

LODESTAR[®]

Operating, Maintenance & Parts Manual
1/4 To 2 Ton
250 Kg. To 2000 Kg.

ENTERTAINMENT



Columbus McKinnon Corporation
CM Entertainment Division
140 John James Audubon Parkway
Amherst, New York 14228-1197
1-800-888-0985
1-716-689-5400
cmrigging.com

GENERAL INFORMATION

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.

LIMITATION OF WARRANTIES, REMEDIES AND DAMAGES

THE WARRANTY STATED BELOW IS GIVEN IN PLACE OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE, NO PROMISE OR AFFIRMATION OF FACT MADE BY ANY AGENT OR REPRESENTATIVE OF SELLER SHALL CONSTITUTE A WARRANTY BY SELLER OR GIVE RISE TO ANY LIABILITY OR OBLIGATION.

Seller warrants that on the date of delivery to carrier the goods are free from defects in workmanship and materials.

SELLER'S SOLE OBLIGATION IN THE EVENT OF BREACH OF WARRANTY OR CONTRACT OR FOR NEGLIGENCE OR OTHERWISE WITH RESPECT TO GOODS SOLD SHALL BE EXCLUSIVELY LIMITED TO REPAIR OR REPLACEMENT, F.O.B. SELLER'S POINT OF SHIPMENT, OF ANY PARTS WHICH SELLER DETERMINES TO HAVE BEEN DEFECTIVE or if Seller determines that such repair or replacement is not feasible, to a refund of the purchase price upon return of the goods to Seller.

Any action against Seller for breach of warranty, negligence or otherwise, must be commenced within one year after such cause of action occurs.

NO CLAIM AGAINST SELLER FOR ANY DEFECT IN THE GOODS SHALL BE VALID OR ENFORCEABLE UNLESS BUYER'S WRITTEN NOTICE THEREOF IS RECEIVED BY SELLER WITHIN ONE YEAR FROM THE DATE OF SHIPMENT.

Seller shall not be liable for any damage, injury or loss arising out of

the use of the goods if, prior to such damage, injury or loss, such goods are (1) damaged or misused following Seller's delivery to carrier; (2) not maintained, inspected, or used in compliance with applicable law and Seller's written instructions and recommendations; or (3) installed, repaired, altered or modified without compliance with such law, instructions or recommendations.

UNDER NO CIRCUMSTANCES SHALL SELLER BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES AS THOSE TERMS ARE DEFINED IN SECTION 2-715 OF THE UNIFORM COMMERCIAL CODE.

INDEMNIFICATION AND SAFE OPERATION

Buyer shall comply with and require its employees to comply with directions set forth in instructions and manuals furnished by Seller and shall use and require its employees to follow such instructions and manuals and to use reasonable care in the use and maintenance of the goods. Buyer shall not remove or permit anyone to remove any warning or instruction signs on the goods. In the event of personal injury or damage to property or business arising from the use of the goods, Buyer shall within 48 hours thereafter give Seller written notice of such injury or damage. Buyer shall cooperate with Seller in investigating any such injury or damage and in the defense of any claims arising therefrom.

If Buyer fails to comply with this section or if any injury or damage is caused, in whole or in part, by Buyer's failure to comply with applicable federal or state safety requirements, Buyer shall indemnify and hold Seller harmless against any claims, loss or expense for injury or damage arising from the use of the goods.



WARNING

Alterations or modifications of equipment and use of non-factory repair parts can lead to dangerous operation and injury.

TO AVOID INJURY:

- Do not alter or modify equipment.
- Do use only CM replacement parts.



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CM HOIST PARTS AND SERVICES ARE AVAILABLE WORLD WIDE

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 World Wide. 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 and Entertainment Hoist Service Stations. To quickly obtain the name of the U.S. Service Center located nearest you, call (800) 888-0985. Fax: (716) 689-5644.

MASTER PARTS DEPOT

ARGENTINA

IFAN RENIERI Y CIA SA.
Aristobulo Del Valle 1933/43
(1295) Buenos Aires,
Argentina

UPSTAGE, S.A.
Warnes 2351
(1427) Capital Federal
Buenos Aires, Argentina

AUSTRIA

Tüchler GmbH
Rennbahnweg 78
Vienna 1220
Austria
(43)-1-400-10-23
Fax (43)-1-400-10-20

AUSTRALIA

PWB ANCHOR
441 Grimshaw Street
Bundoora Victoria,
Australia 3083
(61)-39-467-2933
Fax (61)-39-467-4320

BRASIL

HABITASUL S.A. COMERCIO
EXTERI
157-Sala 1302
90.010.030
Porto Alegre-RS-Brasil

ROSCO DO BRASIL
Rua Antonio De Barros #827
Cep 03401-000
Sao Paulo, Brasil

BOLIVIA

SONILUM ILUMINACION Y
SONIDO
Tucuman 20 (6 Este) Equipetrol
Santa Cruz De La Sierra
Bolivia

CHINA

HANGZHOU, LILA LIFT/LASH. CO.
Zhejiang Hi-Tech Zone
Hangzhou, Zhejiang, 310053
PR. Of China
(86)-571-8669-6946
Fax (86)-571-8669-6219

ENGLAND

TOMCAT UK Ltd.
Unit 2, Skiddaw Rd
Croft Business Park
Bromborough, Wirral CH62 3RB
United Kingdom
(44)-151-482-3100
Fax (44)-151-482-3111

FRANCE

SONOSS
Avenue De La Rotonde
Sac Postal 9
59465 Lomme, France
Lomme (Cedex)
(33)-3-20-00-92-10
Fax (33)-3-20-00-92-11

GERMANY

LMP LICHTTECHNIK
Gildestrasse 55
49477 Ibbenburen, Germany

PFAFF SILBERBLAU
Postfach 102229
Augsburg 86012, Germany

HOAC HANDELS GMBH
Pferdsweide 39C
Nordrhein-Westfalen, Deutschla
Mores, Germany 47441
(49)-2841-90-828-28
Fax (49) 2841-90-828-70

ISRAEL

GILON SUPPLY (1946) LTD
21, Frug St.
Tel-Aviv, 63417, Israel

ITALY

Litec Srl
Via Venier 52
30020 Macron (Ve)
Italy
(39)-041-596-0000
Fax (39) 041-595-1082

JAPAN

KATSUYAMA KIKAI LTD
104-18 Honjounishi 2
Chome, Higashiosaka,
Osaka, 578-0965
Japan
(81)-6-6747-6390
Fax (81)-6-6748-2039

SHIMIZU OCTO INC
1-4-1 Shimoochiai, Shinjuku-Ku
Tokyo 161-0033
Japan
(81)-0-3-3360-7743
Fax (81)-0-3-3360-1664

MEXICO

COLUMBUS McKINNON
De Mexico S.A. De C.V.
Venustiano Carranza #301
Santiago Tianguistenco
C.P. 52600, Mexico

NETHERLANDS

Louis Reynders B.V.
Symon Spiersweg 13A
Postbus 2118
1500 GC Zaandam
Netherlands
(31)-75-650-4750
Fax (31)-75-650-4760

SINGAPORE

CSP PRODUCTIONS (PTE) LTD
No 3 Upper Aljunied Link 05-04
Joo Seng Warehouse Tower B
Singapore 367902
(65)-6283-0220
Fax (65)-6284-0220

"ENTERTAINMENT HOIST" SERVICE STATIONS

CALIFORNIA

OTTO SYSTEMS, INC.
12010 Bloomfield Ave.
Sante Fe Springs, CA 90670
562/462-1612 or 800/596-7392
Fax 562/462-1617
or
7656 Las Positas Road
Livermore, CA 94551
925/245-8800 or 800/508-6886
Fax 925/245-8804

STAGE RIGGING
2690 Middlefield Road, Unit F
Redwood City, CA 94063
650/299-1189
Fax 650/299-1617

FLORIDA

NATIONAL PRODUCTIONS SERVICES
9561 Satellite Blvd.
Orlando, FL 32837
407/857-6446
Fax 407/857-6264

GEORGIA

ATLANTA RIGGING SYSTEMS
1270 Tacoma Dr.
Atlanta, GA 30318
404/355-4370
Fax 404/355-4360

ACE INDUSTRIES, INC.
6295 McDonough Drive
Norcross, GA 30093
770/441-0898 or 800/733-2231
Fax 800/628-3648

ILLINOIS

REED RIGGING
2309 S. Keeler Ave.
Chicago IL 60623
773/521-7333
Fax 773/521-1709

INDIANA

HORNER ELECTRIC COMPANY, INC.
1521 East Washington Street
Indianapolis, IN 46201
317/639-4261
Fax 317/639-4342

IOWA

VMI HOIST & CRANE SERVICES
901 17th Street NE
Cedar Rapids, IA 52406
319/365-4662
Fax 319/365-8075

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

MISSOURI

INDEPENDENT ELECTRIC MACHINERY
4425 Oliver Street
Kansas City, MO 66106
913/362-1155
Fax 913/904-3330

"ENTERTAINMENT HOIST" SERVICE STATIONS

NEVADA

SILVER STATE WIRE ROPE
5380 S. Valley View Blvd.
Suite A
Las Vegas, NV 89118
702/597-2010
Fax 702/896-1977

TOMCAT USA, INC
4020 Ali Baba Lane
Bldg. D, Suite A
Las Vegas, NV 89118
702/798-6200
Fax 702/798-6225

NEW JERSEY

SHUPPER-BRICKLE EQUIPMENT CO.
2394 Route 130, Suite C
Dayton, NJ 08810
732/438-3888
Fax 732/438-3889

NEW YORK

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

NORTH CAROLINA

TEAM SESCO
2225 Freedom Drive
Charlotte, NC 28208
704/372-4832 or 800/487-3726
Fax 704/358-1098

OHIO

MAZZELLA LIFTING TECHNOLOGIES
21000 Aerospace Parkway
Cleveland, OH 44142
440/239-5700 or 800/362-4601
Fax 440/239-5707

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.
5460-B Pottsville Pike
Leesport, PA 19533
610/916-8000 or 877/916-8018
Fax 610/916-7957

MOUNTAIN PRODUCTIONS
80 New Fredrick St.
Wilkes-Barre, PA 18702
570/826-5566 or 800/733-5553
Fax 570/824-6139

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
Fax 713/228-0931

SHIMIZU INTERNATIONAL PRO-
DUCTION SERVICES, INC.
1500 East Belt Line Road
Carrollton, TX. 75006

"ENTERTAINMENT HOIST" SERVICE STATIONS

ALBERTA

BENNETT & EMMOTT, LTD.
18131 118th Avenue
Edmonton, Alberta T5S 1M8
403/454-9000
Fax 403/454-8990

CHRISTIE LITES
2610 3rd Avenue
Calgary, AB T2A 2L5
403/243-2688
Fax 403/243-2689

"ENTERTAINMENT HOIST" SERVICE STATIONS

ALBERTA

**COLUMBUS McKINNON, LTD.
10311-174th Street
Edmonton, Alberta T5S 1H1
800/263-1997
Fax 403/486-6160

BRITISH COLUMBIA

FLECK BROTHERS, LTD.
4084 McConnel Court
Burnaby, British Columbia V5A 3N7

CHRISTIE LITES
3686 Bainbridge Ave.
Burnaby, BC V5C 5A9
604/255-9943
Fax 604/255-9194

STUDIO CITY RENTALS
2050 Alfa Avenue
Burnaby, BC V5C 5A9
604/291-9414
Fax 604/292-6786

MANITOBA

KING'S ELECTRIC MOTORS, INC.
633 Tyne Avenue
Winnipeg, Manitoba R2L 1J5
204/663-5332
Fax 204/663-4059

NOVA SCOTIA

*W & A MOIR
95 Ilsey Ave.
Burnside Park, Nova Scotia B3B 1L5
902/468-7720
Fax 902/468-3777

ONTARIO

CHRISTIE LITES
102-15 North Queen St.
Toronto, ON M8Z 6C1
416/644-1010
Fax 416/644-0404

PRG LIGHTING
2480 Tedlo St.
Mississauga, ON L5A 3V3
905/270-9050
Fax 905/270-2590

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

STUDIO CITY RENTALS
75 Commissioner St.
Toronto, ON M5A 1A6
416/465-6434
Fax 416/465-7008

*TORONTO ELECTRIC HOIST SALES & SERVICE
9 CoDeco Court
North York, Ontario M3A 1A1
416/386-0820
Fax 416/386-0821

*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
3800 TransCanada Highway
Pointe-Claire, Quebec H9R 1B1
514/428-5511
Fax 514/428-5555

*LEGER PALANS ET OUTILLAGES, INC.
7995-17th Ave.
Montreal, Quebec H1Z 3R2
514/376-3050
Fax 514/376-0657

SOLOTECH
4820 4th Avenue
Montreal, QC H1Y 2T8
514/526-7725
Fax 514/526-7729

*ARE ALSO MASTER PARTS DEPOTS

**MASTER PARTS DEPOT ONLY

SAFETY PRECAUTIONS

Each Entertainment-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), the Occupational Safety and Health Act, British Health Safety Executives, TUV and CE Directive. 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 A17.1). 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.



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** lift people.
2. **NOT** allow people on unsecured load without fall protection.
3. **NOT** exceed rated capacity of hoist.
4. **NOT** remove or obscure any capacity or warning label.
5. Check the supporting structure. The connection between the load hook and structure. The load itself and the connection between the hoist support and the load for their ability to withstand the loads imposed with an adequate design factor.
6. Tie off the load with auxiliary chains or cables before access to the area beneath the load is permitted. As an alternative, the system may be designed such that malfunction or failure of one hoist's load bearing components does not cause load loss and/or overloading of any other hoists in the system. Note that in such a system, hoist performance and function must be monitored visually or with use of load cells.
7. Read hoist manual and special instructions before installing and operating the hoist.



CAUTION

Successful Theatrical Hoist Operation Requires the following actions:

At the loose end, maintain a minimum of 24 inches of chain freely hanging over the side of hoist.

Keep load chain well lubricated using Lubriplate® 10R Bar and Chain oil.

Do make sure hoist is phased properly and chain travel limits function properly.

If a chain container is used, inspect before each use for damaged, loose hardware and water drainage provisions. Make certain container attachment hardware has an adequate design factor of a minimum of 5 to 1. Also, make sure chain container is of sufficient capacity: chain chain in fully loaded container shall not exceed 75% of container height.



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. 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.

FORWARD

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 handbook 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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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 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 included hoist-duty motor, rugged hoist brake, magnetic reversing contactor and voltage conversion board (dual voltage units).

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 the hoist operator.

Failure to operate the equipment as directed in the manual may cause injury.

Before putting hoist into service, fill in the information below. Refer to the hoist identification plate.

Model Number _____

Serial Number _____

Purchase Date _____

Voltage _____

Rated Load _____

Table 1. Specifications

Entertainment-Lodestar Electric Chain Hoists

Maximum Capacity (Tons)	Model	*Lifting Speed Per Min. (Feet)	*Lifting Speed Per Min. (M)	Motor H.P.	Motor K.W.	Shortest Distance Between Hooks (Inches)	Shortest Distance Between Hooks (mm)	Net Weight (Lbs.)	Net Weight (Kg.)
Single Speed 230/460-3-60 or 220/380-3-50 or 220/415-3-50									
1/4	B	16	4.88	1/4	.186	14-1/4	362.0	57	25.8
1/4	C	32	9.75	1/2	.372	14-1/4	362.0	65	29.5
1/2	F	16	4.88	1/2	.372	14-1/4	362.0	64	29.0
1/2	J	32	9.75	1	.746	15-9/16	395.3	115	52.2
1	L	16	4.88	1	.746	15-9/16	395.3	117	53.1
2	R	8	2.44	1	.746	22-1/2	571.5	136	61.7
Single Speed 230/460-3-60 or 220/380-3-50 or 220/415-3-50									
1	LL	32	9.75	2	1.49	15-9/16	395.3	121	54.9
2	RR	16	4.88	2	1.49	22-13/16	579.4	136	61.7

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

ACCESSORIES

HOOK SUSPENSIONS

Swivel and rigid type hook suspensions (see Figure 1) are available for all Lodestar Electric Hoists. However, swivel type hook suspensions are normally recommended for most applications.

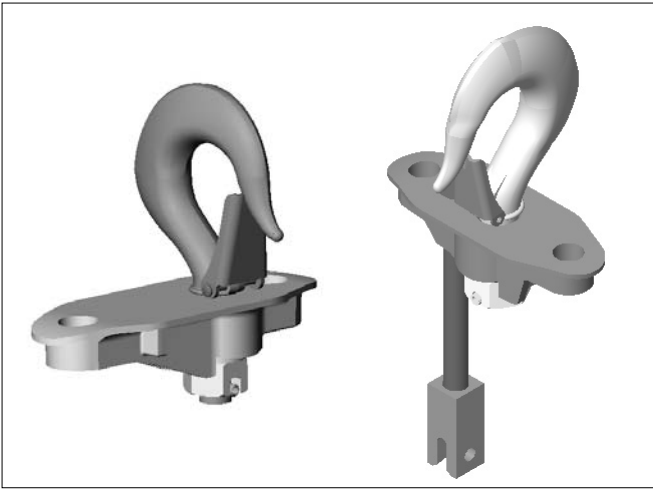


Figure 1. Hook Suspensions

LATCHLOK® HOOKS

CM's Latchlok hooks (see Figure 2) are available to replace the standard upper and lower hooks used on the Lodestar Electric Hoists.



Figure 2. Upper or Lower Latchlok® Hook

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 using the hoist, make sure the voltage change board (Key# 627-1013) is connected for the intended power supply the hoist is to be operated.

NOTE: To assure long life and top performance, be sure to follow the load chain lubricating instructions on page 11.

B. Double Reeved Units:

Remove the hook 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 reseal 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 7/16" (11.11 mm) for the Models R and RR. If the distance is not correct, adjust the position of the dead end block to obtain the proper distance (see Page 21).

INSTALLING THE SUSPENSION



CAUTION

USE OF IMPACT TOOLS (ELECTRIC OR PNEUMATIC) MAY CAUSE PREMATURE FAILURE OF ATTACHING HARDWARE.

A. Single Reeved Units:

Remove the hook 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 hand thread these into the self locking nuts enclosed in the hoist. The screws will turn freely into the nuts until the last 1/4" (6.35 mm) 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 (1/2" (13mm) socket) which fits the head of the screw.

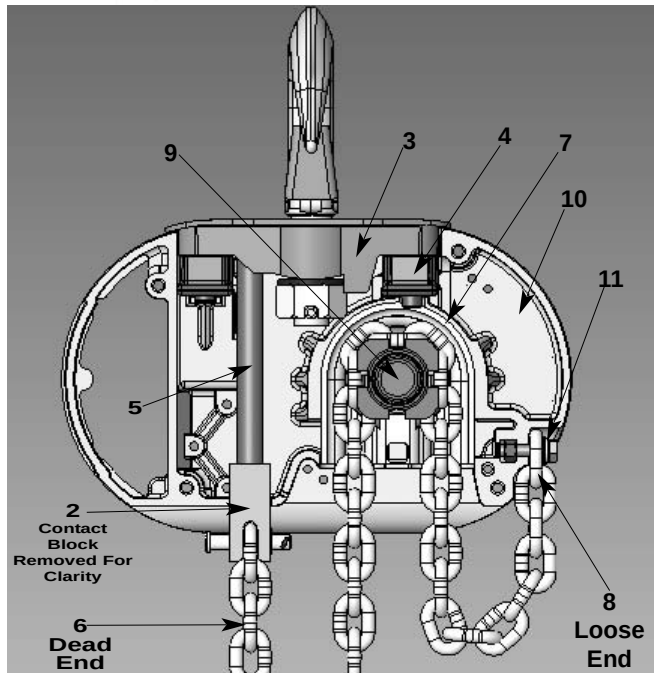
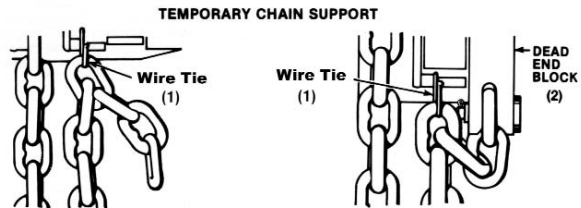


Figure 7. Attaching Load Chain Models R and RR

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

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

Now, insert the suspension screws through the holes in the adapter and hand 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" (6.35mm) 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 tie. **Do not** remove this tie before attaching the chain to the dead end block. (See Fig.7).

