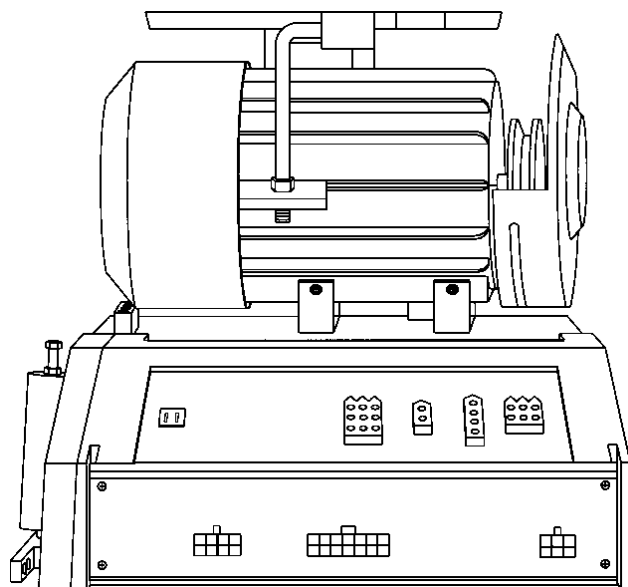


CLINTON MODEL AS-890

VARIABLE SPEED
DC SERVO MOTOR

NEEDLE POSITIONER THREAD TRIMMER
AUTOMATIC BACKTACKING



SERVICE MANUAL

40-0231-02



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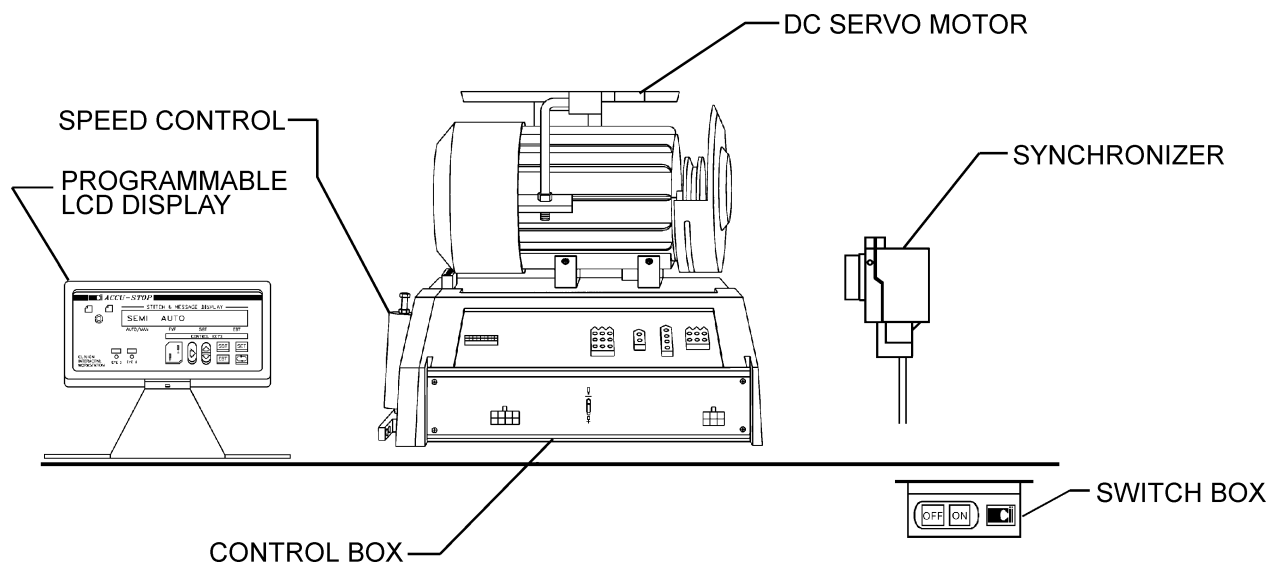
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INTRODUCTION

Clinton's Model 890 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 890 has outputs for a trimmer, foot lift, wiper, and automatic backtack. It can be used to operate all Clinton trimmers, as well as the Singer, Union Special, Pfaff, Juki, and Brother undertrimmers.

The backtack can be set up to operate in two (2) different modes. They are (1) NORMAL and (2) EQUALIZED. In normal mode, the reverse feed cylinder is operated when the machine is running. This can cause the stitch length to vary while the cylinder is moving. In many cases this is acceptable. If not, the EQUALIZED mode will have to be used. In this mode the machine is stopped whenever the cylinder moves. This insures a constant stitch length throughout the tack.

The programmable LCD display is used to select the desired mode. In addition, the display box is used to select or change other parameters such as number of stitches in the tack, backtack speed, trimmer type, etc. See Section V.



