INSTALLATION, OPERATING, & MAINTENANCE MANUAL

VARIABLE SPEED ELECTRIC CHAIN HOIST

CM® LODESTAR® VS

VARIABLE SPEED ELECTRIC CHAIN HOIST WITH INTELLI-CONNECT™ OPTION

Before installing hoist, fill in the information below.

Model Number _____

Serial No. _____

Purchase Date _____

Voltage _____

Rated Load _____

RATED LOADS 1/8 TO 3 TONNES
125 KG TO 3000 KG

⚠ WARNING ⚠

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

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

NOTE: All Lodestar VS electric chain hoists have 24VDC control voltage as standard. For Lodestar VS hoists furnished with motorized trolley suspensions or for use in bridge applications, please contact our Special Applications Department at *SpecialApplications@cmworks.com* to have a complete package quoted to include the required electronics for 115V control voltage out of the factory.

P/N: 192047082 (REV AD) 627NH March 2022

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

PARTS FOR YOUR HOIST ARE AVAILABLE FROM YOUR LOCAL AUTHORIZED REPAIR STATION. FOR THE NAME OF THE NEAREST PARTS OR SERVICE CENTER, VISIT OUR WEB SITE WWW.COLUMBUSMCKINNON.COM OR CALL OUR CUSTOMER SERVICE DEPARTMENT AT (800) 888.0985.

AN ELECTRONIC COPY OF THIS MANUAL AND THE CM HOIST PARTS AND SERVICES LIST IS AVAILABLE AT:

https://www.columbusmckinnon.com/en-us/products/hoisting-lifting-equipment/electric-air-hoists/electric-chain-hoists/lodestar-vs-electric-chain-hoist/

WARNING

Follow all instructions and warnings for inspecting, maintaining, and operating this hoist.

⚠ WARNING

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

TO AVOID INJURY:

Consult Columbus McKinnon for information concerning using hoists in these applications.

⚠ WARNING

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

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

⚠ CAUTION

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

1. Maintain a firm footing or be otherwise secured when operating the hoist.
2. Check brake function by tensioning the hoist prior to each lift operation.
3. Use hook latches. Latches are to retain slings, chains, etc. under slack conditions only.
4. Make sure the hook latches are closed and not supporting any parts of the load.
5. Make sure the load is free to move and will clear all obstructions.
6. Avoid swinging the load or hook.
7. Make sure hook travel is in the same direction as shown on the controls.
8. Inspect the hoist regularly, replace damaged or worn parts, and keep appropriate records of maintenance.
9. Use the hoist manufacturer's recommended parts when repairing the unit.
10. Lubricate load chain per hoist manufacturer's recommendations.
11. **NOT** use the hoist load limiting or warning device to measure load.
12. **NOT** use limit switches as routine operating stops unless allowed by manufacturer. They are emergency devices only.
13. **NOT** allow your attention to be diverted from operating the 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.

SAFETY PRECAUTIONS

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

The safety laws for elevators, lifting of people and for dumbwaiters specify construction details that are not incorporated into the 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.

HOIST SAFETY IS UP TO YOU...

⚠ WARNING

DO NOT LIFT MORE THAN RATED LOAD.

CHOOSE THE RIGHT HOIST FOR THE JOB...

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

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

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

⚠ WARNING

DO NOT OPERATE DAMAGED OR MALFUNCTIONING HOIST.

DO NOT OPERATE WITH TWISTED, KINKED, OR DAMAGED CHAIN.

INSPECT

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

Inspect hoists for operations warning notices and legibility.

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

Under no circumstances should you operate a malfunctioning hoist.

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

Load chain should be properly lubricated.

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

Chains should be checked for deposits of foreign material which may be carried into the hoist mechanism.

Check brake for evidence of slippage under load.

⚠ WARNING

DO NOT PULL AT AN ANGLE. BE SURE HOIST AND LOAD ARE IN A STRAIGHT LINE.

DO NOT USE LOAD CHAIN AS A SLING.

USE HOIST PROPERLY

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

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

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

Do not use load chain as a sling. Such usage damages the chain and lower hook.

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

⚠ WARNING

DO NOT LIFT PEOPLE OR LOADS OVER PEOPLE.

LIFT PROPERLY

Do not lift co-workers with a hoist.

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

Do not remove or obscure operational warning notices.

MAINTAIN PROPERLY

CLEANING

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

LUBRICATION

Chain should be properly lubricated.

AFTER REPAIRS

Carefully operate the hoist before returning it to full service.

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

FOREWORD

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

Please study its contents thoroughly before putting your hoist into operation. By practicing correct operating procedures and by carrying out the recommended preventive maintenance suggestions, you will experience long, dependable and safe service. After you have completely familiarized yourself with the contents of this manual, we recommend that you carefully file it for future reference.

The information herein is directed to the proper installation, 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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GENERAL INFORMATION

SPECIFICATIONS

The Lodestar Electric Chain Hoist is a highly versatile materials handling device that can be used to lift loads that are within rated capacity. The mechanical features of these hoists include an alloy steel liftwheel, Load Limiter, hardened steel chain guides, hardened steel gear train, lifetime lubrication, forged steel hooks and lightweight aluminum frame. The electrical features include hoist-duty motor, rugged hoist brake, variable frequency drive and electronic brake contoller circuit. The hoist is available with hook or lug suspensions that are supplied separately. Table 1 summarizes the Lodestar Electric Chain Hoist models.

CM REPAIR/REPLACEMENT POLICY

All Columbus McKinnon (CM®) Lodestar Electric Chain Hoists are 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 page 39 for Limitations of Warranties, Remedies and Damages, and Indemnification and Safe Operation.

Table 1. Specifications

Lodestar VS Electric Chain Hoists											
Model	Load Capacity		Lifting Speed 60 Hz Output		Lifting Speed 50 Hz Output		Chain Falls	Chain Size		Chain Weight per Length of Lift	
	Tonne	kg	ft/min	m/min	ft/min	m/min		in x in	mm x mm	lb/ft	kg/m
A	1/8	125	32	9.8	26.7	8.1	1	0.250 x 0.7445	6.35 x 18.9	0.585	0.87
AA	1/8	125	60	18.3	50.0	15.2	1	0.250 x 0.7445	6.35 x 18.9	0.585	0.87
B	1/4	250	16	4.9	13.3	4.1	1	0.250 x 0.7445	6.35 x 18.9	0.585	0.87
C	1/4	250	32	9.8	26.7	8.1	1	0.250 x 0.7445	6.35 x 18.9	0.585	0.87
E	1/2	500	8	2.4	6.7	2.0	2	0.250 x 0.7445	6.35 x 18.9	1.17	1.74
F	1/2	500	16	4.9	13.3	4.1	1	0.250 x 0.7445	6.35 x 18.9	0.585	0.87
J	1/2	500	32	9.8	26.7	8.1	1	0.312 x 0.8583	7.92 x 21.8	0.94	1.40
H	1	1000	8	2.4	6.7	2.0	2	0.250 x 0.7445	6.35 x 18.9	1.17	1.74
L	1	1000	16	4.9	12.3	4.1	1	0.312 x 0.8583	7.92 x 21.8	0.94	1.40
R	2	2000	8	2.4	6.7	2.0	2	0.312 x 0.8583	7.92 x 21.8	1.88	2.80
RT	3	3000	5.3	1.6	4.4	1.4	3	0.312 x 0.8583	7.92 x 21.8	2.82	4.20

Lodestar VS Electric Chain Hoists									
Model	Shortest Distance Between Hooks		Motor Power 60 Hz Output		Motor Power 50 Hz Output		IP Rating	Net Weight Standard 10 ft, 230V Unit Add 0.5lb (0.3kg) for 460V	
	in	mm	HP	kW	HP	kW		lb	kg
A	16.9	429	0.25	0.19	0.21	0.16	66	66	30
AA	19.9	505	0.50	0.37	0.42	0.31	66	67	30
B	16.9	429	0.25	0.19	0.21	0.16	66	67	30
C	16.9	429	0.50	0.37	0.42	0.31	66	66	30
E	21.6	549	0.25	0.19	0.21	0.16	66	81	37
F	16.9	429	0.50	0.37	0.42	0.31	66	67	30
H	18.1	460	1	0.75	0.83	0.62	66	81	37
J	21.6	549	0.50	0.37	0.42	0.31	66	122	55
L	18.1	460	1	0.75	0.83	0.62	66	120	54
R	25.8	655	1	0.75	0.83	0.62	66	143	65
RT	32.1	815	1	0.75	0.83	0.62	66	161	73

Figure 1. Chain Container, Standard on the Lodestar VS

Figure 2. Latchlok Hook

Figure 3. Series 635 Low Headroom Trolley

Figure 4. Series 635 Motor Driven Trolley

Figure 5. Universal Trolley

Figure 6. CM® Rocket™ Universal Pendant Control

ACCESSORIES

HOOK SUSPENSIONS

Swivel- and rigid-type hook suspensions are available for all Lodestar Electric Hoists. Rigid-type hook suspensions are normally recommended for most applications. The hook suspensions are intended for suspending the hoist from a trolley which has a single load bar (such as CM® Series 632 and 633 Trolleys) or for suspending the hoist from a fixed structure.

CHAIN CONTAINER

This accessory (see Figure 1) is used to hold slack chain and it is supplied complete with mounting hardware and instructions. The chain container is recommended for those applications where the slack chain would interfere with the load or drag on the floor as may be the case with double- or triple-reeved units. Chain containers can be furnished for units already in use.

LATCHLOK® HOOKS

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

LUG SUSPENSION

Lug suspensions are available for all Lodestar Electric Hoists. These are rigid-type suspensions wherein the lug replaces the hook in the suspension adapter. The lug suspensions are required for suspending the hoist from the Series 635 Low Headroom, Motor Driven and Universal Trolleys described in the following sections.

SERIES 635 LOW HEADROOM TROLLEY

These are manual push-type trolleys (see Figure 3) designed for use with Lodestar Electric Chain Hoists. A rigid lug suspension is required to suspend the hoist from the trolley. The trolley is adjustable for operation on a range of American Standard “S” beams. It will also operate on flat flanged beams.

SERIES 635 MOTOR DRIVEN TROLLEY

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

CM UNIVERSAL (UT) TROLLEY

The CM Universal Trolley (UT) is designed to fit virtually all Columbus McKinnon powered chain hoists up to 3-tonne capacities. The rugged UT is available as a convertible plain unit, a geared unit ideal for precise hoist positioning, and a motorized unit that’s perfect for applications requiring high-cycling and long-distance hoist travel.

CM® ROCKET™ UNIVERSAL PENDANT CONTROL

The CM Rocket Pendant Control is engineered for maximum operator comfort, while delivering the precision control your application demands.

INTELLI-CONNECT™

Optional Intelli-Connect™ enables quick and easy programming, maintenance, monitoring, and troubleshooting of the Lodestar – all from a tablet or smartphone. And, it works wirelessly, so you don’t need to attach a programming cable to access information.

INSTALLATION

UNPACKING INFORMATION

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

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

NOTE: See Electrical Installation instructions.

INSTALLING THE SUSPENSION

A. Single-Reeved Units:

Remove the hook suspension and (2) suspension screws from the packaging. 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.

Securely tighten the screws to the recommended seating torque (see Table 13) using a 12-point socket: 3/8” for Models A, AA, B, C & F and 1/2 for models J & L.

⚠ CAUTION

Use of impact tools (electric or pneumatic) may cause premature failure of attaching hardware.

B. Double-Reeved Units:

Remove the hook suspension, (2) suspension screws, (1) dead end pin, (1) washer, and (1) cotter pin from the packaging. Note 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 8. If these are not aligned as shown, lift the head of the bolt from the hex recess in the adapter, turn the bolt and block assembly, and reseat the bolt head to obtain the proper alignment. Do not change the position of the dead end block on the bolt to attain this alignment.

Check the position of the pin hole in the dead end block to make sure it has not been disturbed from its factory setting. The distance from the top of the pin hole to the bottom of the hoist should not exceed 1/4” (6.35 mm) for Models E & H and 7/16” (11.11 mm) for Model R. If the distance is not correct, adjust the position of the dead end block to obtain the proper distance.

Insert the suspension screws through the holes in the adapter and hand-thread these into the self-locking nuts enclosed in the hoist frame. Securely tighten the screws to the recommended seating torque (see Table 13) using a 12-point socket: 3/8” for Models E & H and 1/2” for Model R.

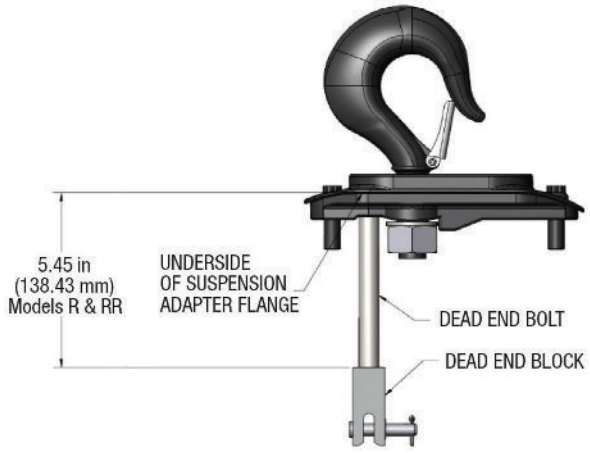


Figure 7. Double-Reeved Suspension Assembly

C. Triple-Reeved Units:

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

Remove the suspension assembly from the carton and the two suspension screws. Place the suspension assembly over the sheave stud and into the recess on top of the hoist. Insert the suspension screws through the holes in the suspension adapter and hand-thread these into the self-locking nut enclosed in the hoist. Securely tighten the screws to the recommended seating torque (see Table 13) using a 12-point, 1/2” socket.

