended seating torque (see Table 2) using a 12 point socket which fits the head of the screw.

For rigid hook suspensions, refer to note on page 5.

B. Double Reeved Units:

Remove the hook or lug suspension from its carton and the two suspension screws, dead end pin, washer and cotter pin. It should be noted that the suspension includes a dead end bolt and block for supporting the dead end of the load chain as shown in Figure 7.

Place the suspension assembly into the recess on top of the hoist. The dead end block should project through the bottom of the hoist with the pin hole and slot aligned to the underside of the hoist as shown in Figure 7. If these are not aligned as shown, lift the head of the bolt from the hex recess in the adapter and turn the bolt and block assembly and reseat the bolt head to obtain the proper alignment. **Do not** change the position of the dead end block on the bolt to attain this alignment.

Check the position of the pin hole in the dead end block to make sure it has not been disturbed from its factory setting. The distance from the top of the pin hole to the bottom of the hoist should not exceed 1/4" for the Models E, E-2, H and H-2 and 7/16" for the Models R, R-2, RR and RR-2. If the distance is not correct, adjust the position of the dead end block to obtain the proper distance (see Page 29).

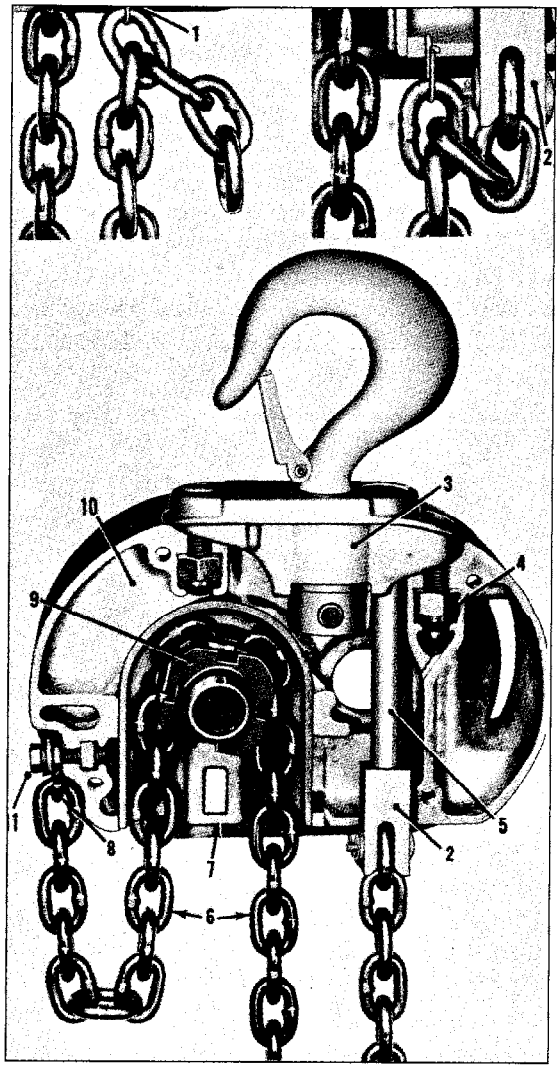


Figure 7. Attaching Load Chain
(Models E, H, E-2 and H-2 illustrated)
(Models R, RR, R-2 and RR-2 similar)

1. **Wire clip**
2. **Dead end block**
3. **Suspension assembly**
4. **Suspension self-locking nut**
5. **Dead end bolt**
6. **Load chain**
7. **Chain guide**
8. **Loose end link**
9. **Liftwheel**
10. **Gear housing**
11. **Loose end screw and lockwasher**

(Do not order parts by these numbers. See parts list.)

Now, insert the suspension screws through the holes in the adapter and thread these into the self locking nuts enclosed in the hoist frame. The screws will turn freely into the nut until the last 1/4" of travel during which the resistance of the nut locking collar will be encountered. Securely tighten the screws to the recommended seating torque (see Table 2) using a 12 point socket which fits the head of the screw.

The dead end of the load chain is temporarily positioned (a few links from the end) by a wire clip. **Do not** remove this clip before attaching the chain to the dead end block. (See page 6).

NOTE: On the rigid hook suspensions for the Models A through RR-2, if it is necessary to rotate the hook 90°, from its factory set position, one of the suspension screws becomes captive and a socket cannot be used to tighten this screw. Therefore, to rotate the hook 90°, proceed as follows:

1. Using a hammer and a drift, drive the pin out of the square hook collar.
2. Remove the square collar from the hook shank.
3. Place a hi-collar type lockwasher (this lockwasher is not supplied with the suspension assembly) under the head of one of the suspension screws. Insert this assembly into a hole in the suspension adapter and rotate the hook 90° to make this screw captive.
4. Re-assemble the square collar to the hook shank using the drive pin previously removed.
5. Follow the instructions above, except tighten the captive screw to the recommended seating torque (see Table 2) using a 12 point box type wrench.

C. Triple Reeved Units:

These hoists have a sheave hanger which is loosely connected to the top of the frame by a thin metal plate for shipping purposes. To attach the suspension, support the sheave hanger from the underside of the hoist and remove the nut and seat from the sheave stud. Remove and discard the shipping plate and retain the sheave stud nut and seat since they will be reused later.

Remove the suspension assembly from the carton and the two suspension screws. Place the suspension assembly over the sheave stud and into the recess on top of the hoist.

Insert the suspension screws through the holes in the suspension adapter and thread these into the self-locking nut enclosed in the hoist. The screws will turn freely into the nuts until the last 1/4" of travel, during which the resistance of the nut locking collar will be encountered. Securely tighten the screws to the recommended seating torque (see Table 2) using a 12 point socket which fits the head of the screw.

After the suspension assembly is installed, secure the sheave stud to the suspension adapter using the round slotted nut and seat that were formerly used to attach the shipping plate to top of the hoist frame. Place the seat over the stud with the flat side down and then rotate the seat so that there is clearance between the seat and the suspension lug or hook. Assemble the nut to the stud and turn the nut by hand until the nut seats in the seat and the sheave hanger is snug in the frame. Then back off the nut until the hole in the stud is in line

with one of the slots in the nut. Using a hammer, drive the retaining pin (packed with the suspension assembly) into the hole in the sheave stud until the end of the pin is flush with the edge of the nut.

Table 2. Recommended Seating Torques For Suspension Adapter Screws

Model No's.	Screw Size	Recommended Seating Torque
A thru H-2	3/8"-16UNC-2A	30 to 45 lb. ft.
J thru RRT-2	1/2"-20UNF-2A	40 to 80 lb. ft.

⚠ WARNING

Using other than CM supplied high strength suspension screws to attach the suspension adapter to the hoist may cause the screws to break and allow the hoist and load to fall.

TO AVOID INJURY:
Use only the CM supplied suspension screws to attach the suspension to the hoist and torque these screws to the recommended seating torque as specified above.

Also, do not apply any type of lubricant to the threads of these screws. Lubricating the threads will reduce the effort to seat the screws and as a result, tightening the screws to the above recommended torque may break the screw, damage the suspension adapter, strip the nuts and/or damage the hoist frame.

ATTACHING LOAD CHAIN

The Models E, E-2, H, H-2, R, R-2 and RR-2 are shipped with the dead end of the load chain temporarily connected to the bottom of the hoist by a light wire clip (1) as shown in Figure 7. The clip is located a few links from the end of the chain, and it should not be removed until the chain is to be attached to the dead end block (2). To attach the chain to the dead end block, proceed as follows:

1. Suspend the hoist from an adequate support.
2. The hoist is shipped with the dead end of the load chain temporarily positioned a few links from the end by a light wire clip (1) as shown in Figure 7. Do not remove this clip until the chain is secured.
3. On Models E, E-2, H and H-2, insert the last link of the load chain into the dead end block (2) and secure it with the dead pin, washer and cotter pin furnished with the suspension. Remove the clip (1) by inserting a screw driver blade through a chain link and levering against the bottom of the hoist.
4. On Models R, R-2, RR and RR-2, remove the clip (1) by inserting a screw driver blade through a chain link and levering against the bottom of the hoist. Slide the contact block up the chain until it is against the bottom of the hoist and the dead end block is projecting through the square opening in the bottom of the block. Insert the last link of the load chain, making sure there are no twists between the hook block and the dead end block, into the dead end block. Push the contact block up slightly and secure the load chain to the dead end block using the dead end pin, washer and cotter pin furnished with the suspension. The dead end pin also supports the contact block (See Figure 8).

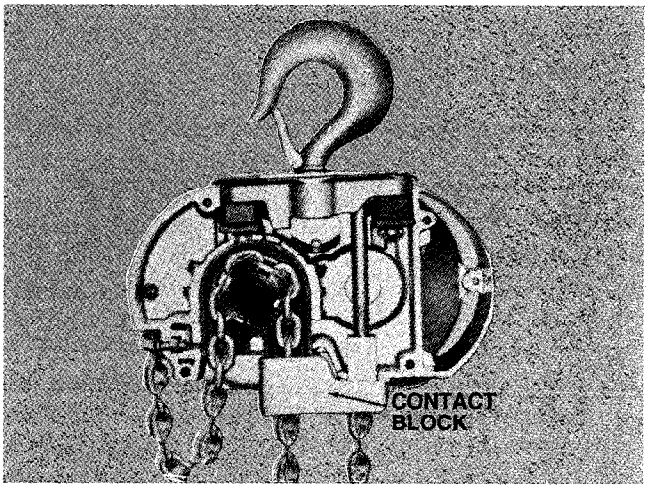


Figure 8. Contact Block Used On Models R, R-2, RR and RR-2

5. Do not remove the plastic ties from the load chain at this time.

After the suspension is installed, hoists with a hook suspension can be suspended from its permanent support and then connected to the power supply system (refer to Page 8). For hoists with a lug suspension that are to be suspended from a Series 635 Low Headroom Trolley, attach the hoist to the trolley per the following instructions.

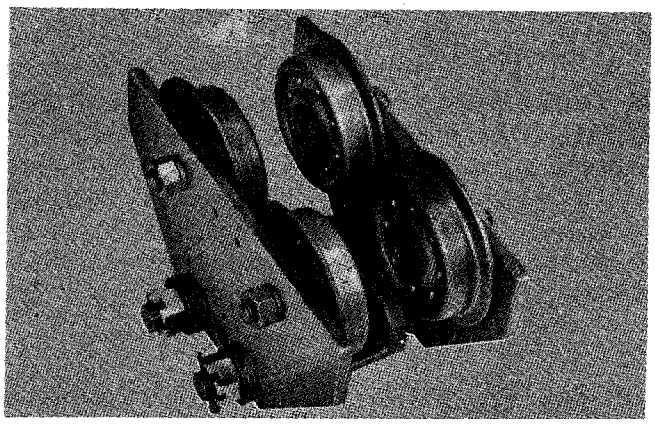


Figure 9. Series 635 Low Headroom Trolley (1 and 2 Ton Trolley shown—3 Ton Similar)

For hoists with a lug suspension that are to be suspended from a Series 635 Motor Driven Trolley, attach the hoist to the trolley, wire the hoist and trolley together and connect the trolley to the power supply system per the instructions supplied with the trolley.

INSTALLING THE SERIES 635 LOW HEADROOM TROLLEY (See Figure 9)

⚠ WARNING

Operating the trolley on a beam that has no rail stops may allow the trolley to fall off the end of the beam.

TO AVOID INJURY:

Install rail stops at each end of the beam on which the trolley is to operate.

The stops must be positioned so as to not exert impact force on the hoist frame or trolley wheels. They must contact the ends of the trolley side frames.

It is recommended that the trolley be mounted on the beam prior to attaching the hoist to the trolley. Before attempting to mount the trolley on the beam, measure the actual width of the beam flange on which the trolley is to operate. Using this measurement and Table 3, determine the arrangement of the spacer washers. Loosely assemble the side frames, load bracket, spacer washers and nuts on the suspension bolts as shown below.

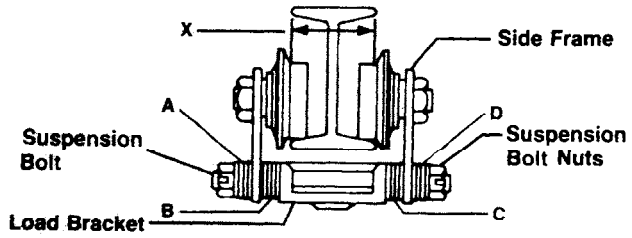


Table 3. Series 635 Low Headroom Trolley Side Frame Spacing

	Flange Width	1 Ton Capacity No. of Spacers A	B	C	D	2 Ton Capacity No. of Spacers A	B	C	D	3 Ton Capacity No. of Spacers A	B	C	D
STANDARD TROLLEYS	2 5/8	10	0	0	10								
	3	9	1	1	9								
	3 3/8	8	2	2	8	8	0	0	8				
	3 5/8	7	3	3	7	7	1	1	7				
	4	6	4	4	6	6	2	2	6	6	1	1	7
	4 5/8	4	6	6	4	4	4	4	4	5	3	3	4
	5	3	7	7	3	3	5	5	3	4	4	4	3
	5 1/4	2	8	8	2	3	5	6	2	3	5	5	2
	5 5/8	1	9	9	1	2	6	7	1	3	5	6	1
SPECIAL TROLLEYS	6	5	5	5	4	0	8	8	0	7	2	2	6
	6 1/4	4	6	6	3	8	2	1	8	6	3	2	6
	7	0	9	9	1	5	5	4	5	4	5	5	3
	7 1/8					5	5	5	4	3	6	5	3
	7 1/4					4	6	5	4				
	7 7/8					2	8	8	1				
	8					1	9	8	1				
*Min. Radius Curve		24 Inches								30 Inches			

*Dimension applies to minimum S-Beam and will vary with larger S-Beams.

⚠ WARNING

If CM's washer spacing recommendations are not followed, trolley may fall from beam.

TO AVOID INJURY:

Measure the actual beam flange on which the trolley is to operate and use Table 3 to determine the arrangement of the spacer washers for that flange width.

NOTE: Due to the variations in beam flange widths, it is suggested that the beam flange width be measured to determine the exact distribution of spacer washers. The distance between trackwheel flanges (dimension "X") 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 greater than the beam flange width if runway system includes sharp curves. Also, the use of other than CM supplied washers may result in trackwheel to beam flange variations and thus Table 3 will not apply.

For the 3-ton trolley, a shackle and pin assembly consisting of a pin retained in a central position by retainers is packed loose with the suspension. Insert this assembly into the opening in the top of the load bracket with the legs of the shackle down. Position the shackle pin in the groove provided for same in the load bracket making sure it is centered between the suspension bolts.

Now install the trolley on the beam by sliding one side frame out far enough to allow the trackwheels to clear the beam flange. Lift the trolley up so that the trackwheels are riding on the beam and draw the side frames together and tighten the nuts snugly. Insert the cotter pins through the slotted nuts and holes in the suspension bolts and spread the legs of the cotter pins to secure.