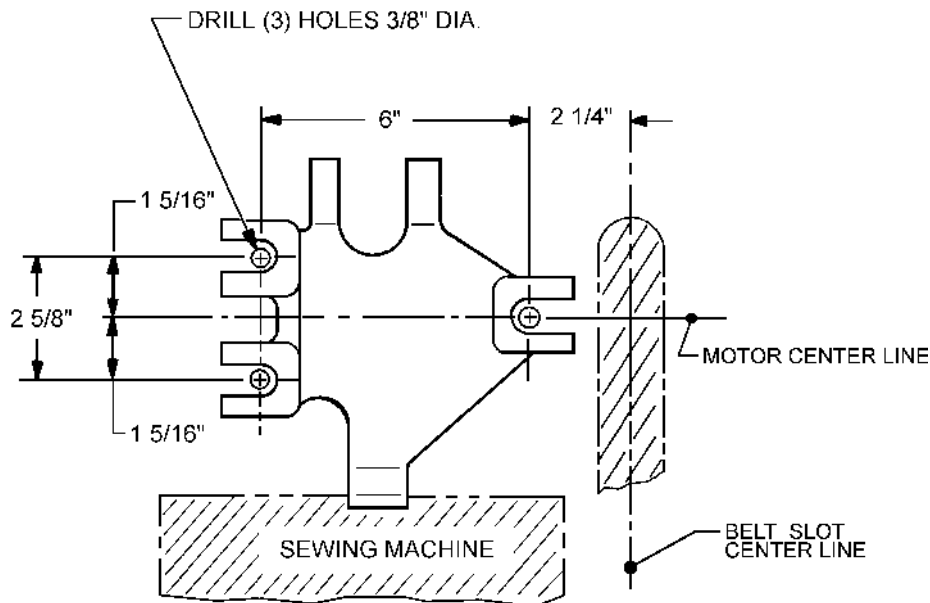
INSTALLATION

A. CONTROL BOX TO MOTOR

Refer to the control box assembly parts drawing in figure 7-3. Attach the mounting brackets to the control box then, mount the control box to the motor with the hardware provided.

B. MOTOR

1. Drill three holes in the sewing machine table as shown in figure 2-1.



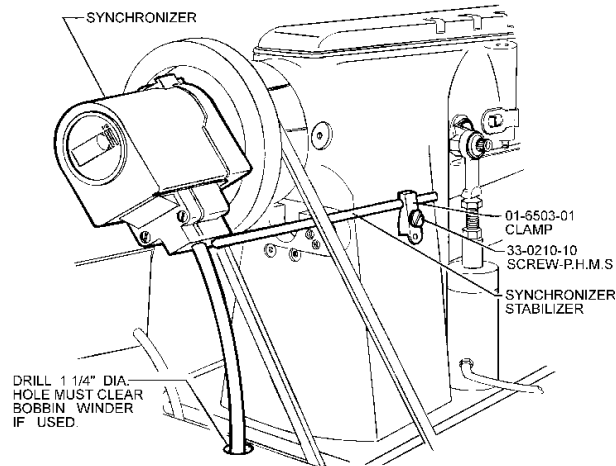
MOTOR INSTALLATION
FIG. 2-1

2. Mount the motor to the table using the spacers, carriage bolts, nuts, washers, and flanged spacers supplied (See Figure 7-2). 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.
 - c. Install the belt guard.

C. SYNCHRONIZER

Two methods are used to attach the synchronizer to the handwheel. They are (1) handwheel turned down to accept synchronizer and (2) an adapter that is mounted to a machined handwheel.

Refer to figure 2-2 and install the synchronizer as follows:



**SYNCHRONIZER INSTALLATION
UNIVERSAL MOUNT
FIG. 2-2**

1. Install adapter if used.
2. Mount and secure synchronizer to handwheel or adapter.
3. Position the synchronizer retaining rod and clamp as shown in figure 2-2. Make sure that the rod clears the sewing machine belt.
4. Using the mounting clamp hole as a guide, drill and tap a 10-32 hole in the machine casting. Secure clamp and rod with a 10-32 X 1/2 B.H.M.S.
5. Drill a 1-1/4" Dia. hole in table to route synchronizer cable to logic box. Check that cable has adequate slack when tilting machine for service.

D. LCD DISPLAY

Mount the LCD display console at a convenient location on the table top as shown in figure 2-3. Route cable through same hole that synchronizer cable passes through.

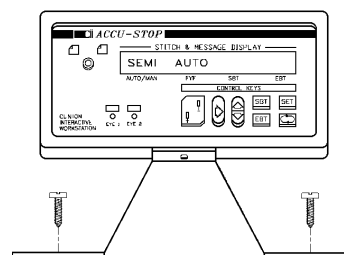


FIG. 2-3

E. SWITCH BOX

Install switch box at a convenient location under the table.
See figure 2-4.

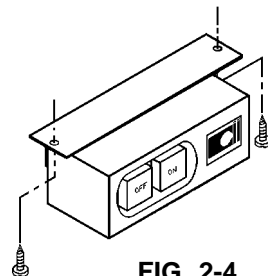


FIG. 2-4



F. POWER AND CABLE CONNECTIONS

Refer to figure 2-5 and connect all cables as shown. The system can be operated from 230V, 3 phase or 230V, single phase power. See figure 2-5.