CAUTION

USE OF IMPACT TOOLS (ELECTRIC OR PNEUMATIC) MAY CAUSE PREMATURE FAILURE OF ATTACHING HARDWARE.

Table 2. Recommended Seating Torques For Suspension Adapter Screws

Models No's	Screw Size	Recommended Seating Torque
B, C & F	3/8"-16UNC-2A	40.7 to 61.0 Nm (30 to 45 lb. ft.)
J, L, R, LL & RR	1/2"-20UNF-2A	54.2 to 108.5 Nm (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 hand torque these screws to the recommended seating torque as specified above.

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 Model R & RR are shipped with the dead end of the load chain temporarily connected to the bottom of the hoist by a wire tie (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. 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).
4. Do not remove the wire ties from the load chain at this time.

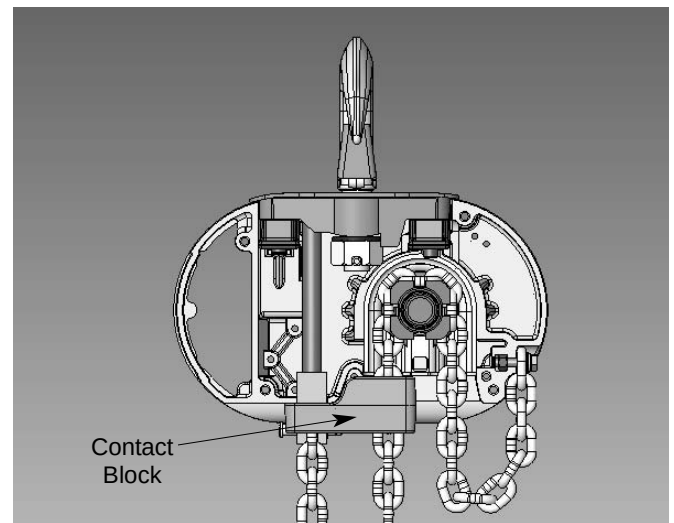


Figure 8. Contact Block Used On Models R & RR.

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 (.746 Kilowatts), 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 yellow, G-Y). Before connecting the hoist to the power supply, check that the power to be used agrees with the position of voltage change plug on the voltage change board. The nominal hoist voltage rating corresponding to the voltage range given on hoist identification plate is:

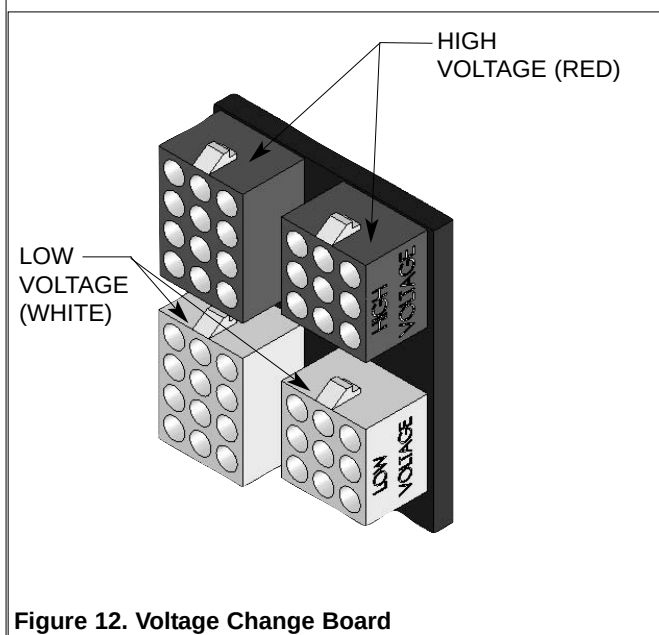


Figure 12. Voltage Change Board

SINGLE SPEED UNITS					
Low	Range	Nominal Volts	High	Range	Nominal Volts
				380-415	400
	220-240	230		440-460	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 voltage change board is provided to easily and quickly change from 460 to 230 (or 380 to 220 or 415 to 220) volt operation. The voltage change board shown in Figure 12 is located in the hoist as shown in Figure 13.

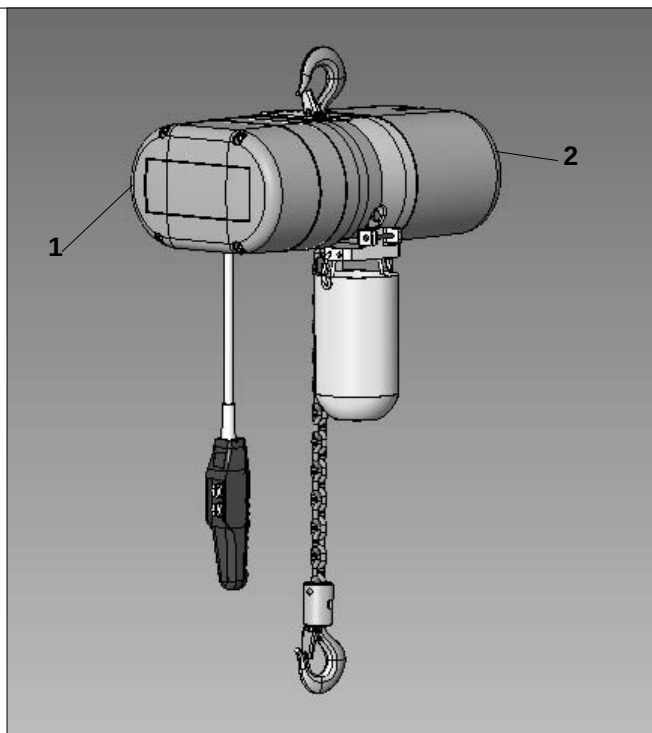


Figure 13. Location of Components

Voltage change board is located under back frame cover (1) for Models B, C & F and under motor housing cover (2) for Models J, L, R, LL and RR.

The voltage change board is color coded to indicate high and low volt connections. Connecting the 9 and 12 pin plugs into the "Red" voltage change board receptacles will connect the hoist for high voltage (380-3-50, 415-3-50 or 460-3-60). To change the hoist voltage to low voltage (208-3-60, 220-3-50 or 230-3-60) simply remove the 9 and 12 pin plugs from the "Red" receptacles and insert same into the "White" receptacles located on the voltage change board.

Be sure to make a notation of the new hoist voltage on the tag attached to the power cord.

PROPER PHASING

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 prior to each usage.

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 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 Blue lead and the Black lead of hoist power cord at power supply. Under no circumstances should the internal wiring of the control device 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.

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

CHECKING FOR TWIST IN LOAD CHAIN Models R, RR

The best way to check for this condition is to run the lower hook, without a load, up to within about 2 feet (.61 Meters) 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.

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 hoist end of the standard power cord with the hoist operating in the , up direction with full load) must be as indicated in the table below.

NOMINAL CURRENT	MINIMUM RUNNING VOLTAGE	MINIMUM STARTING VOLTAGE
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 provide (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 may also be caused by using an undersized cord and/or connectors 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	THREE PHASE HOISTS
	MINIMUM WIRE SIZE
UP TO 50 FEET	#16 AWG (1.6 mm)
80 FEET (24.4 M)	#16 AWG (1.6 mm)
120 FEET (36.7 M)	#14 AWG (2.0 mm)
200 FEET (61.0 M)	#14 AWG (2.0 mm)
300 FEET (91.4 M)	#12 AWG (2.7 mm)
For runs beyond 300 Feet contact factory.	

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 each 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.



WARNING

TO AVOID INJURY:

Always disconnect the power cord from the power supply system and lockout/tagout disconnecting means before servicing the hoist. Working in or near exposed energized electrical equipment presents the the danger of electric shock.

CHECKING LIMIT SWITCH OPERATION IF HOIST IS EQUIPPED

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 (.30 M) 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 6 inches (152 mm) from the bottom of all hoists.
3. If adjustment is necessary, see page 12.

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. Maintain a minimum of 24" (610 mm) of chain freely hanging over the side of the hoist.

5. If adjustment is necessary, see page 12.

NOTE: If the hoist is equipped with a chain container/bag, reset the upper and lower limit switches as indicated on page 12.

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

NOTE: When chain bag is filled to capacity the bag must be no more than 75% filled.

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 ii concerning dumbwaiter applications.

Also, if a Lodestar Hoist with a Protector is used at unusual extremes of ambient temperatures, above 66°C (150°F), or below -9°C (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. With hoists that are equipped with an adjustable screw limit switch, the limit switch will automatically stop the hook at any predetermined point when either hoisting or lowering.

OPERATING INSTRUCTIONS HOIST

1. Check to ensure that the load point is in line with the hoist head.
2. **WHEN APPLYING A LOAD, IT MUST BE DIRECTLY IN LINE WITH HOIST. 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 and/or attachments to bear against the hook latch.

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 B, C & F and on hoist back frame cover, Models J, L, R, LL & RR. 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. Warn personnel of your intention to lift a load in the area. Tie off the load with auxiliary chains or cables before access to the area beneath the load is permitted.
6. Permit only competent personnel to operate unit.
7. 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 result in twisted chain and a jammed lift wheel.
 - b. The upper limit switch, if so equipped, is by-passed and the load could hit the hoist.
 - c. The chain could be damaged at the hook.
8. Before lifting load, 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 capsized to remove twist.

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 and/or attachments to bear against the hook latch and/or hook tip. Apply load to hook bowl or saddle only.

9. On single reeved chain hoist used in conjunction with head blocks and ground support systems. Check for twists between the hoist and head block. Twisted load can result in a jammed liftwheel.
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.
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

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 11).

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, hook block screws, load pins and hook block bodies 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.

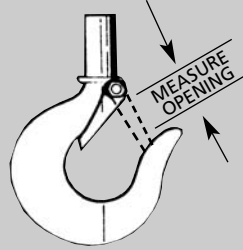
Table 4. Minimum Frequent Inspections

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 10. d) Load chain for adequate lubrication, as well as for signs of wear, damaged links or foreign matter - see page 10. e) Load chain for proper reeving and twists.

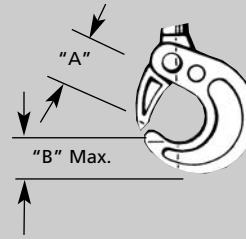
Table 5. Minimum Periodic Inspections

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 11. g) External evidence of pitting or any deterioration of contactor 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 4. 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.

LATCH TYPE HOOK
(Upper and Lower)
TO MEASURE OPENING,
DEPRESS LATCH AGAINST
HOOK BODY AS SHOWN.



LATCHLOCK® TYPE HOOK
(UPPER AND LOWER)



Models	Replace Hooks When Opening is Greater Than
B, C AND F	1 3/16 (30.2mm)
J, L, AND LL	1 5/16 (33.3mm)
R AND RR	1 1/2 (38.1mm)

Models	Replace Hook When Opening or Seat are:	
	"A" Max	"B" Max
B, C, F, J, L, AND LL	1 31/64 in. (37.7mm)	2 1/32 in. (51.6mm)
R AND RR	1 59/64 in. (48.8mm)	27/32 in. (21.4mm)

Figure 14. Hook Inspection

LOAD CHAIN

Chain should feed smoothly into and away from the hoist or hook block. If chain binds, jumps or is noisy, first clean and lubricate it (see below). If trouble persists, inspect chain and mating parts for wear, distortion or other damage.

Chain Inspection

First Clean chain with a non-caustic/non-acid type solvent and make a link by link inspection for nicks, gouges, twisted links, weld splatter, corrosion pits, striations (minute parallel lines), cracks in weld areas, wear and stretching. Chain with any one of these defects must be replaced.

Slack the portion of the chain that normally passes over the lift-wheel. Examine the interlink area for the point of maximum wear (polishing, see Figure 15). Measure and record the stock diameter at this point of the link. Then measure stock diameter in the same area on a link that does not pass over the liftwheel (use the link adjacent to the loose end link for this purpose). Compare these two measurements. If the stock diameter of the worn link is 0.010 inches (0.254 mm), or more, less than the stock diameter of the unworn link, the chain must be replaced.

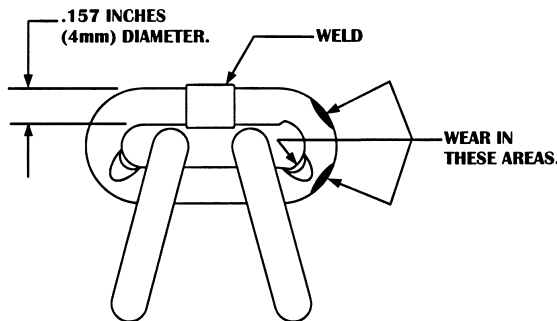


Figure 15. Chain Wear Areas

On double reeved units, repeat this examination of the chain that passes through the hook block.

Also check chain for stretch using a vernier caliper as shown in Figure 16. Select an unused, unstretched section of chain (usually at the loose end) and measure and record the length over 11 chain links (pitches). Measure and record the same length on a worn section of the chain. Obtain the amount of stretch and wear by subtracting the measurement of the worn section. If the result (amount of stretch and wear) is greater than 0.145 inch (3.7mm), the chain must be replaced.

Use only a "Knife-edge" caliper to eliminate possibility of false reading by not measuring full pitch length.

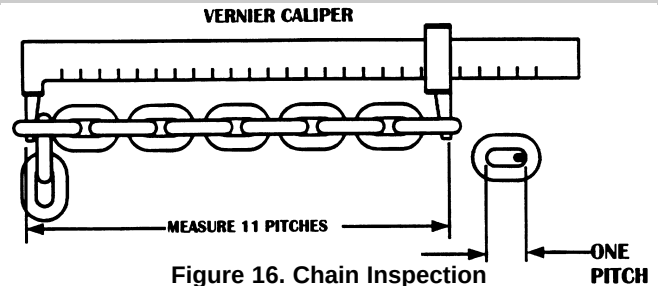


Figure 16. Chain Inspection

Note that worn chain can be an indication of worn hoist components. For this reason, the hoist's chain guide, hook block and liftwheel 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.

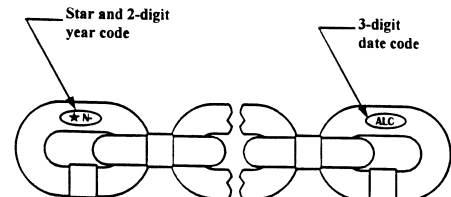


Figure 17. Chain Embossing

Use only Star (*) grade load chain and original 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 Lodestar Hoists may cause load loss.

TO AVOID INJURY:

Use only factory supplied replacement load chain and parts. Chain and parts may look alike, but factory original chain and parts are made of specific materials or processed to achieve specific properties. See Figure 17.

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 lengths to prevent use after disposal.

MAINTENANCE

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 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 had been color coded at the factory as follows:

Models	Protector Color Code	No. of Teeth on Gear
B	White	63
C, F	Orange	63
J	Red	71
L, R	Green	92
LL, RR	Yellow	92



WARNING

DO NOT REMOVE PROTECTOR SNAP RING

Removing the snap ring on the Protector assembly will allow the parts to spring apart. Personal injury may occur.

TO AVOID INJURY:

Do not attempt to disassemble the Protector.



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.

HOIST LUBRICATION

GEARS

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 29 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 "Century Lubricants HB-11 #3" 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 LL, and RR, see page 22 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, page 28) at least once a year.

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. or equivalent) 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 10-4 (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, especially in the interlink area.



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.

ELECTRIC BRAKE ASSEMBLY

The correct air gap between armature and field, when brake is not energized, is 0.025 inch (.635mm) and need not be adjusted until the gap reaches 0.045 inch (1.143mm). When checking brake gap, always reset to .025 inch (.635 mm).

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 inch, 4.78mm), scoring or 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 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 7 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 18 and 19.

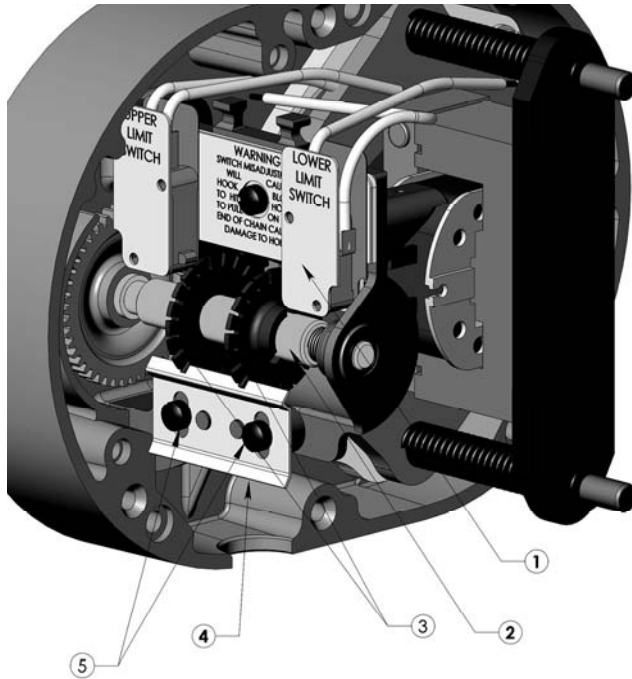


Figure 18. Limit Switches, Models B, C & F

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

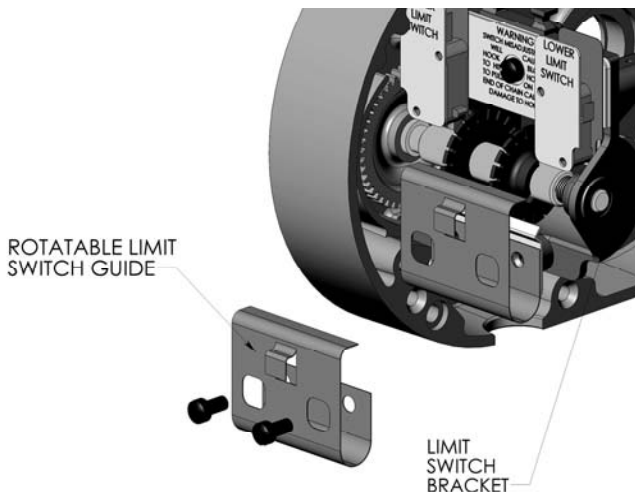


Figure 18A. Rotatable Limit Switches, Models B, C & F

1. Disconnect the hoist from the power supply system.
2. Refer to the exploded views and remove the back frame cover from the hoist.
3. Remove and discard the limit switch guide plate and attaching screws.
4. Refer to Figure 18A and assemble the rotatable limit switch guide from the kit to the limit switch bracket (spring back the guide tab to engage the slots in the traveling nuts) using the screws provided. Securely tighten the screws.
5. Reset the limit switches. Spring back the guide tab to allow the traveling nuts to be rotated to the desired position.

