

# DC SERVOMOTOR

## SERVICE MANUAL

MD-803 (Single-Phase Type)  
MD-813 (Three-Phase Type)

Mark II



# INTRODUCTION

This service manual is compiled for the technical staff responsible for maintaining and inspecting the drive motor designed for the automatic thread trimming machine. The manual describes the motor and the control box and also covers adjustments. Read the service manual carefully so that you understand the right handling and adjustment.

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## DESCRIPTION OF THE MOTOR

★ The Brother DC servomotor is best suited to labor-saving applications. To save sewing labor and enhance automation, advanced functions are provided with a full systems design.

### FEATURES

#### 1. Energy Saving

Power consumption is reduced about 50% with the DC servomotor as compared with conventional Brother clutch motors. When the sewing machine is stopped, the DC servomotor is also stopped, resulting in highly effective energy savings.

#### 2. Quiet Operation

While the clutch motor produces a whirring idling sound and vibrations, the DC servomotor is free of these because it does not run when the sewing machine is stopped.

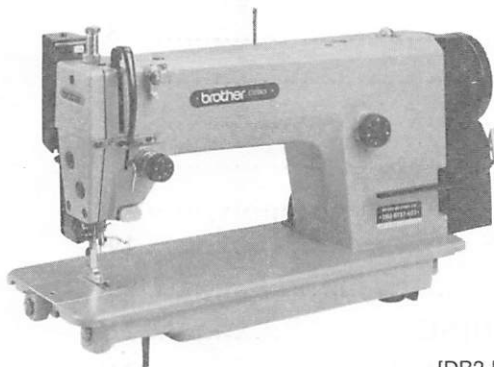
#### 3. Easy maintenance

Maintenance is as easy as adjusting the solenoid brake spacing. There is no need to replace the moving brake plate.

#### 4. Reliability

High integration microcomputers and hybrid ICs are used for higher reliability.

★Use the DC servomotor for the following sewing machines.



[DB2-B737]



[DB2-B737]  
Mark II



[DB2-B791]



[DB2-B7910]

★The DC servomotor is also used with automatic thread trimming machines models DB2-B748, B795, and B798.

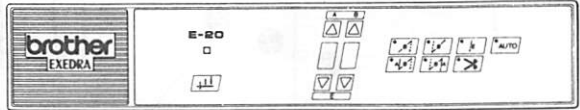
# SPECIFICATIONS

※The operation panel is optionally available. Use the operation panel which is best suited to your work.

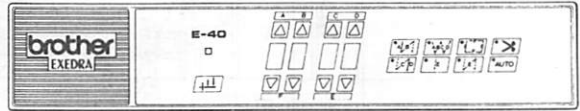


●Operation panel

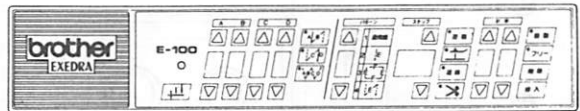
E-20



E-40



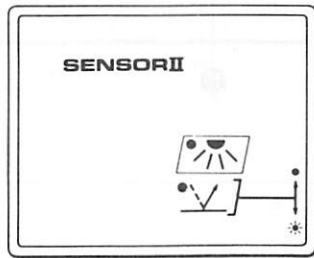
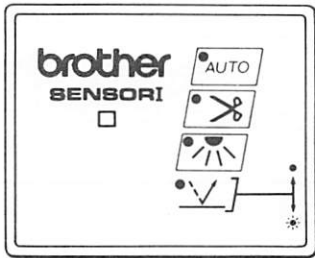
E-100



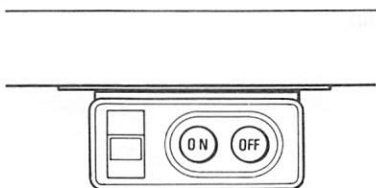
●Production quantity counter



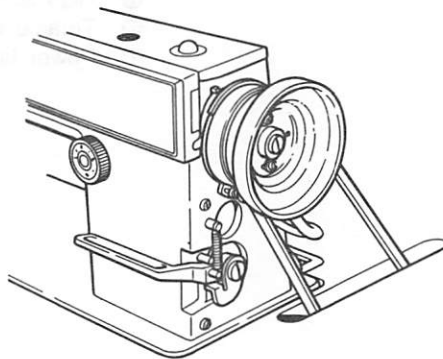
●Sensors



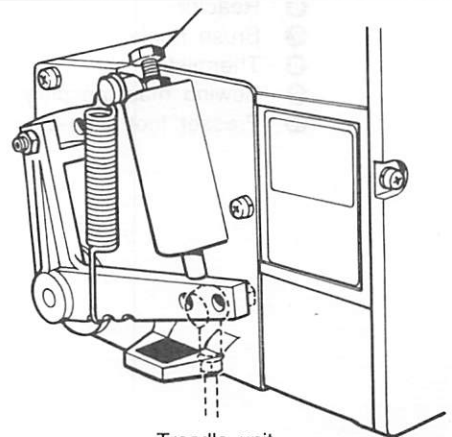
Machine Head to be Applied [DB2-B737 · B748 · B791 · B793 · B795 · B798]  
 [LT2-B842 · B845 · B847 · B848 · B872 · B875]  
 [LZ2-B852 · B853 · B854]



Power switch

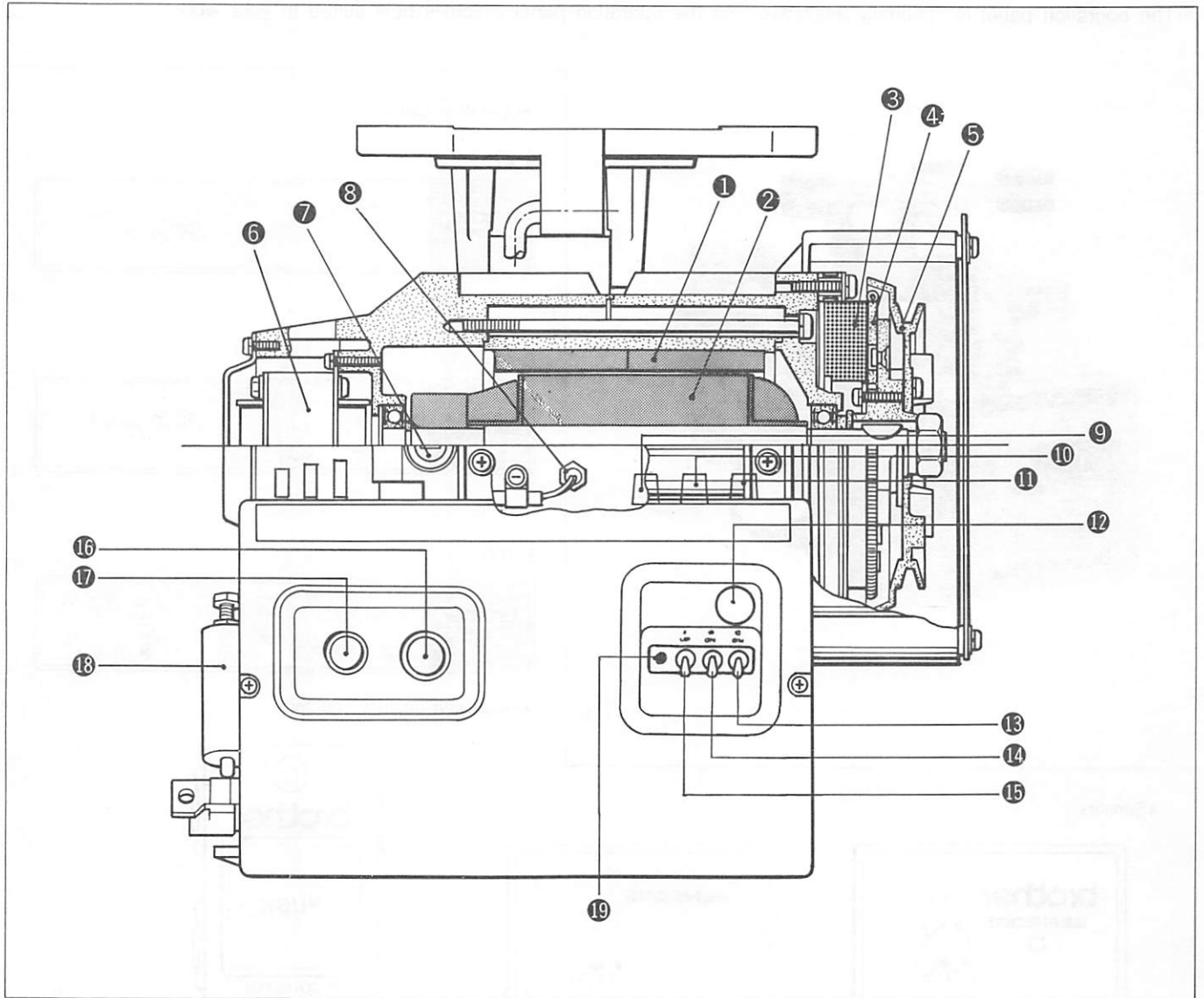


Synchronizer



Treadle unit

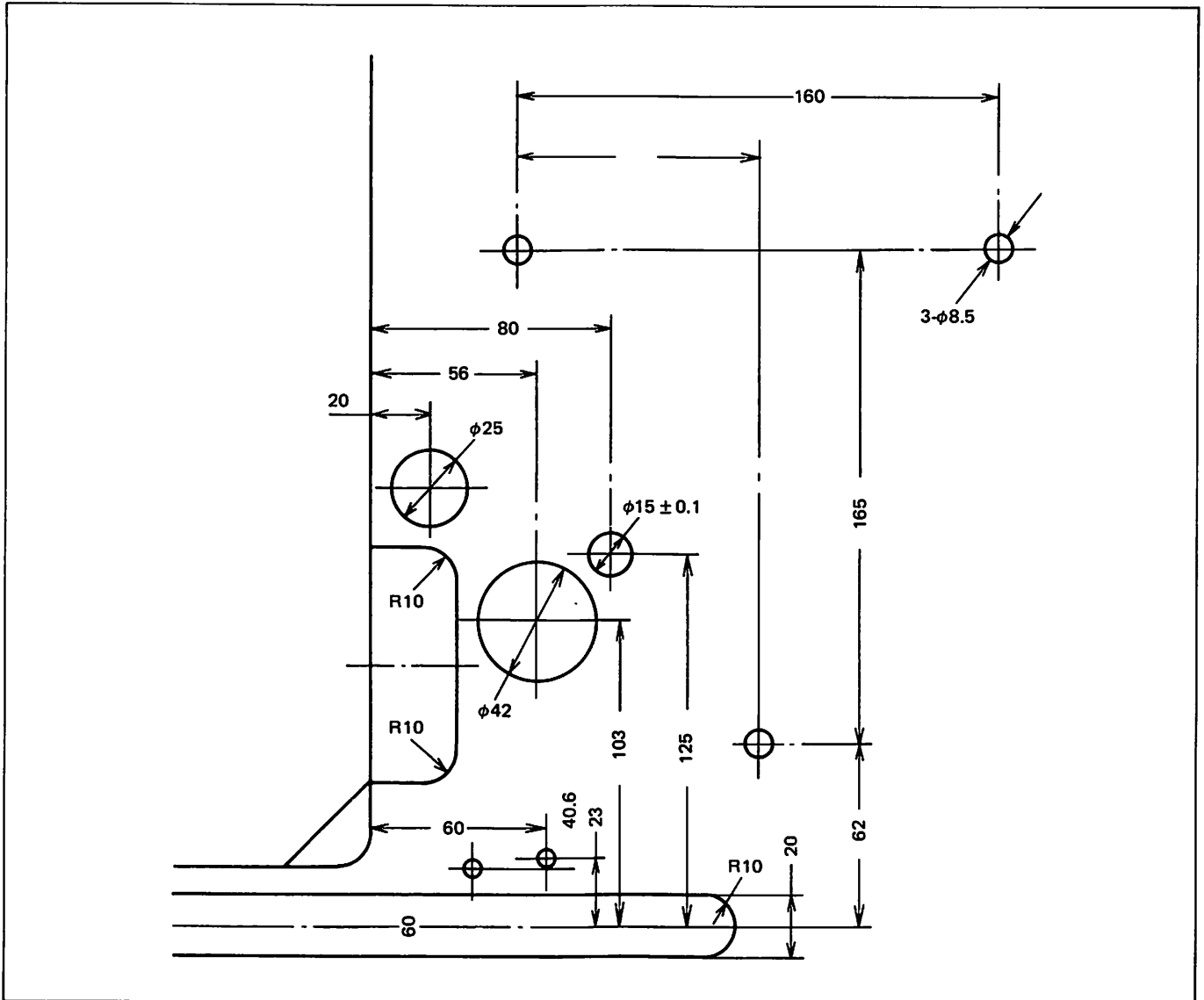
# NAME OF EACH PART



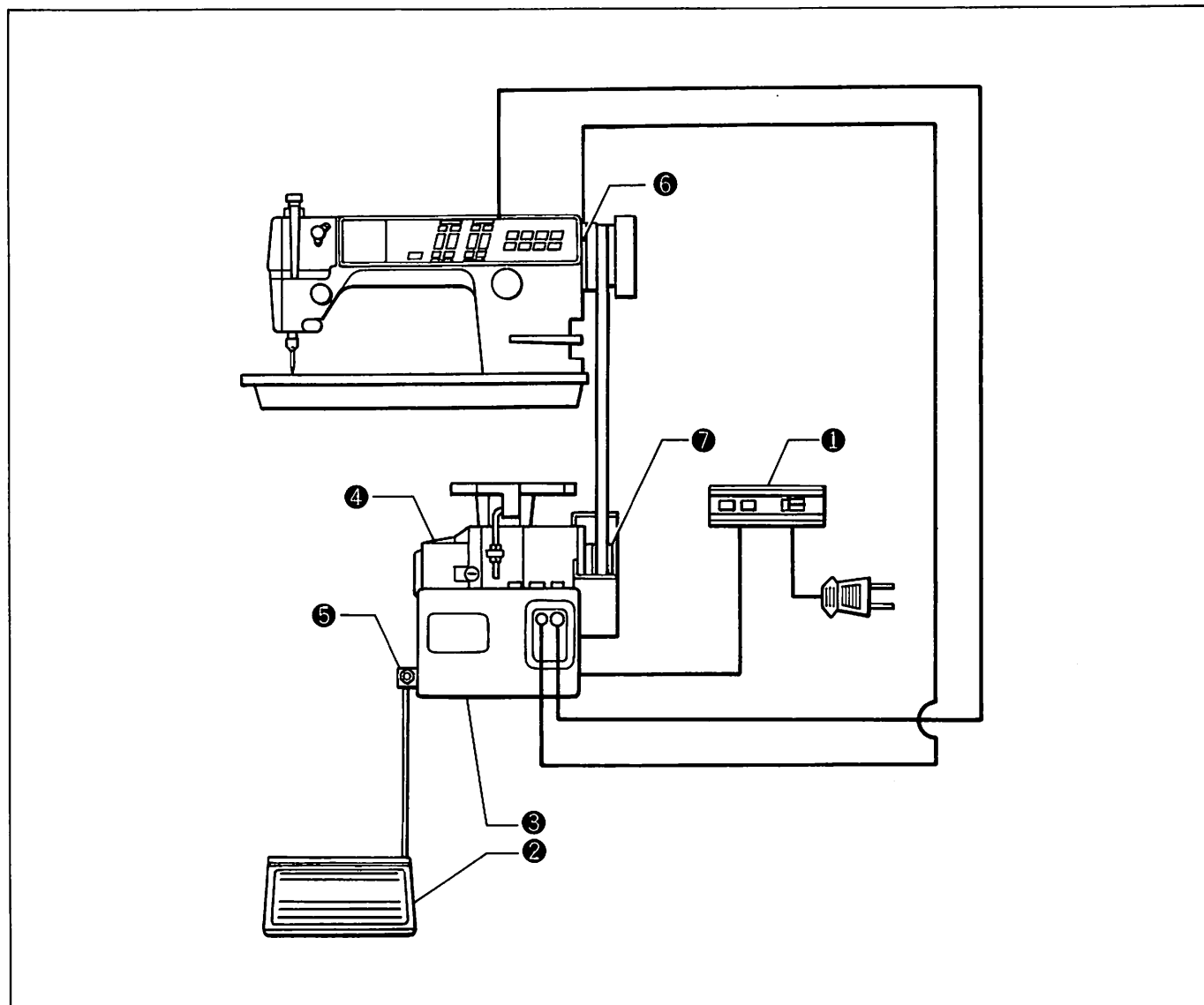
- ① Stator (magnet)
- ② Rotor
- ③ Brake coil (lining)
- ④ Brake armature
- ⑤ Pulley
- ⑥ Reactor
- ⑦ Brush holder
- ⑧ Thermistor
- ⑨ Sewing machine plug
- ⑩ Presser foot lifter plug

- ⑪ Brake plug
- ⑫ Synchronizer plug
- ⑬ Slow start switch
- ⑭ Correction switch
- ⑮ Needle position switch
- ⑯ Backtack sewing speed control
- ⑰ High sewing speed control
- ⑱ Treadle unit
- ⑲ Power lamp

# Motor Mounting Template

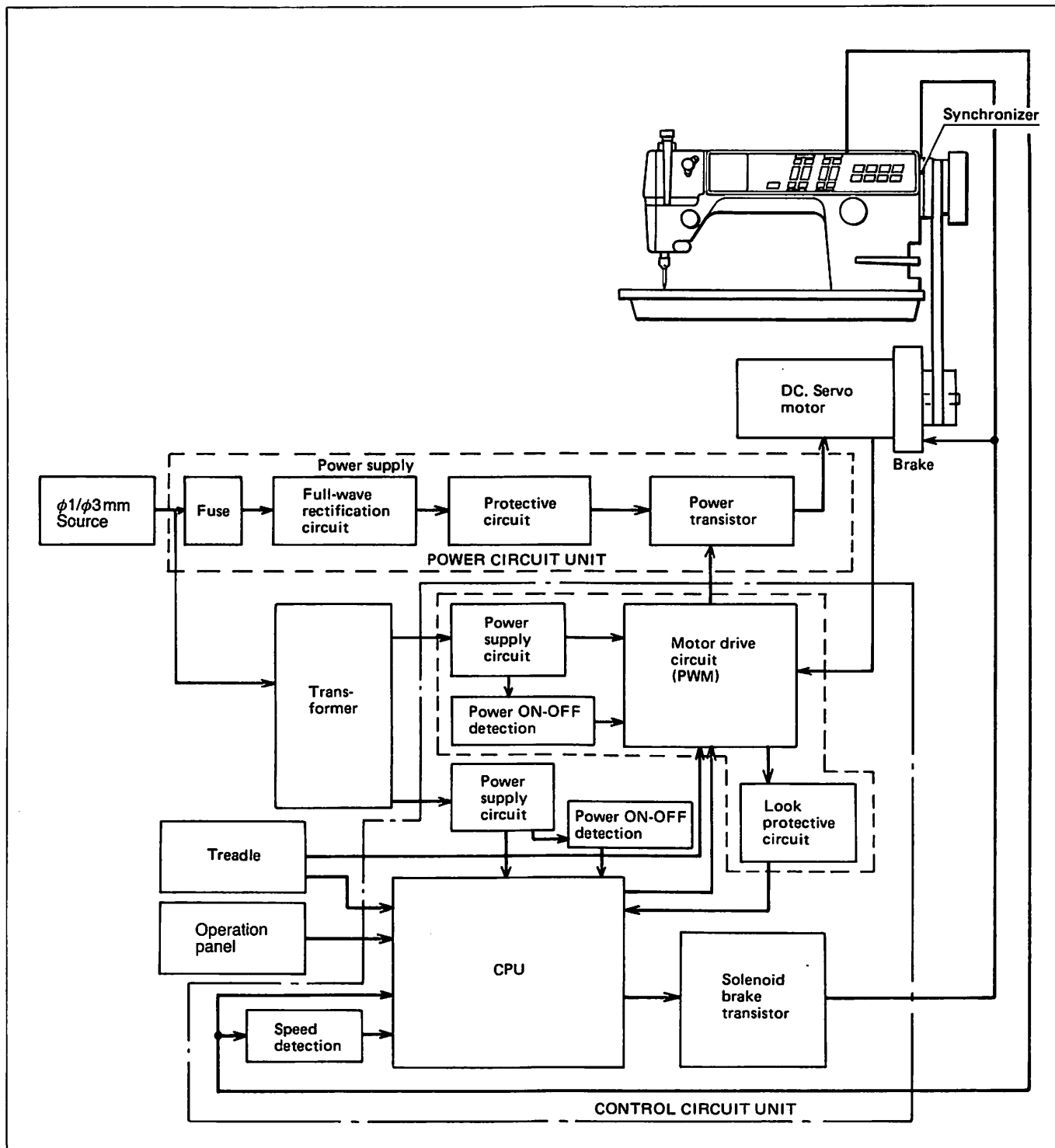


## PRINCIPLE OF CONTROL SYSTEM



1. When the power switch ① is turned on and the treadle ② is depressed, the start signal and a voltage corresponding to how far the treadle is depressed are supplied to the control box ③ by the treadle unit. The voltage is supplied to the motor ④ by the control circuit board in the control box ③ so that the motor runs in proportion to the depression of the treadle to drive the sewing machine.
2. When the treadle ② is returned to the neutral position (with foot off), the neutral signal is sent to the control box ③ by the treadle unit ⑤ and the brake command is given by the control circuit board to decelerate the motor ④. Then the signal from the synchronizer ⑥, mounted on the pulley of the sewing machine, is sent to the control box ③ and the brakes are applied so that the operation of the sewing machine is stopped at the needle down stop position set by the synchronizer ⑥.
3. When the treadle is stepped on again, the thread trimming signal is sent to the control box ③ by the treadle unit ⑤ and the command is given by the control circuit board to run the motor ④ at the thread trimming speed (inching speed). Then the signal from the synchronizer ⑥ is sent to the control box ③ and the brakes ⑦ are applied so that the operation of the sewing machine is stopped at the needle up stop position set by the synchronizer ⑥.

# CONFIGURATION



Note: The sections enclosed by the broken line indicate where high voltage is applied. Handle these sections with great care.

## CAUTION:

1. When setting down the machine head or touching the needle, be sure to turn off the power switch and confirm that the pilot lamp is OFF.
2. Ground cords are provided for both single-phase and three-phase types. Do not fail to ground the motor. (A ground cord is not provided for single-phase 110V types. Be sure to ground the motor frame if necessary.)
3. When adjusting the controls in the control box, be sure to turn off the power switch, remove the front cover and confirm that the pilot lamp is OFF.  
\*It is dangerous to handle the control box when the power is on because high voltage is applied. Handle with great care.
4. Do not use the DC servomotor rear machines which generate strong high frequency noise, e.g., are welders.



## COMPATIBILITY OF MD-802, 812 AND MD-803, 813 (except B738 or B7380)

		MD-802, 812	MD-803, 813	
Control circuit board	1-110V	S-PCB300B1-100V (291270-110)	S-PCB500B1-100V (291782-110)	
	1-230V	S-PCB300B1-230V (291270-123)	S-PCB500B1-230V (291782-123)	
	3-230V	S-PCB300B3-230V (291270-323)	S-PCB500B3-230V (291782-323)	
	3-400V	S-PCB300B3-400V (291270-340)	S-PCB500B3-400V (291782-340)	
Threadle unit	comp.	PS-UNIT#8 (291442-001)	PS-UNIT#11 (291790-001)	
	p.c.b.	PS-PCB#8 (291443-001)	PS-PCB#11 (291792-001)	
Operation box or panel		E-2 (137209-90103) E-4 (137209-90203)	MarkII	others
			E-20 137208-91111	137208-91120
			E-40 137208-91211	137208-91220
			E-100 137208-91311	137208-91320
SI, SII reference *1				
Power board	1-110V	D-PCB1-110V (291273-001)		
	1-240V	D-PCB1-240V (291274-001)		
	3-240V	D-PCB3-240V (291275-001)		
	3-400V	D-PCB3-415V (291276-001)		
Transformer	110V (6V)	229963-001		
	220V (6V)	229643-001		
	220V (12V)	230660-001		
	230V (6V)	229645-001		
	240V (6V)	229646-001		
	240V (12V)	231335-001		
	380V (6V)	229561-001		
	380V (12V)	229623-001		
	415V (6V)	230214-001		
	415V (12V)	229644-001		
Motor		There is fundamentally two kinds of motor, one is from 100V to 240V, another is higher than 380V. But as motor level depends on each voltage or phase, there are many motors.		
Synchronizer		Synchronizer #13 (291079-001) #14 (291670-001) ; For twin needle		

Note: Power board 1-110V (100~110V), 1-240V (200~240V), 3-230V (220~240V), 3-400V (380~440V)

Note: ( ) is lamp tap voltage.

\*1 Sensor

Sewing machine	SI	SII
B737 MarkII	SENSOR#1-1 (291655-002)	SENSOR#2-2 (291657-002)
B748	SENSOR#1-1 (291655-002)	SENSOR#2-1 (291659-002)
B842 type	SENSOR#1-3 (291673-002)	SENSOR#2-3 (291674-002)
B791	SENSOR#1-4 (291656-002)	SENSOR#2-4 (291640-002)
B793, B795	SENSOR#1-5 (291658-002)	SENSOR#2-5 (291641-002)
B798	SENSOR#1-6 (291744-002)	SENSOR#2-6 (291642-002)

## MOTOR

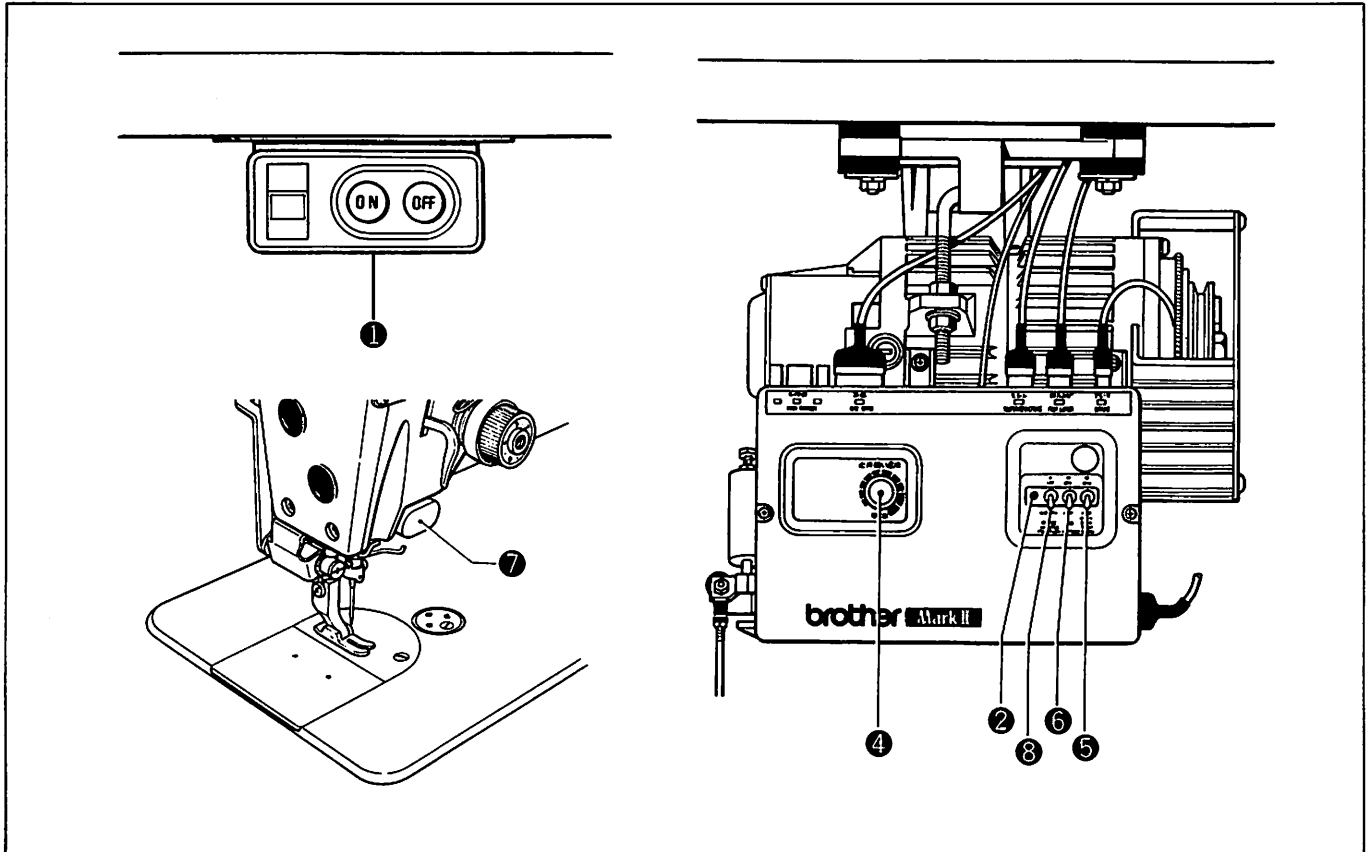
			MD-802 -812	MD-803 -813
Motor Assembly	Single phase	110V	291408-001	291823-001 (MD-803C)
		220V	291409-001	
		230V	291410-001	291824-001 (MD-803A)
		240V	291411-001	
	Three phase	220V	291412-001	291825-001 (MD-813A)
		380V	291413-001	291826-001 (MD-813B)
415V		291414-001		
Bracket L	Single phase Three phase 220V		231001-001	
	Three phase 380V, 415V		231003-001	
Brush	Single phase Three phase 220V		231556-001	
	Three phase 380V, 415V		231558-001	
Rotor#145	Single phase 110V		231646-001	
	Single phase 220~240V		231004-001	
	Three phase 380V, 415V		231018-001	

## OPERATION PANEL

Model	Operation panel	
B737 MarkII	E20	137-208-911-11
	E40	137-208-912-11
	E100	137-208-913-11
B791 B798 B748	E20	137-208-911-15
	E40	137-208-912-15
	E100	137-208-913-15
LT2-B842 Type	E20	137-208-911-17
	E40	137-208-912-17
	E100	137-208-913-17
B793 B795	E20	137-208-911-19
	E40	137-208-912-19
	E100	137-208-913-19
Operation panel	E20	137-208-911-20
	E40	137-208-912-20
	E100	137-208-913-20

# OPERATION INSTRUCTION

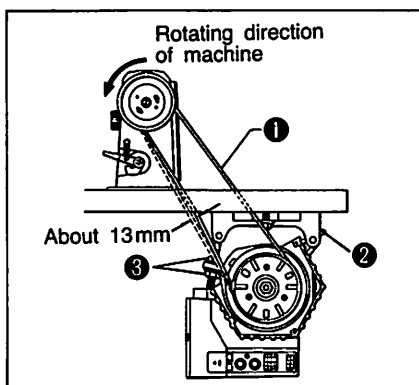
## 1 Motor control and control box use



- ★ The power lamp ② will light up when the power switch ① is turned on.
- ★ Sewing speed will increase as the speed control ③ is turned toward HIGH (to the right), and will decrease as the control is turned towards LOW (to the left).  
The sewing speed range varies from a minimum 215spm to an adjustable maximum speed.
- ★ Start backtack sewing speed will increase as the backtack sewing speed control ④ is turned clockwise, and will decrease as the control is turned counterclockwise.  
The start backtack continuous sewing speed range is 215 to 3000spm. The end backtack sewing speed is set at 1800spm and cannot be adjusted.
- When the slow start switch ⑤ is switched to ON, the first two stitches (after thread trimming and needle up position stop) will be sewn at low speed. Sewing speed after these first two stitches is regulated by depressing the treadle.
- When the correction switch ⑥ is ON, the machine will sew in the correction stitch mode (215spm) when the actuator ⑦ is depressed while the machine is stopped. If the actuator is depressed during machine operation, the machine will enter the reverse sewing mode.
- The machine will stop with the needle in the down position if the machine is stopped after setting the needle position switch ⑧ to the needle down position. Conversely, the machine will stop in the needle up position if the needle position switch ⑧ is set to the needle up position.

# ADJUSTMENT

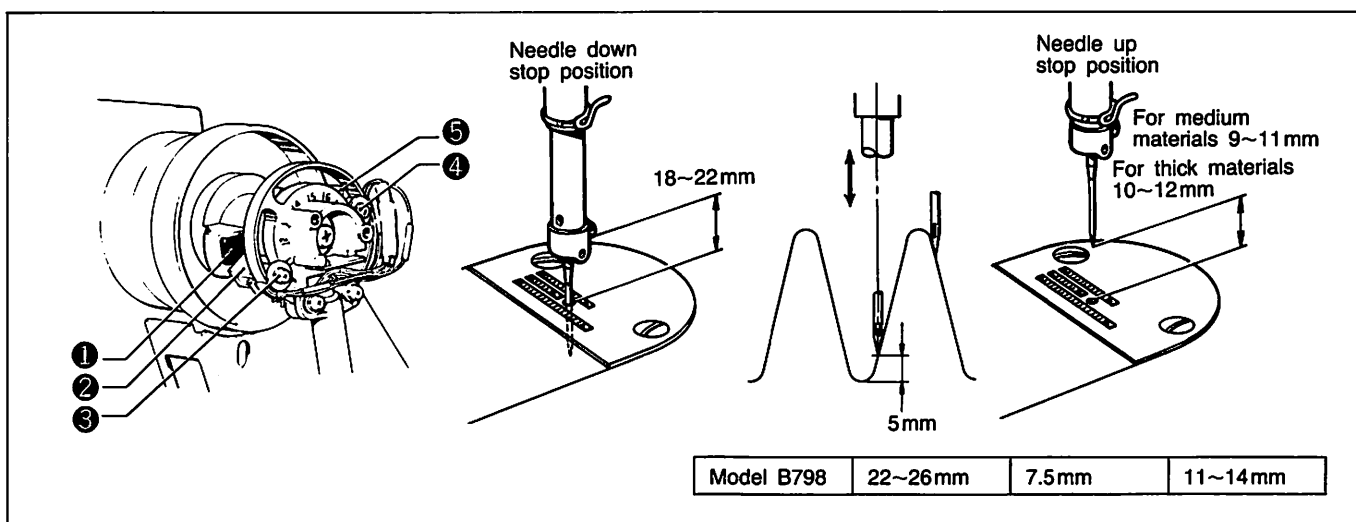
## 1 DC Servomotor



- ★ Lower the machine head and then mount the belt on the motor pulley and the machine pulley.
- ★ The belt fits the machine pulley and the motor pulley as shipped. Belt tension may loosen in time. Check the belt tension.
- ★ The machine rotates counterclockwise as seen from the pulley side.
- ★ Adjust the belt ① by loosening the set screw ② and turning the nut ③ so that it gives about 13mm when pressed by hand.

## 2 Needle position detector (synchronizer) Model DB2-B791 · B793 · B795 · B798

- ★ Take off the synchronizer cover for adjustment. The synchronizer detects the needle with two sensors and controls the needle down signal and the thread trimming signal with one sensor.



- ★ In adjusting each sensor, do not fail to turn off the power switch.

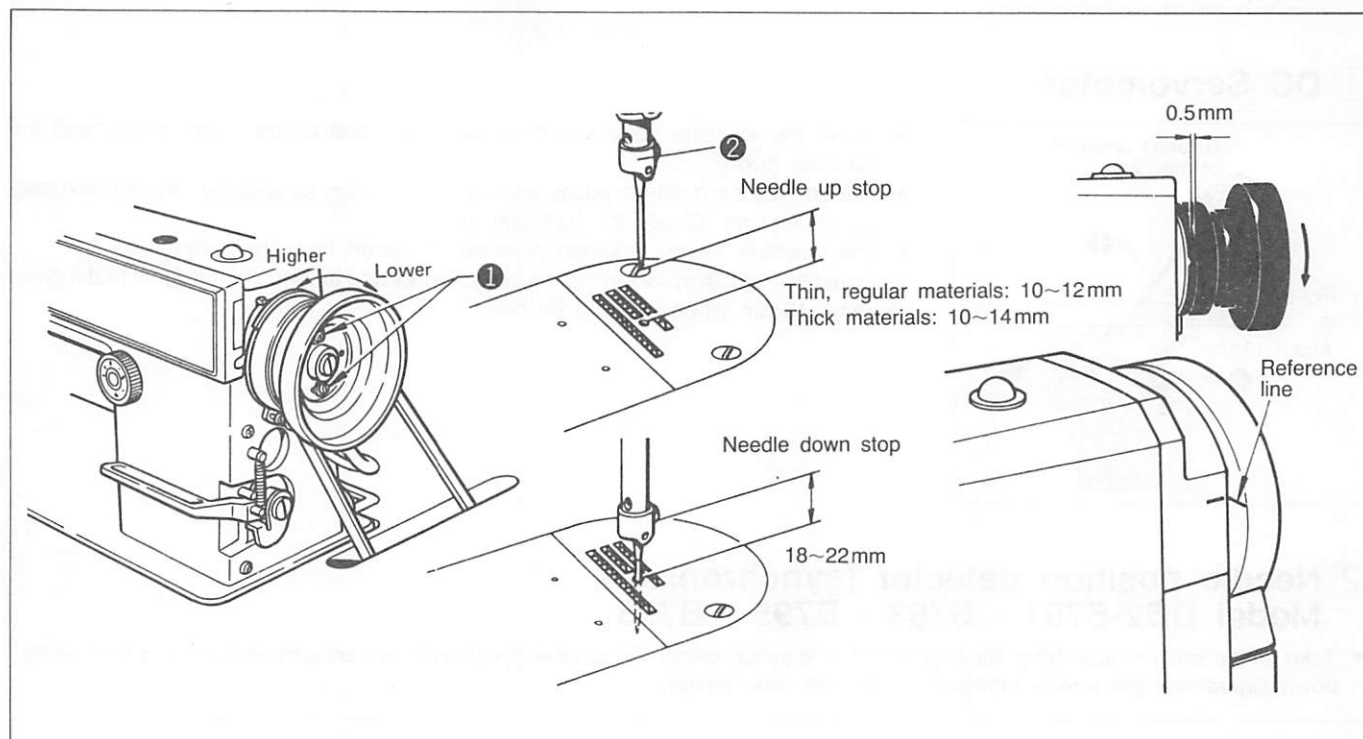
### Position adjustment for needle down signal

- ★ Turn the machine pulley this side and set the needle 5mm up from the bottom to align the lower end of the magnet ① with the upper end of the thread trimming needle down sensor ②.  
(As for the model B747 · B748, adjust the needle 7mm up from the bottom and as for the model B798, 7.5mm up.)  
When the lower end of the magnet ① does not coincide with the upper end of the thread trimming needle down sensor ②, loosen the screw ③ and move the thread trimming needle down sensor for adjustment.  
When the thread trimming needle down sensor ② is moved in the rotating direction, the needle bar comes up. And when in the reverse direction, the needle bar comes down.  
Turn on the power switch and stop the machine at the needle down stop position so that the distance between the top of the needle plate and the lower end of the needle clamp screw is 18~22mm. (As for the model B798, the distance is 22~26mm.)

### Position adjustment for needle up signal

- ★ Stop the machine at the needle up stop position. The needle point stops 9~11mm away from the top of the needle plate for thin and medium materials, and 10~12mm for thick materials.  
(As for the model B798, the needle point stops 11~14mm away.)  
When the needle point does not stop properly, loosen the screw ④ and move the needle up stop sensor ⑤ for adjustment.  
When the needle up stop sensor ⑤ is moved in the rotating direction, the needle bar comes down. And when in the reverse direction, the needle bar comes up.
- ★ Tighten the screw ③ and ④ by the force of 6~10kg-cm.

## Synchronizer Model DB2-B737 · B748



- ★ The synchronizer detects the needle position with two sensors.  
The thread trimmer signal is timed to the needle down position signal and the treadle reverse signal.
- ★ When the power is turned on and the needle stopped in the down position, the distance between needle plate top and needle set screw bottom should be 18 to 22mm.  
When the needle is stopped in the up position and the pulley reference line is within the belt cover reference lines, the distance between needle plate top and needle tip should be 10 to 12mm with thin and regular materials, 10 to 14 mm with thick materials. (With Model B748 the needle up stop position is 10~14mm.)  
Adjust as follows when necessary.
- ★ Turn the power off.

### Needle up position

1. Slightly loosen the two screws ①.  
Move the set screws ① in the direction of normal pulley movement to raise the needle bar ② stop position. Turn the other way to lower the needle bar.

### Needle down position

1. Set the treadle to reverse and then release it to neutral. (This is the needle down stop position.)
  2. The needle plate top to needle screw bottom gap should be 18~22mm.
  3. Loosen screw ③ and move the synchronizer ④ to adjust.
- \* Check the needle up stop position.
  - \* When the machine pulley is removed once, provide 0.5mm clearance between the pulley bottom and the synchronizer for installation.  
(Improper clearance causes improper machine operation)

### When the synchronizer is out of order . . .

- ★ Turn off the power switch and disconnect the synchronizer cord.  
Use the machine with standard function (without thread trimming) until the synchronizer is replaced.

### ③ Control box

#### Control box (Model DB2-B737)

The high speed volume, backtack stitch volume, power lamp, needle position switch, one-stitch modification switch, slow start switch and connector for synchronizer are arranged on the front of the control box. All these parts are already provided on the control circuit board.

The control circuit board is installed on the inside of the control box.

The power circuit board is at the back and the treadle unit is on the left side wall.

The right side wall is furnished with one 15A fuse for the 110~240V single-phase type, two 5A fuses for the 200~240V three-phase type and two 3A fuses for 380~440V three-phase type.

The control circuit board is provided with the 8A fuse for solenoid load.

\*Do not fail to secure the fuse holder cap after replacing or inspecting the fuses.

\*Never short-circuit the lamp terminal (AC 6V or 12V terminal) for lighting, or the transformer may be broken.

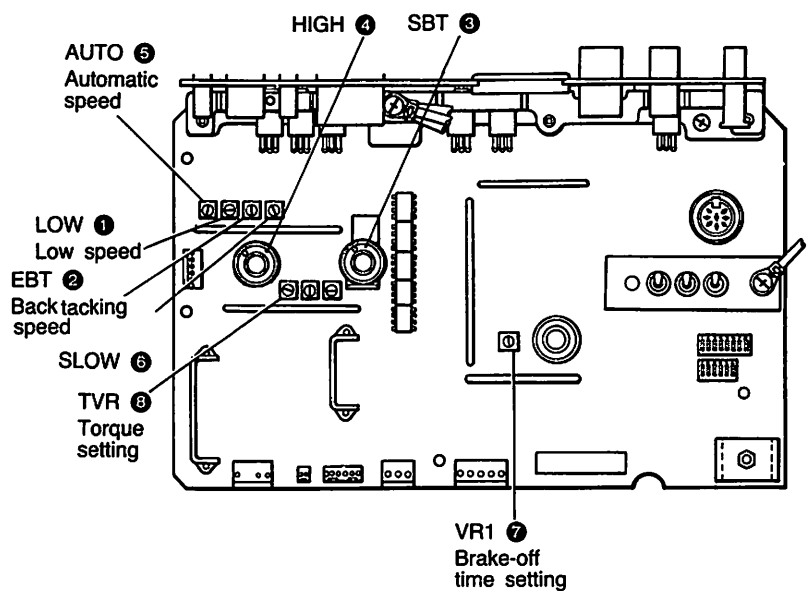
### Control circuit board

#### Explanation of each volume knob

\*Do not turn the volume knobs when not necessary.

Model B737 · B748 · B791 · B793 · B795 · B798

1. Take off the front cover.
2. When the LOW VR ① (low speed and thread trimming) is turned clockwise, the low machine speed is adjusted to increase.
3. When the EBT VR ② (end backtacking speed) is turned clockwise, the backtacking speed is adjusted to increase.
4. The SBT VR ③ is start backtacking speed and continuous backtacking speed adjust volume.
5. The HIGH VR ④ is high sewing speed adjust volume.
6. The AUTO VR ⑤ is automatic sewing speed adjust volume.
7. The SLOW VR ⑥ is slow start speed adjust volume.
8. When the VR1 ⑦ is (brake-off timing set) is turned clockwise, the brake force is adjusted to increase. And when counter-clockwise, it is adjusted to decrease.
9. When the TVR ⑧ (torque setting) is turned clockwise, the torque is adjusted to increase.



#### CAUTION:

Other volume knobs are factory set, so that they never require adjustment.

Note 1: It is dangerous to touch the volume knobs by finger because high voltage is applied. Do not fail to turn off the power switch before adjustment. To check the setting, turn it on again.