After the suspension assembly is installed, secure the sheave stud to the suspension adapter using the round slotted nut and seat that were formerly used to attach the shipping plate to top of the hoist frame. Place the seat over the stud with the flat side down and then rotate the seat so that there is clearance between the seat and the suspension lug or hook. Assemble the nut to the stud and turn the nut by hand until the nut seats in the seat and the sheave hanger is snug in the frame. Then back off the nut until the hole in the stud is in line with one of the slots in the nut. Using a hammer, drive the retaining pin (packed with the suspension assembly) into the hole in the sheave stud until the end of the pin is flush with the edge of the nut.

⚠ 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.

⚠ WARNING

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 in Tables 13a-13c. 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.

SUSPENSION BOLT SHOULD BE REPLACED ANY TIME THE SUSPENSION IS REMOVED FROM THE HOIST.

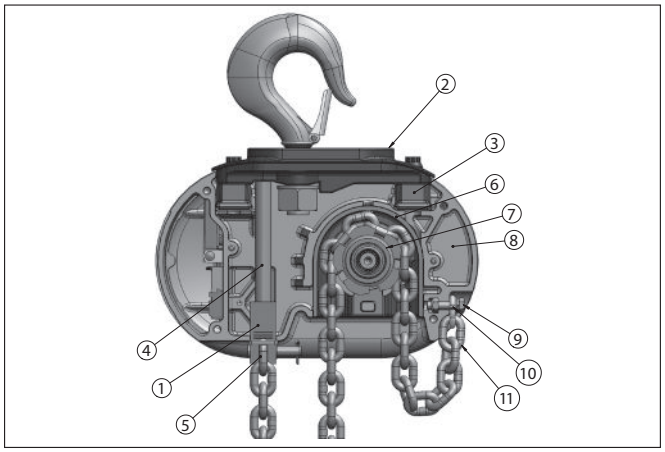


Figure 8. Suspension Components (Chain plate not shown for clarity)

①. Dead end block
②. Suspension assembly
③. Suspension self-locking nut
④. Dead end bolt
⑤. Dead end link
⑥. Chain guide
⑦. Liftwheel
⑧. Motor housing
⑨. Loose end screw
⑩. Loose end link
⑩. Loose end

(Do not order parts by these numbers. Parts list can be accessed online - see page 2.)

ATTACHING LOAD CHAIN

Single-Reeved

1. Suspend the hoist from an adequate support.
2. If replacing existing chain, remove chain block kit from loose end of chain by removing the two (2) screws from opposing sides of the block. Remove lower hook assembly by removing the pin holding the chain into the assembly.
3. Limit switch settings will need to be disabled when removing or installing chain. Refer to the limit switch section.
4. Using the connecting link, attach new chain to end of starter chain (existing chain if replacing) and feed through chain guides and over liftwheel. Feed enough chain through to be able to attach the chain block kit to the loose end of the chain by assembling the screws and nuts into the appropriate slots and tightening securely.
5. Attach the lower hook assembly to the appropriate end of the chain by inserting the end link of the chain into the block and securing the link with the pin.
6. Set upper and lower travel limits before putting unit into service. Refer to the limit switch section.

Double-Reeved

Suspend the hoist from an adequate support.

To attach the chain to the dead end block on Models E, H and R proceed as follows:

1. Suspend the hoist from an adequate support.
2. On Models E and H insert the last link of the load chain into the dead end block (1) and secure it with the dead end pin, washer and cotter pin furnished with the suspension. Ensure there are no twists in the chain.
3. On Model R, 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 9).

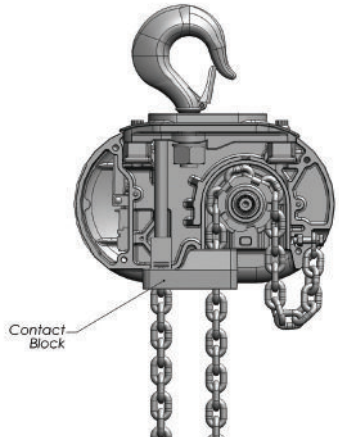


Figure 9. Contact Block Used on Model R

Triple-Reeved

1. Suspend the hoist from an adequate support.
2. If replacing existing chain, disconnect “loose end” of chain by removing the screw holding loose end link in place on side of hoist frame. Remove dead end of chain by removing the pin holding dead end link into lower hook assembly block.
3. Using a connecting link, attach new chain to the “loose end” of starter chain (existing chain if replacing) and guide through lower hook block, through upper sheave hanger and over sheave wheel, through center hole of plate, and to dead end (center) slot on lower hook assembly. Make certain load chain is free from twists and binds.
4. Place dead end link into dead end slot and insert pin. Attach loose end link to frame of hoist, using the provided screw. Tighten all fasteners securely.

Do not remove the plastic ties from the load chain at this time. After the suspension is installed, hoists with a hook suspension can be suspended from their permanent support and then connected to the power supply system (refer to page 11). For hoists with a lug suspension that are to be suspended from a Series 635 Low Headroom Trolley, attach the hoist to the trolley per the following instructions.

CHECKING FOR TWIST IN LOAD CHAIN

Double-Reeved

The best way to check for twisting is to run the lower hook, without a load, up to within about 2 feet (0.61 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 the capsize to remove twist.

Triple-Reeved

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

LOWER HOOK BLOCK PIN

When removing or installing the lower hook pin, care must be taken 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 (7.94 mm) for Models A, AA, B, C, & F, and 3/8" (9.52 mm) for models J, L, R, & RT. 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 three 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 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 this pin can cause the pin to break and allow the load to fall.

TO AVOID INJURY:

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.

CHAIN STOP INSTALLATION

Place polyurethane stop block over loose end of chain and slide past desired chain stop location. Place one half of chain stop on chain. Then place other half on top of the first half of chain stop. **NOTE:** Be sure the half-circle cutout side of one stop block half is aligned with hex cutout side. Place one (1) nut into hex cutout, insert one (1) screw with one (1) lock washer through hole opposite nut, and loosely tighten. Repeat for second connection. Tighten both screw connections to ensure that they do not come loose.

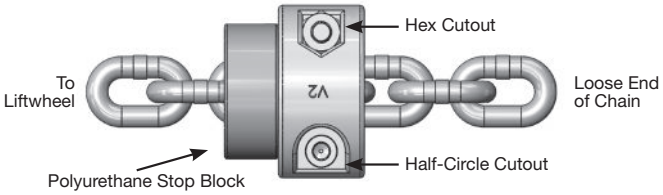


Figure 10. Chain Stop

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 11). Then secure the link in a vise and break off with a hammer.
2. Use a 7 inch (177.8 mm) minimum diameter by 1/8 inch (3.175 mm) thick abrasive wheel (or type recommended by wheel supplier) that will clear adjacent links.
3. Use a bolt cutter (Figure 12) similar to the H.K. Porter No. 0590MTC with special cutter jaws for cutting hardened chain (1 inch [25.4 mm]) long cutting edge.

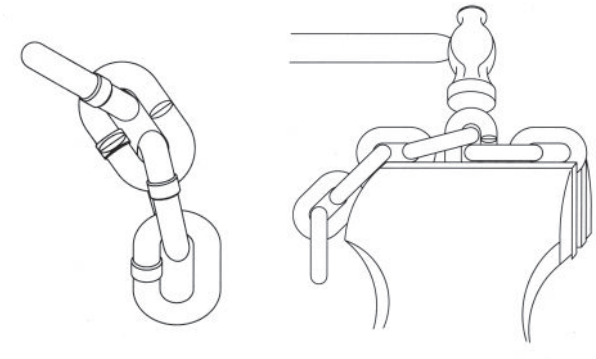


Figure 11. Cutting Chain by Nicking

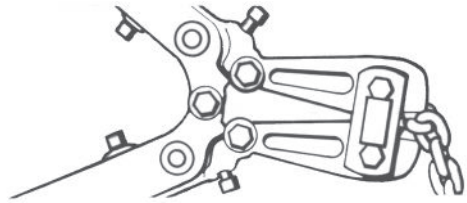


Figure 12. Cutting Chain with a Bolt Cutter

⚠ WARNING

Cutting chain can produce flying particles.

TO AVOID INJURY:

• Wear eye protection.

• Provide a shield over chain to prevent flying particles.

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.

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

Table 2. Voltage Ranges

Nominal	Range
115/1/60	110V-120V
230/1/60	208V-240V
230/3/60	200V-240V
460/3/60	440V-480V
220/3/50	200V-240V
380/3/50	350V-410V
415/3/50	380V-440V

Three-Phase Hoist

Some Lodestar VS hoists operate on 3-phase power.

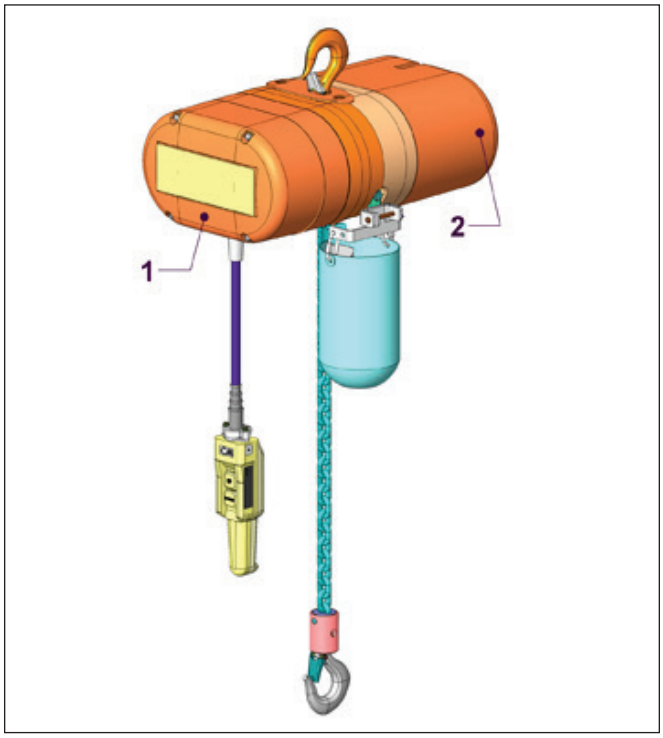


Figure 13. Location of Components

Variable frequency drive (VFD) is located under back frame cover (1) for Models A-H and under the motor housing cover (2) for models J-RT.

Power Phasing

The Lodestar VS will automatically correct for L1, L2, L3 incoming power-supply phasing. If after a repair the hoist is running in the wrong direction, it should be corrected by correcting the motor output connections at the VFD.

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. 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, change direction by correcting the motor output connections (T1, T2, T3) at the VFD. Consult the wiring diagram. Disconnect power before making any wiring changes.

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

Single-Phase Hoist

Some Lodestar VS hoists operate on single-phase power.

Some single-phase VS hoists operate on 115/1/60, while others operate on 220-240/1/50-60. Like all Lodestar VS units, this operating voltage range cannot be changed. 115/1/60 hoists utilize a “voltage doubler,” shown in Figure 14, to allow them to operate. This doubler unit is connected directly to the DC bus of the VFD inside the hoist. 220-240/1/50-60 hoists operate by connecting the incoming power phase directly to two of the VFD AC input terminals.

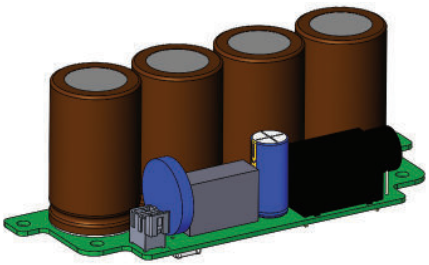


Figure 14. Voltage Doubler

⚠ WARNING

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

TO AVOID INJURY:

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

⚠ 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.

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.

Table 3. Minimum Running Voltage

Nominal Voltage	Minimum Running Voltage
115/1/60	98 VAC
230/1/60	207 VAC
230/3/60	170 VAC
460/3/60	323 VAC
220/3/50	198 VAC
380/3/50	365 VAC
415/3/50	399 VAC

Low-Voltage Protection

Single-Phase Lodestar VS Hoists are equipped with software that automatically slows the motor speed in a low-voltage condition. This feature helps ensure safe lifting, even during unexpected electrical situations. If this feature is engaging routinely, check for adequate supply voltage and wiring.

SIGNS OF INADEQUATE ELECTRICAL POWER (LOW VOLTAGE) ARE:

- Noisy hoist operations due to brake 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.

⚠ 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.

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.

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 wire sizes in the extension cord in order to minimize the voltage drop between the power source and the hoist.

