

CHESTER HOIST

WORM DRIVE HOISTS

WD-680C

SECTION A

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OPERATING and MAINTENANCE INSTRUCTIONS FOR WD SERIES HOISTS

Your Order No. _____

Holst Serial No. _____

Model No. _____

When ordering parts, please use hoist serial number

CHESTER HOIST

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Authorization for return must be received from the Chester Hoist
before returning any equipment for inspection or warranty repair.

WARNING

The hoisting equipment shown in this bulletin is intended for
industrial use only and should not be used to lift, support or otherwise transport human cargo.

I SAFETY PRECAUTIONS

This hoist is designed for safe operation within the limits of its rated capacity. There are safety features built into the hoist to protect the operator and others from injury due to failure of the hoist itself. However, listed below are safety pointers which must be followed in order to protect personnel and property.

1. Avoid side pull or end pull at all times.
2. Limit switches are emergency devices. Do not use limit switches to stop the hoist in normal operation. Do not leave load block in contact with limit switch at end of operation.
3. Do not operate hoist with twisted, kinked or damaged wire rope.
4. Do not operate hoist with a wire rope that is not properly seated in all grooves.
5. Do not operate a damaged or malfunctioning hoist until necessary adjustments or repairs have been made.
6. Do not use hoist to lift, support, or otherwise transport people or to carry loads over people.
7. Make sure all supporting structures are strong enough to hold your intended load.
8. Do not lift more than the rated capacity of the hoist.
9. Do not use the wire rope as a substitute for slings.
10. Allow only qualified personnel to operate the hoist.
11. Do not leave a load suspended in the air unattended.
12. Avoid jogging controls or quick reversals of load.
13. Always disconnect hoist from power supply before making electrical connections or repairs.
14. Do not double wrap cable wire rope on drum.
15. Do not use P.B. cable to move either hoist or load along rail.

II INSTALLATION INSTRUCTIONS

1. GENERAL INSTRUCTIONS

- a. The power supply should be within plus or minus 10% of the voltage specified on the hoist nameplate.
- b. Supporting structure, including trolleys, mono-rail, etc., should have a load rating at least equal to the hoist plus weight of hoist.
- c. Check lubrication level in the gear case and trolley gear case (if supplied with the hoist).
- d. Check wire rope for damage and improper seating on the drum and sheave(s).

2. LOAD HOOK DIRECTION (PHASING)

When installing your hoist, make only temporary connections at the power source. Push the "UP" button and observe the direction of the load block. If the load block raises, the phasing is correct and

permanent connections may be made at the power source. If the load block lowers, release the button immediately. To correct load block direction, reverse any two wires (except the green ground wire) at the power source only. DO NOT CHANGE CONNECTIONS AT ANY OTHER LOCATION.

3. LIMIT SWITCH OPERATION (PADDLE)

Before placing the hoist in operation, check for proper upper limit switch operation. Push the "UP" button and, while the hoist is moving upward, raise the limit switch lever. The hook should stop immediately. DO NOT OPERATE THE HOIST IF THE LIMIT SWITCH(S) ARE NOT OPERATING PROPERLY.

4. BRAKE OPERATION

NOTE: Run in hoist with a light load a few times before lifting the rated load. After lifting a light load a few times, test the hoist per paragraph VI. Check for load block drift with the maximum rated capacity load on the hook. If hook does not stop within one to two inches when push button is released it may be necessary to adjust the brake. See paragraph V.2.a.(3).

III OPERATION

1. OPERATING PERSONNEL

It is recommended that hoist operation be limited to the following personnel:

- a. Appointed operators who have passed a practical operating examination.
- b. Maintenance and test personnel when it is necessary in the performance of their duties.
- c. Inspectors.

2. GOOD OPERATING PRACTICES

- a. The operator should not engage in any practice which will divert his attention while engaged in operating the hoist.
- b. When an "out-of-order" sign is on the starting controls, the operator should not power the unit or start operations until the sign has been removed by a designated person.
- c. Before starting the hoist, the operator should be certain that all personnel are clear.
- d. The operator should familiarize himself with the equipment and its proper care. If adjustments or repairs are necessary or any damage known, or suspected, he should report the same promptly to the appointed person and should also notify the next operator of the damage upon changing shifts.
- e. All controls, such as push button stations, brakes and limit switch(es) should be tested by the operator before beginning a shift. If any controls do not operate properly, they should be adjusted or repaired before operations are started.