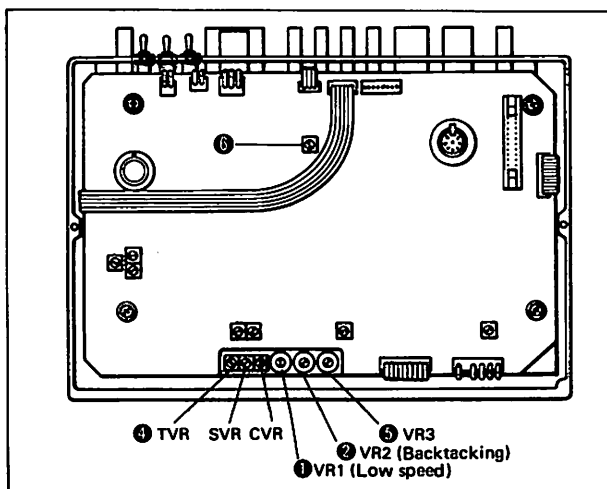
Note 2: Take care that the driver does not touch other parts but the volume knobs for adjustment. Adjust the volume knobs with great care. They may be broken if turned past the stop point.

Note 3: When any volume knob is turned by mistake, turn it back so that the red indexes match with each other.

## 4 Explanation each dip switches

Dip A			
1	Position of presser after thread trimming	ON	Down
		OFF	Raised
2	Position of presser after thread trimming with treadle at neutral	ON	Raised
		OFF	Down
3	Position of presser when machine is stopped with treadle at neutral	ON	Raised
		OFF	Down
4	Double start backtack	ON	Double start backtack (W)
		OFF	Single start backtack (V)
5	Double end backtack	ON	Double end backtack (W)
		OFF	Single end backtack (V)
6	AB+10 backtack	ON	10 stitches added to the displayed AB seam length
		OFF	Seam AB sewn as displayed
7	CD+10 backtack	ON	10 stitches added to the displayed CD seam length
		OFF	Seam CD sewn as displayed
8	Continuous backtack selection	ON	A+C, B+C, sewn repeatedly D times
		OFF	A, B, C, D
Dip B			
1			Normally OFF
2	Start backtack selection	ON	Stops when treadle is returned to neutral
		OFF	Sews to end of B when treadle is at neutral
3	Start and End backtack stitch number	ON	Fixed 4-stitches setting becomes variable with models E-20, E-40
		OFF	Fixed at 4 stitches
4	Actuator switch	ON	Thread trimming controllable with actuator switch
		OFF	none
5			Normally ON
6	Unused		

### Model B7380



1. Take off the front cover.
2. When VR1 ① (low speed and thread trimming) is turned clockwise, the low machine speed increases.
3. VR2 ② (backtacking speed) is preset at 1800spm. It does not require adjustment. (Do not touch VR2, or the stop position varies.)
4. VR3 ⑤ (automatic speed) is changed by the maximum sewing speed volume knob, so VR3 requires no adjustment.
5. When TVR ④ (torque setting) is turned clockwise, the torque increases.
6. When the VR1 ⑥ (brake-off time setting) is turned clockwise, the brake force increases. When turned counterclockwise, it decreases.

#### CAUTION:

Other volume knobs are factory set, so that they never require adjustment.

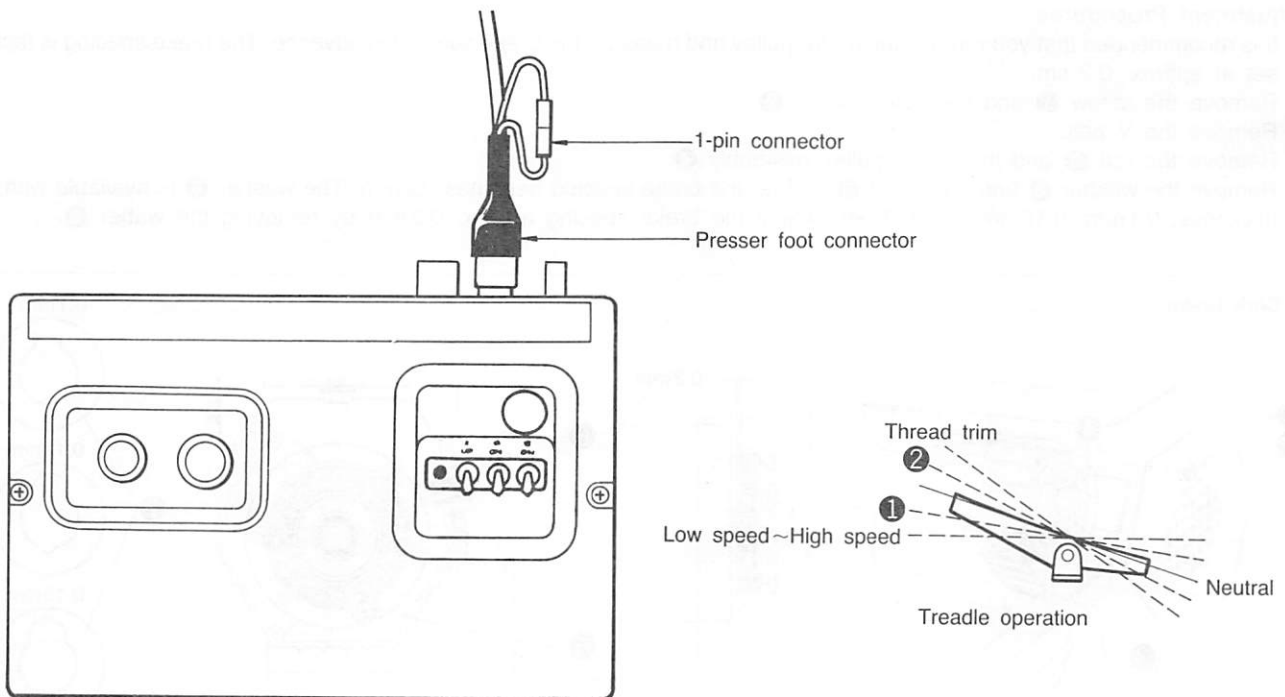
Note 1: It is dangerous to touch the volume knobs by finger because high voltage is applied. Do not fail to turn off the power switch before adjustment. To check the setting, turn it on again.

Note 2: Take care that the driver does not touch other parts but the volume knobs for adjustment. Adjust the volume knobs with great care. They may be broken if turned past the stop point.

Note 3: When any volume knob is turned by mistake, turn it back so that the red indexes match with each other.

#### 4 Use of the presser foot connector (1-pin) and DIPA2, 3

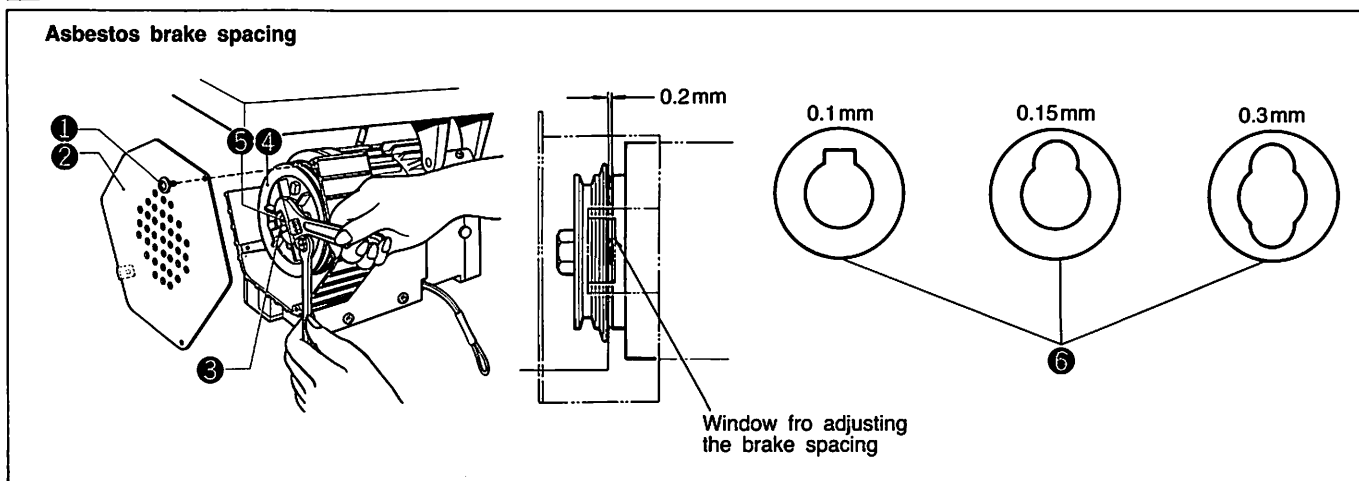
			After thread trimming	Stop state after returned to neutral
1-pin short			Allways up at neutral Down at ①	Allways up at neutral Down at ①
1-pin open	DIPA 2	ON	Allways up at neutral Down at ①	irrelevance
		OFF	Allways down at neutral Up at ②	
	DIPA 3	ON	irrelevance	Allways up at neutral Down at ①
		OFF		Allways down at neutral Up at ②



Presser foot conditions are indicated by UP (raised) and DOWN (lowered).



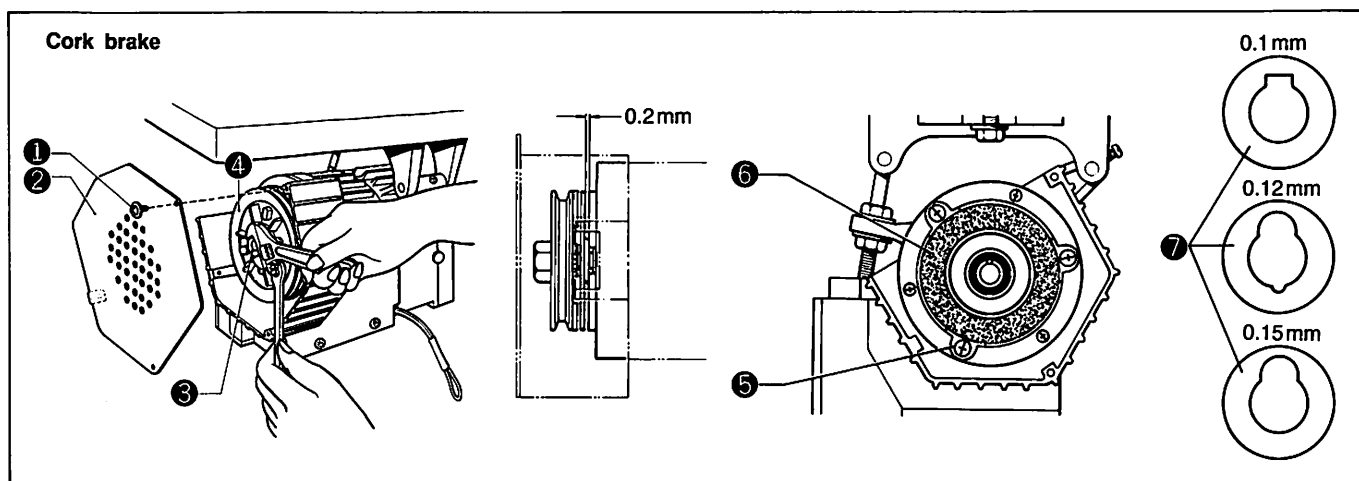
## 6 Motor brake



★ Adjust the brake spacing when about two years have passed. And also adjust when the brake generates abnormal noises and does not stop stably.

### Adjustment Procedures

1. It is recommended that you remove the motor pulley and measure the brake spacing in advance. The brake spacing is factory set at approx. 0.2mm.
2. Remove the screw ① and the pulley cover ②.
3. Remove the V belt.
4. Remove the nut ③ and the motor pulley assembly ④.
5. Remove the washer ⑥ from the shaft ⑤ so that the brake spacing becomes 0.2mm. The washer ⑥ is available with the thickness, 0.1 mm, 0.15mm and 0.3mm. Adjust the brake spacing approx. 0.2mm by removing the washer ⑥.



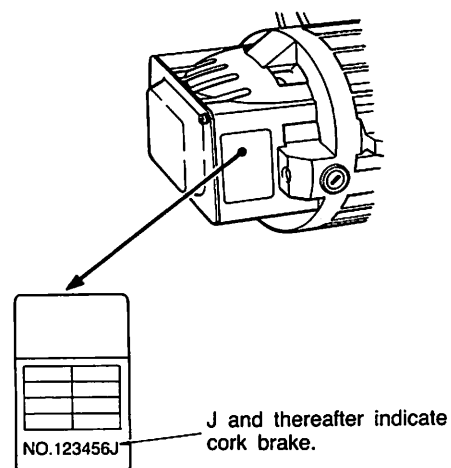
★ Check for brake lining wear (excessive gap) if the brakes become noisy or the sewing stop position fluctuates. If the lining is worn (the gap is large), replace the brake lining ⑥.

### Replace the brake lining as follows.

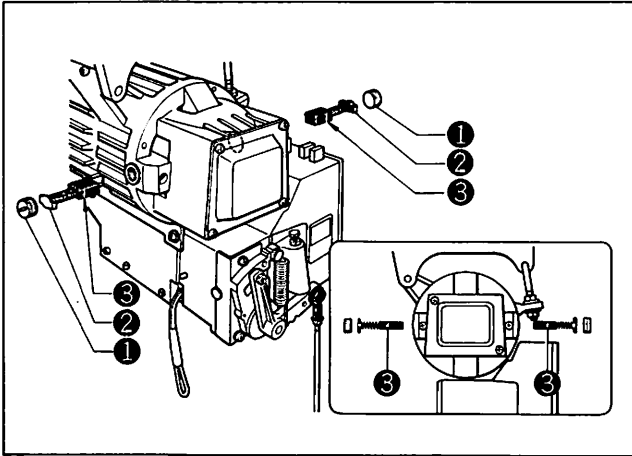
1. The brake lining gap is factory-adjusted to approximately 0.2mm.
2. Remove screw ①, and remove the pulley cover ②.
3. Remove the V-belt.
4. Remove nut ③, and remove the motor pulley assembly ④.
5. Remove the three set screws ⑧, and replace the brake lining ⑥. Use supplied spacers ⑦ to adjust the brake lining gap to approximately 0.2mm. There are three spacer thicknesses: 0.1 mm, 0.12mm, 0.15mm.

Note 1: Pulley M125 ④ for the asbestos brake cannot be installed to the cork brake.

Note 2: For the cork brake, be sure to adjust so that the brake lining does not rub, because rubbing will cause excessive brake wear.

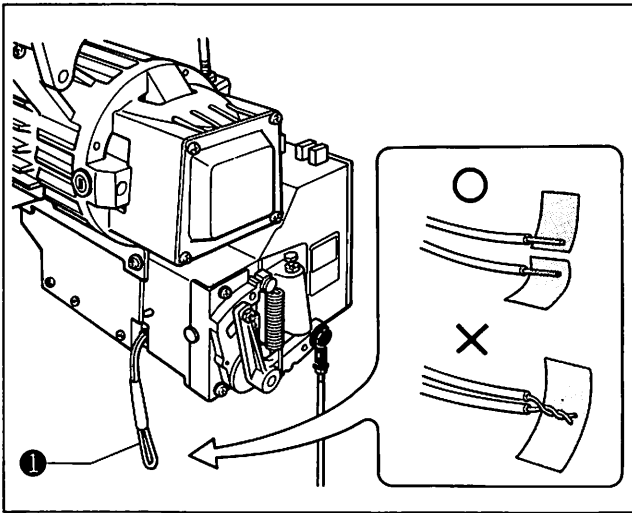


## 7 Brush replacement



1. Be sure to turn off the power switch.
2. Disconnect the motor plug.
3. Remove the clamp screws ①.
4. Remove the brushes ②.
5. After checking the reference line of the brush ②, mount the usable brush ② so that the reference line ③ directs toward the treadle unit. Replace the brush used to the reference line ③ with a new one.
6. Tighten the clamp screws ① with 10~15kg/cm torque.
7. Connect the motor plug.

## 8 Checking the lamp terminal code



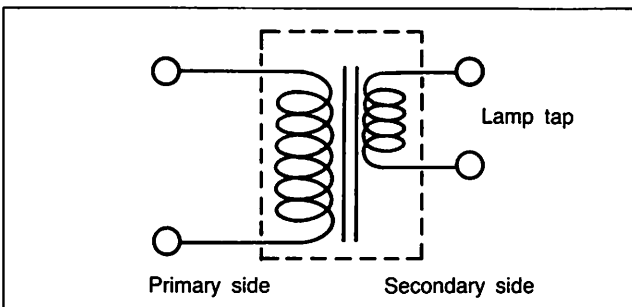
- ★ The lamp terminal cord ① is provided at the back of the control box. The AC 6V or 12V lamp can be connected with this lamp terminal cord.

The lamp terminal cord  
 Black cord 6V 20W  
 Grey cord 12V 20W

For the lamp cord, the primary side is insulated by the transformer.

### CAUTION:

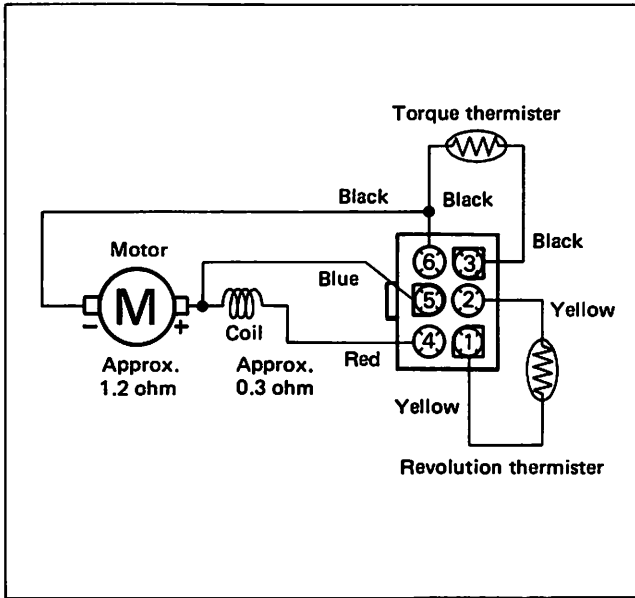
Be sure to wrap the end of the cord with tape after disconnecting the lamp cord.





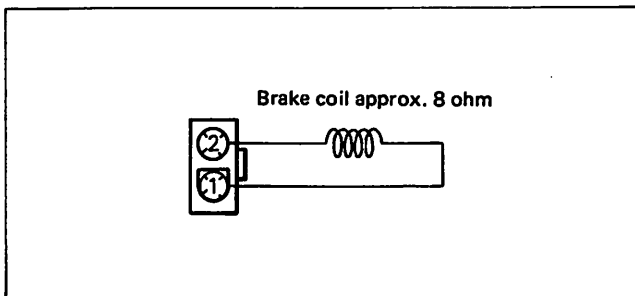
# CHECKING THE MOTOR

## 1 Motor



1. Remove the motor cord (6P connector) from the connector part of the control box.
2. Measure with the tester set in the resistance range as follows.
  - If the tester reads approx. 2-3ohm at any position between 4 (red) and 6 (black) with the resistance range  $\times 1$ , it is normal. It should read approx. 2-3ohm at each position while turning the motor pulley slowly. If it reads approx. 10ohm or more at some positions, it is out of order. However, if the pointer swings to much extent while turning the motor pulley, be sure to measure after stopping the pulley.
  - If the tester reads approx. 5K-40Kohm when measured at any position between 3 (black) and 6 (black) with the resistance range  $\times 1$ , it is normal.
  - If the tester reads approx. 5K-40Kohm when measured at any position between 1 (yellow) and 2 (yellow) with the resistance range  $\times 1$ , it is normal.

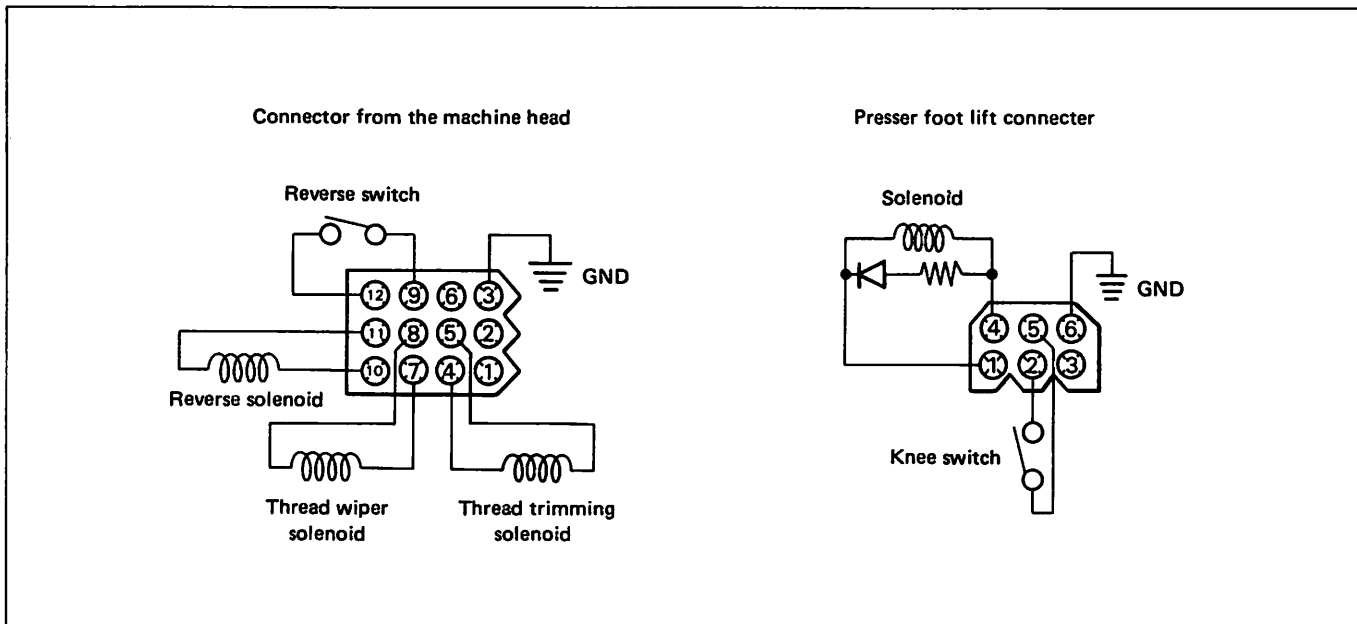
## 2 Brake



1. Remove the brake cord (2P connector) from the connector part of the control box.
2. Measure with the tester set in the resistance range as follows.
  - If the tester reads approx. 7-9ohm when measured at any position between 1 (black) and 2 (black) with the resistance range  $\times 1$ , it is normal.

## CHECKING THE MACHINE SOLENOIDS

### 1 Solenoid load of the machine



1. Remove the load connector (12P connector) of the machine from the connector part of the control box.
2. Measure with the tester set in the resistance range  $\times 1$  as follows.

#### <Machine Head>

- The thread trimming solenoid at pins 4 and 5 is normal if the tester reads approx. 7ohm.
- The thread wiper solenoid at pins 7 and 8 is normal if the tester reads approx. 5ohm.
- The actuator at pins 9 and 12 is normal if the tester reads 0ohm when pressed, and  $\infty$  ohm when released.

#### <Presser Lift>

- The presser lift solenoid at pins 1 and 4 is normal if the tester reads approx. 5ohm.
- The presser lift switch at pins 2-5 is normal if the tester 0ohm when pressed, and  $\infty$  ohm when released.

**1 Three phase control box**

Voltage	Power Source	Lamp	Destination	Parts Code No. 7.8.9 Digit											Motor		
				1-6 Digit	020	025	035	040	045	050	046	047	033	038	043	Code No.	Type
B737 Mark II				r.p.m.	2000	2500	3500	4000	4500	5000	4500	4500	3000	3500	4000		
220V	6V	USA/Canada	291812-	DB212A	DB322A	DB342A	DB552A	DB562A	DB572A	DB462A1	DB562A2	DB332A3	DB342A3	DB352A3	291825001	MD-813A	
380V	12V	Germany	291817-	DB212B	DB322B	DB342B	DB552B	DB562B	DB572B	DB462B1	DB562B2	DB332B3	DB342B3	DB352B3	291826001	MD-813B	
	6V		291820-	DB212A	DB322A	DB342A	DB552A	DB562A	DB572A	DB462A1	DB562A2	DB332A3	DB342A3	DB352A3			
	NIL	France	291821-	DB212C	DB322C	DB342C	DB552C	DB562C	DB572C	DB462C1	DB562C2	DB332C3	DB342C3	DB352C3			
415V	12V	U. Kingdom	291824-	DB212B	DB322B	DB342B	DB552B	DB562B	DB572B	DB462B1	DB562B2	DB332B3	DB342B3	DB352B3	291826001	MD-813B	
	6V		291827-	DB212A	DB322A	DB342A	DB552A	DB562A	DB572A	DB462b1	DB562A2	DB332A3	DB342A3	DB352A3			
B7380																	
220V	6V	USA/Canada	291844-			DB348A			DB578A						291825001	MD-813A	
380V	12V	Germany	291847-			DB348B			DB578B						291826001	MD-813B	
	6V		291848-			DB348A			DB578A								
	NIL	France	291849-			DB348C			DB578C								
415V	12V	U. Kingdom	291850-			DB348B			DB578B					291826001	MD-813B		
	6V		291851-			DB348A			DB578A								
B7910																	
220V	6V	USA/Canada	291813-			DB349A			DB569A						291825001	MD-813A	
380V	12V	Germany	291818-			DB349B			DB569B						291826001	MD-813B	
	6V		291854-			DB349A			DB569A								
	NIL	France	291822-			DB349C			DB569C								
415V	12V	U. Kingdom	291825-			DB349B			DB569B					291826001	MD-813B		
	6V		291856-			DB349A			DB569A								

1 Digit	2 Digit		3 Digit		4 Digit		5 Digit		6 Digit	
	Ref.	Treadle unit	Ref.	Pulley size outer dia.	Ref.	spm	Ref.	Control box spec.	Ref.	Voltage
D	A	#10	1	75	1	2000	1		A	6V
	B	#11	2	80	2	2500	2	B737MII	B	12V
			3	90	3				C	NIL
			4	105	4	3500				
			5	125	5	4000				
					6	4500	6	Overlock (Semiauto)		
					7	5000				
					8		8	B7380		
					9		9	B7910		

TYPE DB572A  
 No. A 8 E 12345- - - - - Production serial No.  
 - - - - - Modification No.  
 - - - - - Year  
 - - - - - Month

## 2 Single phase control box

Voltage		Destination	Parts Code No. 7.8.9 Digit												Motor	
Power Source	Lamp		1~6 Digit	020	025	035	040	045	050	046	047	033	038	043	Code No.	Type
			r.p.m.	2000	2500	3500	4000	4500	5000	4500	4500	3000	3500	4000		
B737 Mark II										B795	B852	2 Needle				
110V	6V	USA/Canada	291798-	DB212A	DB322A	DB342A	DB552A	DB562A	DB572A	DB462A1	DB562A2	DB332A3	DB342A3	DB352A3	291823001	MD-803C
220V	12V	Germany	291801-	DB212B	DB322B	DB342B	DB552B	DB562B	DB572B	DB462B1	DB562B2	DB332B3	DB342B3	DB352B3	291824001	MD-803B
	6V		291802-	DB212A	DB322A	DB342A	DB552A	DB562A	DB572A	DB462A1	DB562A2	DB332A3	DB342A3	DB352A3		
	NIL	France	291805-	DB212C	DB322C	DB342C	DB552C	DB562C	DB572C	DB462C1	DB562C2	DB332C3	DB342C3	DB352C3		
230V	6V		291806-	DB212A	DB322A	DB342A	DB552A	DB562A	DB572A	DB462A1	DB562A2	DB332A3	DB342A3	DB352A3		
	NIL	New Zealand	291807-	DB212C	DB322C	DB342C	DB552C	DB562C	DB572C	DB462C1	DB562C2	DB332C3	DB342C3	DB352C3		
240V	12V	U. Kingdom	291808-	DB212B	DB322B	DB342B	DB552B	DB562B	DB572B	DB462B1	DB562B2	DB332B3	DB342B3	DB352B3		
	6V	Australia	291809-	DB212A	DB322A	DB342A	DB552A	DB562A	DB572A	DB462B1	DB562A2	DB332A3	DB342A3	DB352A3		
B7380																
110V	6V	USA/Canada	291828-			DB348A			DB578A						291823001	MD-803C
220V	12V	Germany	291830-			DB348B			DB578B						291824001	MD-803B
	6V		291831-			DB348A			DB578A							
	NIL	France	291833-			DB348C			DB578C							
230V	6V		291834-			DB348A			DB578A							
	NIL	New Zealand	291835-			DB348C			DB578C							
240V	12V	U. Kingdom	291836-			DB348A			DB578A							
	6V	Australia	291837-			DB348A			DB578A							
B7910																
110V	6V	USA/Canada	291799-			DB349A		DB569A							291823001	MD-803C
220V	12V	Germany	291835-			DB349B		DB569B							291824001	MD-803B
	6V		291836-			DB349A		DB569A								
	NIL	France	291838-			DB349C		DB569C								
230V	6V		291839-			DB349A		DB569A								
	NIL	New Zealand	291840-			DB349C		DB569C								
415V	12V	U. Kingdom	291841-			DB349B		DB569B								
	6V	Australia	291842-			DB349A		DB569A								

# SPEED ADJUSTMENT FOR EACH MACHINE

## 1 Selection of motor pulley and method of replacement

### 1) Selection of motor pulley

Select the correct motor pulley for relative machine according to the separate list.

(Remark): The figures described for motor pulley are outer diameters of V groove.

### 2) Replacement of pulley

- a) Take off pulley cover
- b) Remove V belt
- c) Unfasten pulley set screw, M5×12 screw (3 pcs.) and then exchange the pulley.
- d) Assemble them back in reverse way.

(Remark): In case the pulley is exchanged, each speed of high speed, backtacking speed, low speed will change.

## 2 Adjustment of each speed

### 1) Adjustment of high speed

- a) Set up the machine & motor.
- b) High sewing speed volume in front of control box to the right in full.
- c) Remove the rubber cock at rear side of control box and turn the inside volume ①.  
When it is turned to the right, the machine speed up.  
(Remark): Turn VR to the left first and then, make speed adjustment from lower speed thereby the troubles can be avoided due to abnormal speed.
- d) Put power switch on and keep the pedal lever down to the maximum and under this condition, make speed adjustment.

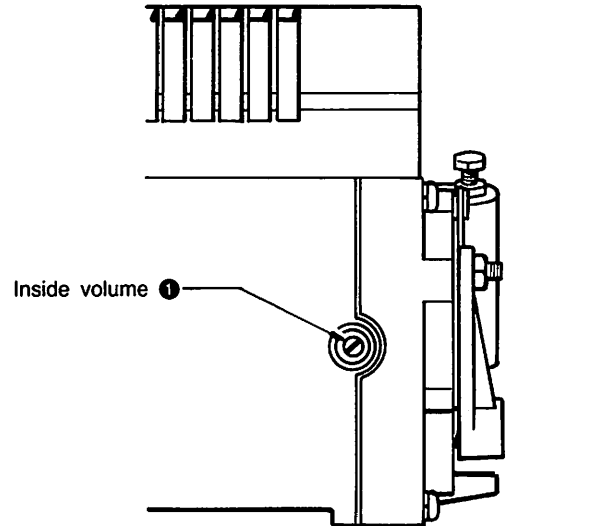
### 2) Adjustment of end backtacking speed

- a) Open the cover of control box.
- b) Put power switch on.
- c) Set operation panel and put only end backtacking switch on. (even in case of E0, make necessary adjustment using E20, E40 or E100 operation panel)
- d) Depress the pedal forward to put it back to the neutral position then stop the machine at needle-down position.
- e) Remove synchronizer plug from control box.
- f) Depress the pedal backward then the machine keeps running at backtacking speed therefore make adjustment by VR EBT.

### 3) Adjustment of thread trimming speed

- a) Open the cover of control box.
- b) Depress the pedal forward lightly to put it back to the neutral position then stop the machine at needle-down position.
- c) Remove synchronizer plug from control box and depress the pedal forward to put it back to the neutral position then the machine keeps running at low speed therefore make adjustment by VR LOW.
- d) After adjustment, put power switch off, close the cover and then, insert synchronizer plug.

In case the torque becomes insufficient due to some specific sewings, use one-class smaller pulley to increase the torque but in that case, make sure to select such pulleys that speed of DC servomotor will not be more than 3,000RPM at maximum sewing speed of machine. Machine pulley must be calculated based on the effective diameter of approx. 70mm.





### ③ Explanation of each VR (printed-circuit board BPD500-1)

VR name		CONTENTS	ANTI-CLOCKWISE	CLOCKWISE
LOW (VR1)	Low speed	Inching and trimming speed setting	Decrease about 150spm	Increase about 300spm
EBT (VR2)	End backtacking speed	End backtacking speed setting	Decrease about 1,000spm	Increase about 2,500spm
SBT (VR3)	Start & continuous BT. speed	Start & continuous backtacking speed setting	Decrease low speed	Increase about 3,000spm
HIGH (VR4)	High speed	Speed setting when pedal is depressed at maximum	Decrease low speed	Increase 5,000spm
AUTO	Auto speed	Auto process speed setting	Decrease low speed	Increase 4,800spm
SLOW	Slow start	Slow start speed setting	Decrease low speed	Increase 1,500spm
VR1 (VR5)	Brake power	Brake off speed setting	Brake power becomes ineffective	Brake power becomes effective
TVR (TVR)	Torque	Torque setting for inching & trimming speed	Penetration power becomes ineffective	It makes hunting and stopping accuracy becomes worse
SVR (SVR)	Voltage	Standard setting of all speed	Speed reduction of all	Speed increase of all
CVR (CVR)	Current limit	Setting of maximum electric current into motor	Speed down at the start	Break down of the power transistor

Remark : Speed is based on 125 pulley. ( ) is printed-circuit board E or C.

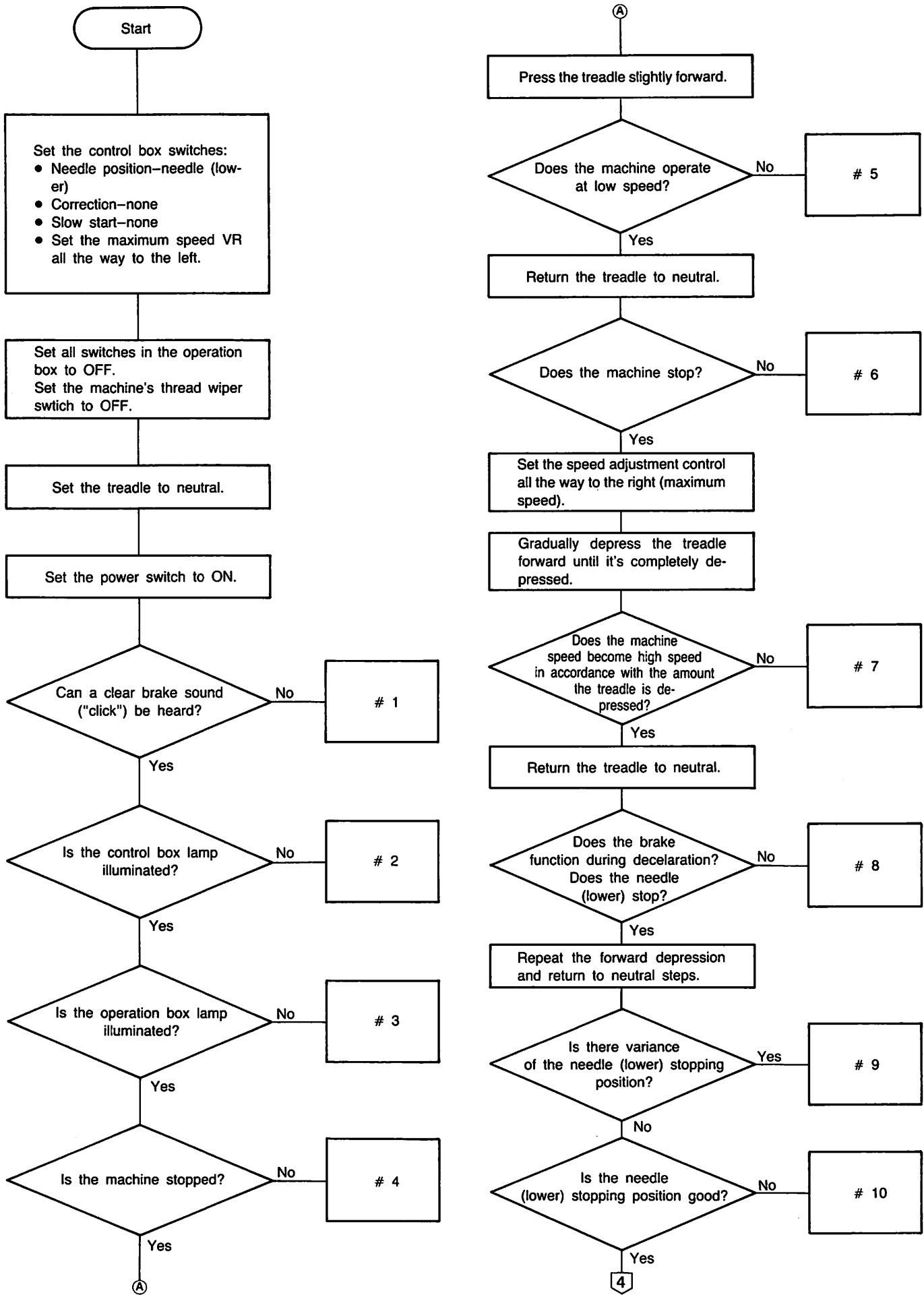
### ④ Sewing speed of each machine

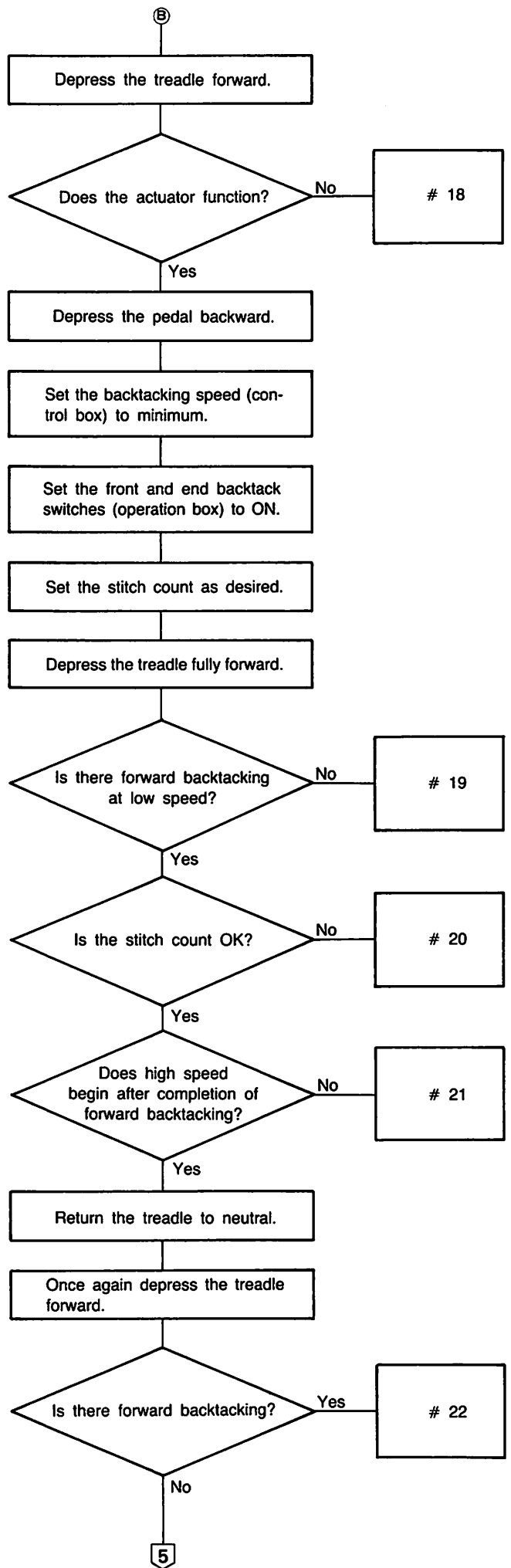
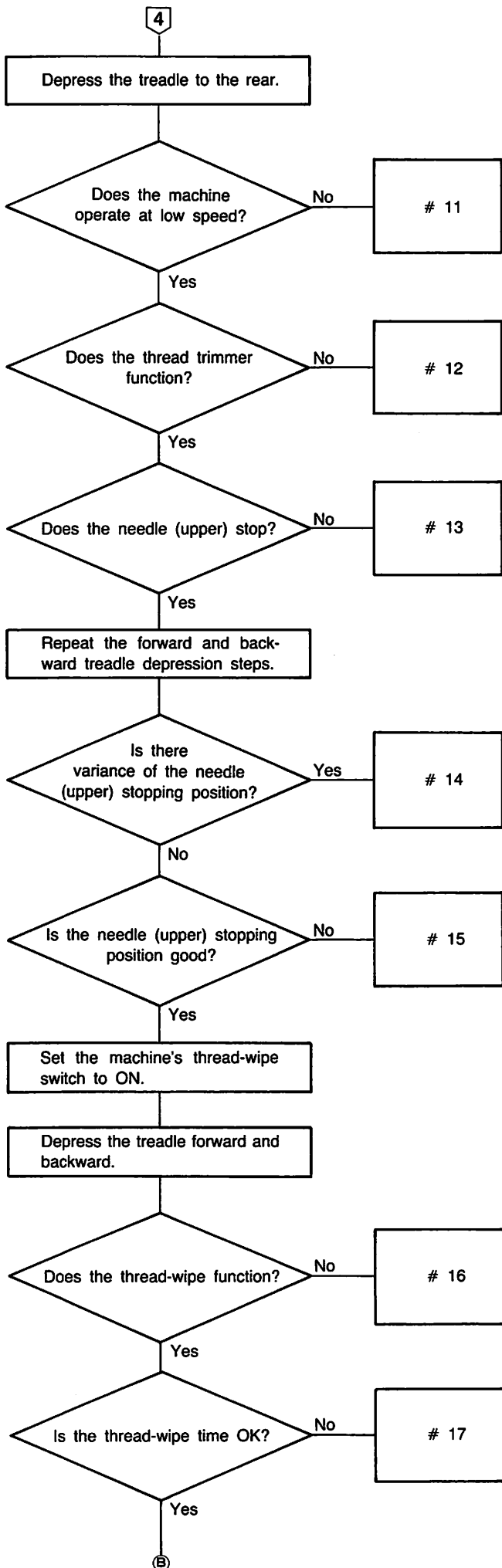
Model No. & Spec	Each Sewing Speed			Motor pulley (outer diameter)
	High Speed	Backtacking Speed	Thread trimming speed	
B737-1	4,000	1,800	215	125
-3	5,000	1,800	215	125
-5	3,500	1,800	215	90
B747-5	3,500	1,800	215	90
B748-7	2,500	1,800	215	90
B798	2,000	900	215	80
B852	4,500	1,800	185	125
B853	4,500	1,800	185	125
B854	4,500	1,800	185	125
B791-3	4,500	1,800	215	125
-5	3,500	1,800	215	90
B793-403	4,500	1,800	215	125
	4,500	1,800	215	105
B795	4,500	1,800	215	105
B842-3	4,000	1,000	185	90
-5	3,500	1,000	185	90
B845	3,000	1,000	185	90
B847	4,000	1,000	185	90
B848	3,000	1,000	185	90

