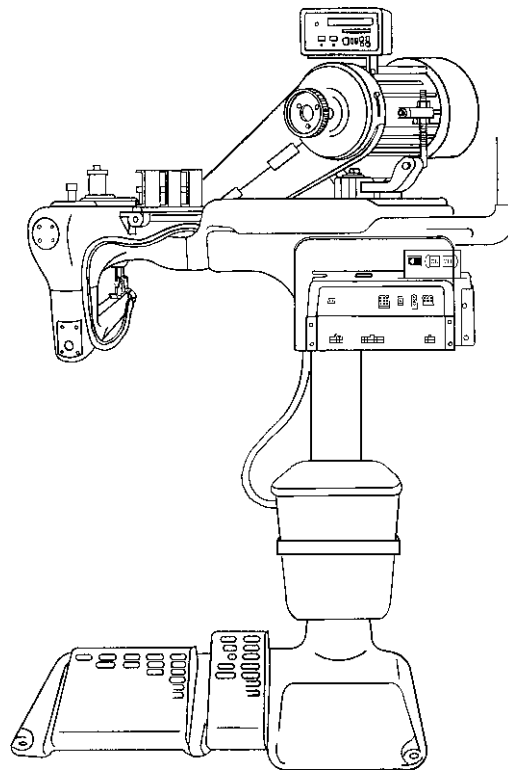


ML892E-4

# CLINTON MODEL AS-892E

VARIABLE SPEED DC SERVO MOTOR  
For  
UNION SPECIAL  
FEED-OFF-THE-ARM MACHINES  
PEDESTAL MOUNT



# SERVICE MANUAL

40-0256-01



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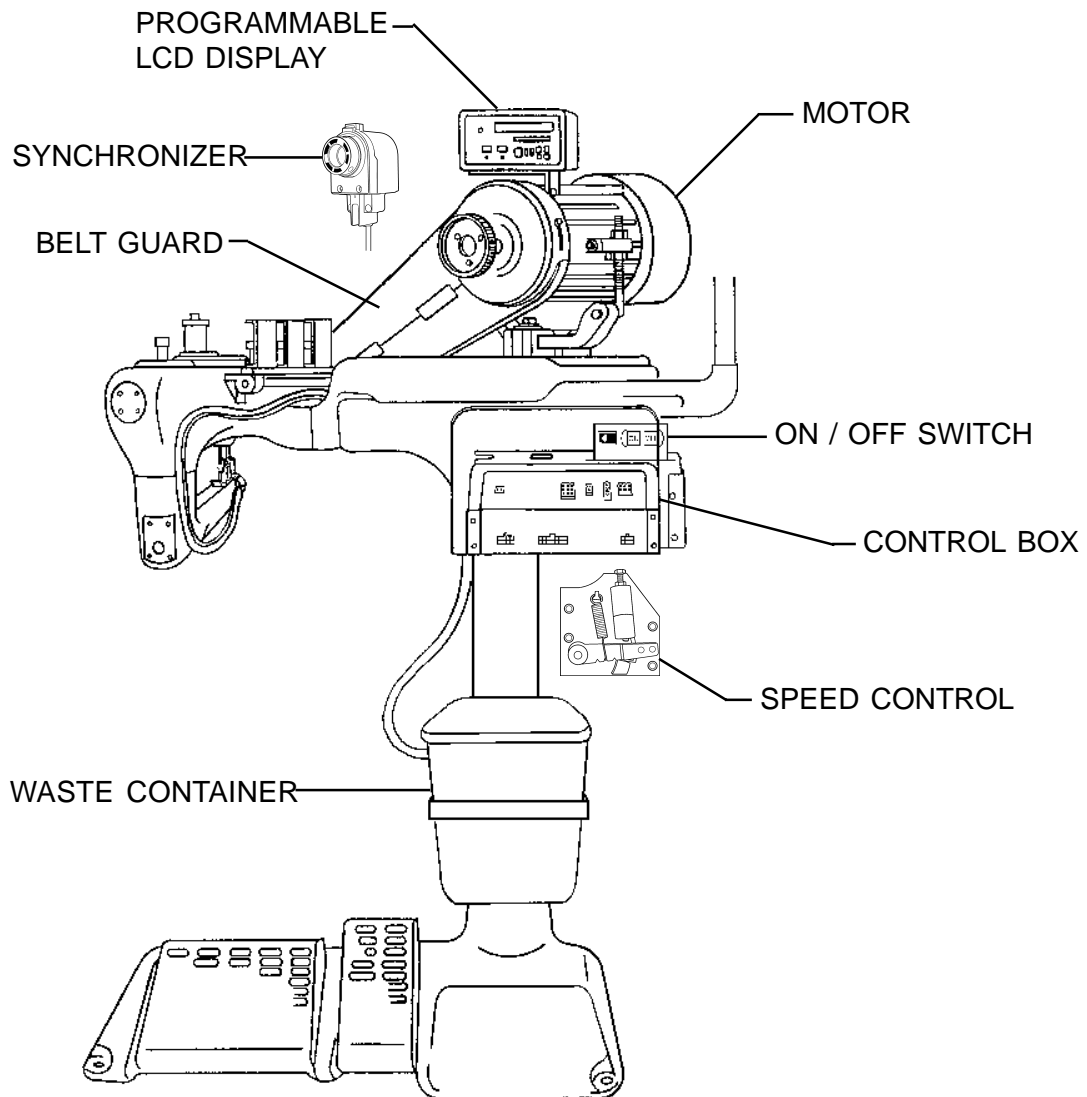
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INTRODUCTION

Clinton's Model 892E is an electronically controlled variable speed drive for industrial sewing machines. The system consists of a brushless DC Servo motor, a microprocessor powered controller, a synchronizer, speed control, and programmable LCD display. No clutches or brakes are used. All components interact to give a fast accurate and reliable sewing machine drive. The components of the system are shown in figure below.



The model 892E has outputs for air thread saver, foot lift, needle cooler and stacker. It can be used to operate all Clinton chain cutters, as well as various make and model chain cutters.

The programmable LCD display is used to select the desired mode. In addition, the display box is used to select or change all parameters such as Speeds, Timers, Counters, Toggle Switches, etc.



## INSTALLATION

## A. MOTOR

Mount the motor to the pedestal base using the plate, the motor support arms, the spacers, the bolts, and washers supplied (See Figure 2-1). Install pulley and belt then check the following:

- a. The motor is mounted so that the motor drive pulley and sewing machine drive pulley are properly aligned.
- b. The V-belt connecting the motor to the sewing machine should be tensioned properly. It should be possible to pull a correctly tensioned belt together between two fingers within approximately 2 cm (3/4"). Excessive tension may not only shorten the life of the bearings, but could also affect the operation of the sewing machine. A loose belt will affect positioning accuracy.

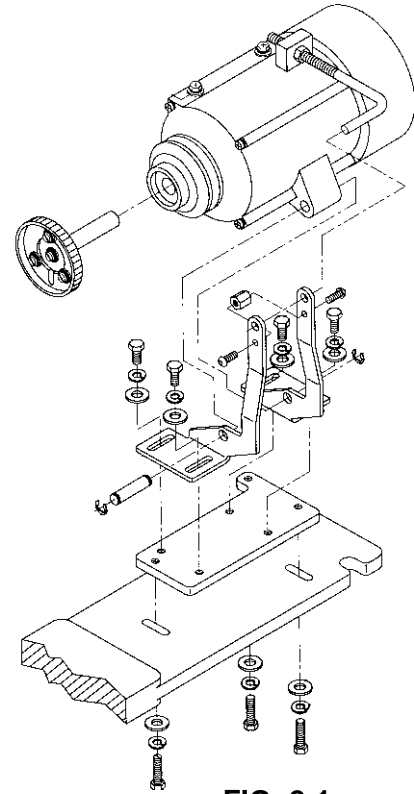


FIG. 2-1

## B. SYNCHRONIZER

1. Install pulley adapter is used (see figure below).
2. Now mount and secure synchronizer to pulley adapter.
3. Mount the synchronizer retaining rod assembly as shown in figure below.

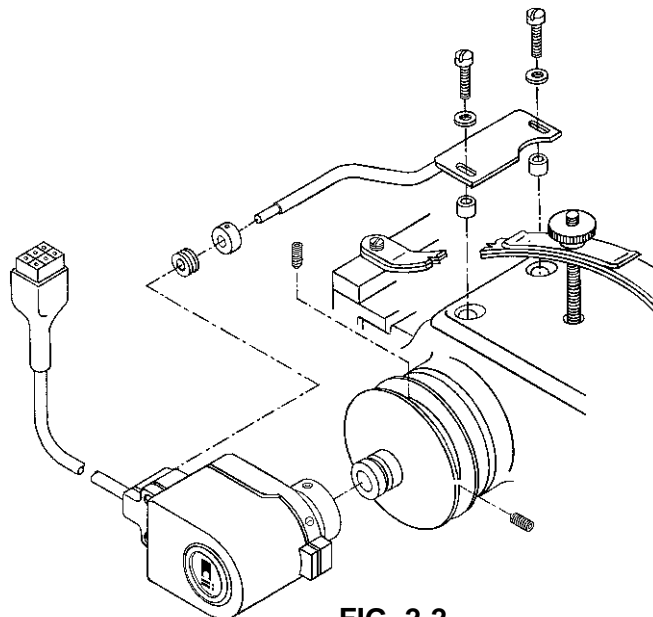


FIG. 2-2



### C. BELT GUARD

After aligning belt and pulleys, install the belt guard (see figure 2-3) starting with the standoff (A) and bracket (B) then add bracket (C) and belt guard (D). Centralize and adjust height and test for proper clearance.

