CROWN INDUSTRIAL OPERATORS

GENERAL INSTALLATION, OPERATION, MAINTENANCE, and PARTS MANUAL for your

Aut-o-doR

1510 SWING-GATE OPERATOR MODEL "F"

HEAVY DUTY & EXTRA HEAVY DUTY

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Crown Industrial Operators
(Formerly manufactured by Richards-Wilcox)
213 Michelle Court
So. San Francisco, CA 94080
Phone (650) 952-5150
Fax (650) 873-1495
website: www.crown-industrial.com

G-993-R3

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Note: We reserve the right to modify or change, without prior notice, any statements or information contained herein. If exact dimensions or specifications are required by the customer certified prints will be furnished without charge upon request to Crown Industrial. This manual covers standard catalogued operators only and does not cover special non-standard equipment.

Crown Industrial Operators • 213 Michelle Ct. • So. San Francisco, Ca 94080-6202
Phone: (650) 952-5150 • Fax: (650) 873-1495
www.crown-industrial.com Email: autodor@crown-industrial.com

1. GENERAL INTRODUCTION

A. PURPOSE: This Crown Installation, Operation, Maintenance and Parts Manual has been developed to assist you in the installation, operation and maintenance of your electric operator and thus enable you to utilize it to its maximum efficiency.

B. MODELS COVERED: The manual covers the Model 1510 Operator in production and contains the latest information available. The parts pages have been prepared so that you can easily determine the parts contained in your Electric Operator.

C. DESCRIPTION:

(1) GENERAL: The Heavy Duty Operator is built into a compact unit consisting of an instantly reversing motor, a precision made speed reduction mechanism with V-belt and pulleys, a safety friction disc clutch, an emergency release, a fully automatic double acting limit switch, a heavy duty crank and connecting arm assembly, and a weather resistant cover (Figure 1). The Extra Heavy Duty Operator is similar but without the V-belt and pulleys.

(2) MOTORS: The motor has ample reserve power to take occasional overloads, and is furnished in 1/2, 3/4, or 1 HP sizes for standard gates, and a 1 HP (gearhead motor) for extra large and heavy gates. Motors are available in single phase, however three phase current is highly recommended for best all around performance.

(3) SHAFTS AND GEARS: Shafts and gears in the heavy unit are mounted in long life bearings enclosed in an oil tight housing and operate at all times in a bath of grease (extra heavy duty units are oil filled). The automatic limit switch is built on the reduction unit and stops the gate in the desired open or closed position.

(4) CRANK AND CONNECTING ARMS: The operating levers consist of a heavy duty crank and connecting arms. The crank arm is driven by a safety friction disc clutch which protects equipment in case the gate comes in contact with an obstruction. A disconnecting device is provided to allow manual operation.

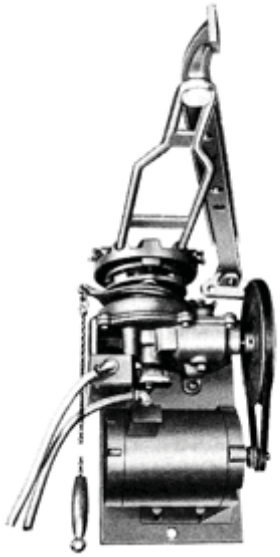

Figure 1.
1510 Heavy Duty Swing Gate Operator.
(Shown with weather-resistant cover removed)

2. INSTALLATION AND OPERATION

A. GENERAL

The Crown Industrial 1510 Electric Gate Operator is rugged, well designed, dependable, and field proven to be trouble free for swing gates. To ensure correct installation and proper operation, observe the following instructions:

(1) CHECK THE SHIPMENT: Included with the installation packet is a copy of the material specification sheet for the components supplied with the order. Compare the components received with the material specification sheets to insure that all equipment is complete.

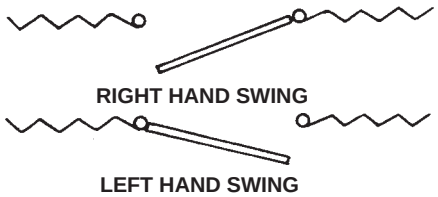

Figure 2. Swing Gate

(3) CHECK THE GATES: Before starting Operator installation, inspect to ensure that the gates are in good working condition, are rigidly supported, and have no obstructions to block or retard their swing. Electric Gate Operators cannot be expected to power operate gates where conditions prevent or resist manual operation. Latches, foot bolts, or other devices should be removed from the gate to prevent their accidental engagement. When standing in a position facing the closed gate and the gate swings toward you to open, the gate has its pivot pin to the left, this is considered a left hand. When the gate has its pivot pin on the right and opens toward you, it is considered right hand. Refer to Figure 2 Swing Gate for gate handing.

(4) REVIEW THE INSTALLATION DRAWINGS: The installation drawings show the layout of the gate, template drilling for the gate bracket and channel post, and general terms used to describe components. Review of the installation drawings will familiarize you with the equipment.

(5) PREPARING THE GATE: The Electric Gate Operator powers the gate through a gate bracket attached to an intermediate cross rail of the gate. If the gate is not provided with a cross rail, a 2-1/2"x 2-1/2" x 3/8" or larger structural angle can be installed, leg up, across the gate to receive the gate bracket. The cross rail is prepared for the gate bracket by drilling two mounting holes on the horizontal center line of the cross rail. These holes are located from the center line of the gate pivot or hinge pin - see Figure 3, 4, 5, or 6.