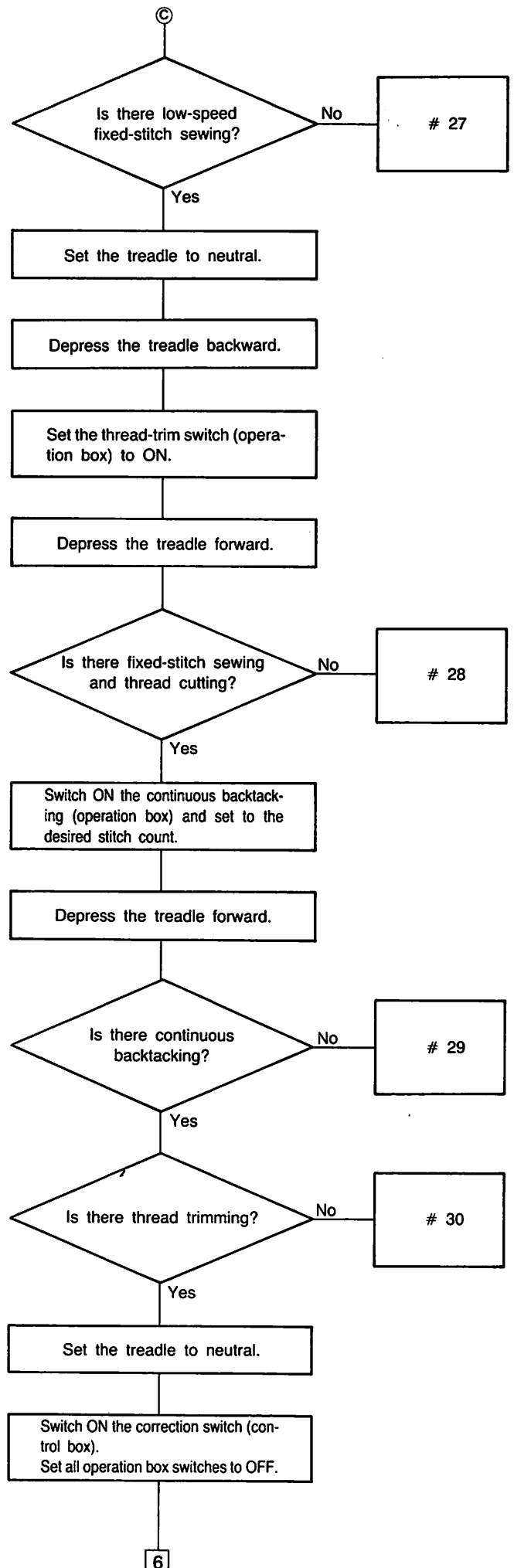
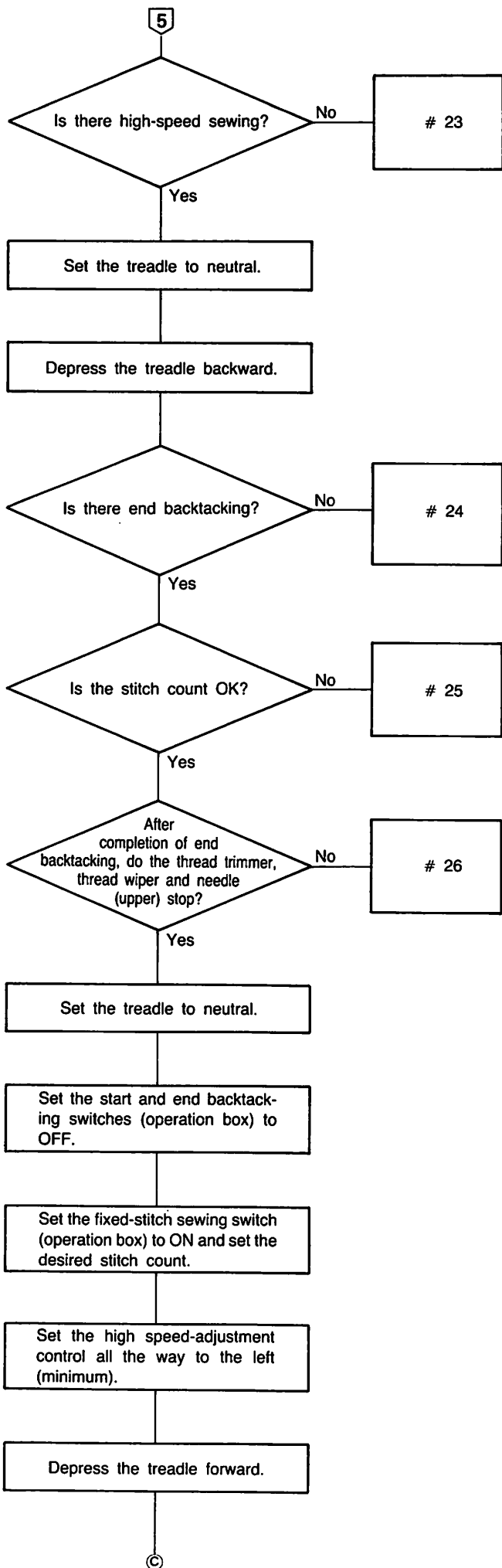
## NOTES REGARDING DC MOTOR INSTALLATION

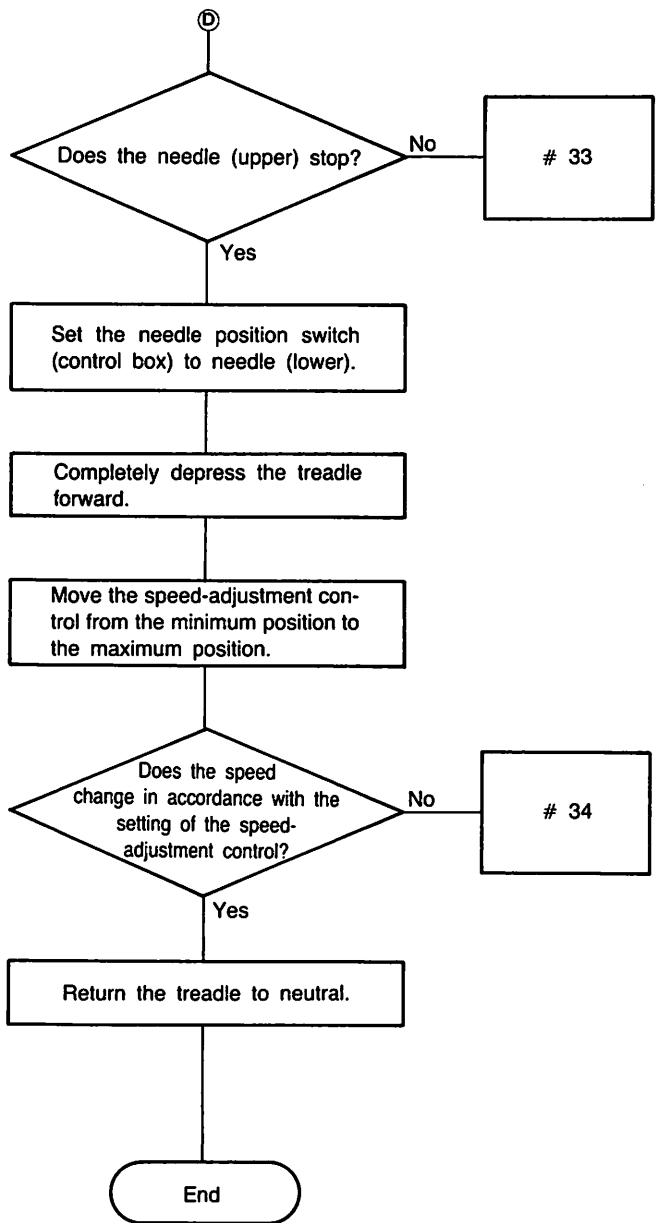
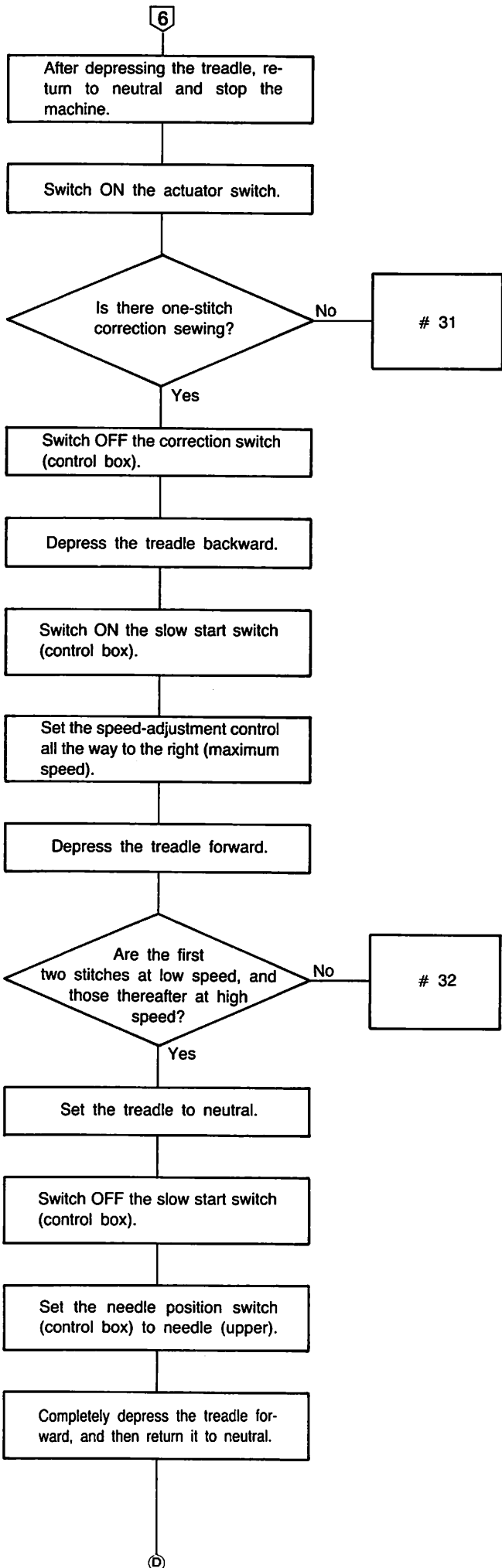
- (1) Be sure, for use of a three-phase power supply, to check the connection of the power plug.  
Be careful to not use a single-phase power supply. Even if single-phase is used, there may be no abnormal condition. Note, however, that quick repeated starting and stopping will cause the fuse to fail.  
(The fuse interior will not become black.)
- (2) The power supply voltage should be  $\pm 10\%$  of the rating.
- (3) Securely connect each connector. The 6-pin connector from the motor is, in particular, very important.
- (4) If single-phase 110V is used, all functions will stop if there is even a momentary drop of the voltage to 75% or below.  
For that reason, indoor wiring capacity should be 20A or higher, and the use of extension cords should be avoided.
- (5) For cold regions, care should be taken to avoid moisture condensation.  
In particular, needle (lower) stop will be abnormal if moisture condensation occurs on the reflector plate of the synchronizer.
- (6) Needle (lower) stop will be abnormal if there is oil or grease on the reflector plate of the synchronizer, so it should be carefully wiped clean.
- (7) Avoid use near any equipment, such as a high-frequency welder, etc., that emits high-pitched noise, because such equipment will cause operational errors and/or damage to the D printed-circuit board (fuse failure).
- (8) For a three-phase power supply, if 130% or higher of the rated voltage is applied, the fuse will melt (fuse interior becomes black), thus protecting the control circuitry.

# DC MOTOR TROUBLESHOOTING GUIDE









ITEM	PROBLEM	CHECKING PROCEDURES	PROBABLE CAUSE	REMEDY
#1 and #2	No "click" sound from brake when power is switched ON. Control box lamp doesn't illuminate.	<ul style="list-style-type: none"> <li>Is the connection of the 4-pin or 3-pin power plug OK?</li> <li>The fuse (outer side of control box) has failed. (YES)</li> <li>* Fuse fails again after replacement.</li> <li>The fuse (8A fuse inside the control box) has failed.</li> <li>Other than the above.</li> </ul>	<p>Power plug is incorrectly connected.</p> <p>Fuse has failed.</p> <p>Malfuction of 8A fuse, the control printed-circuit board. Malfuction of the control printed-circuit board.</p>	<p>Connect the power plug correctly.</p> <p>Replace the fuse.</p> <p>Replace the motor and control box. Replace the fuse and control box. Replace the control box.</p>
#3	No illumination of operation box lamp.	<ul style="list-style-type: none"> <li>Does the operation box function correctly? (YES) (NO)</li> <li>Other than the above.</li> </ul>	<p>Bulb failure—no functional problem.</p> <p>Malfuction of the operation box.</p> <p>Malfuction of the control printed-circuit board.</p>	<p>Replace the operation box.</p> <p>Replace the control box.</p>
#4	Machine starts when power is switched ON.		<p>Malfuction of the control printed-circuit board.</p> <p>Malfuction of the D printed-circuit board. (single phase 110V or higher)</p>	<p>Replace the control box.</p> <p>Replace the control box motor.</p>
#5	Machine doesn't operate.  Machine operates in reverse. Unsuitable low-speed operation. Machine operates at high speed.	<ul style="list-style-type: none"> <li>Does the control box lamp flash? (YES)</li> <li>Is there a motor noise? (YES)</li> <li>Other than the above.</li> </ul>	<p>Large torque (head). Malfuction of control printed-circuit board Malfuction of treadle unit. Large torque (head). Malfuction of treadle unit. Malfuction of treadle unit. Malfuction of treadle unit.</p> <p>Malfuction of treadle unit.</p>	<p>Reduce the torque. Replace the control box.</p> <p>Replace the control box. Reduce the torque. Replace the control box. Replace the control box. Replace the control box. Adjust VR LOW and TVR.</p> <p>Replace the control box.</p>
#6	Machine doesn't stop when treadle is set to neutral.		<p>Synchronizer installation position is not good. Synchronizer malfuction. Control printed-circuit board malfuction.</p>	<p>Position adjustment: 0.5mm</p> <p>Replace the synchronizer. Replace the control box.</p>
#7	Operation doesn't correspond to amount of treadle depression.	<ul style="list-style-type: none"> <li>Uneven operation at treadle maximum.</li> <li>Initial operation speed is fast (no low-speed range).</li> </ul>	<p>Malfuction of treadle unit. Malfuction of control box. Malfuction of treadle unit.</p>	<p>Replace the control box. Replace the control box. Replace the control box.</p>

ITEM	PROBLEM	CHECKING PROCEDURES	PROBABLE CAUSE	REMEDY
#8	Needle (lower) doesn't stop.	<ul style="list-style-type: none"> <li>Is the synchronizer OK? (NO) (YES)</li> </ul>	<p>Synchronizer installation position is not good. Synchronizer malfunction. Control printed-circuit board malfunction.</p>	<p>Position adjustment: 0.5mm Replace the synchronizer. Replace the control box.</p>
#9	Needle (lower) stops at various places.	<ul style="list-style-type: none"> <li>Is the V-belt loose? (YES)</li> <li>Is there oil, grease, dirt scratches, etc. on the synchronizer's reflecting surface? (YES)</li> <li>Is the motor's braking noise loud? (YES) (NO)</li> </ul>	<p>Insufficient V-belt tension. Malfunction of the synchronizer.</p> <p>Reduced motor braking force. Malfunction of the synchronizer. Malfunction of the control printed-circuit board.</p>	<p>Adjust the V-belt tension. Replace the synchronizer.</p> <p>Adjust the motor brake clearance. Replace the synchronizer.</p> <p>Replace the control box.</p>
#10	Poor position of needle stop.	Is adjustment at synchronizer possible? (YES) (NO)	<p>Poor position of needle (lower) stop. Reduced motor braking force.</p>	<p>Adjust needle (lower) stop by 18~22mm. Replace the motor.</p>
#11	After treadle return, machine won't operate at low speed.	<ul style="list-style-type: none"> <li>Is thread trimming speed OK? (YES) (NO)</li> </ul>	<p>Low speed is too fast. Malfunction of control printed-circuit board.</p>	<p>Adjust VR LOW and TVR. Replace the control box.</p>
#12	Thread trimmer doesn't function.	<ul style="list-style-type: none"> <li>Is the 1-pin plug (of the 12 pins) in the control box connected? (NO)</li> <li>Does the thread trimmer solenoid switch ON?(YES) (NO)</li> <li>Switch OFF the power and measure the resistance of the thread trimmer solenoid. Is there 7ohms between ④ and ⑤ of the 12-pin? (NO)</li> <li>Does the 8A fuse (at the top of the control printed-circuit board) appear normal? (NO)</li> </ul>	<p>Improper connection of the 1-pin plug. Malfunction related to head thread trimming. Malfunction of control printed-circuit board. Malfunction of the thread trimmer solenoid.</p> <p>8A fuse failure.</p>	<p>Connect the 1-pin plug correctly. Adjust. Replace the control box. Replace the thread trimmer solenoid. Replace the 8A fuse.</p>
#13	Needle (upper) doesn't stop.	<ul style="list-style-type: none"> <li>Is the speed at low speed OK? (NO)</li> <li>Is the synchronizer OK? (NO) (YES)</li> </ul>	<p>Speed at low speed is too fast. Improper installation of the synchronizer. Malfunction of the control printed-circuit board.</p>	<p>Adjust VR LOW and TVR. Replace the synchronizer. Replace the control box.</p>



ITEM	PROBLEM	CHECKING PROCEDURES	PROBABLE CAUSE	REMEDY
#14	Needle (upper) stops at various places.	<ul style="list-style-type: none"> <li>· Is the V-belt loose?(YES)</li> <li>· Is there oil, grease, dirt scratches, etc. on the synchronizer's reflecting surface? (YES) (NO)</li> <li>· Are the speed and torque at low speed OK? (NO) (YES)</li> </ul>	<p>Insufficient V-belt tension. Malfunction of the synchronizer.</p> <p>Malfunction of the control printed-circuit board. Speed at low speed is too slow. Operational malfunction related to head thread trimming.</p>	<p>Adjust the V-belt tension. Replace the synchronizer.</p> <p>Replace the control box.</p> <p>Adjust the VR LOW and TVR. Adjust.</p>
#15	The stop position of the needle (upper) is not good.	<ul style="list-style-type: none"> <li>· Can adjustment be made at the synchronizer? (YES) (NO)</li> </ul>	<p>Improper needle (upper) stop position.</p> <p>Reduction of motor brake force.</p>	<p>Adjust the needle (upper) stop position by 10~12mm.</p> <p>Replace the motor.</p>
#16	Thread wiper doesn't function.	<ul style="list-style-type: none"> <li>· Switch OFF the power switch and then measure the resistance of the thread wiper solenoid.</li> <li>· Is there 5ohms between ⑦ and ③ of the 12-pin? (NO) (YES)</li> <li>· Other than above.</li> </ul>	<p>Malfunction of the thread wiper solenoid. Improper installation of the thread wiper solenoid. Malfunction of the control printed-circuit board.</p>	<p>Replace the thread wiper solenoid. Adjust the installation.</p> <p>Replace the control box.</p>
#17	Thread wiper operation time is too short.		Improper installation of the thread wiper solenoid.	Adjust the installation.
#18	Reverser doesn't function.  (when treadle is depressed and actuator is switched ON)	<ul style="list-style-type: none"> <li>· Can the reverser be operated by the reverse lever? (NO)</li> <li>· Switch OFF the power switch and then measure the resistance of the reverse solenoid.</li> <li>· Is there 7ohms between ⑩ and ① of the 12-pin? (YES)</li> <li>· Measure the resistance of the actuator. Is there 0ohms between ⑨ and ⑫ of the 12-pin with the actuator switch ON, and ∞ohms with the actuator switch OFF?(NO) (YES)</li> </ul>	<p>Operational malfunction related to head reverse.</p> <p>Malfunction of the reverse solenoid.</p> <p>Malfunction of the actuator.</p> <p>Malfunction of the control printed-circuit board.</p>	<p>Adjust.</p> <p>Replace the reverse solenoid.</p> <p>Replace the actuator.</p> <p>Replace the control box.</p>
#19	Does not forward backtack.	<ul style="list-style-type: none"> <li>· Is it OK when the backtack stitch count is changed and you try again? (YES) (NO)</li> </ul>	<p>Malfunction of the operation box.</p> <p>Malfunction of the control printed-circuit board.</p>	<p>Replace the operation box.</p> <p>Replace the control box.</p>

ITEM	PROBLEM	CHECKING PROCEDURES	PROBABLE CAUSE	REMEDY
#20	Does not forward backtack the set number of stitches.  (Note that care must be taken because there is a difference in stitch length depending on whether the stitch pitch is forward or reverse.)	· Is it OK when the backtack stitch count is changed and you try again? (YES) (NO)	Malfunition of the operation box.  Malfunition of the control printed-circuit board.	Replace the operation box.  Replace the control box.
#21	Won't operate at high speed after forward backtacking.		Malfunition of the control printed-circuit board.	Replace the control box.
#22	Forward backtacks after treadle is set to neutral.		Malfunition of the control printed-circuit board.	Replace the control box.
#23	Won't sew at high speed after forward backtacking.		Malfunition of the control printed-circuit board.	Replace the control box.
#24	Won't reverse backtack.	Same as #19.	Same as #19.	Same as #19.
#25	Won't forward backtack set stitch count.	Same as #20.	Same as #20.	Same as #20.
#26	Needle (upper), thread trimmer and thread wiper won't stop after reverse backtacking.		Malfunition of the control printed-circuit board.	Replace the operation box.
#27	Won't fixed-stitch sew at low speed.	· Is it OK when the fixed-stitch count is changed and you try again? (YES) (NO)	Malfunition of the operation box.  Malfunition of the control printed-circuit board.	Replace the operation box.  Replace the control printed-circuit board.
#28	Won't thread trim after fixed-stitch sewing.		Malfunition of the operation box.	Replace the operation box. Replace the control printed-circuit board.
#29	Won't thread trim after continuous backtacking.	· Is it OK when the backtack stitch count is changed and you try again? (YES) (NO)	Malfunition of the operation box.  Malfunition of the control printed-circuit board.	Replace the operation box.  Replace the control printed-circuit board.
#30	Won't thread trim after continuous backtacking.		Mulfunition of the operation box.	Replace the operation box.
#31	Won't 1-stitch correction sew. Won't slow start. Needle (upper) won't stop (control box).		Malfunition of the control printed-circuit board.	Replace the control box.
#31	Speed is not in accordance with the setting of the speed-adjustment control.		Malfunition of the control printed-circuit board.	Replace the control box.

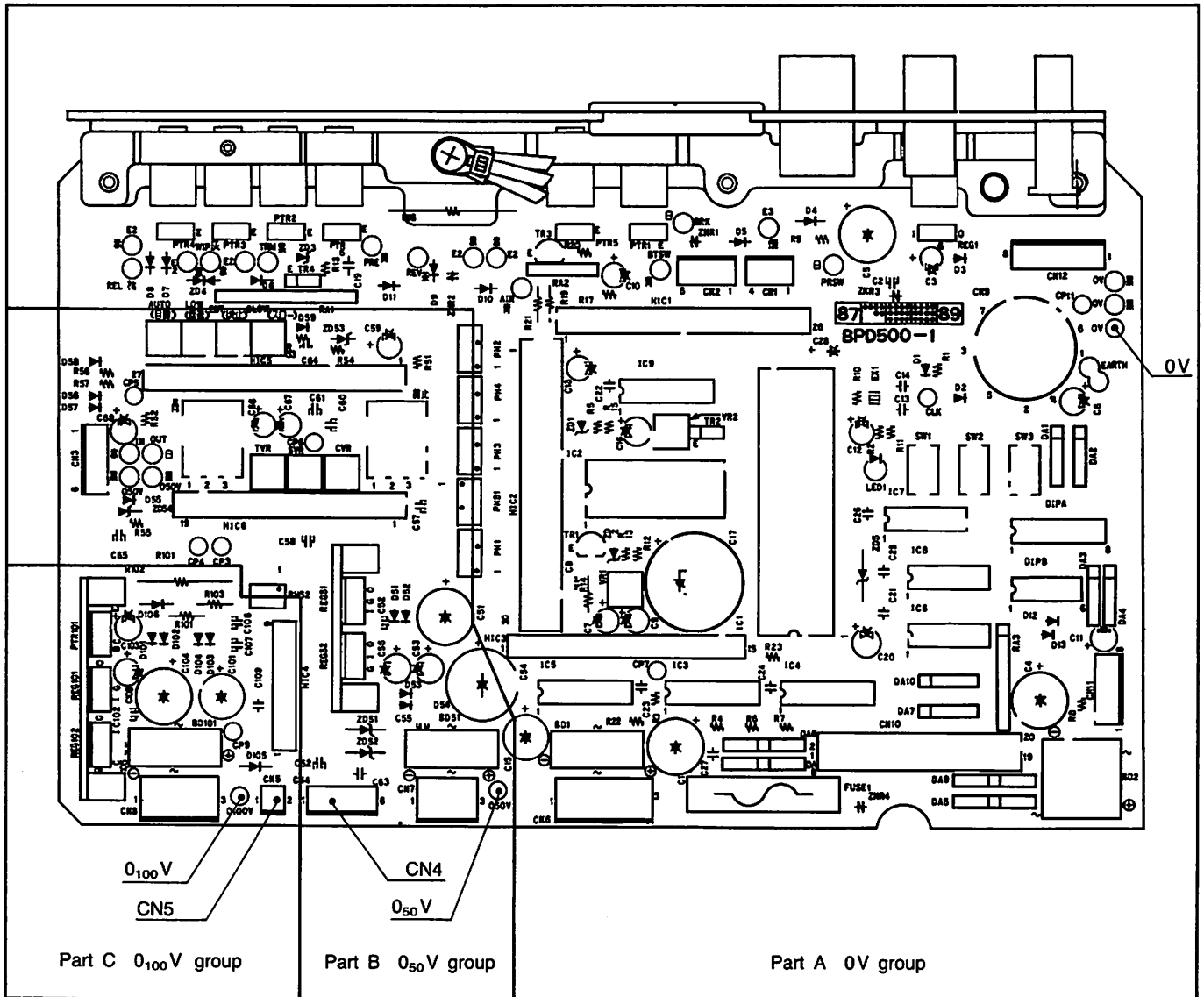
ITEM	PROBLEM	CHECKING PROCEDURES	PROBABLE CAUSE	REMEDY
#32	Machine stops during sewing.	<p>Is the power lamp flashing? (YES)</p> <p>(NO)</p>	<p>Head torque is large.</p> <p>Safety circuit has operated because of insufficient lubrication of the rotary hook.</p> <p>Malfunction of the treadle unit.</p> <p>Malfunction of the control printed-circuit board.</p> <p>Malfunction of the control printed-circuit board.</p>	<p>Lubricate the rotary hook.</p> <p>Replace the control box.</p> <p>Replace the control box.</p> <p>Replace the control box.</p>

## CONTROL BOX TROUBLESHOOTING GUIDE OUTLINE

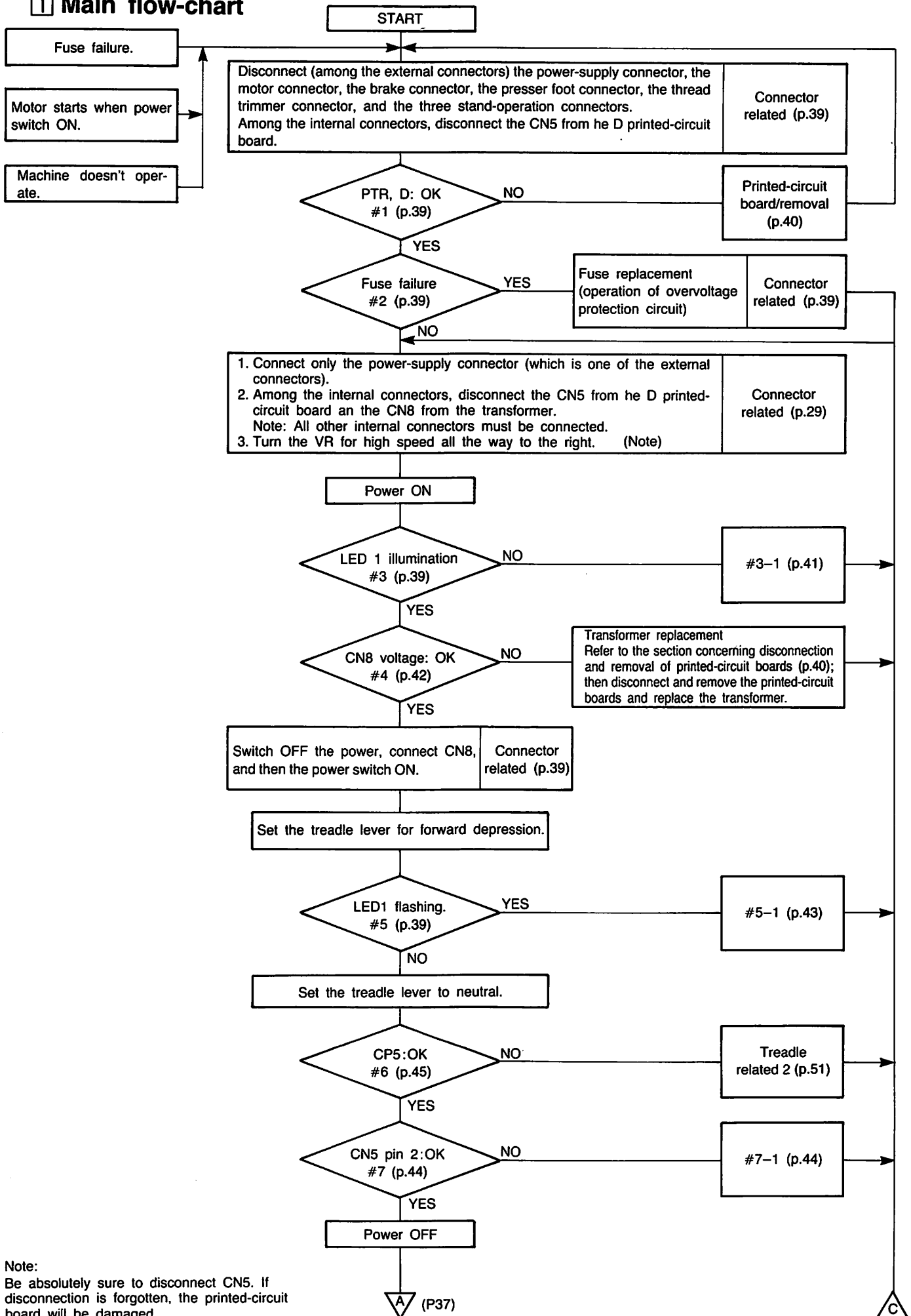
PROBLEM	CHECK METHOD	REPLACEMENT PART
1. Motor won't operate. A Lamp won't illuminate with power ON. (Fuse the failed.)	(1) Fuse is replaced and fails again.	D printed-circuit board PTR, D (If PTR broken then motor frame assembly)
	(2) Operation OK after fuse replacement.	Due to operation of overvoltage protection circuit; no abnormal condition.
2. Motor won't operate. B Lamp illuminates with power ON.	(1) LED flashes during forward back-tack.	Treadle printed-circuit board tantalum C1, HIC5
	(2) Motor roars or hums.	CPU, brake PTR 1
	(3) Others	HIC1, HIC2, HIC6
3. Machine abnormal high-speed rotation with power ON.		HIC4, HIC5, HIC6 D printed-circuit board PTR (single-phase 110V)
4. With power ON: Thread trimmer continues. Reverse continues. Brake remains ON. All continue.		Thread trimmer PTR2 Reverse PTR5 Brake PTR1 CPU HIC2
5. With treadle forward, abnormal high speed; won't stop.		HIC6
6. With treadle depressed to maximum, high-speed rotation changes. (High-speed rotational irregularity)		Poor soldering of treadle printed-circuit board. HIC6
7. During speed reduction from high speed, brake doesn't function, or great deviation of needle (lower) stop position.		HIC3

# CONTROL BOX TROUBLESHOOTING GUIDE DETAILS

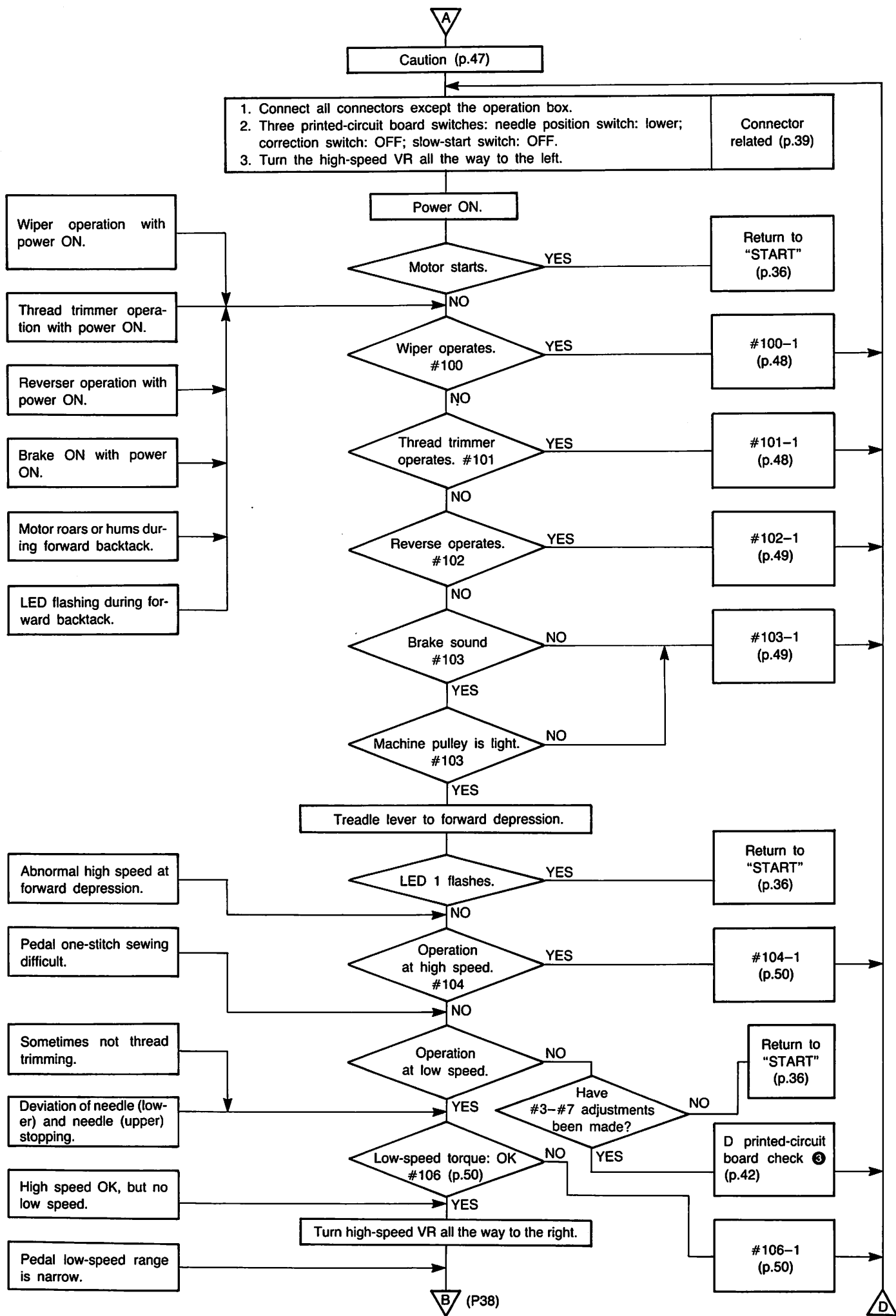
- (1) For other than the control box, it is particularly important to use products of confirmed good quality.
  - (2) Do not use an extension cord for the motor's 6-pin cord. Extension cords can be used, however, for other cords.
  - (3) About the power supply of the p.c.b. BPD500-1.
    - The p.c.b. BPD500-1 is divided into three power-supply groups (part A, part B and part C).
    - Although part A (0V group) is insulated at the transformer, part B (0<sub>50</sub>V group) and part C (0<sub>100</sub>V group) are high-voltage circuits (primary side voltage) due to the CN5 and CN4 connections, and so are dangerous.
    - For that reason, it is extremely important, before checking part B (0<sub>50</sub>V group) and part C (0<sub>100</sub>V group), to be absolutely sure to first disconnect CN5 and CN4.
- Also disconnect the motor connector (which is among the external connectors).

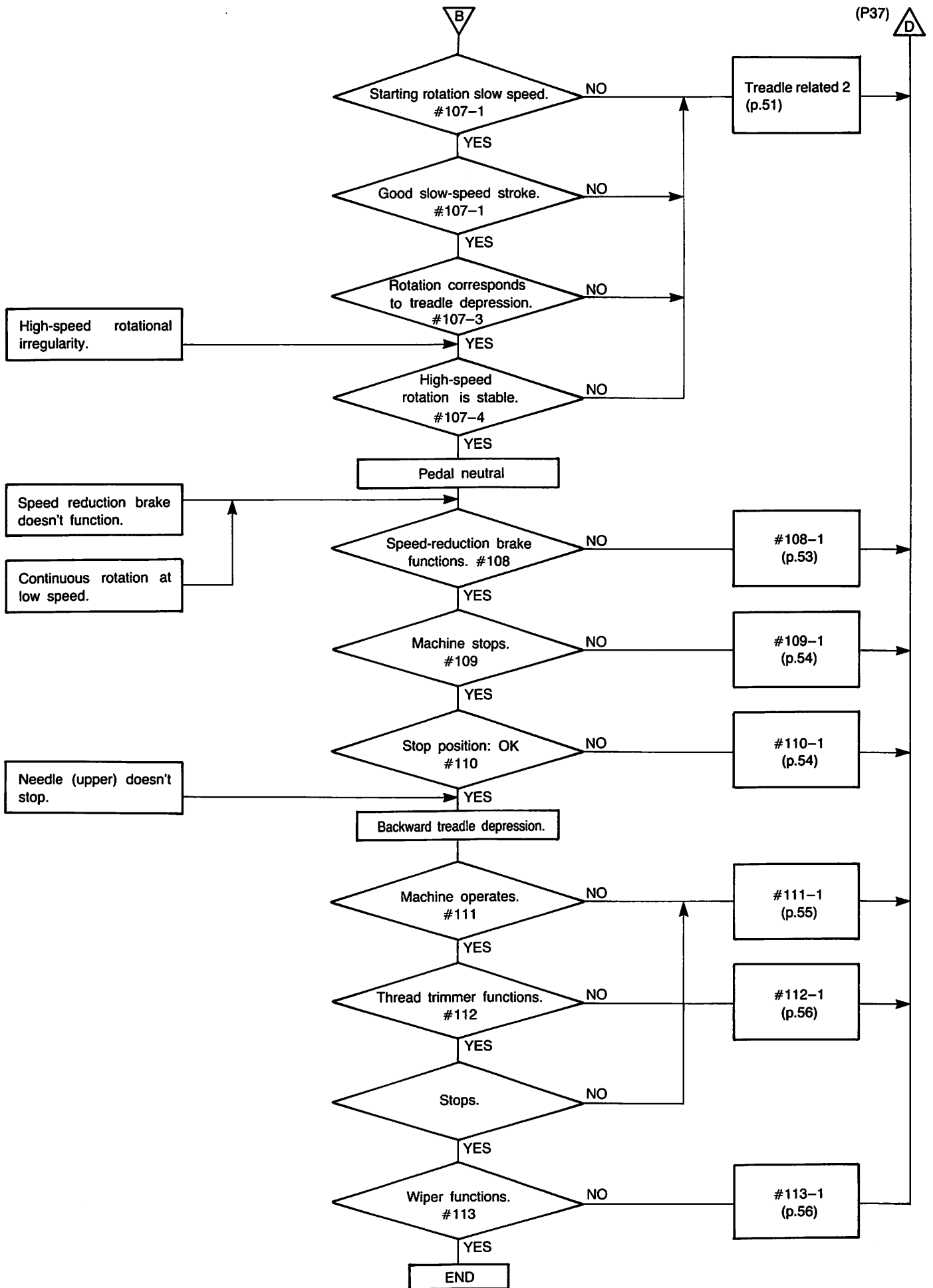


# 1 Main flow-chart



Note:  
Be absolutely sure to disconnect CN5. If disconnection is forgotten, the printed-circuit board will be damaged.





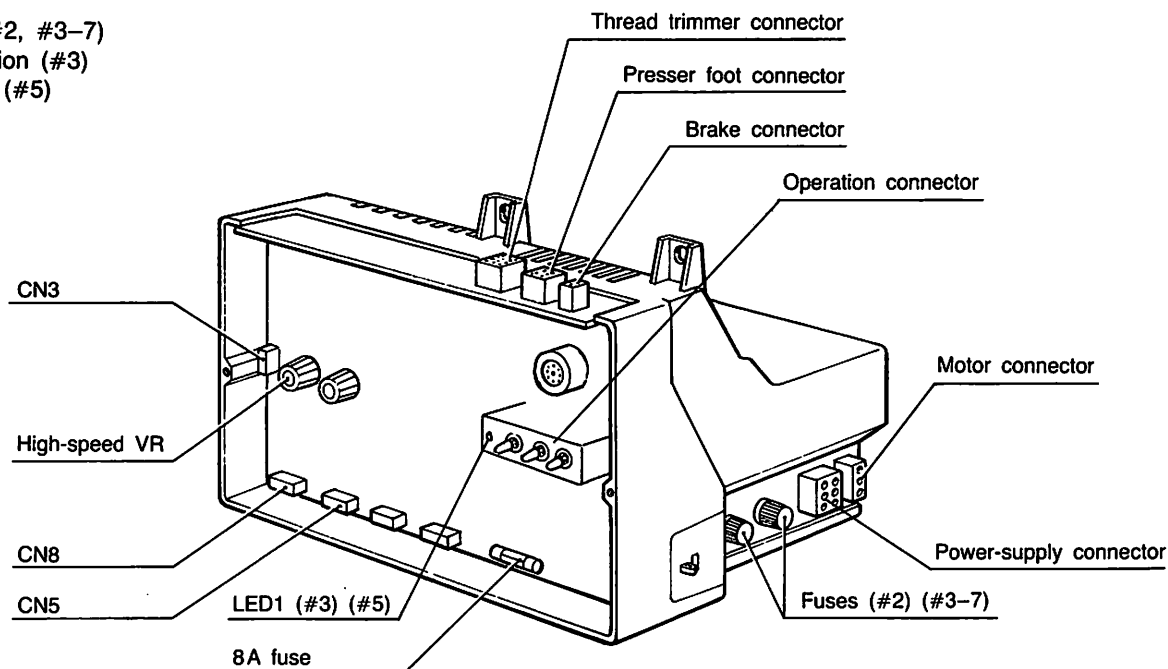


## 2 Connector related

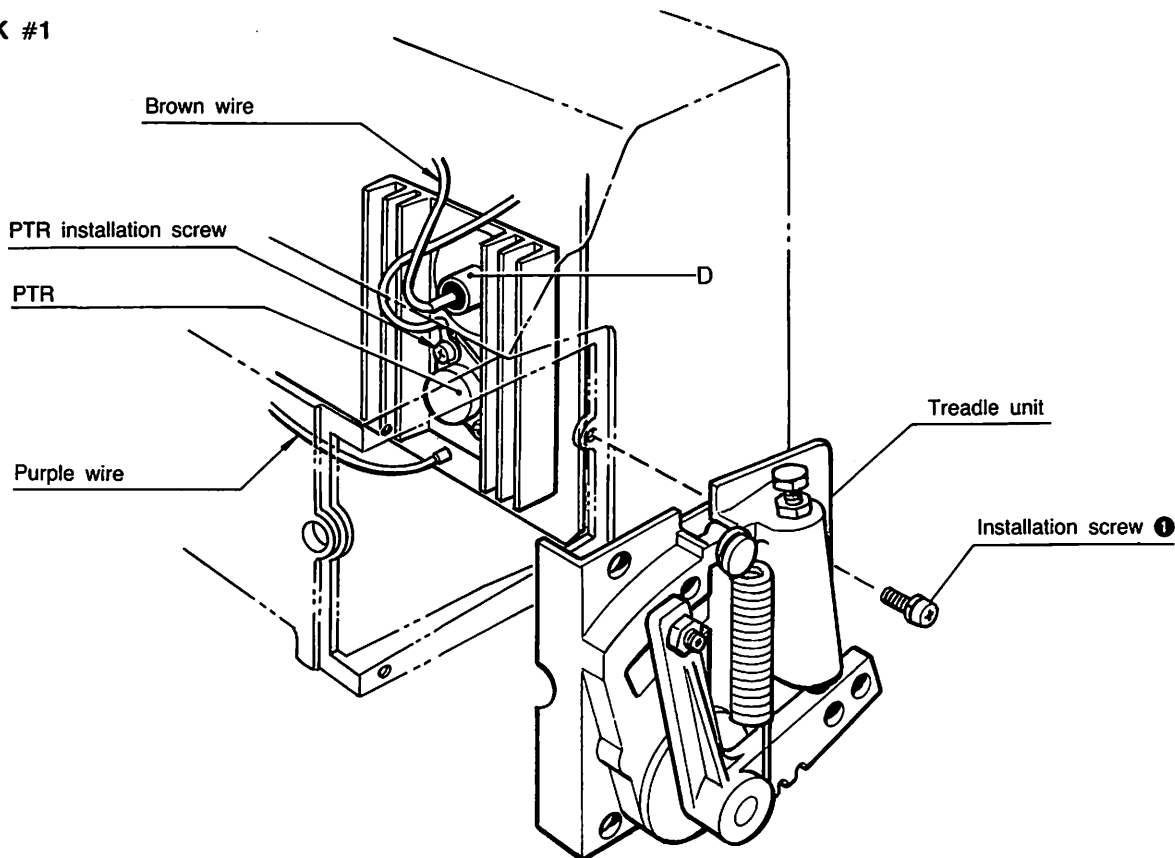
Fuse failure (#2, #3-7)

LED 1 illumination (#3)

LED 1 flashing (#5)



PTR, D: OK #1



PTR and D check methods

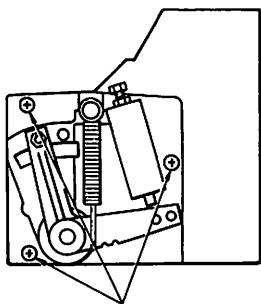
1. Remove the three treadle unit installation screws 1.
2. Set the tester to the X 1Ω range (0ohm adjustment).
3. PTR continuity test  
Between PTR installation screw and purple wire  
Should not be 0ohms in both directions.
4. D continuity test  
Between D case and brown wire  
Should not be 0ohms in both directions

Note:

If the PTR is damaged, replace the frame assembly of the motor used as a set with the control box. (The motor torque becomes weak and all rotation becomes higher.)