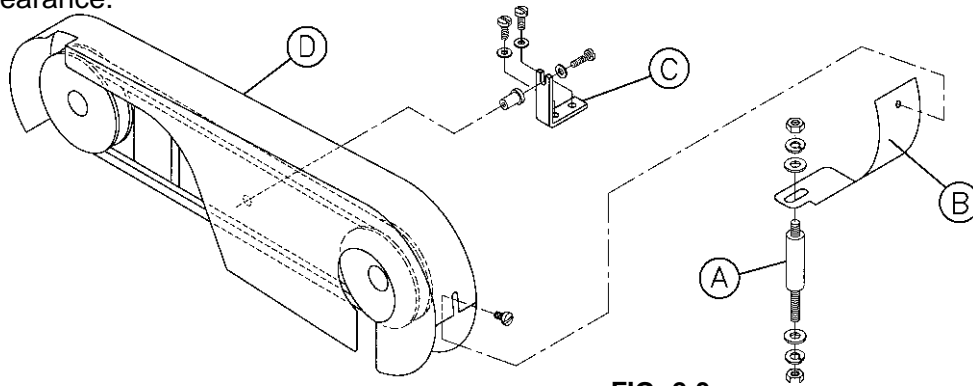


FIG. 2-3

### D. LCD DISPLAY

Mount the LCD display to the motor with the mounting bracket as shown in figure 2-4.

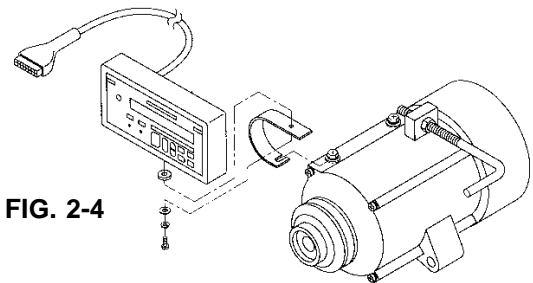


FIG. 2-4

### E. CONTROL BOX

Refer to figure 2-5 and install as follows:

1. Mount primary mounting bracket (A) to the top plate of the column (B) with the two 3/8 screws, washers and lock washers.
2. Fasten L brackets (C) to control box and to rear panel plate (D) with the 10-32 screws provided.
3. Mount On-Off switch and adapter bracket (E) as shown.
4. Hook and slide assembly onto bracket (A) already fastened to column and screw in place.
5. Add air control assembly (F) venturi (G) as shown to complete installation.
6. Fasten plastic guard (H) after power and cable connections are made.

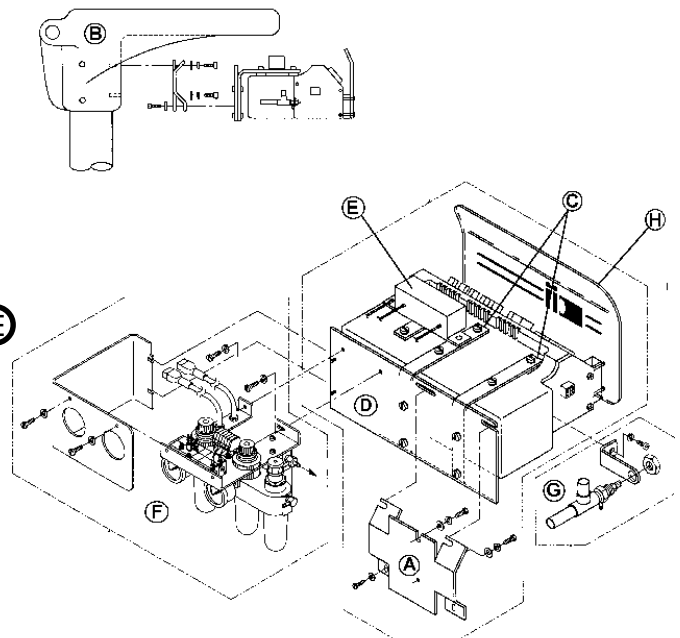
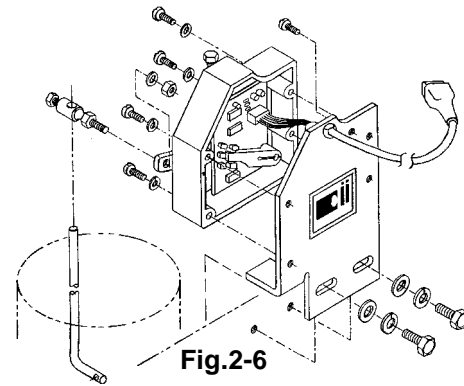


Fig. 2-5



### F. SPEED CONTROL

The Clinton model 892E is equipped with a remote speed control. Connect treadle rod to ball joint assembly with rod and drill/tap 2 1/4-20 holes as shown. Assemble with 1/4 screws, flat washer and split washer.



### G. POWER AND CABLE CONNECTIONS

Refer to figure below and connect all cables as shown. The system can be operated from 230V, 3 phase or 230V, single phase power.

**Caution:** It is important that the ground wire be connected between the motor and sewing machine to prevent a static charge buildup at the sewhead.

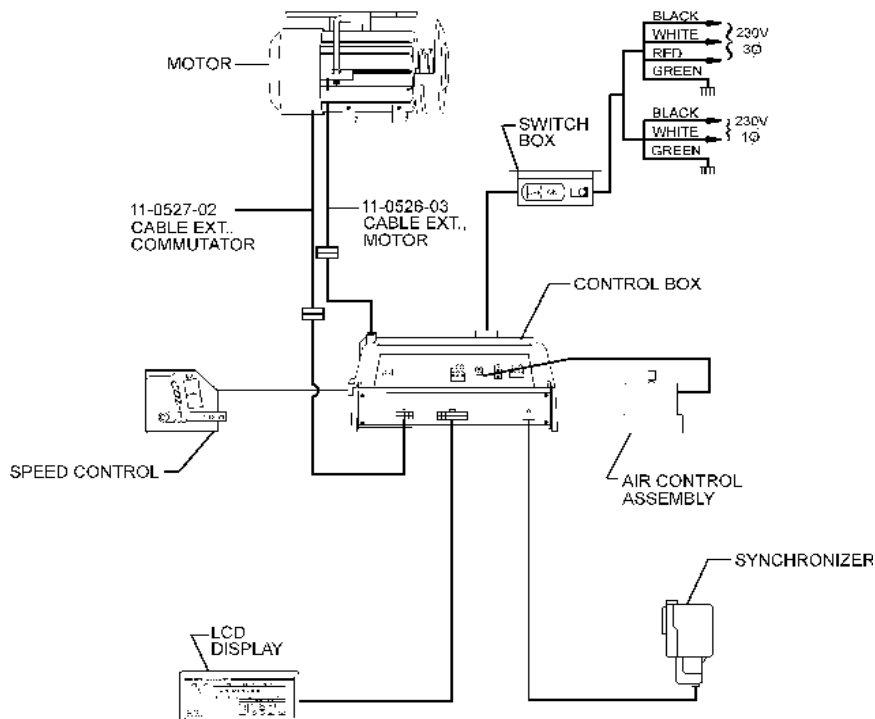


Fig. 2-7

### H. MOTOR ROTATION

Temporarily remove the "V" belt. Turn power on then move the pedal forward and note the direction of motor pulley rotation. If incorrect, do the following:

1. Turn power off.
2. Refer to section IV-C, Hidden Parameters, and follow the instructions to change motor rotation. The parameter is in the "\*\*\*\* Toggle Switches" group.
3. Install the "V" belt.

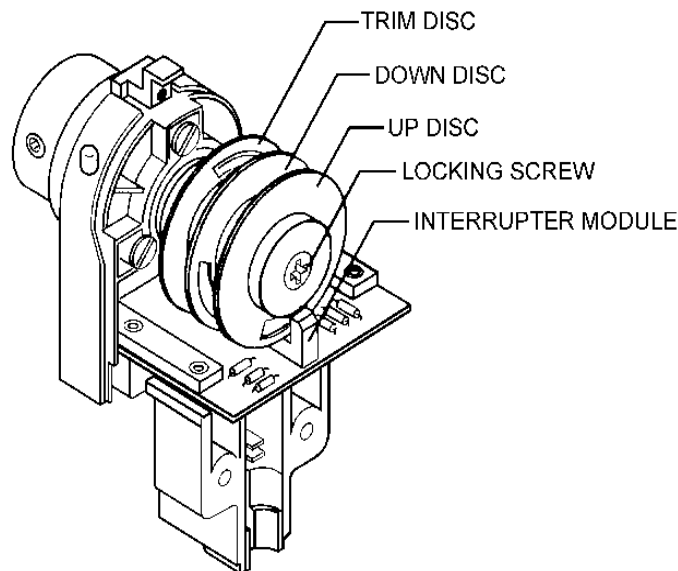


### SYNCHRONIZER TIMING

Turn the power off before making synchronizer adjustments. Refer to figure below for all adjustments and perform the steps below to time the synchronizer.