B. PREPARING THE MOUNTING CHANNEL

(1) CONCRETE EMBEDDED TYPE:

(a) The channel post for support of the Operator is an optional extra cost item. When furnished as an optional part of the operator equipment, they will be pre-drilled for the mounting of the Operator and hot dipped galvanized. When the channel posts are not provided, posts of the size indicated on Figure 3 or 4 are required. These posts should be drilled in accordance with the channel post drilling template on Figure 3 or 4. It is recommended that the posts be hot dipped galvanized or specially treated to avoid corrosion. The channel post should be set to dimensions shown on Figure 3 or 4 in concrete piers, considering the angle of the gate in the full open position. The size and depth of the piers may vary with soil and fill types.

NOTE: The customer and/or contractor is responsible for the proper installation of the mounting posts. The posts must be installed plumb and in exact position as shown on Figure 3 or 4.

(b) The top of the channel post should be positioned vertically one inch below the horizontal center line of the gate bracket mounting holes drilled in the gate cross rail. The back of the channel post web should be located parallel to, and three and one-half inches away from the gate frame in the gate's fully opened position (regardless of degree of opening).

(c) Locate the inside edge of the channel post flange (Dim. "E") from the center line of the gate pivot and along the line of the opened gate as indicated on Figure 3 or 4.

(2) PAD MOUNTED TYPE: The type mounted channel for support of the Operator is available as an optional extra cost item. When furnished, they will be pre-drilled for mounting of the Operator and to the concrete pad.

NOTE: A suitable mounting pad with (4 ea.) 3/4" diameter studs is the responsibility of the customer and/or contractor. The pad must be level and the studs in the exact position as shown on Figure 5.

C. MOUNTING THE OPERATOR

(1) Remove the Electric Gate Operator from the crate. The Gate Operators are universal and therefore can be used on either hand gate. (Heavy Duty Units Only).

NOTE: The extra heavy duty operators are <u>handed.</u>

(2) Remove the front cover of the Operator by removing the self-tapping screws from the edges of the cover and sliding the front cover down, then away.

(3) Remove the nuts, lock washers, and flat washers from the bolts on the back of the Operator. Raise the Operator into position on the channel post, inserting the mounting bolts. Secure the Operator with the flat washers, lock washers, and nuts.

D. MOUNTING THE ARMS

(1) Release the arm plate by pulling down on the clutch release chain located on the side of the Operator. To keep the arm plate disengaged, insert a wedge of some sort between the clutch yoke the chain is connected to and the bottom of the clutch. Check to see if the arm plate is free to rotate. (See Figure 7).

E	2' - 1-1/4"	LEFT HAND
	2' - 4-3/4"	RIGHT HAND

A	B	C	D
90°	2' - 6-1/4"	2' - 0"	3' - 2"
95°	2' - 7 1/4"	2' - 1"	3' - 6"
100°	2' - 8"	2' - 2"	3' - 10"
105°	2' - 8-3/4"	2' - 2-3/4"	4' - 1"
110°	2' - 9-3/4"	2' - 3-1/2"	4' - 4"
115°	2' - 10 1/4"	2' - 4 1/4"	4' - 8"
120°	2' - 11"	2' - 4-3/4"	4' - 11"