3. HANDLING THE LOAD

a. Size of Load

Do not load the hoist beyond the rated load, except for properly authorized tests.

b. Attaching the Load

- (1) The hoist rope should not be wrapped around the load.
- (2) The load should be attached to the hook by means of slings or other approved devices.
- (3) The slings or other approved devices shall be seated properly in the saddle of the hook before operation.

c. Moving the Load

- (1) The load should not be moved or lifted more than a few inches until it is well balanced on a sling or lifting device.
- (2) Care should be taken in hoisting to be certain that:
 - (a) Hoist rope is not kinked or twisted.
 - (b) Load does not contact any obstructions.
 - (c) Multiple part ropes are not twisted about each other.
- (3) No hoist should be operated until the hoist unit is centered over the load.
- (4) The operator should test the brake each time a load approaching the rated load is handled by raising the load just enough to clear the floor or supports, and check for brake action. The lift should be continued after the operator is assured the brake is operating properly.
- (5) No loaded hoist drum should be rotated in the lowering direction beyond the point where less than two wraps of cable remain on the drum unless a lower limit switch is provided in which case no less than one wrap shall remain.
- (6) The operator should inch the hoist into engagement with a load, and avoid unnecessary stops and starts.

LOAD BLOCK ASSY.	CORRECT THROAT OPENING "X"
30KG28-50	1-1/16
BA-101	1-7/32
BA-102	1-1/2
BA-118	1-1/2
BA-119	2-1/4
BA-129	2-1/4
BA-134	1-7/32
BA-144	1-1/2
BA-150	4
BA-154	2-1/2
BA-156	2-1/4

TABLE 1. HOOK THROAT OPENING MEASUREMENTS

IV INSPECTION

Inspection procedures are divided into three general classifications based upon the intervals at which inspection should be performed. Deficiencies should be carefully examined and corrected. The intervals between inspection will vary due to operating conditions and amount of use. The following inspection intervals are based on 40 hours per week use under normal environmental conditions. If the hoist is used more than 40 hours per week or under adverse environmental conditions, it should be inspected more frequently.

1. DAILY INSPECTION

Inspect the following items daily before operating hoist.

- a. Check all controls and operating mechanisms for proper operation.
- b. Check limit switches and brake for proper operation.
- c. Check hooks for deformations, chemical damage, or cracks. Replace any hook showing any of these signs. If the throat opening is spread wider than listed in Table 1 it has been overstressed and must be replaced.

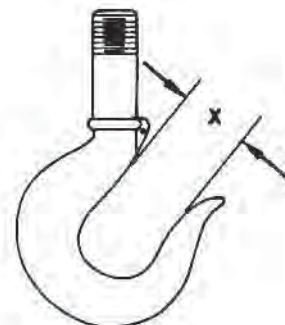
NOTE: Any hook that is twisted or has throat opening in excess of normal, indicates abuse or overloading of the hoist. When a hook is found to be in this condition, other load bearing components of the hoist should be inspected for damage.

- d. Check wire rope for wear, twist or distortion.
- e. Check for damaged or improperly working safety latch.

2. QUARTERLY INSPECTION

Inspect the following items at 90-day intervals:

- a. Check all items under daily inspection.
- b. Check for loose bolts, screws and nuts.
- c. Inspect drums and sheaves for cracks and excessive wear.



- d. Inspect for worn, corroded, cracked or distorted parts.
- e. Check for proper operation of brake. See paragraph II.4.
- f. Inspect for excessive wear of wire rope. See paragraph V.4.
- g. Check electrical parts for signs of pitting or any deterioration of controls, limit switches and push button station.

3. ANNUAL INSPECTION

Inspect the following items annually.

- a. Check all items under daily and 90-day interval inspection.
- b. Check hooks for cracks by means of a magnetic particle test or other suitable crack detecting test.
- c. Inspect supporting structure and trolleys (if used) for continued ability to support the imposed loads.
- d. Check brake for worn linings and discs. See paragraph V.2.b.(7).

NOTE: A hoist which has been idle for a period of one month or more, but less than six months, should be given an inspection of those items listed under paragraphs IV.1 and IV.2. A hoist which has been idle for a period of six months, or more, should be given a complete inspection.

V MAINTENANCE

A preventive maintenance program based on the following should be established for the hoist. It is recommended that detailed records be kept and made available to appointed personnel.

NOTE: Only parts obtained from Chester should be used in maintenance of the hoist.