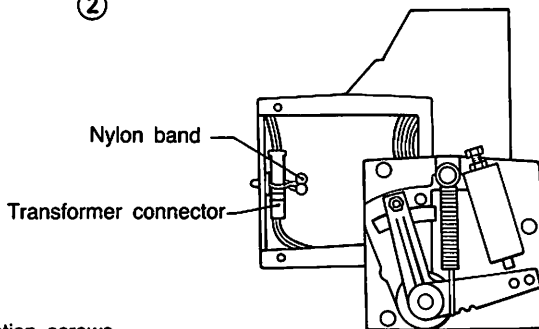
### 3 Printed-circuit board removal

①



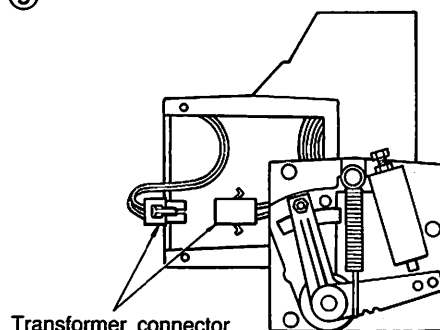
Remove the three treadle installation screws.

②



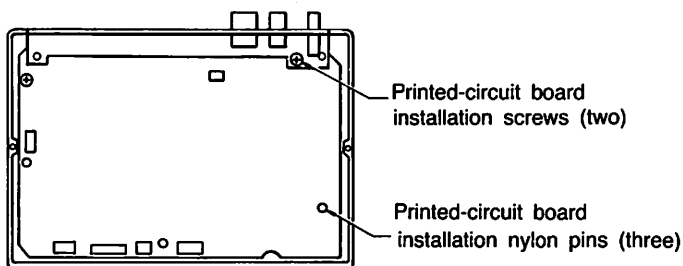
Disconnect the transformer connector from the nylon band.

③



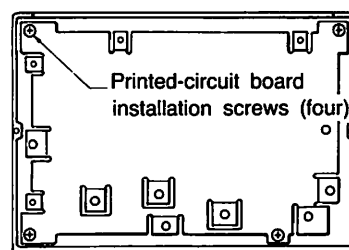
Disconnect the transformer connector.

④

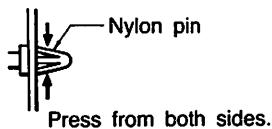


- (1) Disconnect CN2, CN3, CN5, CN6, CN7, and CN8.
- (2) Remove the two printed-circuit board installation screws.
- (3) Remove the three printed-circuit board installation nylon pins.

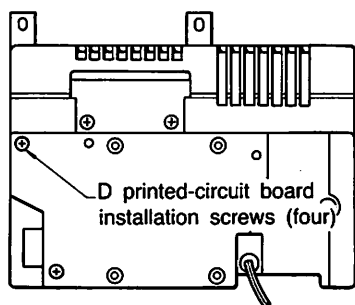
⑤



Remove the four printed-circuit board installation screws.

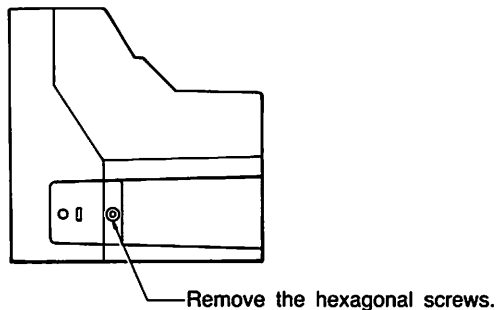


⑥



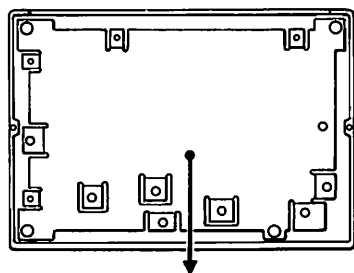
Remove the four D printed-circuit board installation screws.

⑦



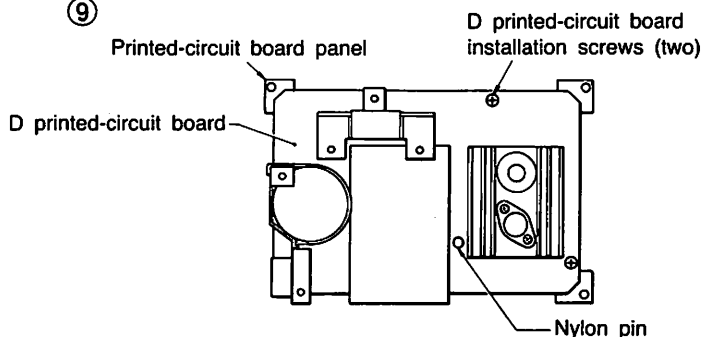
Remove the hexagonal screws.

⑧

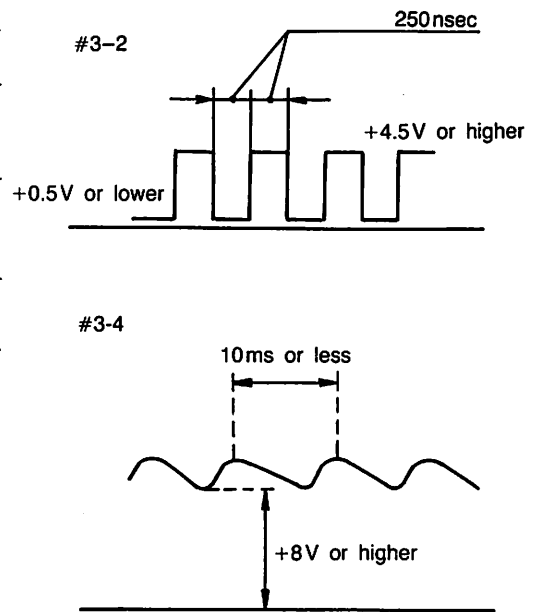
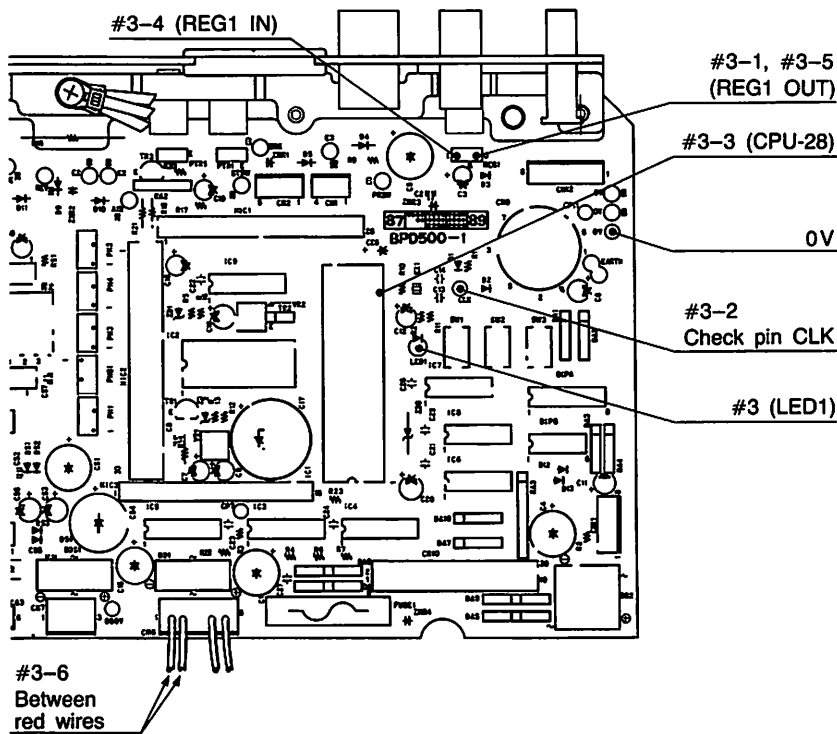
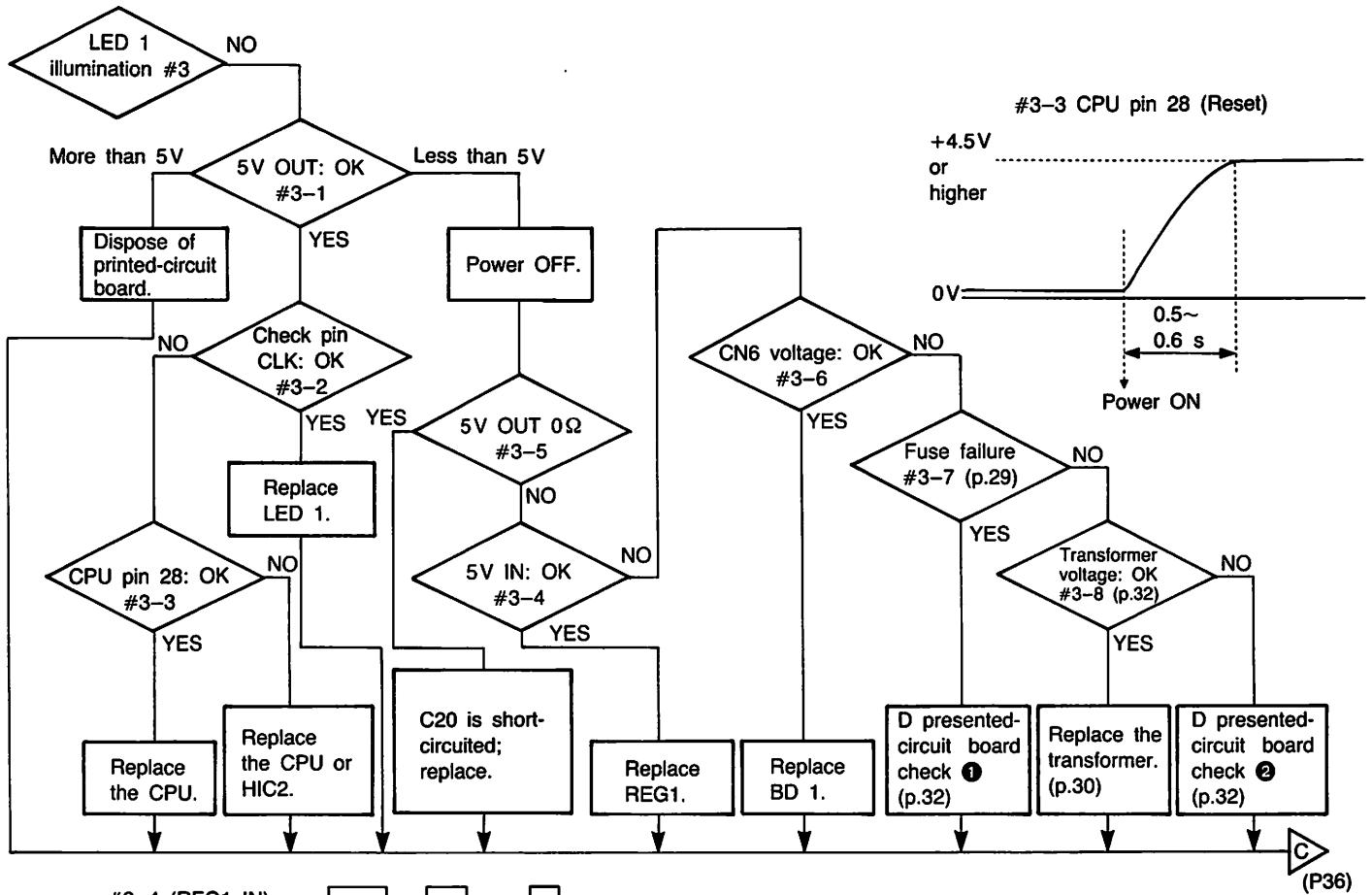


Pull the printed-circuit board panel.

⑨



- (1) Remove the two D printed-circuit board installation screws.
- (2) Remove the nylon pin (same as ④-(3)).



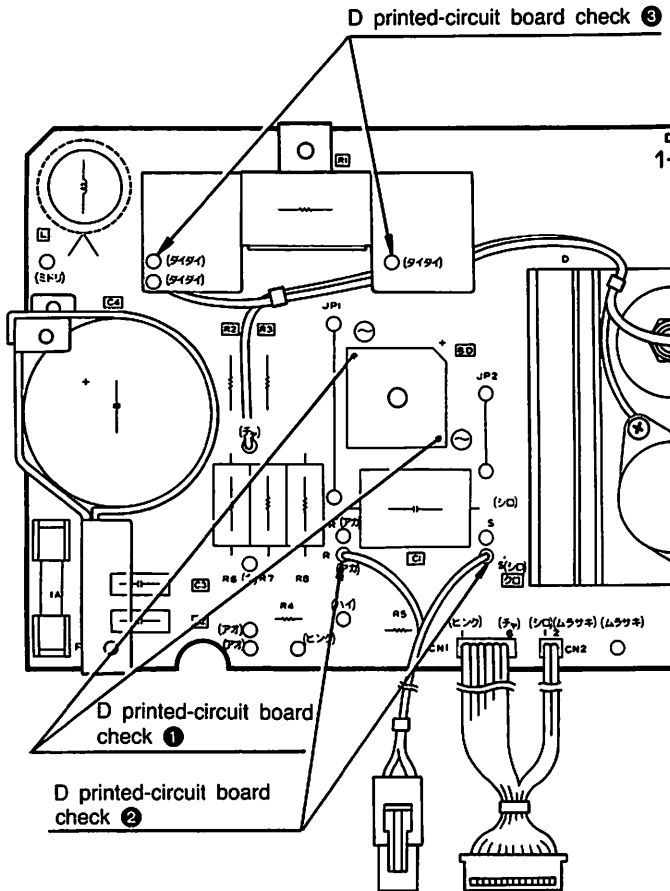
**#3 related**

0V: Check pin 0V

5V OUT: OK #3-1	Check pin CLK: OK #3-2	CPU pin 28: OK #3-3	5V IN: OK #3-4	5V OUT: 0Ω #3-5	CN6 voltage: OK #3-6	Transformer primary voltage: OK #3-8
REG1 OUT +5±0.5V	Refer to figure above.	Must be +4.5V or higher.	REG1 IN Refer to figure above.	REG1 OUT 0ohms at X1 range	AC 8V or higher between red wires	Rating 10% (Refer to p.32.)

## 4 D printed-circuit board

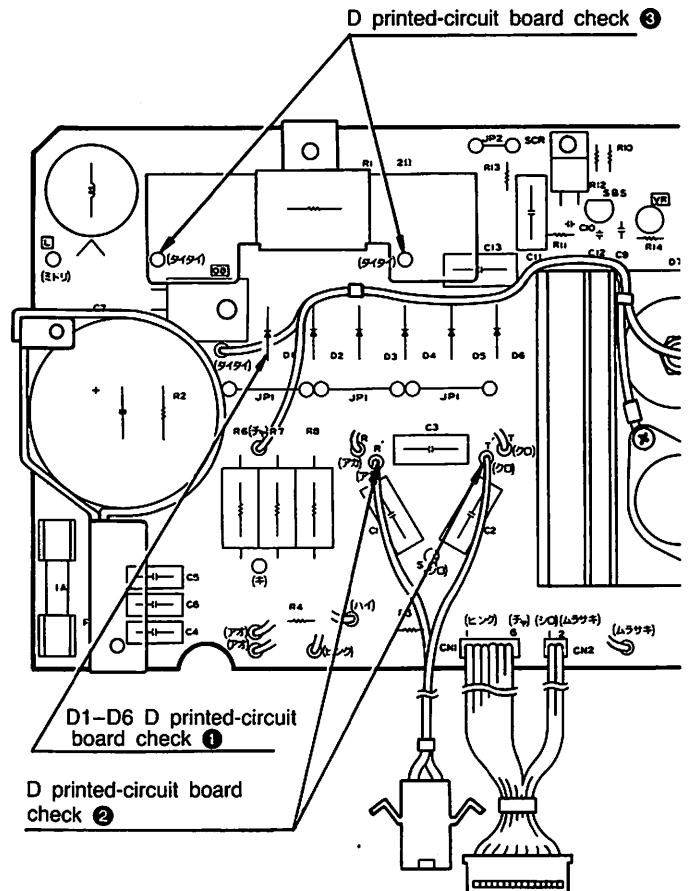
D printed-circuit board 1-110V assembly  
1-240V assembly



- D printed-circuit board check ①**  
BD ⊖ - ⊖ both directions: must not be 0Ω
- D printed-circuit board check ②**  
Is solder of connector lead wiring OK?
- D printed-circuit board check ③**  
Between orange wires: must be 0-5Ω

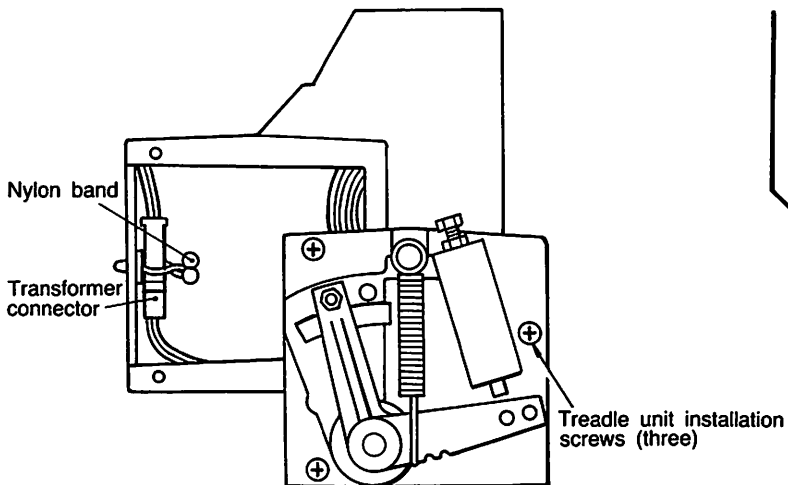
Transformer primary voltage: OK #3-8

D printed-circuit board 3-240V assembly  
3-415V assembly

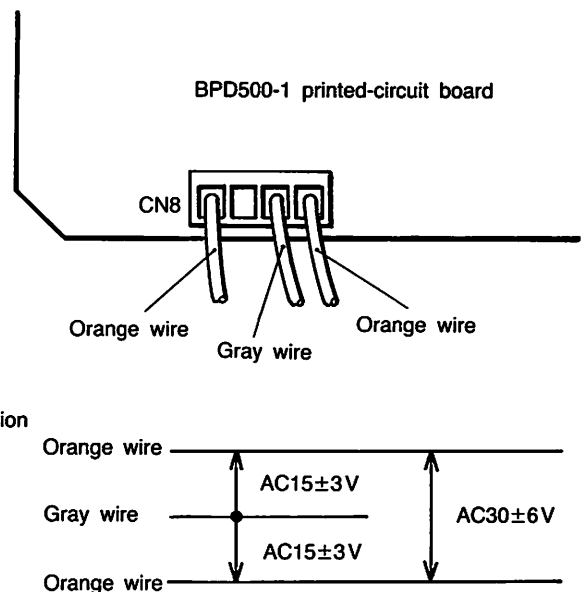


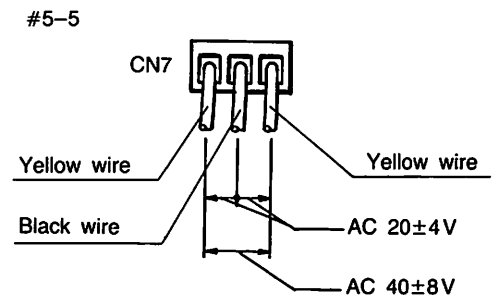
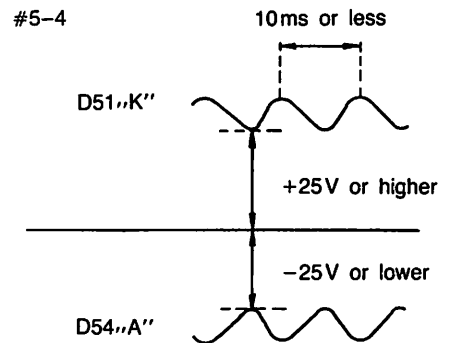
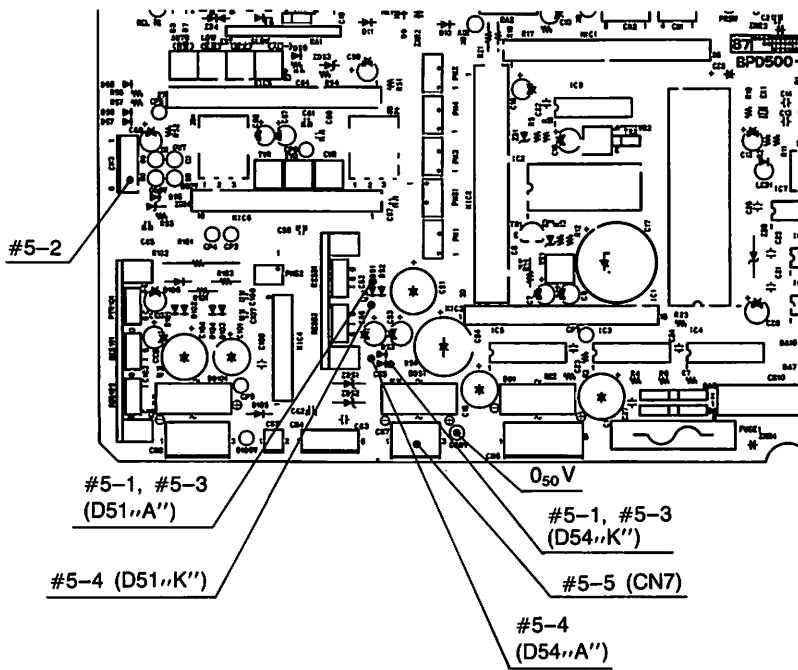
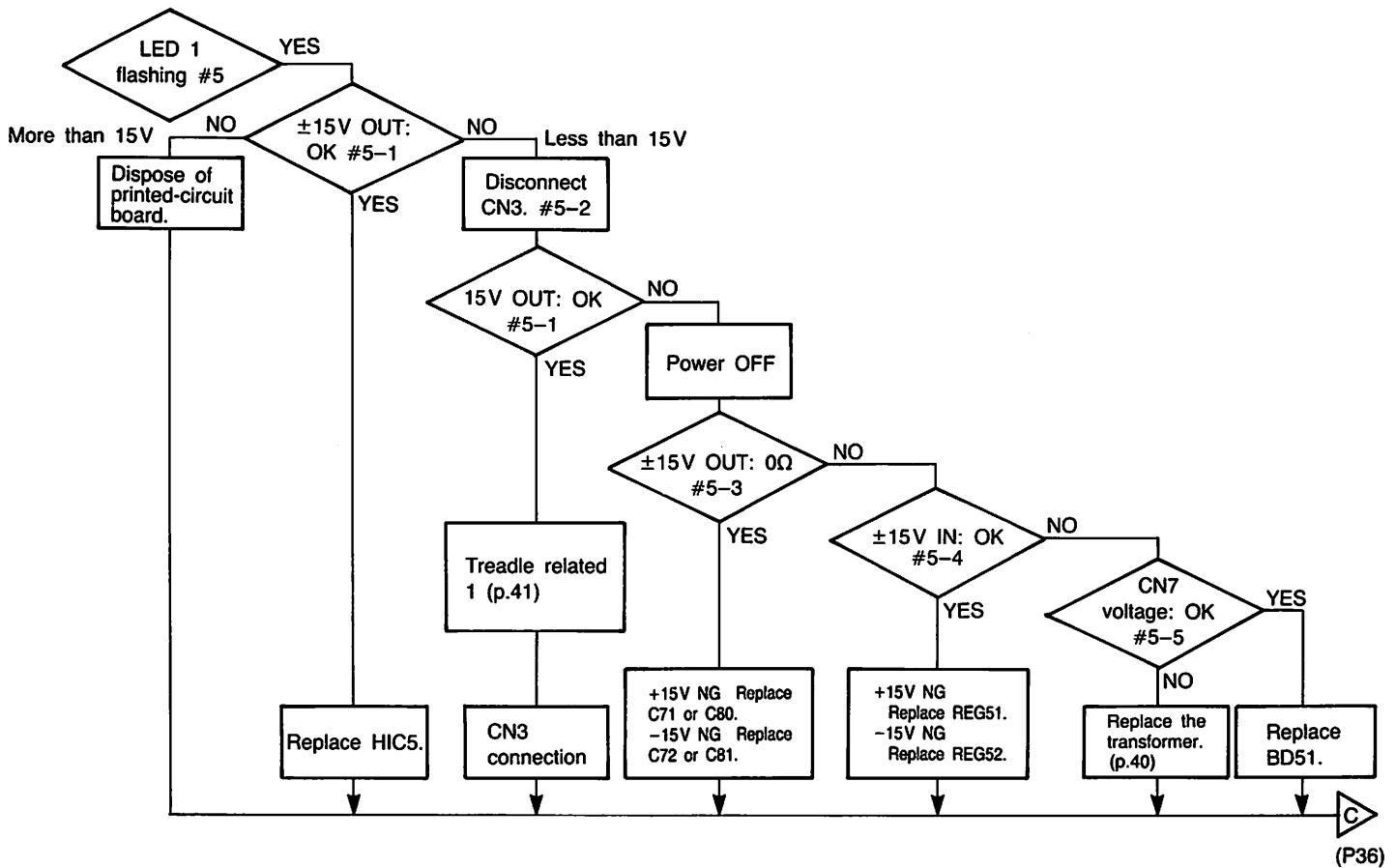
- D printed-circuit board check ①**  
BD D1-D6 both directions: must not be 0Ω
- D printed-circuit board check ②**  
Is solder of connector lead wiring OK?
- D printed-circuit board check ③**  
Between orange wires: must be 0-5Ω

CN8 voltage: OK #4



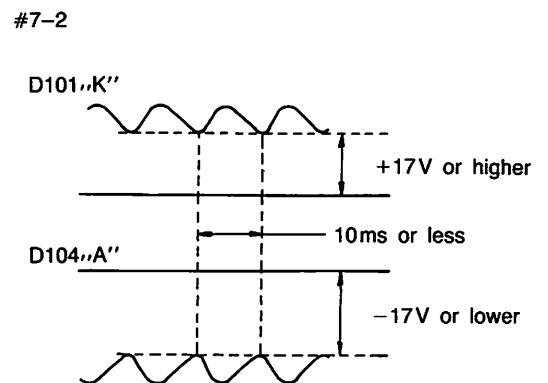
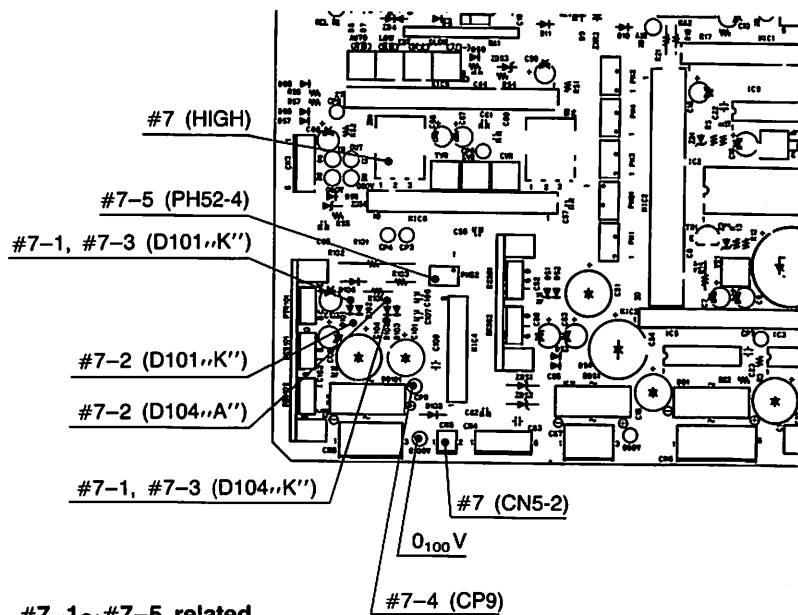
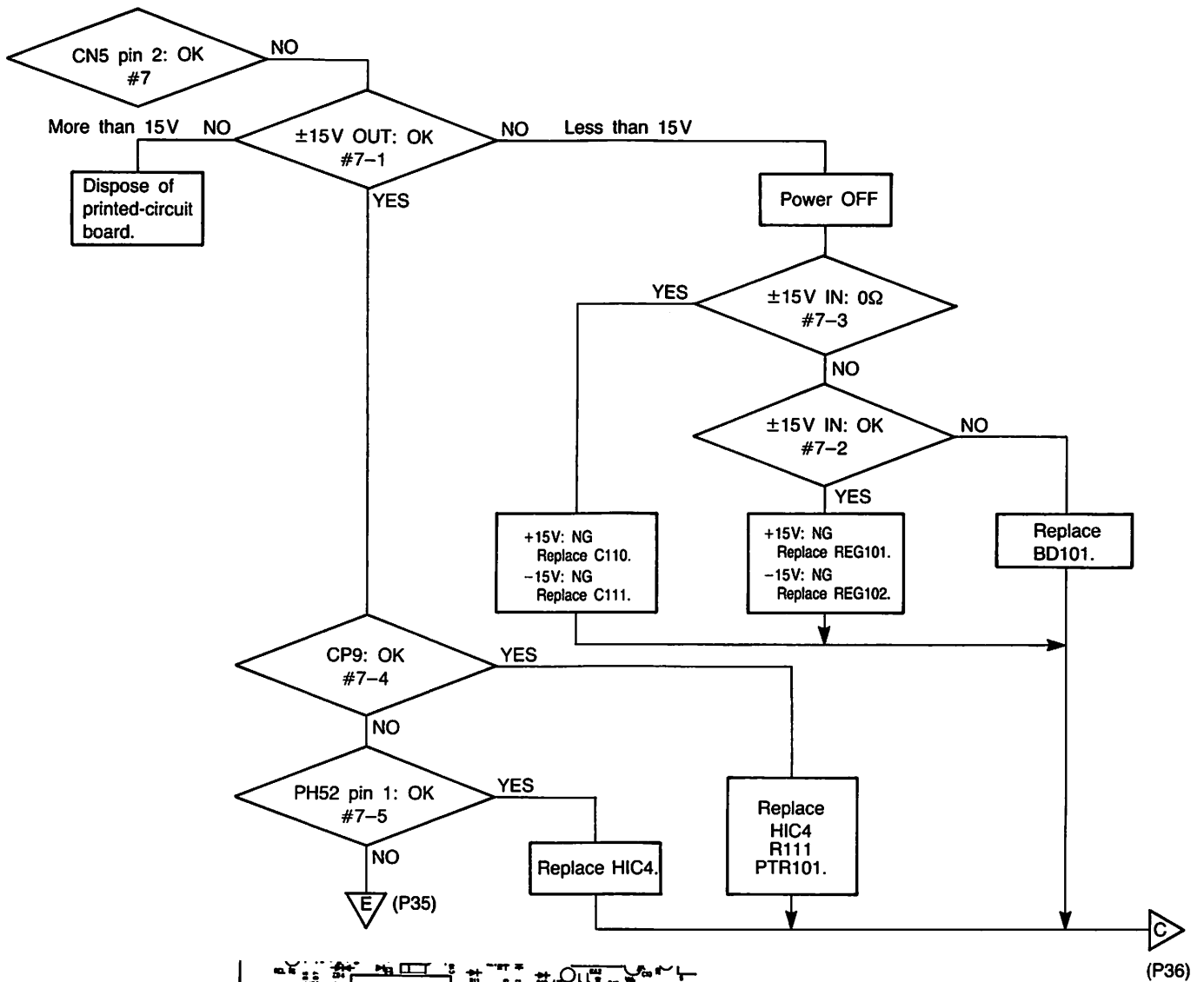
- (1) Remove the three treadle unit installation screws.
- (2) Disconnect the transformer connector from the nylon band.
- (3) Check the AC voltage of the transformer connector.





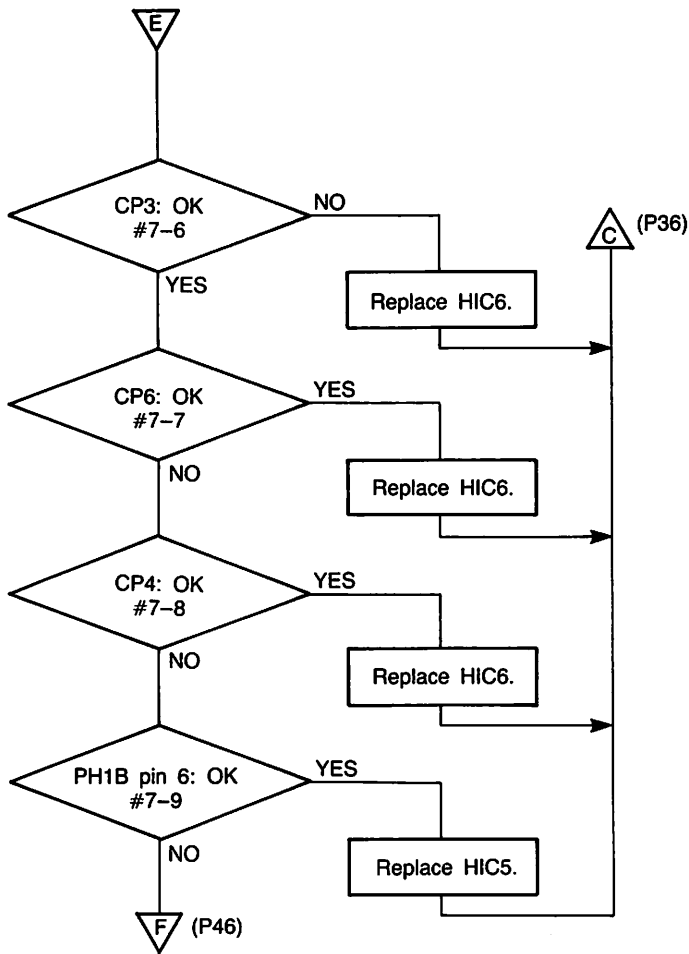
#5 related  
 0<sub>50</sub>V: Check pin 0<sub>50</sub>V

±15V OUT: OK #5-1	±15V OUT: 0Ω #5-3	±15V IN: OK #5-4	CN7 voltage: OK #5-5
D51,,A'' +15±0.5V D54,,K'' -15±0.5V	D51,,A'' 0Ω D54,,K'' 0Ω	Refer to the figure above.	Refer to the figure above.

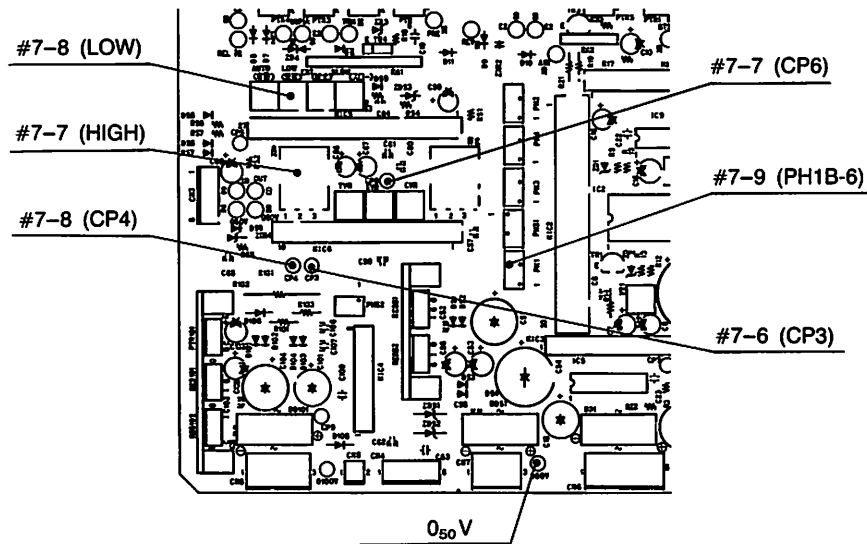
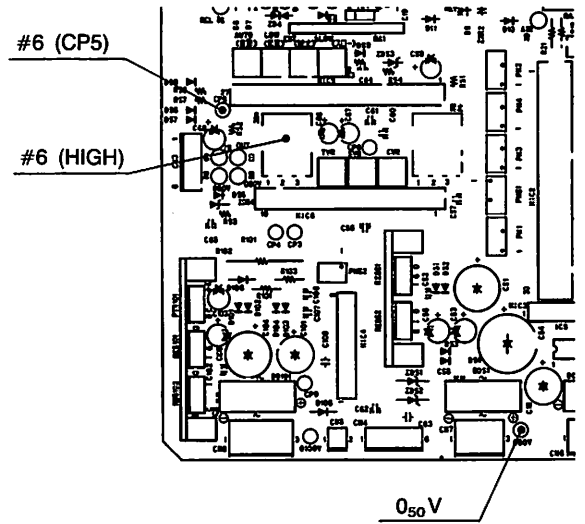


#7-1~#7-5 related  
 0<sub>100</sub>V: Check pin 0<sub>100</sub>V  
 HIGH VR must be fully to right.