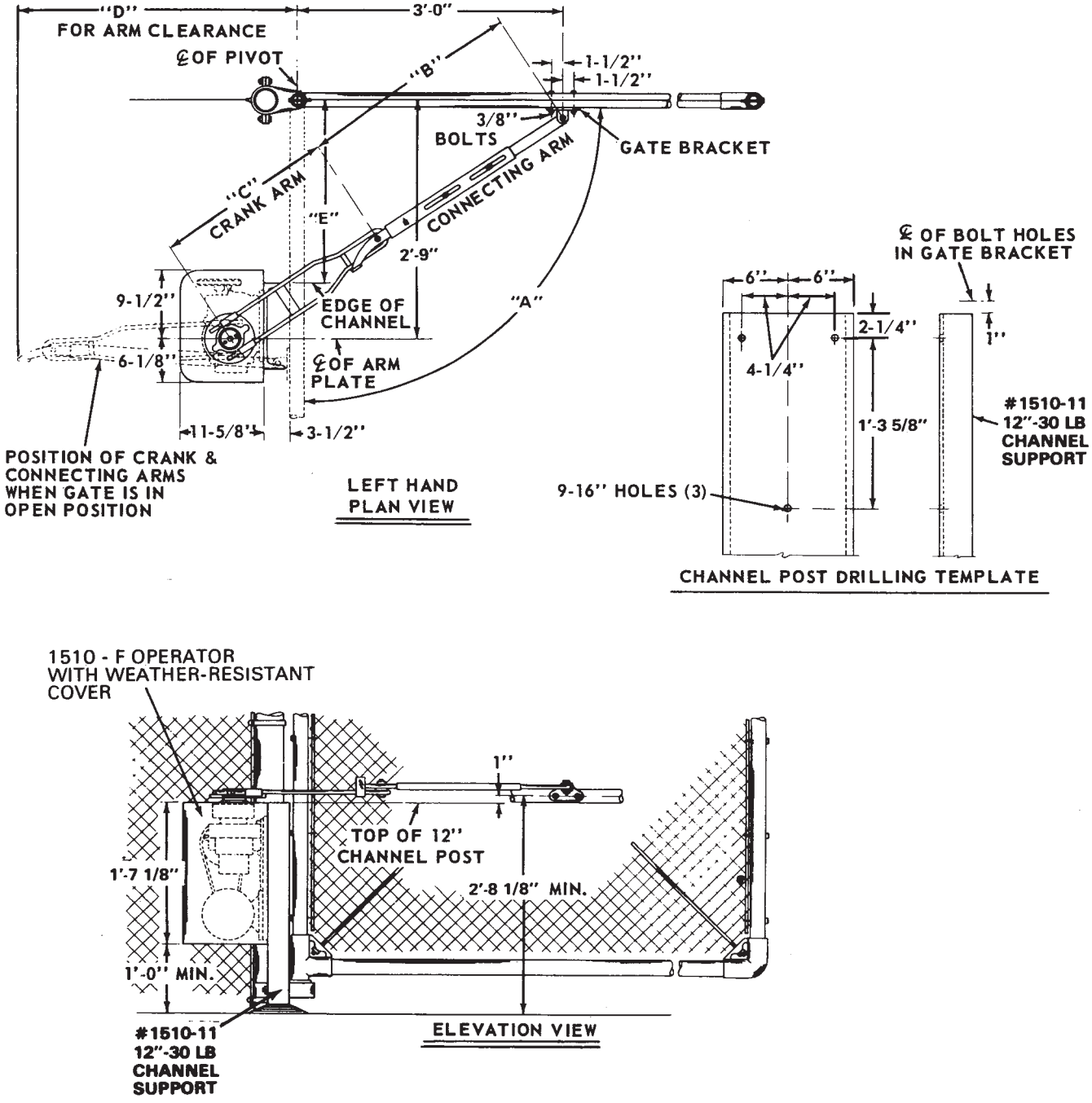

Figure 3. Installation of Operator - Heavy Duty 1/2, 3/4, and 1 H.P.
(Using Concrete Embedded Mounting Channel)

A	B	C	D
90°	2' - 10-1/2"	2' - 2-1/4"	3' - 6"
95°	2' - 11-5/8"	2' - 3-7/8"	3' - 7-1/8"
100°	3' - 0-1/4"	2' - 4-1/4"	3' - 7-3/4"
105°	3' - 1-3/8"	2' - 5-1/8"	3' - 8-7/8"
110°	3' - 2-1/4"	2' - 6-1/8"	3' - 9-3/4"
115°	3' - 3"	2' - 6 7/8"	3' - 10-1/2"
120°	3' - 3-5/8"	2' - 7-1/2"	3' - 11-1/8"

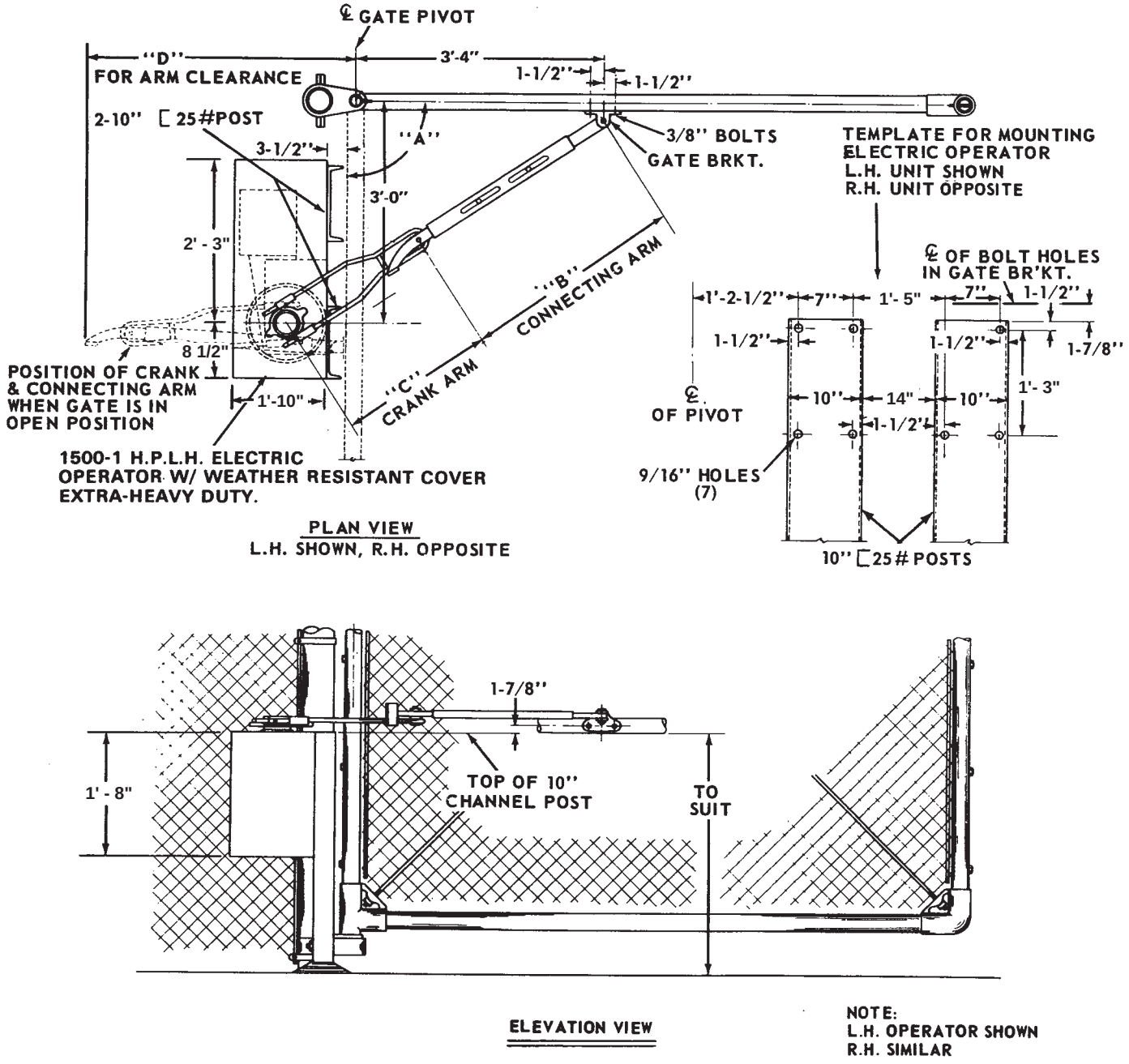

Figure 4. Installation of Operator - Extra Heavy Duty 1 H.P.