1. MAINTENANCE PROCEDURE

Before adjustments and repairs are started on the hoist, the following precautions should be taken:

- a. The main or emergency switch on the line feeding the hoist should be locked in the open position or the power disconnected.
- b. Warning or "out-of-order" signs should be placed on the hoist. These signs should be placed and removed only by designated personnel.

2. ADJUSTMENTS AND REPAIRS

Any unsafe condition disclosed by inspection should be corrected before operation of the hoist is resumed. Adjustments and repairs should be accomplished only by qualified personnel.

a. Adjustments

Adjustments should be made to assure correct functioning of components after replacements or when malfunctions are detected.

(1) Geared Limit Switch

Adjust geared limit switch according to instructions contained in the maintenance and parts sheets included in the illustrated parts breakdown.

NOTE: The lower limit switch should not be adjusted to allow less than one full wrap of rope on the drum when the limit switch actuates.

(3) Brake Adjustment (See Figure 1.)

- (a) Remove nuts (1), and cover (2).
- (b) Adjust air gap adjusting nuts (4) until the air gap at all four coils is 0.020 inch for single disc brakes or 0.035 inch for double disc brakes and 0.050 inch for triple disc brakes.
- (c) Replace cover (2), and nuts (1).
- (d) For brakes not of Chester manufacture, see attached parts sheets.

b. Repairs or Replacements

Repairs or replacements should be provided promptly as needed for correct operation. The following are examples:

- (1) Replace all critical parts which are cracked, broken, bent or excessively worn.
- (2) Replace pitted or burned electrical contacts in sets only.
- (3) Keep push button control stations clean and function labels legible.
- (4) Replace hooks showing defects described in paragraph IV.1.c.
- (5) Replace wire rope showing defects described in paragraph V.4.
- (6) Replace missing or illegible warning labels.
- (7) Replace brake linings when worn to a thickness of 1/8 in.

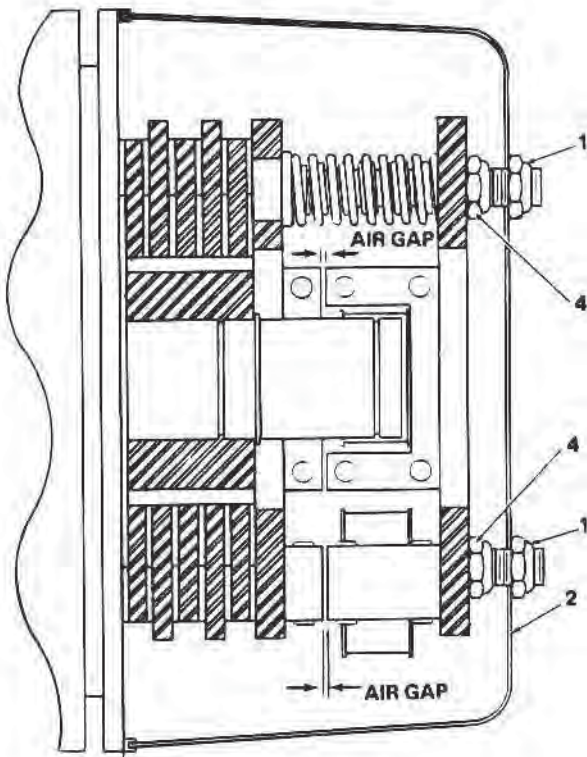
3. LUBRICATION

Lubricate the hoist according to table 2.

4. WIRE ROPE INSPECTION, REPLACEMENT AND MAINTENANCE

a. Inspection

- (1) Visually inspect the rope once each working day. A thorough inspection of the rope should be performed once each month. Any deterioration, resulting in appreciable loss of original strength, such as described below, should be carefully noted and determination made as to whether further use of the rope would constitute a safety hazard.
 - (a) Reduction of rope diameter below nominal due to loss of core support, internal or external corrosion or wear of outside wires.
 - (b) A number of broken outside wires and



BRAKE COIL CONNECTIONS

230/460V	230V	460V	200/208V OR 575V
(115V COILS) SINGLE SPEED	(115V COILS) 2 SPEED	(230V COILS) 2 SPEED	200/208V 200V COIL 575V - 575V COIL SINGLE SPEED

FIGURE 1. BRAKE ADJUSTMENT

the degree of distribution or concentration of such broken wires.

(c) Worn outside wires.

(d) Sections of rope which are normally hidden during inspection or maintenance procedures, such as parts passing over sheaves, should be given close inspection as these are points most subject to deterioration.