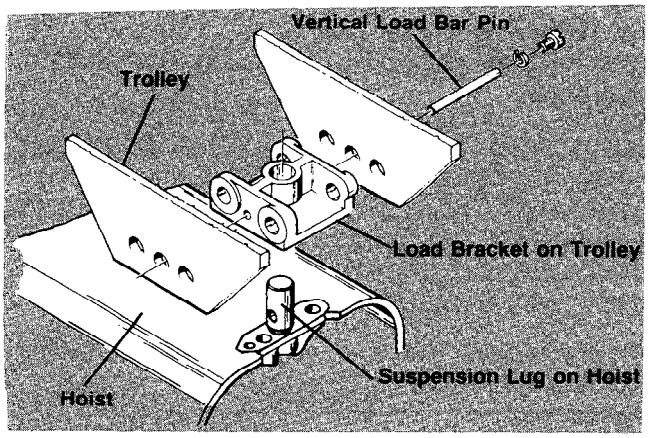


Figure 10. 1/8 to 2 Ton Hoist to Trolley Assembly

On the 1/8 to 2-ton trolleys, assemble the suspension lug on hoist to the trolley on beam as shown in Figure 10. The lug is inserted in the trolley load bracket and retained by the vertical load bar pin. A socket head cap screw and lockwasher are used to keep the pin in place.

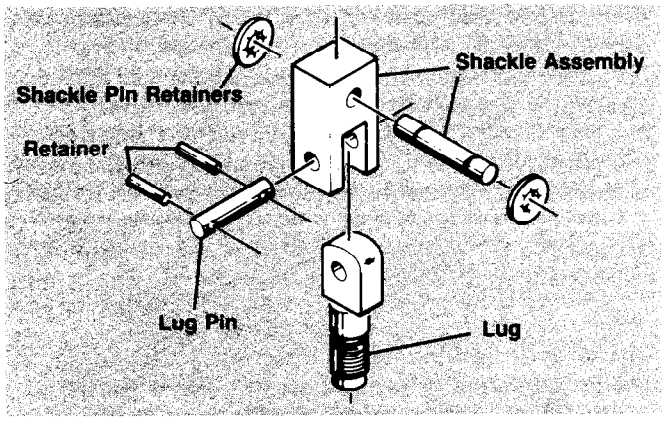


Figure 11. 3 Ton Hoist to Trolley Assembly

On the 3 ton trolley (refer to Figure 11), drive one retaining pin into the hole on one end of the lug pin. Raise the hoist into position so that the lug is between the legs of the shackle. Align the holes in the shackle and lug. Insert the lug pin in the aligned holes and secure the lug pin by driving the remaining retaining pin into the hole in the lug pin. Make certain that the shackle pin is properly seated in the load bracket by manipulating the hoist and checking for freedom of movement (swinging) in both planes and all four directions.

Note that the shackle pin should be retained and centered in the shackle by the retainers.

NOTE: After the unit is connected to the power supply system (see below), suspend a capacity load from the hoist and operate the trolley over the entire length of the runway or monorail system to be sure that the adjustments and operation is satisfactory. On systems with curves, the edges of the rail at the curved sections should be kept lightly lubricated with grease.

⚠ WARNING
An excessively worn beam flange may fail and allow the trolley to fall from the beam.
TO AVOID INJURY:
Periodically inspect the beam flange for wear. Replace beam if flange is worn.

POWER SUPPLY AND ELECTRICAL CONNECTIONS

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

It is recommended, especially for a single phase hoist with a one horsepower motor, that a line of adequate capacity be run directly from the power supply to the hoist to prevent having problems with low voltage and circuit overloads.

For grounding of the hoist, the power cord includes a grounding conductor (green wire). On a standard single phase unit this cord is equipped with a three-prong plug. Be sure that the receptacle opening which receives the longest prong is properly grounded. Furthermore, the suspension system on which the hoist is mounted must also be permanently grounded.

Before connecting the hoist to the power supply, check that the power to be used agrees with that shown on hoist identification plate. In addition, for a three phase, dual voltage unit, check the voltage shown on the tag attached to power cord.

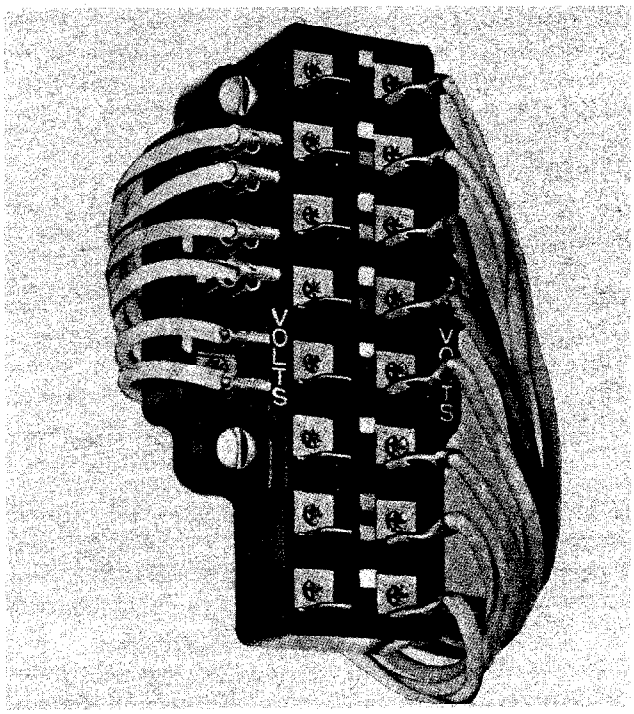


Figure 12. Voltage Conversion Terminal Board

The nominal hoist voltage rating corresponding to the voltage range given on hoist identification plate is:

SINGLE SPEED UNITS		TWO SPEED UNITS	
Range	Nominal Volts	Range	Nominal Volts
110-120	115	208-230	230
208-240	230	440-460	460
440-480	460		

THREE PHASE HOIST

Unless ordered on a special basis, all single speed dual voltage (230/460-3-60, 220/380-3-50 and 220/415-3-50) hoists are factory arranged to operate on 460-3-60 (or 380-3-50 or 415-3-50). However, a conversion terminal

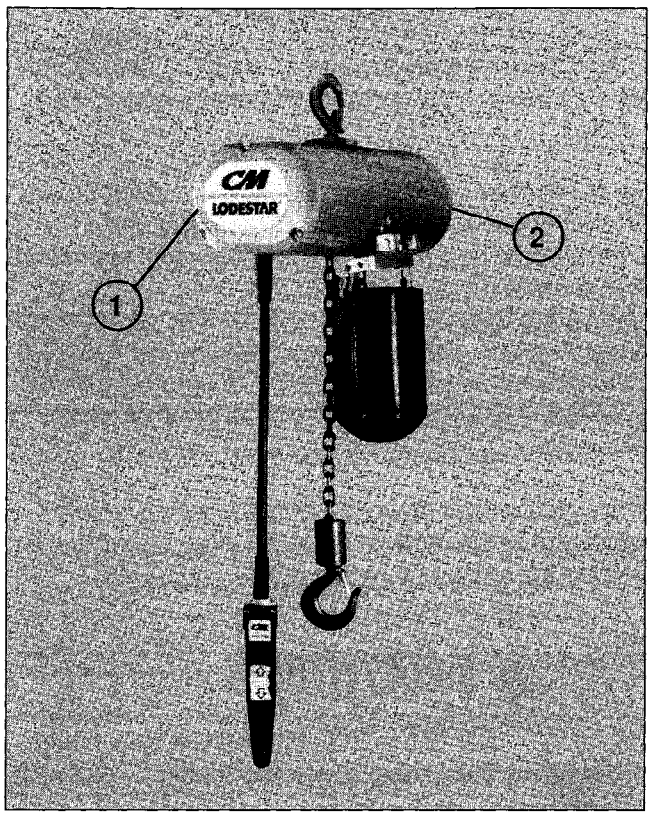


Figure 13. Location of Components

board is provided to easily and quickly change from 460 to 230 (or 380 to 220 or 415 to 220) volt operation. The conversion terminal board shown in Figure 12 is located in the hoist as shown in Figure 13.

NOTE: The column of terminals on the left (marked "low") are to be used to connect the hoist for operation on 220 or 230 volts. Terminals in the right column (marked "high") are used to connect the hoist for operation on 460, 380 or 415 volts.

Voltage conversion terminal board is located under back frame cover (1) for Models A thru H and under motor housing cover (2) for MODELS J thru RRT.

Limit switches and electric brake are located under back frame cover for all hoists.

To change the hoist voltage connections, simply shift eight wires to the column of terminals marked for the desired voltage. The insulation color combination of each wire much match the two colors adjacent to the terminal lug to which each wire is attached. All eight wires must be in the same column and all terminals must be tight. Be sure to make a notation of the new hoist voltage on the tag attached to power cord.

Since the motor in a three phase hoist 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 the original installation and each time hoist is moved to a new location.

NOTE: Serious damage can result if the hook is run to the upper or lower limit of travel with the hook operating in a direction opposite to that indicated by the control station. Therefore, proceed as follows:

1. Make temporary connections at the power supply.
2. Operate ▲ (UP) control in control station momentarily. If hook raises, connections are correct and can be made permanent.
3. If hook lowers, it is necessary to change direction by interchanging the Red lead and the Black lead of hoist power cord at power supply. Under no circumstances should the internal wiring of control station or hoist be changed to reverse hook direction. The wiring is inspected and tested before leaving the factory.

⚠ WARNING

Allowing the hook block to run into the bottom of the hoist when raising a load or allowing the chain to become taut between the loose end screw and the frame when lowering a load may break the chain and allow the load to drop.

TO AVOID INJURY:

Do not allow the hook block to contact the bottom of the hoist or the loose end chain to become taut.

Also, do not force the Lodestar Protector to compensate for improperly adjusted limit switches or reverse voltage phasing.

CHECKING FOR TWIST IN LOAD CHAIN
Models E, H, E-2, H-2, R, RR, R-2, and RR-2

The best way to check for this condition is to run the lower hook, without a load, up to within about 2 feet of hoist. If the dead end of the chain has been properly installed, a twist can occur only if the lower hook block has been capsized between the strands of chain. Reverse capsize to remove twist.

Models RT, RT-2, RRT and RRT-2

On these models, the load chain is dead ended on top of the lower hook block. If the chain has been properly installed, the only way a twist can occur is if the lower hook block has been capsized between the strands of chain. If this has occurred, two strands of chain will be wrapped around each other and to remove this, reverse the capsize.

CHECKING FOR ADEQUATE VOLTAGE AT HOIST

The hoist must be supplied with adequate electrical power in order to operate properly. For proper operation, the voltage, (measured at the end of the standard 15 foot power cord with the hoist operating in the ▲, up direction with full load) must be as indicated in the table on page 10.

NOMINAL CURRENT	MINIMUM RUNNING VOLTAGE	MINIMUM STARTING VOLTAGE
115-1-60	104	98
230-1-60	207	196
230-3-60	187	-
460-3-60	396	-
220-3-50	198	-
380-3-50	365	-
415-3-50	399	-

SIGNS OF INADEQUATE ELECTRICAL POWER (LOW VOLTAGE) ARE:

- Noisy hoist operations due to brake and/or contactor chattering.
- Dimming of lights or slowing of motors connected to the same circuit.
- Heating of the hoist motor and other internal components as well as heating of the wires and connectors in the circuit feeding the hoists.
- Failure of the hoist to lift the load due to motor stalling.
- Blowing of fuses or tripping of circuit breakers.

To avoid these low voltage problems, the hoist must be connected to an electrical power supply system that complies with the National Electrical Code and applicable local codes. This system must also be rated for a minimum of 20 amps and it must have #14 AWG or larger wiring, a disconnecting means, overcurrent protection (slow blow fuses or inverse-time type circuit breakers) and provisions for grounding the hoist.

⚠ WARNING

Failure to properly ground the hoist presents the danger of electric shock.

TO AVOID INJURY:

Permanently ground the hoist as instructed in this manual.

Low voltage can also be caused by using an undersize extension cord to supply power to the hoist. The following chart should be used to determine the size wires in the extension cord in order to minimize the voltage drop between the power source and the hoist.

LENGTH OF EXTENSION CORD	SINGLE PHASE HOISTS MINIMUM WIRE SIZE	THREE PHASE HOISTS MINIMUM WIRE SIZE
UP TO 50 FEET	#14 AWG	#16 AWG
80 FEET	#12 AWG	#16 AWG
120 FEET	#10 AWG	#14 AWG

⚠ WARNING

Failure to provide a proper power supply system for the hoist may cause hoist damage and offers the potential for a fire.

TO AVOID INJURY:

Provide the hoist with a 20 amp, minimum, overcurrent protected power supply system per the National Electrical Code and applicable local codes as instructed in this manual.

Remember, operation with low voltage can void the CM repair/replacement policy. When in doubt about any of the electrical requirements, consult a qualified electrician.

Always disconnect the power from the power supply system and lockout/tagout disconnecting means before servicing the hoist.

⚠ WARNING

Working in or near exposed energized electrical equipment presents the danger of electric shock.

TO AVOID INJURY:

DISCONNECT POWER AND LOCKOUT/TAGOUT DISCONNECTIONG MEANS BEFORE REMOVING COVER OR SERVICING THIS EQUIPMENT.

CHECKING LIMIT SWITCH OPERATION

Operate hoist over the entire length of its rated lift, checking upper and lower limit switches for correct operation as follows:

1. Press ⬆ (UP) control and raise the lower hook until top of hook block is about one foot below the hoist.
2. Cautiously continue raising the hook until the upper limit switch stops the upward motion. The upper limit switch is set at the factory to stop the hook block 3 inches from bottom of hoist on all units with standard 10 foot lift except Models AA and AA-2. Factory setting is 6 inches for these models and for all other models equipped with chain for lifts longer than 10 feet.
3. If adjustment is necessary, see page 17.

⚠ WARNING

Allowing the hook block to run into the bottom of the hoist when raising a load or allowing the chain to become taut between the loose end screw and the frame when lowering a load may break the chain and allow the load to drop.

TO AVOID INJURY:

Do not allow the hook block to contact the bottom of the hoist or the loose end chain to become taut.

4. Press ▼ (DOWN) control and cautiously lower hook until lower limit switch stops the downward motion. From 7 to 11 chain links (depending on hoist model) should be between the loose end link and the hoist entry. See Figures 7 and 8.
5. If adjustment is necessary, see page 17.
NOTE: If the hoist is equipped with a chain container, reset the upper and lower limit switches as indicated on page 17. Set the upper limit switch so that the uppermost point of hook travel is just below the bottom of the chain container. Set the lower limit switch so that there is a minimum of ten links showing below the bottom of the hoist when the hook is at its lowest position.

Under no condition should the hook block or load be permitted to come in contact with the chain container. If contact is made, the function of the chain container can be interfered with and its fasteners imperiled.

CONTROL CORD

Unless ordered on a special basis, the hoist is supplied with a control cord that will position the control station approximately 4 feet above the lower hook when it is at the lower limit of the lift. If this places the control station too close to the floor, a "control cord alteration kit" (Key No. 627-474, Part Number 28642) can be obtained from CM for shortening the length of the control cord.

⚠ WARNING

Tying knots or loops to shorten the drop of the control station will make the strain relief ineffective and the internal conductors of the cord may break.

TO AVOID INJURY:

Shorten the control cord using the control cord alteration kit and the instructions provided with the kit.