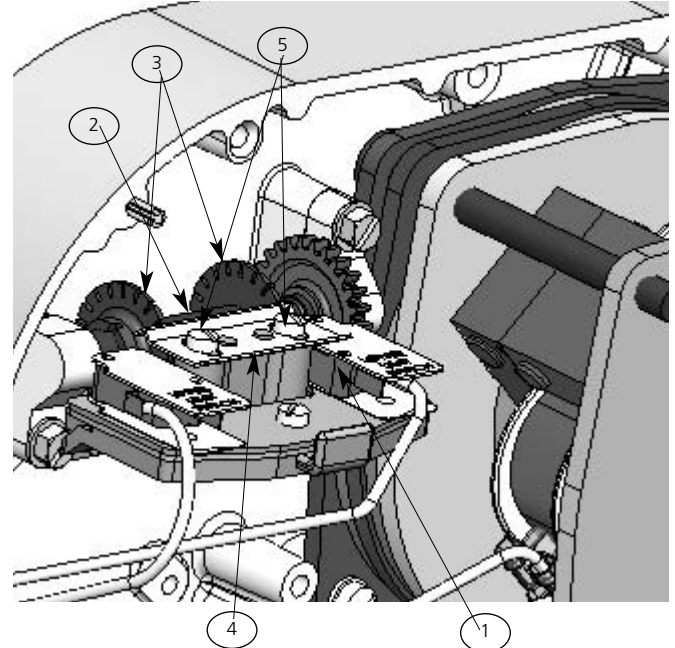


Figure 19. Limit Switches, Models J, L, R, LL & RR

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

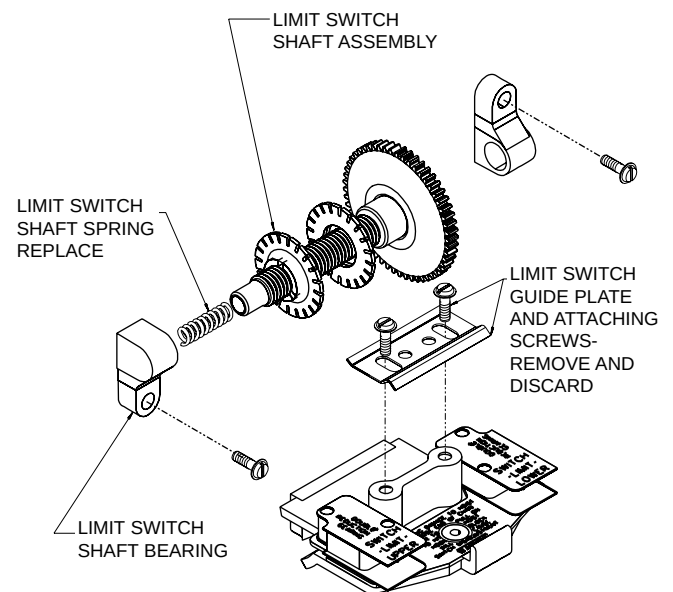


Figure 19A. Industrial Limit Switches, Models J, L, R, LL & RR

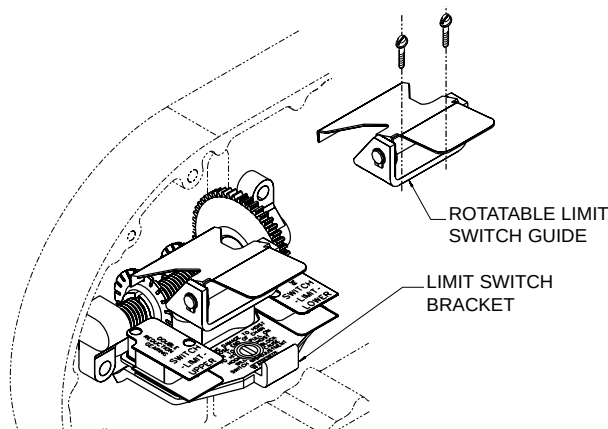


Figure 19B. Rotatable Limit Switches, Models J, L, R, LL & RR

SETTING UPPER LIMIT SWITCH

- 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. REFER TO TABLE 6.

- Reconnect hoist to power supply.
- Run hook to the desired upper position, cautiously operating the hoist without a load.
- Disconnect hoist from power supply.
- 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.
- Reposition the guide plate in the next slot and securely tighten screws.
- Reconnect hoist to power supply and check the stopping point of hook by first lowering the hook about 61 cm (2 Foot), 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.
- Double check setting by lowering the hook about 61cm (2 feet) and then run the hook into the upper limit with **↑(UP)** control held depressed.
- 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

- Refer to Table 6 - The "B" 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 "B" DIMENSIONS SHOWN IN THE TABLE ARE THE MINIMUM ALLOWED FOR SAFE OPERATION AND SHOULD NOT BE REDUCED. REFER TO TABLE 6.

- Reconnect hoist to power supply.

- Run hook to the desired lower position, cautiously operating the hoist without a load.
- Disconnect hoist from power supply.
- 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.
- Reposition the guide plate in the next slot and securely tighten screws.
- Reconnect hoist to power supply and check the stopping point of hook by first raising the hook about 61 Centimeters (2 feet) then lower the hook by jogging cautiously until the lower limit switch stops downward motion. The stopping point of hook should be the desired lower position. If not, repeat the above instructions.
- Double check setting by raising the hook about 61 cm (2 feet) and then run the hook into the lower limit with **↓(DOWN)** control held depressed.

- 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.

Table 6. LIMIT SWITCHES Hook Travel Per Notch of Limit Switch Nut				
MODEL	MAX. LENGTH OF LIFT M (ft.)	HOOK TRAVEL Per Notch mm (in.)	A mm (IN.) Min.	B (links) Min.
C	62.2 (204)	33.3 (1 ⁵ / ₁₆)	38.1 (1 ¹ / ₂)	6
B, F	31.1 (102)	17.5 (11/16)	38.1 (1 ¹ / ₂)	6
J, L	38.1 (125)	19.0 (3/4)	38.1 (1 ¹ / ₂)	8
LL	77.4 (254)	37.3 (1 ¹⁵ / ₃₂)	38.1 (1 ¹ / ₂)	8
R	20.1 (66)	9.5 (3/8)	63.5 (2 ¹ / ₂)	8
RR	38.1 (125)	19.0 (3/4)	63.5 (2 ¹ / ₂)	8

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 B All Other Models	1 2
627-1007	Transformer and Bracket Assembly	1
627-563	Control Station Parts Kit	1
627-565	Control Station Switch Kit	1
627-650	Contactors	1
Refer to Page 24 for ordering instructions and the Parts List for part numbers.		

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 7. Electrical Data For Hoist Components

Transformer Voltage	Leads	*D.C. Resistance (Ohms)
230/460 To 115	X1 To X2	22.8
	H1 To H2	127
	H3 To H4	158
220/380 To 48	X1 To X2	4.0
	H1 To H2	127
	H3 To H4	158
220/415 To 24	X1 To X2	1.1
	H1 To H2	127
	H3 To H4	158

Models	Contactor Coil Voltage	Nominal Current (Amps)	*D.C. Resistance (Ohms)
B thru RR	115	0.04	297.5
	48	0.09	56.3
	24	0.19	14.9

Models	Brake Coil Voltage	Nominal Current (Amps)	*D.C. Resistance (Ohms)
B, C and F	**230	.17	23.1
J, L, R	**230	.46	4.6
JJ, LL,RR	**230	1.7	2.2

*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.

MOTOR DATA

Models/ Cap.	Volts-Phase-Hertz	H.P (Kw)	Full Load Current (Amps)	Motor Leads	*D.C. Resist. (Ohms)
B - 1/4 Ton	230/460-3-60	1/4 (.186)	1.6/.81	W-BL to O-	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	
C - 1/4 Ton F - 1/2 Ton	230/460-3-60	1/2 (.373)	1.7/.85	W-BL to O-	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	

MOTOR DATA

Models/ Cap.	Volts-Phase-Hertz	H.P. (Kw)	Full Load Current (Amps)	Motor Leads	*D.C. Resist. (Ohms)
J - 1/2 Ton	230/460-3-60	1 (.746)	4.1/2.2	W-BL to O-BL	5.1
				W-B to O-B	
L - 1 Ton	230/380-3-50		4.6/2.3	W to O-G	10.2
				Y-B to Y-BL	
R - 2 Ton	230/415-3-50		4.2/2.1	Y-B to Y-G	
				Y-BL to Y-G	
LL-1 Ton	230/460-3-60	2 (1.49)	7.3/3.9	W-BL to O-BL	2.3
				W-B to O-B	
	230/380-3-50		8.6/3.7	W to O-G	4.6
				Y-B to Y-BL	
RR - 2 Ton	230/380-3-50		8.6/3.9	Y-B to Y-G	
				Y-BL to Y-G	

TROUBLE SHOOTING

All Hoists

Table 8.

TROUBLE	PROBABLE CAUSE	CHECK AND REMEDY
1. Hook does not respond to the control station or control device	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 control circuit.	C.) Press the "other" control and the hook should respond. Adjust limit switches as described on page 12.
	D.) Open control circuit-open or shorted winding in transformer, reversing contactor coil or loose connection or broken wire in circuit; mechanical binding in contactor control station contacts not closing or opening.	D.) Check electrical continuity and repair or replace defective part.
	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 voltage change board are the proper voltage as described on page 5.
	F.) Low Voltage.	F.) Correct low voltage condition as described on page 5.
	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 11.
	H.) Excessive load.	H.) Reduce loading to the capacity limit of hoist as indicated on the identification plate.
2.) Hook moves in wrong direction.	A.) Phase reversal (three phase unit only).	A.) Refer to installation instruction 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 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.) Phase failure (three phase unit only).	C.) 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, 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 12.
5.) Hook lowers when hoisting control is operated.	A.) Phase failure (three phase unit only).	A.) See item 1B.
	B.) Phase reversal (three phase unit only).	B.) Refer to installation instruction on page 5.
6.) Hook does not stop promptly.	A.) Brake slipping.	A.) Check brake adjustment as described on page 11.
	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 6.
	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 11.
8.) Motor overheats.	A.) Low voltage.	A.) Correct low voltage condition as described on page 6.
	B.) Excessive load.	B.) See item 1H.
	C.) Extreme external heating.	C.) Above an ambient temperature of 40°C. (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 11.
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 12. Check for a pinched wire.
	B.) Limit Switch Shaft not rotating.	B.) Check for damaged Limit Switch 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 11.
	C.) Binding of Limit Switch Shaft.	C.) Check Limit Switch Bearing for proper seating.

Figure 20. Typical Wiring Diagrams (Entertainment)

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

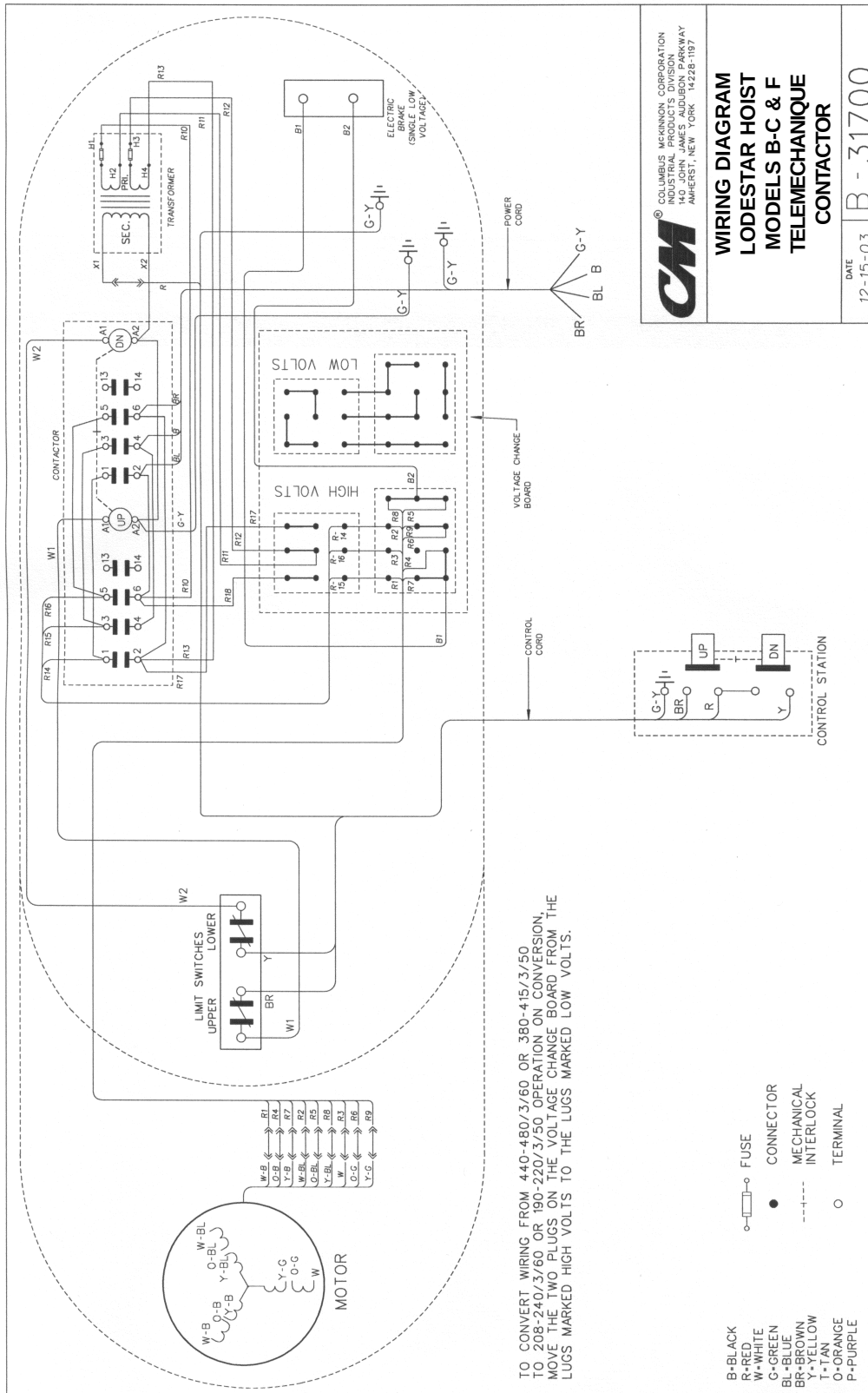
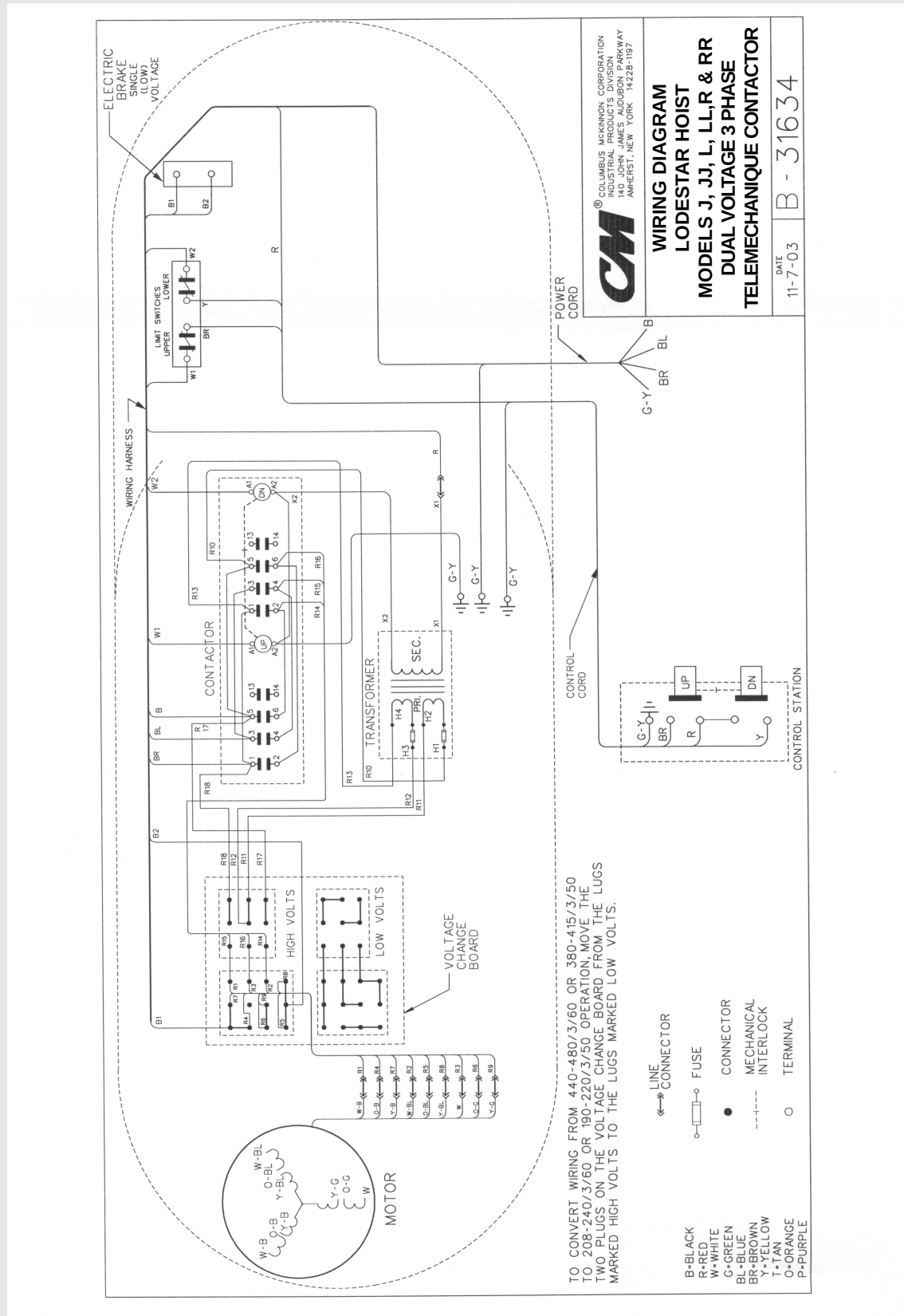
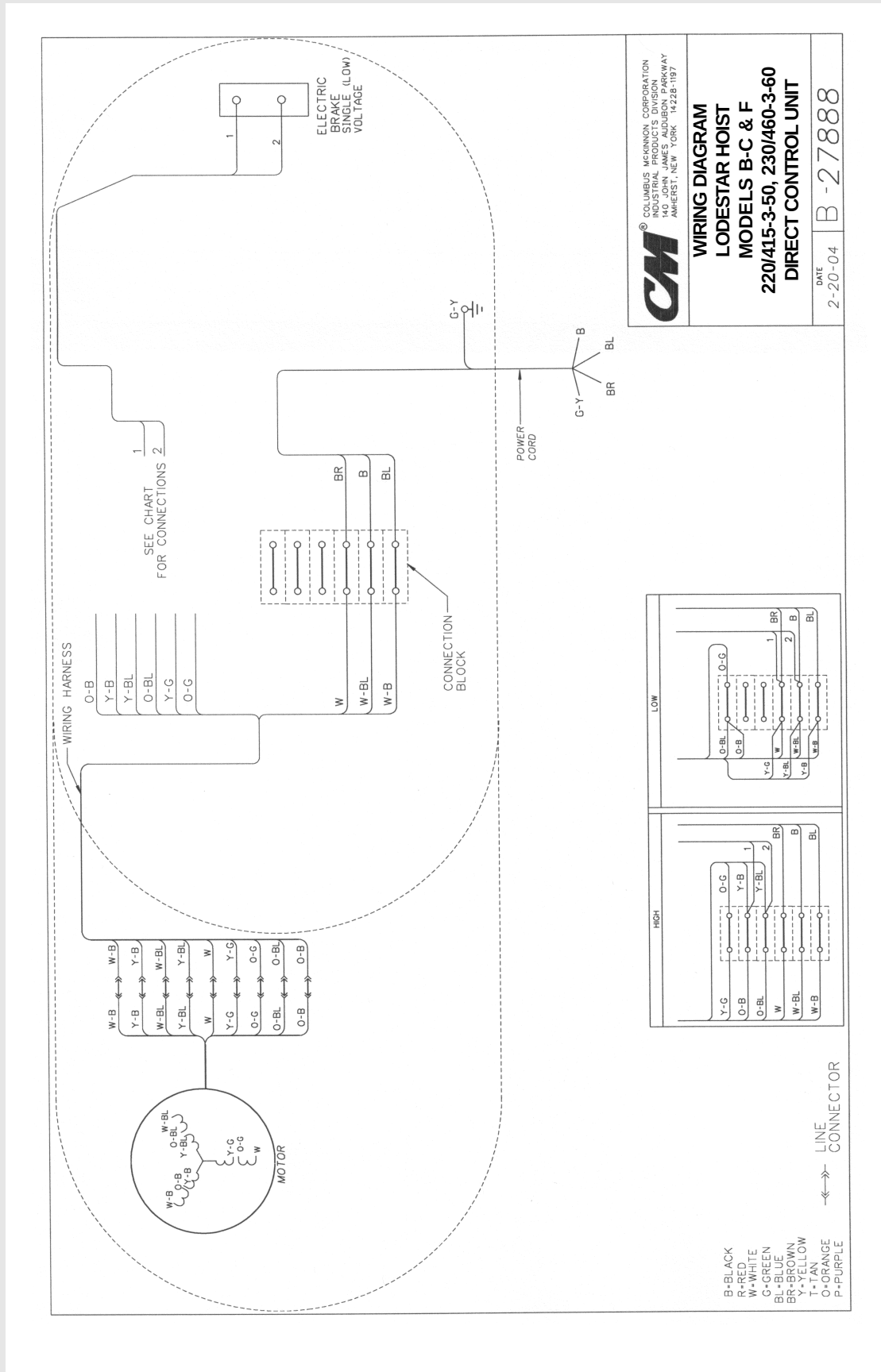


Figure 20. Typical Wiring Diagrams (Entertainment)

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



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ASSEMBLY INSTRUCTIONS

SWIVEL HOOK SUSPENSION

Models R & RR.