(e) Corroded, or broken wires at end connections.

(f) Corroded, cracked, bent, worn or improperly applied end connections.

(g) Kinking, crushing, cutting or unstranding.

(2) All rope which has been idle for a month or more should be given a thorough inspection before it is placed in service.

b. Replacement

(1) No precise rules can be given for determination of the exact time for replacement of wire rope, since many variable factors are involved. Conditions such as the following should be sufficient for questioning rope safety and consideration of replacement:

(a) Any broken wire.

(b) Wear of one-third of the original diameter of outside individual wires.

(c) Kinking, crushing, birdcaging or any other damage resulting in distortion of the rope structure.

(d) Evidence of any heat damage from any cause.

NOTE: See figure 2 for correct way to measure wire rope.

(e) Reductions from nominal diameter of more than:

1/64 inch for dia. up to and including 5/16 inch

1/32 inch for dia. 3/8 inch up to and including 1/2 inch

3/64 inch for dia. 9/16 inch up to and including 3/4 inch



INCORRECT
MEASUREMENT



CORRECT
MEASUREMENT

FIGURE 2. ROPE MEASUREMENT

PART TO BE LUBRICATED	LUBRICANT	INSTRUCTIONS	FREQUENCY
Transmission	Mobilgear #634 or equivalent.	Drain from drain plug in bottom of housing. Fill to level plug on side of housing.	After initial 50 hours operation, then every 3 months or 500 hours.
Motorized Trolley Gear Box	Mobilgear #634 or equivalent.	Drain by means of drain plug in bottom of housing. Fill to level plug on side of housing.	
Wire Rope	Heavy motor oil or a cable compound	Apply light coat to entire rope.	30 days.
Load Block	Darina #2 or equivalent.	Lubrication is required only when sheave pin contains grease fittings.	30 days.

TABLE 2. LUBRICATION

- (2) Special attention should be given to end fastenings. Ropes should be examined frequently at fittings, and upon the development of any broken wires, the rope should be replaced. Rope length should be sufficient for proper operation.

NOTE: Check for proper operation of geared limit switch.

- (3) Replacement rope should be obtained from Chester and should be the same size, grade and construction as the original rope installed on the hoist.

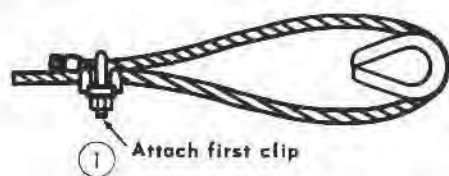
CAUTION: The main precaution to be taken in removing and installing wire rope is to avoid kinking which greatly lessens its strength and useful life.

- (4) 2 P.S. and 4 P.S. Single and Twin Hook Rope Replacement. See figure 4.

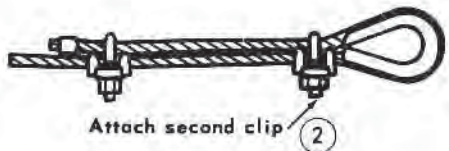
- Remove wire rope where anchored to frame.
- Remove load block from wire rope.
- Unwind wire rope from drum by rotating drum until rope is completely played out. Pull rope from drum by pulling rope clamp through hole in drum guard until a few feet of rope remains to be pulled through drum.
- Attach end of new rope to end of old rope with a strong tape or wire leader and pull new rope through drum until several feet extend from drum through drum guard. Remove tape.
- Assemble cable clamp to new wire rope as shown in figure 3.
- Pull new rope back through drum until cable clamp is seated in hub of drum

opposite gear case.

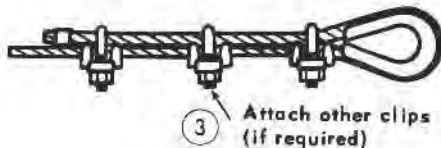
- Rotate drum to wind rope on drum. Make sure that the first few turns of rope are wound tightly on drum and that rope is correctly located in grooves of drum.
 - Reeve rope around load block (and sheeve for 4 P.S.).
 - Attach end fitting to rope as shown in figure 3 and anchor to frame.
- (5) 2 P.D. and 4 P.D. Rope Replacement. See figure 4.
- Rotate drum until rope is completely unwound from drum.
 - Pull one end of wire rope from drum through hole in drum guard. Remove end attachment from wire rope.
 - Attach end of new rope to end of old rope with a strong tape and pull new rope through end of drum through opening in drum guard.
 - Reeve new rope through hook block sheaves and idler sheave(s). Pull rope through opening in opposite end of drum and back through drum until several feet of the new rope extend from drum.
 - Assemble cable clamp to both ends of new wire rope as shown in figure 3.
 - Rotate drum to wind rope on drum. Make sure that the first few turns of rope are wound tightly on drum and that rope is correctly located in grooves of drum.