OPERATING INSTRUCTIONS

GENERAL

1. The Protector is designed to allow the intermediate gear to slip on an excessive overload. An overload is indicated when the hoist will not raise the load. Also, some clutching noise may be heard if the hoist is loaded beyond rated capacity. Should this occur, immediately release the ▲ (UP) control to stop the operation of the hoist. At this point, the load should be reduced to the rated hoist capacity or the hoist should be replaced with one of the proper capacity. When the excessive load is removed, normal hoist operation is automatically restored.

CAUTION: The Protector is susceptible to overheating and wear when slipped for extended periods. Under no circumstance should the clutch be allowed to slip for more than a few seconds.

Due to the above, a hoist equipped with a Protector is not recommended for use in any application where there is a possibility of adding to an already suspended load to the point of overload. This includes dumbwaiter (*see below) installations, containers that are loaded in mid-air, etc.

(*)Refer to limitations on Page i concerning dumbwaiter applications.

Also, if a Lodestar Hoist with a Protector is used at unusual extremes of ambient temperatures, above 150°F, or below 15°F, changes in lubricant properties may permit the hoist to raise larger loads than under normal operating conditions and presents possibility of damage or injury.

2. All hoists are equipped with an adjustable screw limit switch, which automatically stops the hook at any predetermined point when either hoisting or lowering.
3. The control station used on two speed hoists is similar to 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 complete 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 and FAST position or vice versa.
4. 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.
2. WHEN APPLYING A LOAD, IT SHOULD BE DIRECTLY UNDER HOIST OR TROLLEY.

AVOID OFF-CENTER LOADING OF ANY KIND.

3. Take up a slack load chain carefully and start load easily to avoid shock and jerking of hoist load chain. If there is any evidence of overloading, immediately lower the load and remove the excess load.
4. Do not allow the load to swing or twist while hoisting.
5. Do not allow the load to bear against the hook latch.

HOIST WITH LOW HEADROOM TROLLEY

This unit should be moved by pushing on the suspended load or by pulling the empty hook. However, the unit can also be moved by pulling on the control station since an internal steel cable extends the length of the control cord and is anchored to the hoist and to the control station.

HOIST WITH MOTOR DRIVEN TROLLEY

This unit should be moved by operating the controls marked ◗ (FORWARD) and ◖ (REVERSE) in the control station. Unless altered by the erector, depressing ◗ (FORWARD) control will move the hoist toward motor 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

For safety precautions and a list of do's and do not's for safe operation of hoists, refer to page i.

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 that the attachments to the 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 or on the hoist motor housing cover, Models A thru H-2 and on hoist back frame cover, Models J thru RRT-2. Overload can cause immediate failure of some load-carrying part or create a defect causing subsequent failure at less than rated capacity. When in doubt, use the next larger capacity of CM Lodestar 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.
8. Do not wrap the load chain around the load and hook onto itself as a choker chain.
   Doing this will result in:
   a. The loss of the swivel effect of the hook which could mean twisted chain and a jammed lift wheel.
   b. The upper limit switch is by-passed and the load could hit the hoist.
   c. The chain could be damaged at the hook.
9. On two and three part reeved hoists, check for twists in the load chain. A twist can occur if the lower hook block has been capsized between the strands of chain. Reverse the capsize to remove twist.
10. Do not allow the load to bear against the hook latch. The latch is to help maintain the hook in position while the chain is slack before taking up slack chain.

⚠ WARNING

Allowing the load to bear against the hook latch and/or hook tip can result in loss of load.

TO AVOID INJURY:

Do not allow the load to bear against the hook latch and/or hook tip. Apply load to hook bowl or saddle only.

11. Take up a slack load chain carefully and start load easily to avoid shock and jerking of hoist load chain. If there is any evidence of overloading, immediately lower the load and remove the excess load.
12. Do not allow the load to swing or twist while hoisting.
13. Never operate the hoist when flammable materials or vapors are present. Electrical devices produce arcs or sparks that can cause a fire or explosion.
14. STAY ALERT! Watch what you are doing and use common sense. Do not use the hoist when you are tired, distracted or under the influence of drugs, alcohol or medication causing diminished control.

INSPECTION

INSPECTION

To maintain continuous and satisfactory operation, a regular inspection procedure must be initiated to replace worn or damaged parts before they become unsafe. Inspection intervals must be determined by the individual application and are based on the type of service to which the hoist will be subjected and the degree of exposure to wear, deterioration or malfunction of the critical components.

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

Normal Service: Involves operation with randomly distributed loads within the rated load limit, or uniform loads less than 65 percent of rated load for not more than 25 percent of the time.

Heavy Service: Involves operating the hoist within the rated load limit which exceeds normal service.

Severe Service: Normal or heavy service with abnormal operating conditions.

Two classes of inspection—frequent and periodic—must be performed.

Frequent Inspections: These inspections are visual examinations by the operator or other designated personnel. Records of such inspections are not required. The frequent inspections are to be performed monthly for normal service, weekly to monthly for heavy service, and daily to weekly for severe service, and they should include those items listed in Table 4.

Periodic Inspections: These inspections are visual inspections of external conditions by an appointed person. Records of periodic inspections are to be kept for continuing evaluation of the condition of the hoist.

Periodic inspections are to be performed yearly for normal service, semi-annually for heavy service and quarterly for severe service, and they are to include those items listed in Table 5.

CAUTION: ***Any deficiencies are to be corrected before the hoist is returned to service. Also, the external conditions may show the need for disassembly to permit a more detailed inspection, which, in turn, may require the use of nondestructive type testing.***

PREVENTIVE MAINTENANCE

In addition to the above inspection procedure, a preventive maintenance program should be established to prolong the useful life of the hoist and maintain its reliability and continued safe use. The program should include the periodic and frequent inspections with particular attention being paid to the lubrication of the various components using the recommended lubricants (see page 16).

HOOK INSPECTION

Hooks damaged from chemicals, deformations or cracks, or that have more than a 10° twist from the hook's unbent plane, excessive opening or seat wear must be replaced. Also, hooks that are opened and allow the latch to not engage the tip must be replaced. Any hook that is twisted or has excessive throat opening indicates abuse or overloading of the unit. Inspect other load sustaining parts for damage.

On latch type hooks, check to make sure that the latch is not damaged or bent and that it operates properly with sufficient spring pressure to keep the latch tightly against the tip of the hook and allow the latch to spring back to the tip when released. If the latch does not operate properly, it should be replaced. See Figure 14 to determine when the hook must be replaced.

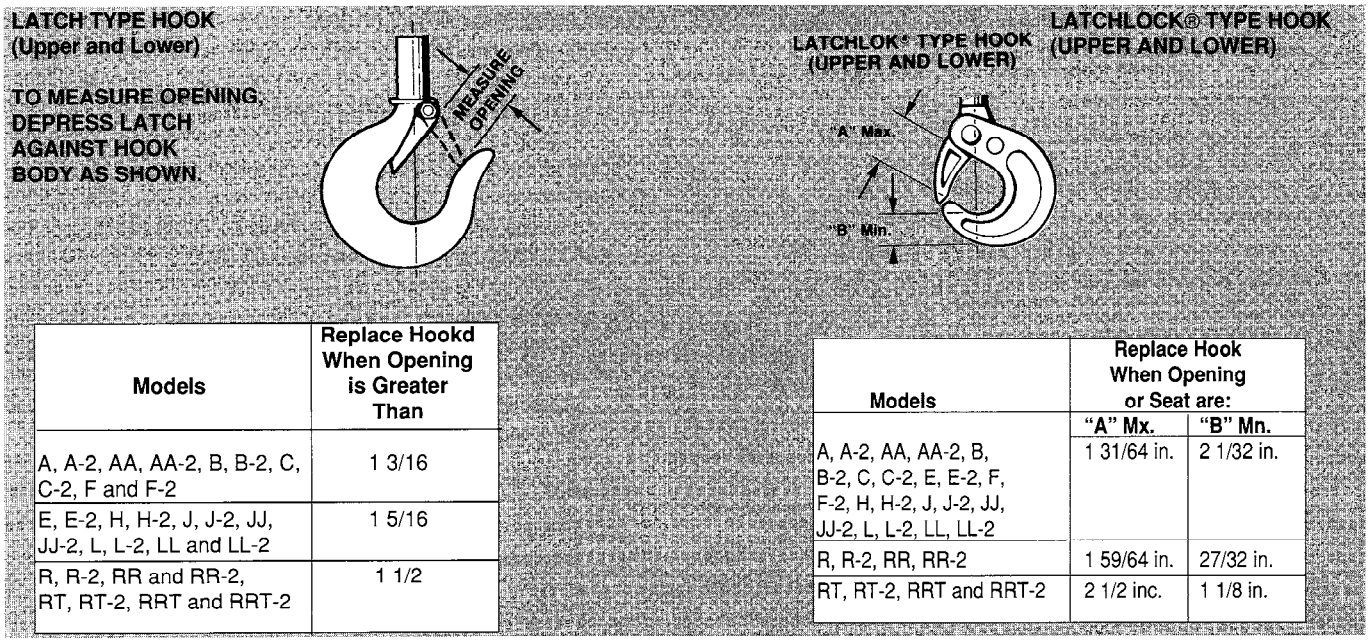
Table 4. Minimum Frequent Inspections

TYPE OF SERVICE			ITEM
Normal	Heavy	Severe	
			a) Brake for evidence of slippage. b) Control functions for proper operation. c) Hooks for damage, cracks, twists, excessive throat opening, latch engagement and latch operation—see page 13. d) Load chain for adequate lubrication, as well as for signs of wear, damaged links or foreign matter—see page 15. e) Load chain for proper reeving and twists.

Table 5. Minimum Periodic Inspections

TYPE OF SERVICE			ITEM
Normal	Heavy	Severe	
			a) All items listed in Table 4 for frequent inspections. b) External evidence of loose screws, bolts or nuts. c) External evidence of worn, corroded, cracked or distorted hook block, suspension screws, gears, bearings and dead end block and chain pin. d) External evidence of damage to hook retaining nut and pin. Also check the upper suspension adapter making sure it is fully seated in the hoist frame and that both screws are tight. e) External evidence of damage or excessive wear of the liftwheel and hook block sheave chain pockets. Widening and deepening of the pockets may cause the chain to lift-up in the pocket and result in binding between liftwheel and chain guides or between the sheave and hook block. Also, check the chain guide for wear or burring where the chain enters the hoist. Severely worn or damaged parts should be replaced. f) External evidence of excessive wear of brake parts, and brake adjustment—see page 17. g) External evidence of pitting or any deterioration of contractor contacts. Check the operation of the control station making sure the buttons operate freely and do not stick in either position. h) Inspect the electrical cords and cables and control station enclosure for damaged insulation. i) Inspect trolley trackwheels for external wear on tread and flange and for wear on internal bearing surfaces as evidenced by a looseness on the stud. Suspension components for damage, cracks, wear and operation. Also check suspension adapter screws for proper tightness—(see page 6). j) Inspect the loose end link, loose end screw and dead end block on double reeved units. Replace worn or distorted parts. k) Inspect the suspension lug or hook for excess free play or rotation. Replace worn parts as evidenced by excess free play or rotation. l) Inspect for signs of lubricant leaks at the gasket between the gear housing and back frame. Tighten screws holding back frame to gear housing. If leak persists, repack housing and gears with grease and install a new gasket. m) On the Models RT, RT-2, RRT and RRT-2: 1. Inspect shackle and lug pins for wear. Replace if worn. 2. Check dead end screw in lower hook block for wear and tightness*. Replace screw if worn. 3. Check shackle pin for proper seating in groove of load bracket. 4. Inspect cloverleaf plate on bottom of sheave hanger for wear or burring. Replace if worn. 5. Inspect sheave stud nut and seat for wear. Replace if worn or damaged.

* When tightening the special, dead end socket head screw, it should be held firmly in place and torqued from the nut end only to avoid damage to the screw and/or dead end chain link (Refer to step J on page 30).



Models	Replace Hookd When Opening is Greater Than
A, A-2, AA, AA-2, B, B-2, C, C-2, F and F-2	1 3/16
E, E-2, H, H-2, J, J-2, JJ, JJ-2, L, L-2, LL and LL-2	1 5/16
R, R-2, RR and RR-2, RT, RT-2, RRT and RRT-2	1 1/2

Models	Replace Hook When Opening or Seat are:	
	"A" Mx.	"B" Mn.
A, A-2, AA, AA-2, B, B-2, C, C-2, E, E-2, F, F-2, H, H-2, J, J-2, JJ, JJ-2, L, L-2, LL, LL-2	1 31/64 in.	2 1/32 in.
R, R-2, RR, RR-2	1 59/64 in.	27/32 in.
RT, RT-2, RRT and RRT-2	2 1/2 inc.	1 1/8 in.

Figure 14. Hook Inspection

LOAD CHAIN

Cleaning and Inspection

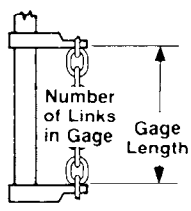
First clean the load chain with a non-acid or non-caustic type solvent. Then slack the chain and make a link-by-link inspection for nicks, gouges, twisted links and excessive wear or stretching. Chain exhibiting wear should be gaged throughout its entire length and replaced if worn beyond serviceable limits.

Gaging Load Chain Wear

To determine if load chain should be continued in service, check gage length as indicated in Figure 15. Chain worn beyond length indicated, nicked, gouged or twisted should be replaced before returning hoist to service. Chain should be clean, free of twists and pulled taut before measuring. To aid in checking gage length, CM can provide a chain gage. This can be obtained by ordering Chain Gage Part Number 3191.

Note that worn chain can be an indication of worn hoist components. For this reason, the hoist's chain guides, hook blocks and lifewheel should be examined for wear and replaced as necessary when replacing worn chain.

Also, these chains are specially heat treated and hardened and should never be repaired.



Models	Dia. of Chain Stock (Inches)	No. of Links to Gage	Max Gage Length Allowable Used Chain (Inches)
A thru H-2	0.250	19	14 13/16
J thru RRT-2	0.312	21	18 7/8

Figure 15. Gaging Load Chain

⚠ WARNING

Using other than CM supplied load chain may cause the chain to jam in the hoist and/or allow the chain to break and the load to drop.

TO AVOID INJURY:

Due to size requirements and physical properties, use only CM Lube-Link load chain in the Lodestar Hoists.

IMPORTANT:

Do not use replaced chain for other purposes such as lifting or pulling. Load chain may break suddenly without visual deformation. For this reason, cut replaced chain into short legths to prevent use after disposal.

PROTECTOR

The Protector should operate for the normal life of the hoist without service. The device has been lubricated and calibrated at the factory for a specific model of Lodestar hoist and is not adjustable or interchangeable with other models. For proper overload protection, be sure before installing a Protector that it is correct for the unit. The spring washer of the Protector has been color coded at the factory as follows:

Models	Protector Color Code
A, A-2	White
AA, AA-2,	Light Blue
B, B-2, E, E-2	White
C, C-2	Orange
F, F-2, H, H-2	Orange
J, J-2	Red
JJ, JJ-2	White - Green
L, L-2, RT, RT-2	Green
LL, LL-2	Yellow
R, R-2	Green
RR, RR-2, RRT, RRT-2	Yellow

⚠ WARNING

Removing the snap ring on the Protector assembly will allow the parts to spring apart.