Assemble the dead end bolt and block through the suspension adapter as shown in Figure 21.

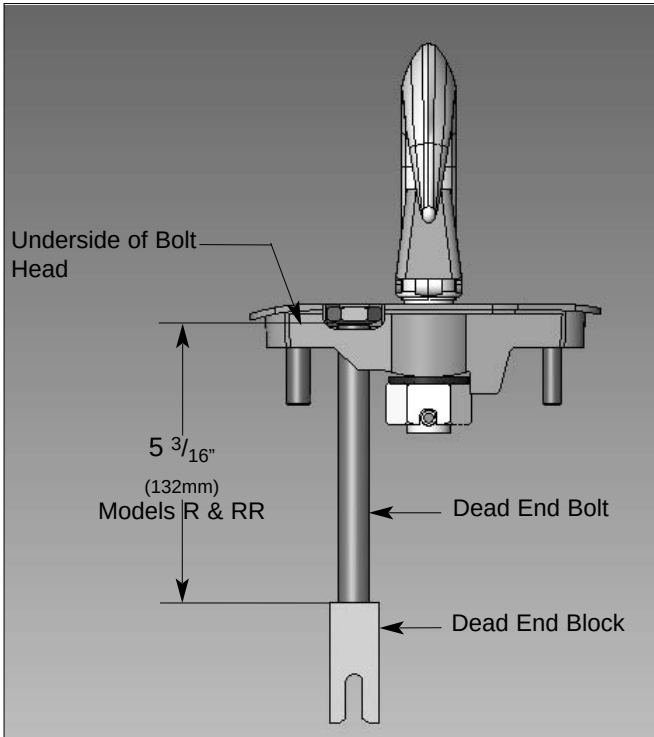


Figure 21. Swivel Hook Suspension

INSTRUCTIONS FOR ASSEMBLING UPPER SUSPENSION TO HOIST-DOUBLE REEVED CHAIN MODELS

Place the suspension assembly into the recess provided on 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 the Figure 8 pg. 4. 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 reseal the bolt head to obtain 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 that it has not been disturbed from its factory settings. The distance from the top of the pin hole to the bottom of the hoist should not exceed 7/16\" (11mm) for Models R & RR. If the distance is not correct, adjust the position of the dead end block to obtain the proper distance. **CAUTION: DO NOT** apply oil or any other lubricant to the threads of the suspension adapter screws. Such lubricant will significantly affect the frictional characteristics and may damage the screw or nut if the screw is tightened to the recommended seating torques.

Now, insert the screws, supplied with the assembly, 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 nut until the last 1/4\" (6.35mm) of travel during which the resistance of the nut locking collar will be encountered. Securely tighten the screws to the recommended seating torque specified in Table 9, using a 12 point socket (1/2\" socket) which fits the head of the screw.

! WARNING

The suspension screws are special high strength screws and under no circumstances should screws other than these be used to attach the suspension to the hoist. If other than the supplied, high strength screws are used, they may break and allow the hoist to fall from the support and this may result in an accident that could cause injury and/or property damage.

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. Refer to Figure 7, page 4 and the tag attached to the load chain on the hoist.

Table 9. Recommended Seating Torque For Suspension Adapter Screws

! CAUTION

USE OF IMPACT TOOLS (ELECTRIC OR PNEUMATIC) MAY CAUSE PREMATURE FAILURE OF ATTACHING HARDWARE.

SCREW SIZE	RECOMMENDED SEATING TORQUE
3/8-16 UNC-3A	40.7 TO 61.0 Nm. (30 TO 45 LB. FT.)
1/2-20 UNF-3A	54.2 TO 108.5 Nm. (40 TO 80 LB. FT.)

Models B, C, F, J, L & LL

INSTRUCTIONS FOR ASSEMBLING UPPER HOOK SUSPENSION TO HOIST-SINGLE CHAIN MODELS

Place the suspension assembly into the recess on the top of the hoist so that the adapter body follows the contour of the hoist. **CAUTION: DO NOT** apply oil or any other lubricant to the threads of the suspension adapter screws. Such lubricant will significantly affect the frictional characteristics and may damage the screw or nut if the screw is tightened to the recommended seating torques. Insert the screws, supplied with this assembly, 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\" (6.35mm) of travel during which the resistance of the nut locking collar will be encountered. Securely tighten the screws to the recommended seating torque specified in Table 9, using a 12 point socket (1/2\" 13mm) which fits the head of the screw.

GEARING

Models LL & RR 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.

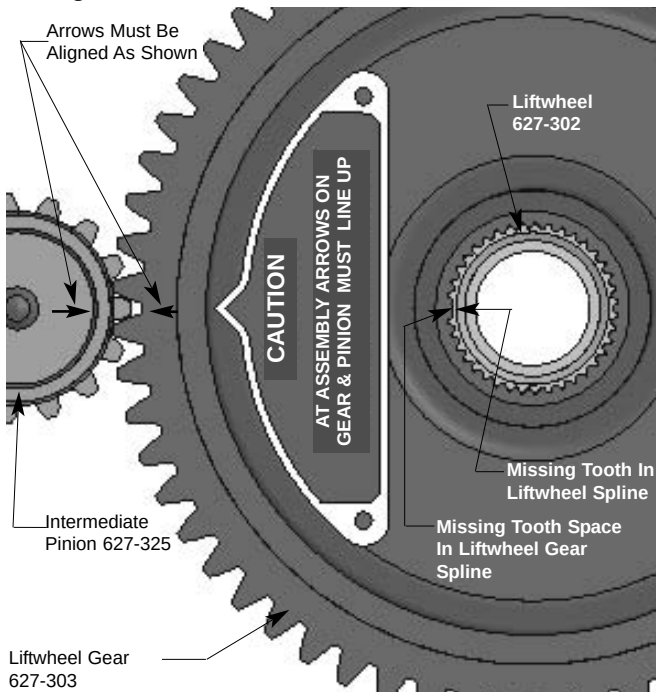


Figure 22. Non-Circular Gearing

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 instruction, see page 16.

FASTENERS

Models B, C & F tighten motor housing cover screws (627-108) to where they have a minimum breakaway torque of 5.423 Nm (48 pound inch) and the brake attaching screws (627-253) have a 5.649 Nm (50 pound inch) minimum breakaway torque.

Models J, L, R, LL & RR 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 5.649 Nm (50 pound inch). The liftwheel gear nut (627-305) should be tighten to a seating torque of 115.245 Nm (85 pound feet).

LOWER HOOK BLOCK PIN

When removing or installing the lower hook 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 (7.94mm) for Models B, C & F and 3/8" (9.52mm) diameter for Models J, L, R, LL & RR, 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 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 block 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 the 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.

REMOVAL AND INSTALLATION OF LOAD CHAIN

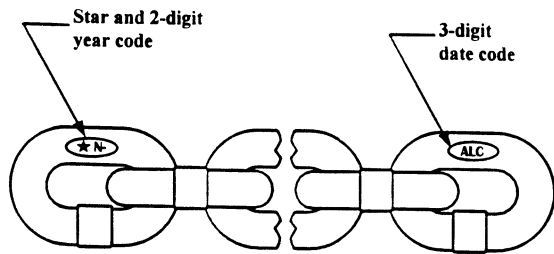
WARNING

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 DIN OR 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 MANUFACTURER'S 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.

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, where as Method 3 requires only partial disassembly.

Method #1

- Disconnect hoist from power supply.
- Remove back frame cover and disengage the limit switch guide plate from the traveling nuts, see page 12 or 13.
- 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 (see pg. 22). On double reeved models R & RR unfasten the dead end side of load chain.
- Continue to disassemble the hoist and inspect the liftwheel, chain guides, motor housing and gear housing which if worn or damaged may cause premature failure of the new chain. Parts can be easily identified by referring to pages 25 thru 44.
- If the liftwheel pockets, in particular the ends, are worn or scored, replace liftwheel. If chain guides and housing are worn, cracked or damaged these parts should also be replaced.

- 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. On double reeved models, **make certain that the new load chain is free of twists.**
- 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 CERTAIN THERE IS NO TWIST.**
- For single reeved models, attach the hook block to load chain (see Page 23) and proceed to step K.
- For double reeved models, run the hoist  (UP) until only 914.4 mm (36" Inches) of 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 certain that no twist exists in the reeving at any point. Assemble dead end pin, washer and cotter pin as shown in Figure 7.
- Adjust limit switches as describe in Table 6, page 13. If the new 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 if necessary.

WARNING

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 from Method #1, a, b, c and h thru k. 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 the load chain before attaching it to the hoist.

Method #3

- First proceed with Steps 1a, b & c from Method #1.
- Then, carefully run the load chain out of the hoist,
- Disconnect hoist from power supply.
- Remove the electric brake assembly.
- 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 the liftwheel as explained in Method #1 step 1f.
- Refer to Method #1 steps g thru j above to complete the installation.

CUTTING CHAIN

CM®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 177.8 mm (7 inches) minimum diameter by 3.175 mm (1/8 inch) 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 (25.4mm-1 inch) long cutting edge.

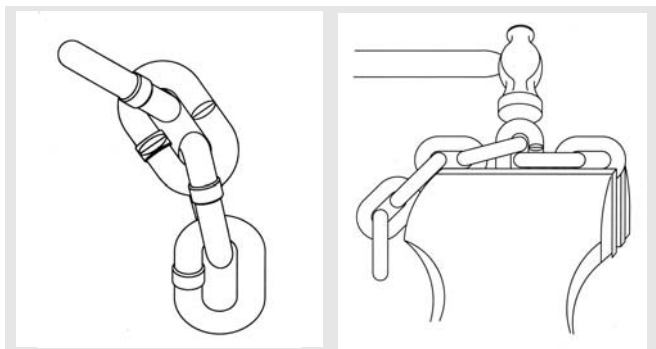


Figure 23. Cutting Chain by Nicking

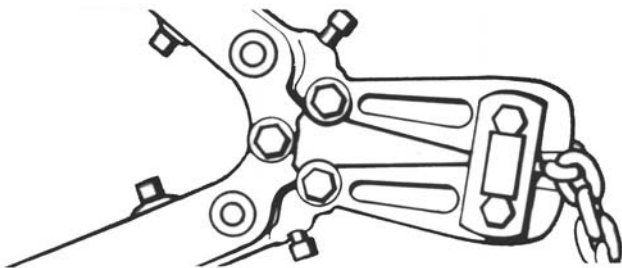


Figure 24. Cutting Chain with a Bolt Cutter

 WARNING
Cutting Chain Can Produce Flying Particles.
TO AVOID INJURY: ● Wear Eye Protection. ● Provide A shield Over Chain to Prevent Flying Particles.

WARNING

TESTING

Before using, all altered, repaired or used hoists that have not been operated for the previous 12 months shall be tested by the user for proper operation. First test the unit without a load and then with a light load of 22.7 kg. (50 pounds) times the number of load supporting parts of load chain to be sure that the hoist operates properly and that the brake holds the load when the control is released. Next test with a load of *125% of rated capacity. In addition, hoists in which load sustaining parts have been replaced should be tested with *125% of rated capacity by or under the direction of an appointed person and written report prepared for record purposes. After this test, check that the Protector functions. If the Protector permits lifting a load in excess of 200% of rated metric load, it should be replaced.

*If Protector prevents lifting of a load of 125% of rated capacity, reduce load to rated capacity and continue test.

NOTE: For additional information on inspection and testing, refer to Code B30.16 "Overhead Hoists" obtainable from ASME Order Department, 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300, U.S.A.

WARNING

Using "Commercial" or other manufacturer's parts to repair the CM Lodestar Hoists may cause load loss.

TO AVOID INJURY:

Use only CM supplied replacement parts. Parts may look alike but CM parts are made of specific materials or processed to achieve specific properties.

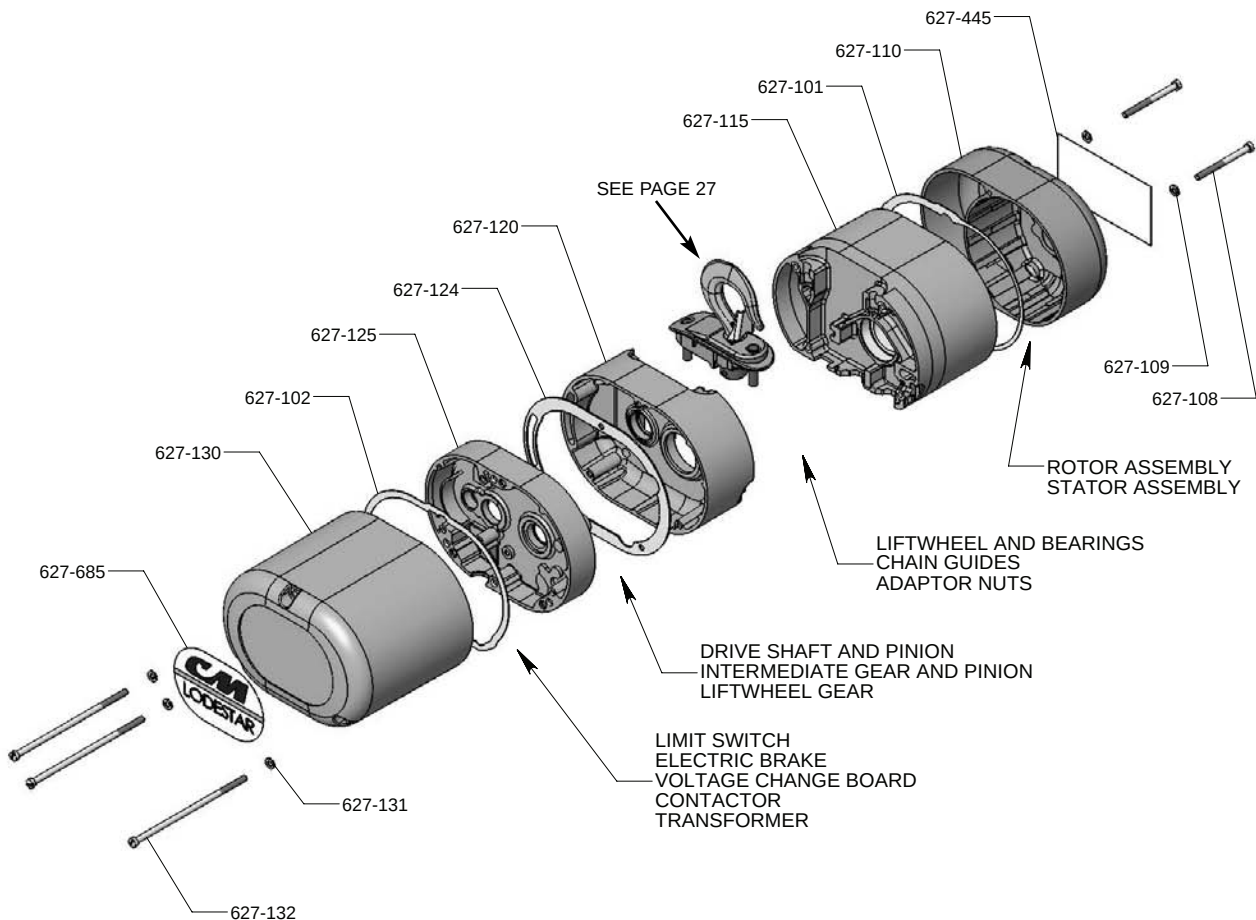
ORDERING INSTRUCTIONS

The following information must accompany all correspondence orders for replacement parts:

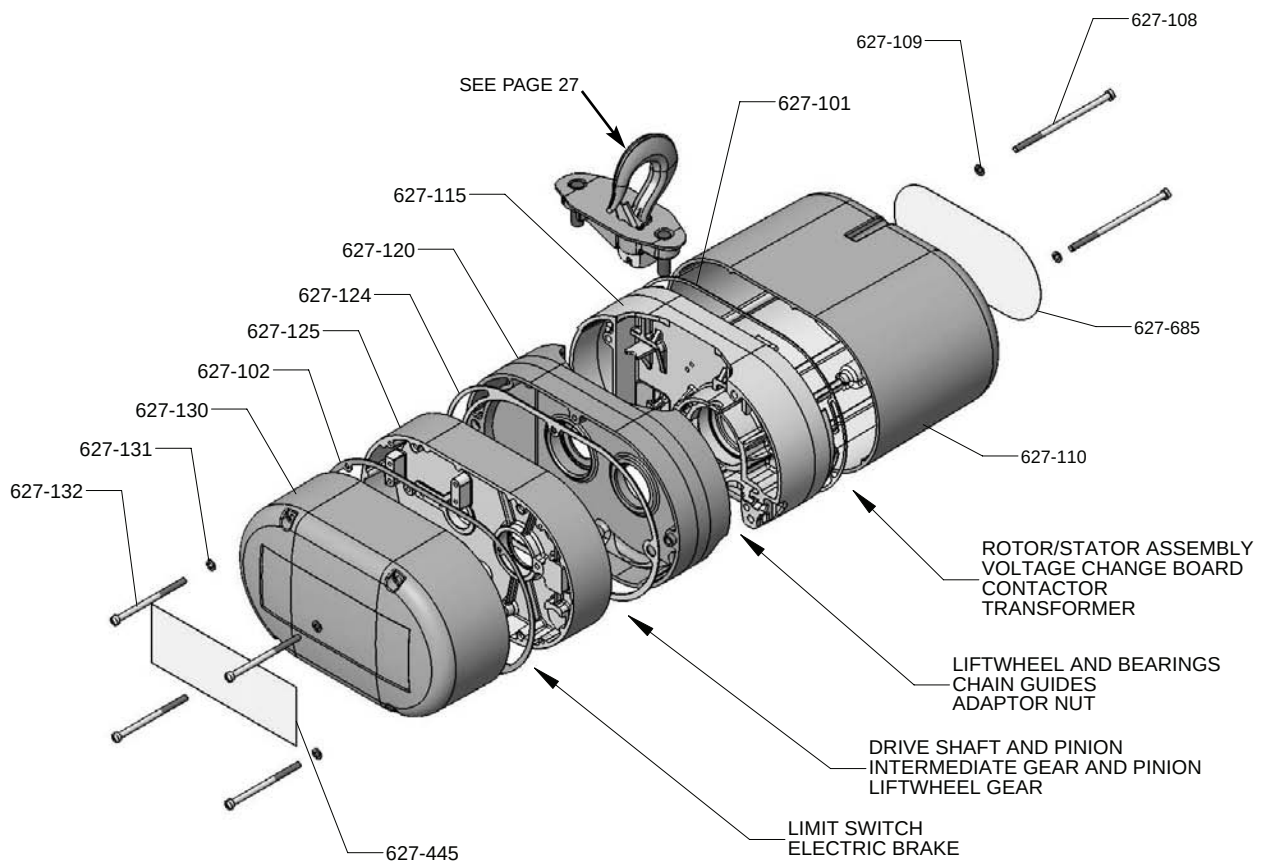
1. Hoist Model Number from identification plate.
2. Serial number of the hoist stamped below identification plate.
3. Voltage, phase, Hertz from the identification plate.
4. Length of lift.
5. Key number of part from parts list.
6. Number of parts required.
7. Part name from parts list.
8. Part number from the parts list.