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Phone: (650) 952-5150 • Fax: (650) 873-1495
www.crown-industrial.com Email: autodor@crown-industrial.com

A	B	C	D
90°	2' - 6-1/4"	2' - 0"	3' - 2"
95°	2' - 7-1/4"	2' - 1"	3' - 6"
100°	2' - 8"	2' - 2"	3' - 10"
105°	2' - 8-3/4"	2' - 2-3/4"	4' - 1"
110°	2' - 9-3/4"	2' - 3-1/2"	4' - 4"
115°	2' - 10-1/4"	2' - 4-1/4"	4' - 8"
120°	2' - 11"	2' - 4 3/4"	4' - 11"

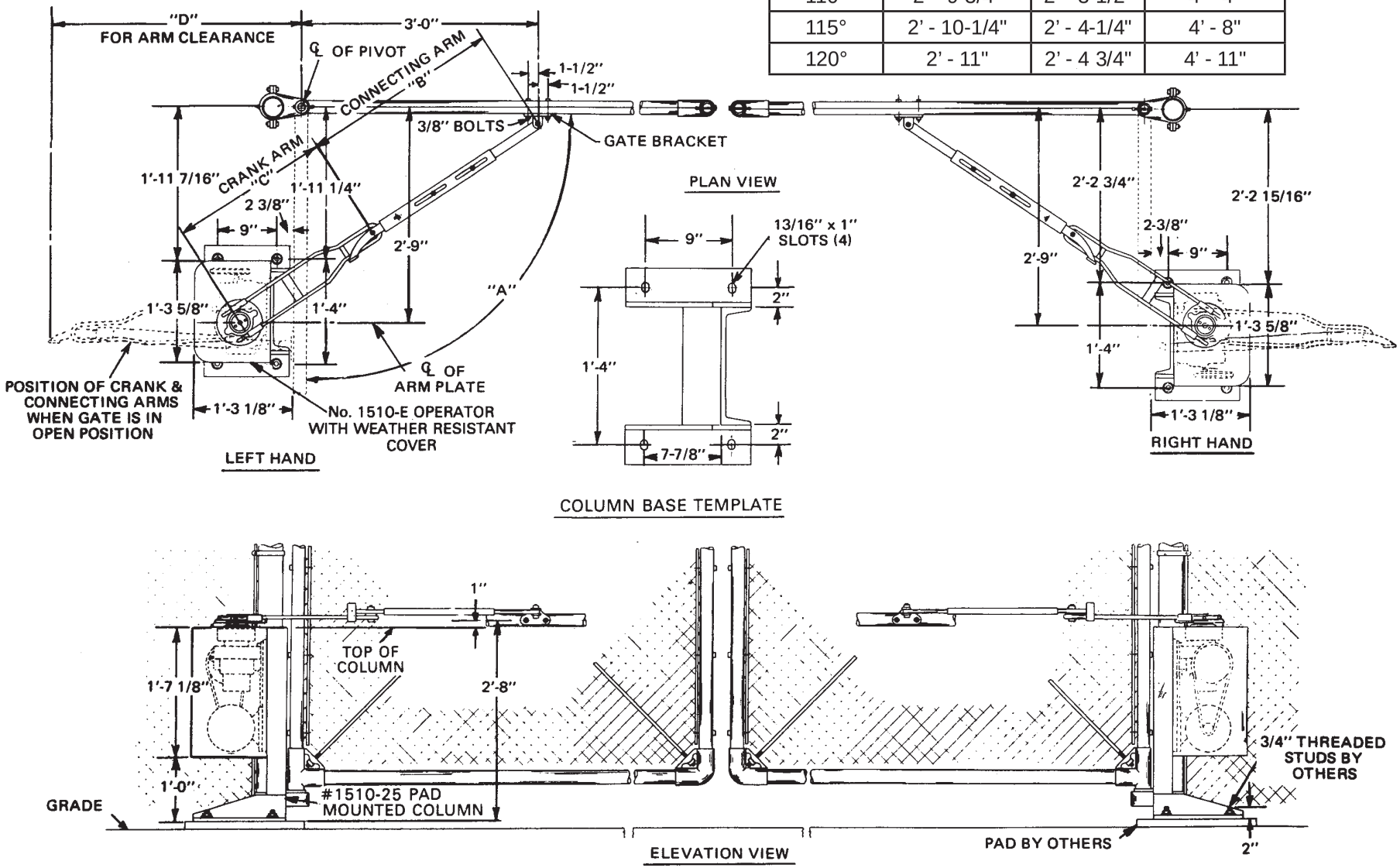

Figure 5. Installation of Operator - Heavy Duty 1/2, 3/4, and 1 H.P. (Using Pad Mounted Column)

(2) Mount the crank arm in place by inserting the rod ends into the two holes at the edge of the arm plate on top of the Operator. Be sure the pivot stud at the end of the arm is pointing up. By sliding the arm into or out of the arm plate holes, you can adjust the distance between the center point of the arm plate to the pivot stud to dimension "C" shown on Figure 3, 4, or 5. Tighten the two set screws securely on each side of the arm plate to secure the crank arm into the arm plate.

(3) Loosen the adjusting bolts on the connecting arm. Remove the nut and washer from the crank arm pivot stud and install the hooked end of the connecting arm to the crank arm. Note that the extended hooked end over-travel stop on the connecting arm should fall on the side of the crank arm away from the gate pivot. The gate bracket on the far end of the connecting arm should then be attached to the gate cross rail with the 3/8" bolts provided. (See Figure 3, 4, or 5).

(4) With the gate closed, the arms should then be placed in a position so that the center point of the crank arm pivot stud falls on a direct line between the center point of the arm plate and the center point of the gate bracket. With this accomplished, the adjustment bolts on the connecting arm should be tightened.