TO AVOID INJURY:

Do not attempt to disassemble the Protector.

MAINTENANCE

HOIST LUBRICATION
GEARS

⚠ WARNING

The lubricants used in and recommended for the Lodestar Hoist may contain hazardous materials that mandate specific handling and disposal procedures.

TO AVOID CONTACT AND CONTAMINATION:
Handle and dispose of lubricants only as directed in applicable material safety data sheets and in accordance with applicable local, state and federal regulations.

NOTE: ***To assure extra long life and top performance, be sure to lubricate the various parts of the Lodestar Hoist using the lubricants specified below. If desired, these lubricants may be purchased from CM. Refer to page 36 for information on ordering the lubricants.***

- The Protector should operate for the normal life of the hoist without service. The device has been lubricated and calibrated at the factory for a specific model of Lodestar Hoist and is not adjustable or interchangeable with other models.

CAUTION: ***The Protector is to be used with "American Lubricants #6283" grease. Do not use any other grease or the Protector will not operate properly and parts could be damaged.***

The gears and Protector (627-327 and 627-328) are packed at assembly with grease and should not need to be renewed unless the gears have been removed from the housing and degreased.

CAUTION: ***Never degrease the Protector or attempt to disassemble this device. Degreasing the Protector may damage parts and using a device that has been degreased may cause erratic, inconsistent operation. If the Protector has been degreased, it must be replaced by a factory calibrated device.***

If the gears are removed from the housing, wipe the excess grease off the outside surfaces of the Protector with a soft cloth and degrease the remaining gears and housings. Upon reassembly, add 7 oz. of the above grease to gears and housing. Also, coat the spline on the end of the drive shaft (627-311) with a Molydisulphide lubricant such as "Super Herculon."

For Models JJ, LL, RR RRT, JJ-2, LL-2, RR-2 and RRT-2, see page 29 for special gearing alignment instructions.

- The limit switch gears are of molded nylon and require no lubrication.
- Apply a light film of machine oil to the limit switch shaft threads (627-220 pages 38 and 39) at least once a year.
- On the Models RT, RT-2, RRT and RRT-2 suspended from trolleys, the upper sheave, shackle pin and lug pin must be periodically lubricated with Lubriplate Bar and Chain Oil 10-R (Fiske Bros. Refining Co.). Also, apply a light film of EP Grease (Acheson Colloids Co. Molydag #204, or equal) to the spherical surfaces of the sheave stud nut and the sheave stud nut seat.

BEARINGS

- All bearings and bushings, except the lower hook thrust bearing, are pre-lubricated and require no lubrication. The lower hook thrust bearing should be lubricated at least once a month.

CHAIN GUIDES, LIFTWHEEL AND LOWER SHEAVE WHEEL

- When the hoist is disassembled for inspection and/or repair, the chain guides, lower sheave wheel (on double chain units) and liftwheel must be lubricated with Lubriplate Bar and Chain Oil 10-R (Fiske Bros. Refining Co.) prior to reassembly. The lubricant must be applied in sufficient quantity to obtain natural runoff and full coverage of these parts.

LOAD CHAIN

A small amount of lubricant will greatly increase the life of load chain. Do not allow the chain to run dry.

Keep it clean and lubricate at regular intervals with Lubriplate Bar and Chain Oil 10-R (Fiske Bros. Refining Co.) or equal lubricant. Normally, weekly lubrication and cleaning is satisfactory, but under hot and dirty conditions, it may be necessary to clean the chain at least once a day and lubricate it several times between cleanings.

When lubricating the chain, apply sufficient lubricant to obtain natural run-off and full coverage.

⚠ WARNING

Used motor oils contain known carcinogenic materials.

TO AVOID HEALTH PROBLEMS:
Never use used motor oils as a chain lubricant. Only use Lubriplate Bar and Chain Oil 10-R as a lubricant for the load chain.

TROLLEY LUBRICATION

LOW HEADROOM TROLLEY

- CM Trackwheel bearings are pre-lubricated and require no lubrication.

EXTERIOR FINISH

The exterior surfaces of the hoist and trolleys have a durable, scratch resistant baked power coating. Normally, the exterior surfaces can be cleaned by wiping with a cloth. However, if the finish is damaged,

compatible touch-up paint can be purchased from CM. Refer to page 36 for information on ordering the paint.

SOLID STATE REVERSE SWITCH

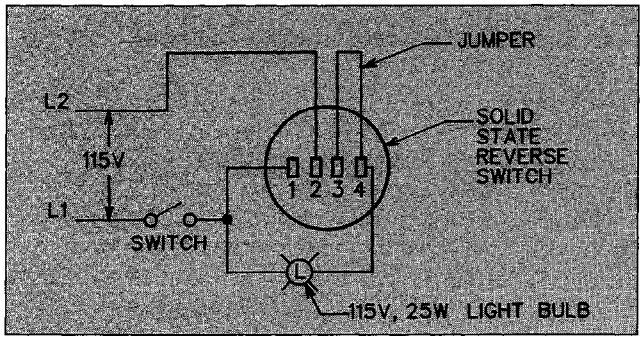
(115-1-60/230-1-60 Units Only)

Above an ambient temperature of 104°F., the frequency of hoist operation should be limited to avoid overheating the solid state reverse switch. Even at temperatures less than 104°F., high duty cycle, frequent starting or reversing, excessive inching, jogging or plugging may overheat the solid state reverse switch. Overheating the switch will cause it to malfunction, and this in turn will overheat the motor and/or damage the solid state reverse switch.

If allowed to cool, the solid state will return to normal operation. However, before returning the hoist to service, the following procedure should be used to determine if the switch has been damaged.

1. De-energize the power system supplying the hoist and remove the solid state reverse switch.
2. Connect the solid state reverse switch to a 115-1-60/230-1-60 light circuit as shown below.
3. Close the switch to energize the 115-1-60/230-1-60 power supply. The light bulb will illuminate if the solid state reverse switch is not damaged. If the bulb fails to illuminate, the switch is damaged and must be replaced.
4. Turn the 115-1-60/230-1-60 power off and remove the solid state reverse switch from the test circuit.

Reinstall the solid state reverse switch in the hoist and re-connect it using the wiring diagram supplied with the hoist. Re-energize the power system supplying the hoist and test for proper operation. Also, ventilate the space around the hoist and/or reduced duty cycle, excessive starting, excessive plugging to reduce future malfunctions of the solid state reverse switch due to overheating.



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 back frame cover, see Figure 13.
3. Before adjusting the gap; a) back off the stud nuts and examine friction linings and friction surfaces for excessive wear, (min.thickness .188), scoring or warpage. b) 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. Any of these symptoms indicate the need for replacement of parts.
4. Turn adjusting nuts clockwise gaging the air gap at both ends.
5. Replace cover, reconnect the power and check operation.

LIMIT SWITCHES

If limit switch operation has been checked as described on page 10 and is not operating correctly or is not automatically stopping the hook at a desired position, proceed as follows:

1. Disconnect hoist from power supply.
2. Remove back frame cover, see Figure 13.
3. The position of upper and lower limit switches are indicated on the fiber insulator.
4. Loosen the screws to permit guide plate to be moved out of engagement with the traveling nuts, refer to Figures 16 and 17.

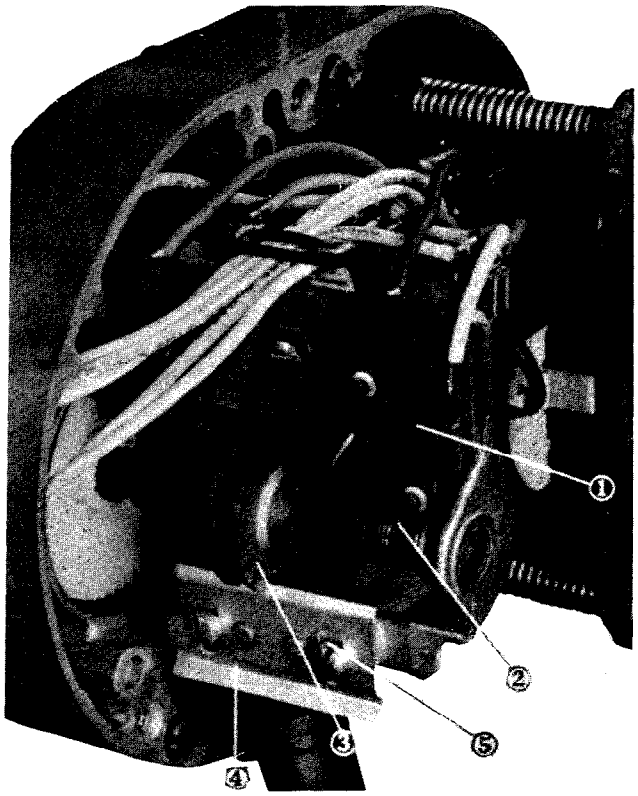


Figure 16. Limit Switches, Models A thru H-2

1. Limit switch sub-assy
2. Limit switch shaft
3. Traveling nuts
4. Guide plate
5. Screws

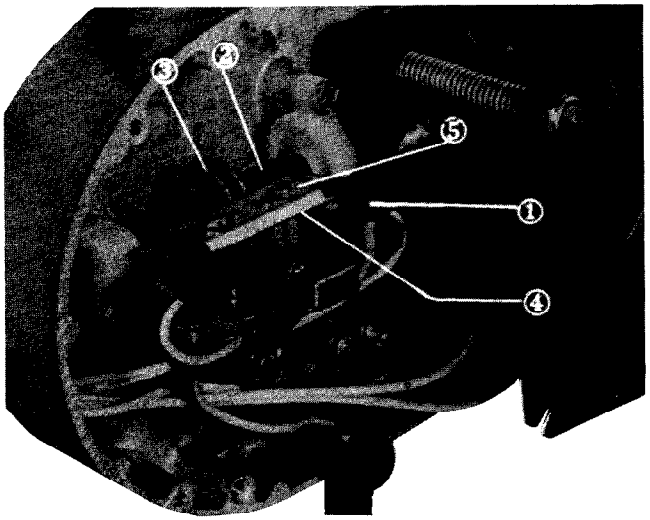


Figure 17. Limit Switches, Models J thru RRT-2

1. **Limit switch sub-assy**
2. **Limit switch shaft**
3. **Traveling nuts**
4. **Guide plate**
5. **Screws**

SETTING UPPER LIMIT SWITCH

5. Refer to Table 6—The "A" dimensions given are the minimum distances that should be set between top of hook block and bottom of hoist. In other words, the highest allowable hook position.

CAUTION: THE "A" DIMENSIONS SHOWN IN THE TABLE ARE THE MINIMUM ALLOWED FOR SAFE OPERATION AND SHOULD NOT BE REDUCED.

6. Reconnect hoist to power supply.
7. Run hook to the desired upper position, cautiously operating the hoist without a load.
8. Disconnect hoist from power supply.
9. Moving one traveling nut toward the other increases hook travel and away from the other decreases the travel. Now, turn the nut nearest the switch indicated as the "UPPER LIMIT SWITCH" until it just breaks the limit switch contacts. An audible click will be heard as the switch opens. Continue to rotate the nut toward the switch an additional one full tooth.
10. Reposition the guide plate in the next slot and securely tighten screws.
11. Reconnect hoist to power supply and check the stopping point of hook by first lowering the hook about 10 inches, then raise the hook by jogging cautiously until the upper limit switch stops upward motion. The stopping point of hook should be the desired upper position. If not, repeat the above instructions.
12. Double check setting by lowering the hook about 2 feet and then run the hook into the upper limit with ▲ (UP) control held depressed.
13. Fine adjustment of the upper limit setting may be obtained by inverting the guide plate in Step 10. The offset on the plate gives adjustments equivalent to 1/2 notch, see Table 6 for the "Hook Travel Per Notch of Limit Switch Nut." When inverting the plate, it may be necessary to use the notch adjacent to the one used in the preliminary setting.

SETTING LOWER LIMIT SWITCH

5. Refer to Table 6—The "B" dimensions given are the minimum number of load chain links that should be set between the loose end link and the hoist frame on the loose end side of the chain. In other words, the lowest allowable hook position.

CAUTION: THE "B" DIMENSIONS SHOWN IN THE TABLE ARE THE MINIMUM ALLOWED FOR SAFE OPERATION AND SHOULD NOT BE REDUCED.

6. Reconnect hoist to power supply.
7. Run the hook to the desired lower position, cautiously operating the hoist without a load.
8. Disconnect hoist from power supply.
9. Moving one traveling nut toward the other increases hook travel and away from the other decreases the travel. Now, turn the nut nearest the switch indicated as the "LOWER LIMIT SWITCH" until it just breaks the limit switch contacts. An audible click will be heard as the switch opens. Continue to rotate the nut toward the switch an additional one full tooth.
10. Reposition the guide plate in the next slot and securely tighten screws.
11. Reconnect hoist to power supply, and check the stopping point of hook by first raising the hook about 10 inches, then lower the hook by jogging cautiously until the lower limit switch stops the downward motion. The stopping point of hook should be the desired lower position. If not, repeat the above instructions.
12. Double check setting by raising the hook about 2 feet and then run the hook into the lower limit with the ▼ (DOWN) control held depressed.
13. Fine adjustment of the lower limit setting may be obtained by inverting the guide plate in Step 10. The offset on the plate gives adjustments equivalent to 1/2 notch, see Table 6 for the "Hook Travel Per Notch of Limit Switch Nut." When inverting the plate, it may be necessary to use the notch adjacent to the one used in the preliminary setting.

RECOMMENDED SPARE PARTS

To insure continued service of the Lodestar Hoist, the following is a list of parts that are recommended to be kept on hand at all times to replace parts that have worn or failed:

KEY NO.	PART NAME	QTY. FOR EACH HOIST IN SERVICE
627-222	Limit Switch Kit	1
627-259	Brake Coil	1
627-261	Brake Friction Disc	
	Models A, B & E	1
	All Other Models	2
627-404	Motor Reverse Switch (230-1-60 Units Only)	1
627-439	Solid State Reverse Switch (115/230-1-60 Units Only)	1
627-418	Capacitor (115-1-60 230-1-60 Units Only)	1
627-530	Transformer and Bracket Assembly	1
627-563	Control Station Parts Kit	1
627-565	Control Station Switch Kit	1
627-650	Contactor	1
627-800	Selector Relay (Two Speed Units Only)	1

Refer to Page 32 for ordering instructions and the Parts List for part numbers.

Table 6.

LIMIT SWITCHES

Hook Travel Per Notch of Limit Switch Nut

MODEL	MAX. LENGTH OF LIFT (ft.)	HOOK TRAVEL Per Notch (in.)	A (in.) Min.	B (links) Min.
A, A-2, C, C-2	204	1-5/16	1-1/2	6
AA, AA-2	385	2-1/2	2	6
B, B-2, F, F-2	102	11/16	1-1/2	6
E, E-2, H, H-2	47	11/32	1-3/4	6
J, J-2, L, L-2	125	3/4	1-1/2	8
JJ, JJ-2	254	1-15/32	2-1/2	8
LL, LL-2	254	1-15/32	1-1/2	8
R, R-2	66	3/8	2-1/2	8
RR, RR-2	125	3/4	2-1/2	8
RT, RT-2	44	1/4	2-1/2	8
RRT, RRT-2	83	15/32	2-1/2	8

TROUBLE SHOOTING

All Hoists

Table 7.