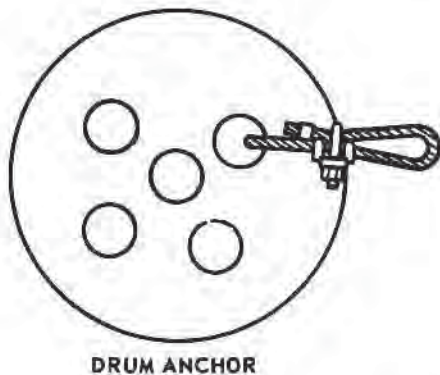
① Attach first clip



② Attach second clip



③ Attach other clips (if required)



DRUM ANCHOR

SIZE FOR ROPE DIA. INCHES	MIN. NO. CLIPS FOR MAXIMUM STRENGTH	MINIMUM SPACING BETWEEN CLIPS INCHES
1/4	2	1-1/2
5/16	2	1-7/8
3/8	2	2-1/4
7/16	3	2-5/8

HOW TO ATTACH WIRE ROPE CLIPS

The right way to attach wire rope clips is illustrated at left. The base or saddle should bear on the live end of the rope—U-bolt on the short or dead end. Staggering or reversing the clips does NOT give additional holding power.

ATTACH FIRST CLIP one base width from dead end of rope. Tighten nuts securely.

ATTACH SECOND CLIP as close to loop as possible. Tighten nuts firmly but not completely tight.

ATTACH ALL OTHER CLIPS (if required) equally spaced between the first two. Tighten nuts firmly.

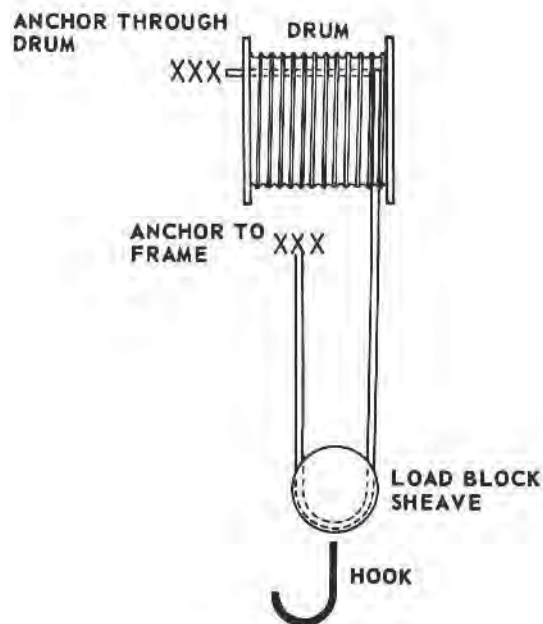
Apply a slight tension to the rope and alternately and uniformly tighten all nuts securely. Nuts should be re-tightened after application of the initial load to compensate for any reduction of rope diameter. They should be checked at periodic intervals.

For maximum holding power and rope strength, use the number of clips and spacing for each size rope shown in table above. Where service conditions are unusually severe, the number of clips should be increased.