(5) The gate should then be opened, with the clutch disengaged, by manually breaking the dead center condition of the crank arm and connecting arm away from the gate pivot and then manually swinging the gate open.

WARNING: After breaking the dead center position of the arms, do not attempt to open the gate with operator arms. Hands can be pinched between the crank and connecting arms as the gate reaches the open position.

(6) When the gate is fully open, the arms should assume the position shown by the dotted lines in Figure 3, 4, or 5. If the arms reach a locking position before the gate is fully open, a re-adjustment of the arms is required.

E. WIRING THE OPERATOR

(1) Wire the Operator and control circuit as shown onokay the wiring diagram enclosed, "General Operator Wiring and Control Information Manual". **BE SURE ALL POWER IS OFF.**

F. PHASING OUT MOTOR

(1) Remove the weather plate, gasket, and retaining ring from the arm plate and lift the arm plate from the operator. Remove the wedge from the clutch.

(2) THREE PHASE: Turn power on. Using the left side reversing contactor for counter-clockwise rotation, and the right side contactor for clockwise rotation, press one of the control buttons. Note the direction the top of the operator is rotating. For a pair operation, operators should be tested separately. If the top is rotating counter-clockwise, then the left side contactor coil should be energized. If the wrong coil happens to be energized, for the counter-clockwise direction, exchange any to power leads.

(3) SINGLE PHASE: The operator and reversing starter are factory prepared for proper rotation.

(4) Check both directions several times to ensure proper phasing of motors. In case the motor continues to run at end of travel and the limit switch does not stop rotation, check the limit switch function and review the proper control circuit wiring.

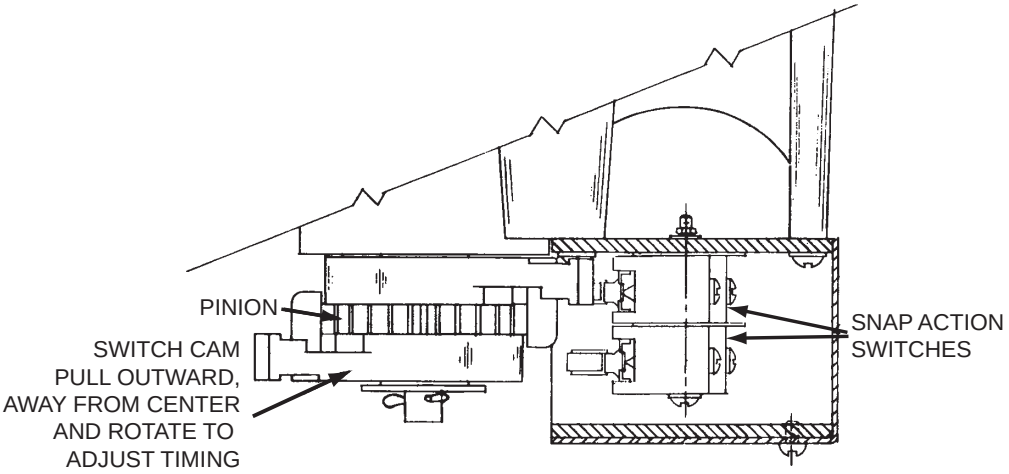

Figure 6. Adjusting Limit Switch

G. ADAPTING CONTROLS

(1) Using the left side contactor for counter-clockwise rotation of the top of the operator, determine if this rotation sends an open or close signal to the left side contactor. On pair operated gates, one operator is to be wired as described, and the second operator is wired using the opposite reversing starter coils. I.E. If less contactor coil opens the right-hand gate, the right contactor coil will open the left-hand gate.

H. PRELIMINARY LIMIT SWITCH ADJUSTMENT

(1) Loosen the four clutch tension bolts and then set the arm plate back into place on the clutch. Do not replace any other items at this time.

(2) To adjust the limit switch, (Figure 6), manually open the gate to within 6 inches of its fully open position, at the same time allowing the clutch to slip. At this point, determine which snap action switch would shut the operator off. Pull outward on the cam in line with that switch and rotate it toward the switch and over it just far enough to shut the operator off. The cam must be rotated in the same direction as the crank arm is rotated to open the gate. The cam should also be reengaged with the center pinion at this point.

(3) Manually close the gate to within 6 inches of its fully closed position. Pull outward on the other cam and rotated toward an slightly over the other snap action switch. The cam must be rotated in the same direction as the crank arm is rotated to close the gate and must be reengaged with the center pinion.

I. SETTING THE CLUTCH (Figure 7)

(1) Remove the arm plate and tighten down the four clutch tension bolts evenly (see Figure 7) until the friction is sufficient to operate the gate. Never tighten the bolts so that the clutch cannot be slipped by forcing the end of the crank arm, and never I just bolts consecutively, but always directly across from each other so as to provide even tension. An equal turn of each bolt is a very important adjustment procedure.

WARNING!! Some electrical gate operator control circuits can cause immediate gate operation upon applying power. Ensure that the path of the gate and operating arm is free from obstructions and personnel.

(2) Replace on plate being certain the clutch pins are engaged and electrically start the gate moving until it is halfway between the open and closed position. Cut the power at this point.

(3) If the gate can be manually moved from this halfway point, readjust the clutch accordingly.

(4) After the clutch is adjusted to suit, replaced the retaining ring, gasket, and weather plate in that order.

J. FINAL LIMIT SWITCH ADJUSTMENT

(1) With Power on, opened the gate until it stops under its own power. If it stops short, electrically start gate closing and cut the power. Pull outward on the opening cycle switch camp and rotate away from the opening cycle snap action switch one tooth on pinion gear and reengage with center pinion. Turn power on.

(2) Close the gate until it stops under its own power. If it stops short, electrically start gate open and cut power. Pull outward on the closing cycle switch camp and rotates away from the closing cycle snap action switch one tooth on pinion gear and reengage with center pinion. Turn power on.