1. Remove cover from synchronizer, then loosen the disc locking screw.
2. Rotate the handwheel so that the needle is at its highest position.
3. Rotate the UP sensor disc until the notch is centered in the photo interrupter module.
4. Rotate the down sensor disc until the notch is centered in the photo interrupter module.
5. Rotate the trim disc until the notch is centered in the photo interrupter module.
6. Tighten the disc locking screw and replace the cover.

**NOTE:** After power is turned on a fine adjustment may be necessary and can be made by positioning the needle under power and noting the actual needle UP and needle DOWN stopping positions. If any of the positions are not correct, readjust the appropriate disc.





## PROGRAMMABLE LCD DISPLAY

### A. MAXIMUM SEWING SPEED

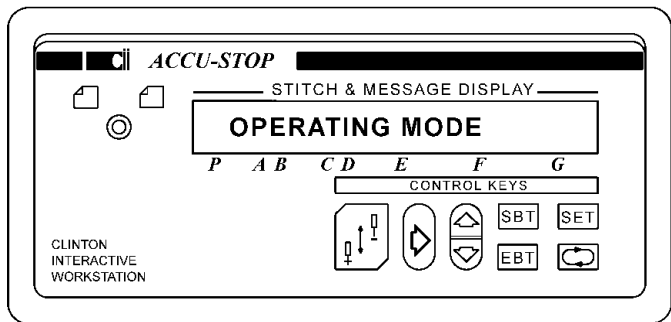
Maximum sewing speed can be adjusted by changing the "MAXIMUM SPEED" parameter in the "LCD" display.

The LCD display, shown below is used to program and set the various parameters of the 892 series, such as; SPEEDS, TIMERS, COUNTERS, and TOGGLE SWITCHES.

Two (2) different modes of operation are available. They are:

1. Operating Mode
2. Programming Mode

When power is turned on, the display reads "Operating Mode".



There are two (2) groups of parameters that are accessed in different ways. They are : (1) parameters with direct access and (2) hidden parameters with indirect access. In addition a master reset is available to reset all parameters to their default values.

### B. DIRECT ACCESS PARAMETERS

The direct access parameters are divided into four (4) groups. They are (1) SPEEDS, (2) TIMERS, (3) COUNTERS, and (4) TOGGLE SWITCHES. Table 5-1 describes each parameter, shows the default value and range of adjustment for each parameter.

To change a parameter, follow the sequence described below.





1. Press the  key to enter the programming mode. Continue pressing this key until the parameter group that is to be changed is displayed. As an alternative; press the **SET** key to enter the programming mode and display the last changed parameter.
2. Press the **SET** key to step to the next parameter in the selected group.
3. Press the  key to increase or the  key to decrease the contents of the displayed parameter. Both keys are used to toggle parameters between states in the Toggle Switches group. Hold the key closed to make the display step automatically.
4. Press the  key to return to the operating mode and save the changed parameters.





TABLE 4-1

PARAMETER	DESCRIPTION	DEFAULT	RANGE
	SPEED GROUP	RPM	RPM
MINIMUM SLOW STRT	First speed when pedal is moved forward. Initial speed at start of cycle (after trim). This speed is maintained for No. of stitches set by soft start count parameter.	180 500	80-250 150-1000
VENT.SPД	Speed motor runs while venturi is active	2000	100-9000
	TIMER GROUP	MS	MS
STRT DEL	Delays machine start to allow presser foot to drop.	120	0-500
VENT TIME	Delays venturi shut off after stop.	300	10-2500
WASTE REM	Waste removal turned on in the seam when this function is selected.	50	15-200
CUT TIME	Cutter on time or pulse length	80	10-250
	COUNTER GROUP	STITCHES	STITCHES
SOFTST	Number of stitches sewn at soft start speed after trim (EOC).	3	1-25
FRNT.CNT	Number of stitches with venturi on and first cut if enabled after eye is covered.	5	1-25
END CNT	Number of stitches with venturi on and end cut if enabled after eye is uncovered.	5	1-25
WASTE REM	Number of stitches with venturi on in the seam if the waste removal function is selected.	50	15-200
	TOGGLE SWITCHES		
PF/SEAM	Pr. Ft. up or down in seam, treadle neutral.	DOWN	UP/DOWN
PF/EOC	Pr. Ft. up or down after trim, treadle neutral.	DOWN	UP/DOWN
SOFT STRT	Used to turn soft strt "on" or "off".	OFF	ON/OFF
HEEL 2	If on, needle up. If off footlifter up with heel 2.	ENABLED	ENABLE/DISABLE
POSITION	Selects the needle position in the seam to UP or DOWN.	DOWN	UP/DOWN
	SWITCHES VENTURI		
1ST CUT	Turns chopper on/off after start venturi stitch count.	OFF	ON/OFF
2ND CUT	Turns chopper on/off after the end venturi stitch count.	OFF	ON/OFF
TREADLE	Neutral: Position before cycle starts Continue: Cycle starts without releasing treadle	NEUTRAL	NEUTRAL/ CONTINUE
START EYE	Uncov: Cycle starts independent of eye Covered: Cycle starts only if eye is covered	UNCOVERED	COVERED/ UNCOVERED
SEAMLEN	No Stop: Turns function off Stop: Motor stops after stitch count is finished	NO STOP	STOP/NO STOP
POS STOP	Select needle position after stop	DOWN	UP/DOWN
PF STOP	Select presser foot position after stop	DOWN	UP/DOWN
WASTE REM	Enables/Disables waste removal function	DISABLED	ENABLE/DISABLE







### C. HIDDEN PARAMETERS

The parameters in this section are separated from the Direct Access parameters because they are infrequently changed and should not be changed by the operator. The parameters are listed in:

**TABLE 4-2**

PARAMETER	DESCRIPTION	DEFAULT	RANGE
	****SPEEDS	RPM	RPM
TRIM/POS	Machine speed during the position trim cycle. If *** Tgl switch "position" is set to w/ramp the "trm/pos" speed affects the slope of the ramp. If "no ramp" is selected, position speed is constant and can be changed by the "trim/pos" parameter.	220	100-400
MAXIMUM	Maximum sewing machine speed. The speed cannot go higher than 3500 times the pulley ratio.	4200	1000-9900
	****MISCELLANEOUS		
HYSTERESIS	The amount the pedal has to be moved when going from one direction to the other before the speed changes.	3	1-10
PF DUTY	Average voltage applied to Pr. Ft. solenoid. The voltage should be high enough to keep the solenoid energized without overheating.	5	2-10
	****TOGGLE SWITCHES		
DIRECTION POSITION	Direction of motor rotation viewed from pulley. Select position with ramp or position at constant speed.	CCW W/ RAMP	CCW/CW W/ RAMP OR NO RAMP
AUTO MODE SAFETY SW	Maximum speed until eye is uncovered. Set to enable only on machine with trimmer safety sw. If enabled, machine will not run unless safety switch is properly connected.	DISABLE DISABLE	ENABLE/DISABLE ENABLE/DISABLE
SAFETY SW SEW	Defines operation of safety switch. If "CLS" machine starts only when the switch is closed. If "OPN" machine starts only when the switch is open.	CLS	CLS/OPN
VENT.SP	Enable/Disable function.	DISABLE	ENABLE/DISABLE





To enable access to Hidden Parameters, follow the sequence described below.

1. Turn power off, if it is on, then wait until the display goes blank.
2. Press the  key and the  key simultaneously. Keep pressed then,
3. Turn power on. A series of "\*\*\*\*" will appear on the display. They will slowly disappear.
4. Release the keys then press the  key before all the stars disappear.
5. Press the  key repeatedly, until the first hidden parameter group (\*\*\*\*SPEEDS) is displayed. Note that 4 stars (\*) as described in section "A".
6. Parameters may then be changed by following the procedure described under DIRECT ACCESS PARAMETERS (Page 4-1).





## D. MASTER RESET

In some cases it may be necessary to reset all parameters to their default values. This is done as follows:





1. Turn power off, if it is on, then wait until the display goes blank.
2. Press the  key,  key and  key simultaneously. Keep pressed then,
3. Turn power on. The display alternates between "Push Set" and "For Reset".
4. Push the  key within 10 cycles.
5. The word "Programming" is displayed. The parameters will be reset to their default values after a few seconds.

## E. PULLEY RATIO (RATIO BETWEEN MOTOR AND MACHINE PULLEYS)



During the initial setup and after power is first turned on. The pulley ratio must be calculated. The pedal must be moved forward to do this. While the ratio is being taken, the machine speed is limited for several stitches. After the ratio is taken, the machine will then accelerate to maximum speed.

Each time power is turned off then back on, the ratio is checked when the pedal is moved forward the first time. If the ratio has changed, because of a pulley change, then the ratio will be recalculated. The ratio can be displayed by pressing the  and  keys simultaneously. If the ratio is correct, a star (\*) will be displayed after the ratio number.

## F. TEST PROGRAM

A test program is available to test the treadle, synchronizer, encoder, and divider for proper operation. To select the program, press the  and  keys simultaneously. The display will show "SYSTEM TEST". Press the  key to toggle between each test, i.e. Treadle, Synchronizer, Encoder, or Divider. Press the  key to activate whichever test is selected.