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.

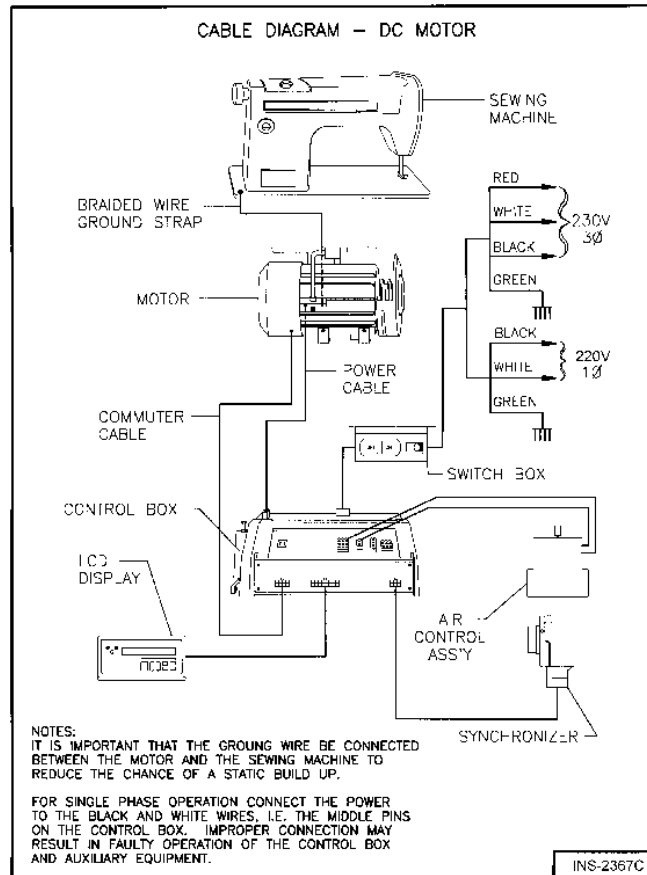


FIG. 2-5

G. 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:

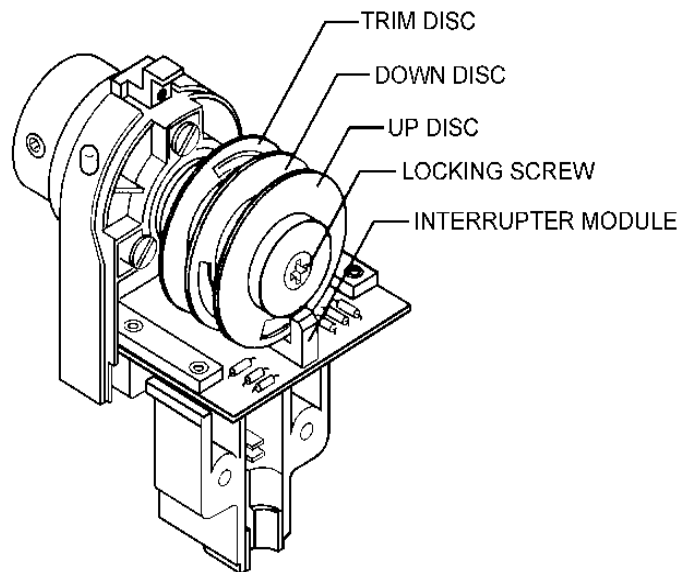
1. Turn power off.
2. Refer to section V-B, Hidden Parameters, and follow the instructions to change motor rotation. The parameter is in the "**** Toggle Switches" group.
3. Install the "V" belt.

**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 take up during the rising portion of its cycle is approximately 1/16" below its highest position.
3. Rotate the UP sensor disc until the notch is centered in the photo interrupter module.
4. Turn the handwheel until the needle is positioned down.
5. Rotate the down sensor disc until the notch is centered in the photo interrupter module.
6. Rotate the handwheel until the needle thread is positioned between 6 and 7 o'clock around the bobbin case. Rotate the trim disc until the notch is centered in the photo interrupter module.
7. 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 and 6 o'clock stopping positions. If any of the positions are not correct, readjust the appropriate disc.



CONTROL BOX ADJUSTMENTS

A. MAXIMUM SEWING SPEED

Maximum sewing speed can be adjusted by changing the "MAXIMUM SPEED" parameter in the "LCD" display (see Section V).



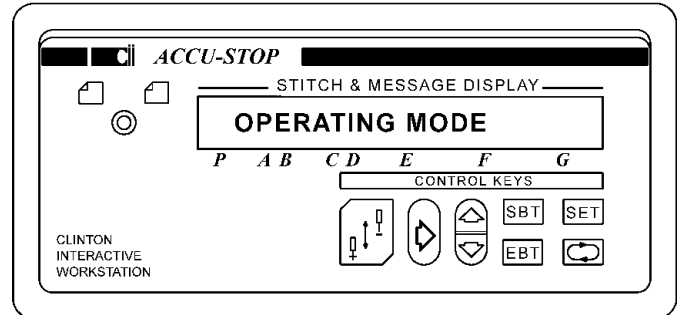
PROGRAMMABLE LCD DISPLAY

The LCD display, shown below is used to program and set the various parameters of the 890 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.