Table 4. Minimum Wire Size

Length of Extension Cord	Minimum Wire Size
Up to 200 feet	#14 AWG
Beyond 200 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.

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

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

TO AVOID INJURY:

Disconnect power and lockout/tagout disconnecting means before removing cover or servicing this equipment.

CHECKING LIMIT SWITCH (EPLS) OPERATION

The limit switch will automatically stop the hook at any predetermined point when either hoisting or lowering.

⚠ 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.

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

4. Press (UP) control and raise the lower hook until top of hook block is about 1 foot (305 mm) below the hoist.
5. Cautiously continue raising the hook until the upper limit switch stops the upward motion. The upper limit switch is set at the factory to stop the hook block 3 inches (76.2 mm) from bottom of the hoist on all units with standard 10-foot (3-m) lift except Model AA. Factory setting is 6 inches (152.4 mm) for this model and for all other models equipped with chain for lifts longer than 10 feet (3 m).
6. If adjustment is necessary, see page 19.
7. Press (DOWN) control and cautiously lower hook until lower limit switch stops the downward motion. 7 to 11 chain links (depending on hoist model) should be between the loose end link and the hoist entry. See Figure 9.
8. If adjustment is necessary, see page 19.

NOTE: If the hoist is equipped with a chain container/bag, reset the upper and lower limit switches as indicated on page 19. 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.

NOTE: If the hoist gears ever rotate without encoder input to the drive, either due to encoder or wiring failure, or due to maintenance or disassembly of the hoist, the limits must be reset as described on page 19.

CONTROL CORD

Unless ordered on a special basis, the hoist is supplied with a control cord that will position the control station approximately 4 feet above the lower hook when it is at the lower limit of the lift. If this places the control station too close to the floor, a “control cord alteration kit” (Part Number 28642) can be obtained from CM for shortening the length of the control cord.

⚠ WARNING

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

TO AVOID INJURY:

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

OPERATING INSTRUCTIONS

GENERAL

1. The load limiter is designed to slip on an excessive overload. An overload is indicated when the hoist will not raise the load. Also, a 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 a load of the proper capacity. When the excessive load is removed, normal hoist operation is automatically restored.

   CAUTION: The load limiter 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.

It 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 3 concerning dumbwaiter applications.

2. All hoists are equipped with electronically programmable limit switches, which automatically stop the hook at any predetermined point when either hoisting or lowering.
3. Rated lifting speeds are shown on hoist identification plate. SLOW speed is intended as a means of carefully controlling or "spotting" the load, although the hoist may be operated solely at this speed if desired. It is not necessary to operate in the SLOW speed position as the hoist will pick up a capacity load at FAST speed from a standing start. In other words, it is not necessary to hesitate at the SLOW position when moving control from STOP to FAST position or vice versa.
4. If material being handled must be immersed in water, pickling baths, any liquid, or dusty or loose solids, use a sling chain of ample length so that the hook is always above the surface. Bearings in the hook block are shielded only against ordinary atmospheric conditions.

HOIST

1. Before picking up a load, check to see that the hoist is directly overhead.

⚠ WARNING

When applying a load, it should be directly under hoist or trolley. Avoid off-center loading of any kind.

2. 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.
3. **DO NOT** allow the load to swing or twist while hoisting.
4. **DO NOT** allow the load to bear against the hook latch.

HOIST WITH PUSH TROLLEY

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

HOIST WITH MOTOR DRIVEN TROLLEY

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

SAFE OPERATING INSTRUCTIONS AND PROCEDURES

For safety precautions and a list of Do's and Do Not's for safe operation of hoists, refer to page 3.

1. Permit only competent personnel to operate unit.
2. 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.
3. **DO NOT** allow the load to bear against the hook latch. The latch is to help maintain the hook in position while the chain is slack before taking up slack chain.

⚠ WARNING

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

TO AVOID INJURY:

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

4. **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 liftwheel.

   b. The upper limit switch is bypassed and the load could hit the hoist.

   c. The chain could be damaged at the hook.
5. Before lifting load, check for twists in the load chain. On double- and triple-reeved units, a twist can occur if the lower hook block has been capsized between the strands of chain. Reverse the capsize to remove twist.
6. Stand clear of all loads and avoid moving a load over the heads of other personnel. Warn personnel of your intentions to move a load in their area.
7. **DO NOT** leave the load suspended in the air unattended.
8. **DO NOT** use this or any other overhead materials handling equipment for lifting persons.
9. **DO NOT** load hoist beyond the rated capacity shown on ID plate. When in doubt, use the next larger capacity CM Lodestar Hoist.
10. 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.
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. 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.
13. **DO NOT** allow the load to swing or twist while hoisting.
14. Never operate the hoist when flammable materials or vapors are present. Electrical devices produce arcs or sparks that can cause a fire or explosion.
15. **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.

THERMOCHROMIC LABELS

This hoist is equipped with special thermochromic labels that change color in response to temperature. When the area under the label exceeds 130°F, the label will transition from orange to white, revealing the word "HOT." When the hoist cools down, the warning will disappear. Over time, the label may lose its effectiveness, and eventually will always say "HOT." For your own safety, always treat any hoist parts as hot before handling them, and wear gloves when handling a hoist that was recently in use.

Figure 15. Thermochromic Label

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.

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% of rated load for not more than 25% 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 or constant exposure to the elements of nature.

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 6.

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 7.

CAUTION: Any deficiencies found during inspections 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 online parts resource).

SUSPENSION INSPECTION CRITERIA

BRACKETS - Replace any cracked or distorted brackets.

BOLTS - If the suspension is removed for any reason, including inspection, the suspension bolts should be replaced.

NYLON THREAD LOCKING NUTS - It is not necessary to replace the nylon thread locking nuts each time the suspension bolts are replaced as long as new bolts with the locking patch are being used. It is recommended that the nylon thread locking nuts are replaced each time the hoist is torn down to allow these nuts to be replaced.

HOOK REMOVAL CRITERIA

Based on ASME B30.10, hooks shall be removed from service if damage such as the following is visible and shall only be returned to service when approved by a qualified person:

a. Missing or illegible rated load identification or illegible hook manufacturer’s identification or secondary manufacturer’s identification.

b. Excessive pitting or corrosion.

c. Cracks, nicks, or gouges.

d. Wear – any wear exceeding 10% of the original section dimension of the hook or its load pin.

e. Deformation – any visibly apparent bend or twist from the plane of the unbent hook.

f. Throat opening – any distortion causing an increase in the throat opening of 5%, not to exceed 1/4” (6 mm).

g. Inability to lock – any self-locking hook that does not lock.

h. Inoperative latch – any damaged latch or malfunctioning latch that does not close the hook’s throat.

i. Thread wear, damage, or corrosion.

j. Evidence of excessive heat exposure or unauthorized welding.

k. Evidence of unauthorized alterations such as drilling, machining, grinding, or other modifications.

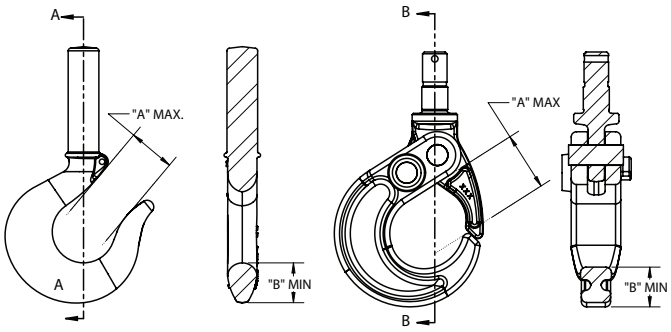


Figure 16. Hook Inspection

Table 5. Hook Inspection Dimensions

Models	Latch Type Hook		Latchlok® Hook	
	"A" Max	"B" Min	"A" Max	"B" Min
A, AA, B, C & F	1.19" (30.2 mm)	0.91" (23.1 mm)	1.48" (37.7 mm)	0.75" (18.8 mm)
E, H, J & L	1.31" (33.3 mm)	1.08" (27.5 mm)	1.48" (37.7 mm)	0.75" (18.8 mm)
R	1.50" (38.1 mm)	1.43" (36.2 mm)	1.92" (48.8 mm)	0.94" (23.9 mm)
RT	1.50" (38.1 mm)	1.43" (36.2 mm)	2.50" (63.5 mm)	1.19" (23.9 mm)

Table 6. Minimum Frequent Inspections

Type of Service			Item
Normal	Heavy	Severe	
Monthly	Weekly to Monthly	Daily to Weekly	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 14.
			d) Load chain for adequate lubrication, as well as for signs of wear, damaged links or foreign matter - see page 16.
			e) Load chain for proper reeving and twists.

Table 7. Minimum Periodic Inspections

Type of Service			Item
Normal	Heavy	Severe	a) All items listed in Table 6 for frequent inspections.
Yearly	Every 6 Months	Every 3 Months	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 - see page 18.
			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 loose stud. Check suspension components for damage, cracks, wear and operation. Also, check suspension adapter screws for proper tightness - see page 9.
			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.

INSPECTING THE LOAD CHAIN

The chain must be inspected at regular intervals, with a minimum of once annually. As the frequency of use increases, the time intervals between inspections must be reduced. During inspection, the chain link must be examined along its entire length, including the hidden parts. If the lifting equipment is frequently used with a constant lifting distance or in other words the switch from upward to downward often takes place in the same area, a particularly thorough inspection and lubrication is required in that area. Worn chain can also be an indication of worn hoist components. For this reason, the hoist's chain guides, hook blocks and liftwheel (sprocket) should be examined for wear and replaced as necessary when replacing chain.

1. Check to see if chain is dirty or poorly lubricated.
2. Clean the chain with a non-caustic/non-acid-type solvent and perform a link-by-link inspection for wear or cracks, twisting or deformation. Replace chain that shows any of these defects.
3. Slack the portion of the chain that normally passes over the lift-wheel (sprocket) or idler sprocket on multi-reeved hoist. Examine the chain links for wear (see figure 17). If the wire diameter anywhere on the link measures less than 90% of the nominal wire diameter, replace the chain.

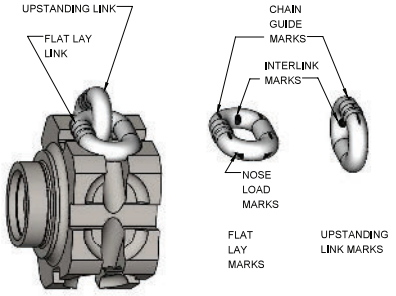


Figure 17. Chain Wear Areas

4. Based on ASME B30.16, chain links should also be checked for elongation. Select an unworn, unstretched length of the chain (at the slack end, for example). Suspend the chain vertically under tension and, using a knife blade caliper-type gauge, measure the outside length of any convenient number of links (11 is recommended). Measure the same number of links in the used sections and calculate the percentage in increased length. The chain should be replaced if the length of the used portion is more than 1.5% longer than the unused portion of the chain. Also, if the pitch of any individual link has elongated by more than 5%, the chain should be replaced.

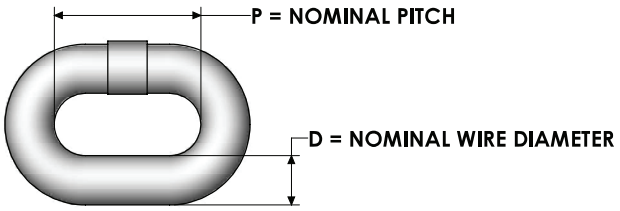


Figure 18. Chain Dimensions

Table 8. Chain Dimensions

Models	P	D
A thru H-2	0 .745" (18.9 mm)	0.250" (6.3 mm)
J thru RRT-2	0.858" (21.8 mm)	0.312" (7.9 mm)
RRS	1.18" (30.0 mm)	0.394" (10.0 mm)

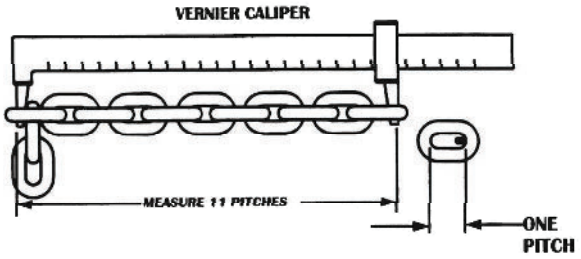


Figure 19. Gaging Load Chain Wear

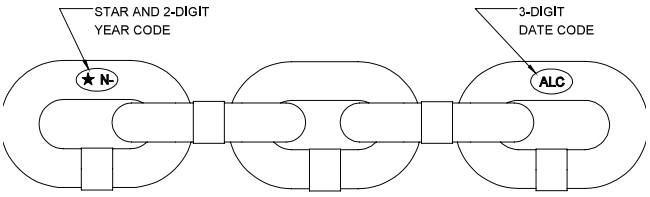


Figure 20. Chain Embossing

Use only Star (*) grade load chain and original replacement parts. Use of other chain and parts may be dangerous and voids factory warranty.

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.

⚠ 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 similar, but CM chain and parts are made of specific material or processed to achieve specific properties.

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.

NOTE: When installing load chain in Models E, H, R and RR by either of the "starter chain" methods, two loose end connecting links must be used. Hoist load chain can be installed by any one of several methods.