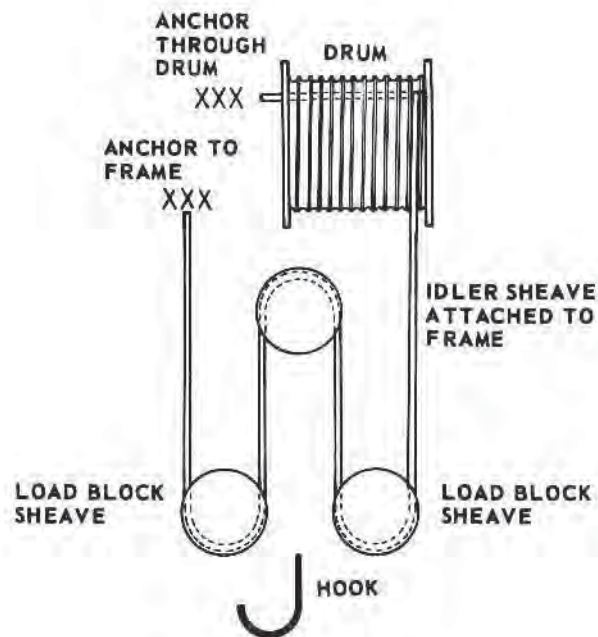
FIGURE 3. WIRE ROPE CLIP ATTACHMENT

VI FUNCTIONAL TESTING

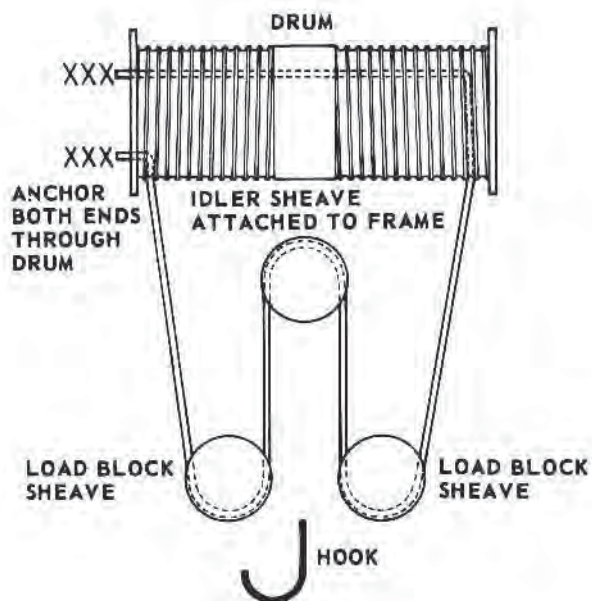
After load sustaining parts have been altered, replaced or repaired, the hoist should be load tested. The hoist should be tested using 100 percent of rated load.



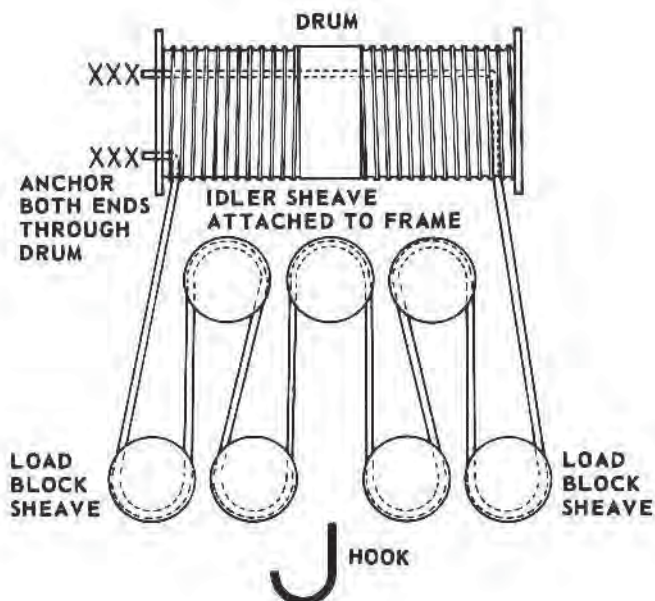
2 P. S.