A. 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 5-1

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
BACKTACK	Speed during backtacking.	1500	100-3500
	TIMER GROUP	MS	MS
STRT DEL TRM TIME	Delays machine start to allow presser foot to drop. Clinton Lockstitch- Time machine stops at 6 o'clock position to pick up threads.	120 80	0-500 10-1000
WIPER TIME	Chain Stitch - Trim time at needle up. Wiper Pulse time.	80	0-2500
BT TIME	Compensates for reaction time of rev. feed cyl. as follows: 1. 1st tack - Makes sure rev. feed cyl. is deenergized before machine accelerates to high speed. 2. 2nd tack (single tack only) - Makes sure rev. feed cyl. is deenergized before trimming. 3. Equalized mode - Machine stops for this time whenever rev. feed cyl. is energized or deenergized.	30	10-1200
	COUNTER GROUP	STITCHES	STITCHES
SOFTST	Number of stitches sewn at soft start speed after trim (EOC).	3	1-50
SBT FORW	Forward stitch count, start backtack.	4	1-200
SBT REV	Reverse stitch count, start backtack.	4	1-200
EBT REV	Reverse stitch count, end backtack.	4	1-200
EBT FORW	Forward stitch count, end backtack.	4	1-200
	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, trims with heel 2. If off no trim wit heel 2.	ENABLED	ENABLE/DISABLE
TURNBAK	If on, machine rotates in reverse direction after trim, to move needle to its highest position.	OFF	ON/OFF
POSITION BACKTACK	Selects the needle position in the seam to UP or DOWN. In "NORMAL" mode, rev. feed cyl. is operated while machine is running. In "EQUALIZED" mode machine is stopped when rev. feed cyl. is operated. A constant stitch length is maintained in this mode.	DOWN NORMAL	UP/DOWN NORMAL/ EQUALIZED
FRONT BT	In the "MANUAL" mode the backtack speed is determined by the treadle. In the "AUTOMATIC" mode the backtack speed is a fixed amount.	MANUAL	MANUAL/ AUTOMATIC



B. 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 the table below

TABLE 5-2

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	8000
	****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.	3	2-10
T.BK.DEL	Delays reversing of motor until the trim cycle is finished. See "TURNBAK" parameter.	50	200
BR FORCE	Amount of brake force applied during stop mode.	2	1-8
SELECT TRIM SYSTEM			
Press then keys first, then use or keys to select one of the following trimmers, NO TRIM SYS, CLINTON LOCKST, JUKI/DURKOPP, PFAFF MECH, BROTH/PFAFF PN, SINGER/UNION, CLINTON T & B TRIM or CHAIN ST.		CLINTON LOCKSTITCH	
	****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
SAFETY SW	Set to enable only on machine with trimmer safety sw. If enabled, machine will not run unless safety switch is properly connected.	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





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 dissappear.
4. Release the keys then press the key before all the stars dissappear.
5. Press the key repeatedly, until the first hidden parameter group (****SPEEDS) is displayed that 4 stars (*) as described in section "A".
6. Parameters may then be changed by following the procedure described under DIRECT ACCESS PARAMETERS (Page 5-1).





C. 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.

D. 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.

E. 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

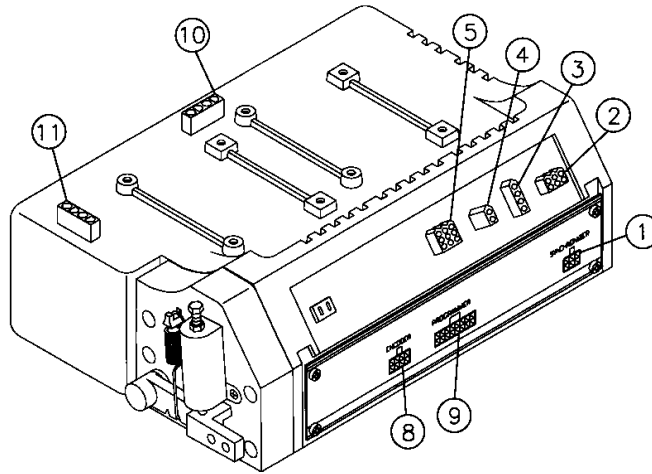
NOTE: This test will not function properly if the encoder test fails. Also, remove the sewing machine belt.

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 890 control box connectors.