⚠ 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 similar, but CM chain and parts are made of specific material or processed to achieve specific properties.

The first method is recommended when replacing severely worn load chain and requires disassembling the hoist. Method 2 does not require hoist disassembly, whereas Method 3 requires only partial disassembly.

Method #1

a. Disconnect hoist from power supply.

b. Detach loose end of load chain from hoist frame (see Figure 8). Also, on single-reeved models, detach the lower hook block from the load chain. On double-reeved models E, H, R, & RR, unfasten the dead end side of load chain. On triple-reeved Models R and RRT, detach the load chain from the lower hook block.

c. 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 accessing the online Parts List (see page 2).

d. If the liftwheel pockets, particularly the ends, are worn or scored, replace liftwheel. If chain guides and housing are worn, cracked or damaged, these parts should also be replaced.

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

f. Attach the loose end link to chain and connect it to the hoist frame with the loose end screw, washer and lock washer (see Figure 8).

BE CERTAIN THERE IS NO TWIST.

NOTE: RRS USES CHAIN BLOCK ON LOOSE END. CHAIN IS NOT SECURED TO THE HOIST.

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.

g. For single-reeved models, attach the hook block to load chain and proceed to step K.

h. For double-reeved models, run the hoist (UP) until only 3 feet (0.9 m) in chain remains on dead end side. This will minimize the chance of introducing a twist between hook block and hoist. Allow the chain to hang free to remove twists.

i. 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.

j. Adjust limit switches as described in Table 10. 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.

k. For triple-reeved models, run the hoist (UP) until only 4 feet (1.2 m) of chain remains on the dead end side. This will minimize the chance of introducing a twist between the hook block and hoist. Allow the chain to hang free to remove twists. Using a wire as a starter, insert the chain, upstanding link first, into lower hook block (upstanding links will have welds toward sheave) and pull through. Using a wire as a starter, insert the chain, upstanding link first, into the outboard cloverleaf of the hanger. Make sure there are no twists between the hook block and then pull the chain through. In the sheave hanger, the upstanding links will have the welds toward the sheaves. Run the chain down to the hook block and, making sure there are no twists between the sheave hanger and the hook block, insert the end of the chain into the recess in the top of the hook block. Slide the dead end screw, with flat sides vertical, through the hole in the top of the hook block. Place the lock washer and nut on the threaded end of the dead end screw. Use an Allen wrench to hold the head of the dead end screw stationary and rotate the nut to tighten. To properly tighten the nut, apply a torque of 45-55 lb-ft (61-74.6 N•m) while holding the head of the dead end screw stationary. Also, when tightening the dead end screw, hold it firmly in position and torque from the nut end to avoid damaging the screw and/or chain.

⚠ WARNING

Do not allow hook block to hit hoist or allow load chain to become taut between loose end screw and frame. Serious damage will result. If hook block should inadvertently hit the hoist, inspect the hoist frames, load chain and hook block 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 through 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 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.

Method #3

a. Proceed with Steps 1a, b & c from Method #1.

b. Then, carefully run the load chain out of the hoist.

c. Disconnect hoist from power supply.

d. Remove the electric brake assembly.

e. Rotate the brake hub by hand, at the same time feeding the load chain into and through liftwheel area with hoist upside down or using a wire to pull the load chain up onto the liftwheel as explained in Method #1, step 1f.

f. Refer to Method #1 steps g through j above to complete the installation.

NOTE: Check limit switch operation after installing load chain.

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. Part number of part from online parts list (see page 2)
6. Number of parts required
7. Part name from online parts list (see page 2)

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

MAINTENANCE

LOAD LIMITER

The load limiter should operate for the normal life of the hoist without service. The device has been calibrated at the factory for a specific model of hoist. For proper overload protection, be sure before installing a load limiter that it is correct for the unit.

Table 9. Load Limiter Part Numbers

Models	Load Limiter Part Number	Load Limiter ID (marked on load limiter)
A, B, E	C00000240	240
AA, C, F, H	C00000241	241
J, L, R, RT	C00000242	242

⚠ 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. If desired, these lubricants may be purchased from CM. See online Parts list for required lubricants..

The gearbox is packed at assembly with grease and should not need to be renewed unless the gears have been removed from the housing and degreased.

If the gears are removed from the housing, wipe off the excess grease with a soft cloth and degrease the gears and housings. Upon reassembly, add grease to gears and housing.

Models A to H hoists require 7 fl. oz. of grease.

Models J-RT require 15 fl. oz. of grease.

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- and triple-chain units), upper sheave wheel (on triple-chain units) and liftwheel must be lubricated with Lubriplate® Bar and Chain Oil 10-R (Fiske Brothers 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 the load chain. Do not allow the chain to run dry.

Keep the chain clean and lubricate it at regular intervals with Lubriplate Bar and Chain Oil 10-R (Fiske Brothers Refining Co.) or equivalent. 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 runoff 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.

TROLLEY LUBRICATION

See appropriate trolley manual.

EXTERIOR FINISH

The exterior surfaces of the hoist and trolleys have a durable, scratch-resistant baked powder coating. Normally, the exterior surfaces can be cleaned by wiping with a cloth. However, if the finish is damaged, compatible touch-up paint can be purchased from CM. Refer to page 17 for information on ordering the paint.

TEMPERATURE RATING

Normal ambient operating temperature, unless otherwise specified, ranges from 0°F to 104°F (-17 to 40°C). Contact factory for ambient temperature solutions outside this stated range.

BRAKE ADJUSTMENTS

DC ELECTRIC BRAKE ASSEMBLY

The correct air gap between field and armature is 0.008-0.018 inches (0.2-0.45 mm) for models A through H and 0.008-0.020 inches (0.2-0.5 mm) for models J through RT. The DC brake is not adjustable. As the friction material wears, the brake gap increases. If the maximum air gap is reached, a new friction disc/rotor should be installed.

LIMIT SWITCH (EPLS) ADJUSTMENTS

If limit switch operation has been checked as described on page 12 and is not operating correctly or is not automatically stopping the hook at a desired position, proceed as follows:

NOTE: If you purchased the available Intelli-Connect wireless operator, limits can be adjusted through the interface. If you have the available cable and your hoist was built with an external data port, limits can be adjusted without removing the cover. Otherwise, proceed with these instructions to alter limits without this interface.

1. Disconnect hoist from power supply.
2. Remove the back frame cover.
3. Reconnect the hoist to the power supply.

Clearing Limits

1. Navigate to parameter C3.12.
2. Change the value to “0” and press enter.
3. Exit programming mode.

Setting Upper Limit Switch

1. The “A” Dimensions in Table 10 are the minimum distances that should be set between the top at hook block and the bottom of the hoist.
2. Operate the hoist in the UP direction until the hook block is at the desired upper limit position. **NOTE:** Actual limit position may vary from initial set position. See dimension “C” in Table 10.
3. Navigate to parameter C3.12 of the VFD (see programming section).
4. Change the value to “2” and press enter.
5. Exit programming mode.
6. Check upper limit function and position. If adjustment is desired, refer to the “C” dimension to determine the minimum adjustment from the current setting.
7. Repeat steps 2-6 as necessary to achieve desired limit position.
8. Set lower limit.

CAUTION: THE “A” DIMENSIONS ARE THE MINIMUM ALLOWED FOR SAFE OPERATION AND SHOULD NOT BE REDUCED.

Setting Lower Limit Switch

1. The “B” dimensions in Table 10 are the minimum length of loose end chain left on the non-load side of the liftwheel when the hook is positioned at the lowest allowable hook position.
2. Operate the hoist in the DOWN direction until the hook block is at the desired lower limit position. **NOTE:** Actual limit position may vary from initial set position. See dimension “C” in Table 10.
3. Navigate to parameter C3.12 of the VFD (see programming section).
4. Change the value to “3” and press enter.
5. Exit programming mode.
6. Check lower limit function and position before placing the unit into service. If adjustment is desired, refer to the “C” dimension to determine the minimum adjustment from the current setting.
7. Repeat steps 2-6 as necessary to achieve desired limit position.
8. Disconnect the hoist from the power supply.
9. Reinstall the end cover.

CAUTION: THE “B” DIMENSIONS ARE THE MINIMUM ALLOWED FOR SAFE OPERATIONS AND SHOULD NOT BE REDUCED.

Slow Approach

The Lodestar VS slow approach function will automatically slow down to 1/3 of normal 60 Hz speed when the hook approaches one of the hook travel limits. This offers operators a warning that they are approaching the final hoist limit. This feature is enabled by default from the factory. This feature can be enabled or disabled by setting C03-22 to 1 or 0, respectively.

⚠ 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 50 pounds (22.7 kg) 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 load limiter functions.

***If load limiter 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.

Table 10. Limit Switches

Models	A (minimum distance between top of hook and bottom of hoist)		B (minimum distance between top of loose end chain stop and bottom of hoist)		C (increment between available limit set positions)	
	in	mm	in	mm	in	mm
A, C, J	3	76.2	3	76.2	2	50.8
AA	6	152.4	6	152.4	3.75	95.3
B, F, L	1.5	38.1	1.5	38.1	1	25.4
E, H, R	1.5	38.1	1.5	38.1	0.5	12.7
RT	1	25.4	1	25.4	.33	8.4

PROGRAMMING THE ADJUSTABLE FREQUENCY DRIVE

Intelli-Connect Mobile

Intelli-Connect Mobile comprises a wireless operator module (WOP-20) mounted on the control panel that is connected to a single Magnetek adjustable frequency drive on a hoist or single crane motion via a CAT5 Ethernet cable. The wireless operator creates a wireless network, which is accessible from a personal electronic device (PED), such as a smartphone or tablet. Set your own SSID (service set identifier) and password to establish a protected link for data flow. Once linked, Intelli-Connect Mobile enables quick and easy programming, maintenance, monitoring, and troubleshooting of adjustable frequency drives associated with your hoist or crane motion via your PED. The mobile app is available as a free download on Google Play or the Apple® App Store®*.

Using the Keypad

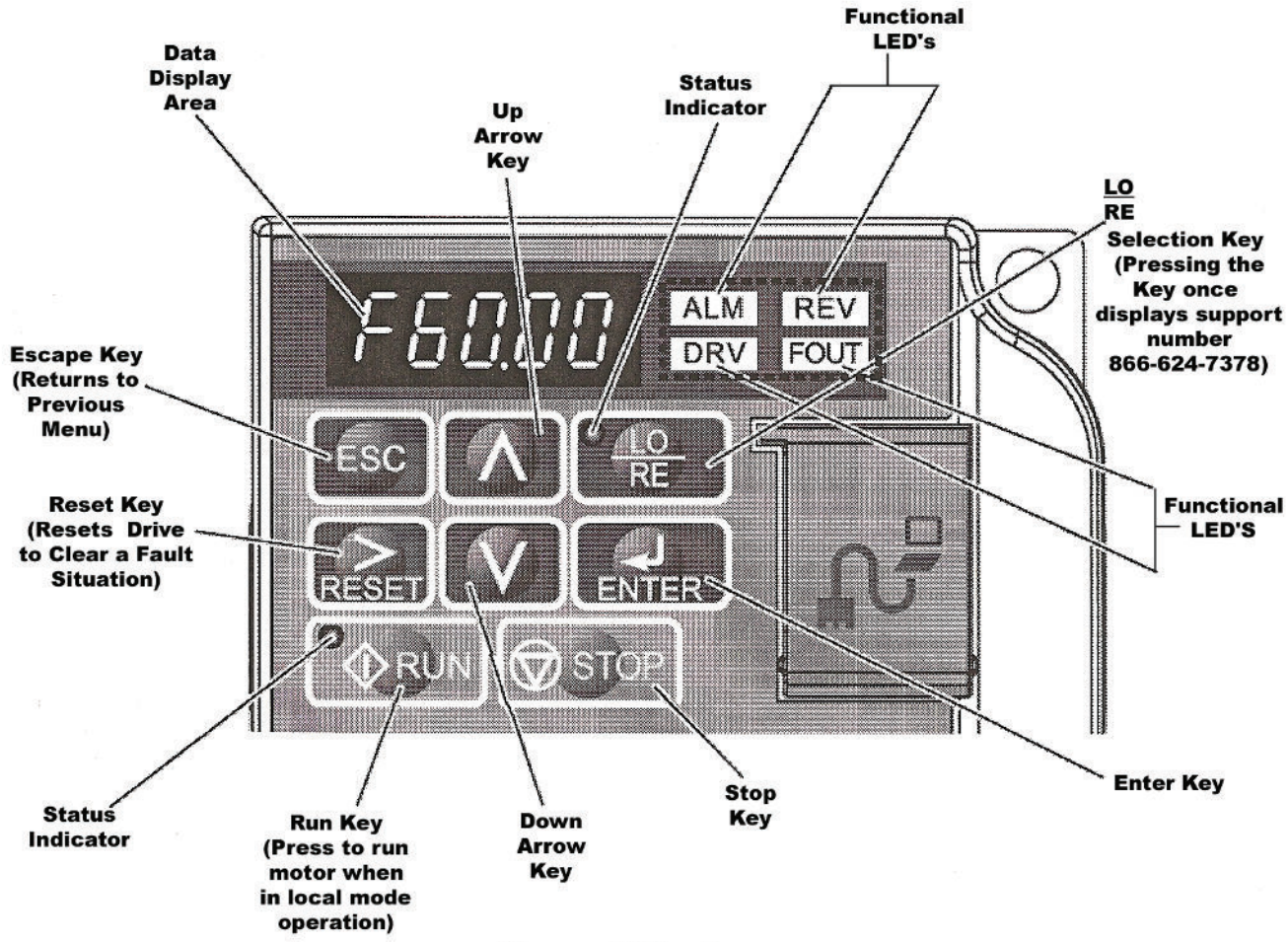
All functions of the drive are accessed using the keypad. The information needed to configure the drive's application is entered into the drive by using the functional LEDs. This information is stored into the drive's memory.