### 1. Treadle Test

Press the  button until "TEST TREADLE" is displayed. Press the  button once. The display should show "NEUTRAL".



- a. Move the pedal from neutral to heel 1 then to heel 2. The display should show each position.



**TEST PROGRAM (Continues....)**



- b. Move the pedal forward slowly. As the pedal is moved, a number (0 to 255, see NOTE#4) will be displayed.  
This number is proportional to how far the pedal is moved. The lowest number should be no more than "8" and the highest number greater than "250".  
(NOTE: the maximum speed pot should be in the full cw position.)
- c. Press the pedal full forward. Turn the maximum speed pot ccw. The displayed count should decrease as the pot is turned. Return the pot to its maximum cw position.

2. Synchronizer Test

Press the  button. The display will read "TEST SYNCHRONIZER". Press the  button. Rotate the machine pulley by hand. The display will show the position. The positions are as follows: "UP", "DOWN", and "TRIM".

3. Encoder Test



**CAUTION: Remove the sewing machine belt. The belt has to be removed because the motor may not develop sufficient torque to turn the machine.**

Press the  button. The display will read "TEST ENCODER". Press the  button. The display will read "PUSH TREADLE". Press the pedal fully forward for approximately three seconds then release the treadle. Do not heel. The result will be displayed, either "OK" or "NOT OK".

Heel the pedal. The display shows the number of counts. The number should be between 795 and 800 pls.

4. Divider Test

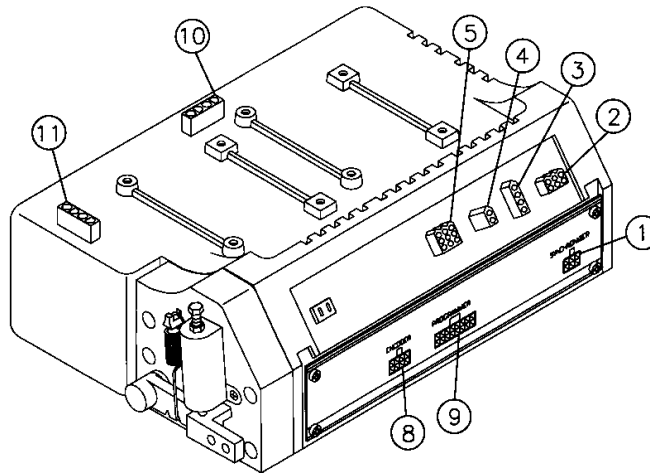
NOTE: This test will not function properly if the encoder test fails. Also, remove the sewing machine belt.

Press the  button, the display will read "TEST DIVIDER". Press the  button. The display reads "PUSH TREADLE". Press the treadle fully forward for 3 seconds, then release the treadle. If the test works the display will read "DIVIDER OK". If the test fails the display will show the test which failed, ie. "PASS 1", "PASS 2", "PASS 3", "PASS 4", "PASS 5", or "PASS 6".




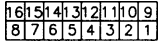
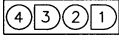
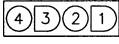
CONNECTOR DIAGRAMS

Listed below are the pinouts for the Model 892E control box connectors.



NO.	TOTAL PINS	CONNECTOR	PIN NO.	FUNCTION									
1	6 <div style="border: 1px solid black; padding: 2px; display: inline-block;"> <table style="border-collapse: collapse; text-align: center;"> <tr><td>4</td><td>5</td><td>6</td></tr> <tr><td>1</td><td>2</td><td>3</td></tr> </table> </div>	4	5	6	1	2	3	SYNCHRONIZER	1 2 3 4 5 6	+5 DOWN SENSOR UP SENSOR TRIM SENSOR GND LED			
4	5	6											
1	2	3											
2	6 <div style="border: 1px solid black; padding: 2px; display: inline-block;"> <table style="border-collapse: collapse; text-align: center;"> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> </table> </div>	1	2	3	4	5	6	AUX INPUTS	1 2 3 4 5 6	+5 GND CHASSIS GND I 1 SAFETY SWITCH I 2 INCHING/CHANGE POSITION I 3			
1	2	3											
4	5	6											
3	4 <div style="border: 1px solid black; padding: 2px; display: inline-block;"> <table style="border-collapse: collapse; text-align: center;"> <tr><td>1</td></tr> <tr><td>2</td></tr> <tr><td>3</td></tr> <tr><td>4</td></tr> </table> </div>	1	2	3	4	AUX OUTPUTS	1 2 3 4	+48 V R1 +48 V R2					
1													
2													
3													
4													
4	2 <div style="border: 1px solid black; padding: 2px; display: inline-block;"> <table style="border-collapse: collapse; text-align: center;"> <tr><td>1</td></tr> <tr><td>2</td></tr> </table> </div>	1	2	FOOTLIFT	1 2	FOOTLIFT SOL. +48V							
1													
2													
5	9 <div style="border: 1px solid black; padding: 2px; display: inline-block;"> <table style="border-collapse: collapse; text-align: center;"> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> <tr><td>7</td><td>8</td><td>9</td></tr> </table> </div>	1	2	3	4	5	6	7	8	9	VENTURI, CHOPPER, AND NEEDLE COOLER	1 4 2 5 3 6 7 8 9	VENTURI SOL. - VENTURI SOL. +(48V) CHOPPER SOL. - CHOPPER SOL. +(48V) NEEDLE COOLER SOL. - NEEDLE COOLER SOL. +(48V) NOT USED NOT USED NOT USED
1	2	3											
4	5	6											
7	8	9											



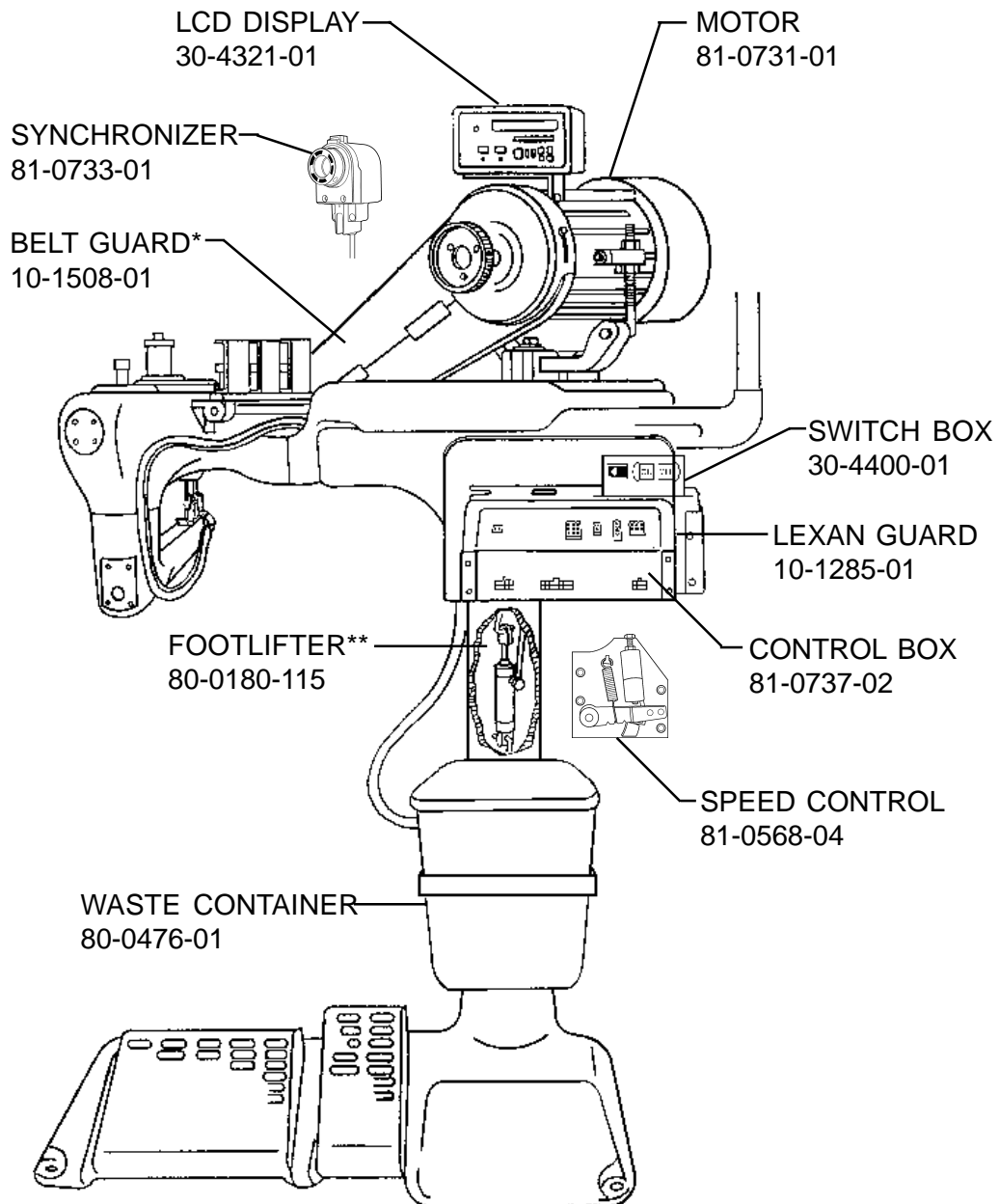
NO.	TOTAL PINS	CONNECTOR	PIN NO.	FUNCTION
8	8 	COMMUTATOR	1 2 3 4 5 6 7 8	+5V ENCODER (S1) ENCODER (S2) SIG. GND PHASE C PHASE B PHASE A -5V
9	16 	LCD DISPLAY	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	EXT1 CHASSIS GND +5V GND D0 D1 D2 D3 D4 D5 D6 D7 CA1 E ERD CA0
10	4 	AC POWER 220V 3	1 2 3 4	PHASE A PHASE B PHASE C CHASSIS GND
11	4 	MOTOR VOLTAGE	1 2 3 4	PHASE A PHASE B PHASE C CHASSIS GND