(3) Continue cycling the gate and make cam adjustments until the gate stops in the proper location.

(4) Replace the front weather resistant cover.

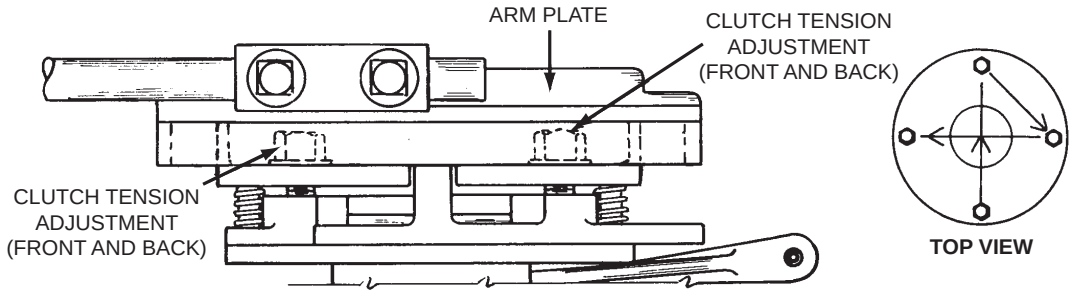

Figure 7. Adjusting Clutch

3. MAINTENANCE

A. GENERAL:

To ensure that the electric operator is ready for operation at all times, it must be inspected systematically each will preclude serious damage or failure. Proper adjustment and lubrication must be maintained and checked as recommended in the following.

B. LUBRICATION

(1) Lubrication Intervals:

EVERY 6 MONTHS

1. Lubricate Pivot Points with SAE 10 Oil.

2. Check Oil Seals for Leakage.

EVERY 12 MONTHS

1. Clean Limit Switch Cam and Pinion Gear and lubricate with SAE 10 oil.

2. Check oil level. If low, fill with lithium complex extreme pressure grease, NLGI No. 2.

3. For Extra Heavy Duty Units (1 H.P.), check green colored tag attached to the gearmotor.

CAUTION: Do Not Overfill. Do Not Use Machine Oil.

C. PREVENTATIVE MAINTENANCE

To prevent damage or improper operation, the following inspections should be made at least EVERY SIX MONTHS.

1. Check pivot points for wear.

2. Inspect drive belt for wear.
(Does not apply to Extra Heavy Duty 1 H.P. Units)

3. Inspect clutch discs for wear.

4. Check clutch for correct tension.

5. Check limit switch cams and pinion for wear.

6. Check that all bolts are tight.

3. PARTS

A. TO ORDER REPLACEMENT PARTS:

Order all replacement parts using the numbers shown on the following parts list pages.

(1) *Send in Serial Number of Electric Operator.*

(2) SPECIFY the number of pieces needed.

(3) Order by part number and the name of the part.

(4) Indicate how the material should ship.

(5) State whether transportation charges are to be prepaid or collect.

(6) Name and address of person or company to whom invoice is to be sent.

B. PARTS LIST

The following pages list the replacement parts illustrated in Figure 8 and 9.

PARTS LIST -- HEAVY DUTY 1/2 3/4 - 1 HP OPERATOR

FIGURE NO.	PART NUMBER	DESCRIPTION
8	266-7	Washer
8	400-34	Switch Insulator (2 per operator)
8	400-95	Snap Action Switch (2 per operator)
8	1200	Motor Per Specifications
8	1200-25	Motor Mounting Bracket
8	1251-11	Motor Pulley
8	1300-57	Clutch Collar Key
8	1300-64	Clutch Shaft Bushing
8	1300-180	Handle
8	1500-7	Gear
8	1500-8	Pinion Gear
8	1500-9	Worm Gear
8	1500-10	Clutch Shaft
8	1500-13	Pinion Shaft
8	1500-14	Thrust Bearing (2 per operator)
8	1500-25	Clutch Shaft Collar
8	1500-26	Clutch Pin (2 per operator)
8	1500-27	Compression Spring (2 per operator)
8	1500-28	Pin Shift Collar
8	1500-29	Top Clutch Plate
8	1500-32	Retaining Disc
8	1500-33	Clutch Disc (2 per operator)
8	1500-34	Bearing (4 per operator)
8	1500-45	Bearing
8	1500-46	Bearing
8	1500-47	Gasket
8	1500-92	Arm Plate
8	1500-98	Worm Shaft Key
8	1500-99	Clutch Shaft Key
8	1500-100	Key
8	1500-114	Clutch Shaft Oil Seal (2 per operator)
8	1500-115	Worm Shaft Oil Seal
8	1500-116	Worm
8	1500-117	Arm Plate Cap
8	1500-118	Arm Plate Cap Gasket
8	1500-124	Pinion Shaft Key
8	1500-253	Upper Gear Housing (Incl. 1500-34 & 1500-46 Bearing)
8	1500-254	Lower Gear Housing (Incl. 1500-34 & 1500-45 Bearing)
8	1500-255	Release Yoke
8	1500-256	Clutch Bolt
8	1500-257	Bottom Clutch Plate
8	1500-258	Worm Shaft
8	1500-259	Switch Throw Pinion
8	1500-260	Switch Cam (2 per operator)
8	1500-261	Switch Cam Spring (2 per operator)
8	1500-262	Closed Eye Eyelet (2 per operator)
8	1500-263	Switch Frame
8	1500-264	Switch Cover
8	1500-265	5" P.D. Pulley (Std. Speed)
8	1500-266	8.7" P.D. Pulley (Low Speed)
8	1500-384A	Clutch Assembly (Consisting of Parts: 25, 26, 27, 28, 29, 32, 33, 92, & 257)
8	1500-428	Weather Resistant Cover Front
8	1500-478	Base Plate
8	1500-481	Weather Resistant Cover Back
8	1MO28	28" 4L V Belt (used with 5" P.D. Pulley)
8	1MO35	35" 4L V Belt (used with 8.7" P.D. Pulley)