NO.	TOTAL PINS	CONNECTOR	PIN NO.	FUNCTION
1	6	SYNCHRONIZER	1	+5
			2	DOWN SENSOR
			3	UP SENSOR
			4	TRIM SENSOR
			5	GND
			6	LED
2	6	AUX INPUTS	1	+5
			2	GND
			3	CHASSIS GND
			4	I 1
			5	I 2
			6	I 3
3	4	AUX OUTPUTS	1	+48 V
			2	R1
			3	+48 V
			4	R2
4	2	FOOTLIFT	1	FOOTLIFT SOL.
			2	+48V
5	9	TRIM, WIPER, BACKTACK SOLENOIDS, AND MANUAL BACKTACK SW.	1	WIPER SOL. -
			4	WIPER SOL. +(48V)
			2	TRIMMER SOL. -
			5	TRIMMER SOL. +(48V)
			3	BACKTACK SOL. -
			6	BACKTACK SOL. +(48V)
			7	+ MANUAL BACK
			8	- TACK SWITCH
			9	NOT USED



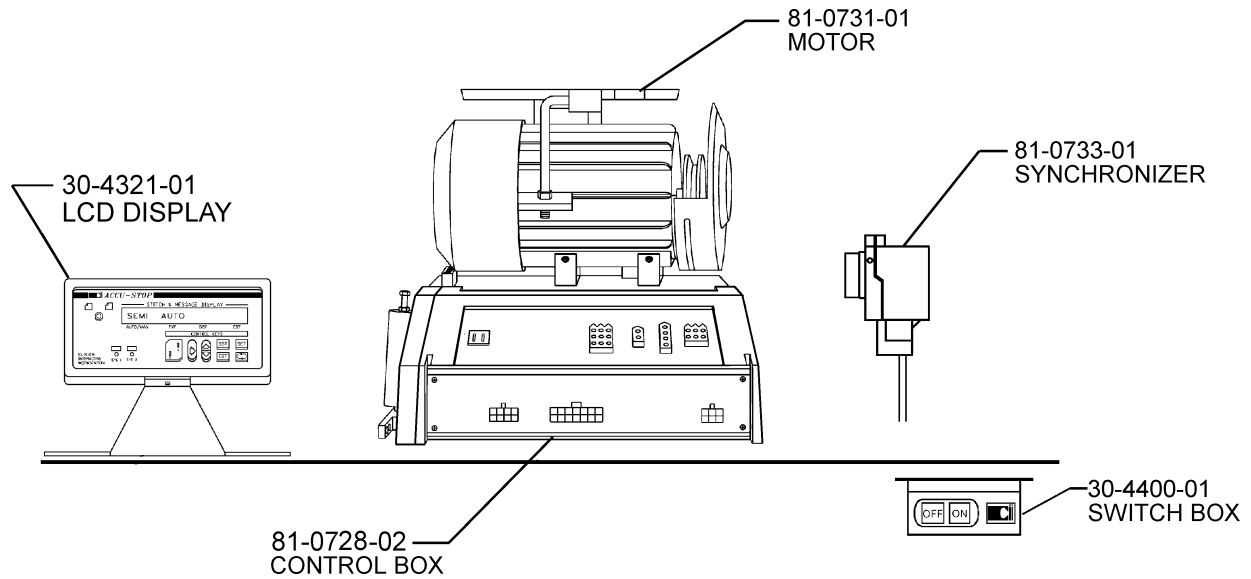
NO.	TOTAL PINS	CONNECTOR	PIN NO.	FUNCTION
8	8	COMMUTATOR	1	+5V
			2	ENCODER (S1)
			3	ENCODER (S2)
			4	SIG. GND
			5	PHASE C
			6	PHASE B
			7	PHASE A
			8	-5V
9	16	LCD DISPLAY	1	EXT1
			2	CHASSIS GND
			3	+5V
			4	GND
			5	D0
			6	D1
			7	D2
			8	D3
			9	D4
			10	D5
			11	D6
			12	D7
			13	CA1
			14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