## DRAWINGS AND PARTS LIST

MODEL 892E  
81-0790-02

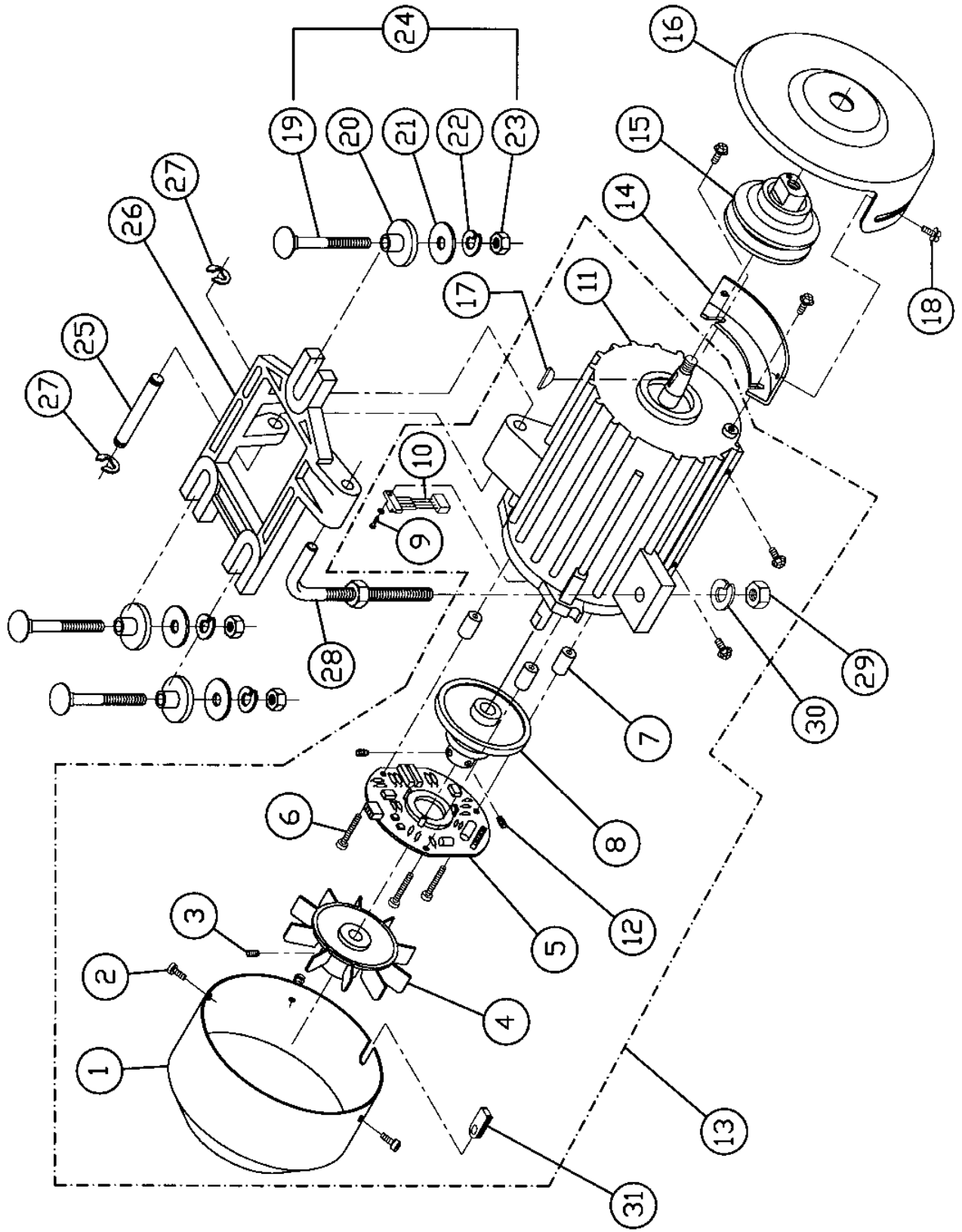
## A. MAJOR ASSEMBLIES



\* USE 10-1508-02 FOR U.S. 35800DWW

\*\* USE 80-0180-121 FOR EXTENDED COLUMN  
USE 80-0180-140 FOR U.S. 36200

B. MOTOR ASSEMBLY DC SERVO  
81-0731-01





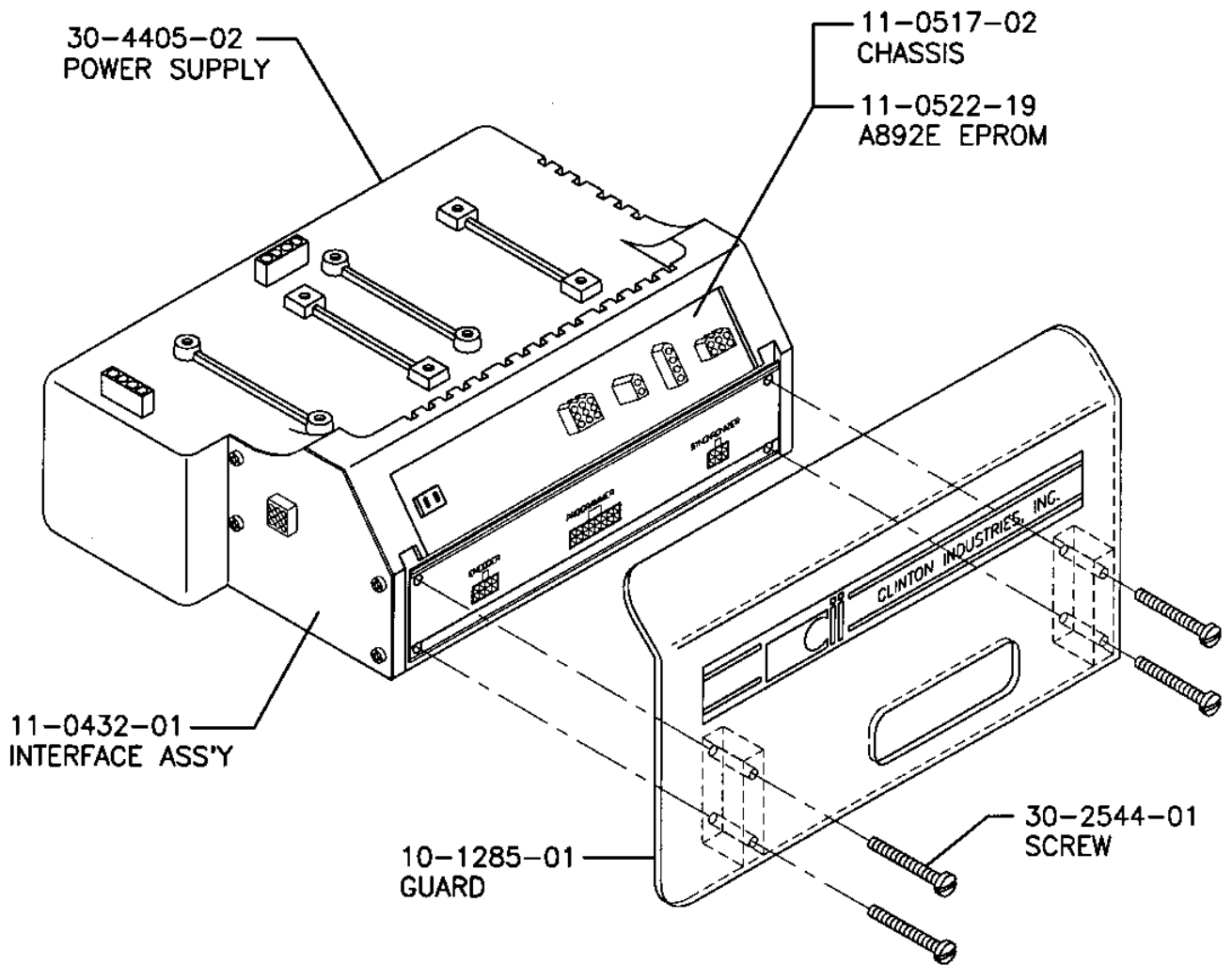


**MOTOR ASSEMBLY PARTS LIST, DC SERVO  
81-0731-01**

ITEM	DESCRIPTION	PART NO.	QUANTITY
1	COVER	30-4433-01	1
2	SCREW	30-4434-01	3
3	SCREW, S.S.S.	30-4435-01	2
4	FAN	30-4436-01	1
5	PC BOARD, ENCODER	30-4437-01	1
6	SCREW	30-4438-01	3
7	SPACER	30-4439-01	3
8	ENCODER DISC	30-4440-02	1
9	SCREW	30-4441-01	1
10	ENCODER SENSOR	30-4442-01	1
11	MOTOR, DC	30-4443-01	1
12	SCREW, S.S.S.	30-4444-01	2
13	MOTOR/ENCODER ASSEMBLY	81-0732-01	1
14	BELT GUARD, FIXED	30-4445-01	1
15	PULLEY - 50MM	30-4204-50	1
	PULLEY - 60MM	30-4204-60	1
	PULLEY - 65MM	30-4204-65	1
	PULLEY - 70MM	30-4204-70	1
	PULLEY - 75MM	30-4204-75	1
	PULLEY - 80MM	30-4204-80	1
	PULLEY - 85MM	30-4204-85	1
	PULLEY - 90MM	30-4204-90	1
	PULLEY - 95MM	30-4204-95	1
	PULLEY - 100MM	30-4204-100	1
	PULLEY - 105MM	30-4204-105	1
	PULLEY - 110MM	30-4204-110	1
	PULLEY - 115MM	30-4204-115	1
	PULLEY - 120MM	30-4204-120	1
	PULLEY - 125MM	30-4204-125	1
	PULLEY - 130MM	30-4204-130	1