Keypad Functions

The keypad has a 5-digit LED display. Both numeric and alpha-numeric data can appear on the display.

Indicators and keys on the keypad are described below.

NOTE: The STOP key is always active and will cause any run command to come to an immediate stop.



Keypad Display

*Google Play is a trademark of Google LLC. Apple and App Store are registered trademarks of Apple Inc., registered in the U.S. and other countries.

KEYPAD LED AND BUTTON FUNCTIONS

Some of the keypad buttons, whose functions are described below, are dual-purpose. The dual-purpose keys have one function when used in a view-only mode and another function when used in a programming mode.

KEYS AND DISPLAYS ON THE LED OPERATOR

No.	Display	Name	Function
1		Data Display Area	Displays the frequency reference, parameter number, etc.
2		ESC Key	Returns to the previous menu (before ENTER Key is pressed), or cursor position.
3		RESET Key	Moves the cursor to the right. Resets the drive to clear a fault situation.
4		RUN Key	Pressing the key initiates the RUN command when LOCAL mode operation is selected. Starts the auto-tuning process.
5		Up Arrow Key	Scrolls up to select next parameter group or parameter settings. It also increases the value of the blinking digit of a parameter setting.
6		Down Arrow Key	Scrolls down to select next parameter group or parameter settings. It also decreases the value of the blinking digit of a parameter setting.
7		STOP Ley	Stops the drive by initiating a base block STOP command. **NOTE:** Stop priority circuit.
8		ENTER Key	Selects modes or parameters. Displays each parameter's set value. By pressing this key again, the set value is stored.
9		LO/RE Key	Pressing the key once displays support phone number 866-624-7378. Pressing the key again shows control method, motion and reference speed. Pressing the key again will show RESET. Pressing the ENTER Key afterward will reset the maintenance timers.

LO/RE LED AND RUN LED INDICATIONS

NO.	LED	Lit	Flashing	Flashing Quickly	OFF
10		During run	During deceleration to stop When a run command is input and frequency is 0	During deceleration at a fast stop During stop by interock operation	During stop
11		When run command is selected from LED operator (LOCAL)	—	—	Run command is selected from device other than LED operator (REMOTE)

FUNCTION LEDS

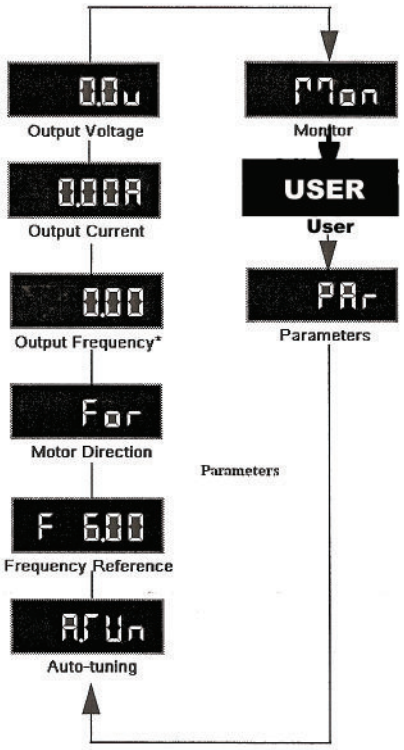
NO.	Display	Lit	Flashing	OFF
12		When the drive detects an alarm or error	When an alarm occurs OPE detected When a fault or error occurs during auto-tuning	Normal state (no fault or alarm)
13		When the REVERSE command is given	—	When the FORWARD command is given
14		Drive Ready Auto-Tuning	—	Programming mode
15		Displays output frequency (Hz)	—	—

PARAMETERS

There are hundreds of parameters, organized by function group, that determine how the drive functions. These parameters are programmed in the drive's software as measurable values or options, both of which will be referred to in this manual as settings. While some of these parameters are associated with one setting, others are tied to a number of possible settings.

The IMPULSE®•G+ Mini is configured for a specific hoist or trolley. If you find it necessary to change the initial settings, it is recommended that you only allow qualified system technicians to program the drive. This can be accomplished by using the Password and Access Level features. The factory must be contacted.

IMPULSE•G+ MINI STRUCTURE OF PARAMETERS



Frequency Reference Setting

Sets/displays the drive operation speed (Hz).

Output Frequency Monitor

Displays the output frequency (Hz) at which the drive is currently operating. This is a monitor-only function; the operator cannot change the displayed value by use of the keypad.

Output Current Monitor

Displays the level of output current (Amps) that the drive is currently producing. This is a monitor-only function; the operator cannot change the displayed value by use of the keypad.

Monitor Selection

Pressing ENTER allows access to the various monitor parameters. These are monitor-only functions; the operator cannot change the displayed value. Accessible during run command. See pages 22-27 for complete listing of all monitor parameters.

***Parameter Programming**

Selects or reads data using parameter settings. Data is displayed by pressing the ENTER key, and can be changed by pressing the “up arrow” or “down arrow” keys. Any changes can be saved by again pressing the ENTER key. Pressing the ESC key exits the programming mode.

Output Voltage Monitor

Displays the level of output voltage to the motor. This is a monitor-only function; the operator cannot change the displayed value by use of the keypad.

User

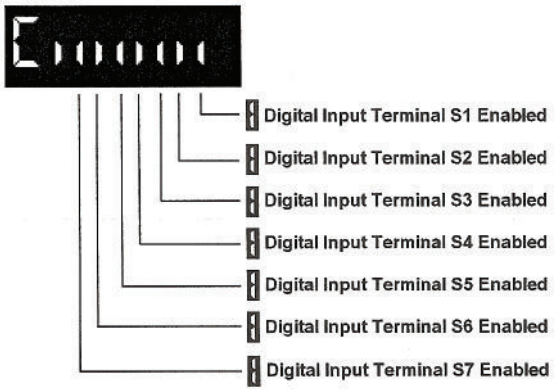
Allows for quick access to parameters that can be programmed by operator.

***NOTE:** All programming parameters are password-protected, except those stored in user function.

MONITOR PARAMETERS

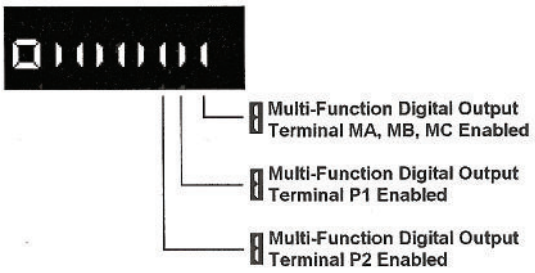
Parameter Code	Name	Function	Units
		Monitor	
U01.01	Frequency Reference	Frequency Reference	Hz
U01.02	Output Frequency	Inverter Output Frequency	Hz
U01.03	Output Current	Inverter Output current	A
U01.04	Control method	Displays the value of A01.02	—
U01.05	Motor Speed	Motor Speed (OLV only)	—
U01.06	Output Voltage	Inverter Output Voltage (Reference)	V
U01.07	DC Bus Voltage	DC Bus Voltage (Measured)	V
U01.08	Output Power	Inverter Output Power (Calculated)	HP
U01.09	Motor Torque	Motor Torque (OLV only)	%
U01.10	Input Terminal	Status Input Terminal Status	—

U01.10



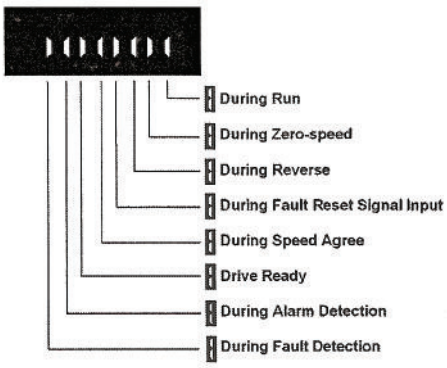
U01.11	Output Terminal Status	Output Terminal Status	—

U01.11



U01.12	Inverter Control Status	Operation Status	—

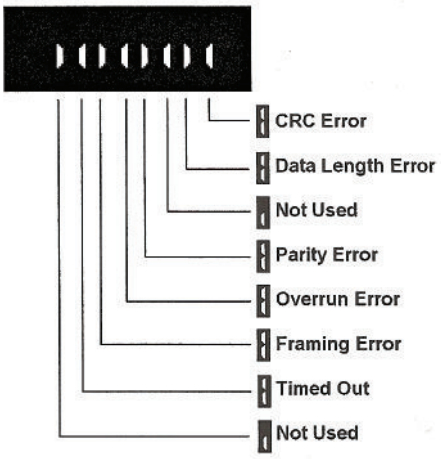
U01.12



MONITOR PARAMETERS

Parameter Code	Name	Function	Units
Monitor			
U01.13	Elapsed Time	Elapsed Time	hr
U01.14	Flash ID	Flash ROM software ID number	—
U01.15	Terminal A1 Level	External Terminal input level	V
U01.16	Terminal A2 Level	External Terminal input level	V/mA
U01.20	Output Frequency after Soft Start	—	Hz
U01.28	Software CPU	—	—
U01.34	OPE Detection Parameter	Parameter OPE detected	const #
U01.39	Memobus Communications Error	Displays content of MEMOBUS error	—

U01.39



Parameter Code	Name	Function	Units
U01.52	Maintenance Timer		hr
U01.54	Pulse Monitor	Displays the pulse train input RP Frequency	—
Fault Trace			
U02.01	Current Fault Displays Current fault		—
U02.02	Last Fault Displays last fault detected		—
U02.03	Frequency Reference @ Fault	Frequency reference when fault was detected	Hz
U02.04	Output Frequency @ Fault	Output frequency when fault was detected	Hz
U02.05	Output Current @ Fault	Output current when fault was detected	A
U02.06	Motor Speed @ Fault (OLV Only)	Motor speed when fault was detected	Hz
U02.07	Output Voltage @ Fault	Output voltage when fault was detected	V
U02.08	DC Bus Voltage @ Fault	DC Bus voltage when fault was detected	V
U02.09	Output Power @ Fault	Output power when fault was detected	kW
U02.11	Input Terminal Status @ Fault	Input terminal status when fault was detected	—
U02.12	Output Terminal Status @ Fault	Output terminal status when fault was detected	—

MONITOR PARAMETERS

Parameter Code	Name	Function	Units
Fault Trace			
U02.13	Operation Status @ Fault	Inverter status before fault was detected	—
U02.14	Elapsed Time @ Fault	Elapsed time when fault was detected	hr
U02.15	Speed Reference During Soft Start @ Fault	Speed reference during soft start at previous fault	%
U02.16	Motor q-Axis Current During Fault	—	—
U02.17	Motr d-Axis Current During Fault	—	—
Fault History			
U03.01	Last Fault	Displays most recent fault	—
U03.02	Fault Message 2	Displays second most recent fault	—
U03.03	Fault Message 3	Displays third most recent fault	—
U03.04	Fault Message 4	Displays fourth most recent fault	—
U03.05	Fault Message 5	Displays fifth most recent fault	—
U03.06	Fault Message 6	Displays sixth most recent fault	—
U03.07	Fault Message 7	Displays seventh most recent fault	—
U03.08	Fault Message 8	Displays eight most recent fault	—
U03.09	Fault Message 9	Displays ninth most recent fault	—
U03.10	Fault Message 10	Displays tenth most recent fault	—
U03.11	Elapsed Time 1	Elapsed time of most recent fault	—
U03.12	Elapsed Time 2	Elapsed time of second most recent fault	—
U03.13	Elapsed Time 3	Elapsed time of third most recent fault	—
U03.14	Elapsed Time 4	Elapsed time of fourth most recent fault	—
U03.15	Elapsed Time 5	Elapsed time of fifth most recent fault	—
U03.16	Elapsed Time 6	Elapsed time of sixth most recent fault	—
U03.17	Elapsed Time 7	Elapsed time of seventh most recent fault	—
U03.18	Elapsed Time 8	Elapsed time of eight most recent fault	—
U03.19	Elapsed Time 9	Elapsed time of ninth most recent fault	—
U03.20	Elapsed Time 10	Elapsed time of tenth most recent fault	—
U03.21	Accumulated Operations	Displays the number of FWD and REV commands	—
U03.22	U03.21 Rollovers	Increments when U03.21 reaches 65535. U03.21 is set to zero	—
U03.23	Overload/Load Check Count	Displays the number of OL1, OL2 and LC faults	—
Maintenance			
U04.01	Cumulative Operation Time		hr
U04.03	Cooling Fan Operation Time		hr
U04.04	Cooling Fan Maintenance		%
U04.05	Capacitor Maintenance		%
U04.06	Soft Charge Bypass Relay Maintenance		%
U04.07	IGTB Maintenance		%
U04.08	Heatsink Temperature		—