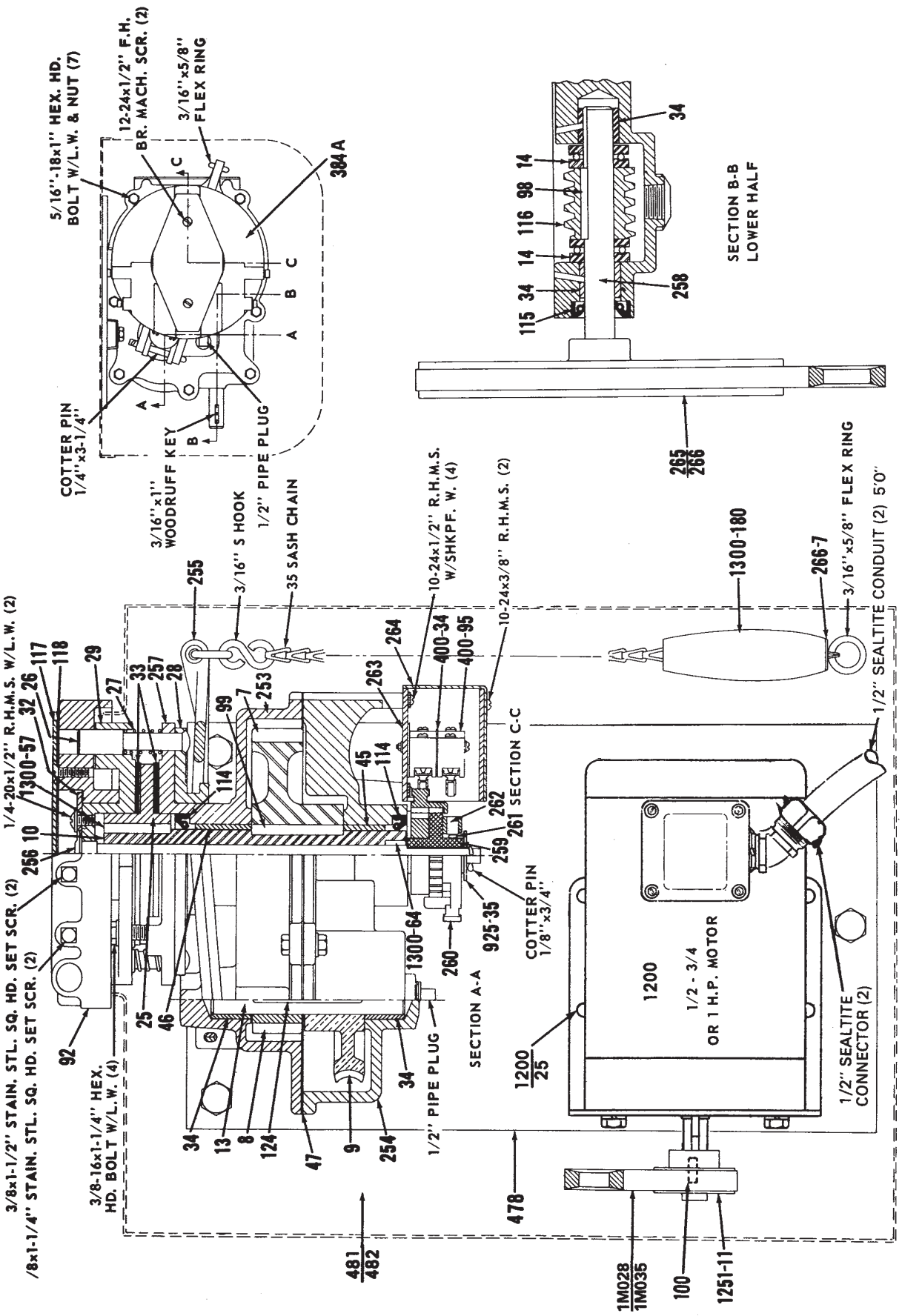

Figure 8. Illustration of Parts - Heavy Duty 1/2 - 3/4 - 1 HP Operator

PARTS LIST -- EXTRA HEAVY DUTY 1 HP OPERATOR

FIGURE NO.	PART NUMBER	DESCRIPTION
9	400-34	Switch Insulator (2 per operator)
9	400-95	Snap Action Switch (2 per operator)
9	405-226	Spring (2 per operator)
9	405-2120-1	1/4" x 1-1/2" Ring
9	925-35	Washer
9	1300-64	Clutch Shaft Bushing
9	1300-180	Handle
9	1500-64	Arm Plate
9	1500-65	Top Clutch Plate
9	1500-66	Bottom Clutch Plate
9	1500-69	Shift Collar
9	1500-73	Clutch Disc (2 per operator)
9	1500-75	Pivot Pin (2 per operator)
9	1500-77	Pivot Pin (2 per operator)
9	1500-148	Arm Plate Cap
9	1500-149	Arm Plate Cap Gasket
9	1500-206A	Base Assembly L.H.
9	1500-207A	Base Assembly R.H.
9	1500-213	Arm Plate
9	1500-214	Clutch Spacer
8	1500-215A	Clutch Assembly (Consisting of Parts: 64, 65, 66, 69, 73, 75, 77, 213, and 405-226)
8	1500-227A	Top Cover Assembly L.H.
8	1500-228A	Top Cover Assembly R.H.
8	1500-229A	Front Cover L.H.
8	1500-230A	Front Cover R.H.
8	1500-231	Motor Shim
8	1500-237A	Clutch Lever Assembly
8	1500-238	Release Pivot Pin
8	1500-240	Gearmotor 230/460-60-3 R.H.
8	1500-241	Gearmotor 230/460-60-3 L.H.
8	1500-259	Switch Throw Pinion
8	1500-260	Switch Cam (2 per operator)
8	1500-261	Spring (2 per operator)
8	1500-262	Closed End Eyelet (2 per operator)
8	1500-264	Switch Cover
8	1500-385	Clutch Bolt
8	1500-389	Support Stud (4 per operator)
8	1500-390A	Limit Switch Housing Assembly