NOTE: When ordering replacement parts, it is recommended that consideration be given to the need for also ordering such items as gaskets, fasteners, insulators, etc. These items may be damaged or lost during disassembly or just unfit for future use because of deterioration from age or service.

ENTERTAINMENT/DIRECT CONTROL LODESTAR-HOIST FRAME			
Key No.	Part Name	Models B, C & F (Qty.)	Models J, L R, LL & RR (Qty.)
627-101	Motor Housing Cover Gasket	27847 (1) Weatherproof Units Only	35841 (1) Weatherproof Units Only
627-102	Back Frame Cover Gasket	27848 (1) Weatherproof Units Only	35840 (1) Weatherproof Units Only
627-108	Motor Housing Cover Screw	987397 (2)	987553 (2)
627-109	Motor Housing Cover Screw Lockwasher	982226 (2) 982251 (2) Weatherproof Units Only	982226 (2) 982251 (2) Weatherproof Units Only
627-110	Motor Housing Cover	27597 (1)	36009 (1)
627-115	Motor Housing	27063 (1)	35073 (1)
627-120	Gear Housing	27038 (1)	35627 (1)
627-124	Gear Housing Gasket	27747 (1)	35707 (1)
627-125	Back Frame	27618 (1)	35031 (1)
627-130	Back Frame Cover	28009 (1)	36008 (1)
627-131	Back Frame Cover Screw Lockwasher	982226 (3) 982251 (3) Weatherproof Units Only	982226 (4) 982251 (4) Weatherproof Units Only
627-132	Back Frame Cover Screw	87325 (3)	968752 (4)
627-445	Capacity Label	27277 (¾ Ton), 27227 (½ Ton)	35200 (½ Ton), 35201 (1 Ton), 35202 (2 Ton)
627-685	Series Label	27238 (1)	36840 (1)



MODELS B, C & F



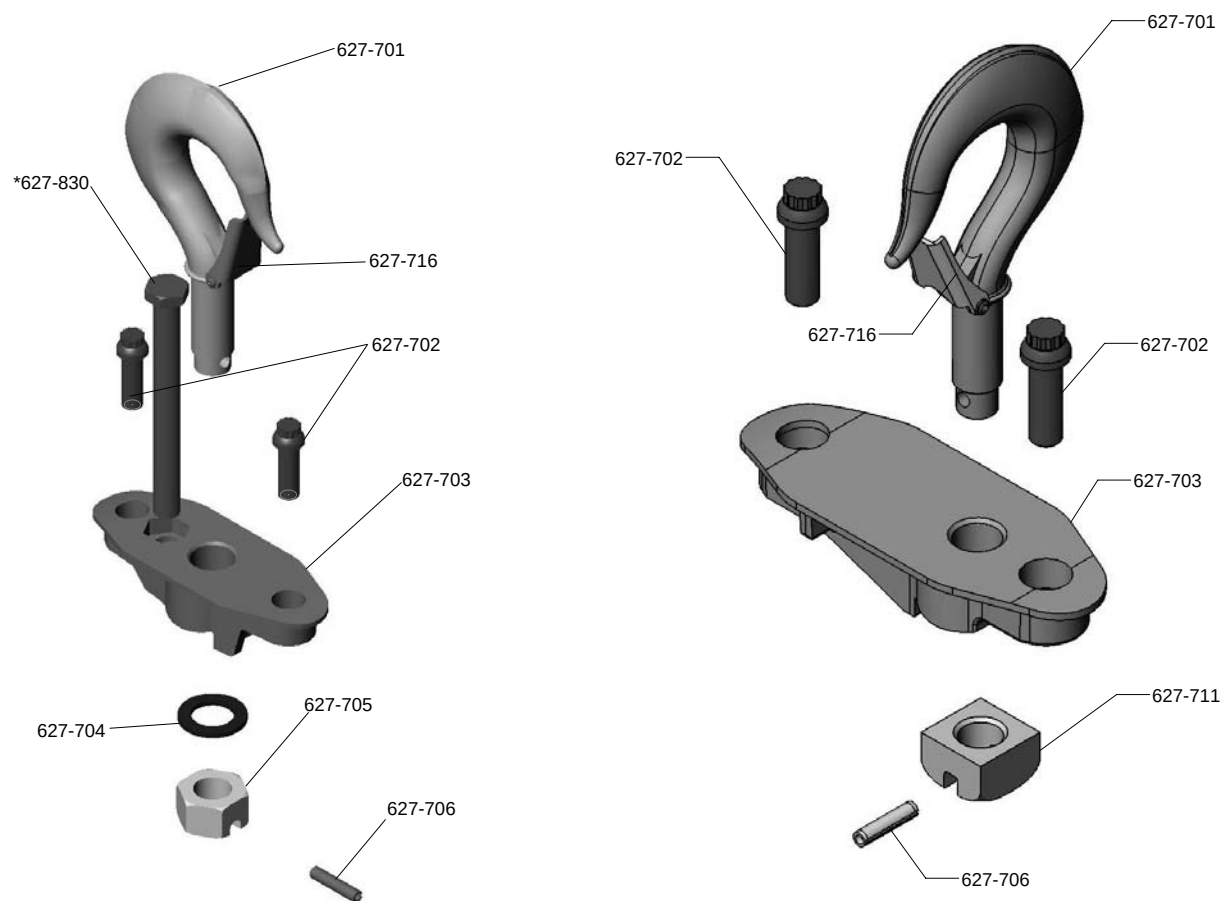
MODELS J, L, R, LL & RR

ENTERTAINMENT/DIRECT CONTROL LODESTAR ELECTRIC CHAIN HOIST PARTS LIST-MECHANICAL					
627-700 Swivel Hook Suspension; 627-710 Rigid Hook Suspension					
Key Number	Part Name	No. Req'd.	Models		
			B, C & F	J, L & LL	R & RR
			Part Number		
627-700	Swivel Hook Suspension (includes items 627-701 thru 627-706 for B, C & F; J, L & LL. Includes items 627-701 thru 627-706, 627-830 & 627-833 thru 627-836 for model RR).	1	*2792 (latch type hook)	*3661 (latch type hook)	*3660 (latch type hook)
627-701	Upper Hook with Latch Latch Type	1	28689	35617	35616
	Upper Hook-Latchlok Type		28643	36678	36680
627-702	Suspension Adapter Screw (Special Alloy Steel)	2	27529	35588	
627-703	Suspension Adapter	1	27703	35740	35741
627-704	Upper Hook Washer for Swivel Hook Suspension	1	27786	45930	45918
627-705	Upper Hook Collar/Nut for Swivel Hook Suspension	1	27350	35042	35041
627-706	Upper Hook or Suspension Lug Pin-Special Alloy Steel-Specify whether for Swivel or Rigid Type Suspension	1	27805	983763 for Rigid Susp. 983764 for Swivel Susp.	983761 Rigid Susp. 983762 Swivel Susp.
627-710	Rigid Hook Suspension (includes items 627-701, 627-702, 627-703, 627-706 & 627-711 for models B, C & F; J, L & LL. Includes items 627-701, 627-702, 627-703, 627-706, 627-711, 627-830 and 627-833 thr 627-836 for model RR.	1	*2788 (latch type hook)	*3651 (latch type hook)	*3658 (latch type hook)
627-711	Upper Hook or Suspension Lug Collar (for Rigid Hook or Lug Suspension)	1	27361	35459	35479
627-716	Latch Kit (specify no req'd)	-	45661	45662	45663

*Latch Type Hook contact CM for part number of Lower Hook Assembly with Latchlok Type Hook.

**With Latch Type Hook. If lower hook block assembly with Latchlok Type Hook is required. Contact CM.

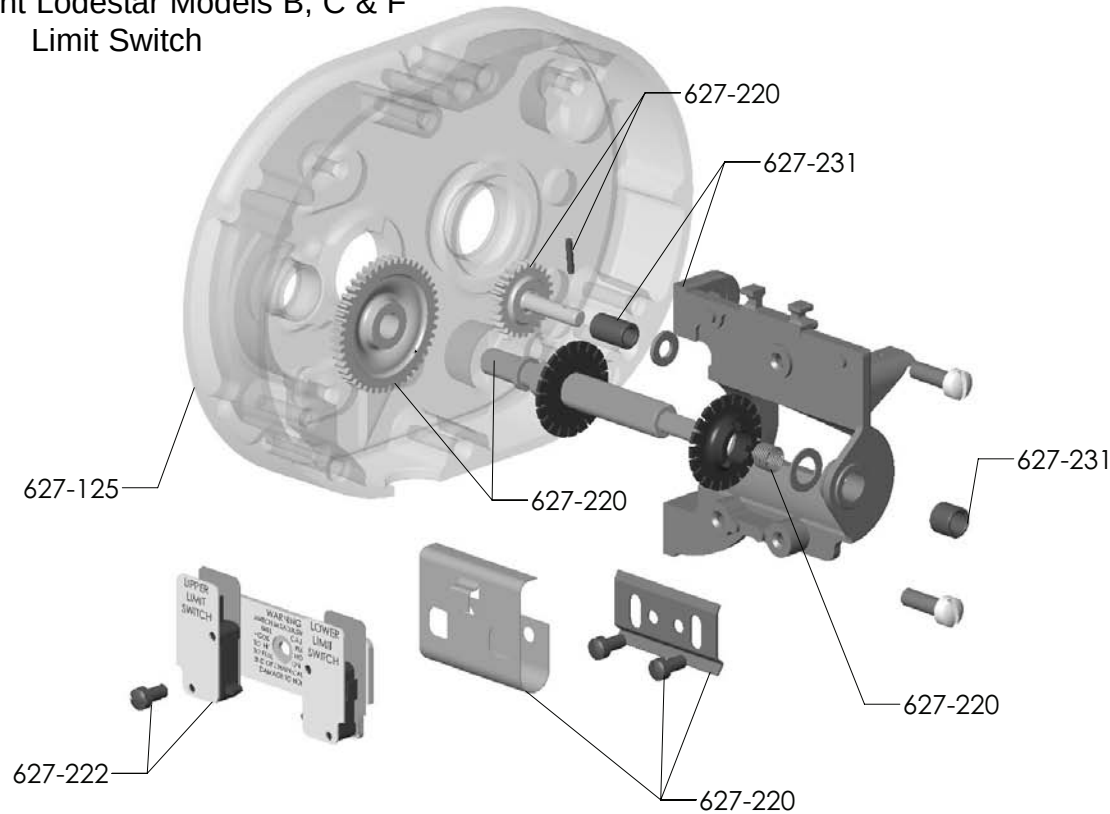
***Contact CM for Part Number of Latchlok Type Hook.



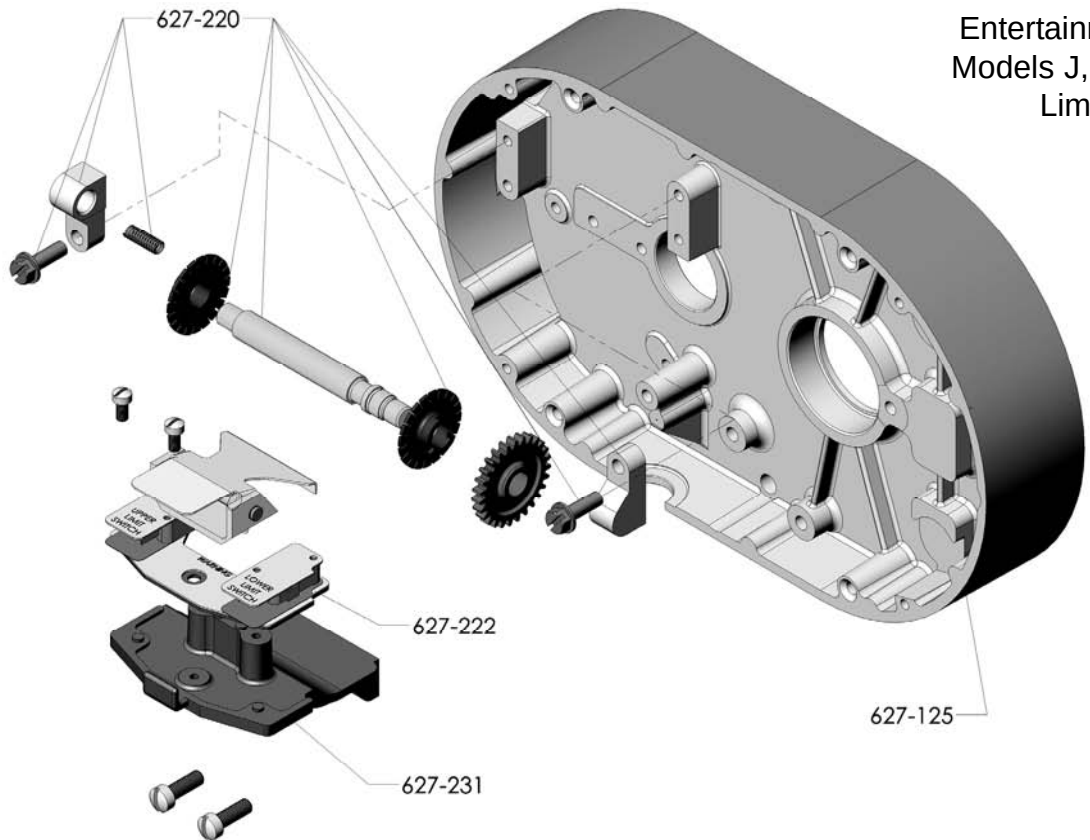
627-700-Complete Swivel Hook Suspension

627-710 Complete Rigid Hook Suspensions

Entertainment Lodestar Models B, C & F
Limit Switch



ENTERTAINMENT LODESTAR ELECTRIC CHAIN HOIST PARTS LIST-CONTROL END				
Key Number	Part Name	No. Req'd.	Models	
			B, C & F	J, L, LL, R & RR
			Part Number	
627-220	Limit Switch Shaft & Gear Kit	1	27749	36656
627-222	Limit Switch Kit	1	31631	31636
627-231	Limit Switch Bracket Sub-Assembly	1	27502	36644



Entertainment Lodestar
Models J, L, LL, R & RR
Limit Switch

ENTERTAINMENT/DIRECT CONTROL LODESTAR ELECTRIC CHAIN HOIST PARTS LIST-CONTROL END				
			Models	
Key Number	Part Name	No. Req'd.	B, C & F	J, L, LL, R & RR
			Part Number	
627-125	Back Frame	1	27618 (Includes 627-123 & 627 211)	35031
627-127	Back Frame Attaching Screw	3	982699	-
627-127A	BackFrame Attaching Screw L.W.	3	982226	-
627-128	Back Frame Attaching Screw	2	-	982698 (1 $\frac{3}{8}$ " Lg., 44.5mm)
627-128A	BackFrame Attaching Screw L.W.	2	-	940830
627-129	Back Frame Attaching Screw	2	-	987322 (2" Lg., 50.8mm)
627-129A	BackFrame Attaching Screw L.W.	2	-	940830
627-245	Back Frame Seal Screw	1	-	982623
627-251	Brake Base Plate And Studs	1	28668	35643
627-252	Brake Attaching Screw L.W.	-	982226, 2 req'd.	945851, 1 red'd.
627-253	Brake Attaching Screw	-	982708, 2 req'd.	982709, 1 req'd.
627-254	Brake Intermediate Plate	1	27090	35069
627-255	Brake Spring	2	27751 (color coded blue)	35716 (color coded yellow) for Models J, L & R 35717 (color coded green) for Models LL & RR
627-256	Brake Field Sub-Assembly	1	28677 (Includes 627-262)	35629
627-257	Brake Stud Nut	2	945840	945840
627-258	Brake Coil Retainer Strap	1	57753	35704
627-259	Brake Coil	1	51518	51511 for Models J,L & R 51512 for Models LL & RR
627-260	Brake Armature Assembly	1	28678	35600 (Includes 627-262)
627-261	Brake Friction Disc	1 or 2	27677	35632
627-262	Brake Shading Coil	2	54831	35826

Part Number for Packaged Lubricants Used in the Lodestar Electric Chain Hoists (Refer to page 11 for Lubrication Instructions)		
Lubricant Usage	Type of Lubricant	Part Numbers and Packaged Quantity of Lubricants
Hoist Gears	Grease (Special)	28605 for 1/2 # Can 28616 for 1# Can 28617 for 4# Can
Spline on end of Drive Shaft	Oil-Graphite Mixture	40628 for 1 pint Can
Load Chain	Oil	28608 for 1 Pint Can 28619 for 1 Gal Can
Limit Switch Shaft Threads	*Oil	"3 in 1" or Light Machine Oil-obtain locally
Lower Hook Thrust Bearing	*Oil	Heavy Machine Oil-obtain locally

*These oils are not furnished by CM in Packaged Quantities.

When ordering lubricants, specify the type of lubricant, part number and packages quantity required.