TROUBLE	PROBABLE CAUSE	CHECK AND REMEDY
1. Hook does not respond to the control station	A) No voltage at hoist—main line or branch circuit switch open; branch line fuse blown or circuit breaker tripped.	A) Close switch, replace fuse or reset breaker.
	B) Phase failure (single phasing, three phase unit only)—open circuit, grounded or faulty connection in one line of supply system, hoist wiring, reversing contactor, motor leads or windings.	B) Check for electrical continuity and repair or replace defective part.
	C) Upper or lower limit switch has opened the motor circuit.	C) Press the "other" control and the hook should respond. Adjust limit switches as described on page 17.
	D) Open control circuit—open or shorted winding in transformer, reversing contactor coil or speed selecting relay coil; loose connection or broken wire in circuit; mechanical binding in contactor or relay; control station contacts not closing or opening.	D) Check electrical continuity and repair or replace defective part.

TROUBLE	PROBABLE CAUSE	CHECK AND REMEDY
Hook does not respond to the control station. (cont'd.)	E) Wrong voltage or frequency.	E) Use the voltage and frequency indicated on hoist identification plate. For three phase dual voltage unit, make sure the connections at the conversion terminal board are the proper voltage as described on page 8.
	F) Low voltage	F) Correct low voltage condition as described on page 9.
	G) Brake not releasing—open or shorted coil winding; armature binding.	G) Check electrical continuity and connections. Check that correct coil has been installed. The coil for three phase dual voltage unit operates at 230 volts when the hoist is connected for either 230 volt or 460 volt operation. Check brake adjustment as described on page 17.
	H) Excessive load.	H) Reduce loading to the capacity limit of hoist as indicated on the identification plate.
2. Hook moves in the wrong direction	A) Wiring connections reversed at either the control station or terminal board (single phase unit only.)	A) Check connections with the wiring diagram.
	B) Failure of the motor reversing switch to effect dynamic braking at time of reversal (single phase unit only).	B) Check connections to switch. Replace a damaged switch or a faulty capacitor.
	C) Phase reversal (three phase unit only)	C) Refer to installation instructions on page 8.
3. Hook lowers but will not raise	A) Excessive load.	A) See Item 1H.
	B) Open hoisting circuit—open or shorted winding in reversing contactor coil or speed selecting relay coil; loose connection or broken wire in circuit; control station contacts not making; upper limit switch contacts open.	B) Check electrical continuity and repair or replace defective part. Check operation of limit switch as described on page 10.
	C) 230-1-60 Units: Motor reversing switch not operating.	C) Check the switch connections and actuating finger and contacts for sticking or damage. Check centrifugal mechanism for loose or damaged components. Replace defective part.
	D) Phase failure (three phase unit only).	D) See Item 1B.

TROUBLE	PROBABLE CAUSE	CHECK AND REMEDY
4. Hook raises but will not lower.	A) Open lowering circuit—open or shorted winding in reversing contactor coil or speed selecting relay coil; loose connection or broken wire in circuit; control station contacts not making; lower limit switch contacts open.	A) Check electrical continuity and repair or replace defective part. Check operation of limit switch as described on page 10.
	B) Motor reversing switch not operating (single phase unit only).	B) See Items 2B and 3C.
5. Hook lowers when hoisting control is operated.	A) Phase failure (three phase unit only).	A) See Item 1B.
6. Hook does not stop promptly.	A) Brake slipping.	A) Check brake adjustment as described on page 17.
	B) Excessive load.	B) See Item 1H.
7. Hoist operates sluggishly.	A) Excessive load.	A) See Item 1H.
	B) Low voltage.	B) Correct low voltage condition as described on page 9.
	C) Phase failure or unbalanced current in the phases (three phase unit only).	C) See Item 1B.
	D) Brake dragging.	D) Check brake adjustment as described on page 17.
8. Motor overheats.	A) Excessive load.	A) See Item 1H.
	B) Low voltage.	B) Correct low voltage condition as described on page 9.
	C) Extreme external heating.	C) 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.	D) Avoid excessive inching, jogging or plugging. This type of operation drastically shortens the motor and contactor life and causes excessive brake wear.
	E) Phase failure or unbalanced current in the phase (three phase unit only).	E) See Item 1B.
	F) Brake dragging.	F) Check brake adjustment as described on page 17.
	G) 230-1-60 Units: Motor reversing switch not opening start winding circuit.	G) See Item 3C.
	H) 115-1-60 Units: Solid state reverse switch exposed to excessive temperature or the switch is damaged.	H) See page 17.

TROUBLE	PROBABLE CAUSE	CHECK AND REMEDY
9. Hook fails to stop at either or both ends of travel.	A) Limit switches not opening circuits.	A) Check switch connections, electrical continuity and mechanical operation. Check the switch adjustment as described on page 10. Check for a pinched wire.
	B) Shaft not rotating.	B) Check for damaged gears.
	C) Traveling nuts not moving along shaft—guide plate loose, shaft or nut threads damaged.	C) Tighten guide plate screws. Replace damaged part.
10. Hook stopping point varies.	A) Limit switch not holding adjustment.	A) See Item 9
	B) Brake not holding.	B) Check the brake adjustment as described on page 17.
Two Speed Hoists		
11. Hoist will not operate at slow speed in either direction.	A) Open Circuit.	A) 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 replace speed selecting contactor.
	B) Phase failure.	B) See Item 1B.
12. Hoist will not operate at fast speed in either direction.	A) Open circuit.	A) See Item 11A.
	B) Open speed selecting circuit.	B) 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. Replace speed selector, repair connection, replace contactor or control station.
	C) Phase failure.	C) See Item 1B.
13. Hook will not raise at slow speed.	A) Excessive load.	A) See Item 1H.
	B) Phase failure.	B) See Item 1B.
	C) Open circuit.	C) See Item 11A.
	D) Brake not releasing.	D) See Item 1G.
14. Hook will not lower at slow speed.	A) Phase failure.	A) See Item 1B.
	B) Open circuit.	B) See Item 11A.
	C) Brake not releasing.	C) See Item 1G.
15. Hook will not raise at fast speed.	A) Excessive load. B) Phase failure. C) Brake not releasing.	A) See Item 1H. B) See Item 1B. C) See Item 1G.
16. Hook will not lower at fast speed.	A) Phase failure.	A) See Item 1B.
	B) Brake not releasing.	B) See Item 1G.
17. Hook moves in proper direction at one speed—wrong direction at other speed.	A) Phase reversal.	A) Wiring reconnected improperly. Interchange two leads of motor winding that is out of phase at the speed selecting relay.

ELECTRICAL DATA

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 unit 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 rotor in place and running. Brake, relay and contactor coil current should be measured with the core iron in operating position.

Table 8. Electrical Data For Hoist Components

Transformer Voltage	Leads	*D.C. Resistance (Ohms)
230/460 to 115	BL to BL-T R-BL to R-B W-R to W-G	28.4 126.1 126.1
230/380 to 48	BL to BL-T R-BL to R-B W-R to W-G	6.2 114.9 133.5
220/415 to 24	BL to BL-T R-BL to R-B W-R to W-G	1.9 116.2 136.1
575 to 115	BL to BL-T R-B to W-G	23.1 385.5

Models	Speed Selector Coil Voltage	Nominal Current (Amps)	*D.C. Resistance (Ohms)
A-2 thru RRT-2	115 48 24	.09 .20 .47	200.0 31.9 8.6

Models	Contactor Coil Voltage	Nominal Current (Amps)	*D.C. Resistance (Ohms)
A thru H-2 And J thru RT-2 (3 Phase And 230-1-60, 1 HP)	115 48 24	.14 .45 .79	116.0 18.2 4.3
JJ, thru RRT-2 (2HP) J, L, R And RT (115-1-60, 1 HP)	115 48 24	.23 .67 1.43	111.8 21.3 4.2

Models	Brake Coil Voltage	Nominal Current (Amps)	*D.C. Resistance (Ohms)
A, AA, B, C, E, F and H	115	.51	5.8
A thru H-2	**230	.17	23.1
A-2 thru H-2	460	.20	92.3
A, A-2, AA, AA-2, B, B-2, C, C-2, E, E-2, F, F-2, H, H-2	575	.14	140.0
J, L, R, RT	115	1.25	1.1
J, J-2, L, L-2, R, R-2, RT, RT-2	**230	.46	4.6
JJ, JJ-2, LL, LL-2, RR, RR-2, RRT, RRT-2	**230	1.7	2.2
J-2, L-2, R-2, RT-2	460	.25	18.7
JJ-2, LL-2, RR-2, RRT-2	460	1.5	8.9

*Resistance values listed are nominal and they may vary slightly from component to component.

**On dual voltage units (230/460-3-60, 220/380-3-50 and 220/415-3-50), brake coils operate on 230 (220) volts.

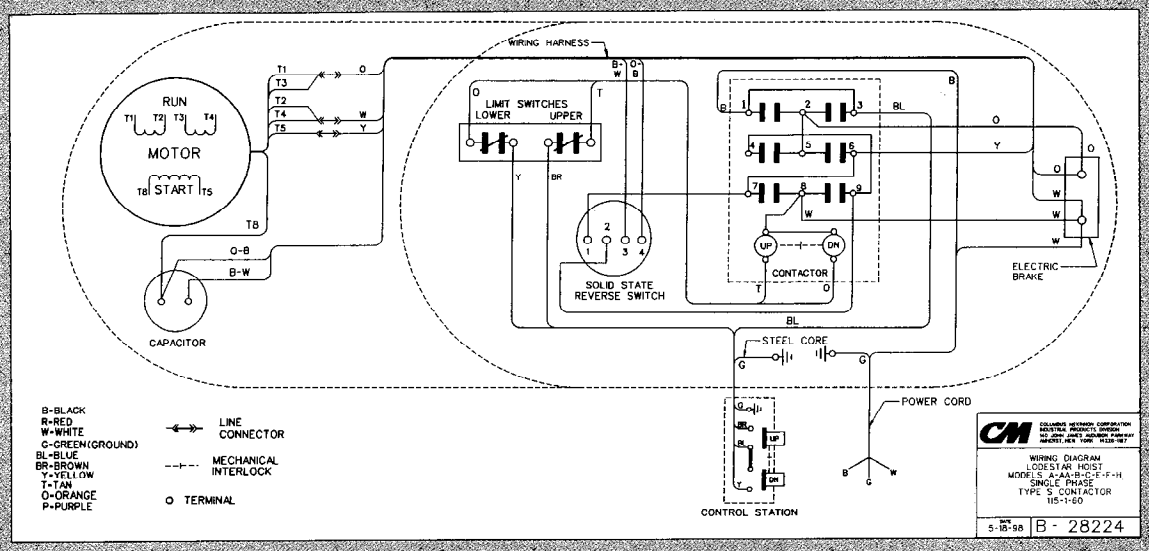
Table 8. Continued — Motors.

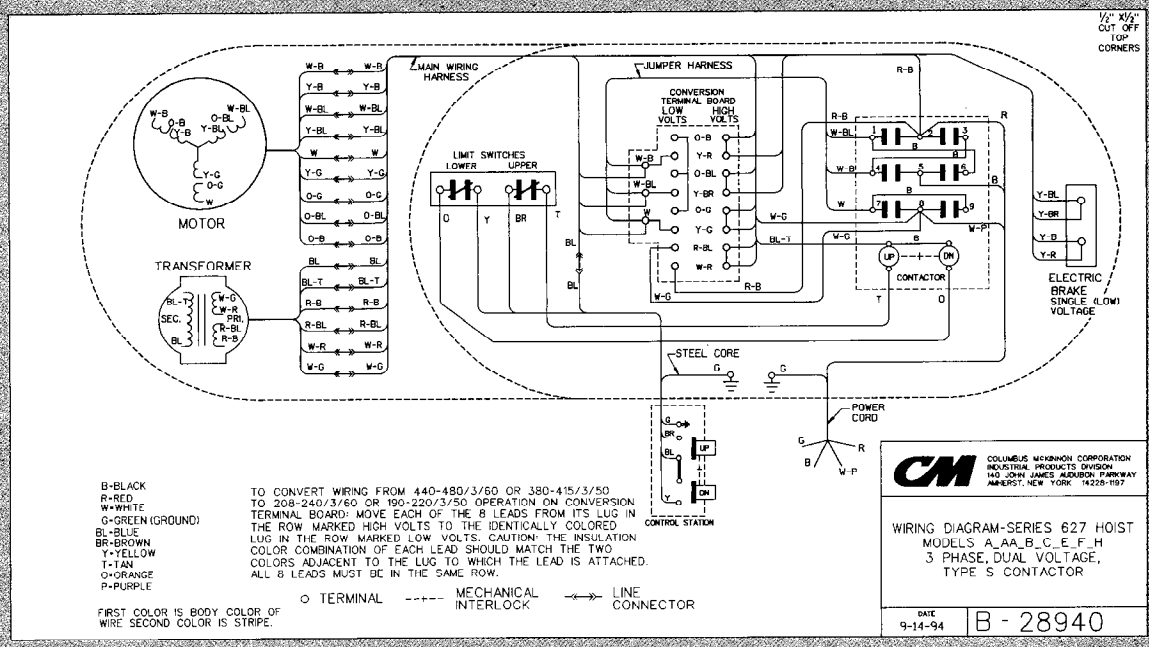
Models	Volts—Phase—Hertz	H.P.	Full Load Current (Amps)	Leads	*D.C. Resist. (Ohms)
A, B, E	115-1-60	1/4	5.7	T1 to T2 (run)	4.9
				T3 to T4 (run)	
				T5 to T8 (start)	5.3
A, B, E	230-1-60	1/4	2.7	T1 to T2 (run)	4.9
				T3 to T4 (run)	
				T5 to T8 (start)	5.3
A, B, E	230/460-3-60	1/4	1.6/.81	W-BL to O-BL	19.4
				W-B to O-B	
	220/380-3-50		1.9/.85	W to O-G	39.3
				Y-B to Y-BL	
	220/415-3-50		1.9/.80	Y-B to Y-G	
				Y-BL to Y-G	
	575-3-60		.65	W-BL to W-B	125.4
	550-3-50		.80	W-B to P	
A-2, B-2, E-2	230-3-60	.25/.08	1.8/1.7	W-B to W	24.7
				W-B to W-BL	
				W to W-BL	
	220-3-50		1.9/2.0	Y-BL to Y-B	49.2
				Y-G to Y-BL	
				Y-G to Y-B	
A-2, AA-2, B-2, C-2, E-2, F-2, H-2	230-3-60	.5/.15	2.4/2.2	W-B to W	16.0
				W-B to W-BL	
				W to W-BL	
	220-3-50		2.5/2.5	Y-BL to Y-B	27.8
				Y-G to Y-BL	
				Y-G to Y-B	
	460-3-60		1.21/1.07	W-B to W	63.9
				W-B to W-BL	
	380-3-50		1.19/1.04	W to W-BL	
				Y-BL to Y-B	111.4
	415-3-50		1.19/1.13	Y-G to Y-BL	
				Y-G to Y-B	
	575-3-60		1.00/.94	W-B to W	102.0
				W-B to W-BL	
	550-3-50		1.04/1.03	Y-BL to Y-B	177.0
				Y-G to Y-B	
AA, C, F, H	115-1-60	1/2	10.3	T1 to T2 (run)	3.2
				T3 to T4 (run)	
				T5 to T8 (start)	2.9
AA, C, F, H	230-1-60	1/2	5.3	T1 to T2 (run)	3.2
				T3 to T4 (run)	
				T5 to T8 (start)	2.9
AA, C, F, H	230/460-3-60	1/2	1.7/.85	W-B to O-BL	12.4
				W-B to O-B	
	220/380-3-50		2.0/1.0	W to O-G	24.5
				Y-B to Y-BL	
	220/415-3-50		2.0/1.0	Y-B to Y-G	
				Y-BL to Y-G	
	575-3-60		.87	W-BL to W-B	76.6
	550-3-50		.91	W-B to P	