	PULLEY - 140MM	30-4204-140	1
	PULLEY - 150MM	30-4204-150	1
16	BELT GUARD, ADJUSTABLE	30-4203-01	1
17	KEY, PULLEY	30-4227-01	1
18	SCREW M5 X 10 HEX HD.	30-4206-01	2
19	BOLT, CARRAIGE	30-4298-01	3
20	SPACER	30-4332-01	3
21	WASHER, FLAT	30-4300-01	3
22	WASHER, SPLIT LOCK	30-4301-01	3
23	NUT, HEX	30-4229-01	3
24	HARDWARE KIT, MOTOR MOUNT	30-4337-01	1
25	PIN	30-4219-01	1
26	BRACKET, MOTOR MOUNT	30-4446-01	1
27	SNAP RING	30-4220-01	1
28	BOLT, ADJUSTING	30-4205-01	1
29	NUT, HEX	30-4210-01	1
30	WASHER, SPLIT LOCK	30-4218-01	1
31	GROMMET	30-4472-01	1



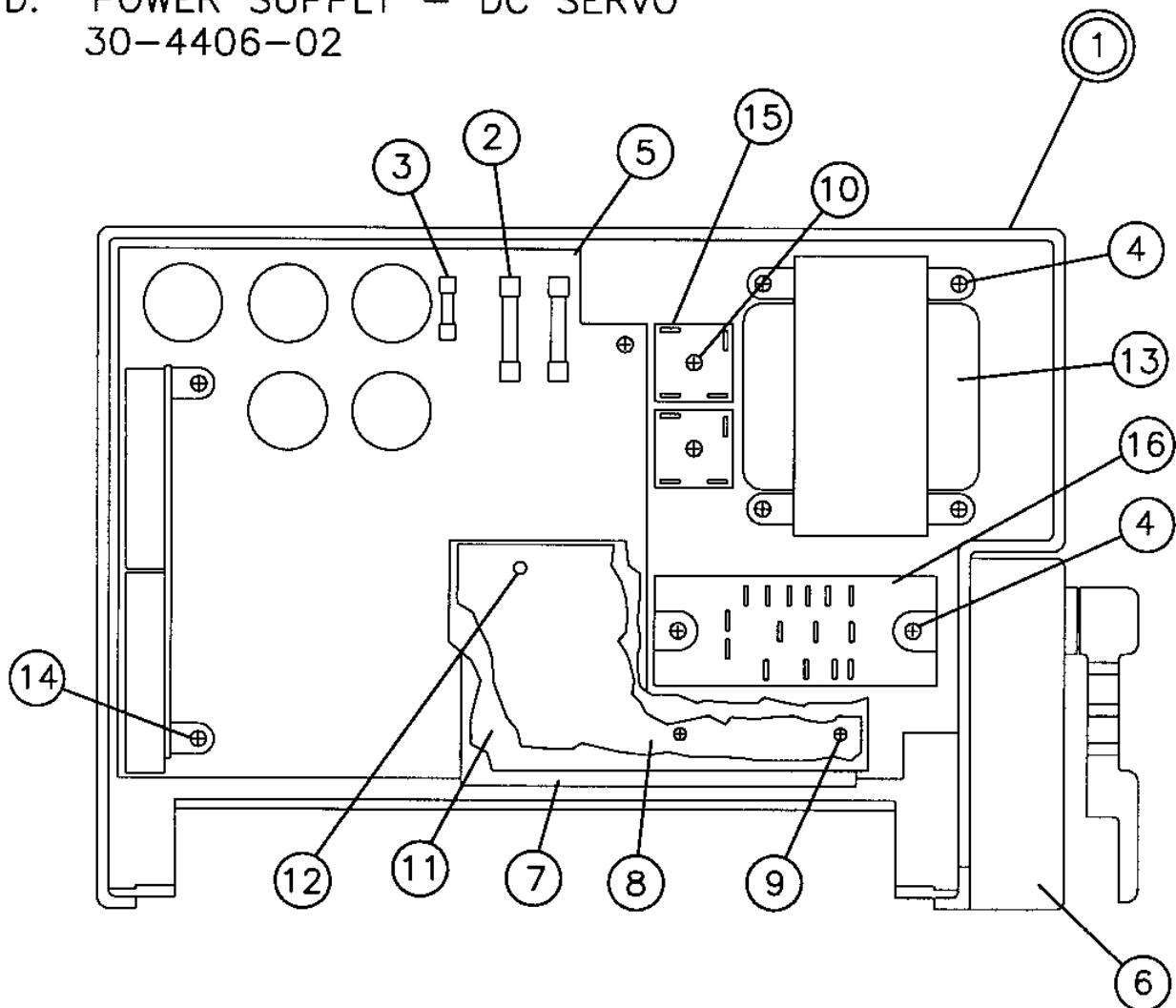
C. CONTROL BOX - 892E  
81-0737-02



NOTE: SEE PAGE 6-7 FOR BOARD NUMBERS



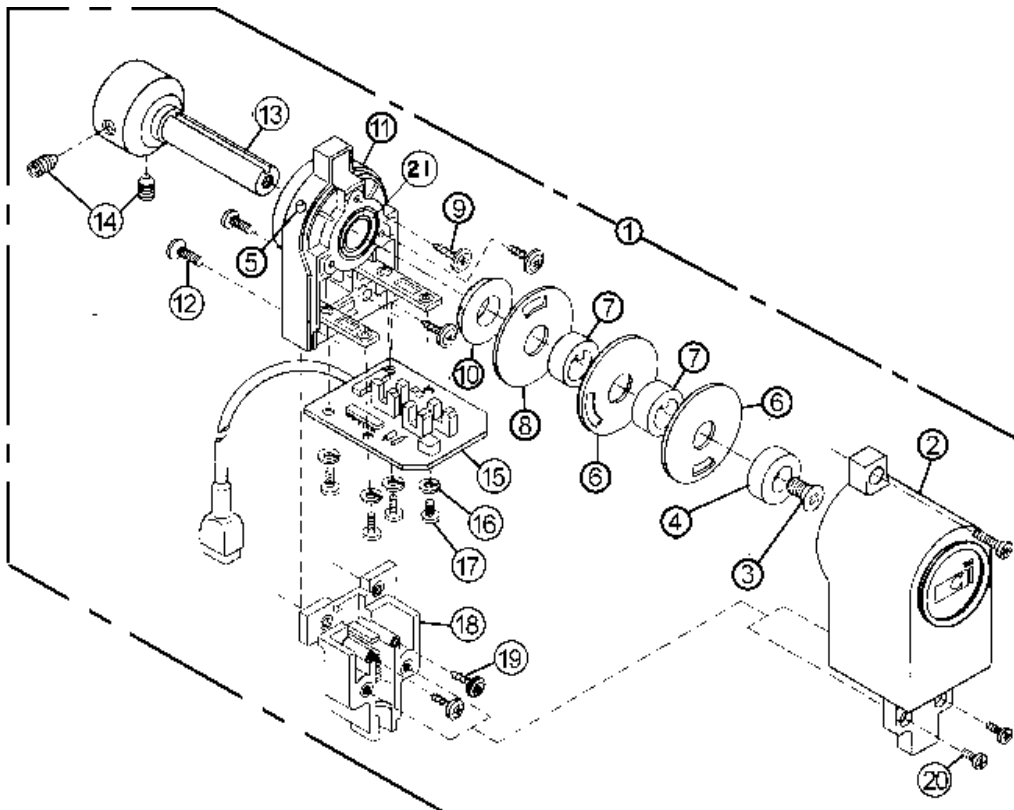
D. POWER SUPPLY - DC SERVO  
30-4406-02



ITEM	DESCRIPTION	PART NO.	QUANTITY
1	POWER SUPPLY-DC SERVO	30-4405-02	1
2	FUSE 15A 250V	30-2748-01	2
3	FUSE 4A 250V	30-2749-01	1
4	SCREW M5 X 10	30-4208-01	6
5	POWER BOARD	30-4408-02	1
6	SPEED CONTROL	81-0709-02	1
7	INSULATOR, LOWER	30-4421-01	1
8	INSULATOR, UPPER	30-4422-01	1
9	SCREW M3 X 7	30-4423-01	2
10	SCREW M5 X 20	30-4424-01	2
11	SERVO MODULE BOARD	30-4425-02	1
12	STANDOFF	30-4426-01	1
13	TRANSFORMER	30-4431-01	1
14	SCREW M4 X 10	30-4432-01	4
15	RECTIFIER BRIDGE	37-0241-01	2
16	POWER MODULE	37-0242-01	1