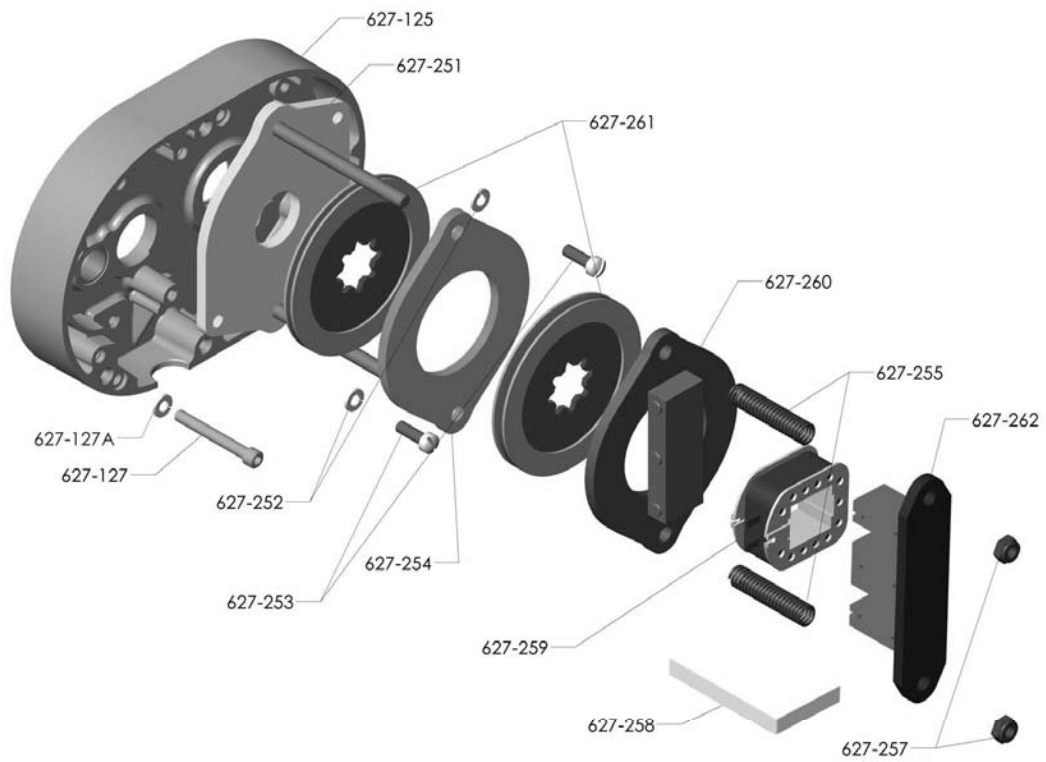
Touch-up Paints for Lodestar Electric Chain Hoists:

Hoist Order *(1) case (12-12 oz. Aerosol Cans) of Black Touch-up paints Part Number 84189.

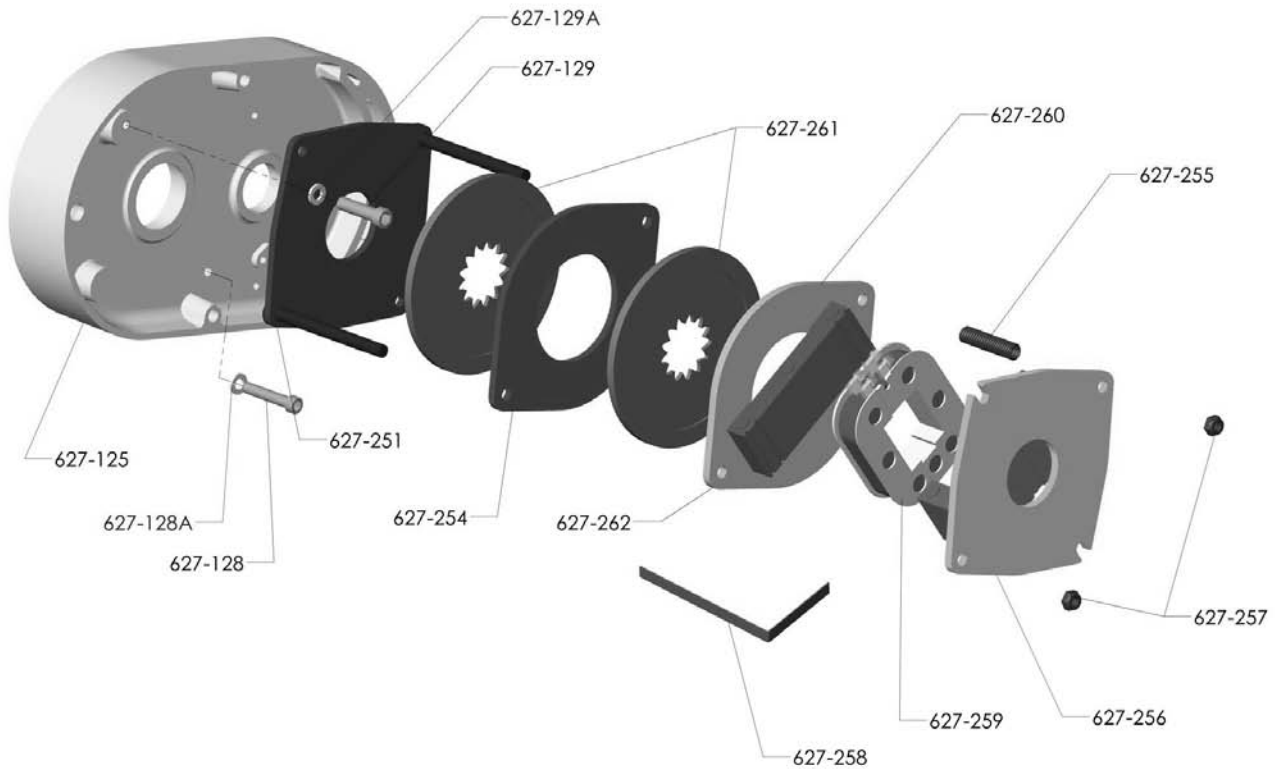
*Touch-up paints are only available in case quantities.

NOTE: When painting Hoists, also order warning labels, identification labels, etc. that may be coated during painting.

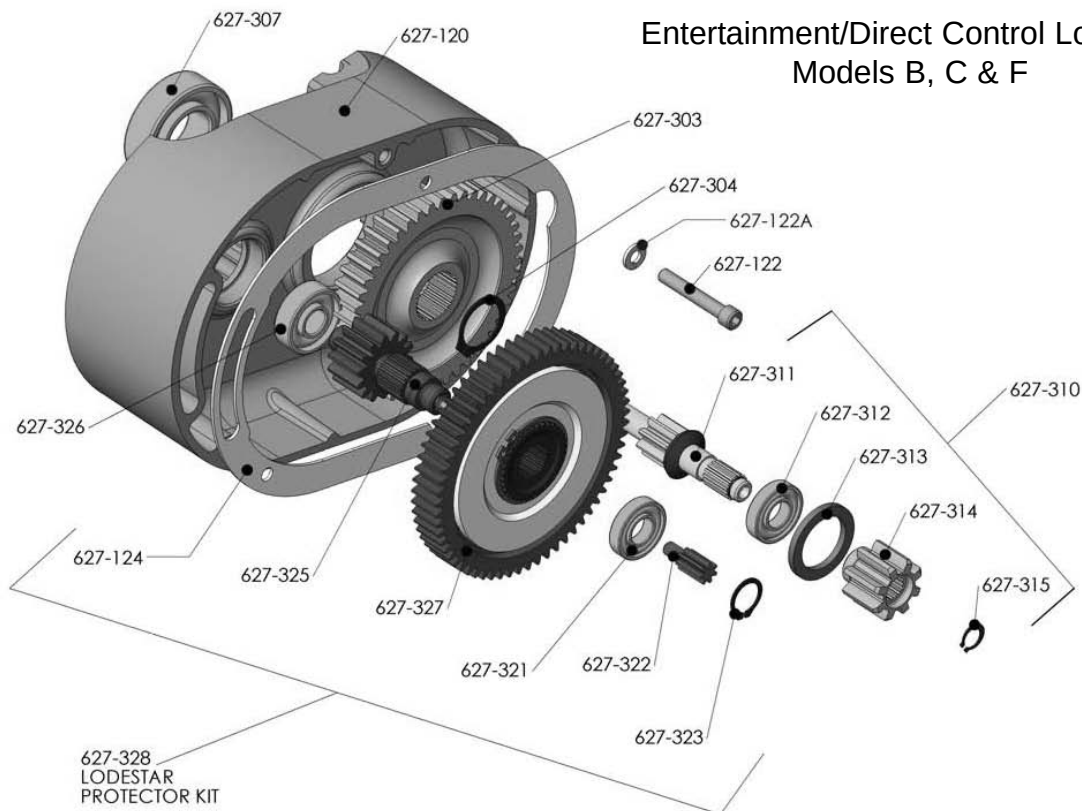
Entertainment/Direct Control Lodestar Models B, C & F Brake



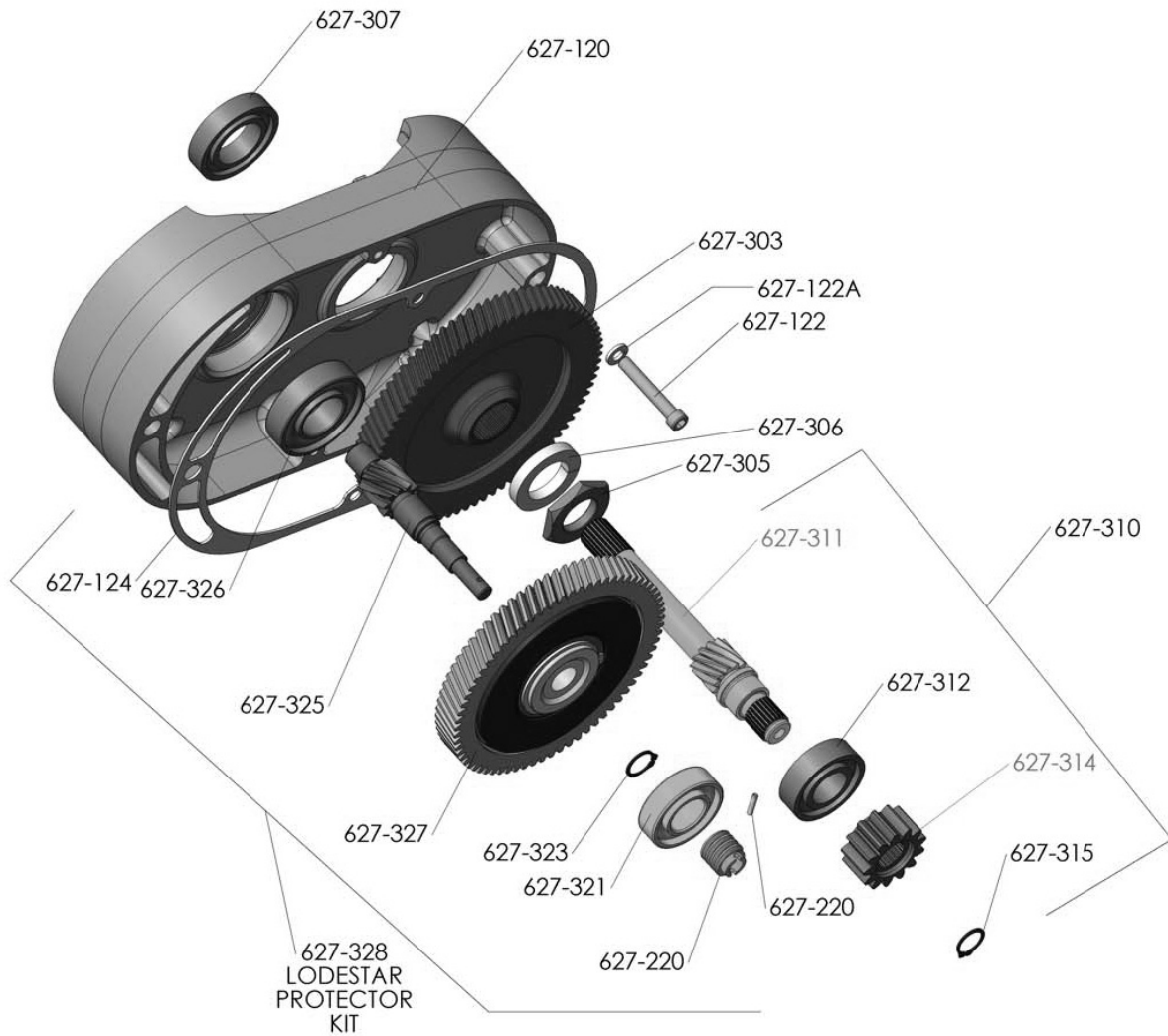
Entertainment/Direct Control Lodestar Models J, L, LL, R & RR Brake



ENTERTAINMENT/DIRECT CONTROL-LODESTAR ELECTRIC CHAIN HOIST-PROTECTOR KIT				
Key Number	Part Name	No. Req'd.	Models	
			B,C & F	J, L, LL, R & RR
627-120	Gear Housing	1	27038	35627 (Includes 627-119)
627-122	Gear Housing Attaching Screw	4	28830	35733
627-122A	Gear Housing Attaching Screw L.W.	4	940802	940830
627-124	Gear Housing Gasket	1	27747	35707
627-303	Liftwheel Gear	1	27009 (53 Teeth) for Model B & F 27010 (47 Teeth) for Model C	35009 (79 Teeth) for Models J, L & R, 35639 (60 Teeth) for Models LL & RR
627-304	Liftwheel Gear Snap Ring	1	27767	-
627-305	Liftwheel Geat Nut	1	-	35773
627-306	Liftwheel Gear Nut Washer	1	-	986276
627-307	Liftwheel Bearing-Gear End	1	88429	82002
627-310	Drive Shaft and Pinion S.A. (Items 627-311 Thru 627-315, as applicable)	1	27653 for Model B 27654 for Models C & F	35688 for Model J 35687 for Models L, LL, R & RR
627-311	Drive Shaft and Pinion	1	24641 for Model B 24642 for Models C & F	35357 (18 teeth) for Model J 35356 (12 teeth) for Models L, LL, R & RR
627-312	Drive Shaft Pinion Bearing	1	82009	83691
627-313	Drive Shaft Bearing Spacer	1	27710	-
627-314	Brake Hub	1	27851 (21/32 Lg.) for Model B 27852 (1-1/8 Lg.) for Models C & F	35744
627-315	Brake Hub Snap Ring	1	27766	35766
627-321	Intermediate Gear & Pinion Bearing-Outboard	1	82009	88437
627-322	Limit Switch Drive Pinion	1	27712	-
627-323	Intermediate Gear Snap Ring	1	27765	35763
627-325	Intermediate Pinion (includes Item 627-322 (If applicable)	1	28623 (8 teeth) for Models B & F 28624 (14 teeth) for Model C	35351 (10 teeth) for Models J, L & R 35420 (15 teeth) for Models LL & RR
627-326	Intermediate Gear and Pinion Bearing-Inboard	1	88440	Order (1) Bearing 83670 and (1) Shaft Adapter 24350
627-327	Lodestar Protector	1	28694 for Model B, 28695 for Models C & F	36668 for Model J, 36670 for Models L & R 36671 for Models LL & RR
627-328	Lodestar Protector Kit (Includes items 627-124, 627-321, 627-322, 627-323, 627-325 & 627-327)	1	2878 for Model B, 2880 for Models C & F	3602 for Model J, 3603 for Models L & R 3604 for Models LL & RR