	CN5 pin 2: OK #7	±15V OUT: OK #7-1	±15V IN: OK #7-2	±15V OUT: 0Ω #7-3	CP9: OK #7-4	PH52 pin 4: OK #7-5
Pedal neutral	-0.7±0.2V	D101,,A'' +15±0.5V D104,,K'' -15±0.5V	Refer to upper right figure.	D101,,A'' D104,,K'' 0Ω at X1 range	+14V or higher	-0.3V or lower
Pedal forward	+12V or higher				-14V or higher	+0.3V or higher

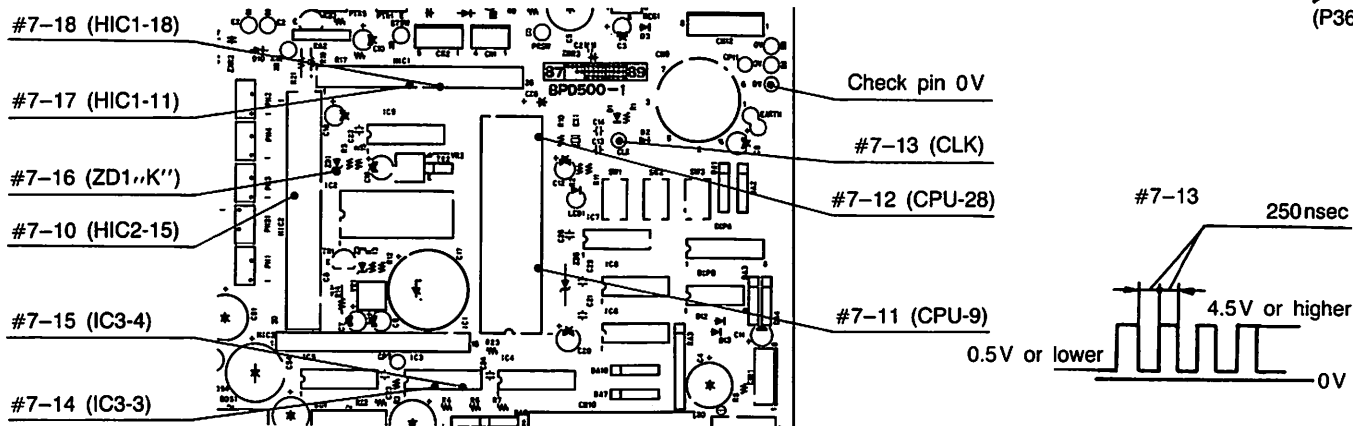
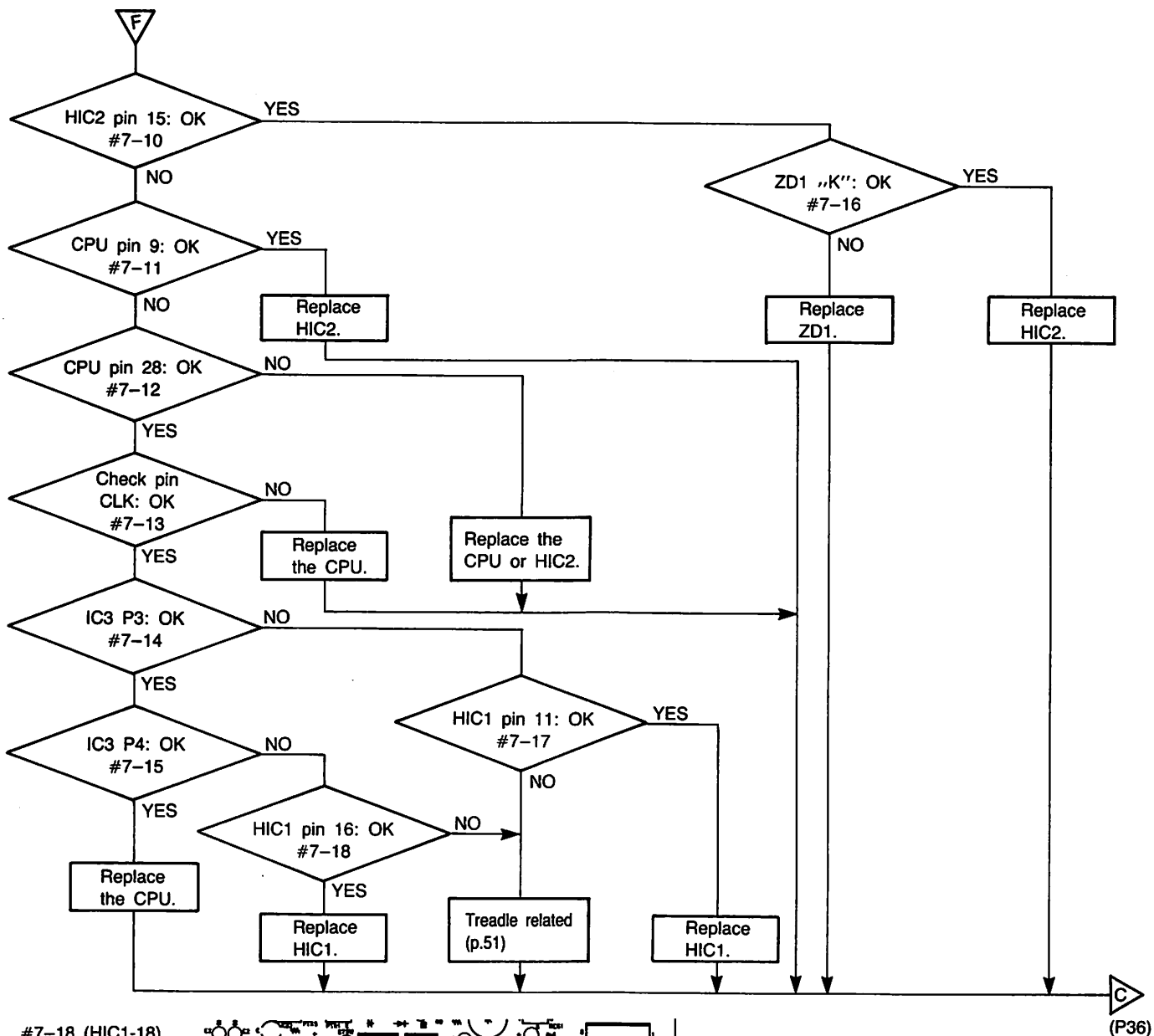


#6 CP5: OK  
 $0_{50V}$ : Check pin  $0_{50V}$   
 With VR4 fully right:  
 Pedal neutral: 0V  
 Pedal fully forward: 8.5V or higher



#7-6—#7-9 related  
 $0_{50V}$ : Check pin  $0_{50V}$

	CP3:OK #7-6	CP6: OK #7-7	CP4: OK #7-8	PH1B-6 pin #7-9
Pedal neutral		HIGH VR must be fully right. $+6.5±0.5V$	LOW VR: at 12:00 position $0~+0.1V$	$0~+0.1V$
Pedal forward		$-8±2V$	$+1.0V$ or higher	$+1.0V$ or higher



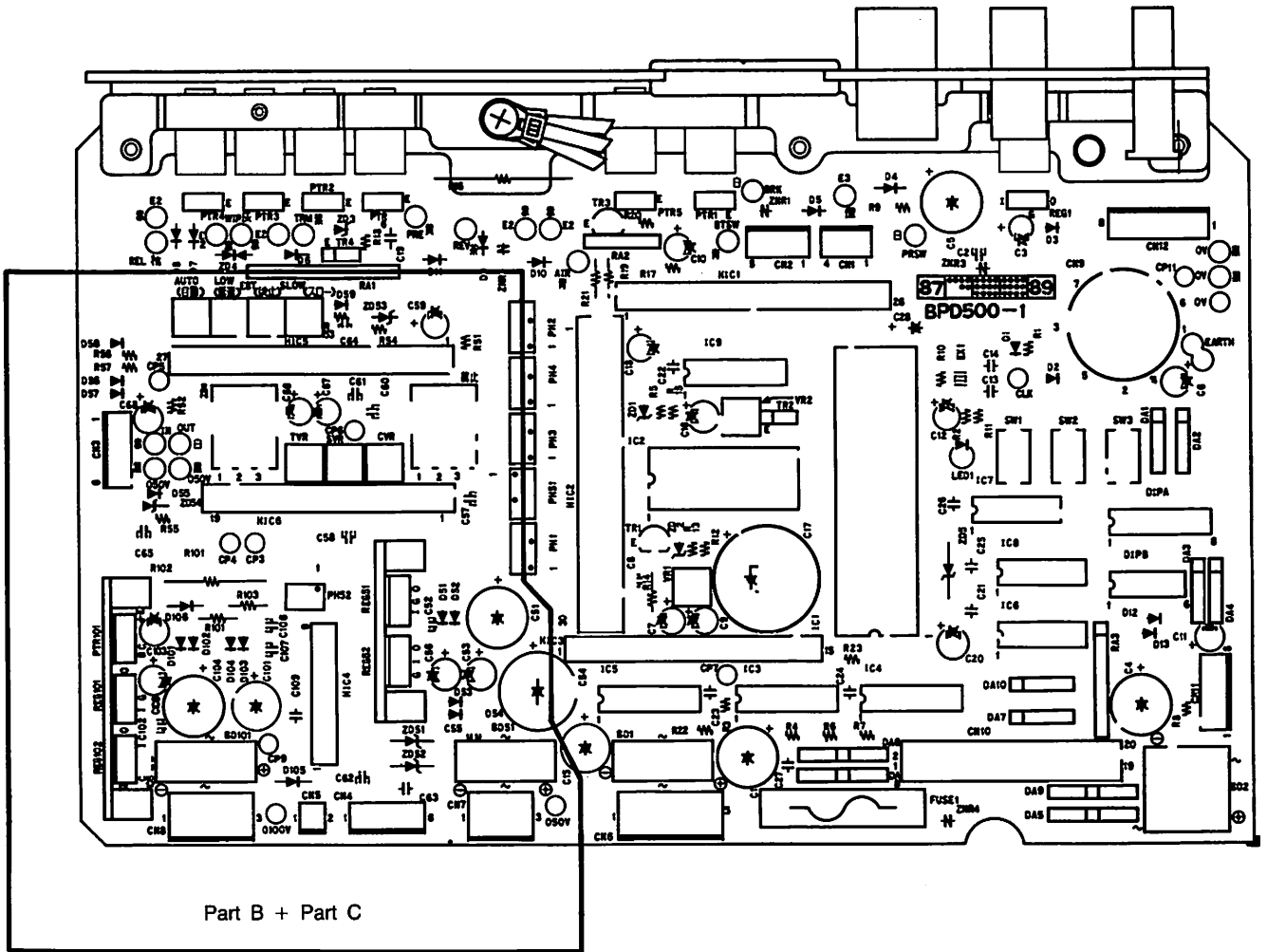
	HIC2 pin 15: OK #7-10	CPU pin 9: OK #7-11	CPU pin 28: OK #7-12	Check pin CLK: OK #7-13	IC3 P3: OK #7-14	IC3 P4: OK #7-15	ZD1 „K”: OK #7-16
Pedal neutral	4.5V or higher	4.5V or higher	4.5V or higher	Refer to upper right figure.	0.5V or lower	4.5V or higher	4.0V or higher
Pedal forward	0.5V or lower	0.5V or lower			0.5V or lower	0.5V or lower	

	HIC1 pin 11: OK #7-17	HIC1 pin 16: OK #7-18
Pedal neutral	0.5V or lower	4.5V or higher
Pedal forward	0.5V or lower	0.5V or lower

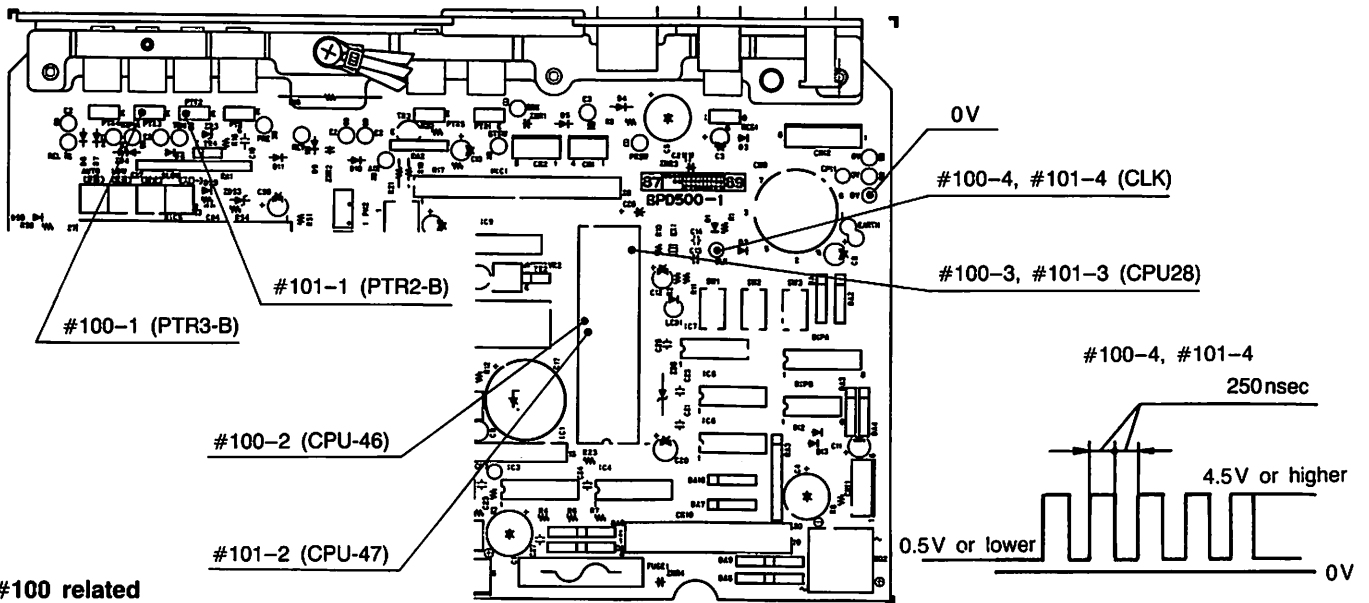
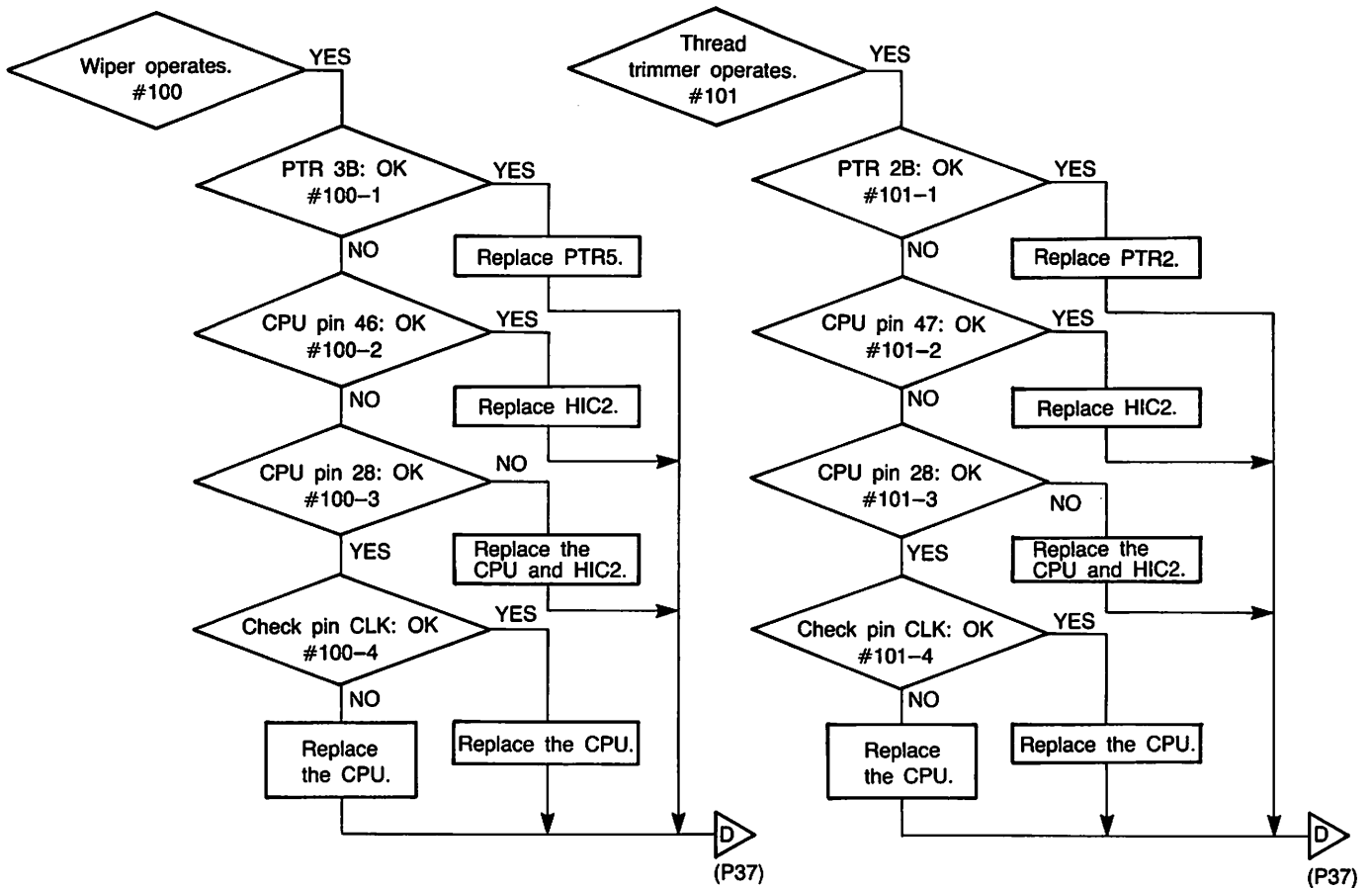
#7-10~#7-18 related  
0V: Check pin 0V



**Caution**



**Note:**  
Because part B and part C are connected to the high-voltage circuitry for this and subsequent tests, care must be taken not to touch them.



**#100 related**

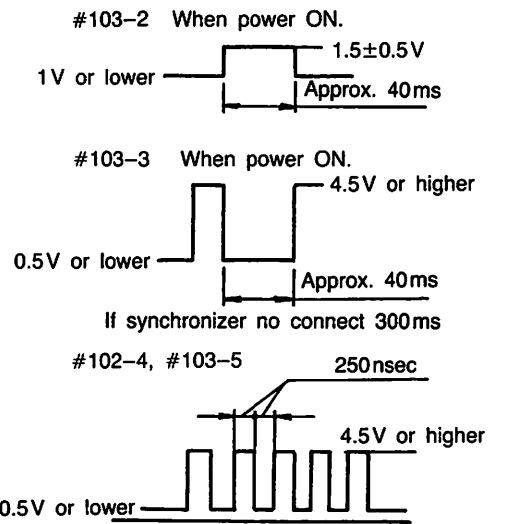
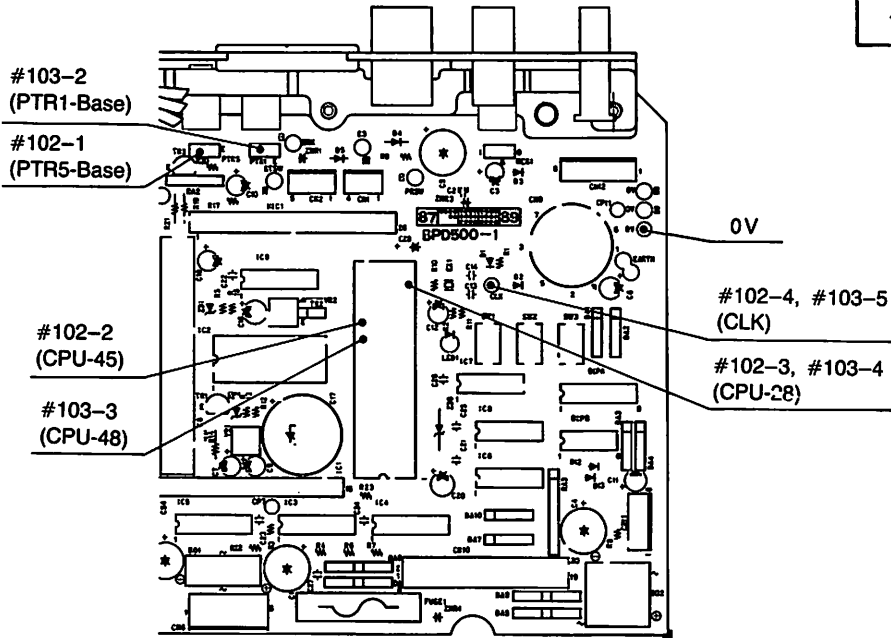
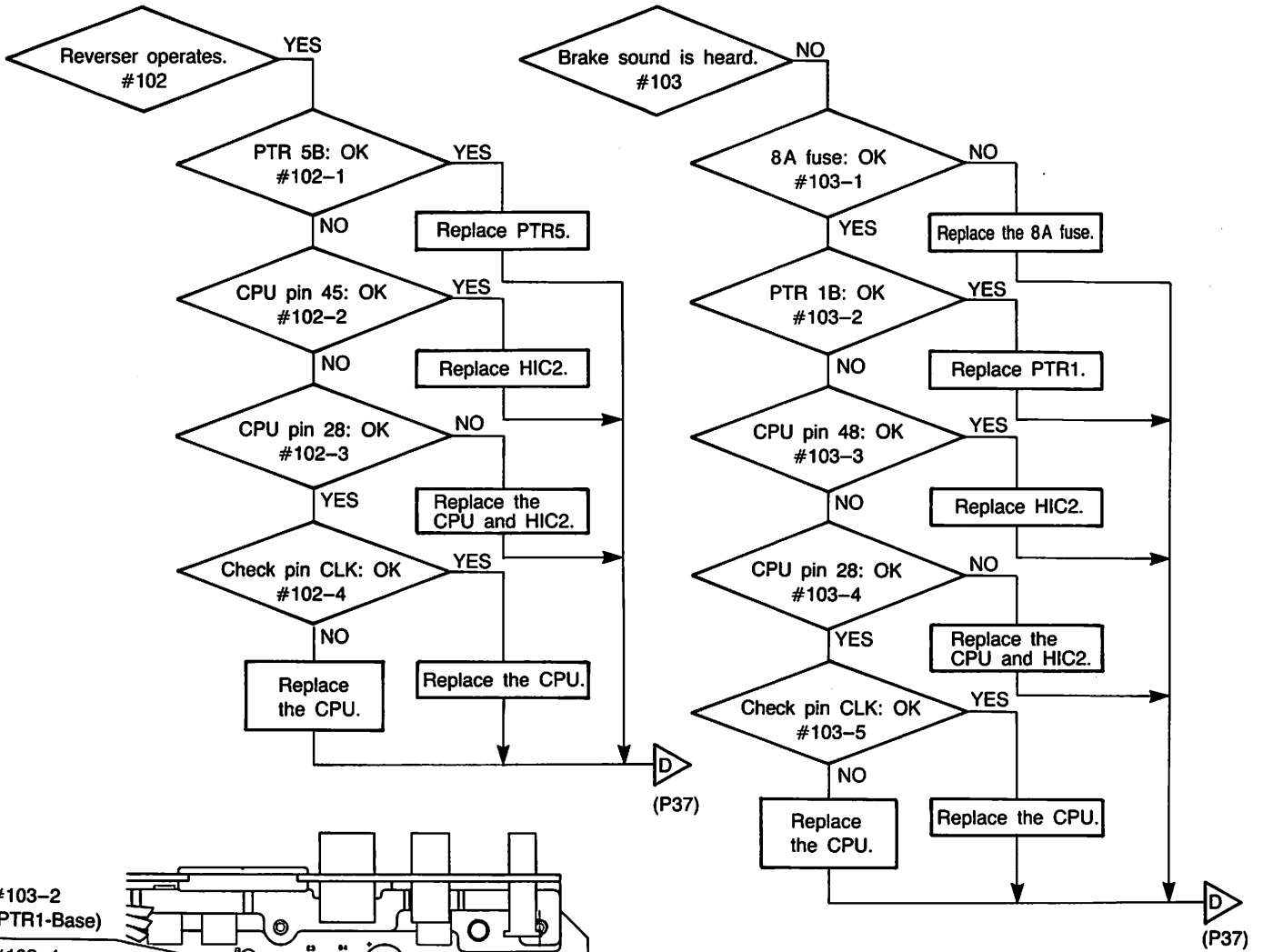
0V: Check pin 0V

PTR 3B: OK #100-1	CPU pin 46: OK #100-2	CPU pin 28: OK #100-3	Check pin CLK: OK #100-4
Base 1V or lower	4.5V or higher	4.5V or higher	Refer to upper right figure.

**#101 related**

0V: Check pin 0V

PTR 2B: OK #101-1	CPU pin 47: OK #101-2	CPU pin 28: OK #101-3	Check pin CLK: OK #101-4
Base 1V or lower	4.5V or higher	4.5V or higher	Refer to upper right figure.

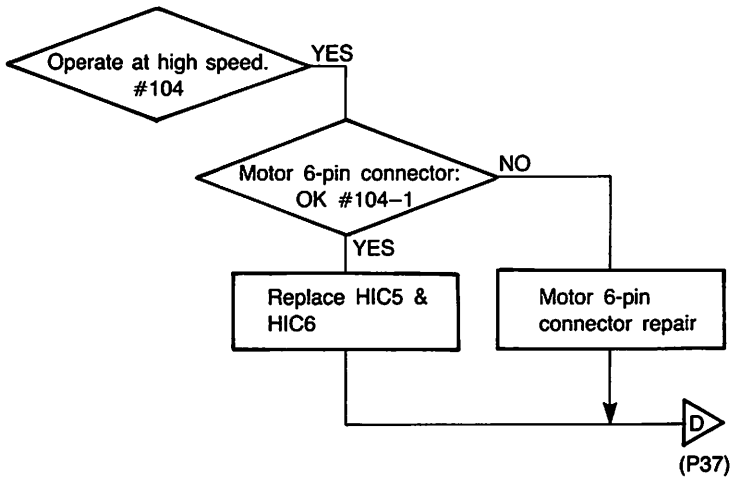


**#102 related**  
0V: Check pin 0V

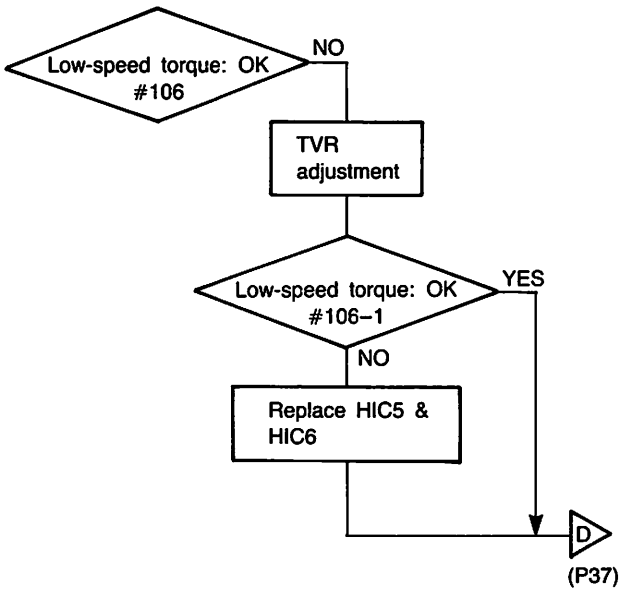
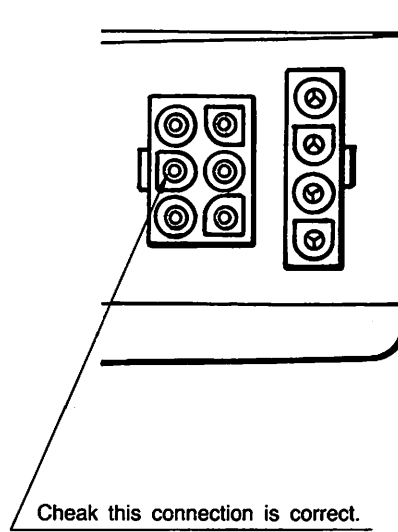
PTR 5B: OK #102-1	CPU pin 45: OK #102-2	CPU pin 28: OK #102-3	Check pin CLK: OK #102-4
Base 1V or lower	4.5V or higher	4.5V or higher	Refer to upper right figure.

**#103 related**  
0V: Check pin 0V

PTR 1B: OK #103-2	CPU pin 48: OK #103-3	CPU pin 28: OK #103-4	Check pin CLK: OK #103-5
Refer to upper right figure.	Refer to upper right figure.	4.5V or higher	Refer to upper right figure.



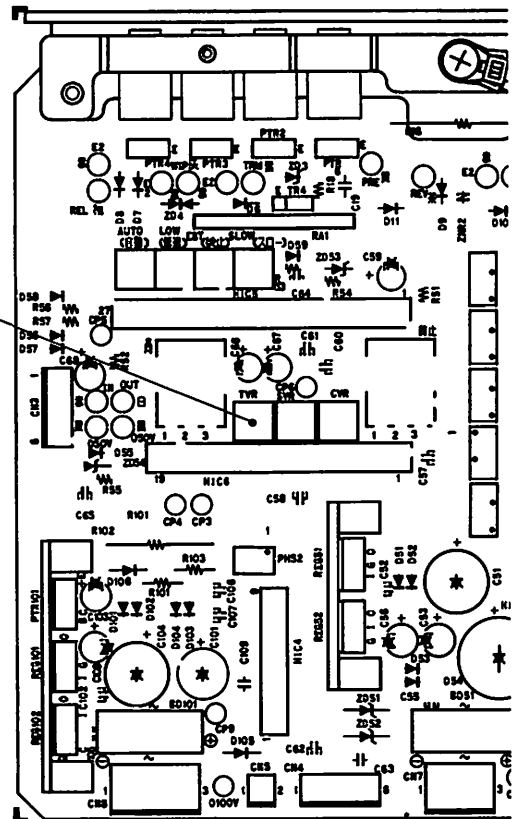
#104-1 related



#106, #106-1 related

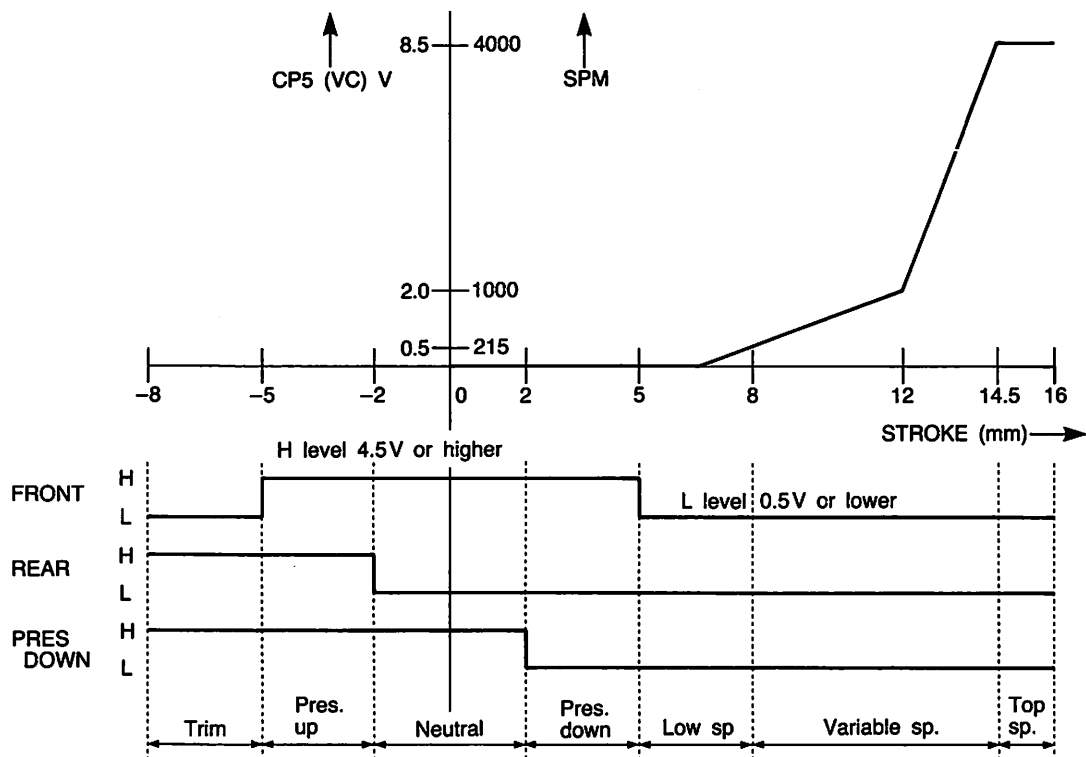
Operate the machine at low speed. Hold the machine pulley and, without "hunting", make the TVR adjustment so that torque is maximized.

#106, #106-1 (TVR)

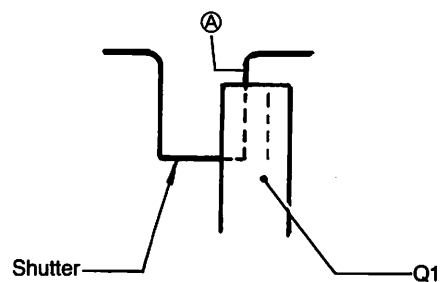
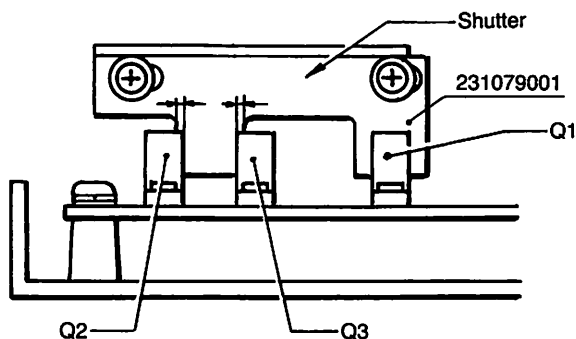


# Treadle unit

## Phot Int & VC chart



### Adjustments



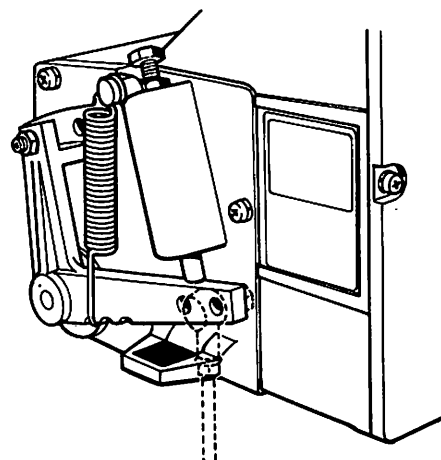
Adjust the shutter position so that it uniformly contacts both Q2 and Q3 at neutral.

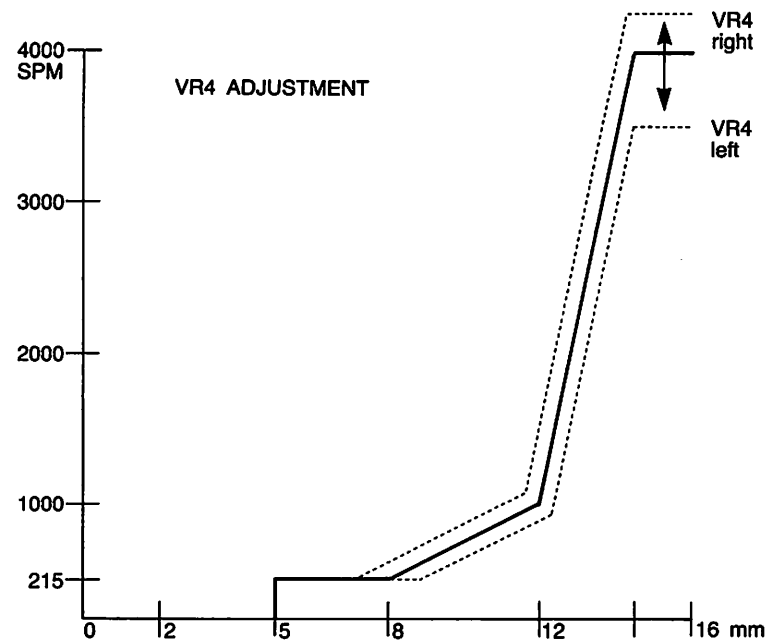
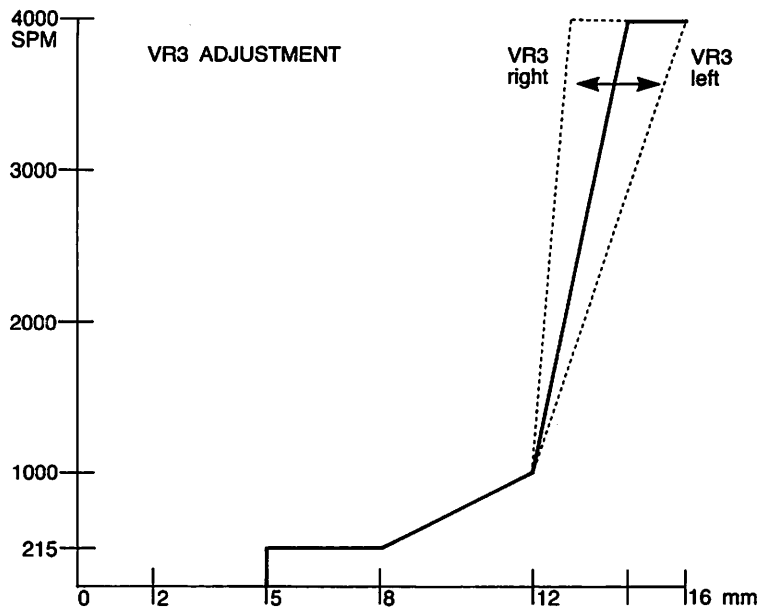
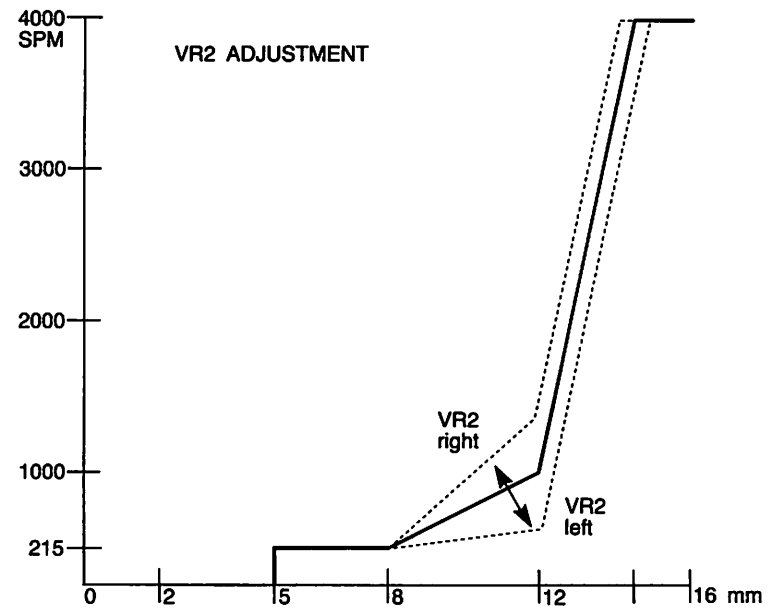
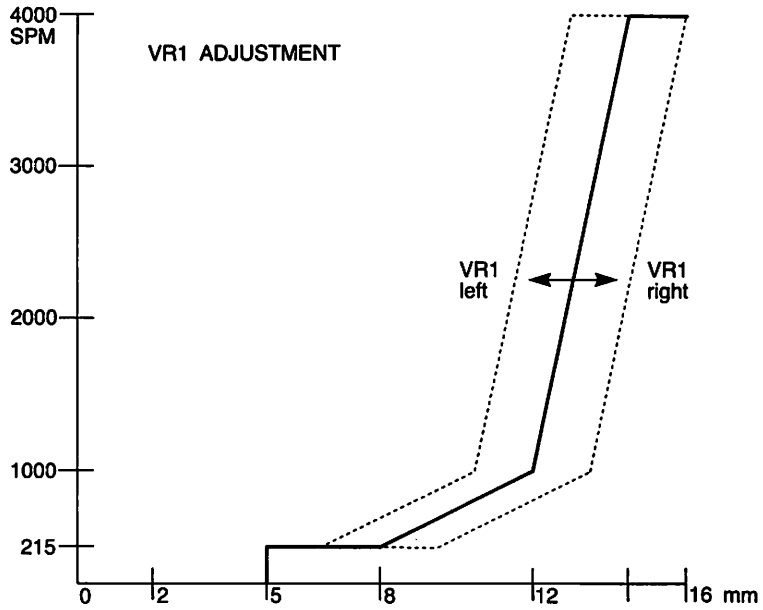
Note:

When the treadle is fully depressed, the edge A of the shutter must be within the left 1/3 of Q1.

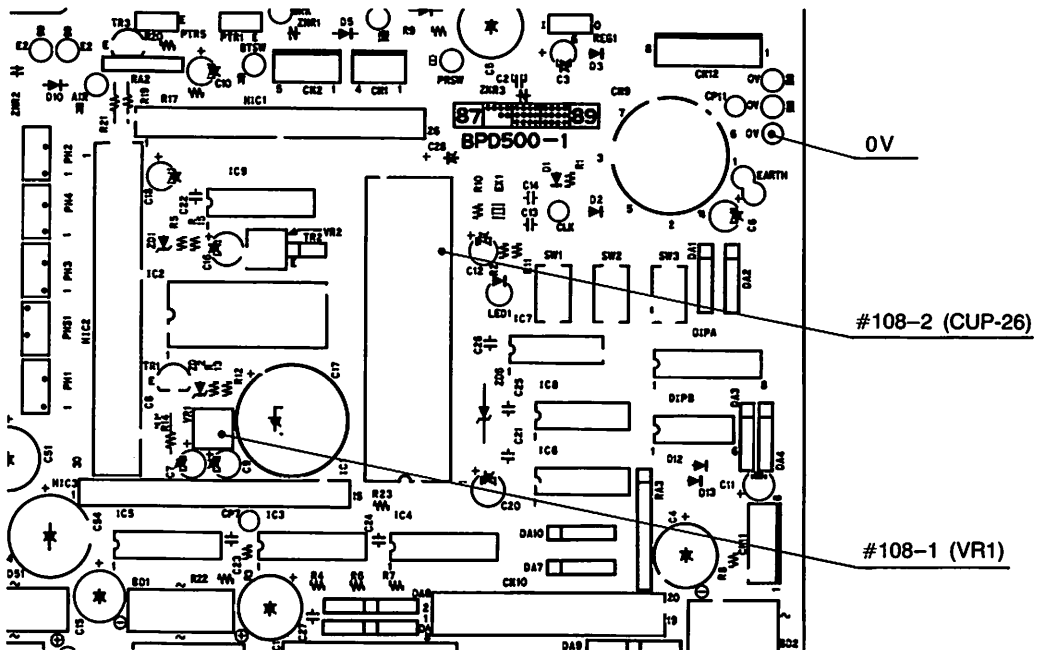
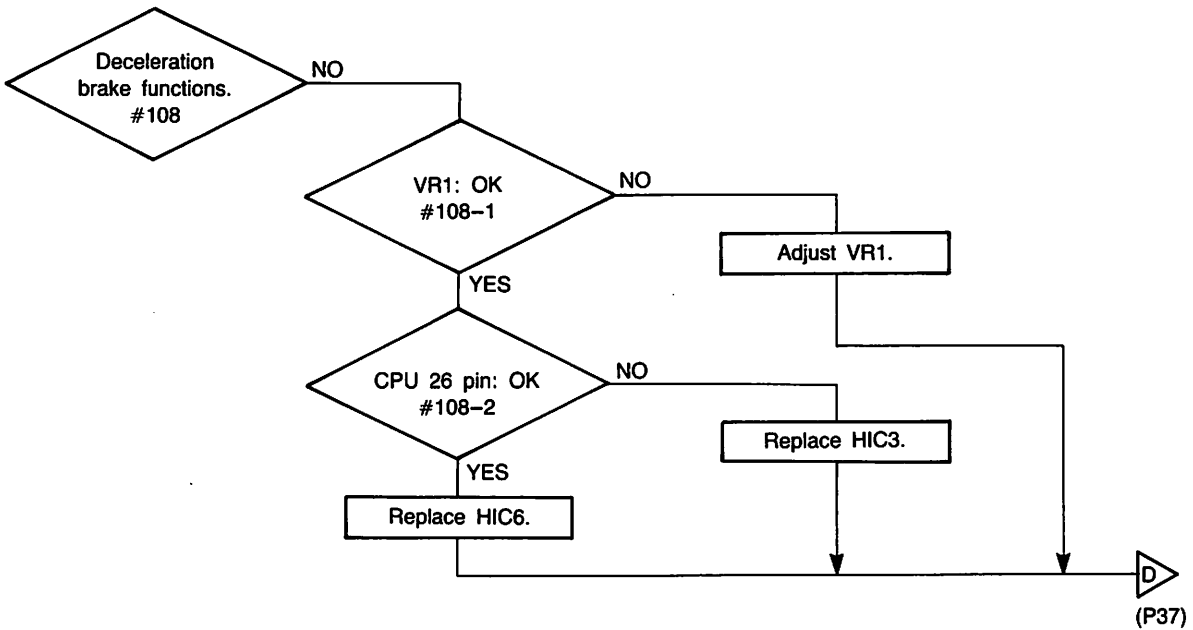
### Connector related

- 1) Connect only the power-supply connector of the external connectors.
- 2) For the internal connectors, remove only CN5 from the D printed-circuit board.
- 3) Making the above adjustments will set the machine speed to approximately 4000spm (125 pulley), so, in the condition after the adjustments are completed, use VR3 to set to maximum speed.