MONITOR PARAMETERS

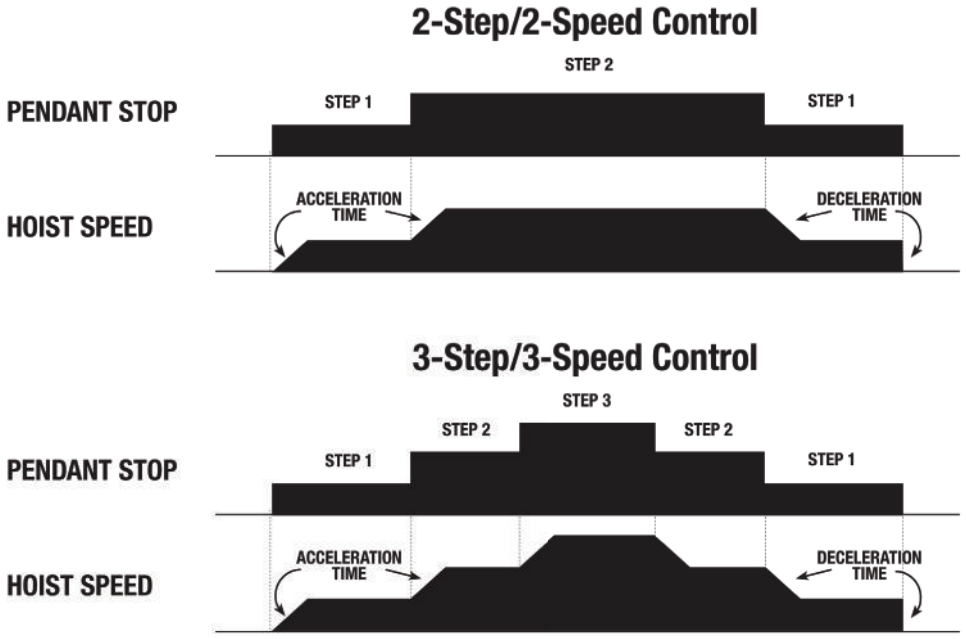
Parameter Code	Name	Function	Units
Maintenance			
U04.09	LED Check	Lights all segments of the LED to verify that the display is working properly	
U04.10	kWh: Lower 4 Digits		—
U04.11	kWh: Upper 5 Digits		—
U04.12	CPU Resources Used		—
U04.13	Peak Hold Current		—
U04.14	Peak Hold Output Frequency		—
U04.16	Motor Overload (oL1) Detection Level		—
U04.17	Motor Overload (oL2) Detection Level		—
U04.18	Frequency Reference Source Selection		—
U04.19	Frequency Reference Memobus		—
U04.20	Output Frequency Reference (decimal)		—
U04.21	Run Command Selection Results		—
U04.22	Memobus Communication Reference		—
U04.23	Not Used		—
Motor Control Monitor			
U06.01	Motor Secondary Current (Iq)		%
U06.02	Motor Excitation Current (Id)		%
U06.03	ASR Input		%
U06.04	ASR Output		%
U06.05	Output Voltage Reference (Vq)		%
U06.06	Output Voltage Reference (Vd)		%
U06.07	ACR (q) Output		%
U06.08	ACR (d) Output		%
U06.20	Frequency Reference Bias (Up/Down2)		%
U06.21	Offset Frequency		%
U06.36	GAIA Communication Error		—
U06.37	LUNA Communication Error		—
U06.38	Option Card Error		—

IMPULSE•G+MINI ADJUSTABLE FREQUENCY DRIVE SPECIFICATIONS

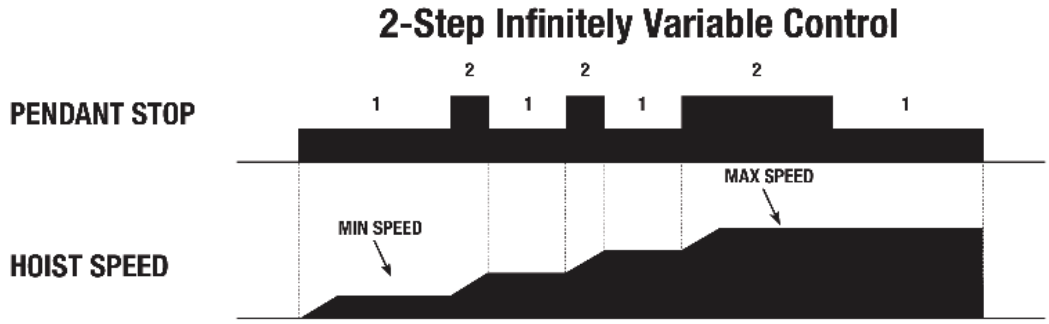
Specification	Specification Value and Information for all Models
Certification	UL, cUL, CE, TüV, RoHS
Rated input power supply volts & frequency	3-phase 200~240V or 380~480V: 50/60 Hz
Allowable input voltage fluctuation	+10% or -15% of nominal
Allowable input frequency fluctuation	±5% of nominal
Control method	Fully digital; sine-wave, pulse-width-modulated
Maximum output voltage (VAC)	Max output voltage 3-phase, 200~240V; 380~480V (proportional to input voltage)
Rated frequency (Hz)	Up to twice motor nameplate RPM (Swift-Lift) 60 Hz standard (150 Hz, consult factory)
Output speed control range	40:1 - V/f, 100:1 - Open Loop Vector (OLV)
Output frequency accuracy	0.01%-with digital reference command 0.1%-with analog reference command; 10 bits/10V
Frequency reference resolution	Digital: 0.01 Hz; analog: 0.03 Hz (at 60 Hz)
Output frequency resolution	0.01 Hz
Overload capacity	150% of rated output current of the drive for 1 minute
Remote frequency reference sources	0-10 VDC (2 kΩ); ±10 VDC serial (RS-485)
Accel/decel times	0.0 to 25.5 seconds - 1 set; 0.0 to 6000.0 - 3 sets; 8 parameters are independently adjustable
Braking torque	150% or more with dynamic braking
Motor overload protection	UL recognized electronic thermal overload relay: field-programmable
Overcurrent protection level	200% of drive rated current
Circuit protection	Ground fault and blown-fuse protection
Overvoltage protection level	Approximately 410 VDC (230V Class), 820 VDC (460V Class)
Undervoltage protection level	Approximately 190 VDC (230V Class), 380 VDC (460V Class)
Heatsink overtemperature	Thermostat trips at 184° to 249°F (90° to 121°C) dependent on drive capacity
Torque limit selection	Separate functions for FORWARD, REVERSE, REGEN; all selectable from 0-300%
Stall prevention	Separate functions for accel, decel, at-speed and constant horsepower region
Other protection features	Lost output phase, failed-oscillator, mechanical overload and internal braking transistor
DC bus voltage indication	Charge LED is on until DC bus voltage drops below 50 VDC
Location	Indoors; requires protection from moisture, corrosive gases and liquids
Ambient operating temperature	14° to 122°F (-10° to 50°C) for open chassis
Storage temperature	-4° to 140°F (-20° to 60°C)
Humidity	95% relative; noncondensing
Vibration	1G less than 20 Hz; 0.2 G for 20-55 Hz
Elevation	3300 feet (1000 m) or less
Memobus	RS485/422 Max 115.2 kbps

SPEED CONTROL METHODS

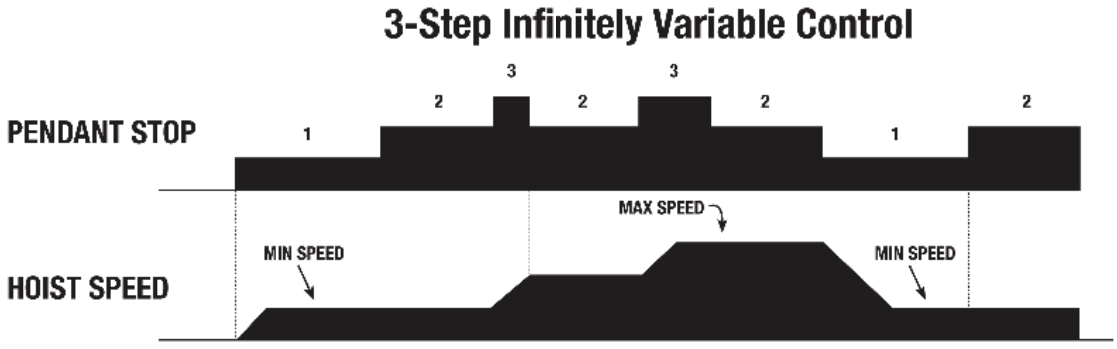
The IMPULSE•G+ Mini provides 1-step, 2-step or 3-step Multi-Step control methods. For each input that is energized, the drive begins to operate at the corresponding frequency. If 1-, 2- or 3-step is desired, then the frequency reference for the first, second or third step will be set at the maximum desired speed of operation.



In addition to discrete speed control, true infinitely variable speed control can be configured. The IMPULSE•G+ Mini has two ways in which infinitely variable control can be configured; 2-Step Infinitely Variable and 3-Step Infinitely Variable control. Sample timing diagrams for both methods are given.



NOTE: Above figures shown with stopping method set for immediate stop (as in hoist applications), the frequency output is immediately set to zero and the hoist brake will immediately close when the run command is removed. With the stopping method set for ramp to stop (as in trolley applications), the trolley speed will ramp down to minimum frequency before the trolley brake (if provided) closes.



NOTE: Above figures shown with stopping method set for immediate stop (as in hoist applications), the frequency output is immediately set to zero and the hoist brake will immediately close when the run command is removed. With the stopping method set for ramp to stop (as in trolley applications), the trolley speed will ramp down to minimum frequency before the trolley brake (if provided) closes.

FACTORY SETTINGS OF PARAMETERS

Control	Parameter	Setting
2-Step/2-Speed and 3-Step/3-Speed	B01.01 - First Speed (Hz)	10 Hz
	B01.02 - Second Speed (Hz)	30 Hz (2 Speed: 60 Hz)
	B01.03 - Third Speed (if equipped, Hz)	60 Hz
	B05.01 - Acceleration Time (seconds)	1 second
	B05.02 - Deceleration Time (seconds)	1 second
	C03.12 - EPLS (see page 19)	1 (enabled)
	C03.22 - Slow Approach (see page 19)	1 (enabled)
	C06.01 - Swift-Lift	1 (enabled)
2-Step/3-Step Infinitely Variable	B01.01 - First Speed (Hz)	10 Hz
	B01.05 - Maximum Speed (Hz)	60 Hz
	B02.01 - Ref. Upper Limit (%, see below)	50
	B05.01 - Acceleration Time (seconds)	1 second
	B05.02 - Deceleration Time (seconds)	1 second
	C03.12 - EPLS (see page 19)	1 (enabled)
	C03.22 - Slow Approach (see page 19)	1 (enabled)
	C06.01 - Swift-Lift	1 (enabled)

NOTE:

1. Standard factory setting for control is 3-Step Infinitely Variable.
2. The parameters listed in this table can be changed in VFD “USER” menu. The other parameters have been factory-set and password-protected and should not be reset without authorization by Magnetek and/or CM.

CHANGING SPEEDS

Run speeds can be changed for 2-Step/2-Speed and 3-Step/3-Speed run modes by simply changing B01.01, B01.02, and B01.03 (if applicable) to the desired frequency.

For Infinitely Variable modes, B01.05 must be adjusted to the desired maximum speed. Then, B02.01 must be adjusted with the following equation: B02.01 = ((B01.05)/(120))*100

For example, if the desired maximum speed (B01.05) is 30 Hz, $B02.01 = \frac{B01.05}{120} * 100 = 25$.