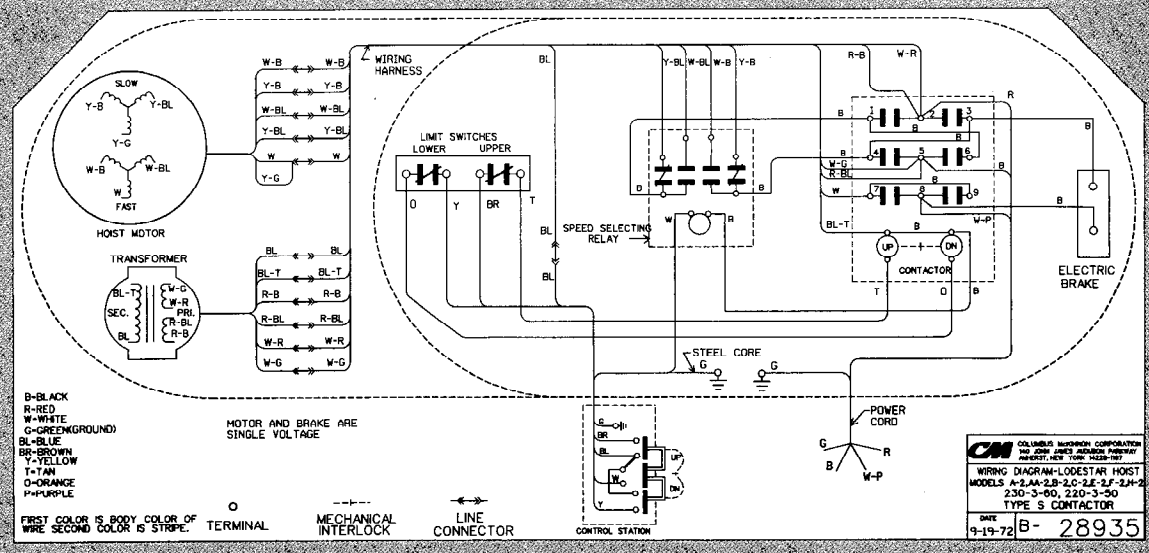
Models	Volts—Phase—Hertz	H.P.	Full Load Current (Amps)	Leads	*D.C. Resist. (Ohms)
J, L R, RT	115-1-60	1	16	T1 to T2 (run)	1.1
				T3 to T4 (run)	
				T5 to T8 (start)	1.5
J, L R, RT	230-1-60	1	9.1	T1 to T2 (run)	1.1
				T3 to T4 (run)	
				T5 to T8 (start)	1.5
J, L R, RT	230/460-3-60	1	4.4/2.2	W-BL to O-BL	5.1
				W-B to O-B	
	220/380-3-50		4.6/2.3	W to O-G	10.2
				Y-B to Y-BL	
	220/415-3-50		4.2/2.1	Y-B to Y-G	
				Y-BL to Y-G	
J-2, L-2, R-2, RT-2	230-3-60	1/.33	4.7/4.4	Y-B to Y-BL	15.2 (230-3-60)
				Y-B to Y-G	18.8 (220-3-50)
				Y-BL to Y-G	
	220-3-50		4.7/4.4	W-B to W-BL	5.7 (230-3-60)
				W-B to W	11.3 (220-3-50)
				W-BL to W	
J-2, L-2, R-2, RT-2	460-3-60	1/.33	2.4/2.5	Y-B to Y-BL	55.3
				Y-B to Y-G	
				Y-BL to Y-G	
	380-3-50		2.7/2.7	W-B to W-BL	27.5
				W-B to W	
	415-3-50		2.5/2.5	W-BL to W	
JJ, LL, RR, RTT	230/460 3-60	2	7.3/3.9	W-B to O-B	2.3
				W-BL to O-BL	
				W to O-G	
	220/380 3-50		8.6/3.7	Y-B to Y-BL	4.6
				Y-B to Y-G	
	220/415 3-50		8.6/3.9	Y-BL to Y-G	
JJ-2, LL-2, RR-2, RRT-2	230-3-60	2/.67	7.8/8.5	Y-B to Y-BL	7.8 (230-3-60)
				Y-B to Y-G	11.4 (220-3-50)
				Y-BL to Y-G	
	220-3-50		7.8/8.5	W-B to W-BL	3.8 (230-3-60)
				W-B to W	5.5 (220-3-50)
				W-BL to W	
JJ-2, LL-2, RR-2, RRT-2	460-3-60	2/.67	4.2/4.6	Y-B to Y-BL	29.9
				Y-B to Y-G	
				Y-BL to Y-G	
	380-3-50		4.8/5.2	W-B to W-BL	14.6
				W-B to W	
	415-3-50		4.2/4.8	W-BL to W	

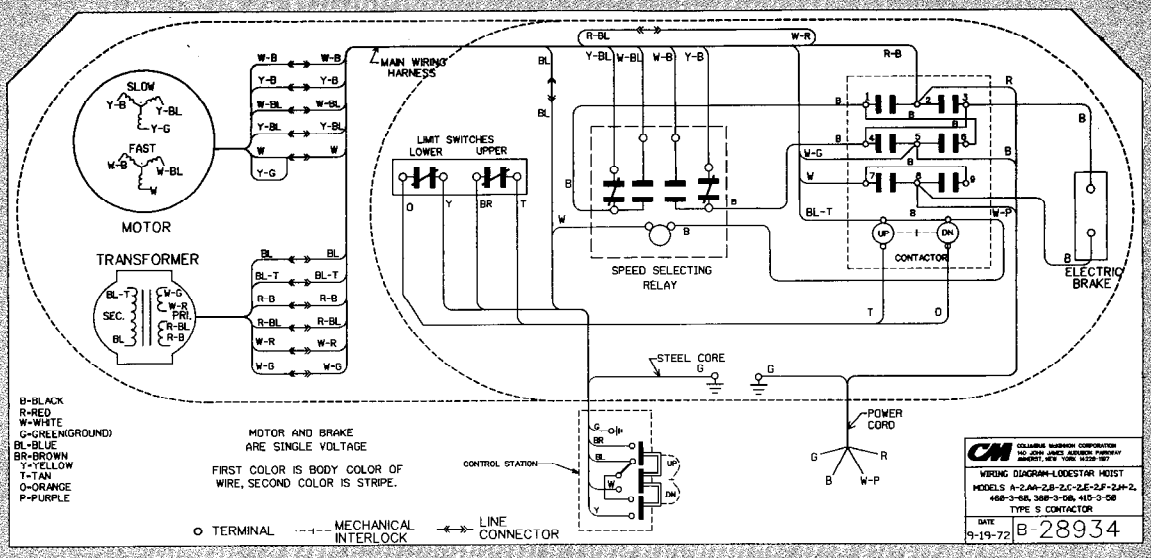
Figure 18. Typical Wiring Diagrams

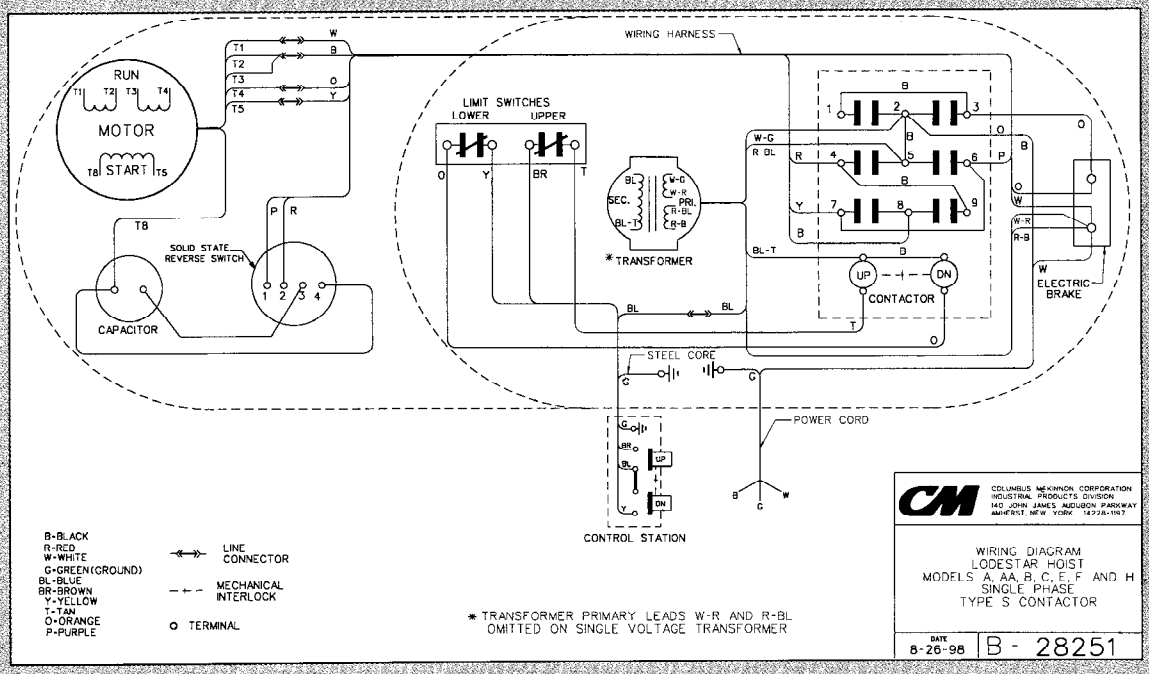
Wiring Diagrams shown are representative. Consult diagram in hoist or furnished with unit.

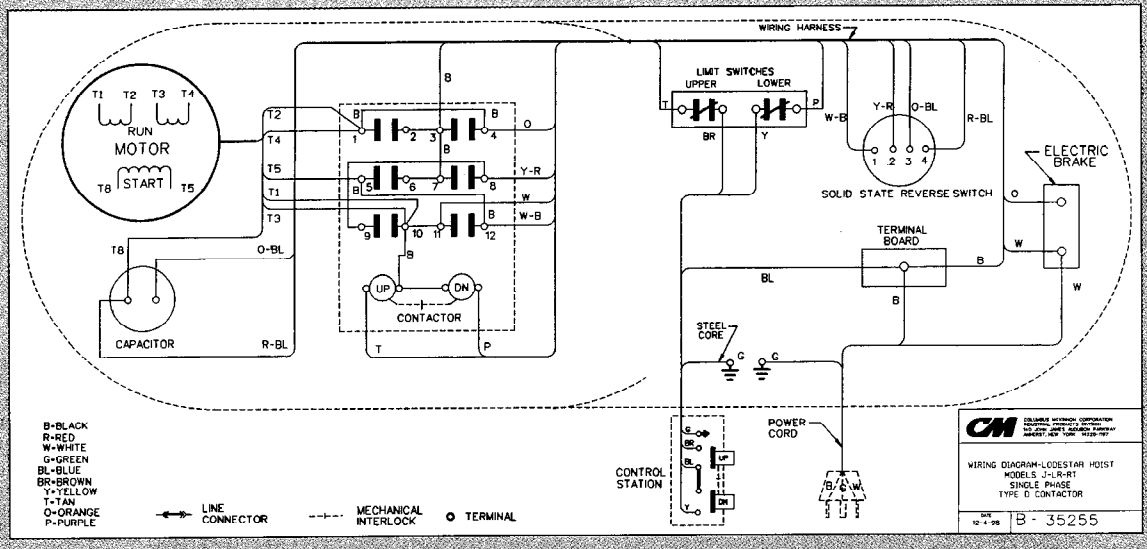


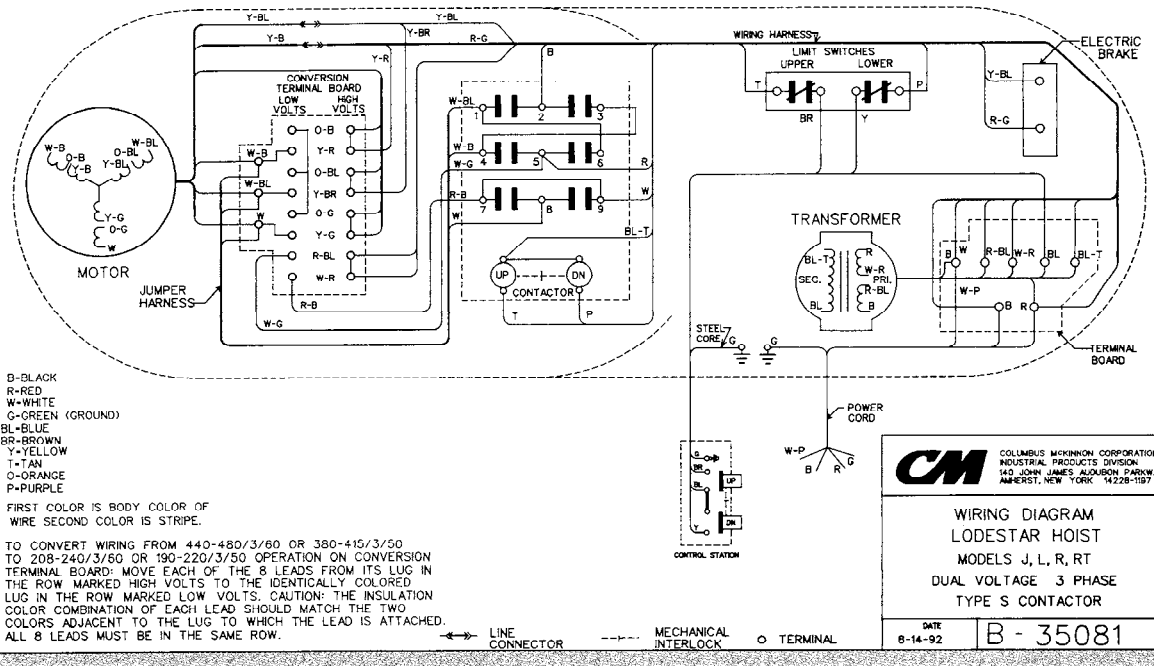





SLOW
FAST
MOTOR
TRANSFORMER
MAIN WIRING HARNESS
LIMIT SWITCHES
LOWER
UPPER
SPEED SELECTING RELAY
CONTACTOR
ELECTRIC BRAKE
STEEL CORE
POWER CORD
CONTROL STATION
B-BLACK
R-RED
W-WHITE
G-GREEN(GROUND)
BL-BLUE
BR-BROWN
Y-YELLOW
T-TAN
O-ORANGE
P-PURPLE
MOTOR AND BRAKE ARE SINGLE VOLTAGE
FIRST COLOR IS BODY COLOR OF WIRE, SECOND COLOR IS STRIPE.
TERMINAL
MECHANICAL INTERLOCK
LINE CONNECTOR
COLUMBUS McKINNON CORPORATION
WIRING DIAGRAM-LODESTAR HOIST
MODELS A-2,AA-2,B-2,C-2,E-2,F-2,H-2,
460-3-60, 380-3-50, 415-3-50
TYPE S CONTACTOR
DATE 9-19-72
B-28934