DRAWINGS AND PARTS LIST

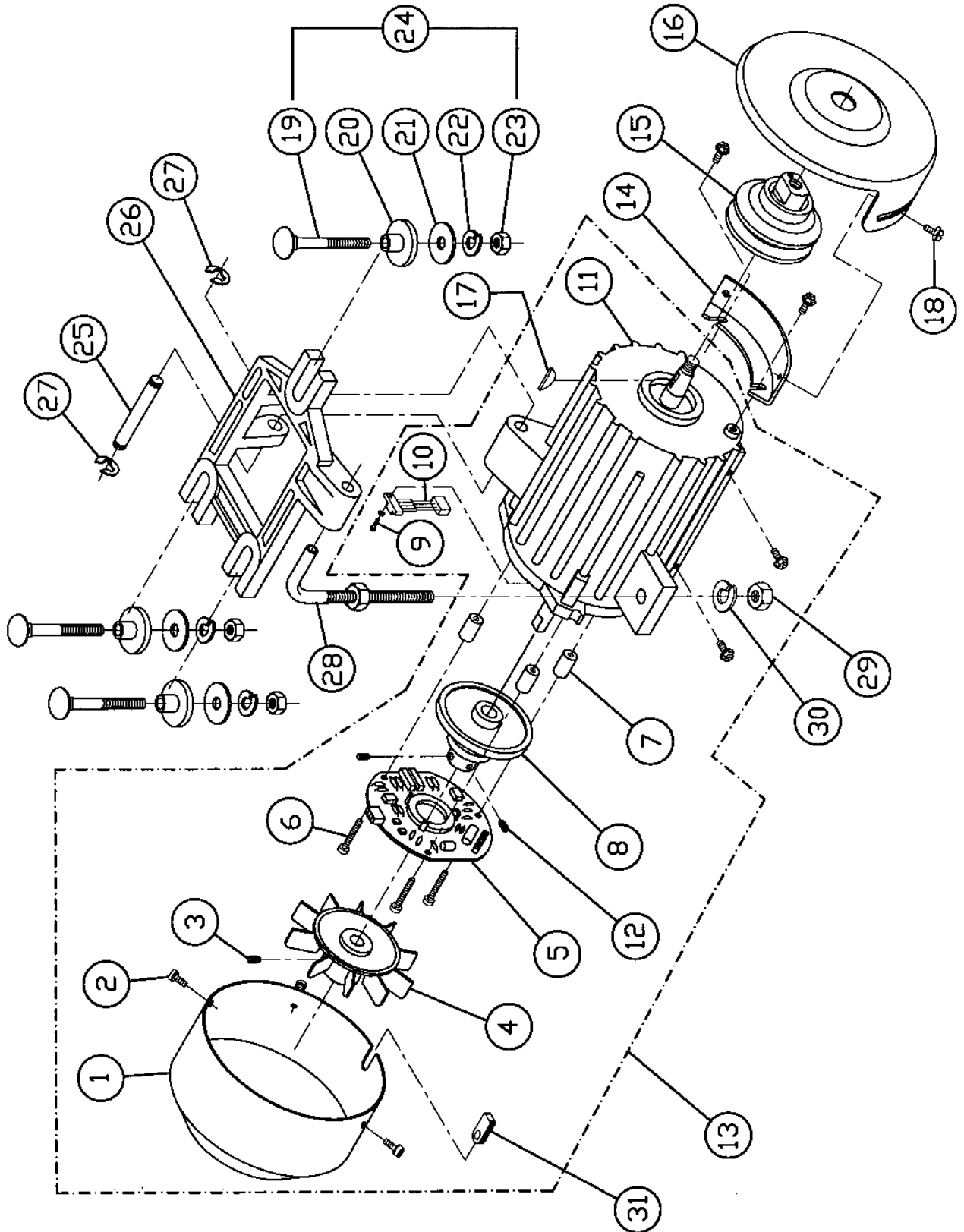
MODEL 890
81-0744-02

A. MAJOR ASSEMBLIES





B. MOTOR ASSEMBLY DC SERVO
81-0731-01



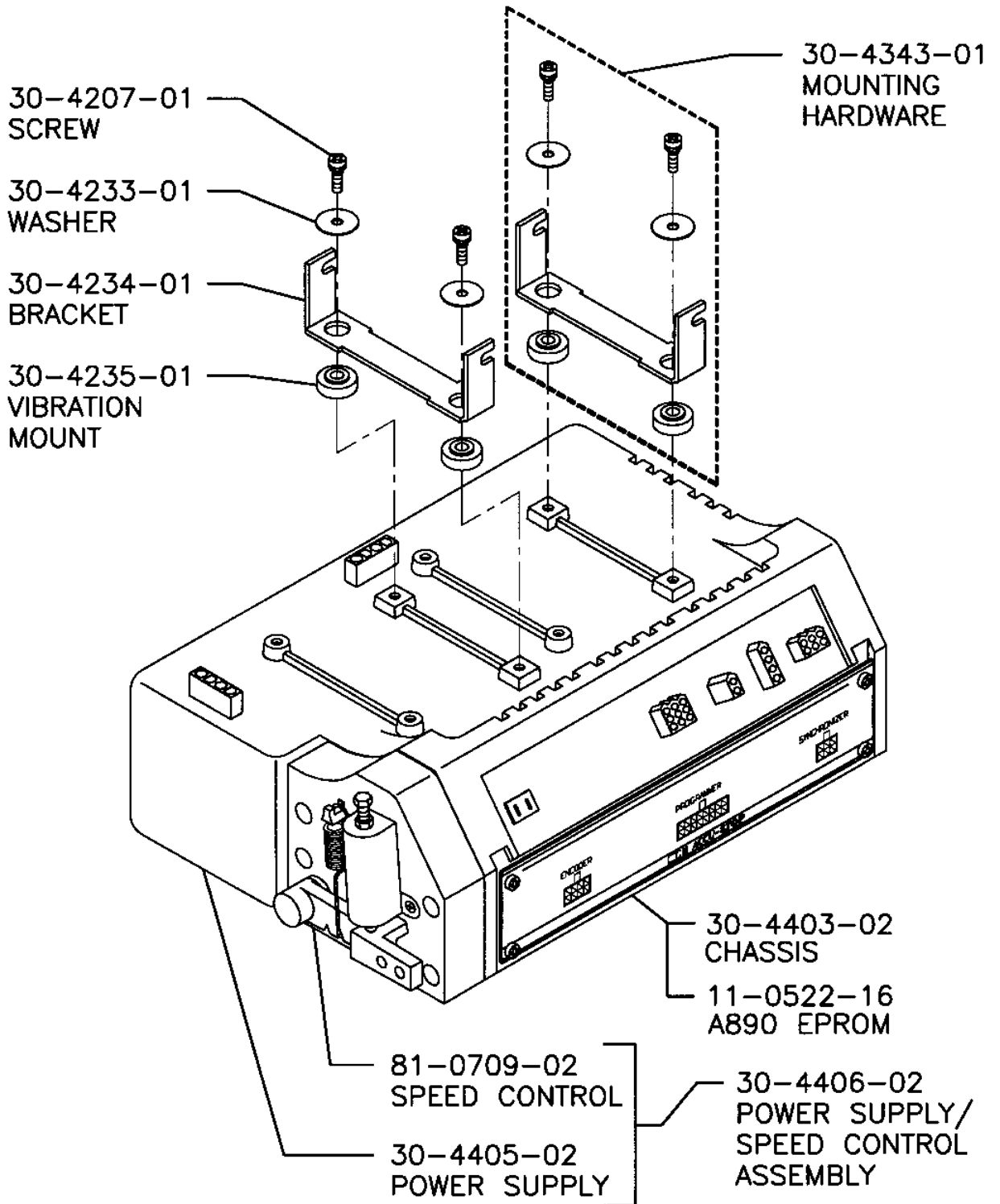


**MOTOR ASSEMBLY PARTS LIST, DC SERVO
81-0731-01**

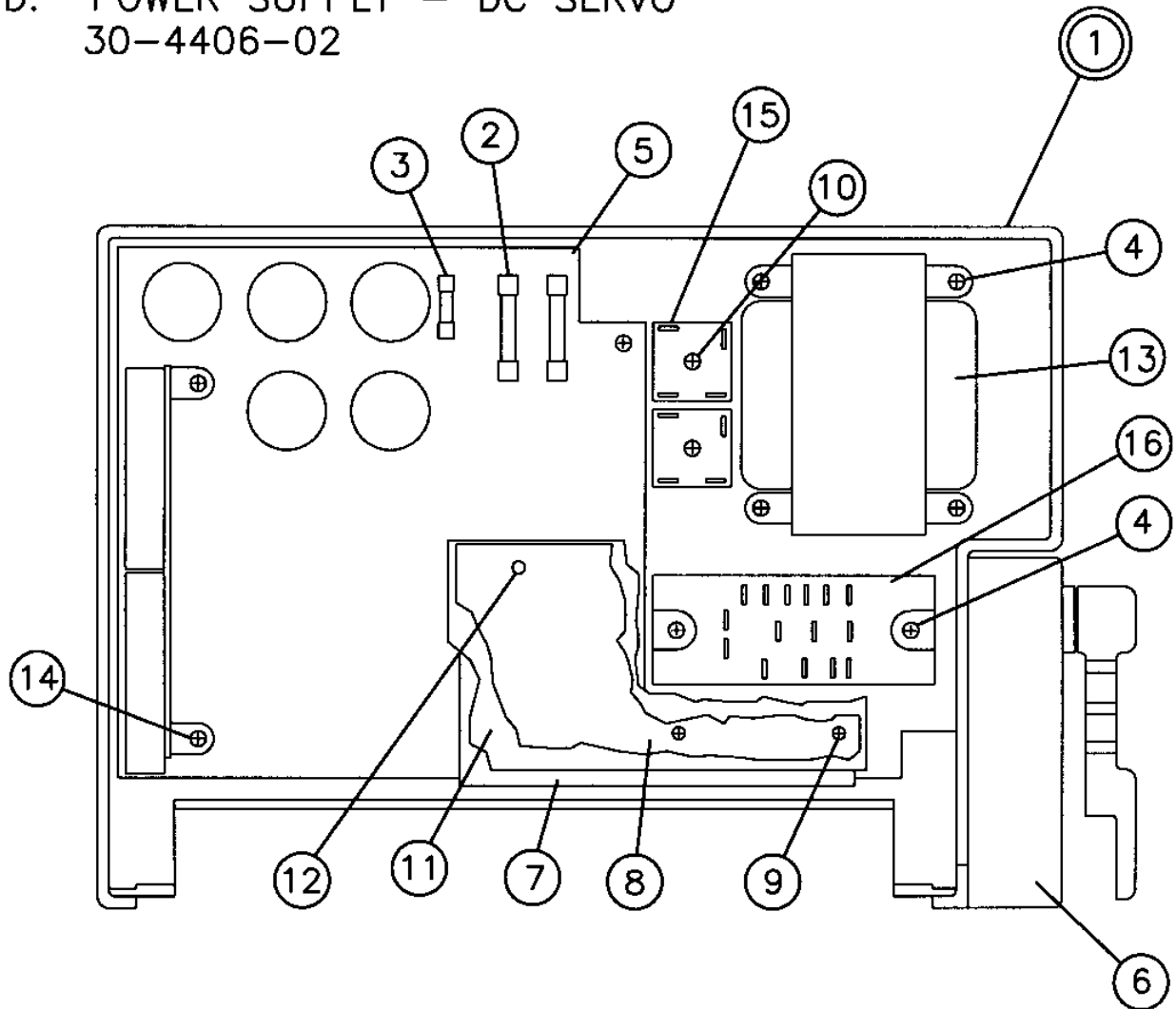
ITEM	DESCRIPTION	PART NO.	QUANTITY
1	COVER	30-4433-01	1
2	SCREW	30-4434-01	3
3	SCREW, S.S.S.	30-4435-01	2
4	FAN	30-4436-01	1
5	PC BOARD, ENCODER	30-4437-01	1
6	SCREW	30-4438-01	3
7	SPACER	30-4439-01	3
8	ENCODER DISC	30-4440-02	1
9	SCREW	30-4441-01	1
10	ENCODER SENSOR	30-4442-01	1
11	MOTOR, DC	30-4443-01	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 ASS'Y-DC SERVO MODEL 890 - 81-0728-02