VR Adjustment



**#108 related**

0V: Check pin 0V

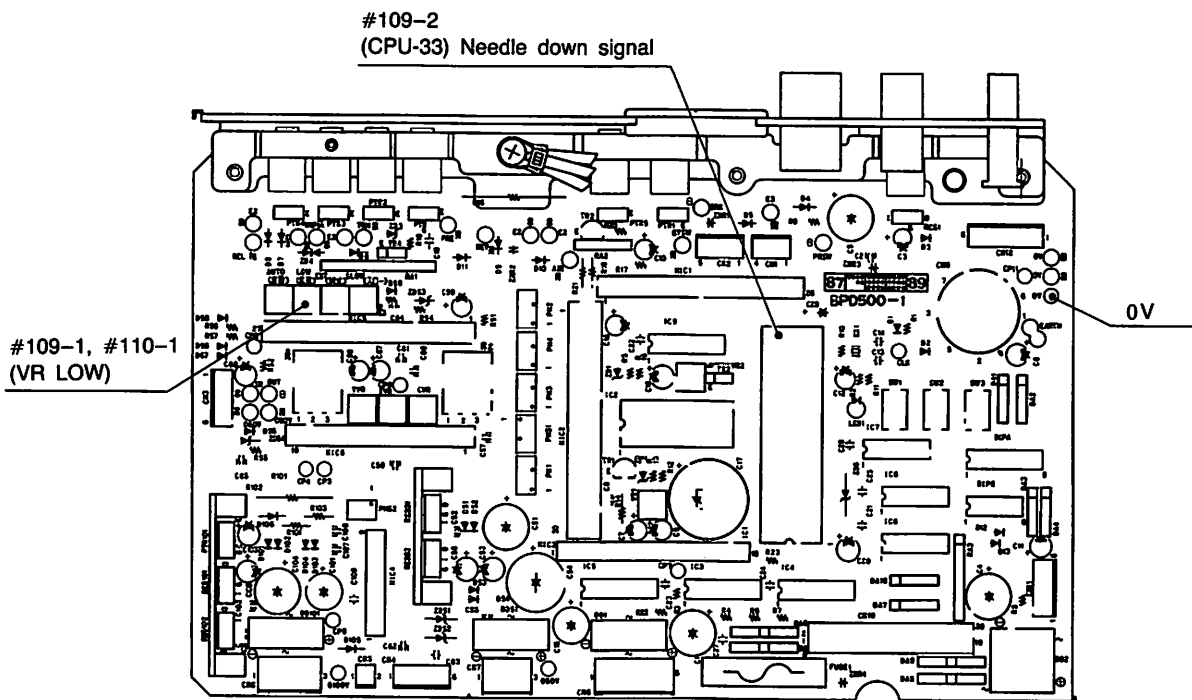
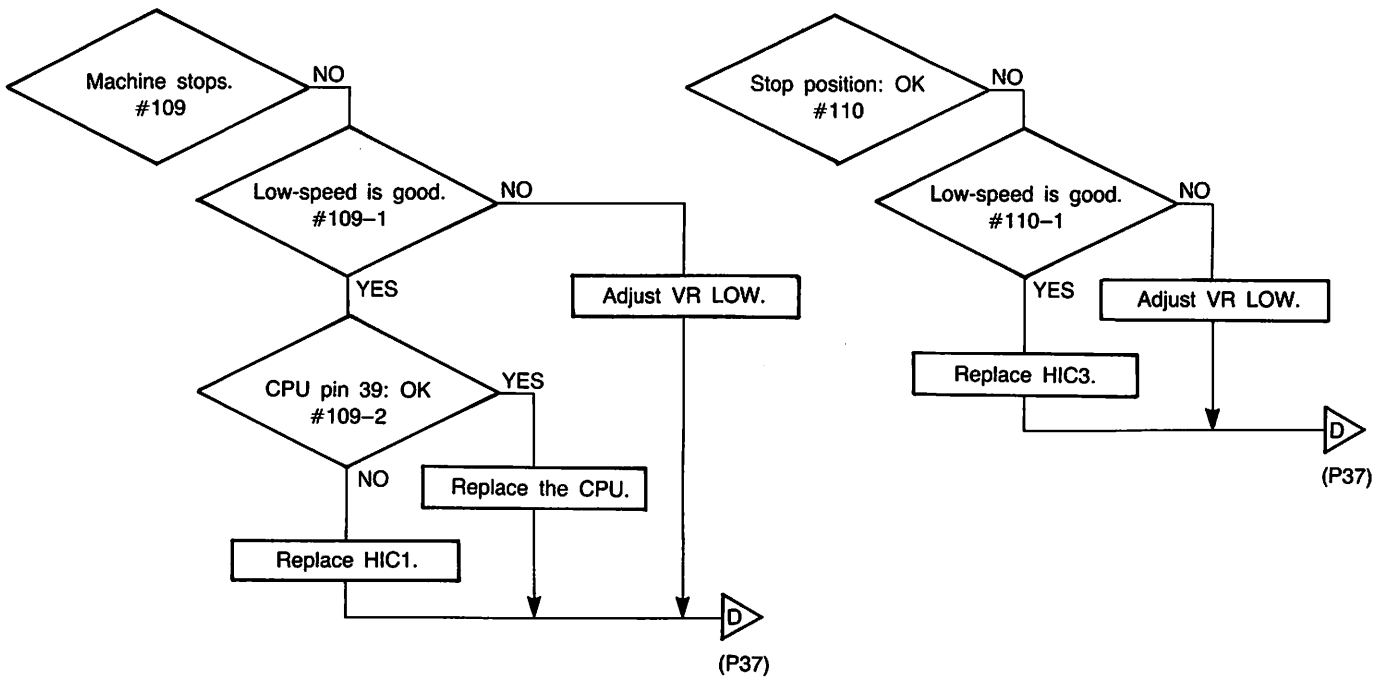
VR1: OK  
#108-1

The VR1 position must be within the range to



CPU pin 26: OK  
#108-2

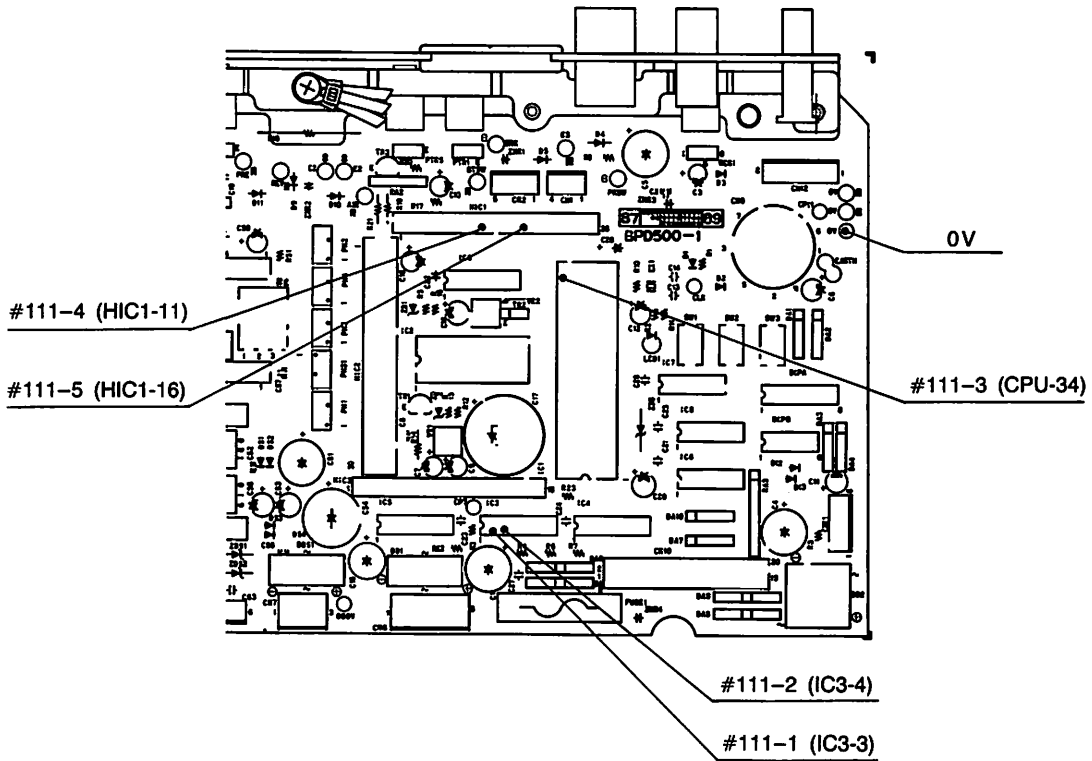
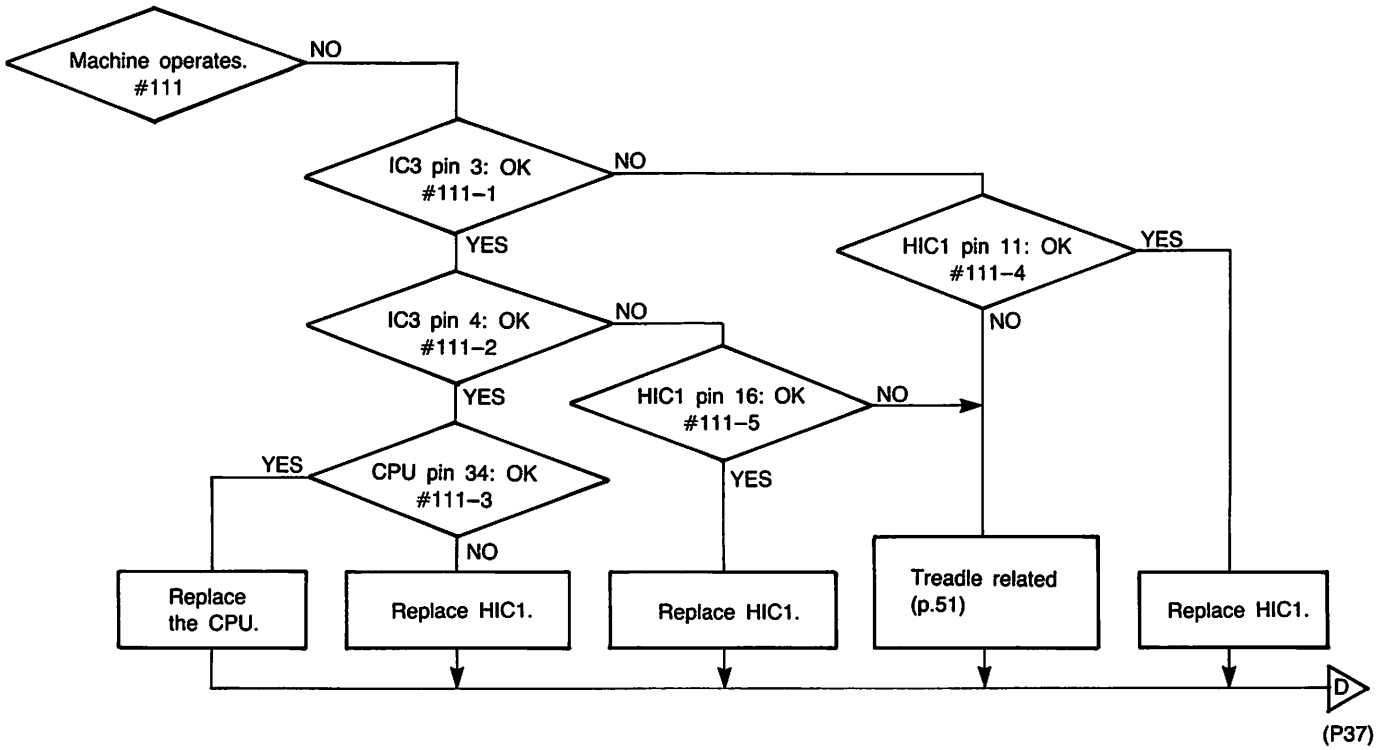




#109, #110 related  
0V: Check pin 0V

Low-speed is good. #109-1	CPU pin 39: OK #109-2	Low-speed is good. #110-1
VR LOW: 215±10spm	Needle (lower) position: 0.5V or lower Other than needle (lower) position: 4.5V or higher	VR LOW: 215±10spm

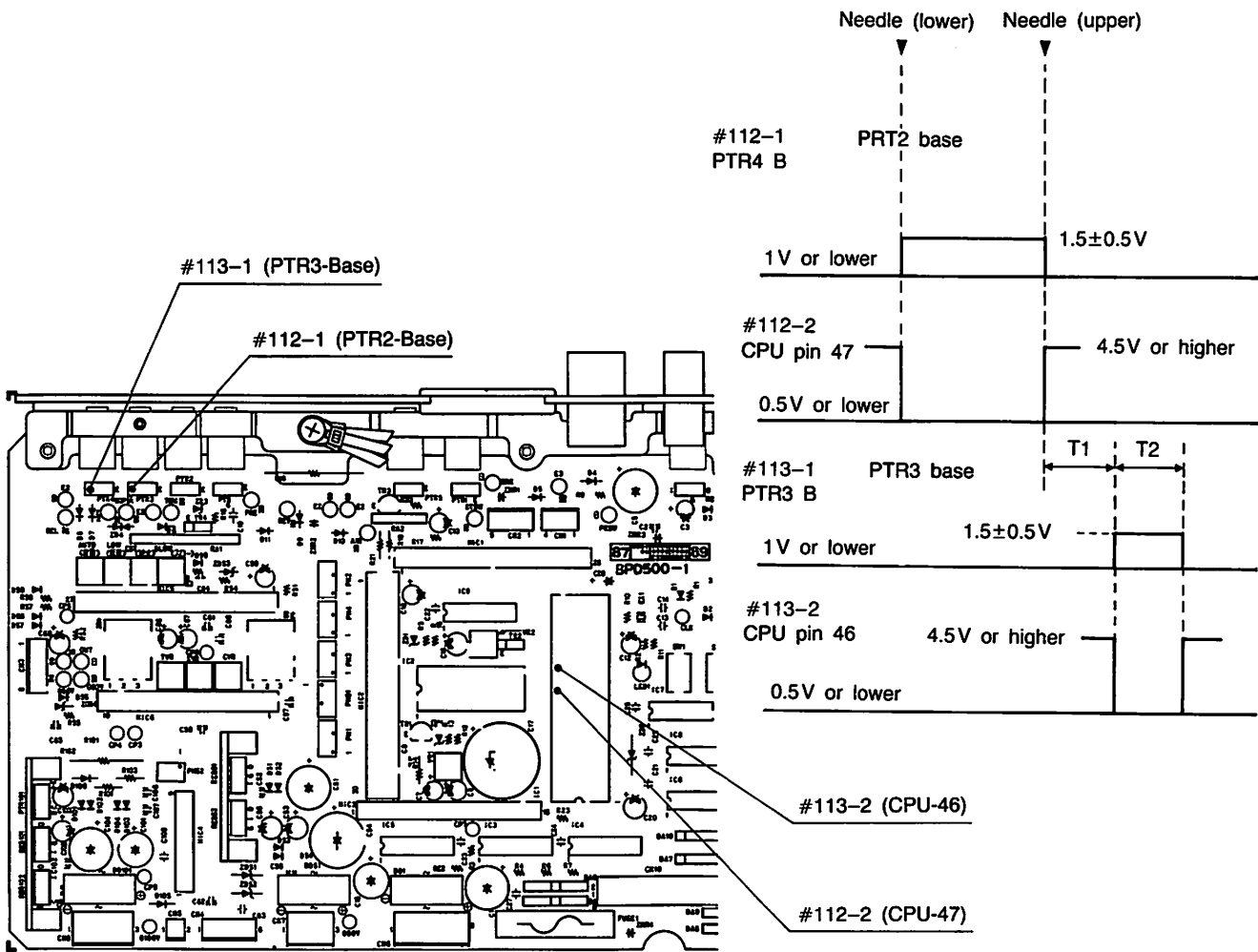
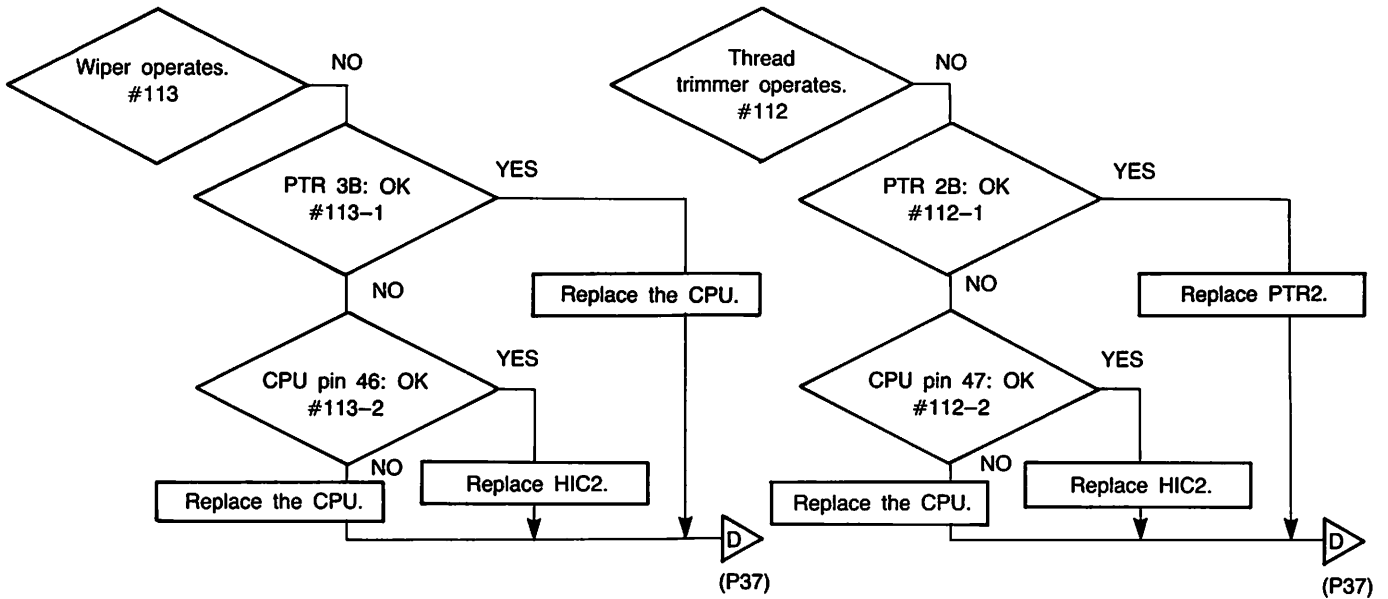




**#111 related**

0V: Check pin 0V

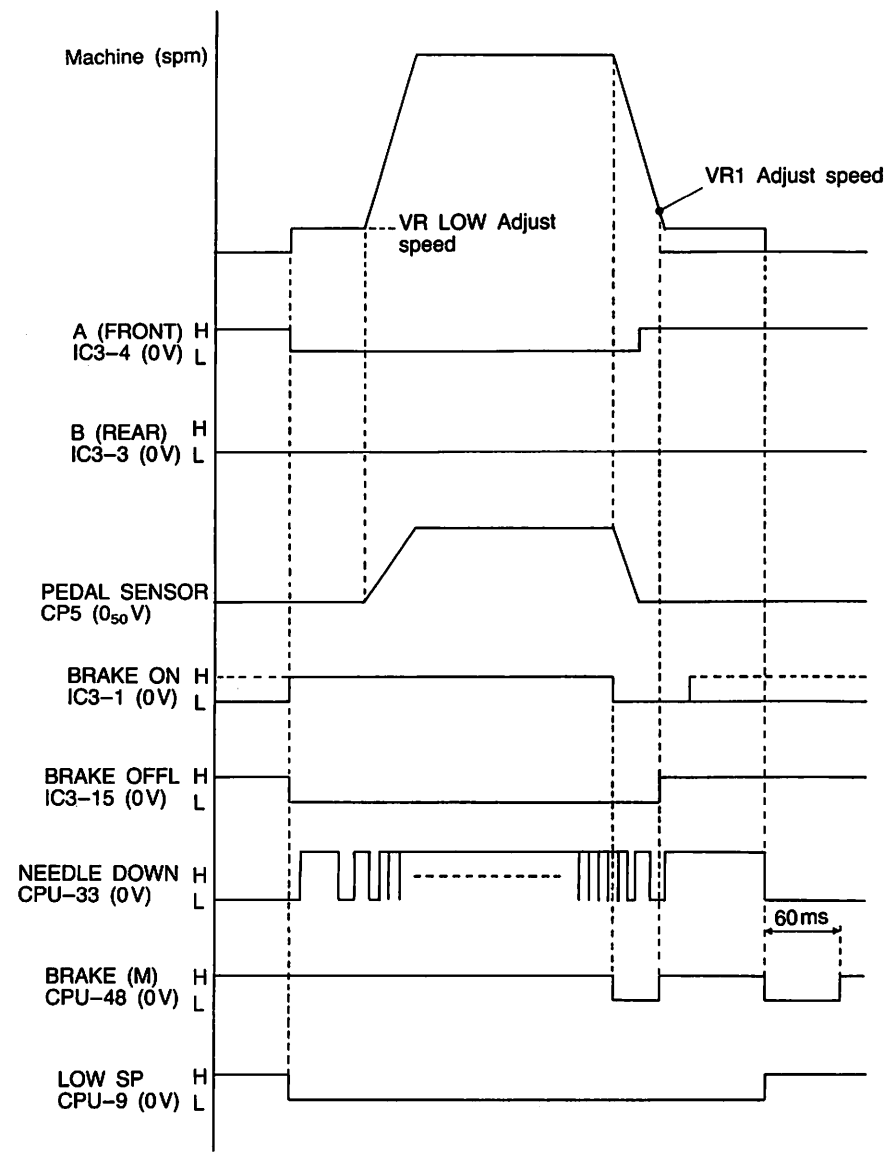
IC3 pin 3: OK #111-1	IC3 pin 4: OK #111-2	CPU pin 34: OK #111-3	HIC1 pin 11: OK #111-4	HIC1 pin 16: OK #111-5
4.5V or higher for backward depression	0.5V or lower for backward depression	Needle (upper) position: 0.5V or lower Other than needle (upper) position: 4.5V or higher	4.5V or higher for backward depression	0.5V or lower for backward depression



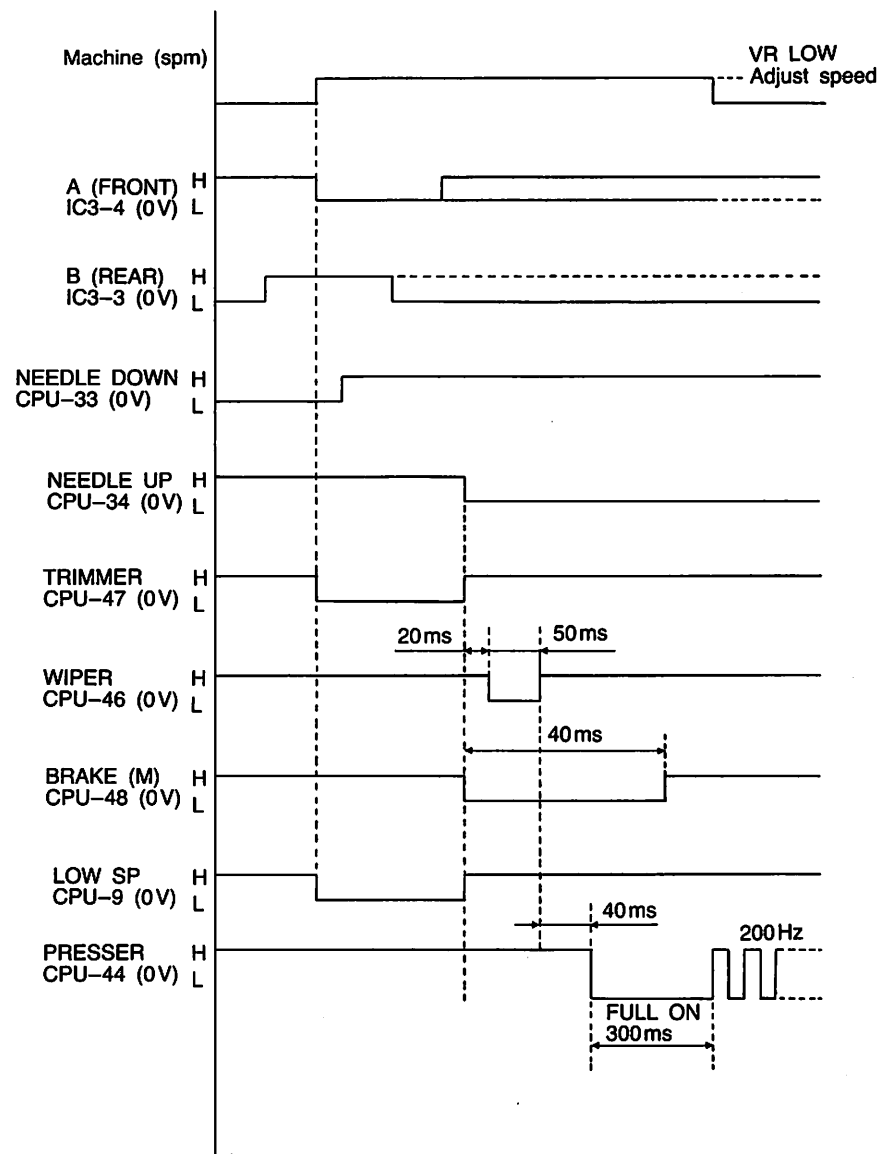
#112, #113 related  
 0V: Check pin 0V

PTR 2B: OK #112-1	CPU pin 47: OK #112-2	PTR 3B: OK #113-1	CPU pin 46: OK #113-2
Refer to figure above.	Refer to figure above.	Refer to figure above.	Refer to figure above.

1 Needle (lower) stop



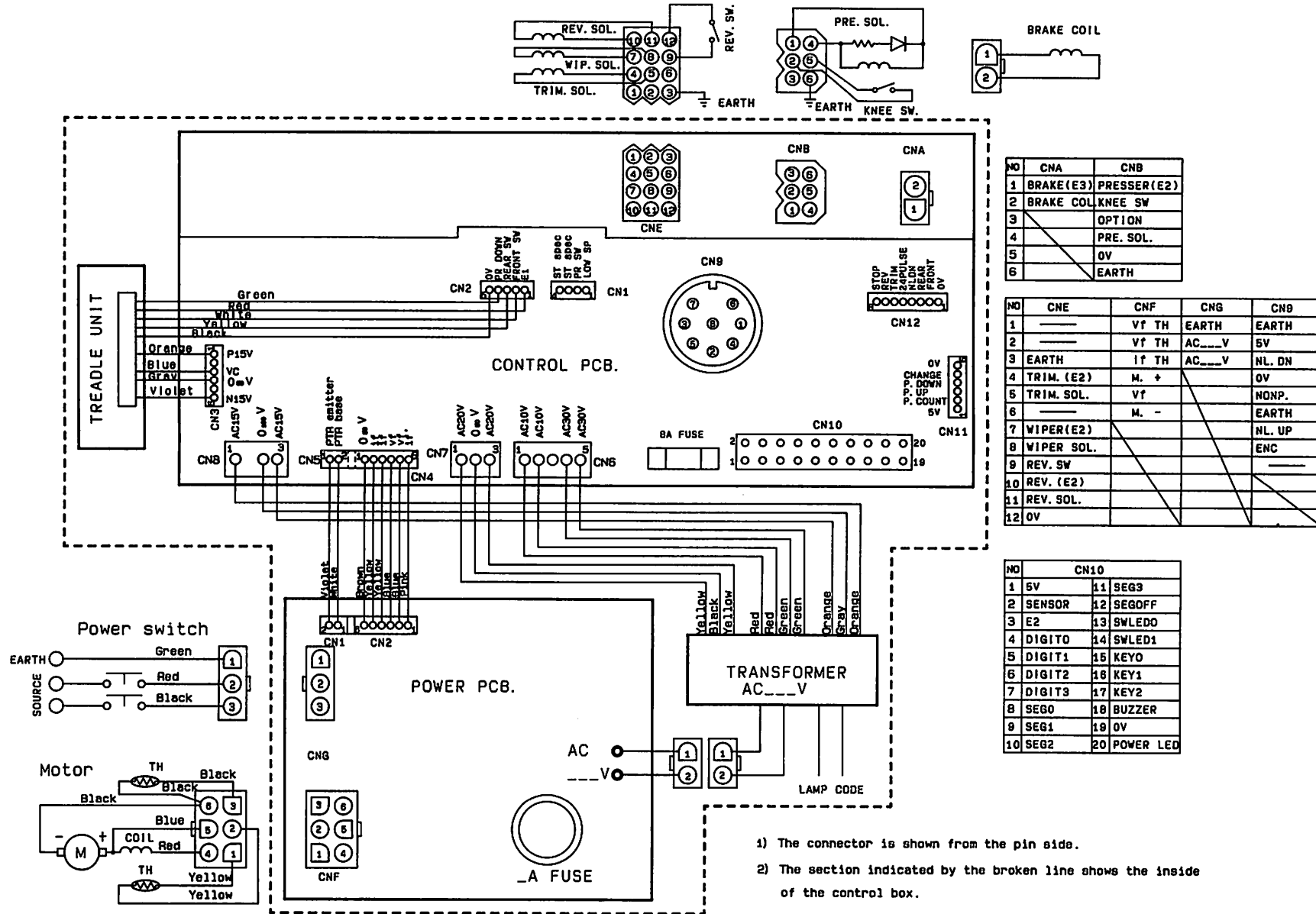
2 Needle (upper) stop



For the presser foot, CPU-16 at S printed-circuit board G.

# BLOCK DIAGRAM OF CONTROL CIRCUIT

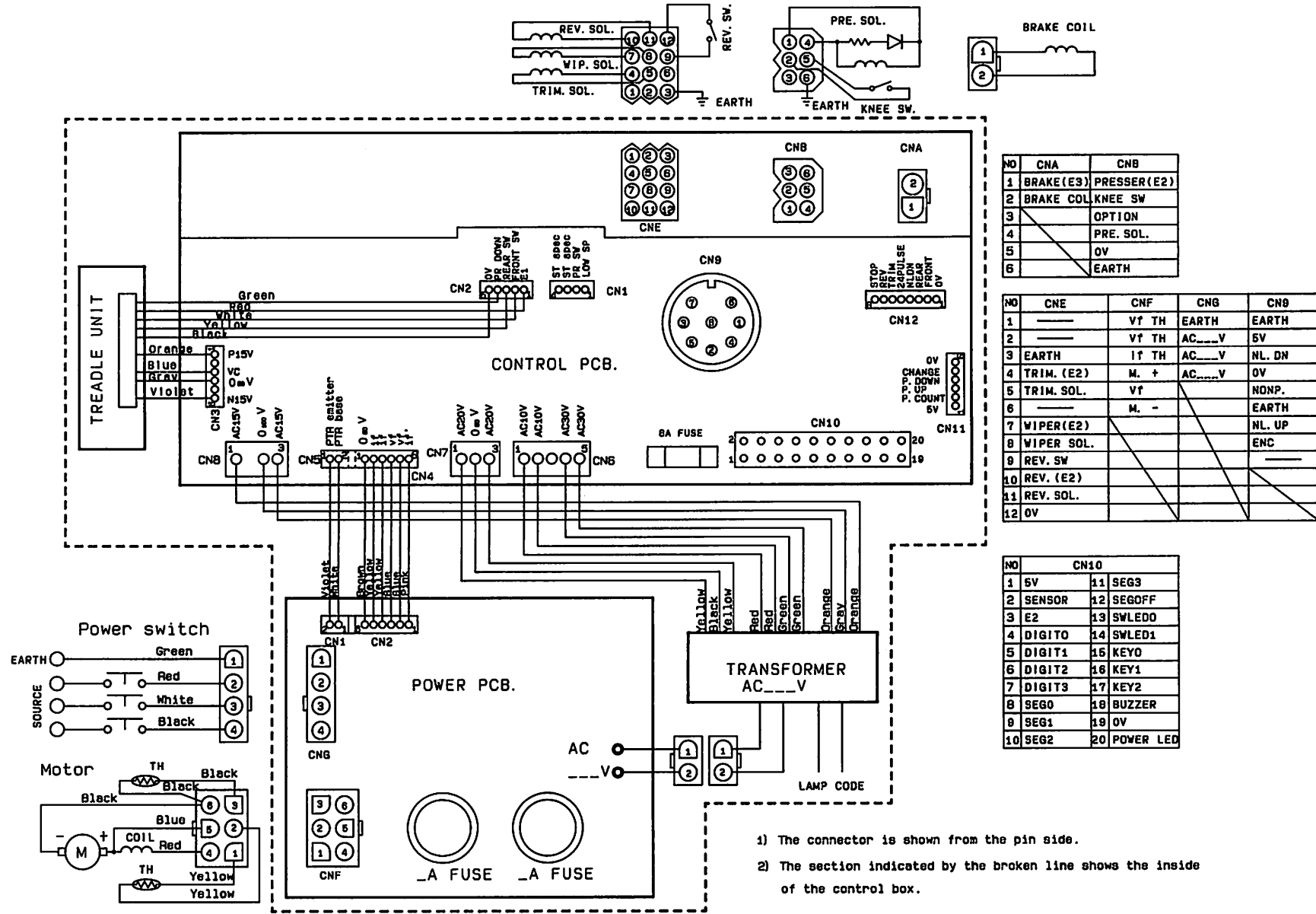
## MD-803 (1 Phase)



BLOCK DIAGRAM OF CONTROL CIRCUIT

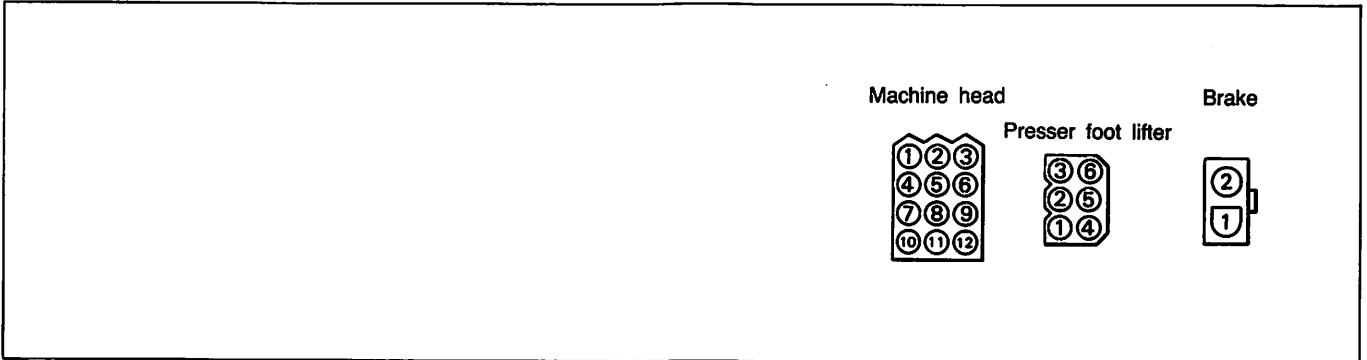
# BLOCK DIAGRAM OF CONTROL CIRCUIT

## MD-813 (3 Phase)

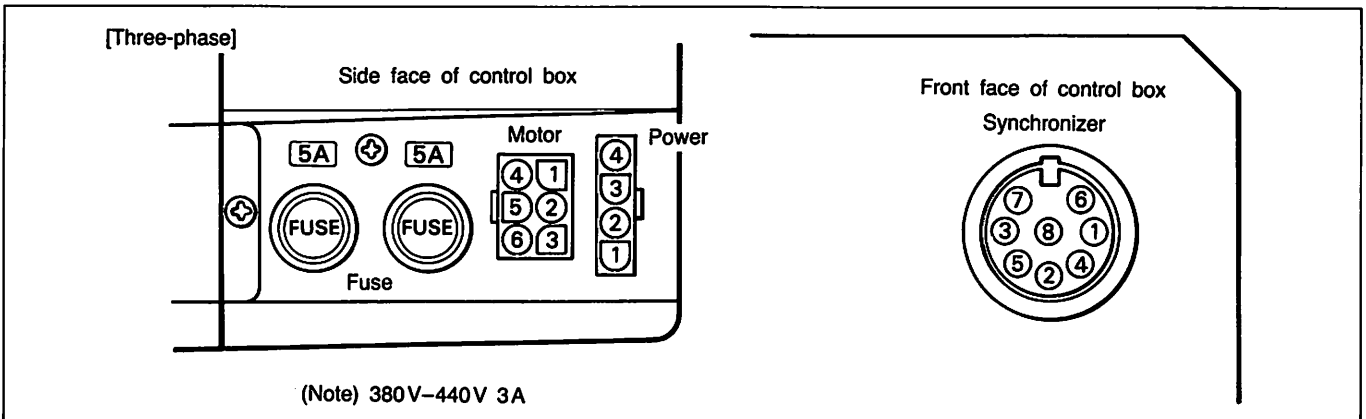


# DETAILS OF CONNECTOR PANEL

**1 Model DB2-B737 · B747 · B748 · B791 · B793 · B795 · B798 (Type 500B)**



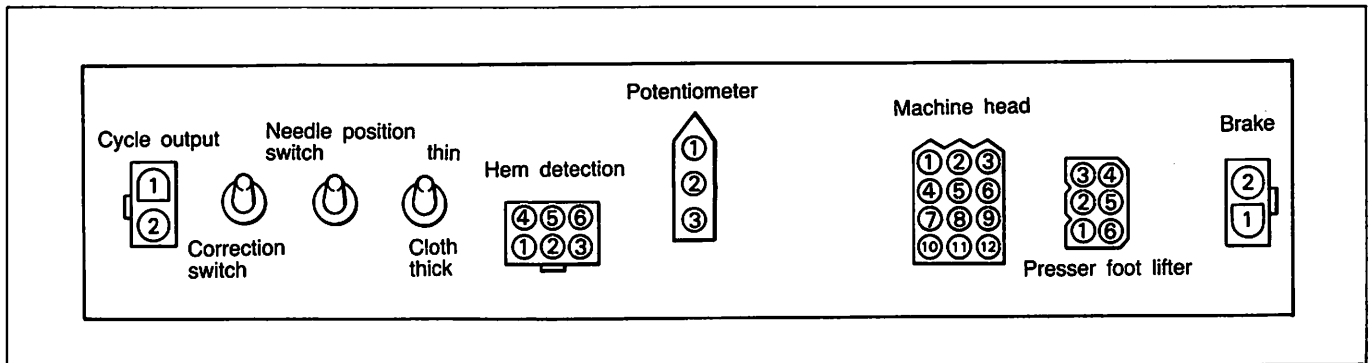
No.	Machine head	Presser foot lifter	Brake
	12P connector	6P connector	2P connector
1	Leading power	Presser power	Brake power
2	Leading output	Presser input	Brake
3	GND	Option	
4	Thread trimming power	Presser output	
5	Thread trimming output	0V	
6	Not used	GND	
7	Thread wiper power		
8	Thread wiper output		
9	Reverse input		
10	Reverse power		
11	Reverse output		
12	0V		



No.	Motor	Power
	6P connector	4P connector
1	Vf. TH	GND
2	Vf. TH	AC 200V
3	if. TH	AC 200V
4	Motor +	AC 200V
5	Vf	
6	Motor -	

No.	Synchronizer
1	GND
2	DC + 5V
3	Needle down
4	0V
5	NO. SYNC
6	GND
7	Needle up
8	Encoder
9	
10	

## ② Model DB2-B7380 (Type #470B)

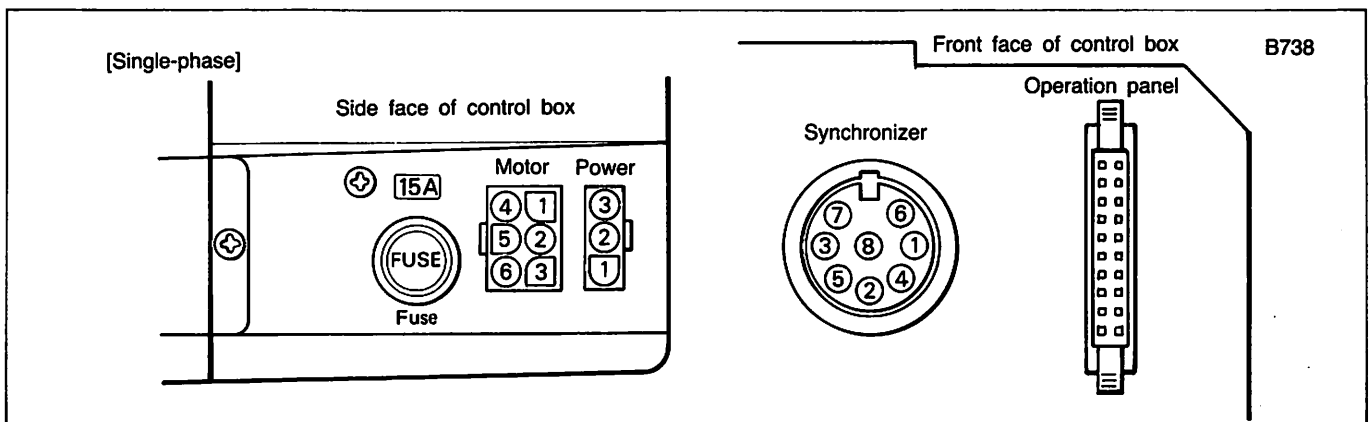


No.	Cycle output 2P connector	Hem detection 6P connector	Potentiometer 3P connector
1	Collector	Anode	+5V
2	Emitter	Collector	Output
3			0V
4		Cathode	
5		Emitter	
6			

No.	Machine head 12P connector	Presser foot lifter 6P connector
1	Leading power	Cloth presser power
2	Leading output	Presser input
3	GND	Option
4	Thread trimming power	Cloth presser output
5	Thread trimming output	0V
6	Not used	GND
7	Thread wiper power	
8	Thread wiper output	
9	Reverse input	
10	Reverse power	
11	Reverse output	
12	0V	

No.	Brake 2P connector
1	Brake power
2	Brake

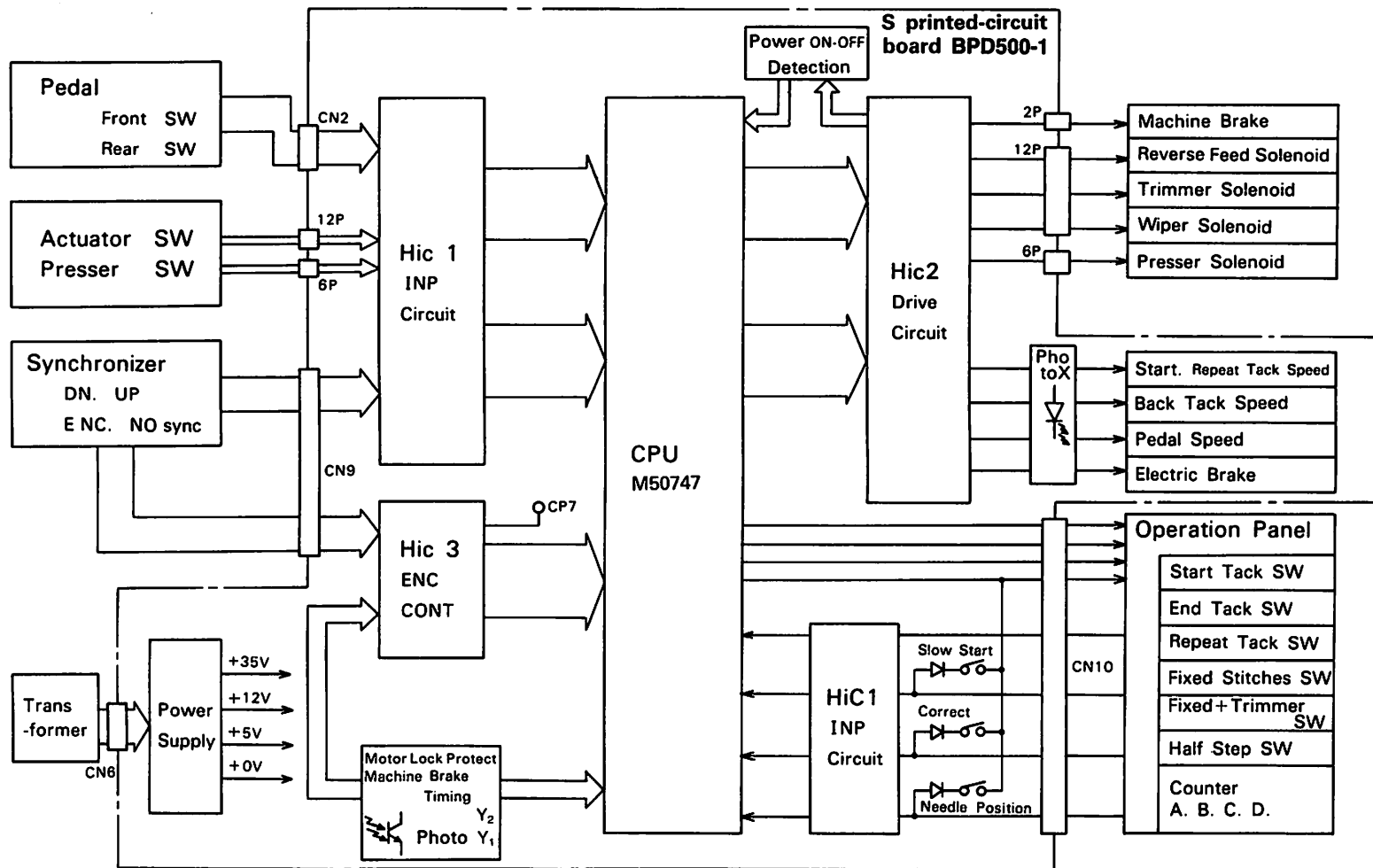


No.	Motor 6P connector	Power 3P connector
1	Vf. TH	GND
2	Vf. TH	AC <input checked="" type="checkbox"/>
3	if. TH	AC <input checked="" type="checkbox"/>
4	Motor +	
5	Vf	
6	Motor -	

No.	Synchronizer	No.	Operation panel		
1	GND	1	0V	11	SLED
2	DC + 5V	2	DC + 5V	12	SCAN 0
3	Needle down	3	SCAN 7	13	LSCAN 3
4	0V	4	BUZZER	14	DPSCAN
5	NO. SYNC	5	SCAN 5	15	LSCAN 1
6	GND	6	SCAN 6	16	LSCAN 2
7	Needle up	7	SCAN 3	17	PC1
8	Encoder	8	SCAN 4	18	PC2
		9	SCAN 1	19	DC + 5V
		10	SCAN 2	20	0V

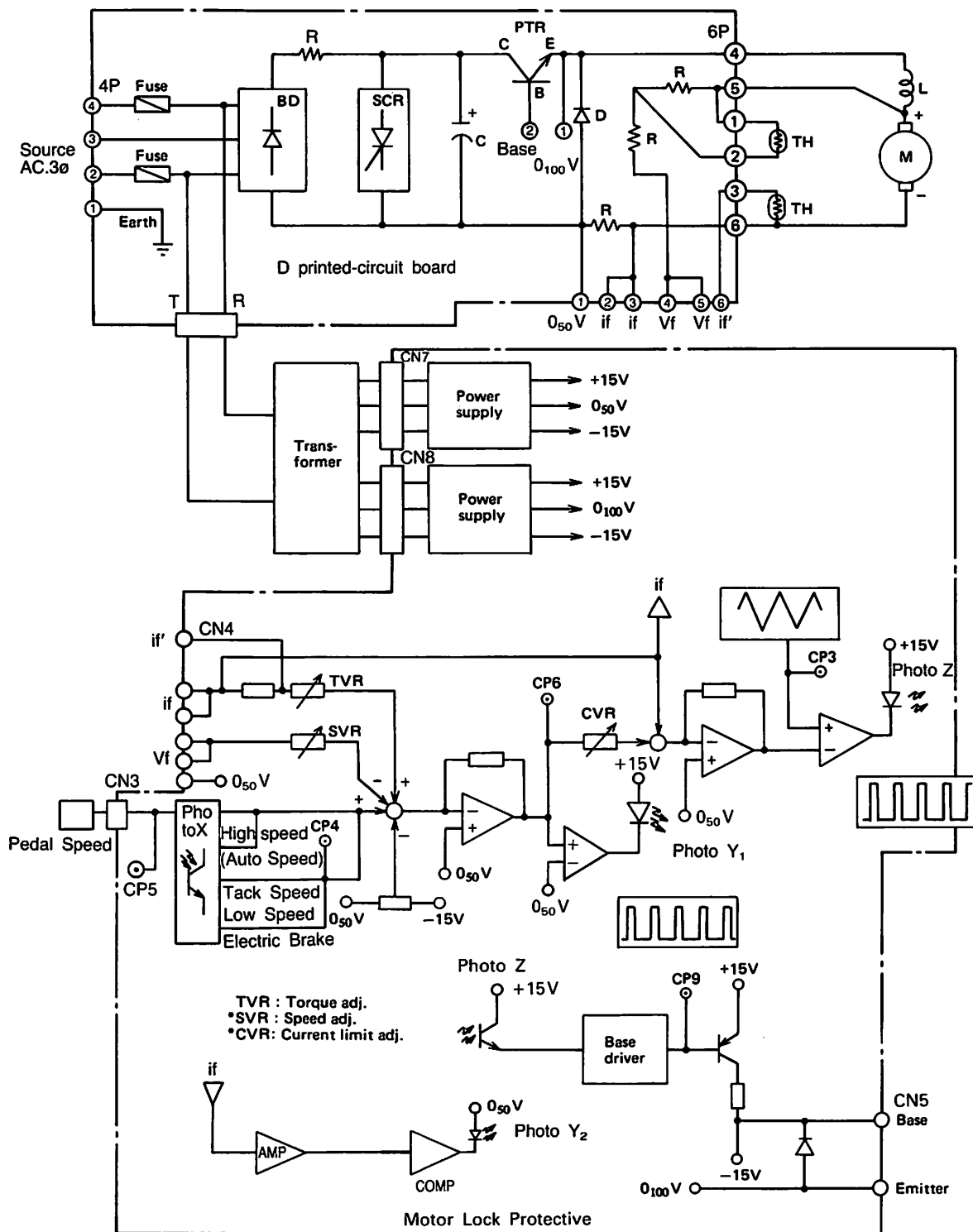
# SEWING MACHINE CONTROL SYSTEM BLOCK DIAGRAM