RUN
MOTOR
START
WIRING HARNESS
LIMIT SWITCHES
LOWER
UPPER
SOLID STATE REVERSE SWITCH
CAPACITOR
* TRANSFORMER
CONTACTOR
ELECTRIC BRAKE
STEEL CORE
POWER CORD
CONTROL STATION
B-BLACK
R-RED
W-WHITE
G-GREEN(GROUND)
BL-BLUE
BR-BROWN
Y-YELLOW
T-TAN
O-ORANGE
P-PURPLE
LINE CONNECTOR
MECHANICAL INTERLOCK
TERMINAL
* TRANSFORMER PRIMARY LEADS W-R AND R-BL OMITTED ON SINGLE VOLTAGE TRANSFORMER
COLUMBUS MCKINNON CORPORATION
INDUSTRIAL PRODUCTS DIVISION
WIRING DIAGRAM
LODESTAR HOIST
MODELS A, AA, B, C, E, F AND H
SINGLE PHASE
TYPE S CONTACTOR
DATE 8-26-98
B - 28251


RUN
MOTOR
START
WIRING HARNESS
LIMIT SWITCHES
UPPER
LOWER
SOLID STATE REVERSE SWITCH
TERMINAL BOARD
CAPACITOR
CONTACTOR
ELECTRIC BRAKE
STEEL CORE
POWER CORD
CONTROL STATION
B-BLACK
R-RED
W-WHITE
G-GREEN
BL-BLUE
BR-BROWN
Y-YELLOW
T-TAN
O-ORANGE
P-PURPLE
LINE CONNECTOR
MECHANICAL INTERLOCK
TERMINAL
COLUMBUS MCKINNON CORPORATION
WIRING DIAGRAM-LODESTAR HOIST
MODELS J-LR-RT
SINGLE PHASE
TYPE D CONTACTOR
DATE 12-4-98
B - 35255



B-BLACK
R-RED
W-WHITE
G-GREEN (GROUND)
BL-BLUE
BR-BROWN
Y-YELLOW
T-TAN
O-ORANGE
P-PURPLE

FIRST COLOR IS BODY COLOR OF WIRE SECOND COLOR IS STRIPE.

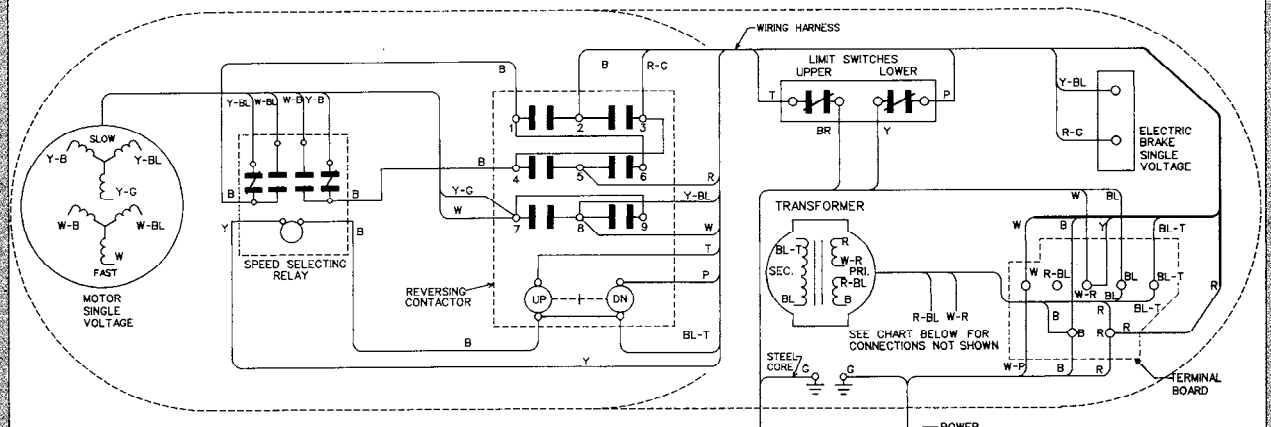
TO CONVERT WIRING FROM 440-480/3/60 OR 380-415/3/50 TO 208-240/3/60 OR 190-220/3/50 OPERATION ON CONVERSION TERMINAL BOARD: MOVE EACH OF THE 8 LEADS FROM ITS LUG IN THE ROW MARKED HIGH VOLTS TO THE IDENTICALLY COLORED LUG IN THE ROW MARKED LOW VOLTS. CAUTION: THE INSULATION COLOR COMBINATION OF EACH LEAD SHOULD MATCH THE TWO COLORS ADJACENT TO THE LUG TO WHICH THE LEAD IS ATTACHED. ALL 8 LEADS MUST BE IN THE SAME ROW.

⟷ LINE CONNECTOR ---|-|--- MECHANICAL INTERLOCK o TERMINAL

COLUMBUS McKINNON CORPORATION
INDUSTRIAL PRODUCTS DIVISION
140 JOHN JAMES AUDUBON PARKWAY
AMHERST, NEW YORK 14228-1197

WIRING DIAGRAM
LODESTAR HOIST
MODELS J, L, R, RT
DUAL VOLTAGE 3 PHASE
TYPE S CONTACTOR

DATE 8-14-92 | B - 35081



B-BLACK
R-RED
W-WHITE
G-GREEN (GROUND)
BL-BLUE
BR-BROWN
Y-YELLOW
T-TAN
P-PURPLE

FIRST COLOR IS BODY COLOR OF WIRE SECOND COLOR IS STRIPE.

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

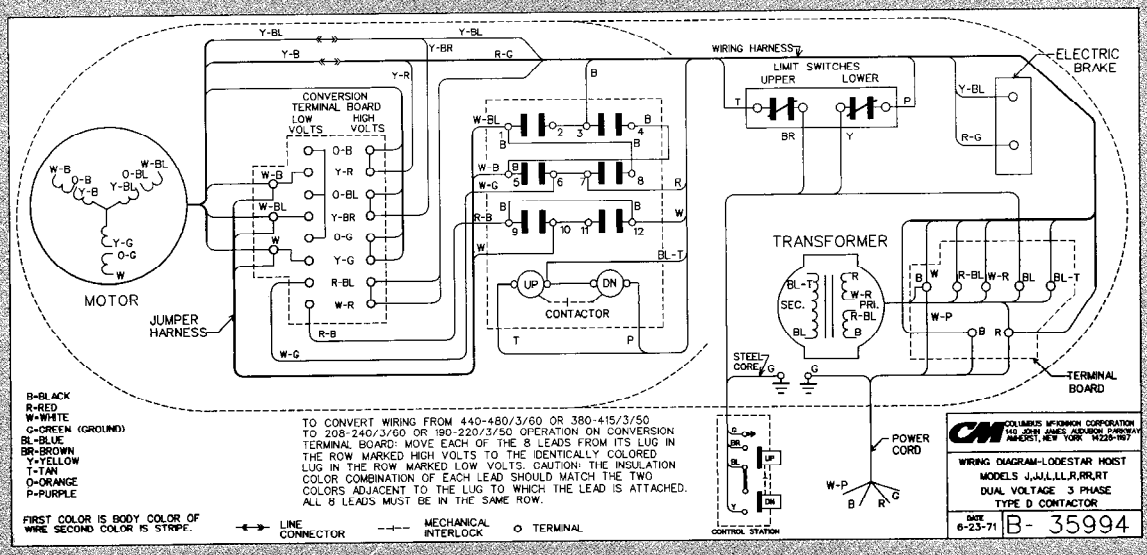
LEAD	CONNECTED TO TERMINAL (COLOR CODED)	
(COLOR CODED)	230-3-60 220-3-50	460-3-60 415-3-50 380-3-50
W-R	B	R-BL
R-BL	R	R-BL

---|-|--- MECHANICAL INTERLOCK o TERMINAL

COLUMBUS McKINNON CORPORATION
INDUSTRIAL PRODUCTS DIVISION
140 JOHN JAMES AUDUBON PARKWAY
AMHERST, NEW YORK 14228-1197

WIRING DIAGRAM
LODESTAR HOIST
MODELS J-2, L-2, R-2, RT-2
230-3-60, 460-3-60, 220-3-50
380-3-50, 415-3-50
TYPE S CONTACTOR

DATE 8-14-92 | B - 35079



B=BLACK
R=RED
W=WHITE
G=GREEN (GROUND)
BL=BLUE
BR=BROWN
Y=YELLOW
T=TAN
O=ORANGE
P=PURPLE

FIRST COLOR IS BODY COLOR OF WIRE SECOND COLOR IS STRIPE.

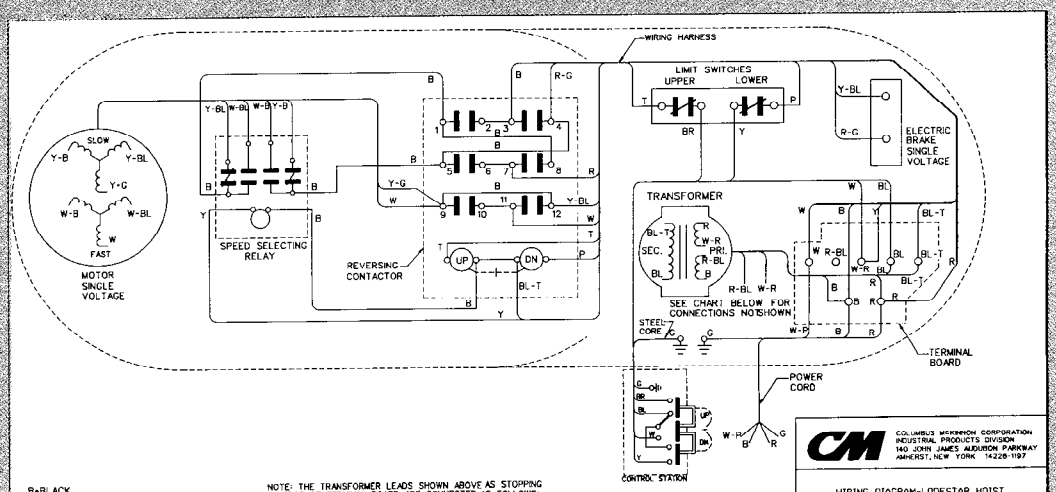
TO CONVERT WIRING FROM 440-480/3/60 OR 380-415/3/50 TO 208-240/3/60 OR 190-220/3/50 OPERATION ON CONVERSION TERMINAL BOARD: MOVE EACH OF THE 8 LEADS FROM ITS LUG IN THE ROW MARKED HIGH VOLTS TO THE IDENTICALLY COLORED LUG IN THE ROW MARKED LOW VOLTS. CAUTION: THE INSULATION COLOR COMBINATION OF EACH LEAD SHOULD MATCH THE TWO COLORS ADJACENT TO THE LUG TO WHICH THE LEAD IS ATTACHED. ALL 8 LEADS MUST BE IN THE SAME ROW.

LINE CONNECTOR — MECHANICAL INTERLOCK — O TERMINAL

COLUMBUS MCKINNON CORPORATION
140 JOHN JAMES AUDUBON PARKWAY
AMHERST, NEW YORK 14228-1197

WIRING DIAGRAM-LODESTAR HOIST
MODELS J,JJ,L,LL,R,RR,RT
DUAL VOLTAGE 3 PHASE
TYPE D CONTACTOR

DATE 6-23-71 B - 35994



B=BLACK
R=RED
W=WHITE
G=GREEN (GROUND)
BL=BLUE
BR=BROWN
Y=YELLOW
T=TAN
P=PURPLE

FIRST COLOR IS BODY COLOR OF WIRE SECOND COLOR IS STRIPE.

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

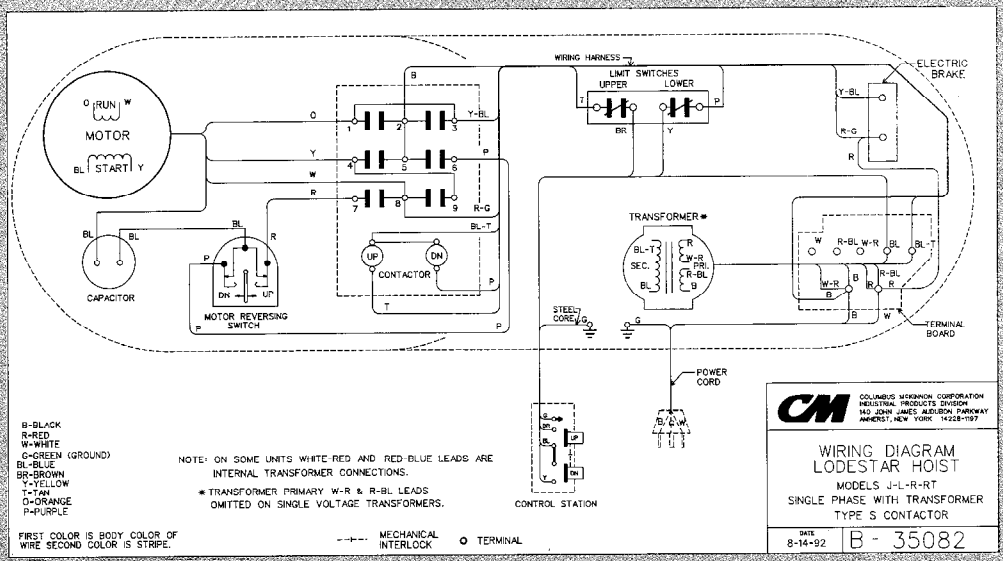
LEAD	CONNECTED TO TERMINAL (COLOR CODED)	
(COLOR CODED)	230-3-60 220-3-50	460-3-60 415-3-50 380-3-50
W-R	B	R-BL
R-BL	R	R-BL

MECHANICAL INTERLOCK — O TERMINAL

COLUMBUS MCKINNON CORPORATION
INDUSTRIAL PRODUCTS DIVISION
140 JOHN JAMES AUDUBON PARKWAY
AMHERST, NEW YORK 14228-1197

WIRING DIAGRAM-LODESTAR HOIST
MODELS J-2, JJ-2, L-2, LL-2,
R-2, RR-2, RT-2, RRT-2
230-3-60, 460-3-60, 220-3-50
380-3-50, 415-3-50

DATE 12-2-96 B - 36991



B=BLACK
R=RED
W=WHITE
G=GREEN (GROUND)
BL=BLUE
BR=BROWN
Y=YELLOW
T=TAN
O=ORANGE
P=PURPLE

FIRST COLOR IS BODY COLOR OF WIRE SECOND COLOR IS STRIPE.