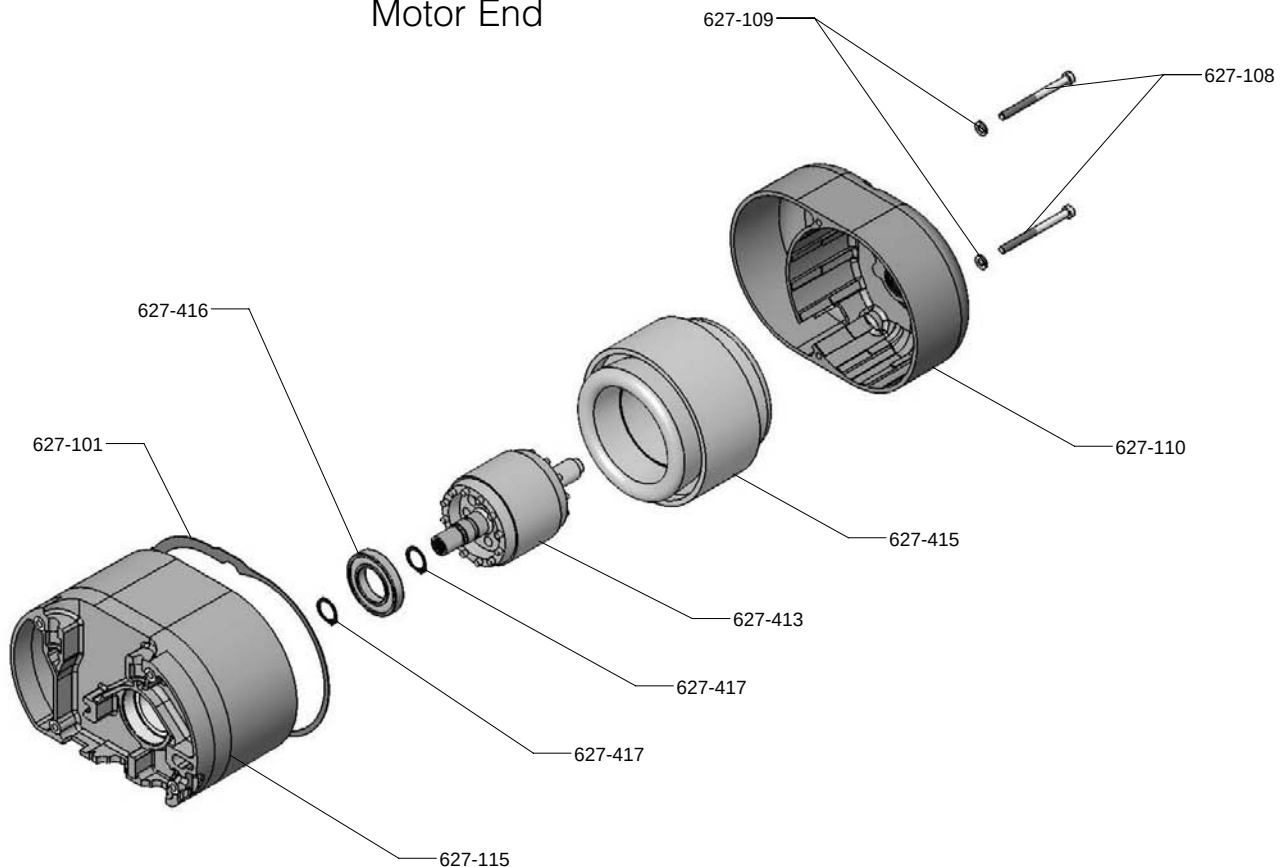


Entertainment/Direct Control Lodestar Models J, L, LL, R & RR
Protector Kit

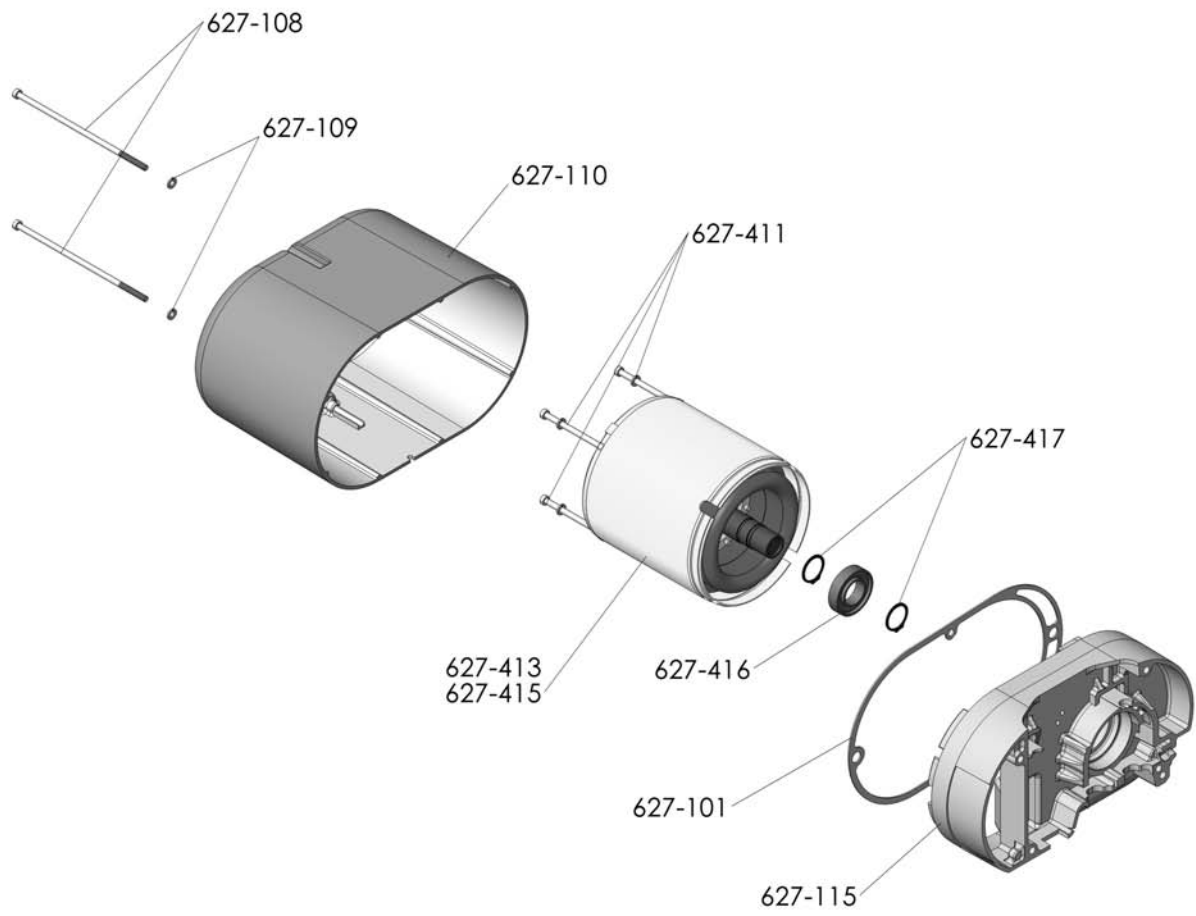


ENTERTAINMENT/DIRECT CONTROL-LODESTAR ELECTRIC CHAIN HOIST-MOTOR END				
Key Number	Part Name	No.	Models	
		Req'd.	B,C & F	J, L, LL, R & RR
			Part Number	
627-101	Gear Housing Gasket	1	27847 Weatherproof Units Only	35841 Weatherproof Units Only
627-108	Motor Housing Cover Screw	-	987397 (2 Req'd.)	987553 (2 Req'd.)
627-109	Motor Housing Cover Screw Lock Washer	-	982226 (2 Req'd.) 982251 (2 Req'd.) Weatherproof Units only	982226 (4 Req'd.) 982251 (4 Req'd.)Weatherproof Units only
627-110	Motor Housing Cover	1	27059	36076
627-115	Motor Housing	1	27063	35073
627-124	Gear Housing Gasket	1	27747	35707
627-411	Motor Thru Bolts	4	—	87377 for Models J, L & R 87336 for Models LL & RR
627-413	Rotor & Shaft Assembly	1	286004 For Model B 286000 For Models C & F	***367002 for Models J, L & R *** 367008 for Models LL & RR
627-415	Stator	1	287006 For Model B 287001 For Models C & F	
627-416	Motor Shaft Bearing (Inboard)	1	82003	82004
627-417	Motor Shaft Inboard Bearing Snapping	2	27790	35764
*** 3/4 Motor Includes Stator, Rotor & Shaft Assembly, End Bell & Attaching Screws assembled complete. Individual Rotor and Shaft Assembly & Stators for Repairs not yet available.				

Models B, C & F
Motor End



Models J, L, LL, R & RR
Motor End

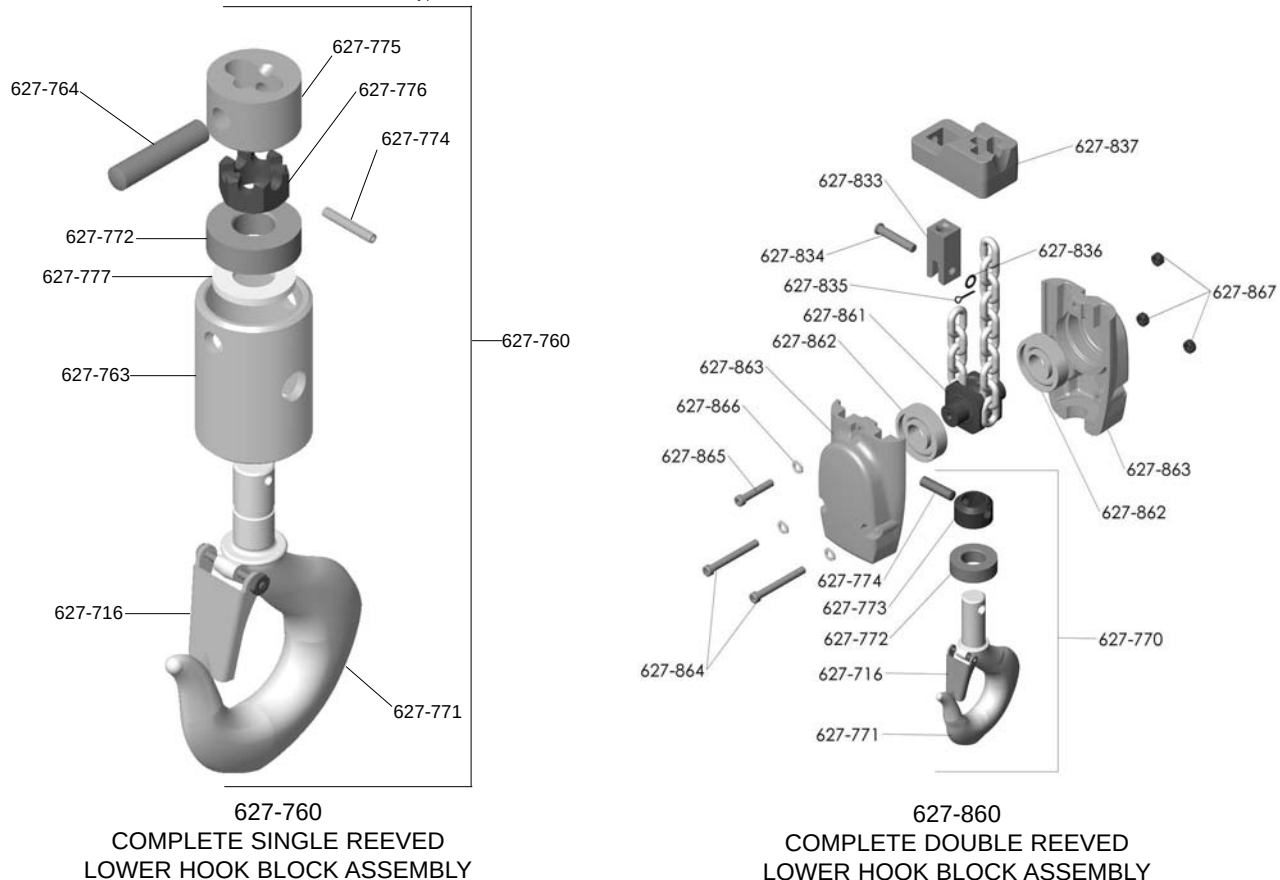


ENTERTAINMENT/DIRECT CONTROL LODESTAR ELECTRIC CHAIN HOIST PARTS LIST-MECHANICAL					
627-760 Single Reeved Complete Lower Hook Block Assembly					
627-860 Double Reeved Complete Lower Hook Block Assembly					
Key Number	Part Name	No. Req'd.	Models		
			B, C & F	J, L & LL	R & RR
			Part Number		
627-716	Latch Kit (specify no. req'd)	-	45661	45662	45663
627-760	Lower Hook Block Assembly	1	**28683	**35651	35621
627-763	Lower Hook Body	1	45401	35370	-
627-764	Lower Hook Chain Block Pin	1	45943	35790	-
627-770	Lower Hook Block Assembly	1	-	-	*35645
627-771	Lower Hook with Latch: Latch Type Hook	1	28686	35611	35612
	Latchlok Type Hook	1	28604	28604	36681
627-772	Lower Hook Thrust Bearing	1	88485	88485	88505
627-773	Lower Hook Collar	1	-	-	35369
627-774	Lower Hook Pin	1	983772	983772	45946
627-775	Lower Hook Chain Block	1	28007	35026	-
627-776	Lower Hook Nut	1	982526	982526	-
627-777	Lower Hook Block Washer	1	945921	945921	-
627-833	Dead End Block	1	-	-	35418
627-834	Dead End Pin	1	-	-	82314
627-835	Dead End Pin Cotter Pin	1	-	-	988330
627-836	Dead End Pin Washer	1	-	-	987877
627-837	Contact Block	1	-	-	36764
627-860	Lower Hook Block Assembly-Complete	1	-	-	**35621
627-861	Hook Block Sheave	1	-	-	35010
627-862	Hook Block Sheave Bearing	2	-	-	83674
627-863	Hook Block (Order in Pairs)	2	-	-	35034
627-864	Hook Block Screw-Long	2	-	-	982374
627-865	Hook Block Screw-Short	1	-	-	982370
627-866	Hook Block Screw L.W.	3	-	-	940830
627-867	Hook Block Screw Nut	3	-	-	982445

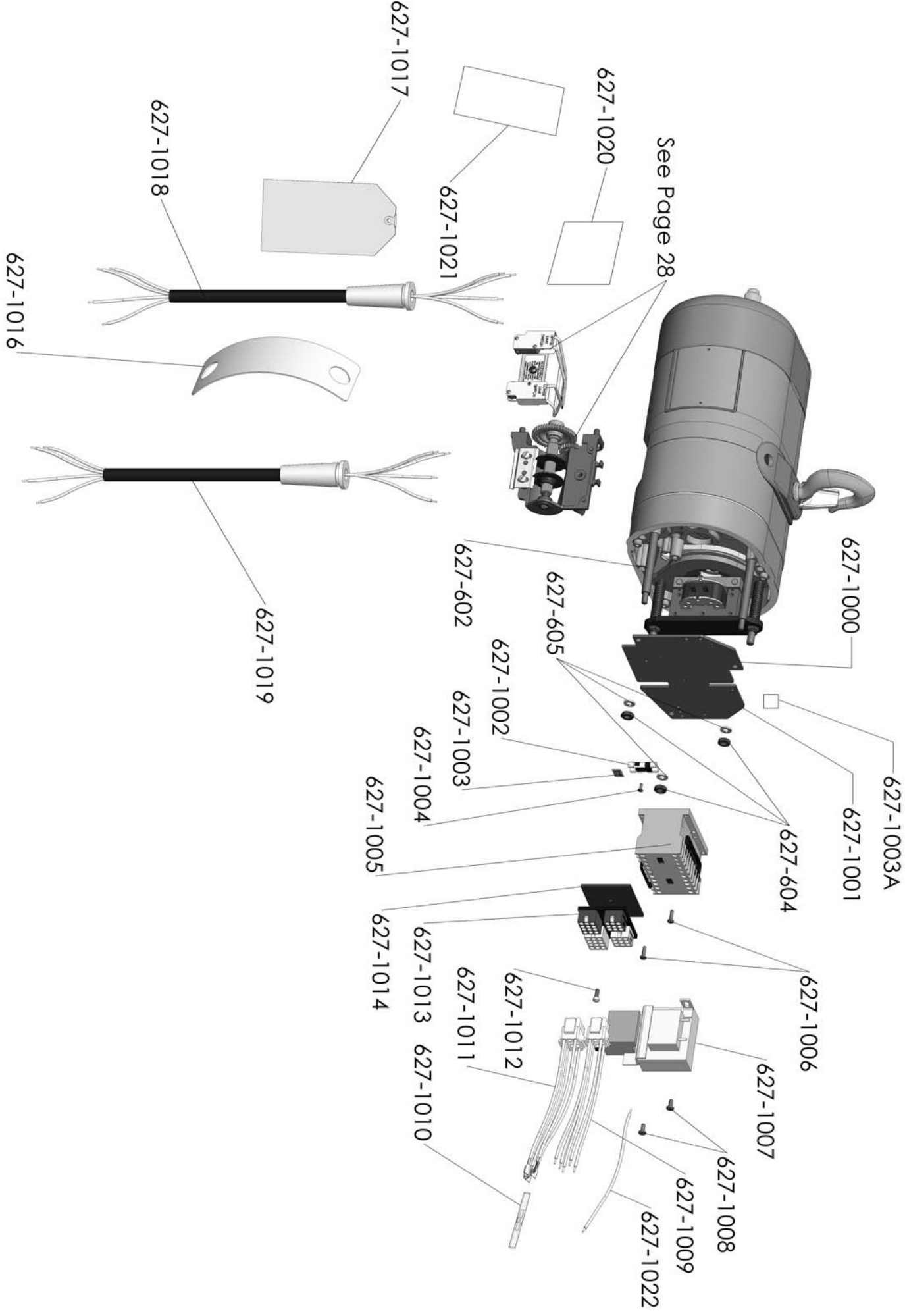
*Latch Type Hook contact CM for part number of Lower Hook Assembly with Latchlok Type Hook.

**With Latch Type Hook. If lower hook block assembly with Latchlok Type Hook is required. Contact CM.

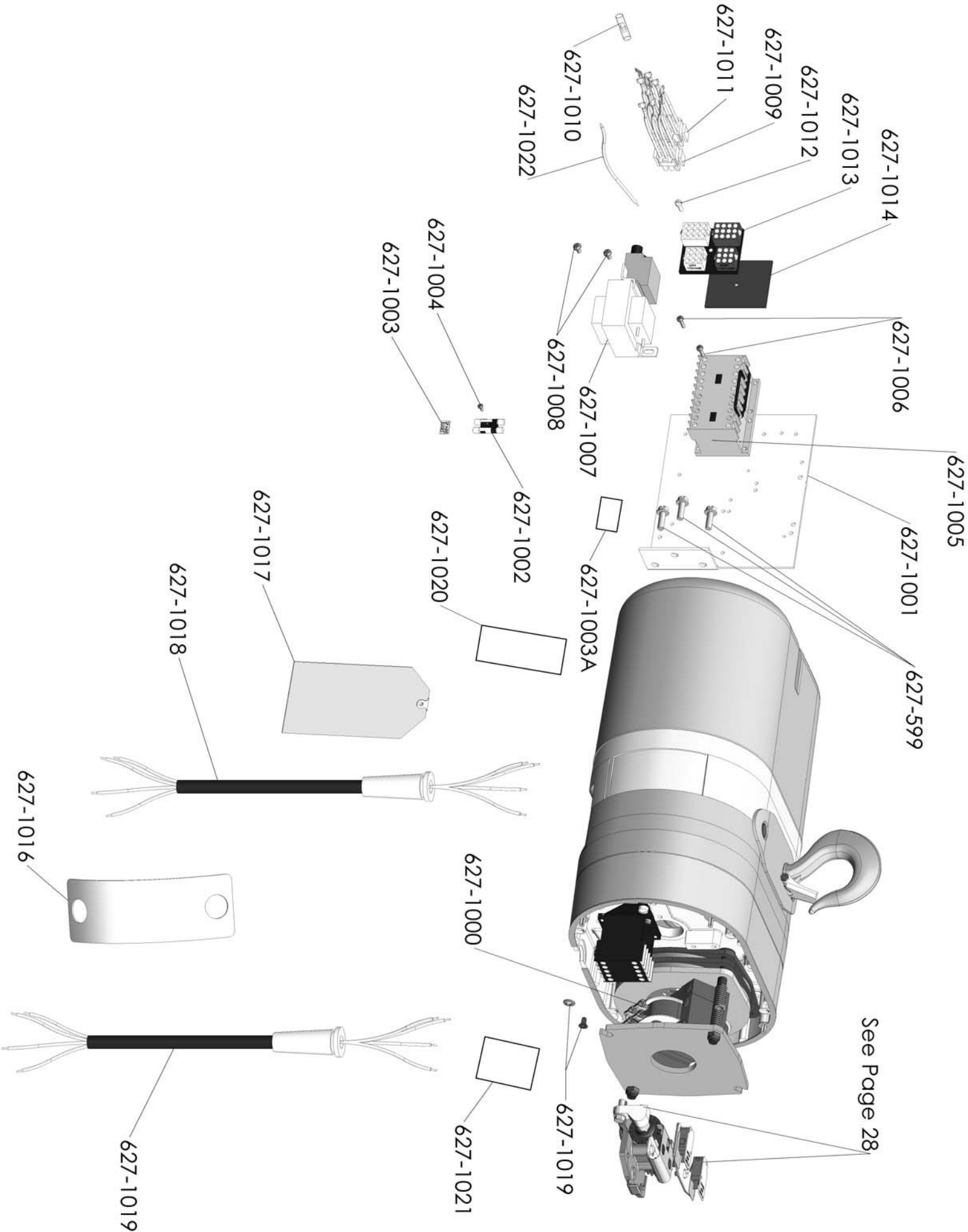
***Contact CM for Part Number of Latchlok Type Hook.