MD-803, 813-500 (B737)

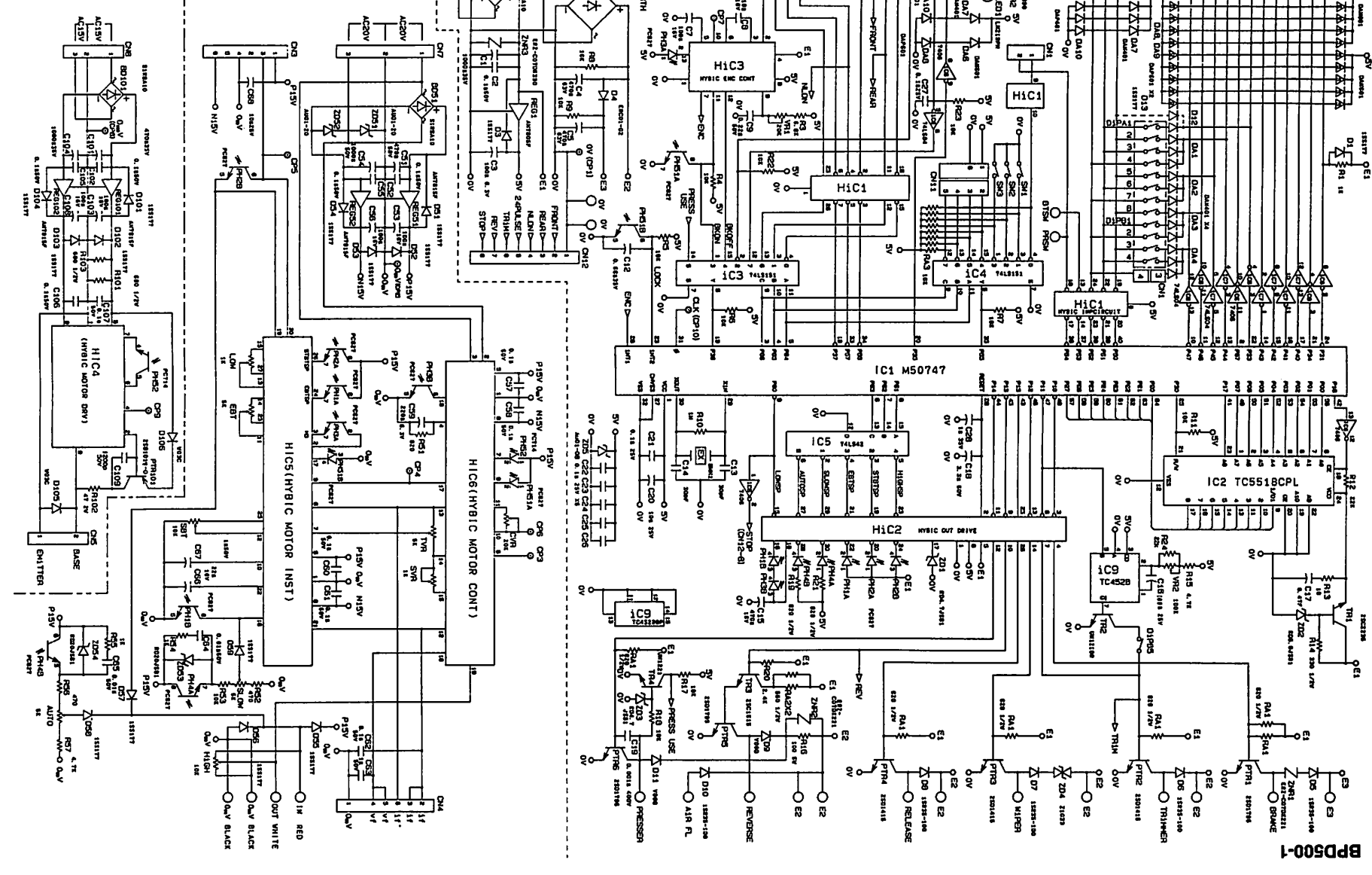




# MOTOR CONTROL SYSTEM BLOCK DIAGRAM

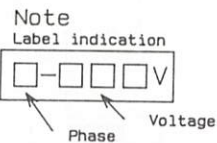
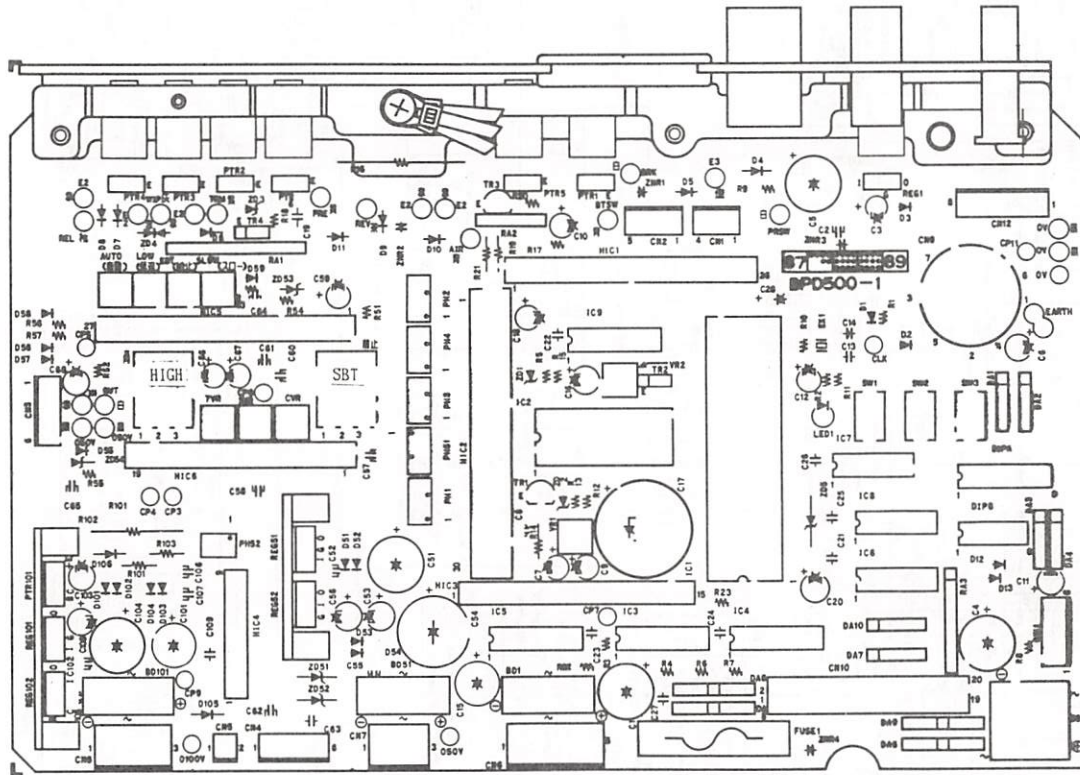


NAME	CODE	NOTE
S-PCB 500B1-100V	291782110	1Phase 100V~110V
S-PCB 500B1-230V	291782123	1Phase 220V~240V
S-PCB 500B3-230V	291782323	3Phase 220V~240V
S-PCB 500B3-400V	291782340	3Phase 380V~415V



# MD-803, 813 (B737)

BPD-500B

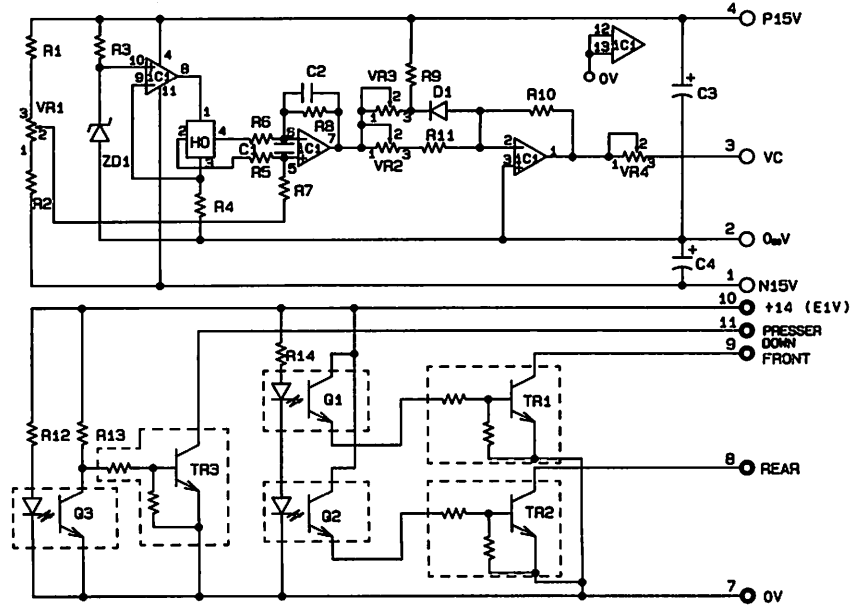


NAME	CODE	NOTE
S-PCB 500B1-100V	291782110	1Phase 100V~110V
S-PCB 500B1-230V	291782123	1Phase 220V~240V
S-PCB 500B3-230V	291782323	3Phase 220V~240V
S-PCB 500B3-400V	291782340	3Phase 380V~415V

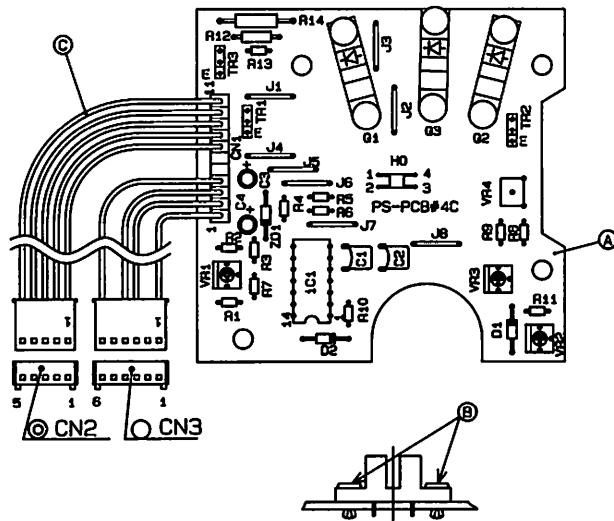
Symbol	Code	Name	Q <sub>ty</sub>	Note	Symbol	Code	Name	Q <sub>ty</sub>	Note
IC1	233081001	LS1 M50747-270SP	1		DIPB	233142001	DSS706	1	
IC2	233138001	CH0SL1 TC5518BPL	1		VH1_CVR	230819001	PN822203H	2	20K
IC3, IC4	091100151	B1PIC H074LS151	2		SVR_LOW	230968001	PN822102H	2	1K
IC5	091100042	B1PIC H074LS42	1		TVR_EBT	230818001	PN822502H	4	5K
IC6	091000008	B1PIC H07406	1		SLOW_AUTO				
IC7, IC8	091100004	B1PIC H074LS04	2		SBT_HIGH	230971001	RK12K114-10K	2	10K
IC9	092004528	CH0SL1 TC4528BP	1		RA1	233288001	RH4D6Y81J	1	820 1/2W
HIC1	228307001	HYBIC INCIRCUIT	1		RA2	233289001	RH4D3Y561J	1	560 1/2W
HIC2	228308001	HYBIC OUT DRIVE	1		RA3	Y61038041	RSSDBX103J	1	10K 1/2W
HIC3	228309001	HYBIC ENC COND	1		R1, 54, 55	090102620	ERO-S2TJ102	3	1K 1/4W
HIC4	228310001	HYBIC MOTOR DRV	1		R2	090391620	ERO-S2TJ391	1	390 1/4W
HIC5	228311001	HYBIC MOTOR INST	1		R3	090682620	ERO-S2TJ682	1	5.8K 1/4W
HIC6	228312001	HYBIC MOTOR COND	1		R4-R, 11, 17	090103620	ERO-S2TJ103	12	10K 1/4W
TR1	230810001	S1TR25C2235-O	1		18, 22, 23, 53				
TR2	233291001	S1TRM1210R	1		R10	090105620	ERO-S2TJ105	1	1M 1/4W
TR3	U51208000	S1TR25C1815-O	1		R12, 24	090223620	ERO-S2TJ223	2	22K 1/4W
TR4	230935001	S1TRM1221	1		R13	090106620	ERO-S2TJ100	1	10 1/4W
PTR1, 5, 6	233139001	S1TR2501795	3		R15, 57	090472620	ERO-S2TJ472	2	4.7K 1/4W
PTR2, 3, 4	233276001	S1TR2501415	3		R20	090242620	ERO-S2TJ242	1	2.4K 1/4W
PTR101	233177001	S1TR2501017-1*	1		R51	090821620	ERO-S2TJ821	1	820 1/4W
REG1	233159001	AH7805F	1		R52, 56	090471620	ERO-S2TJ471	2	470 1/4W
REG51, 101	233160001	AH7805F	2		R14	090330320	ERO-S2TJ331	1	330 1/2W
REG52, 102	233161001	AH7805F	2		R19, 21	090821320	ERO-S1TJ821	2	820 1/2W
BD1, 51, 101	216385000	S1D51R8A10	3		R101, 103	090691320	ERO-S1TJ691	2	820 1/2W
BD2	228320001	S1D51V810	1		R102	231880001	EPF-2AJA70	1	47 2W
D1, 2, 3, 12	13, 51-59	101-104	18		R16	U34229000	EPF-5AJ101	1	100u 5W
D4	228321001	S1DERC01-02	1		C1, 104	Y41024001	ECEA1VU102	2	1000u 35V
D5, 6, 7, 8, 10	230938001	S1D15R35-100	5		C3, 16	Y41010001	ECEAGJU101	2	100u 6.3V
D9, 11	230965001	S1DV066	2		C4, 5	Y44716001	ECEA1JM471	2	470u 63V
D105, 106	230966001	S1D0W3C	2		R102	Y41012001	ECEA1CU101	5	100u 16V
ZD1, 3	233132001	ZOR04_7,5S81	2	4.7V 0.5W	C7, 53, 56	Y41012001	ECEA1CU101	5	100u 16V
ZD2	233278001	ZOR05_6,5S81	1	5.6V 0.5W	C103, 108	Y44712001	ECEA1CU471	1	470u 16V
ZD4	230814001	ZDZ1033	1	33V	C15	Y43395001	ECEA1HJ393	1	3.3u 50V
ZD5, 54	230974001	ZDAU01-20	2	20V	C51	Y44715001	ECEA1HJ471	1	470u 50V
ZD53, 54	U32269000	ZDR020,5HJ1	2	20V 0.5W	C54	Y41025001	ECEA1HJ102	1	1000u 50V
PH1, 2, 3, 4, 5	230906001	PC827	5		C59	Y42210001	ECEADJ221	1	220u 6.3V
PH52	230934001	PC714	1		C66	Y42020001	ECEA1CU220	1	22u 16V
LED1	233279001	LN21RPH	1		C67	Y41095001	ECEA1HJ101	1	1u 50V
DA1-4, 7	U33215000	DAN401	5		C101	Y44714001	ECEA1VU471	1	470u 35V
DA5, 6	U33181000	DAN801	2		C9	Y42285001	ECEA1HJ282	1	0.22u 50V
DAB, 9	230979001	DAP601	2		C8	233290001	ECEA1CN100S	1	10u 16V
DA10	U338235000	DAP401	1		C17	U77085000	ECCF3R5U474	1	0.47F
TR1, 2	230967001	ERZ-C070K221	2		C63	Y21052420	RPE121F105250V	1	1u 50V
ZD5	233280001	S1DAU01-08	1		C2, 52, 55, 57	Y21042420	RPE121F104250V	12	0.1u 50V
EX	W00125001	CSAB_08T	1		58, 60-62				
CHUCK PIN	233281001	TM-301H	1		105-107, 102				
FUSE1	230975001	FUSE HOLDER F-711	1		C21-27	Y31042100	D0306-282F104Z25	7	0.1u 25V
FUSE	219225000	FUSEBA-125V	1	BA	C13, 14	Y13002110	D0105-63C4300,50V	2	30u 50V
SM1, 2, 3	233282001	E-2012P	3		C64, 65	Y21032420	RPE121F103250V	2	0.1u 50V
DIPA	U32744000	DSS706	1		C19	Y51024200	ECO-H4102MZ	1	1000u 400V

Symbol	Code	Name	Q <sub>ty</sub>	Note
C12	230825001	ECSF1VE684	1	0.68u 35V
C26	230827001	ECSF1VE105	1	1u 35V
C109	234377001	EC081H122J2	1	1200p
DN1	234558001	CONNECTOR 5045-04A	1	
DN2	234559001	+ 5045-05A	1	
DN3, 4, 11	233283001	+ 5045-06A	2	
DN5	234560001	+ 5045-02A	1	
DN6	233284004	+ 5273-05A	1	
DN7	234561001	+ 5273-03A	1	
DN8	234562001	+ 5277-03A	1	
DN9	233285001	+ S-13364	1	
DN10	233286001	+ XG4A-2031	1	
DN12	233287001	+ 5045-08A	1	
VR2	230820001	PN822104H	1	100K
	228305001	HEATED BOARD#14	1	BD2
	233134001	HEATED BOARD#16	1	REG51, 52
	233135001	HEATED BOARD#17	1	REG51, 52

MD-803, 813 TREADLE UNIT (PS-PCB#11 ASSM.)

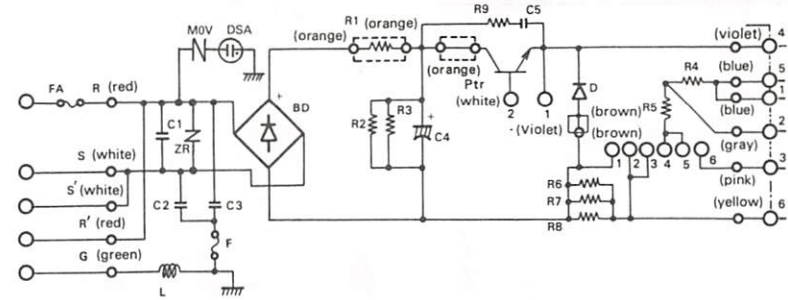
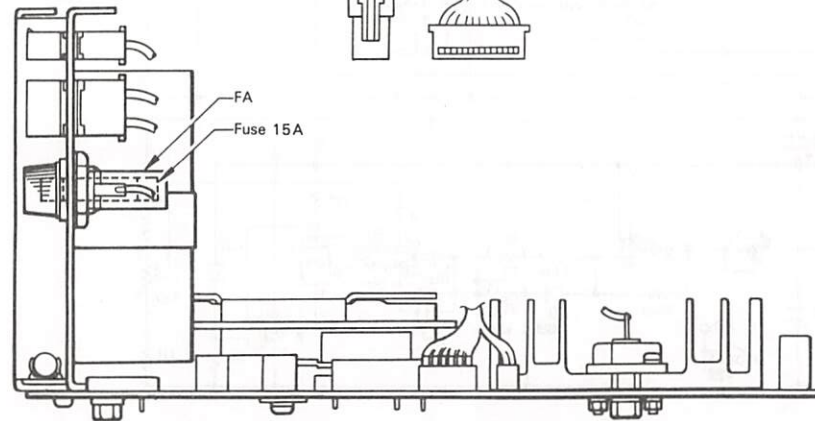
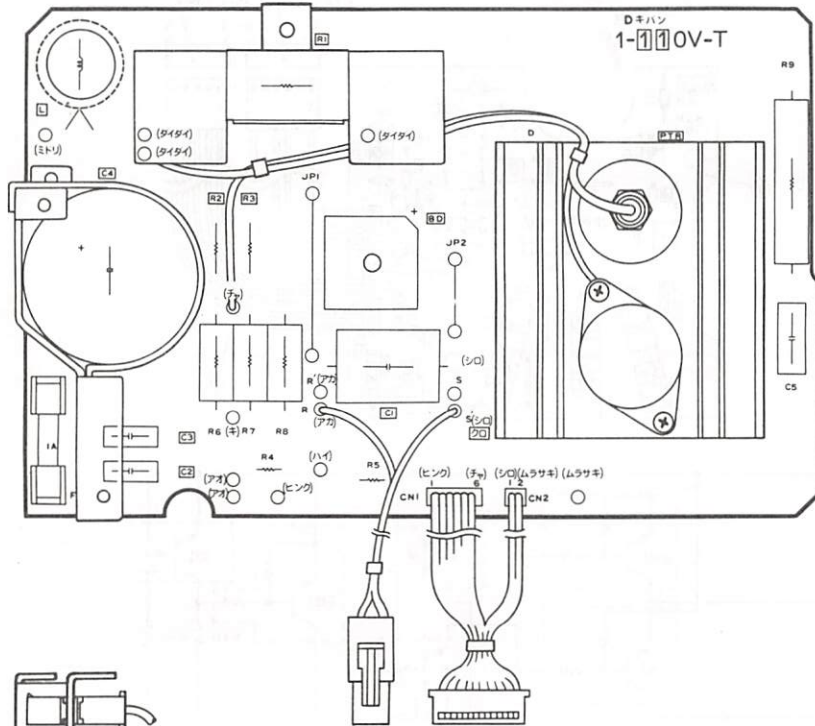


Symbol	Code	Name	Qty	Note
Q1, Q2, Q3	228246000	PHOT INT GP-1502	3	
TR1, TR2, TR3	228264000	S1TR UN1213	3	
IC1	228247000	BIPIC upc451C	1	
ZD1	233132001	ZD RD4. 7JSB1	1	500mV 4.7V
C1	Y51020010	ECQB1H102JZ	1	50V 0.001uF
C2	Y54730040	ECQV1H473JZ	1	50V 0.047uF
C3, C4	Y42285301	ECEA1HKS2R2	2	50V 2.2uF
HO	231887001	THS102A	1	
VR1	233154001	PK502H103HO	1	10K
VR2	233154001	* 103HO	1	10K
VR3	233155001	* 502HO	1	5K
VR4	233156001	* 103V2	1	10K
D1	224281000	S1D 1S1588	1	
R14	Y03910511	ERB-1SJ391	1	1W 390
R12	090561320	ERD-S1TJ561	1	0.5W 560
R3	090821620	* S2TJ821	1	0.25W 820
R4	090102620	* 102	1	0.25W 1K
R1	090163620	* 153	1	0.25W 15K
R2	090472620	* 472	1	0.25W 4.7K
R5, R6	090222620	* 222	2	0.25W 2.2K
R7, R8	090684620	* 684	2	0.25W 680K
R10	090103620	ERD-S2TJ103	1	0.25W 10K
R13	090333620	* 333	1	0.25W 33K
R9	090562620	* 562	1	0.25W 5.6K
R11	090762620	* 752	1	0.25W 7.5K
A	233153001	PS board#4	1	
B	224378001	NRP-365	6	
C	233157001	PS connector ASSM.#3	1	
J1~J8				



NAME	CODE	NOTE
PS-PCB#11 ASSM.	291792001	

# D printed-circuit board 1-110V assembly

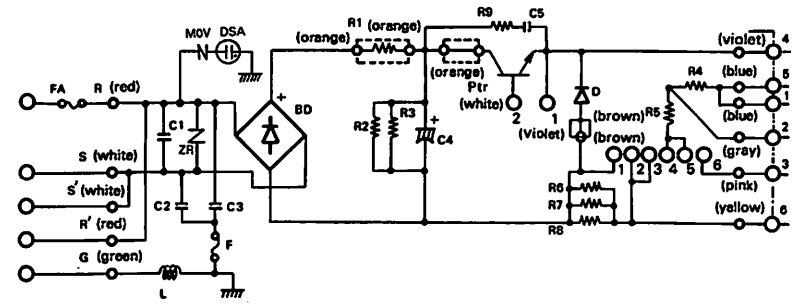
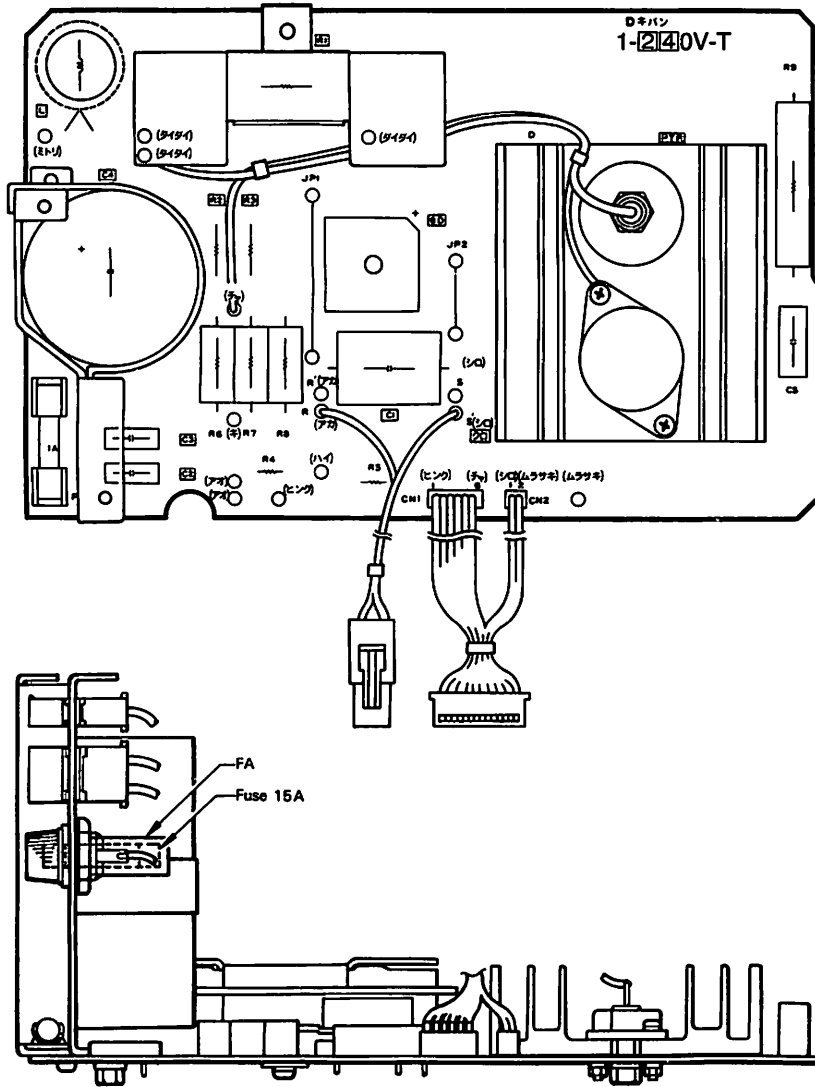


Symbol	Code	Name	Qty	Note
C1	228372001	P-Capacitor 400A105	1	400V 1 $\mu$ F
C2,3	228373001	P-Capacitor 400A222	2	400V 0.0022 $\mu$ F
F	228359001	Fuse Holder. SN5051	2	
Fuse	225432001	Fuse 1.0 A	1	1.0A
BD	224119000	SIDS15VB40	1	400V .15A
R1	228374001	MR 40W 0.2 $\Omega$	1	40W. 0.2 $\Omega$
R2,3	090473420	DR-A1YJ 473	2	1W. 47K $\Omega$
C4	228377001	A-Capacitor 200B222	1	200V 2200 $\mu$ F
R9	228366001	MR 10W .5.6 $\Omega$	1	10W .5.6 $\Omega$
C5	228356001	P-Capacitor 630B104	1	630V .0.1 $\mu$ F
PTR	224127001	SITR T30K 40D	1	400V .20A
D	228367001	SIDERD 74-06	1	600V .12A
R6,7,8	228368001	MR 5W .0.1 $\Omega$	3	5W .0.1 $\Omega$
R4		DR-A12YJ 393	1	1/2W .39k $\Omega$
R5		DR-A12YJ 224	1	1/2W .220k $\Omega$
JP1		Jumper Wire 0.8 $\times$ 55	1	
JP2		Jumper Wire 0.8 $\times$ 35	1	
FA	225433001	Fuse Holder SN2054	1	250V AC 20A
Fuse	218469001	Fuse 15A	1	15A
L	228358001	SF Coil	1	3A
ZR	232380001	SABSORBER ENC621D	1	620V
M0V	232382001	SABSORBER NV621D	1	620V
DSA	232384001	SABSORBER DSA362MA	1	

MD-803- (B737, 738)

NAME	CODE	NOTE
D-PCB1-110V	291273001	1Phase 110V

# D printed-circuit board 1-240V assembly

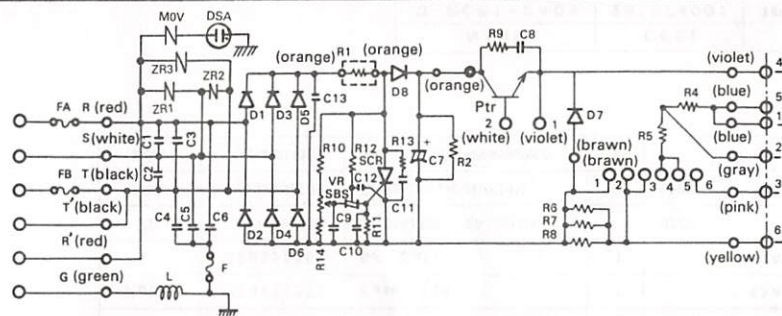
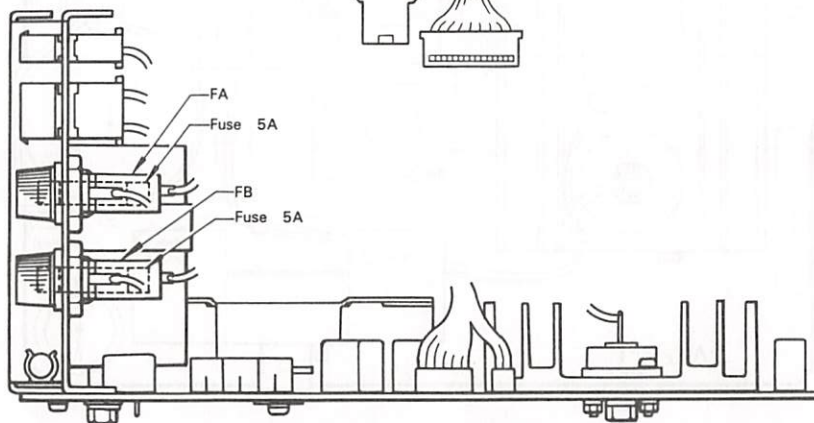
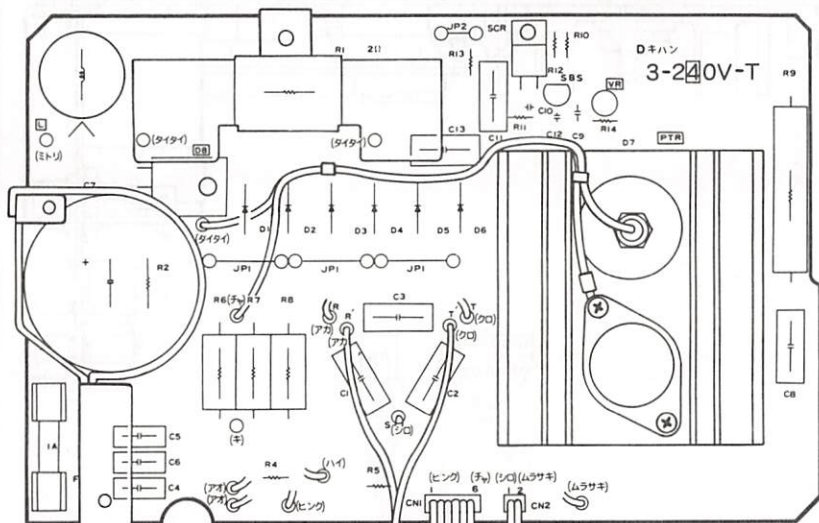


Symbol	Code	Name	Qty	Note
C1	228143001	P-Capacitor 630A105	1	630V 1 $\mu$ F
C2.3	228357001	P-Capacitor 630B223	2	630V .0.022 $\mu$ F
F	228359001	Fuse Holder .SN5051	2	
Fuse	225432001	Fuse 1.0A	1	250V AC 1.0A
BD	229142001	SIDS15VB60	1	600V .15A
R1	229141001	MR 40W .0.4 $\Omega$	1	40W .0.4 $\Omega$
R2.3	090224420	DR-A1YJ 224	2	1W .220k $\Omega$
C4	229139001	A-Capacitor 450B821	1	450V .820 $\mu$ F
R9	228366001	MR 10W .5.6 $\Omega$	1	10W .5.6 $\Omega$
C5	228356001	P-Capacitor 630B104	1	630V .0.1 $\mu$ F
PTR	229138001	SITRT 30K 40DA	1	450V .20A
D	228367001	SIDERD 74-06	1	600V .12A
R6.7.8	228368001	MR 5W .0.1 $\Omega$	3	5W .0.1 $\Omega$
R4		DR-A12YJ 393	1	1/2W .39k $\Omega$
R5		DR-A12YJ 224	1	1/2W .220k $\Omega$
JP1		Jumper Wire 0.8 $\times$ 55	1	
JP2		Jumper Wire 0.8 $\times$ 35	1	
FA	225433001	Fuse Holder SN2054	1	250V AC 20A
Fuse	218469001	Fuse 15A	1	15A
L	228358001	SF Coil	1	3A
ZR	232380001	SABSORBER ENC621D	1	620V
MOV	232382001	SABSORBER NV621D	1	620V
DSA	232384001	SABSORBER DSA362MA	1	

MD-803- (B737, 738)

NAME	CODE	NOTE
D-PCB1-240V	291274001	1Phase 220V~240V

## D printed-circuit board 3-240V assembly

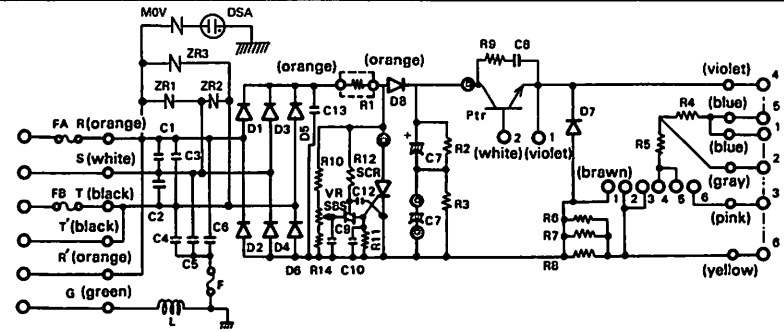
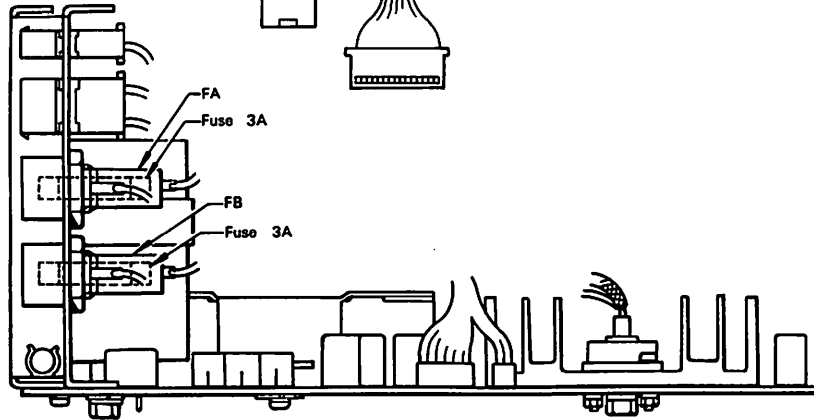
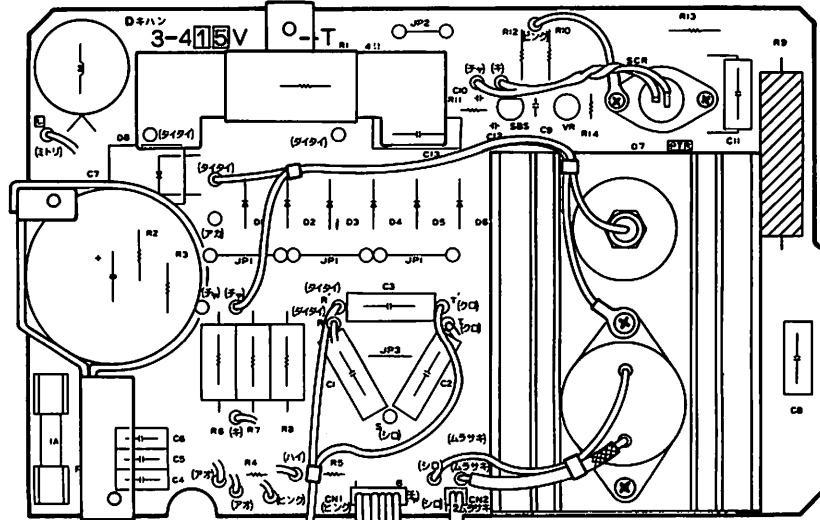


Symbol	Code	Name	Qty	Note
C1, 2, 3	228356001	P-Capacitor 630B104	6	630V, 0.1μF
C4, 5, 6	228357001	P-Capacitor 630B223	3	630V, 0.022μF
L	228358001	SF Coil	1	3A
F	228359001	Fuse Holder SN5051	2	
Fuse	225432001	Fuse 1.0A	1	1.0A
D1-6	228360001	SIDP 300J	6	600V, 3A
R13		DR-A12YJ 47-1	1	1/2W, 4.7Ω
R 1	228362001	MR 40W, 2Ω	1	40W, 2Ω
R10, 12		DR-A12YJ 474	2	1/2W, 470kΩ
C 7	228365001	A-Capacitor 450B271	1	450V, 270μF
R 9	228366001	MR 10W, 5.6Ω	1	10W, 5.6Ω
PTR	229138001	SI TRT30K 40DA	1	450V, 20A
D 7	228367001	SID ERD 74-06	1	600V, 12A
R6, 7, 8	228368001	MR 5W, 0.1Ω	3	5W, 0.1Ω
R 4		DR-A12YJ 393	1	1/2W, 39kΩ
R 5		DR-A12YJ 224	1	1/2W, 220kΩ
JP1		Jumper Wire 0.8×30	3	
FA, FB	224087001	Fuse Holder, SN2050	2	250VAC, 10A
Fuse	215822000	Fuse 5A	2	5A
JP2		Jumper Wire 0.8×15	1	
C 9	Y54740040	P-Capacitor 50B474	1	50V, 0.47μF
C10	Y54730040	P-Capacitor 50B473	1	50V, 0.047μF
R 2	090224420	DR-A1YJ 224	1	1W, 220kΩ
D 8	229144001	SIDS12KC40A	1	12A, 500V
SCR	228615001	SCR CR6AM-12	1	6A, 600V
SBS	229027000	BS08A	1	8V
V R	229148001	CVR-1RLB 502RJ6P	1	5kΩ
C12	Y51040040	P-Capacitor 50B104	1	50V, 0.1μF
R11		DR-A14YJ 102	1	1/4W, 1kΩ
R14		ERD-25TJ 103	1	1/4W, 10K
ZR1-3	232380001	SABSORBER ENC621D	1	620V
M0V	232382001	SABSORBER NV621D	1	620V
DSA	232384001	SABSORBER DSA362MA	1	

NAME	CODE	NOTE
D PCB 3-240V	291275001	3Phase 220V~240V

·MD-813- (B737, 738)

# D printed-circuit board 3-415V assembly



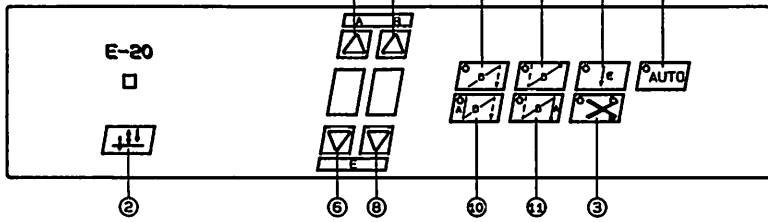
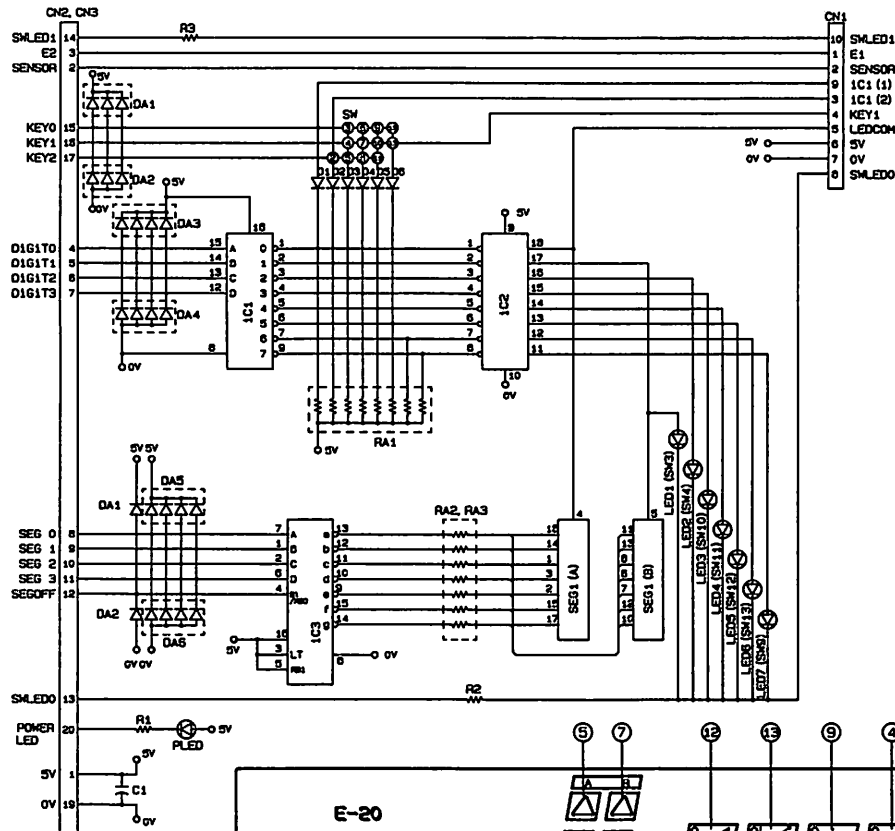
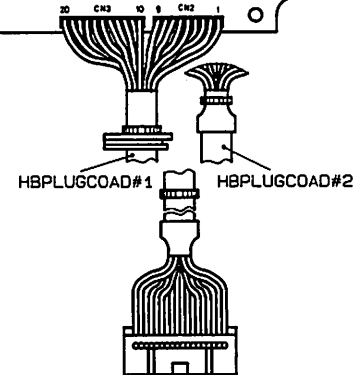
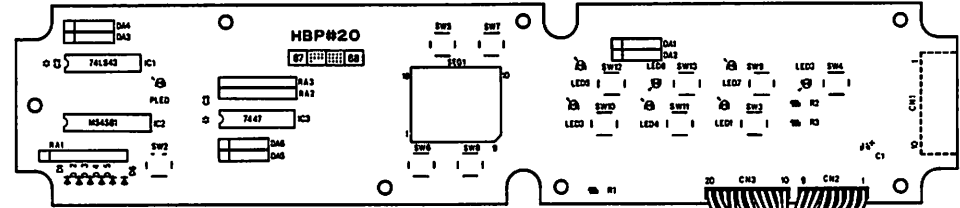
Symbol	Code	Name	Qty	Note
C1, 2, 3 8, 13	229149001	P-Capacitor 1000B104	5	1000V.0.1 $\mu$ F
C4, 5, 6	229178001	P-Capacitor 1000B103	3	1000V.0.01 $\mu$ F
L	228358001	SF Coil	.1	3A
F	228359001	Fuse Holder.SN5051	2	
Fuse	225432001	Fuse 1.0A	1	1.0A
D1~6	229150801	SIDERC 01-10	6	1000V 1.5A
R 1	229151001	MR 40W.4 $\Omega$	1	40W.4 $\Omega$
R2, 3	090224420	DR-A1YJ 224	2	1W.220K
R10, 12	090105420	DR-A1YJ 105	2	1W.1M
C 7	229153001	A-Capacitor 450B101	2	450V.100 $\mu$ F
R 9	229154001	MR 15W.10 $\Omega$	1	15W.10 $\Omega$
PTR	229155001	SITR ET212	1	800V.30A
D 7	229156001	SIDERD 77-10	1	1000V.10A
R6, 7, 8	228368001	MR 5W.0.1 $\Omega$	3	5W.0.1 $\Omega$
R 4		DR-A12YJ 393	1	1/2W.39K
R 5		DR-A12YJ 274	1	1/2W.270K
D 8	229157001	SIDD10V 100	1	1000V.10A
SCR	229158001	SCR SC10C-100	1	1000V.10A
SBS	229027001	BS08A	1	8V
VR	229148001	CVR-1RLB501RJ6P	1	5K
C12	Y51040040	P-Capacitor 50B104	1	50V.0.1 $\mu$ F
R11		DR-A14YJ 102	1	1/4W.1K
C 9	Y54740040	P-Capacitor 50B474	1	50V.0.47 $\mu$ F
C10	Y54730040	P-Capacitor 50B473	1	50V.0.047 $\mu$ F
JP1		Jumper Wire 0.8x30	3	
JP2		Jumper Wire 0.8x15	1	
JP3		Jumper Wire 0.8x25	1	
FA.FB	224576001	Fuse Holder.SN2059	2	
Fuse	215769001	Fuse 3.0A	2	3.0A
R14		ERD-25TJ 103	1	1/4W 10K
ZR1-3	232380001	SABSORBER ENC621D	3	1100V
MOV	232382001	SABSORBER NV112D	1	1100V
DSA	232384001	SABSORBER DSA362MA	1	