NOTE: ON SOME UNITS WHITE-RED AND RED-BLUE LEADS ARE INTERNAL TRANSFORMER CONNECTIONS.

* TRANSFORMER PRIMARY W-R & R-BL LEADS OMITTED ON SINGLE VOLTAGE TRANSFORMERS.

MECHANICAL INTERLOCK — O TERMINAL

COLUMBUS MCKINNON CORPORATION
INDUSTRIAL PRODUCTS DIVISION
140 JOHN JAMES AUDUBON PARKWAY
AMHERST, NEW YORK 14228-1197

WIRING DIAGRAM
LODESTAR HOIST
MODELS J-L-R-RT
SINGLE PHASE WITH TRANSFORMER
TYPE S CONTACTOR

DATE 8-14-92 B - 35082

ASSEMBLY INSTRUCTIONS

HOOK OR LUG SUSPENSION

Models E, H, R, RR, E-2, H-2, R-2 and RR-2.
Assemble the dead end bolt and block through the suspension adapter as shown in Figure 19.

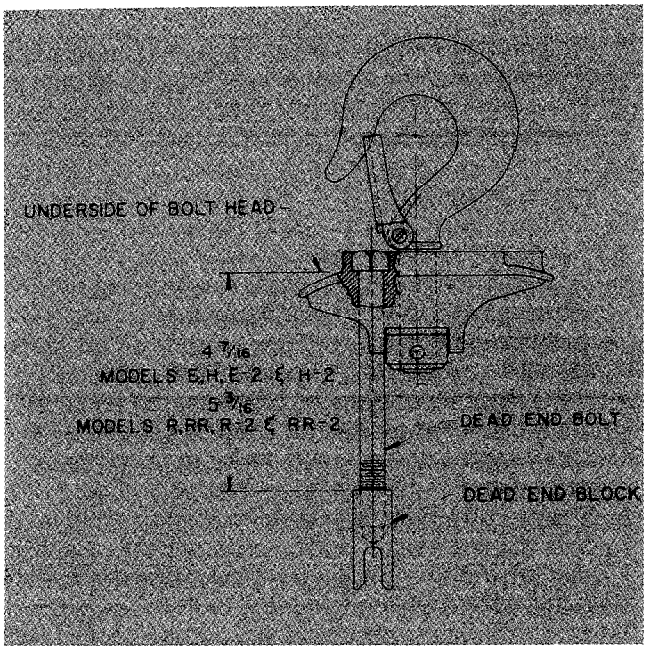


Figure 19. Hook Suspension

WEATHERPROOF HOIST

Apply Prematex #2 (or equal) on all mating surfaces where gaskets are not used when reassembling.

Check to see that control station gasket and neoprene grommet are in good condition and in correct position when reassembling.

GEARING

Models JJ, LL, RR, JJ-2, LL-2, RR-2, RRT and RRT-2 have a special Liftwheel Gear (627-303) and Intermediate Pinion (627-325).

If the gear train in these hoists is disassembled, the following steps must be observed in order to properly orient the three parts when reassembling:

1. Assemble liftwheel gear to liftwheel.

   NOTE: ***These parts have their splines keyed in such a way that they will go together only one way. See Figure 20.***

2. To install the intermediate pinion, align the arrows that are stamped on the pinion and liftwheel gear so they point toward each other.
3. Check operation of gear train by rotating the pinion four (4) complete revolutions; liftwheel gear will turn one (1) complete revolution and the arrows will again be aligned as shown. If the arrows do not align or there is binding between the gear teeth, repeat the above steps.
4. For gearing lubrication instructions, see page 16.

FASTENERS

Models A thru H-2 tighten motor housing cover screws (627-108) to where they have a minimum breakaway torque of 48 pound inch and the brake attaching screws (627-253) have 50 pound inch minimum breakaway torque.

Models J thru RRT-2 tighten limit switch bracket attaching screws (627-220), motor end bell attaching screws (627-411), brake attaching screws (627-253) and hexagonal brake stud (627-265) to where they have a minimum breakaway torque of 50 pound inch. The liftwheel gear nut (627-305) should be tightened to a seating torque of 85 pound feet.

LOWER HOOK BLOCK PIN

When removing or installing the lower hook block pin (627-764), care must be taken so as to prevent damaging the pin and/or hook block. These pins are tapered groove, pins and as a result, they can only be removed in one direction. To remove the pin, a V-Block, drift and hammer (or slow acting press) are required. The drift should be the same diameter as the pin (5/16" diameter for Models A, A-2, AA, AA-2, B, B-2, C, C-2, F, and F-2; and 3/8" diameter for Models J, J-2, JJ, JJ-2, L, L-2, LL and LL-2), and it should be placed on the small end of the pin. The small end of the pin is the end opposite the end on which the 3 grooves are visible. Place the hook block in the V-Block and drive the pin out using the drift and a hammer or slow acting press.

To re-install the pin, the parts must be arranged the same as they were when the pin was removed. To do this, use the small end of the pin as a gage. First check the holes in the hook block body and determine which hole is the largest. Place the hook block body in the V-Block with the larger hole on top. Next, check each end of the hole in the lower hook chain block (627-775) and determine which end is the largest. Place the chain in the slot of the chain and insert the chain block, with the large hole on top, into the hook block body. Align the holes in the hook block body with the hole in the chain block and insert the small end of the pin in the hole. Push the pin in by hand until it stops and then use a hammer or slow acting press to drive the pin into position so that the end of the pin is flush with the outside surface of the hook block body.

⚠ WARNING

Use of improper lower hook chain block pin as well as improper installation of this pin can cause the pin to break and allow the load to fall.

TO AVOID INJURY AND PROPERTY DAMAGE:
Use only CM supplied, special high strength lower hook chain block pin to attach the chain to the lower hook block and install the pin as directed above.

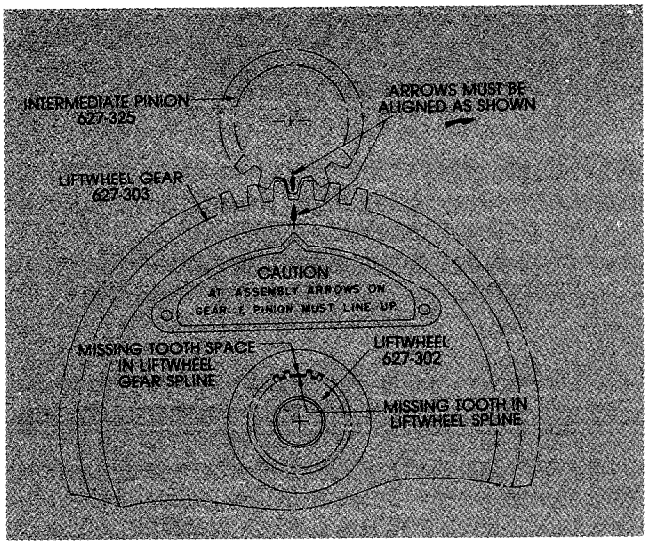


Figure 20. Non-Circular Gearing

REMOVAL AND INSTALLATION OF LOAD CHAIN

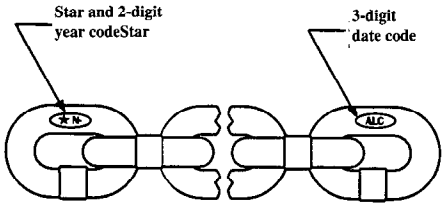
⚠ WARNING

Improper installation (reeving) of the load chain can result in a dropped load.

TO AVOID INJURY/DAMAGE:

- Verify use of proper size and type of hoist load chain for specific hoist.
- Install load chain properly as indicated below.

USE ONLY CM STAR (★) GRADE LOAD CHAIN AND CM REPLACEMENT PARTS. USE OF OTHER CHAIN AND PARTS MAY BE DANGEROUS AND VOIDS FACTORY WARRANTY



⚠ WARNING

USE OF COMMERCIAL OR OTHER MANUFACTURERS' CHAIN AND PARTS TO REPAIR CM HOISTS MAY CAUSE LOAD LOSS.

TO AVOID INJURY:

Use only CM supplied replacement load chain and parts. Chain and parts may look alike, but CM chain and parts are made of specific material or processed to achieve specific properties.

NOTE: ***When installing load chain in Models E, H, R, RR, E-2, H-2, R-2, and RR-2 by either of the "starter chain" methods, two loose end connecting links (627-743) must be used.***

Hoist load chain can be installed by any one of several methods. The first method is recommended when replacing severely worn load chain and requires disassembling the hoist. Method 2 does not require hoist disassembly, whereas Method 3 requires only partial disassembly.

Method #1

a) Disconnect hoist from power supply.

b) Remove back frame cover and disengage the limit switch guide plate from the traveling nuts, see page 17 or 18.

c) Detach loose end of load chain from hoist frame, see Figure 7. Also on single reeved models, detach the lower hook block from the load chain. On double reeved models E, H, R, RR, E-2, H-2, R-2 and RR-2, unfasten the dead end side of load chain. On triple reeved models RT, RRT, RT-2 and RRT-2, detach the load chain from the lower hook block.

d) Continue to disassemble the hoist and inspect the liftwheel, chain guides, motor housing and gear housing which if worn or damaged could cause early failure of the new chain. Parts can be easily identified by referring to pages 33 thru 38.

e) If the liftwheel pockets, in particular the ends, are worn or scored excessively, replace liftwheel. If chain guides and housing are worn or cracked, these parts should also be replaced.

f) Reassemble hoist with the new load chain inserted over the liftwheel. Position chain with the weld on upstanding links away from liftwheel and leave only one foot of chain hanging free on loose end side. Make sure the last chain link is an upstanding link. On double reeved models, make sure that the new load chain has an even number of links. On triple reeved models, make sure that the new chain has an odd number of links. This will prevent twist in chain.
To simplify handling when reassembling the hoist, a short undamaged piece of the old chain may be used as a "starter chain". Position this piece of chain in exactly the same manner as explained above for the "new chain", and complete the reassembly of the hoist.

g) Attach the loose end link to chain and connect it to the hoist frame with the loose end screw, washer and lockwasher, see Figure 7. BE SURE THERE IS NO TWIST.
If a starter chain is used, the loose end link (two links required for double reeved models) can serve as a temporary coupling link to connect together the starter chain in the hoist and the new load chain to be installed. Then, under power, reeve the new load chain through the liftwheel area, replacing the starter chain in unit. Run enough chain through to attach loose end link to hoist frame.

CAUTION: ***For double reeved models, be sure to disconnect one of the loose end links from load chain before attaching to hoist frame.***

h) For single reeved models, attach the hook block to load chain (see Page 29) and proceed to step K.

i) For double reeved models, run the hoist ➧ (UP) until only 3 feet in chain remains on dead end side. This will minimize the chance of introducing a twist between hook block and hoist.
Allow the chain to hang free to remove twists.

Using a wire as a starter, insert the chain, flat link first, into lower hook block (upstanding links will have weld toward sheave) and pull through. Insert last link into slot in dead end block making sure that no twist exists in the reeving at any point. Assemble dead end pin, washer and cotter pin as shown in Figure 7.

j) For triple reeved models, run the hoist ▲ (UP) until only 4 feet of chain remains on the dead end side. This will minimize the change of introducing a twist between the hook block and hoist.
Allow the chain to hang free to remove twists.
Using a wire as a starter, insert the chain, upstanding link first, into lower hook block (upstanding links will have welds toward sheave) and pull through.
Using a wire as a starter, insert the chain, upstanding link first, into the outboard cloverleaf of the hanger. Make sure there are no twists between the hook block and the sheave hanger and then pull the chain through. In the sheave hanger, the upstanding links will have the welds toward the sheaves.
Run the chain down to the hook block and making sure there are no twists between the sheave hanger and the hook block, insert the end of the chain into the recess in the top of the hook block. Slide the dead end screw, with flat sides vertical, through the hole in the top of the hook block. Place the lockwasher and nut on the threaded end of the dead end screw. Use an Allen wrench to hold the head of the dead end screw stationary and rotate the nut to tighten. To properly tighten the nut, apply a torque of 45 to 55 pound feet while holding the head of the dead end screw stationary.
Also, when tightening this dead end screw, it should be held firmly in position and torqued from the nut end to avoid damaging the screw and/or chain.

k) Adjust limit switches as described on pages 17 and 18. If the new load chain is longer than the old, check to be sure limit switch will allow for new length of lift. In the event maximum adjustment does not allow entire length of lift, check with CM for modification necessary.
Do not allow hook block to hit hoist or allow load chain to become taut between loose end screw and frame or else serious damage will result. If hook block should inadvertently hit the hoist—the hoist frames, load chain and hook block should be inspected for damage before further use.

Method #2
Treat the old load chain in hoist as a "starter chain" and proceed with Steps 1a, b, c and f thru k above.

Method #3
a) First proceed with Steps 1a, b, c above.
b) Then, carefully run the load chain out of hoist.
c) Disconnect hoist from power supply.
d) Remove the electric brake assembly.
e) Rotate the brake hub by hand, at the same time feeding the load chain into and through liftwheel area with hoist upside down or using a wire to pull the load chain up onto liftwheel. Position the chain on liftwheel as explained in Step 1f.
f) Refer to Steps 1g thru k above to complete the installation.

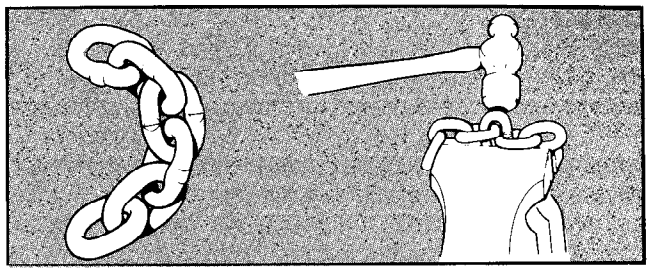


Figure 21. Cutting Chain by Nicking

CUTTING CHAINS

CM Lube-Link load chain is hardened and it is difficult to cut. The following methods are recommended when cutting a length of new chain from stock or cutting off worn chain.

1. Use a grinder and nick the link on both sides (Figure 21), then secure the link in a vise and break off with a hammer.
2. Use a 7" minimum diameter by 1/8" thick abrasive wheel (or type recommended by wheel supplier) that will clear adjacent links.
3. Use a bolt cutter (Figure 22) similar to the H. K. Porter No. 0590MTC with special cutter jaws for cutting hardened chain (1" long cutting edge).

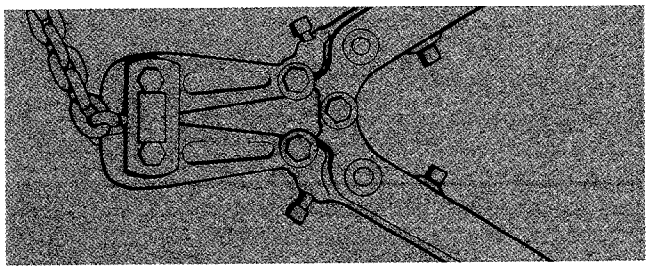


Figure 22. Cutting Chain with a Bolt Cutter

⚠ WARNING
Cutting Chain Can Produce Flying Particles
To Avoid Injury: • Wear Eye Protection • Provide A Shield Over Chain To Prevent Flying Particles.