FACTORY SETTINGS OF PARAMETERS

Fault Code	Fault or Indicator Name/Description	Corrective Action
BB (flashing) Base Block	External Base Block Indicator. The flashing base block signal is the result of a multi-function input in the terminal strip. The base block indicates that the drive's IGBTs have been disabled. The motor will begin coasting when the base block input is received. If a RUN command is still present when the BB signal is removed, the output voltage will be restored to the previous operating level and operation will continue at the previously commanded frequency.	1. Check constants H01.01 through H01.07 for proper programming. 2. Check terminal status (U01.10).
BEO (flashing) Brake Ans Lost	Brake Answer-Back signal is lost during run. While running, the multi-function input brake answer-back is lost.	1. Check brake answer-back circuit. 2. Check terminal status (U01.10).
BE4 (flashing) Brake Answer 1	Brake Answer-Back, Brake Not Released. At start, brake answer-back is not input within predetermined time (C08.04) after electric brake release command is output. Electric brake not released.	1. Check brake answer-back circuit. 2. Increase the value of C08.04. 3. Check terminal status (U01.10).
BE5 (flashing) Brake Answer 2	Brake Answer-Back, At Stop. At stop, brake answer-back signal is not removed within predetermined time (C08.11) after electric brake release command is removed. Electric brake not closed.	1. Check brake answer-back circuitries. 2. Increase the value of C08.11 time.
CALL (flashing)	Serial Communication Transmission Error. Control data is not received correctly after power supply is turned on for 2 seconds.	1. Check serial device connections. 2. Ensure drive is properly programmed for serial communication.
CE Memobus Com Err	MEMOBUS/Modbus Communication Error. Serial communications data corrupted.	1. Check serial connections (R+, R-, S+ & S-). 2. Check H05.01 through H05.03 for proper programming.
CF Control Fault	Control Fault. A torque limit was reached for 3 seconds or longer while in open loop vector.	1. Perform auto-tune. 2. Check motor parameters.
COF	Current Offset Fault. The drive automatically adjusts the current offset, the calculated value exceeded the allowable setting range.	1. Press reset. 2. Check brake. 3. Check brake contact.
CPF02	A/D Conversion Error. An A/D conversion error occurred.	1. Cycle power to drive. 2. Ensure that the control board terminals and wiring are shielded from electrical noise. 3. Check resistance of potentiometer. 4. Replace the drive.
CPF03	PWM Data Error. There is a problem with the PWM data.	1. Cycle power to the drive. 2. Replace the control board.
CPF06	EEPROM Data Error. There is an error in the data saved to EEPROM.	1. Cycle power to the drive. 2. If the problem continues, replace the drive.
CPF07	Terminal Board Communications Error. A communications error occurred at the terminal board.	1. Cycle power to the drive. 2. Check connections on the control board.
CPF08	EEPROM Serial Communications Fault. EEPROM communications are not functioning properly.	1. Cycle power to the drive. 2. If the problem continues, replace the drive.
CPF11	RAM Fault.	1. Cycle power to the drive. 2. Replace the drive.
CPF12	FLASH Memory Fault. Problem with the ROM (FLASH memory).	1. Cycle power to the drive. 2. Replace the drive.
CPF13	Watchdog Circuit Exception. Control circuit damage.	1. Cycle power to the drive. 2. Replace the drive.
CPF14	Control Circuit Fault. CPU Error (CPU operates incorrectly due to noise, etc.).	1. Cycle power to the drive. 2. Replace the drive.
CPF16	Clock Fault. Standard clock error.	1. Cycle power to the drive. 2. Replace the drive.
CPF17	Timing Fault. A timing error occurred during an internal process.	1. Cycle power to the drive. 2. Replace the drive.
CPF18 and CPF19	Control Circuit Fault. CPU error (CPU operates incorrectly due to noise, etc.).	1. Cycle power to the drive. 2. Ensure that the control board terminals and wiring are shielded from electrical noise. 3. Replace the drive.
CPF20 and CPF21	RAM fault, FLASH memory error, watchdog circuit exception.	1. Cycle power to the drive. 2. Replace the drive.
CPF22	A/D Conversion Fault. A/D conversion error.	1. Cycle power to the drive. 2. Ensure that the control board terminals and wiring are shielded from electrical noise. 3. Replace the drive.
CPF23	PWM Feedback Fault. PWM feedback error.	1. Cycle power to the drive. 2. Replace the drive.

Fault Code	Fault or Indicator Name/Description	Corrective Action
CPF24	Drive Capacity Signal Fault. Entered a capacity that does not exist (checked when the drive is powered up).	1. Cycle power to the drive. 2. Replace the drive.
CRST	Cannot reset. External fault occurred and reset button was pressed before motor was completely stopped. Fault reset was being executed when a run command is executed during a fault.	1. Wait for motor to come to complete stop. 2. Reset fault before issuing a run command.
DNE Drive not ready	User is trying to give a run command while a FWD or REV is present at Power Up.	1. Check input terminals. 2. Check H01.01 to H01.07 programming.
EF (flashing) External Fault	Both FORWARD/UP and REVERSE/DOWN commands are input at same time for 500 msec or longer.	1. Check control input wiring. 2. Check the sequence of operation.
EF0 Optional External Fault	External fault input from communication option card.	1. Check communication option card connection and signals. 2. Check external device for any fault(s).
EF1 External Fault 1	External fault occurs on Terminal S1.	1. Check constant H01.01 for proper programming. 2. Check the conditions for input terminal S1 (U01.10).
EF2 External Fault 2	External fault occurs on Terminal S2.	1. Check constant H01.02 for proper programming. 2. Check the conditions for input terminal S2 (U01.10).
EF3 External Fault 3	External fault occurs on Terminal S3.	1. Check constant H01.03 for proper programming. 2. Check the conditions for input terminal S3 (U01.10).
EF4 External Fault 4	External fault occurs on Terminal S4.	1. Check constant H01.04 for proper programming. 2. Check the conditions for input terminal S4 (U01.10).
EF5 External Fault 5	External fault occurs on Terminal S5.	1. Check constant H01.05 for proper programming. 2. Check the conditions for input terminal S5 (U01.10).
EF6 External Fault 6	External fault occurs on Terminal S6.	1. Check constant H01.06 for proper programming. 2. Check the conditions for input terminal S6 (U01.10).
EF7 External Fault 7	External fault occurs on Terminal S7.	1. Check constant H01.07 for proper programming. 2. Check the conditions for input terminal S7 (U01.10).
GF Ground Fault	Ground Fault. Current shorted to ground exceeds 50% of rated current in output side of the drive. Setting L08.09 to 1 enable ground fault detection in models 2025 and 4014 or larger.	1. Disconnect motor from drive and check it for shorts using a megger. 2. Ensure that R/C Surge Suppressors are used across all brake contactor coils to prevent disturbance by electrical transients.
HBB	Hardware Base Block. The Safe Disable Input channel is open.	1. Check if external safety circuit tripped and disabled the drive. 2. If the Safe Disable function is not utilized, check if the terminals HC and H1 are linked.
LC Load Check Err	Load Check Fault. Load is greater than specified amount.	1. Reduce load. 2. Check Load Check sequence set-up (C05.XX).
LF Output Phase Loss	An open phase occurs at the inverter output.	1. Check for broken wires in output cable. 2. Check for open winding in the motor. 3. Check for loose terminals.
LL1 (flashing) Lower Limit 1 Err	Lower Limit 1 - SLOW Down Indicator. Hoist has reached lower slow approach limit. No action is required. If desired, slow approach limits may be disabled as described on page 19.	1. May not require corrective action. 2. Check the position of the limit switch.
LL2 (flashing) Lower Limit 2 Err	Lower Limit 2 - STOP Indicator. Hoist has reached lower limit. Run hoist UP away from lower limit, or if limit is in an inappropriate place, reset limits as described on page 19.	1. May not require corrective action. 2. Check the position of the limit switch.
MNT Maintenance Required	Maintenance Required Alert. Running time has exceeded C12.05.	1. Reset timer by MFI=5A or depress Mode/Service key three times and enter within 2 seconds.
OC Over Current	Output current exceeds 200% of inverter rated output current.	1. Check for a phase-to-phase short in the motor or wiring using a megger. 2. Extend the acceleration/deceleration time. 3. Check torque limit setting.
OH (flashing) Heatsnk Over temp	Overheat Pre-Alarm. Heatsink is overheating. The temperature of the inverter's heatsink exceeded the setting in L08.02.	1. The inverter cooling fan has stopped. 2. Reduce the ambient temperature.

Fault Code	Fault or Indicator Name/Description	Corrective Action
OH1 Heatsink MaxTemp	Overheat Fault. There are two situations that result in an overheat fault. The first occurs when the measured heatsink exceeds 105°C. The second is the result of a fault in the internal 24VDC cooling fan.	1. Ensure that the heatsink cooling fans are functioning. 2. Ensure that the heatsink is free from dirt and debris. 3. Ensure that the inverter's ambient temperature is within specifications. 4. Replace the 24 VDC fan. 5. Replace the heatsink thermistor(s).
OH2 (Flashing) Overheat 2	Overheat Alarm. Signal is input by external terminal. H01.XX = 39	
OH3 Motor Overheat 1	Motor Overheating 1. Thermistor analog input detects motor overheating. See L01.03.	1. Check the motor rated current value, E02.01. 2. Increase cycle time OH4 Motor or reduce the load.
OH4 Motor Overheat 2	Motor Overheating 2. Thermistor analog input detects motor overheating. See L01.04.	
OL1 Motor Overloaded	Motor Overload Fault. Inverter output exceeds the inverter overload level.	1. Ensure drive is programmed with proper motor full load Amps (E02.01). 2. Reduce the load.
OL2 INV Overload	Inverter Overload Fault. Inverter output exceeds the inverter overload level.	1. Reduce the load. 2. Extend the acceleration time.
OPE01 kVA Selection	kVA Settings Fault. Inverter kVA setting range is incorrect.	1. Check O02.04 constant for proper kVA.
OPE02	Parameter Range Setting Error. Parameter settings are set outside the parameter range.	1. Press enter to view parameter. 2. Change parameter to appropriate setting.
OPE03 Terminal	Multi-Function Input Settings Fault. Set values other than F and FF are duplicated.	1. Check the settings for H01.01 to H01.07. Verify that the same input is not used twice.
OPE04 Terminal	Parameters do not match. The drive, control board, or terminal board has been replaced, and the parameter settings between the controll board or terminal board do not match.	1. Press ENTER to view the parameter. 2. Change parameter(s) to appropriate settings. 3. Set A01.05 = 5550.
OPE07 Analog Selection	Multi-Function Analog Input Setting Fault. Set values other than 00 and 0F are duplicated.	1. Check setting for H03.02 and H03.10. Verify that the same value is not used twice.
OPE08 Terminal	Selection Parameter error. A parameter has been changed that is not available in the present control method.	1. Undo the last parameter change (if known). 2. Scroll through modified constants for obvious setting error. 3. Perform a user initialize (A01.05 = 1110). CAUTION: All settings will be restored to the factory defaults.
OPE10 V/fPtm Setting	V/f Parameter Setting Error.	1. Check parameters E01.04 to E01.11.
OPE23 Load Check	Check C05.04 ≤ C05.07 ≤ C05.09.	1. Load check setting error.
OT1 Overtorque Det 1	Overtorque Detection Level 1 Fault. Current is higher than set value (L06.02) for more than set time (L06.03).	1. Check for proper programming of L06.02 and L06.03.
OT2 Overtorque Det 2	Overtorque Detection Level 2 Fault. Defined by L06.05. Alarm defined by L06.04.	1. Check for proper programming for L06.XX constant.
OV DC Bus Overvolt	Overvoltage Fault. The DC bus voltage exceeds overvoltage level. Detection level: 230V class - approximate 410V; 460V class - approximate 820V.	1. Extend the deceleration time. 2. Check for proper DBU operation. 3. Check the resistor. 4. Check the line voltage. 5. If on a load break hoist, check the gear box.
OV (flashing) DC Bus Overvolt	Overvoltage Fault. Overvoltage occurs during stop. Main circuit DC voltage rises above the detection level while the drive output is off. Detection level: 410V or more for 230V; 820V or more for 460V.	1. Check the line voltage.
PF Input Pha Loss	Input Phase Loss Fault. Inverter input power supply has open phase.	1. Check the line voltage. 2. Remove power. 3. Retighten the input terminal screws. 4. Check the fuses.
RR DynBrk Transistr	Braking Transistor Fault. Internal Braking transistor failed.	1. Verify that the external braking resistor is connected to the proper terminals. 2. Confirm that the proper resistor is installed. 3. Check for a short circuit across the braking resistor.
UL1 Upper Limt 1 Err	Upper Limit 1 - SLOW DOWN Indicator. Hoist has reached upper slow approach limit. No action is required. Slow approach limits can be disabled by following the instructions on page 19.	1. May not require corrective action. 2. Check the position of the limit switch.

Fault Code	Fault or Indicator Name/Description	Corrective Action
UL2 Upper Limt 2 Err	Upper Limit 2 - STOP Indicator. Hoist has reached upper limit. Run hoist DOWN away from upper limit. If limit is set in an inappropriate place, follow the instructions to reset limits on page 19.	1. May not require corrective action. 2. Check the position of the limit switch.
UL3 Upper Limt 3 Err	Upper Limit 3 - Weighted Stop. Upper limit weighted limit switch is tripped.	1. May not require corrective action. 2. Check the position of the limit switch. 3. Check the condition of the limit switch. 4. Check the conditions of/for input terminal H01.XX (U01.10).
UT1 Undertorque Det1	Undertorque Detection 1. The current is less than L06.02 for more than L06.03.	1. Check settings. 2. Check motor coupling.
UT2 Undertorque Det2	Undertorque Detection 2. The current is less than L06.05 for more than L06.06.	1. Check settings. 2. Check motor coupling.
UV (Flashing) DC Bus Undervolt	Undervoltage Fault. Undervoltage status occurs for more than 2 seconds during STOP. Input voltage drops below 190 VDC or less for 230 VAC class; 380 VDC or less for 460 VAC class.	1. Check the power source wiring. 2. Replace bad branch fuses. 3. Check collector system.
UV1 DC Bus Undervolt	Undervoltage 1 Fault. Undervoltage status occurs for more than 2 sec during run command. Input voltage drops below 190V DC or less for 230V AC class, 380V DC or less for 460V AC class.	1. Check the power source wiring. 2. Correct the line voltage. 3. Check collector system.
UV2 CTL PS Undervolt	Undervoltage 2 Fault. The inverter detects a loss of 24V logic power supply voltage.	1. Check the power source wiring. 2. Correct the line voltage. 3. Check collector system.
UV3 MC Answerback	MC Fault. The pre-charge contactor opens during operation.	1. Check the power supply wiring. 2. Correct the line voltage. 3. Check collector system. 4. Wait 30-45 seconds before restarting drive after auto-shutdown.