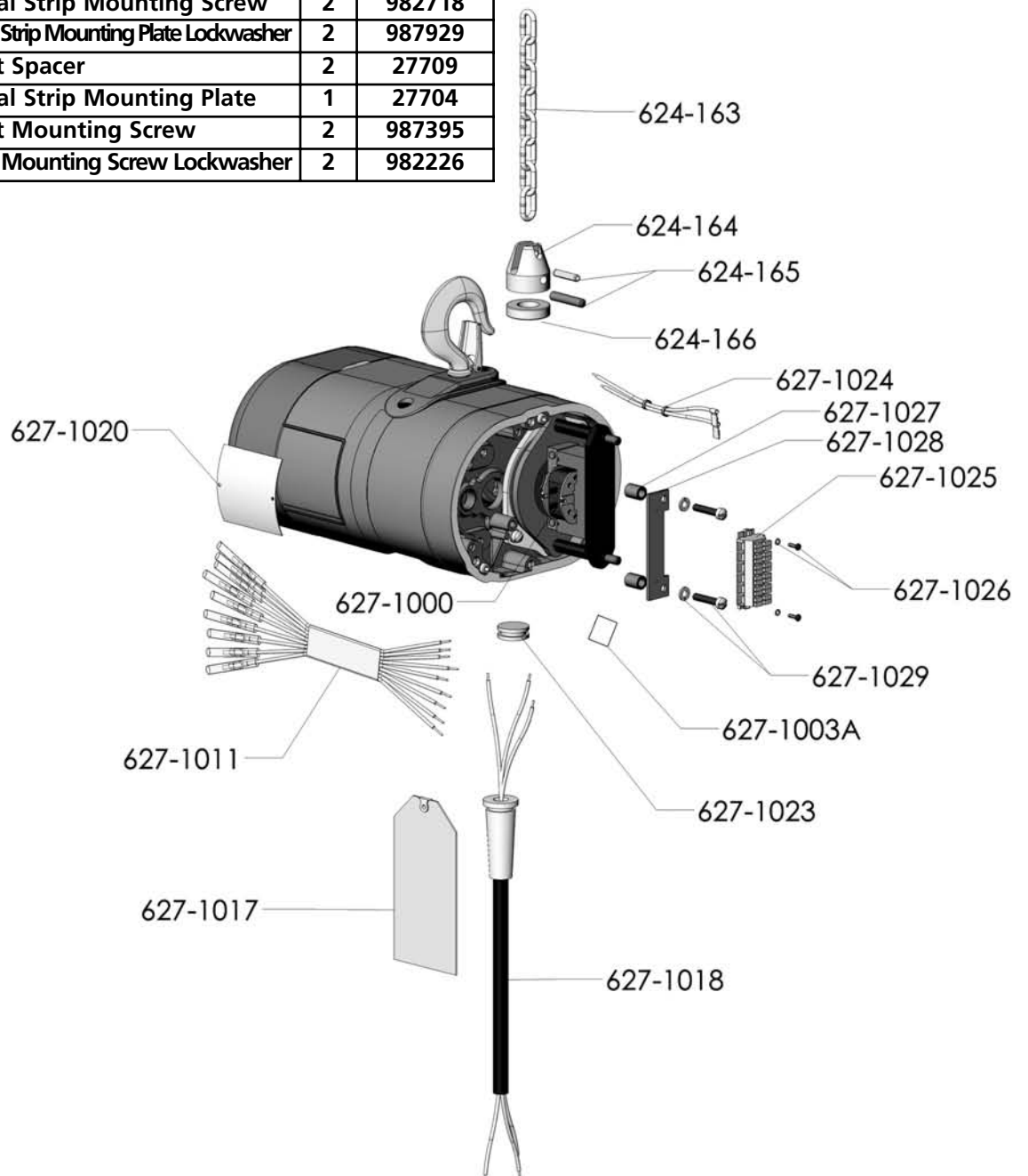
V1 ENTERTAINMENT-MODELS B, C & F			
Key/No.	Description	Qty.	Part No.
627-602	Contactor Bracket Plate Stud	3	27836
627-604	Contactor Bracket Plate Stud Lockwasher	3	982226
627-605	Contactor Bracket Plate Stud Nut	3	982514
627-1000	Insulated Brake Coil Terminal	2	983197
627-1001	Contactor Bracket	1	31633
627-1002	Spare Fuse Clamp	1	951951
627-1002	Fuse (160mA)-Specify Quantity	-	27675
627-1003	Spare Fuse Label	1	27674
627-1003A	Ground Symbol Label	1	20940
627-1004	Fuse Clamp Attaching Screw	1	982574
627-1004	Fuse Clamp Attaching Screw Lockwasher	1	987844
627-1005	Reversing Conatactor (115v Coil) (48 v Coil) (24v Coil)	1	24799
		1	24797
		1	28860
627-1006	Contactor Attaching Screw	2	982718
627-1007	Transformer w/fusing (115v sec) (Fuses not included) (48v sec) (24v sec)	1	28294
		1	28295
		1	28296
627-1008	Transformer Mounting Screw	2	982683
627-1009	Contactor/Transformer Wiring Harness	1	27602
627-1010	Line Connector-Specify Qty.	-	982158
627-1011	Motor Wiring Harness (1 Speed)	1	27603
627-1012	Board Attaching Screw	1	987862
627-1013	Voltage Change Board (1 Speed)	1	27672
627-1014	Voltage Change Board Insulator	1	27685
627-1016	Warning Tag	1	81704
627-1017	Instruction Tag	1	28271
627-1018	Power Cord	1	31701
627-1019	Control Cord Assembly-Entertainment	1	31703
627-1020	Hoist I.D. Plate	1	Contact Factory
627-1021	Voltage Label-Model B	1	27698
	Model C	1	27699
	Model F	1	27696
627-1022	Jumpers:		
	W1 "UP" Limit Switch Jumper	1	27613
	W2 "Down" Limit Switch Jumper	1	27614
	R10 Transformer Jumper	1	27609
	R13 Transformer Jumper	1	27610
	G-Y Ground Jumper	1	27686
	Contactor Coil Jumper	1	27627



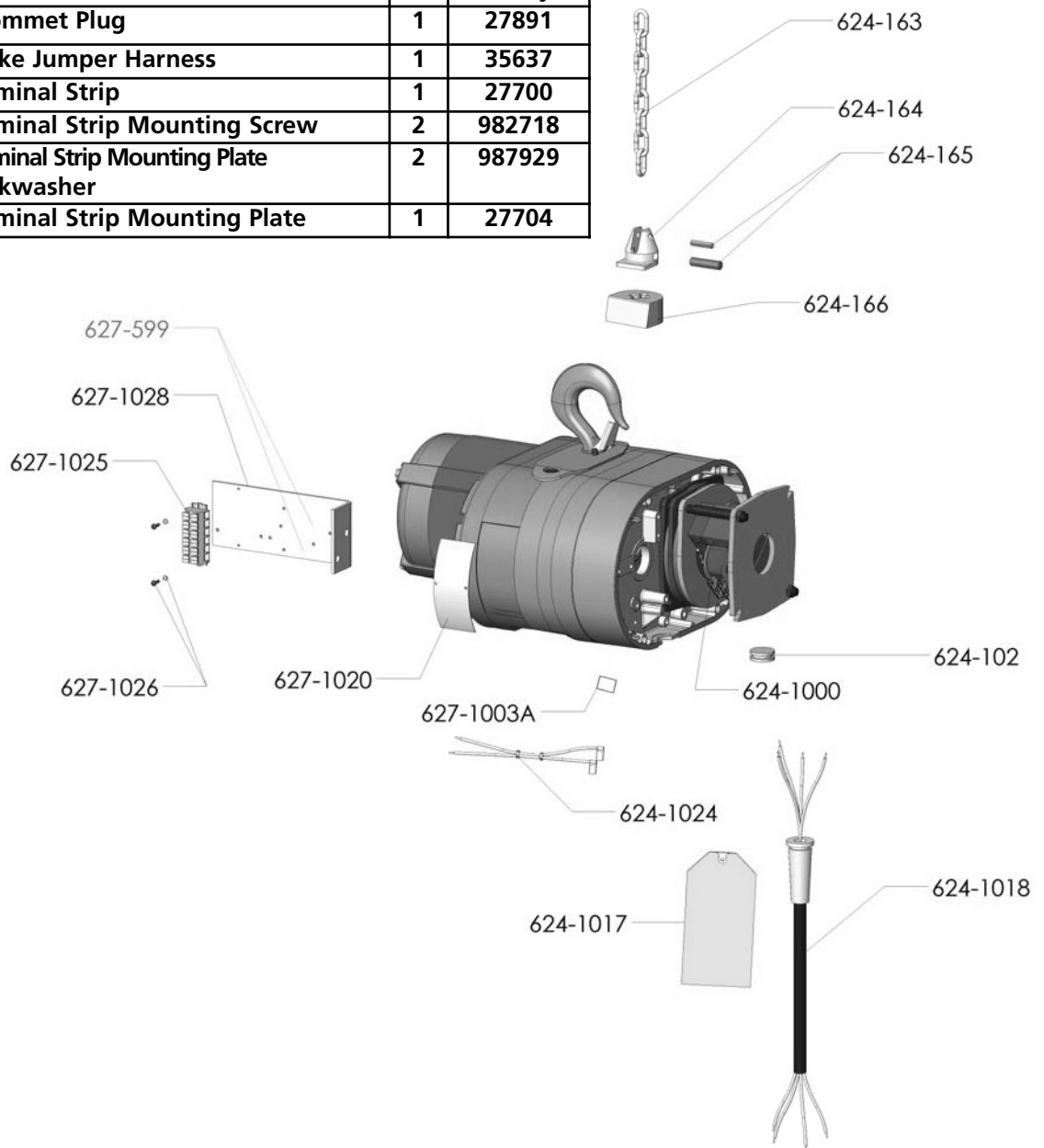
V2 ENTERTAINMENT-MODELS J, L, R, LL & RR			
KeyNo	Description	Qty.	Part No.
627-599	Contactor Bracket Mtg. Screw	3	983643
627-1000	Insulated Brake Coil Terminal	2	983197
627-1001	Contactor Bracket	1	31635
627-1002	Spare Fuse Clamp	1	951951
627-1002	Fuse (160mA)-Specify Quantity	-	27675
627-1003	Spare Fuse Label	1	27674
627-1003A	Ground Symbol Label	1	20940
627-1004	Fuse Clamp Attaching Screw	1	982574
627-1004	Fuse Clamp Attaching Screw Lockwasher	1	987844
627-1005	Reversing Conatactor (115v Coil) (48 v Coil) (24v Coil)	1	24799
		1	24797
		1	28860
627-1006	Contactor Attaching Screw	1	982718
627-1007	Transformer w/fusing (115v sec) (Fuses not included) (48v sec) (24v sec)	1 1 1	28294 28295 28296
627-1008	Transformer Mounting Screw	2	982683
627-1009	Contactor/Transformer Wiring Harness	1	35613
627-1010	Line Connector-Specify Qty.	-	982158
627-1011	Motor Wiring Harness (1 Speed)	1	35615
627-1012	Board Attaching Screw	1	987862
627-1013	Voltage Change Board (1 Speed)	1	27672
627-1014	Voltage Change Board Insulator	1	27685
627-1016	Warning Tag	1	81704
627-1017	Instruction Tag	1	28271
627-1018	Power Cord	1	31701
627-1019	Control Cord Assembly-Entertainment	1	31704
627-1020	Hoist I.D. Plate	1	Contact Factory
627-1021	Voltage Label-Model J	1	27690
	Model L	1	27687
	Model R	1	27691
	Model LL	1	27692
627-1022	Model RR	1	27693
	Jumpers:		
	W1 "UP" Limit Switch Jumper	1	35661
	W2 "Down" Limit Switch Jumper	1	35662
	R10 Transformer Jumper	1	35638
	R13 Transformer Jumper	1	35641
	G-Y Ground Jumper	1	27686
	Contactor Coil Jumper	1	27627



V1 DIRECT CONTROL - MODELS B, C & F			
Key No.	Description	Qty.	Part No.
624-163	Loose End Chain (8-Links)	1	85832
624-164	Loose End Block	1	24015
624-165	Loose End Chain Pin & Load Chain Pin	1	C328
624-166	Stop Block	1	24785
627-1000	Insulated Brake Coil Terminal	2	983197
627-1003A	Ground Symbol Label	1	20940
627-1017	Instruction Tag	1	28271
627-1018	Power Cord Assembly	1	27637
627-1020	Hoist I.D. Plate	1	Contact Factory
627-1023	Grommet Plug	1	27891
627-1024	Brake Jumper Harness	1	27715
627-1025	Terminal Strip	1	27700
627-1026	Terminal Strip Mounting Screw	2	982718
	Terminal Strip Mounting Plate Lockwasher	2	987929
627-1027	Bracket Spacer	2	27709
627-1028	Terminal Strip Mounting Plate	1	27704
627-1029	Bracket Mounting Screw	2	987395
	Bracket Mounting Screw Lockwasher	2	982226

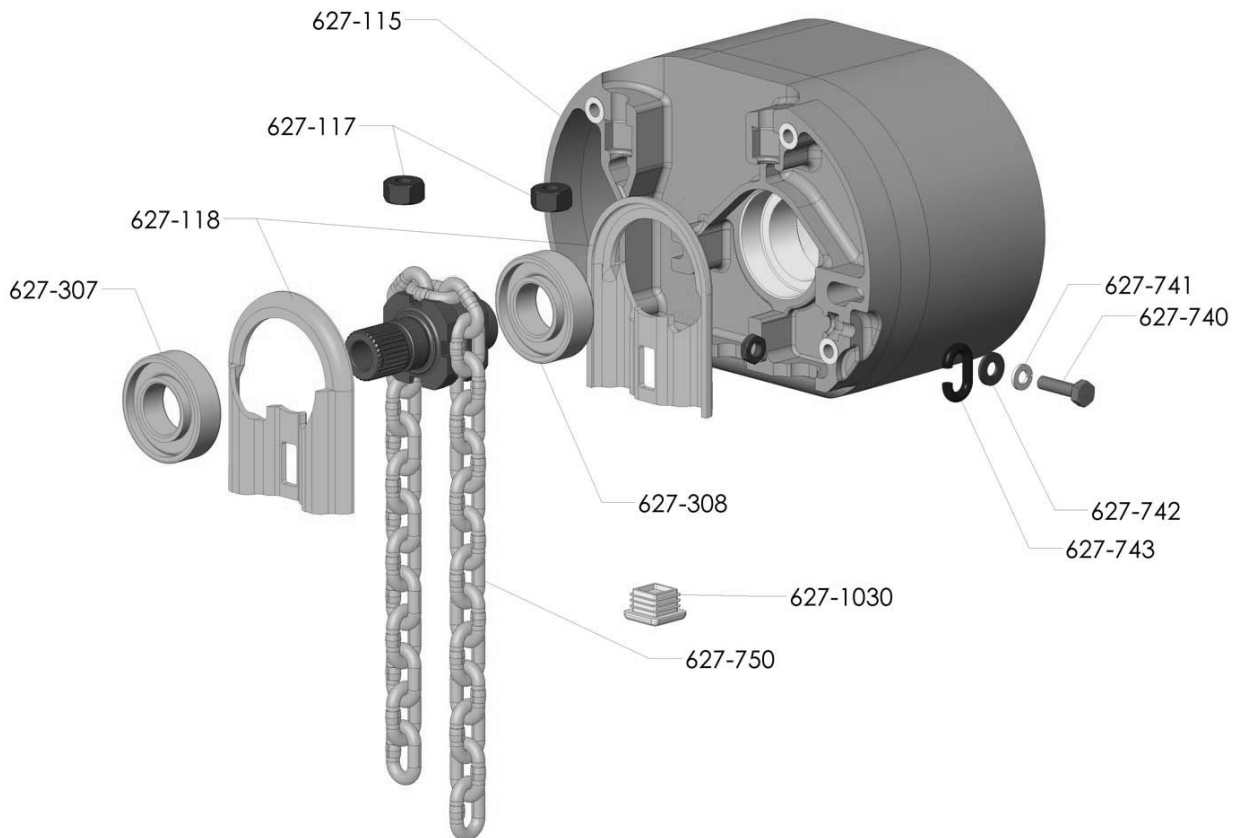


V2 DIRECT CONTROL - MODELS J, L, R, LL & RR			
Key No.	Description	Qty.	Part No.
624-163	Loose End Chain (8-Links)	1	85832
624-164	Loose End Block	1	24016
624-165	Loose End Chain Pin & Load Chain Pin	1	C348
624-166	Stop Block	1	24786
627-599	Mounting Plate Screws	2	983643
627-1000	Insulated Brake Coil Terminal	2	983197
627-1003A	Ground Symbol Label	1	20940
627-1017	Instruction Tag	1	28271
627-1018	Power Cord Assembly	1	31711
627-1020	Hoist I.D. Plate	1	Contact Factory
627-1023	Grommet Plug	1	27891
627-1024	Brake Jumper Harness	1	35637
627-1025	Terminal Strip	1	27700
627-1026	Terminal Strip Mounting Screw	2	982718
	Terminal Strip Mounting Plate Lockwasher	2	987929
627-1028	Terminal Strip Mounting Plate	1	27704



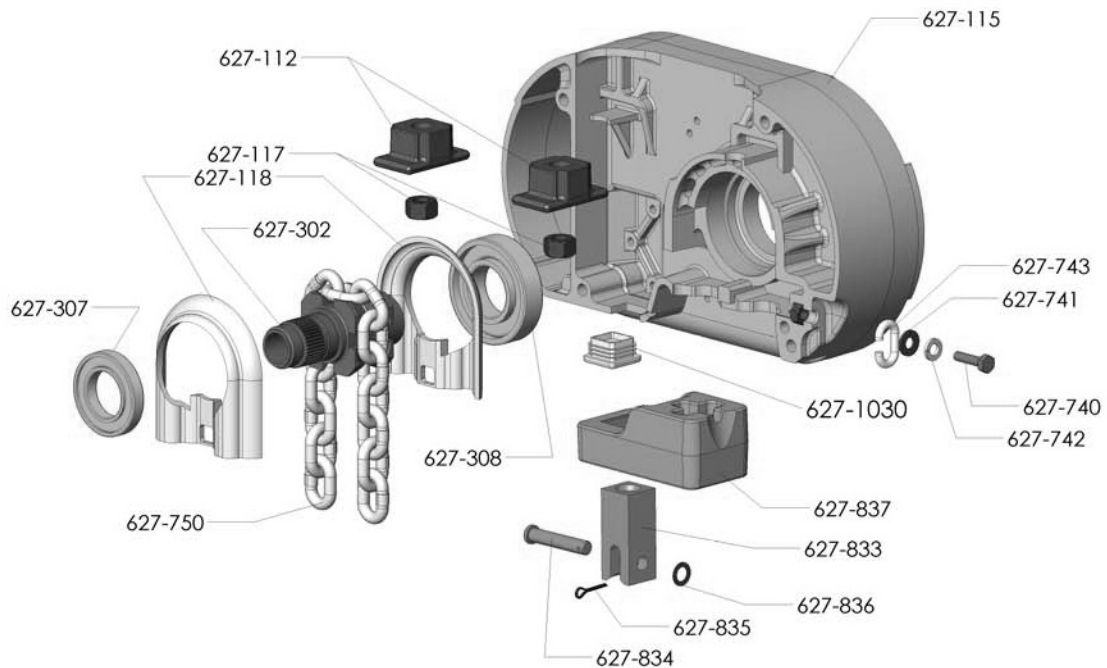
**V1 ENTERTAINMENT/DIRECT CONTROL
MODELS B, C & F**

GEARING			
Key No.	Description	Qty.	Part No.
627-115	Motor Housing	1	27063
627-117	Suspension Adapter Nut	2	927755
627-118	Chain Guide	2	27008
627-302	LiftWheel	1	27360
627-307	Lift Wheel Bearing (Gear End)	1	88429
627-308	Lift Wheel Bearing (Motor End)	1	88429
627-740	Loose End Screw	1	927764
627-741	Loose End Screw Lockwasher	1	982226
627-742	Loose End Screw Washer	1	954802
627-743	Loose End Link	1	27351
627-750	Load Chain	-	85994
627-1030	Dead End Block Hole Plug	1	27223



**V2 ENTERTAINMENT/DIRECT CONTROL
MODELS J, L, R, LL & RR**

GEARING			
Key No.	Description	Qty.	Part No.
627-112	Suspension Adapter	2	35066
627-115	Motor Housing	1	35073
627-117	Suspension Adapter Nut	2	935791
627-118	Chain Guide	2	35018
627-302	LiftWheel	1	35421
627-307	Lift Wheel Bearing (Gear End)	1	82002
627-308	Lift Wheel Bearing (Motor End)	1	83669
627-740	Loose End Screw	1	987210
627-741	Loose End Screw Lockwasher	1	945851
627-742	Loose End Screw Washer	1	954807
627-743	Loose End Link	1	35367
627-750	Load Chain	-	85949
627-833	Dead End Block	1	35418
627-834	Dead End Pin (Models R & RR)	1	82314
627-835	Dead End Pin Cotter Pin (Models R & RR)	1	988330
627-836	Dead End Pin Washer (Models R & RR)	1	987877
627-837	Contact Block (Models R & RR)	1	36764
627-1030	Dead End Block Hole Plug (Models J, L & LL)	1	35291



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