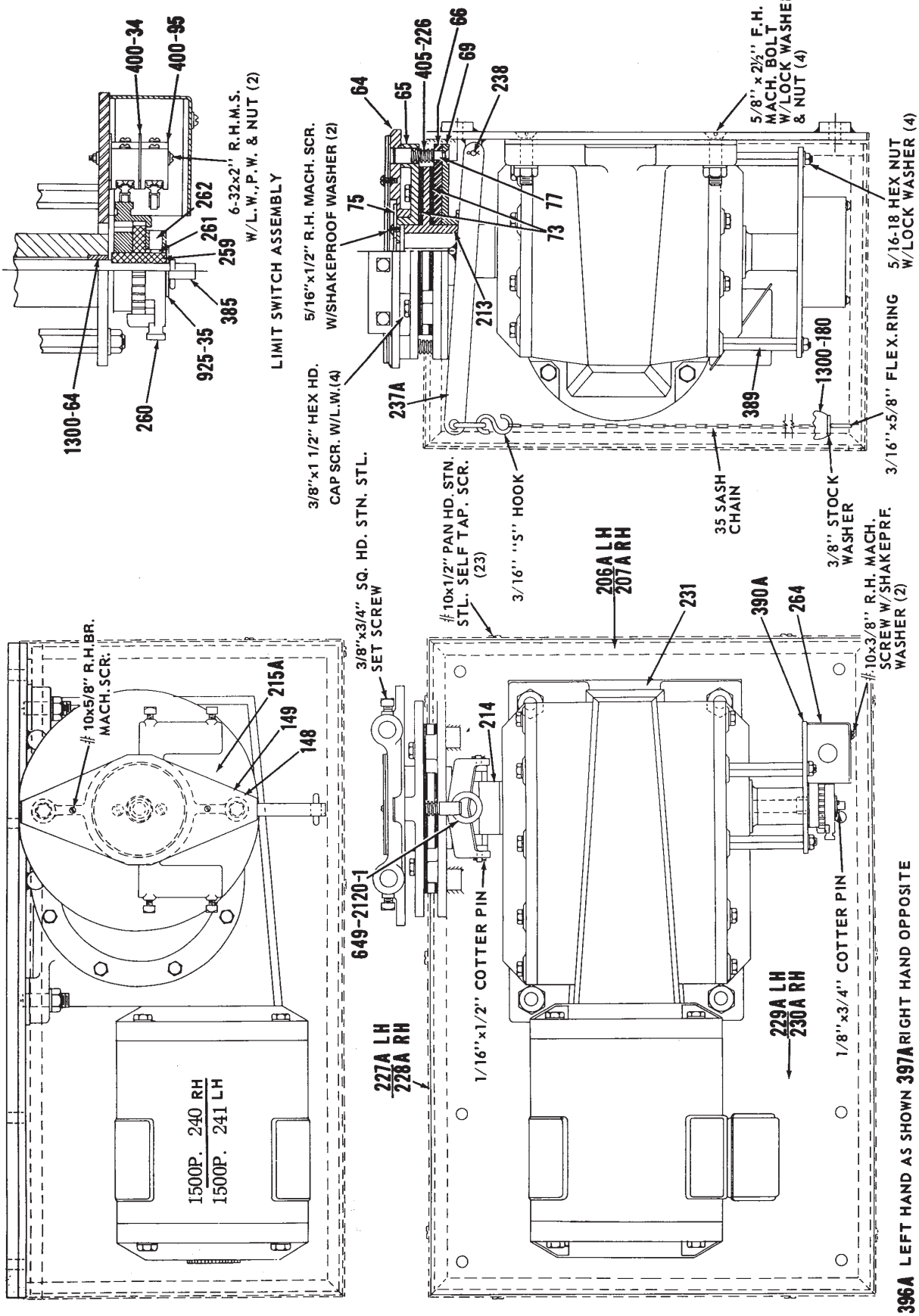

Figure 9. Illustration of Parts - Extra Heavy Duty 1 HP

MAINTENANCE INFORMATION

(To Be Filled Out By User)

Operator Serial Number _____ H.P. _____

Supplied on Crown Industrial Operators Order Number _____

Power Supply _____ Volts _____ Hz _____ Phase _____

Installed At _____ Date _____

Notes _____

_____

_____

_____

_____

GUARANTEE

If, within a period of one year from date of shipment, any part of a CIO Electric "Aut-o-doR" Operator is found defective due to poor materials or workmanship, new parts will be furnished free of charge F.O.B. manufacturer's plant, providing the equipment has been given normal and proper usage, lubrication, and maintenance and is still the property of the original purchaser and/or part of the original installation. *THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, AND THE MANUFACTURER MAKES NO IMPLIED WARRANTY OF MERCHANTABILITY BEYOND THE EXPRESSED TERMS HEREOF. MANUFACTURER'S LIABILITY FOR DAMAGES, INCLUDING CONSEQUENTIAL DAMAGES RESULTING FROM ANY SUCH DEFECTIVE PRODUCT IS STRICTLY LIMITED TO THE DELIVERY OF NEW PARTS, AS SET FORTH ABOVE.*

Crown Industrial Operators
213 Michelle Court
So. San Francisco, CA 94080
Phone (650) 952-5150
Fax (650) 873-1495
website: www.crown-industrial.com