TROUBLESHOOTING

Table 11. Troubleshooting

Trouble	Probable Cause	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. The upper or lower limits have stopped the hoist motion.	C. Press the “other” control and the hook should respond. Adjust limit switches as described on page 19.
	D. Wrong voltage or frequency.	D. Use the voltage and frequency indicated on hoist identification plate.
	E. Low voltage.	E. Correct low voltage condition as described on page 11.
	F. Brake not releasing - open or shorted coil winding; armature binding.	F. Check electrical continuity and connections. Check that correct coil has been installed. Check brake adjustment as described on page 18.
	G. Excessive load.	G. Reduce loading to the capacity limit of hoist as indicated on the identification plate.
	H. Signal connections have unplugged from brake board.	H. Firmly press the 6- and 13-pin connection plugs into board. Limits have to be cleared and reset if hoist moves without encoder input. Verify safe limit operation before proceeding.
2. Hook moves in wrong direction.	A. Wiring connections reversed at the control station.	A. Check connections with the wiring diagram.
	B. Reversal of motor leads.	B. Refer to installation instructions on page 8.
3. Hook lowers but will not raise.	A. Excessive load.	A. See item 1H.
	B. Open hoisting circuit - open; control station contacts faulty; upper limit position has been reached.	B. Check electrical continuity and repair or replace defective part. Check operation of limit switch as described on page 12.
	C. Phase failure.	C. See item 1B.
4. Hook raises but will not lower.	A. Open hoisting circuit - open; control station contacts faulty; upper limit position has been reached.	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.	A. See item 1B.
	B. Phase reversal.	B. Refer to installation instructions on page 11.
6. Hook does not stop promptly.	A. Brake slipping.	A. Check brake adjustment as described on page 18.
	B. Excessive load.	B. See item 1H.

Trouble	Probable Cause	Remedy
7. Hoist operates sluggishly.	A. Excessive load.	A. See item 1H.
	B. Low voltage.	B. Correct low voltage condition as described on page 11.
	C. Phase failure or unbalanced current in the phases.	C. See item 1B.
	D. Brake dragging.	D. Check brake adjustment as described on page 18.
8. Motor overheats.	A. Low voltage.	A. Correct low voltage condition as described on page 11.
	B. Excessive load.	B. See item 1H.
	C. Extreme external heating.	C. When ambient temperature is above 104°F (40°C), 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.	E. See item 1B.
	F. Brake dragging.	F. Check brake adjustment as described on page 18.
9. Hook fails to stop at either or both ends of travel.	A. Limit switches not set correctly.	A. Set the hook limits per the procedure on page 19.
	B. Missing, loose, or damaged components.	B. Check for missing, loose and/or damaged encoder boards, harnesses, magnetic pinion.
10. Hook stopping point varies.	A. Missing, loose, or damaged components.	A. Check for missing, loose and/or damaged encoder boards, harnesses, magnetic pinion.
	B. Brake not holding.	B. Check the brake adjustment as described on page 18.

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 DC resistance substantially below normal. The current method is recommend for coils with very low DC resistance.

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

Table 12a. DC Electric Brake Data

Models	DC Brake Coil Voltage	Nominal Current (Amps)	*DC Resistance (Ohms)
A-H	103	0.243	424.4
	205	0.0975	2101
J-RT	103	0.311	331.5
	205	0.122	1681

Table 12b. Motor Data

Models	Volts-Phase-Hertz	HP (kW)	Motor Full Load Current (Amps)	Leads	*DC Resistance (Ohms)
A, AA, B, C, E, F, H	230-3-60	1/2 (0.37)	1.8	3 - 6	7.8
				2 - 5	7.8
	380-3-50		1.0	1 - 4	7.8
				8 - 9	15.6
	460-3-60		0.9	8 - 7	15.6
				9 - 7	15.6
J, L, R, RT	230-3-60	1 (0.74)	3.0	3 - 6	4.7
				2 - 5	4.7
	380-3-50		1.8	1 - 4	4.7
				8 - 9	9.4
	460-3-60		1.5	8 - 7	9.4
				9 - 7	9.4

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

Table 12c. Hoist Current Data

Models	Volts-Phase-Hertz	Hoist Full Load Current
A-H	115-1-60	11
	230-1-60	5.5
	230-3-60	1.8
	380-3-50	1.0
	460-3-60	0.9
J, L, R, RT	115-1-60	15
	230-1-60	8.8
	230-3-60	3
	380-3-50	1.8
	460-3-60	1.5

Table 13a. Torque Specification: All Models

Fastener	Fastener Description	Tool Required	*Recommended Seating Torque	
			ft-lbf	N·m
Brake End Cover	1/4"-20 Socket-Head Cap Screw	3/16" Hex Driver	4.2 - 5.0	5.7 - 6.8
Motor End Cover	1/4"-20 Socket-Head Cap Screw	3/16" Hex Driver	4.2 - 5.0	5.7 - 6.8
1/4"-20 Button-Head Screw for Miscellaneous Applications	1/4"-20 Button-Head Socket Cap Screw	5/32" Hex Driver	4.2 - 5.0	5.7 - 6.8
Cord Grips	ø3/4" NPT Cord Grip	1-1/16" Hex Socket or Wrench	5.0 - 5.8	6.8 - 7.9
Cord Grip Dome Nut	1-1/16" Dome Nut for Cord Grip	2 x 1-1/16" Wrench; hold the cord grip body while tightening the dome nut	3.3 - 4.5	4.5 - 6.1
			or until cord does not slip	

Table 13b. Torque Specification: Models A-H

Fastener	Screw Size	Tool Required	*Recommended Seating Torque	
			ft-lbf	N·m
Motor Housing / Gear Housing / Back Frame Screws	1/4"-20 Socket-Head Cap Screw	3/16" Hex Driver	7.9 - 8.3	10.7 - 11.3
Liftwheel Nut	1"-12 Hex Nut	1-1/2" - 6- or 12-Point Socket	55.0 - 60.0	74.6 - 81.3
Brake Mounting Screws	M4 Socket-Head Cap Screw	3mm Hex Driver	2.5 - 3.3	3.4 - 4.5
Suspension Adapter Screws	3/8"-16 - 12-Point Cap Screw	3/8" - 12-Point Socket	35.0 - 45.0	47.5 - 61.0
Lower Hook Block Screws (Double-Reeved)	1/4"-20 Socket-Head Cap Screw	3/16" Hex Driver	5.0 - 5.8	6.8 - 7.9
Loose End Screw	1/4"-20 Socket-Head Cap Screw	3/16" Hex Driver	4.2 - 5.0	5.6 - 6.8
Chain Stop Screw	1/4"-20 Socket-Head Cap Screw	3/16" Hex Driver	5.0 - 5.8	6.8 - 7.9

Table 13c. Torque Specification: Models J-RT

Fastener	Screw Size	Tool Required	*Recommended Seating Torque	
			ft-lbf	N·m
Motor Housing / Gear Housing / Back Frame Screws	5/16"-18 Socket-Head Cap Screw	1/4" Hex Driver	14.2 - 15.0	19.3 - 20.3
Liftwheel Nut	1-1/8"-12 Hex Nut	1-11/16" - 6- or 12-Point Socket	85.0 - 90.0	115.2 - 122.0
Brake Mounting Screws	M5 Socket-Head Cap Screw	4mm Hex Driver	3.3 - 4.1	4.5 - 5.6
Suspension Adapter Screws	1/2"-16 - 20-Point Cap Screw	1/2" - 12-Point Socket	70.0 - 80.0	94.9 - 108.5
Lower Hook Block Screws (Double-Reeved)	5/16"-18 Socket-Head Cap Screw	1/4" Hex Driver	10.0 - 11.3	13.6 - 15.3
Lower Hook Block Screws (Triple-Reeved)	1/2"-13 Hex Cap Screw	3/4" - 6- or 12-Point Socket	55.0 - 65.0	74.6 - 88.1
Loose End Screw	5/16"-20 Socket-Head Cap Screw	1/4" Hex Driver	8.0 - 10.0	10.8 - 13.6
Chain Stop Screw	1/4"-20 Socket-Head Cap Screw	3/16" Hex Driver	5.0 - 5.8	6.8 - 7.9

*All torque values are for clean,dry fasteners. DO NOT apply oil or any other lubricant to the fastener threads.

WARRANTY

LIMITATION OF WARRANTIES, REMEDIES AND DAMAGES

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 and any Replacement Parts. Buyer shall not remove or permit anyone to remove any warning or instruction signs on the Goods or Replacement Parts. In the event of personal injury or damage to property or business arising from the use of the Goods or Replacement Parts, 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 laws, rules or regulations 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 and/or Replacement Parts.

CMCO Warranty (HOISTS)

A. Columbus McKinnon Corporation ("Seller") warrants to the original end user ("Buyer") that: (a) for a period of one (1) year from the date of Seller's delivery of the goods (collectively, the "Goods") to the carrier, the electrical components of the Goods will be free from defects in workmanship and materials; and (b) for the life of the Goods, the mechanical components of the Goods will be free from defects in workmanship and materials. In addition, Seller warrants to Buyer that, for a period of one (1) year from the date of their delivery by Seller to the carrier, any aftermarket or replacement parts, accessories or components purchased by Buyer with respect to any Goods (collectively, "Replacement Parts") will be free from defects in workmanship and materials.

B. IN THE EVENT OF ANY BREACH OF ANY SUCH WARRANTY, SELLER'S SOLE OBLIGATION SHALL BE EXCLUSIVELY LIMITED TO, AT THE OPTION OF SELLER, REPAIR OR REPLACEMENT, F.O.B. SELLER'S POINT OF SHIPMENT, OF ANY GOODS OR REPLACEMENT PARTS THAT 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 OR REPLACEMENT PARTS TO SELLER. NO CLAIM AGAINST SELLER FOR ANY BREACH OF (i) SUCH WARRANTY WITH RESPECT TO THE ELECTRICAL COMPONENTS OF ANY GOOD, OR ANY REPLACEMENT PART, SHALL BE VALID OR ENFORCEABLE UNLESS BUYER'S WRITTEN NOTICE THEREOF IS RECEIVED BY SELLER WITHIN ONE (1) YEAR FROM THE DATE OF SELLER'S DELIVERY TO THE CARRIER AND (ii) SUCH WARRANTY WITH RESPECT TO THE MECHANICAL COMPONENTS OF ANY GOOD SHALL BE VALID OR ENFORCEABLE UNLESS BUYER'S WRITTEN NOTICE THEREOF IS RECEIVED BY SELLER WITHIN ONE (1) YEAR FROM THE DATE ANY ALLEGED CLAIM ACCRUES. EXCEPT FOR THE WARRANTIES SET FORTH ABOVE, SELLER MAKES NO OTHER WARRANTIES WITH RESPECT TO THE GOODS OR ANY REPLACEMENT PART, WHETHER EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, QUALITY AND/OR THOSE ARISING BY STATUTE OR OTHERWISE BY LAW OR FROM ANY COURSE OF DEALING OR USE OF TRADE, ALL OF WHICH ARE HEREBY EXPRESSLY DISCLAIMED.

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D. Seller shall not be liable for any damage, injury or loss arising out of the use of the Goods or any Replacement Part if, prior to such damage, injury or loss, such Goods or Replacement Parts are: (1) damaged or misused following Seller's delivery to the 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 (a) with any part or accessory other than those supplied by Seller or (b) without compliance with such laws, instructions or recommendations

E. This warranty is limited and provided only to the original end user. **Each Good and Replacement Part must be registered within sixty (60) days of receipt of each product to establish eligibility.** Please register at https://www.columbusmckinnon.com/en-us/warranty-registration/ or submit registration card via US mail.

F. Any action against Seller for breach of warranty, negligence or otherwise in connection with the electrical components of any Good must be commenced by Buyer within one (1) year after: (a) the date any alleged claim accrues; or (b) the date of delivery of the Goods to Buyer, whichever is earlier. Any action against Seller for breach of warranty, negligence or otherwise in connection with the mechanical components of any Good must be commenced by Buyer within one (1) year after the date any alleged claim accrues. Any action against Seller for breach of warranty, negligence or otherwise in connection with any Replacement Part must be commenced by Buyer within one (1) year after: (y) the date any alleged claim accrues; or (z) the date of delivery of the Replacement Part to Buyer, whichever is earlier.

G. This warranty is contingent upon Buyer's proper maintenance and care of the Goods and/or Replacement Parts, and does not extend to normal wear and tear. Seller reserves the right, at its option, to void this warranty in the event of Buyer's use with the Goods and/or Replacement Parts of parts or accessories other than those supplied by Seller.

⚠ WARNING

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

TO AVOID INJURY:

- **Do not alter or modify equipment.**
- **Do use only replacement parts manufactured by seller.**

CM Lodestar® VS Installation, Operating, & Maintenance Manual

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