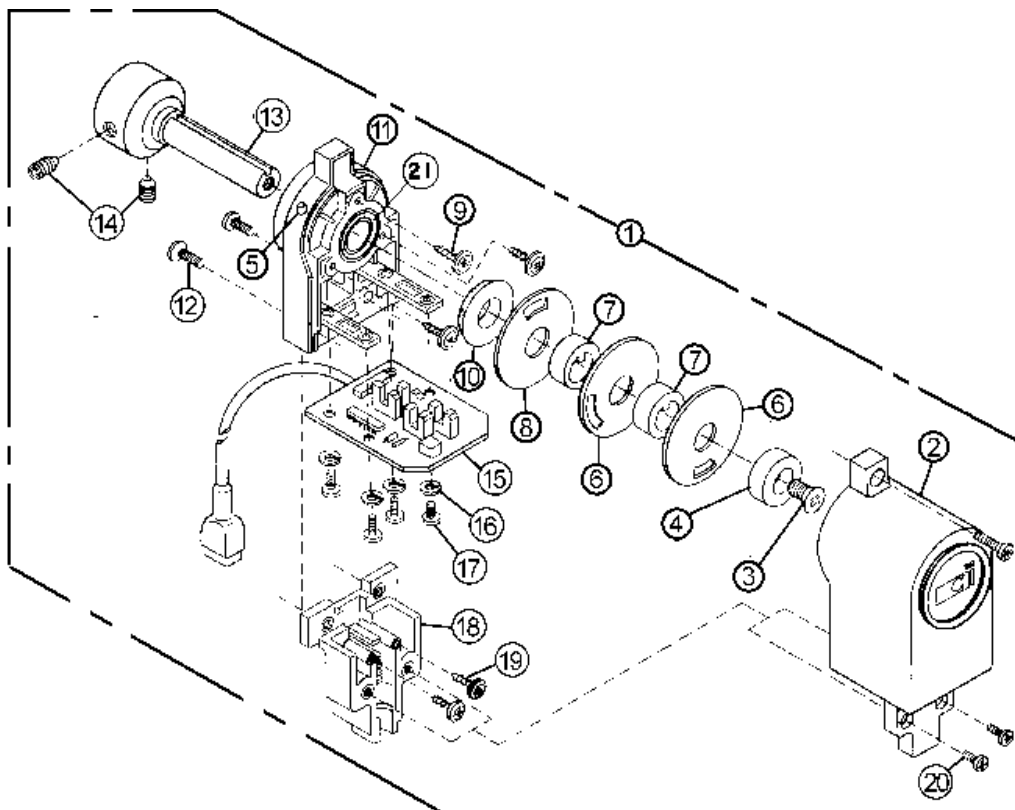
D. POWER SUPPLY - DC SERVO
30-4406-02



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



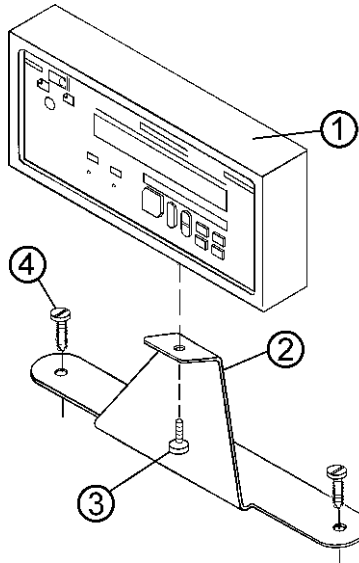
E. SYNCHRONIZER



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 (890)	1
	PROGRAMMABLE DISPLAY	30-4317-01 (870LCD)	1
2	BRACKET, MOUNTING	30-4286-01	1
3	SCREW M4 X 12	30-4287-01	1
4	SCREW	30-4288-01	2

G. MISCELLANEOUS PARTS