4 P. S. SINGLE & TWIN HOOK



2 P. D.



4 P. D.

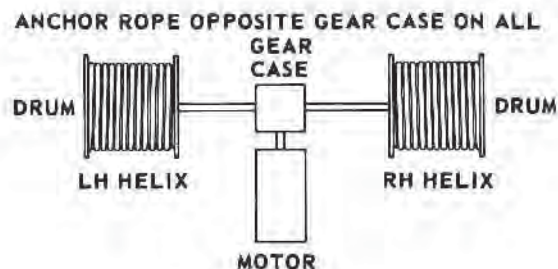


FIGURE 4. DIAGRAMS FOR REPLACING WIRE ROPE

TABLE 3. TROUBLESHOOTING

TROUBLE	CAUSE	REMEDY
Hook Fails to Stop at End of Travel	1. Improperly adjusted brake. 2. Worn brake linings. 3. Magnetic reversing controller malfunction.	1. Adjust per para. V.2.a.(3). 2. Replace when worn beyond limits specified in para. V.2.b.(7). 3. Check out reversing controller.
Hoist Does Not Respond to Push Button	1. Power failure in supply lines. 2. Wrong voltage or frequency. 3. Brake does not release. 4. Improper connections in hoist or push button station. 5. Faulty magnetic controller.	1. Check circuit breakers, switches and connections in power lines. 2. Check voltage and frequency of power supply against the rating on the hoist nameplate. 3. Check brake adjustment. (See para. V.2.a.(3). Check connections to brake coils for open or short circuit. 4. Check all connections at line connectors and on terminal block. 5. Check coils for open or short circuit. Check all connections in control circuit. Check for burned contacts. Replace as needed.
Hook Does Not Stop Promptly	1. Hoist overloaded. 2. Brake not holding.	1. Reduce load to within rated capacity of hoist. 2. Check brake adjustment (see V.2.a.(3)). Check brake linings for wear. See para. V.2.b.(7).
Hook Moves in Wrong Direction	1. Three-phase reversal. 2. Improper connections.	1. Reverse any two wires (except the green ground wire) at the power source. 2. Check all connections against Wiring Diagram.
Hook Raises But Will Not Lower	1. "Down" circuit open. 2. Broken conductor in push button cable. 3. Faulty magnetic controller.	1. Check circuit for loose connections. Check "Down" limit switch for malfunction. 2. Check each conductor in the cable. If one is broken, replace entire cable. 3. Check coils for open or short circuit. Check all connections in control circuit. Check for burned contacts. Replace as needed.
Hook Lowers But Will Not Raise	1. Hoist overloaded. 2. Low voltage. 3. "UP" circuit open. 4. Broken conductor in push button cable. 5. Faulty magnetic controller.	1. Reduce load to within rated capacity. 2. Determine cause of low voltage and bring up to within plus or minus 10% of the voltage specified on the hoist. 3. Check circuit for loose connections. Check "UP" limit switch for malfunction. 4. Check each conductor in the cable. If one is broken, replace entire cable. 5. Check coils for open or short circuit. Check all connections in control circuit. Check for burned contacts. Replace as needed.
Lack of Proper Lifting Speed	1. Hoist overloaded. 2. Brake not releasing fully. 3. Low Voltage.	1. Reduce load to within rated capacity of hoist. 2. Check brake adjustment. See para. V.2.a.(3). 3. Bring up voltage to plus or minus 10% of of voltage specified on hoist.

VII ILLUSTRATED PARTS LIST

GENERAL

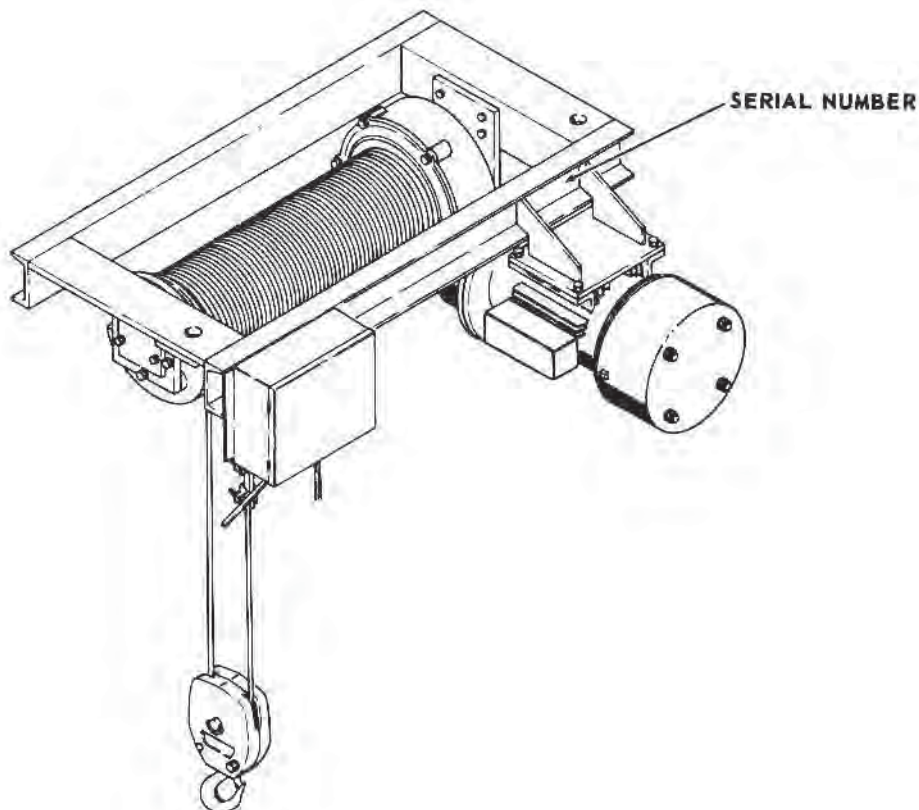
The illustrated parts list that follow are designed to help you identify replacement parts for your Chester hoist. In addition to exploded illustrations which cover a large part of your hoist, some manufacturers' sheets are included for such items as geared limit switches, magnetic reversing controllers, relays and other items. If assistance is required please contact your Chester representative.