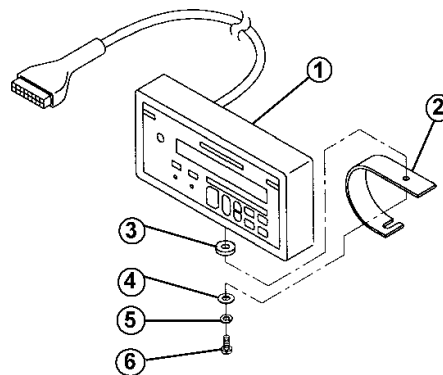
**E. SYNCHRONIZER**



ITEM	DESCRIPTION	PART NO.	QUANTITY
1	SYNCHRONIZER	81-0733-01	1
2	COVER, SYNCHRONIZER	30-4262-02	1
3	SCREW M5 X 12 F.H.M.S.	30-4263-01	1
4	SPACER DISC RETAINING	30-4264-01	1
5	LED	30-4428-01	1
6	DISC POSITIONER	30-4266-01	2
7	SPACER, DISC	30-4267-01	3
8	DISC, TRIM	30-4268-01	1
9	SCREW M3.5 X SELF TAP	30-4270-01	3
10	SPACER	30-4271-01	1
11	HOUSING	30-4272-02	1
12	SCREW M4 X 10	30-4273-01	2
13	SHAFT, SYNCHRONIZER	30-4429-01	1
14	SCREW M6 X 8 S.S.S.	30-4275-01	2
15	PC BOARD, SYNCHRONIZER	30-4430-01	1
16	SCREW, PC BOARD MOUNT	30-4209-01	4
17	WASHER, SPLIT LOCK	30-4277-01	4
18	BASE	30-4278-02	1
19	SCREW M3 X SELF TAP	30-4279-01	2
20	SCREW M3 X 10	30-4280-01	2
21	BEARING	30-4281-01	1



### F. PROGRAMMABLE DISPLAY



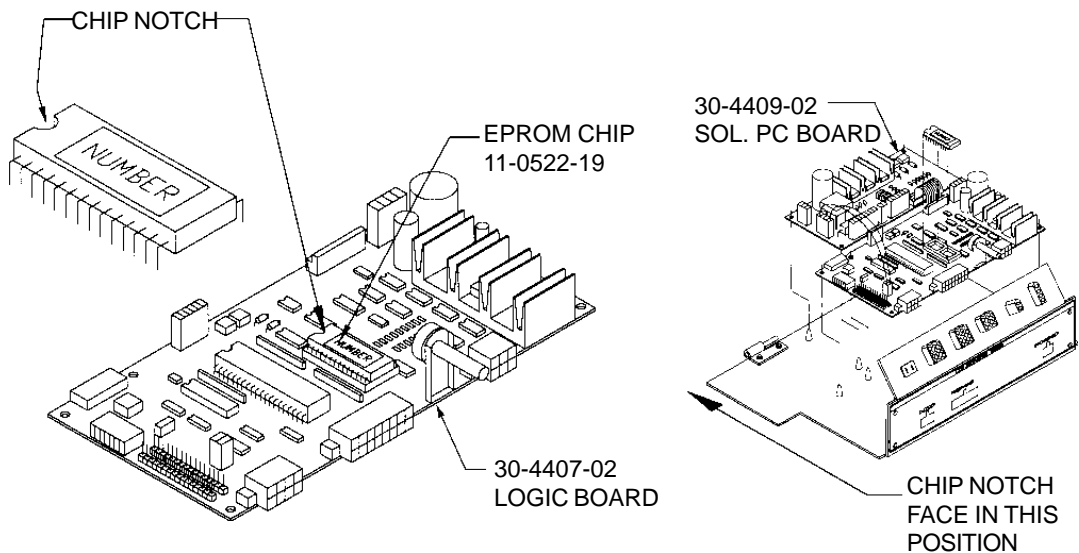
ITEM	DESCRIPTION	PART NO.	QUANTITY
1	PROGRAMMABLE DISPLAY	30-4321-01	1
2	BRACKET, MOUNTING	02-4059-01	1
3	RUBBER WASHER	30-2549-01	1
4	FLAT WASHER	33-1708-01	1
5	LOCK WASHER	33-1808-01	1
6	SCREW	30-2014-01	1

### G. E-PROM

Most of the E-proms used are Cmos devices, thus subject to being damaged by electrostatic discharges. Proper grounding practices should be followed when handling and replacing them.

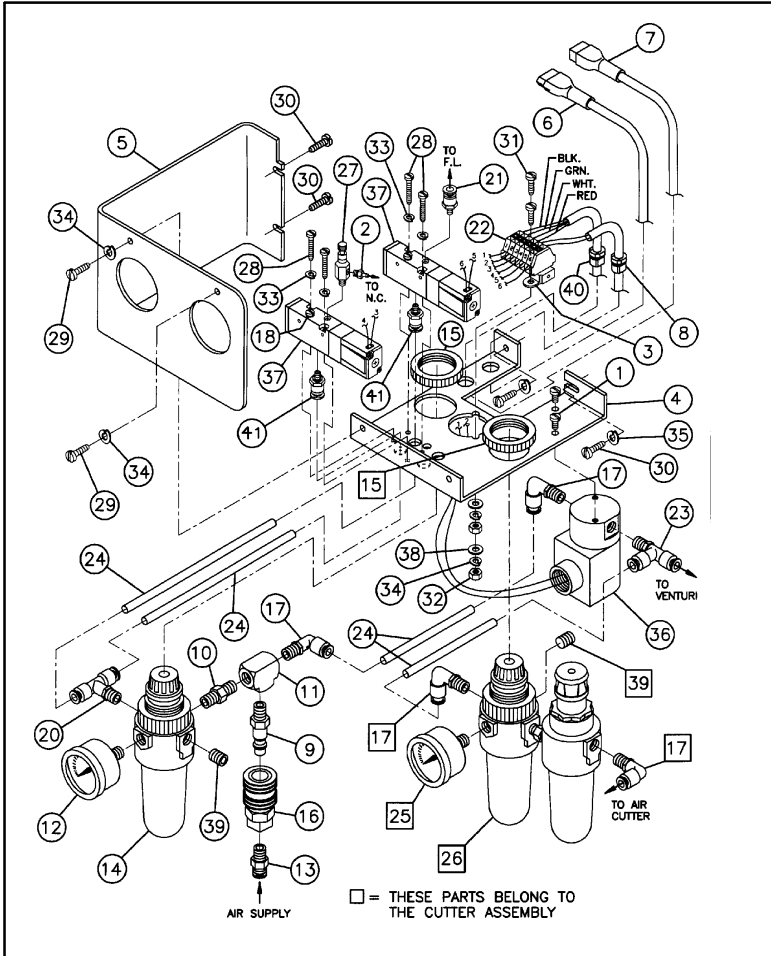
Refer to figure below when replacing the E-prom.

1. The notch on the E-prom chip and the other chips on the board all face towards the back of the board (towards back of chassis).
2. Check to make sure that all of the E-prom chip's legs/pins are properly seated.



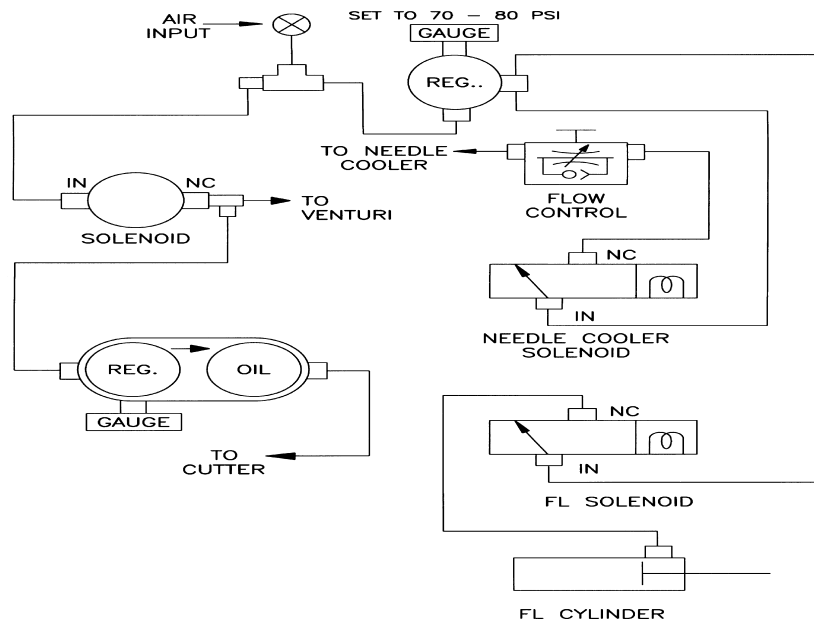


**H. AIR CONTROL ASSEMBLY**  
81-0808-01



ITEM	PART NO.	DESCRIPTION	QUANTITY
PARTS WITH AN ASTERIK (*) BELONG TO THE CUTTER ASSY			
1	01-3066-11	FIL.HD.-SCREW	2
2	30-1729-01	HOSE FITTING	1
3	01-6850-02	BRACKET	1
4	02-0518-01	BRACKET	1
5	02-0519-01	GUARD	1
6	11-0322-02	CABLE ASS'Y	1
7	11-0441-01	CABLE ASS'Y	1
8	30-0100-01	STRAIN RELIEF	1
9	30-0277-01	QUICK DISCONNECT, MALE	1
10	30-0279-01	HEX NIPPLE	1
11	30-0280-01	TEE FITTINGS	1
12	30-0282-01	GAUGE	1
13	30-2737-250	TUBE FITTINGS	1
14	30-0893-01	FILTER REGULATOR	1
*15	30-0899-01	NUT REGULATOR	1
16	30-1048-01	QUICK DISCONNECT-FEMALE	1
*17	30-2738-250	ELBOW	4
18	30-1124-01	SCREW	2
20	30-2739-250	TEE	1
21	30-2955-250	FITTING	1
22	30-1750-03	TERMINAL BLOCK	1
23	30-2740-250	TEE	1
24	30-2102-01	TUBING	42"
*25	30-2146-01	GAUGE	1
*26	30-2347-01	FILTER/REG./LUB.	1
27	30-2487-01	VALVE, NEEDLE	1
28	33-0103-16	PHMS-SCREW	4
29	33-0108-06	PHMS-SCREW	2
30	33-0210-06	PHMS-SCREW	4
31	33-0708-06	FIL.HMS-SCREW	2
32	33-1508-01	HEX NUT	2
33	33-1803-01	LOCK WASHER	4
34	33-1808-01	LOCK WASHER	4
35	33-1810-01	LOCK WASHER	2
36	35-0224-01	SOLENOID AIR VALVE	1
37	35-0237-01	SOLENOID VALVE	2
38	33-1708-02	FLAT WASHER	2
*39	30-1299-01	PLUG	1
40	30-0191-01	STRAIN RELIEF	1
41	01-4707-21	FITTING	2

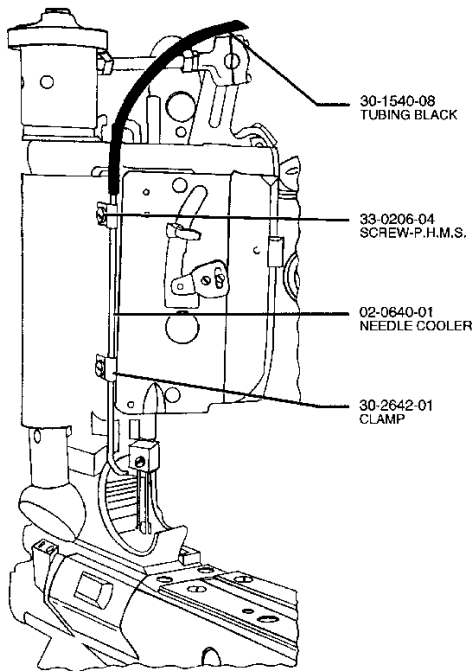
**AIR CIRCUIT DIAGRAM**



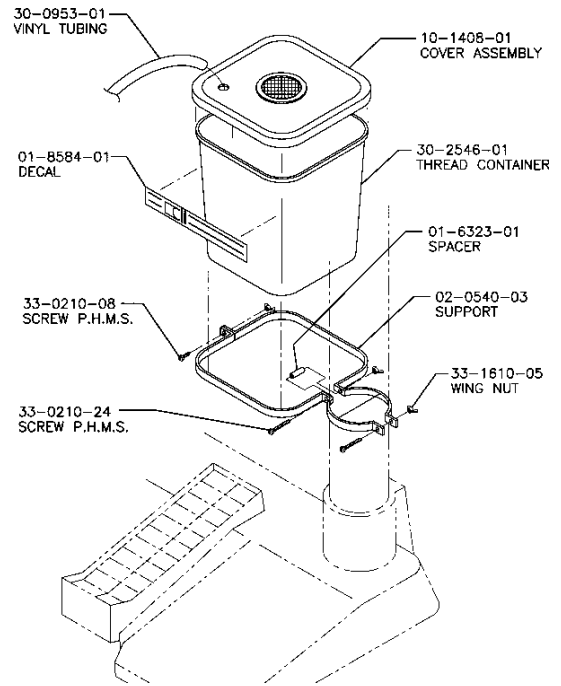


COMPLIMENTARY ASSEMBLIES

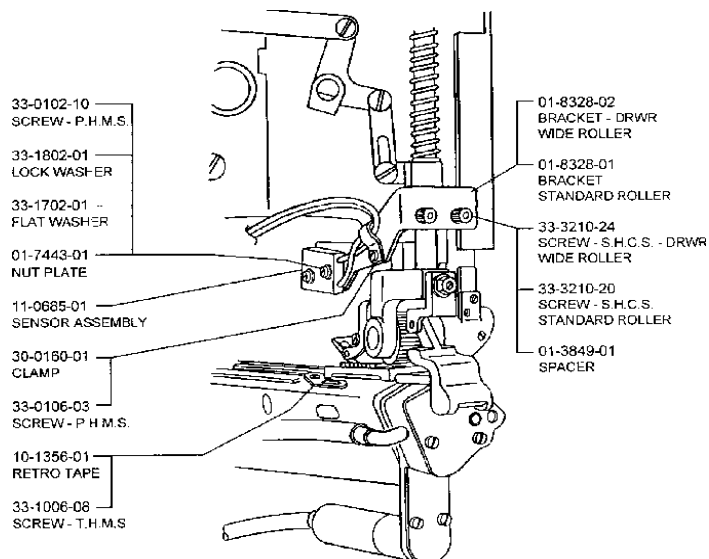
A. NEEDLE COOLER  
80-0495-01



B. THREAD CATCHER  
80-0476-01



C. ELECTRIC EYE MOUNTING  
80-0500-01 = STANDAD ROLLER  
80-0500-02 = WIDE ROLLER



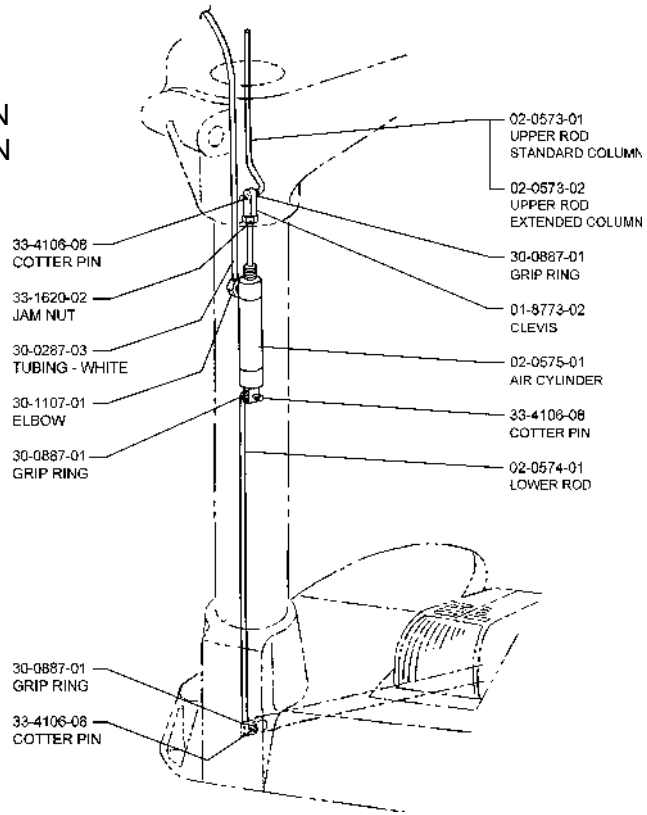


### D. FOOTLIFTER ASSEMBLY

U.S. 35800

80-0180-115 STANDARD COLUMN

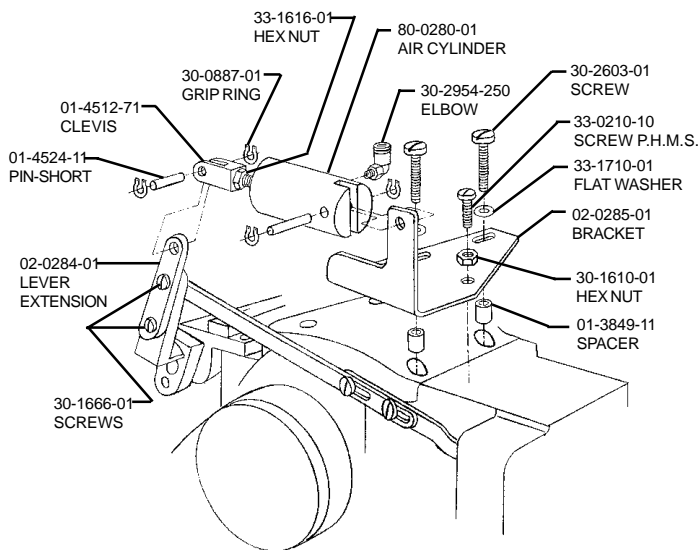
80-0180-121 EXTENDED COLUMN



### E. FOOTLIFTER ASSEMBLY

U.S. 36200

80-0180-140



### F. VENTURI ASSEMBLY

80-0198-06