HOW TO USE THE PARTS LISTS

To identify a part from your hoist, locate the illustration for the affected section of the hoist. Study the illustration and locate the part you wish to find. An arrow will be pointing to the part from a number. This figure number will be found in the accompanying parts list with the part name, part number and quantity required.

When ordering parts, please send the following information.

1. Serial Number of your hoist.
2. Your power supply (voltage, phase and cycles).
3. Title of illustration (for example, TA2A 2-WHEEL PLAIN TROLLEY).
4. Figure Number, Part Name, Quantity Required and Part Number.
5. Any additional information required by notes at the bottom of parts lists.



WARRANTY

All goods sold by SELLER hereunder are sold with only the following warranty: SELLER warrants that the goods shall be free from defects in material and workmanship under normal use and service. SELLER'S obligation under this warranty is limited to reworking or replacing at its option, any goods, which, within the time stated herein, shall be returned to it at its place of business at the address set forth herein with two-way packaging and shipping costs prepaid, and which upon examination and determination by SELLER, shall be found to have been thus defective. The rework, repair or replacement of defective goods under this warranty will be made without charge for material or labor. This warranty shall remain in force and be valid on goods manufactured by SELLER, or manufactured by others to SELLER'S detailed design for 12 months from the date of shipment by SELLER to BUYER. THE WARRANTY PROVIDED IN THIS ARTICLE 1, THE OBLIGATIONS AND LIABILITIES OF SELLER HEREUNDER AND THE RIGHTS AND REMEDIES OF BUYER HEREUNDER ARE EXCLUSIVE AND IN SUBSTITUTION FOR, AND BUYER HEREBY WAIVES, ALL OTHER WARRANTIES, GUARANTEES, OBLIGATIONS, LIABILITIES, RIGHTS AND REMEDIES, EXPRESSED OR IMPLIED, ARISING BY LAW OR OTHERWISE, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTY OR MERCHANTABILITY, ANY IMPLIED WARRANTY ARISING FROM COURSE OR PERFORMANCE, COURSE OF DEALING OR USAGE OF TRADE, ANY IMPLIED WARRANTY OF FITNESS AND ANY OBLIGATION OR LIABILITY OF SELLER ARISING FROM TORT, OF FOR LOSS OF USE, REVENUE OR PROFIT, OR FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. SELLER SHALL NOT BE LIABLE UNDER ANY CIRCUMSTANCES FOR MORE THAN THE REPLACEMENT

OR REFUND OF THE PURCHASE PRICE ON DEFECTIVE GOODS. Goods which are allegedly defective may not be returned to SELLER without prior written approval of SELLER. SELLER, at its option, may first request samples for inspection purposes. The provisions of this warranty shall not apply to, nor is any other warranty given on, goods which have not been used or maintained in accordance with SELLER'S instructions or which have been subject to misuse, negligence or accident or which have been repaired, altered or modified in any way by anyone other than the SELLER. SELLER makes no warranty, expressed or implied (including without limiting the generality of the foregoing, any warranties of merchantability or fitness) with respect to any (accessory) goods not manufactured by SELLER. With respect to any such goods sold by SELLER to BUYER hereunder, including purchased goods incorporated in goods manufactured by SELLER, BUYER agrees to look solely to the manufacturer of such goods for any warranty. BUYER waives all claims other than claims based on SELLER'S expressed warranty or the added cost of replacement due to SELLER'S failure to deliver the goods purchased hereunder. Such waived claims shall include but not be limited to claims based on strict tort liability and other economic losses such as loss of profits, loss of business opportunity and loss of goodwill. Upon request, SELLER will furnish such technical advice or assistance as it has available in reference to the use of the goods; however, it is expressly understood that (i) SELLER assumes no obligation or liability for the advice or assistance given or results obtained, (ii) all such advice or assistance is given and accepted at BUYER'S risk, and (iii) such advice or assistance shall not increase or alter SELLER'S liability as herein defined and limited.

WARNING

The hoisting equipment shown in this bulletin is intended for industrial use only and should not be used to lift, support, or otherwise transport human cargo.