MD-813- (B737, 738)

NAME	CODE	NOTE
D-PCB3-415V	291278001	3Phase 380V-415V

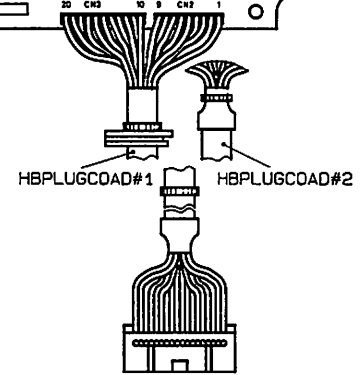
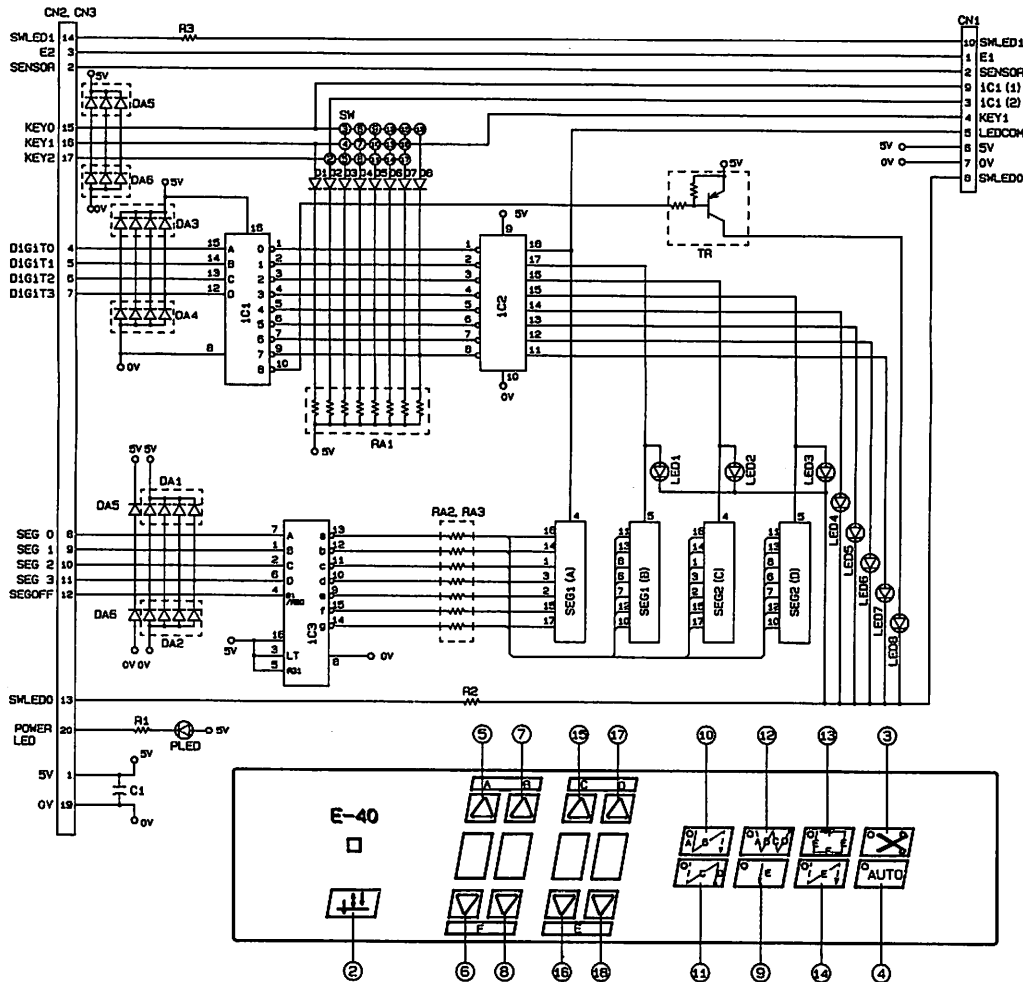
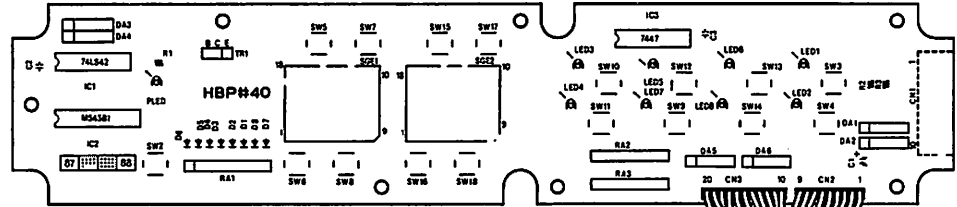


# OP Printed-circuit board E20



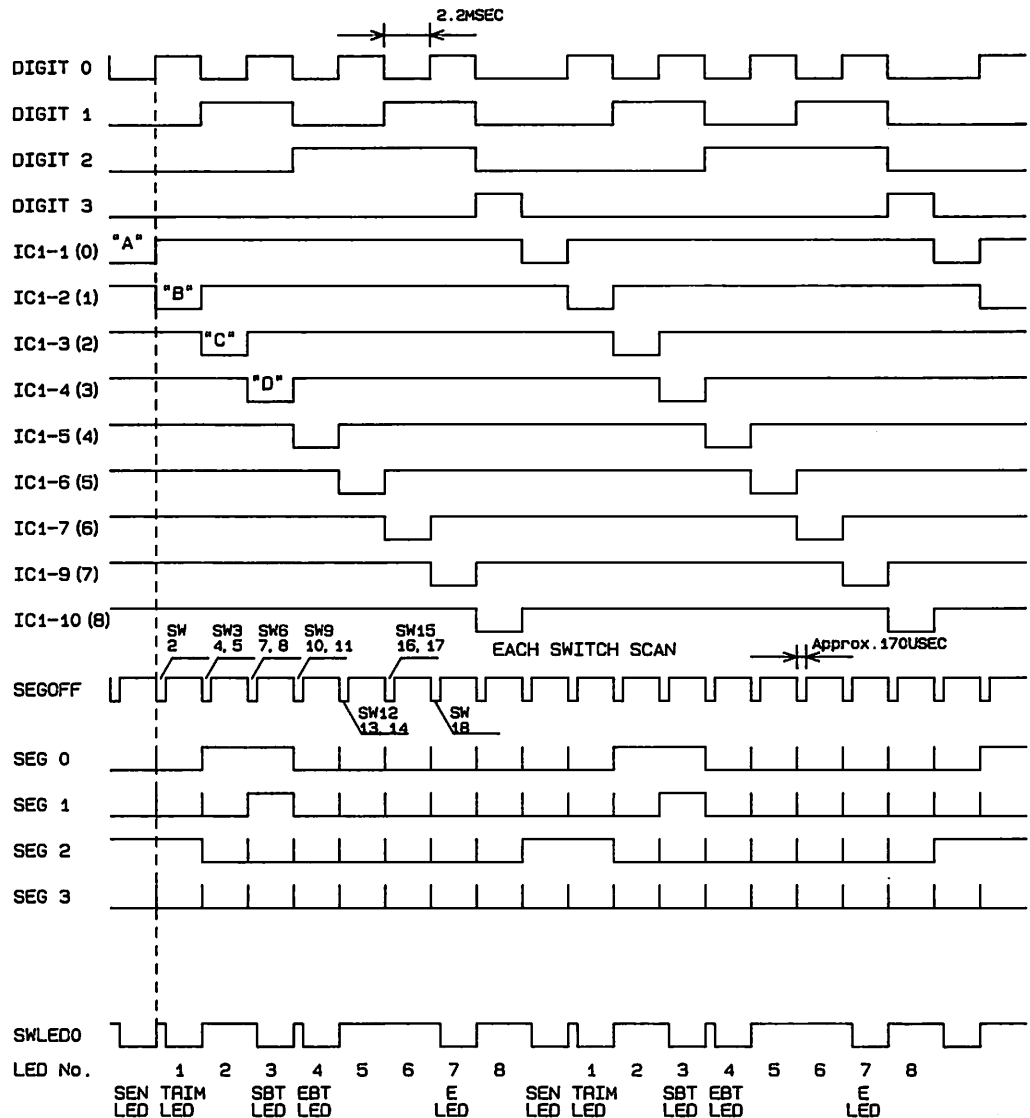
Symbol	Code	Name	Q'ty	Note
DA1, DA3, DA5	532315000	DARREYDA-N4	3	
DA2, DA4, DA6	538235000	DARREYDA-P4	3	
D1, 2, 3, 4, 5, 6	132999001	S1D1SS177	6	
LED1, 2, 3, 4	U52015001	LED6L-5HD22	7	
5, 6, 7				
SEG1	233061001	LEOTLR325	1	
SW2, 3, 4, 5, 6	233083001	83F-1020	12	
7, 8, 9, 10, 11				
12, 13				
RA1	Y63338041	RARREY333X6J	1	1/8W, 33kΩ
RA2, RA3	Y62204441	RARREY220Y4J	2	1/4W, 22Ω
R1	090391620	DR-A14AJ3915	1	1/4W, 390Ω
R2, R3	090101620	DR-A14AJ1015	2	1/4W, 100Ω
IC1	091100042	B1P1C74LS42	1	
IC2	233059001	B1P1CH54581	1	
IC3	091000047	B1P1C7447	1	
C1	Y41002301	A-CAPAC1TOR168100	1	10μ 16V
CN1	233064001	S108-XH-A	1	
CN2, CN3 *	233065001	HBPLUGCOAD#1	1	* Outside
	233098001	HBPLUGCOAD#2	1	* Built-in
PLED	233082001	LED6L-8HD4	1	

# OP Printed-circuit board E40

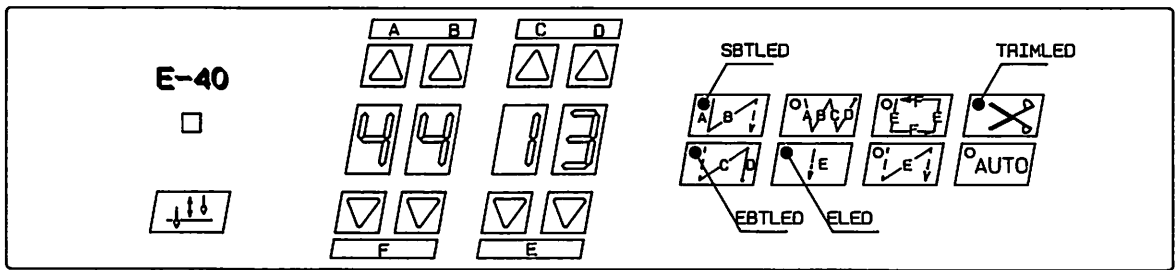


Symbol	Code	Name	Q'ty	Note
DA1, DA3, DA5	532315000	DARREYDA-N4	3	
DA2, DA4, DA6	538235000	DARREYDA-P4	3	
D1, 2, 3, 4, 5, 6, 7, 8	132999001	S101SS177	8	
LED1, 2, 3, 4, 5, 6, 7, 8	U52015001	LEOGL-5HD22	8	
SE61, 2	233061001	LEOTLR325	2	
SW2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15	233083001	B3F-1020	17	
RA1	Y63338041	RARREY333X8J	1	1/8W, 33kΩ
RA2, RA3	Y62204441	RARREY220Y4J	2	1/4W, 22Ω
R1	090391620	DR-A14AJ391S	1	1/4W, 390Ω
R2, R3	090101620	DR-A14AJ101S	2	1/4W, 100Ω
IC1	091100042	B1P1C74LS42	1	
IC2	233059001	B1P1CM545B1	1	
IC3	091000047	B1P1C7447	1	
C1	Y41002301	A-CAPAC1TOR16B100	1	10μ 16V
TR	233835001	S1TRN1124	1	
CN1	233064001	S10B-XH-A	1	
CN2, CN3 *	233065001	HBPLUGCOAD#1	1	* Outside
	233098001	HBPLUGCOAD#2	1	* Built-in
PLED	233082001	LEOGL-9HD4	1	

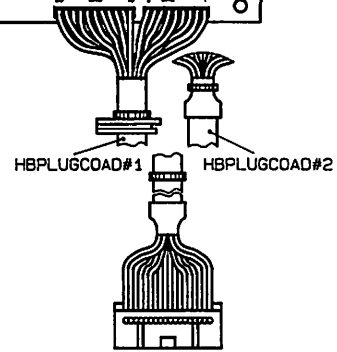
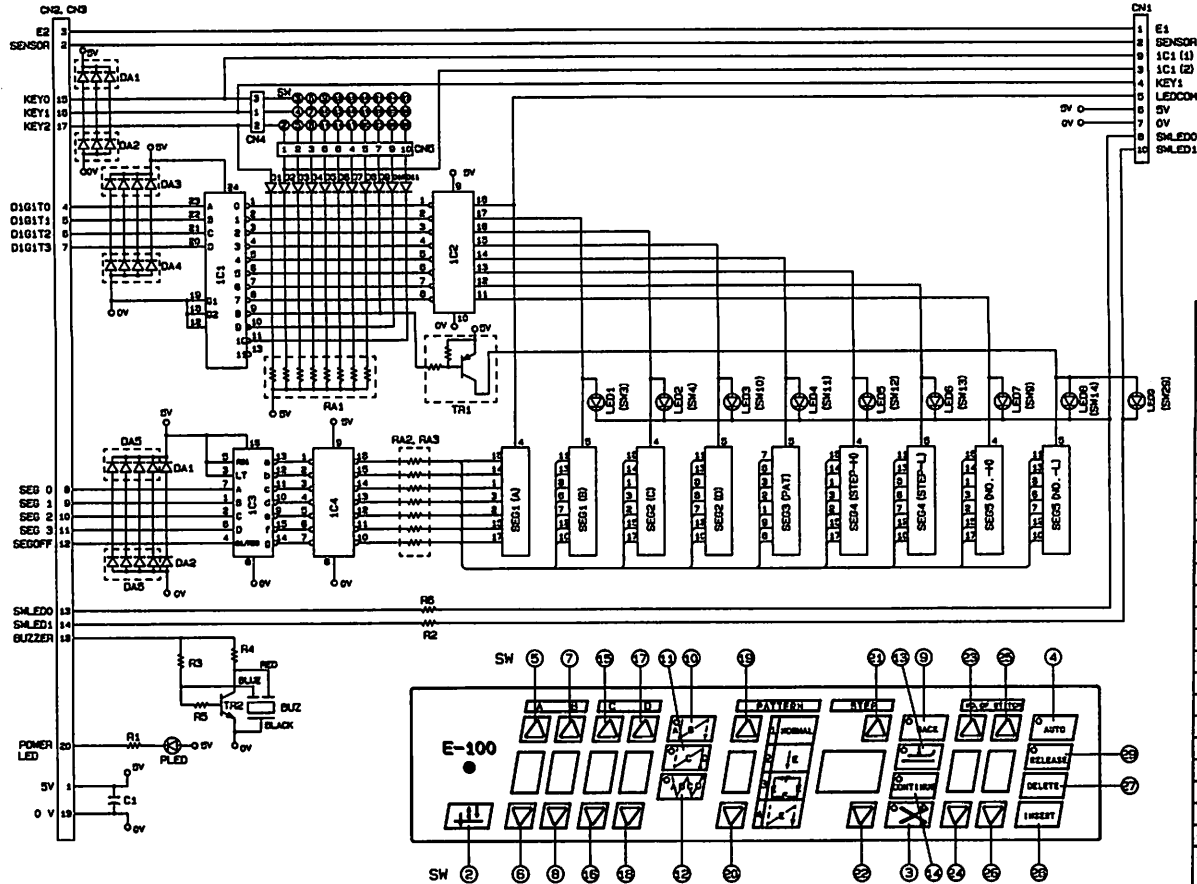
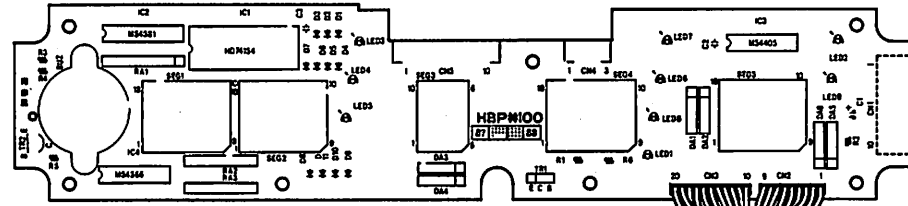
# TIMING CHART OF OP. PANEL E-40



Remark: High level of signal, except (SWLEDO), is higher than +3V, and low level is lower than +0.5V.

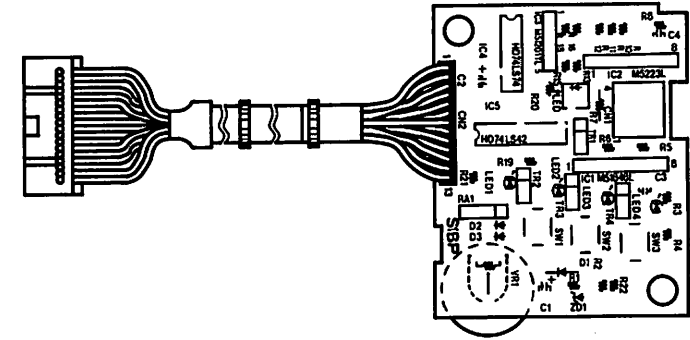
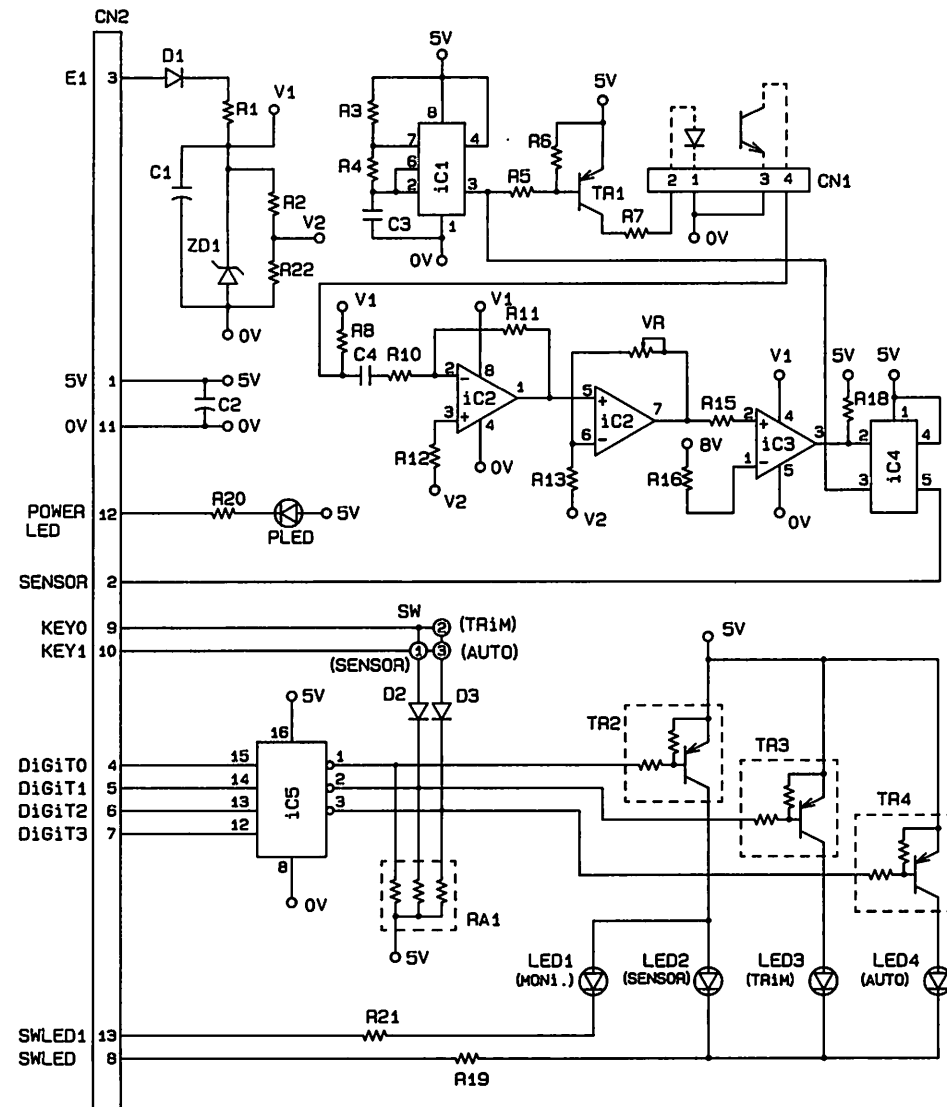


# OP Printed-circuit board E100



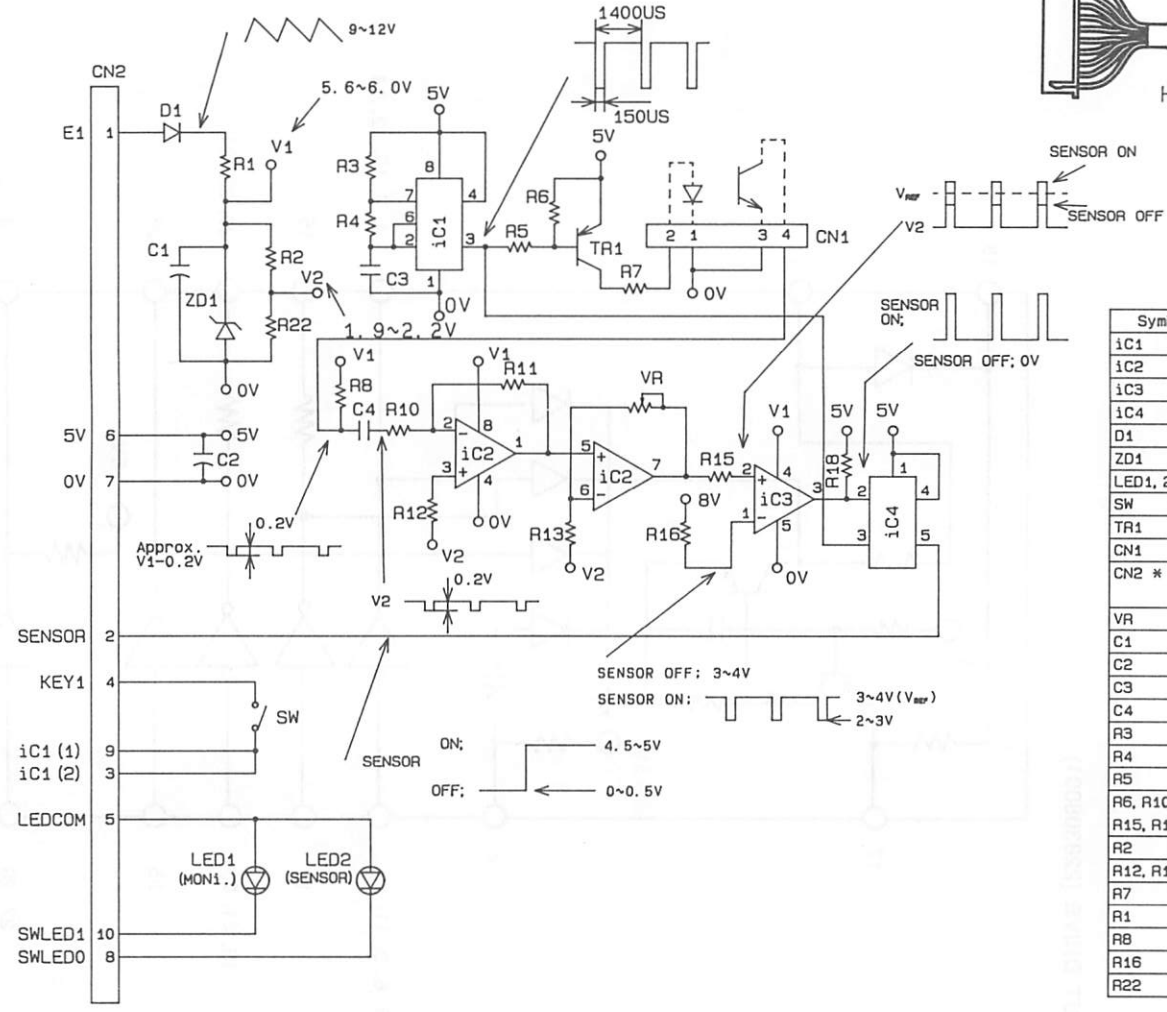
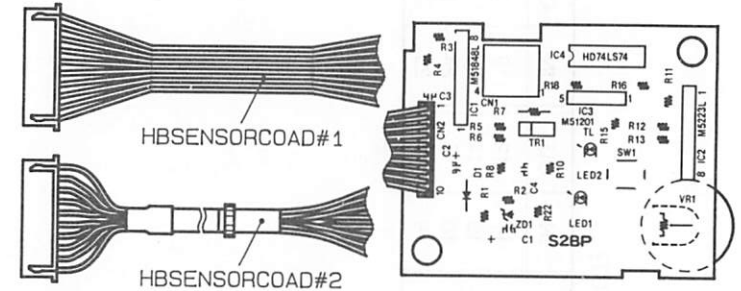
Symbol	Code	Name	Q'ty	Note
DA1, DA3, DA5	532315000	DARREYDA-N4	3	
DA2, DA4, DA6	538235000	DARREYDA-P4	3	
D1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	132999001	S1D1SS177	11	
LED1, 2, 3, 4, 5, 6, 7, 8, 9	U52015001	LEDGL-SHD22	9	
SEG1, 2, 4, 5	233061001	LEDTLR325	4	
SEG3	233062001	LEDTLR353	1	
RA1	Y63338041	RARREY333X8J	1	1/8W, 33kΩ
RA2, RA3	Y62204441	RARREY220Y4J	2	1/4W, 22Ω
R1	090381620	DR-A14AJ391S	1	1/4W, 390Ω
R2, R6	090101620	DR-A14AJ101S	2	100Ω
R3	090184620	DR-A14AJ184S	1	180kΩ
R4	090471620	DR-A14AJ471S	1	470Ω
R5	090103620	DR-A14AJ103S	1	10kΩ
1C1	091000154	B1P1C74154	1	
1C2	233059001	B1P1CM54581	1	
1C3	233060001	B1P1CM54405P	1	
1C4	233656001	S1TRT062304AP	1	
C1	Y41002301	A-CAPAC1TOR16B100	1	10µ 16V
TR1	239835001	S1TRUN1124	1	
TR2	221791000	S1TR2SC2603	1	
BUZ	227795000	PKM24SW-4401	1	
CN1	233064001	S10B-XH+A	1	
CN2, CN3 *	233065001	HBPLUGCOAD#1	1	* Outside
	233098001	HBPLUGCOAD#2	1	* Built-in
CN4	234336001	S138-03APB	1	
CN5	234337001	HBLB10R-1J	1	

# SENSOR Printed-circuit board S1



Symbol	Code	Name	Q'ty	Note
IC1	234340001	B1P1CM51848L	1	
IC2	U74631000	B1P1CM5223L	1	
IC3	234341001	B1P1CM51201TL	1	
IC4	091100074	B1P1C74LS74	1	
IC5	091100042	B1P1C74LS42	1	
D1	230938001	S1D1SR35-100	1	
D2, D3	132999001	S1D1SS177	2	
ZD1	234338001	S1DR05.6JS83	1	
PLED	233082001	LEDGL-SHD4	1	
LED1, 2, 3, 4	U52015001	LEDGL-SHD22	4	
SW1, 2, 3	233083001	SWB3F-1020	3	
TR1	U15090000	S1TR25A1115	1	
TR2, 3, 4	233835001	S1TRJN1124	3	
CN1	136476001	CNS4B-XH-A	1	
CN2	233262001	CBSENC0AD ASSY.	1	
VR	233261001	VRV08L-8104	1	100kΩ
C1	Y41012301	A-CAPAC10R168101	1	100uF 16V
C2	Y41002301	A-CAPAC10R168100	1	100uF 16V
C3	Y21032420	C-CAPAC10R508103	1	0.01uF
C4	Y21042420	C-CAPAC10R508104	1	0.1uF
R1	090391620	DR-A14AJ391S	1	390Ω
R19, R21	090101620	DR-A14AJ101S	2	100Ω
R3	090124620	DR-A14AJ124S	1	120kΩ
R4	090153620	DR-A14AJ153S	1	15kΩ
R5, R20	090391620	DR-A14AJ391S	2	390Ω
R6, R10, R11	090103620	DR-A14AJ103S	5	10kΩ
R15, R18				
R2	090392620	DR-A14AJ392S	1	3.9kΩ
R12, R13	090472620	DR-A14AJ472S	2	4.7kΩ
R7	090200320	DR-A12AJ200S	1	1/2W 20Ω
RA1	Y61033041	RARREY103XBJ	1	10kΩ
RA8	090221620	DR-A14AJ221S	1	220Ω
R16	090822620	DR-A14AJ822S	1	8.2kΩ
R22	090222620	DR-A14AJ222S	1	2.2kΩ

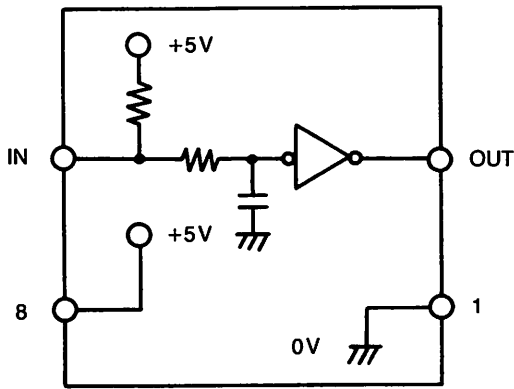
# SENSOR Printed-circuit board S2



Symbol	Code	Name	Q'ty	Note
iC1	234340001	B1P1CM5184BL	1	
iC2	U74631000	B1P1CM5223L	1	
iC3	234341001	B1P1CM51201TL	1	
iC4	091100074	B1P1C74LS74	1	
D1	230938001	SiD1SR35-100	1	
ZD1	234338001	SiDRD5.6USB3	1	
LED1, 2	U52015001	LEDGL-5HD22	2	
SW	233083001	SWB3F-1020	1	
TR1	U15090000	SiTR2SA1115	1	
CN1	136476001	CNS4B-XH-A	1	
CN2 *	233271001	HBSENSORCOAD#1	1	* Outside
	233274001	HBSENSORCOAD#2	1	* Built-in
VR	233261001	VRV08L-B104	1	100kΩ
C1	Y41012301	A-CAPAC1TOR16B101	1	100μF 16V
C2	Y41002301	A-CAPAC1TOR16B100	1	10μF 16V
C3	Y21032420	C-CAPAC1TOR50B103	1	0.01μF
C4	Y21042420	C-CAPAC1TOR50B104	1	0.1μF
R3	090124620	DR-A14AJ124S	1	120kΩ
R4	090153620	DR-A14AJ153S	1	15kΩ
R5	090391620	DR-A14AJ391S	1	390Ω
R6, R10, R11 R15, R18	090103620	DR-A14AJ103S	5	10kΩ
R2	090392620	DR-A14AJ392S	1	3.9kΩ
R12, R13	090472620	DR-A14AJ472S	2	4.7kΩ
R7	090200320	DR-A12AJ200S	1	1/2W, 20Ω
R1	090391620	DR-A14AJ391S	1	390Ω
R8	090221620	DR-A14AJ221S	1	220Ω
R16	090822620	DR-A14AJ822S	1	8.2kΩ
R22	090222620	DR-A14AJ222S	1	2.2kΩ

# HIC CIRCUIT DIAGRAM

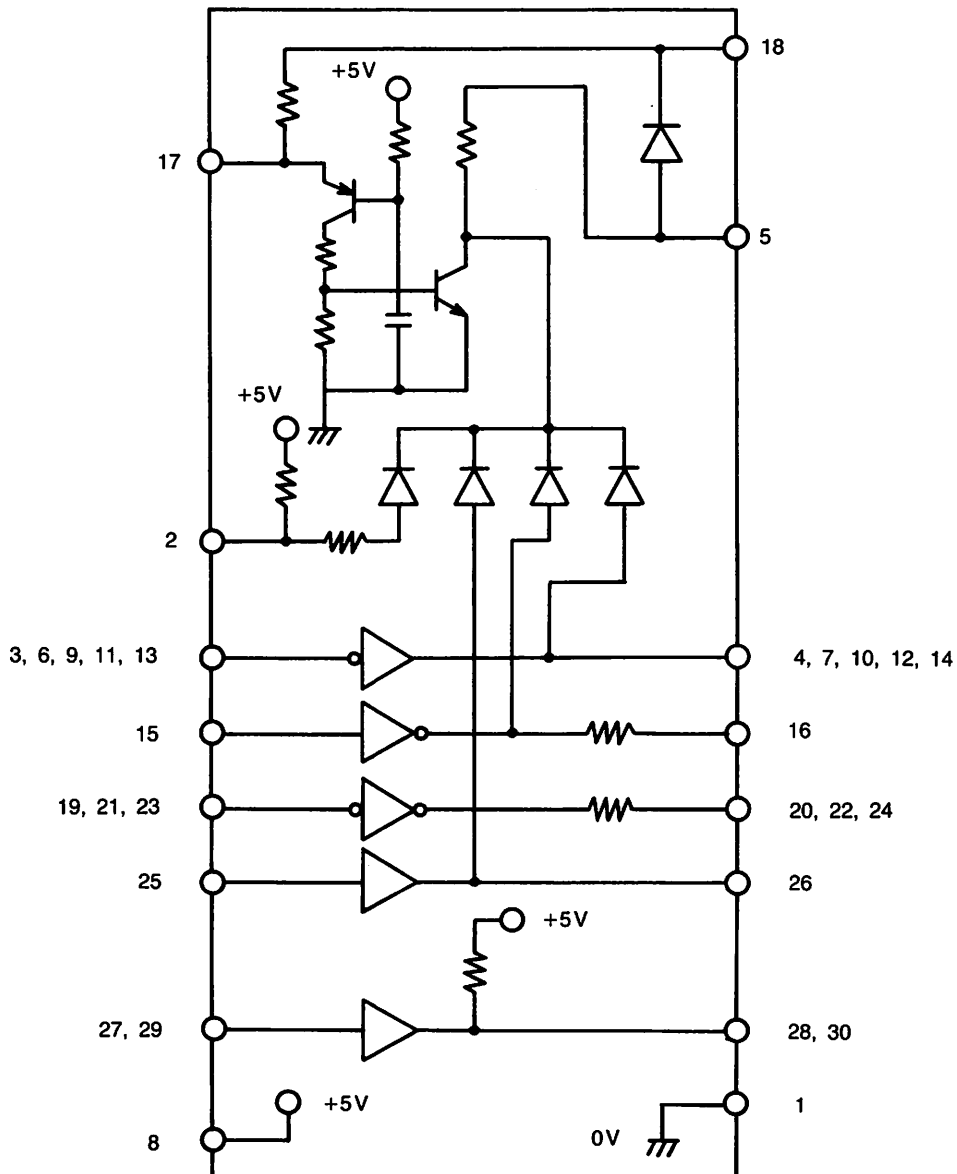
## 1 INP CIRCUIT (228307001)



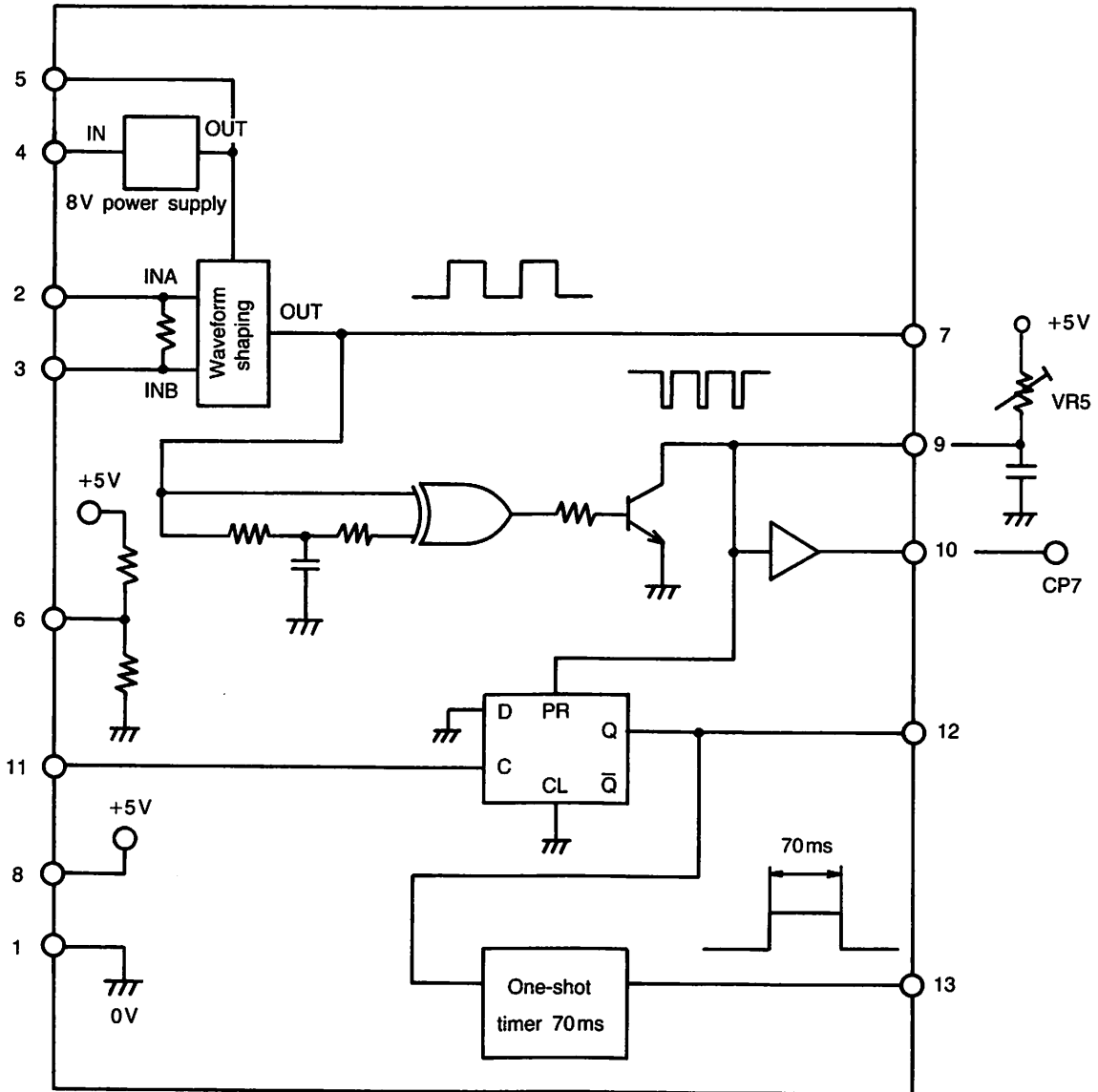
Pin No (IN-OUT)

IN	OUT	IN	OUT	IN	OUT
2	3	11	12	19	20
4	5	13	14	22	21
6	7	16	15	24	23
9	10	18	17	25	26

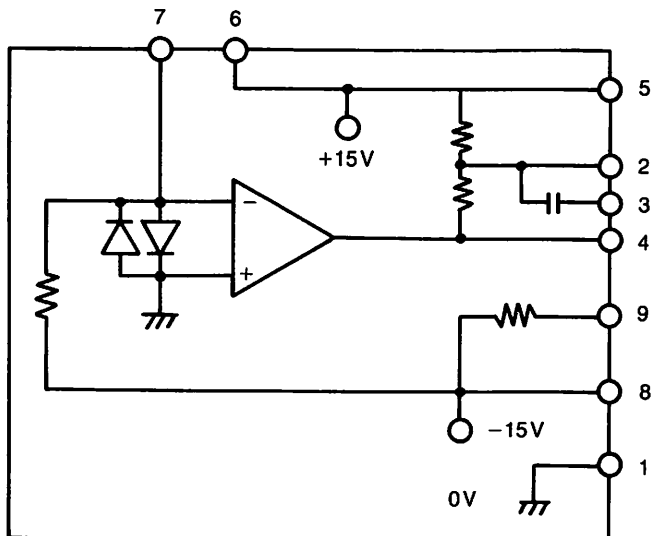
## 2 OUT DRIVE (228308001)



③ ENC CONT (228309001)

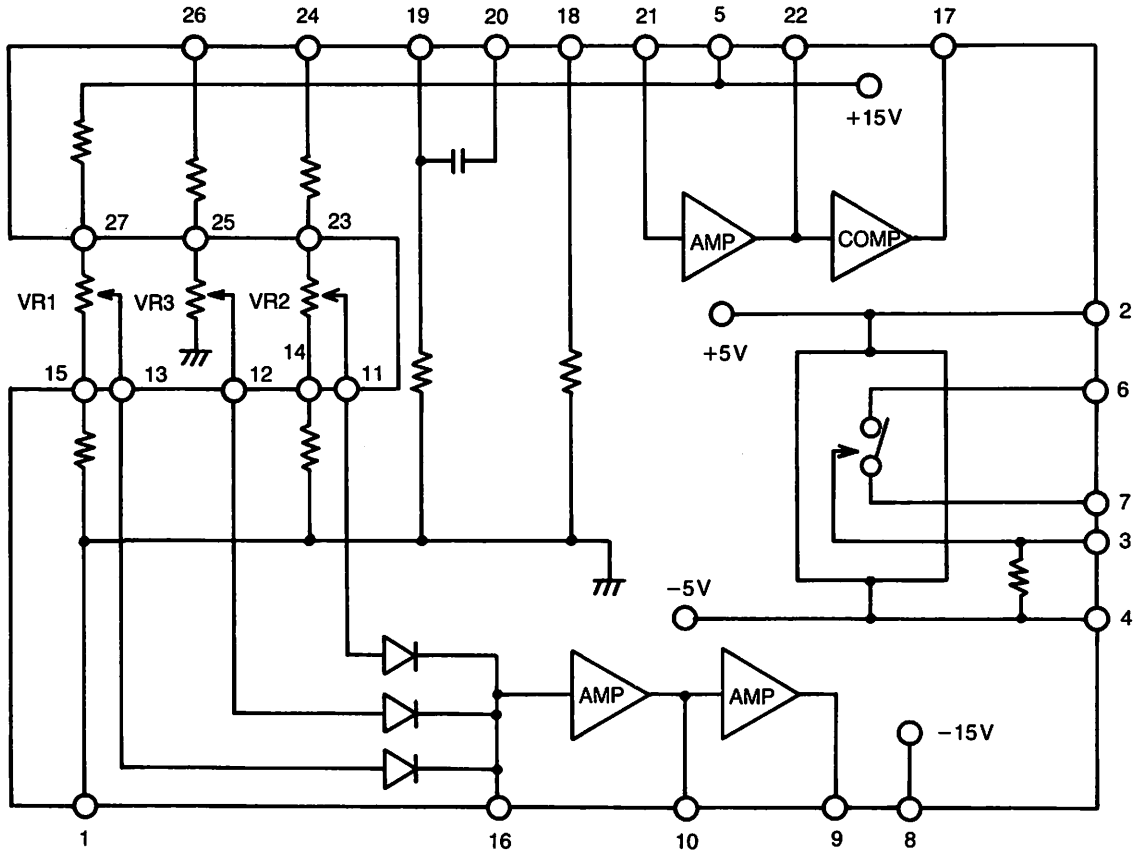


④ MOTOR DRV (228310001)

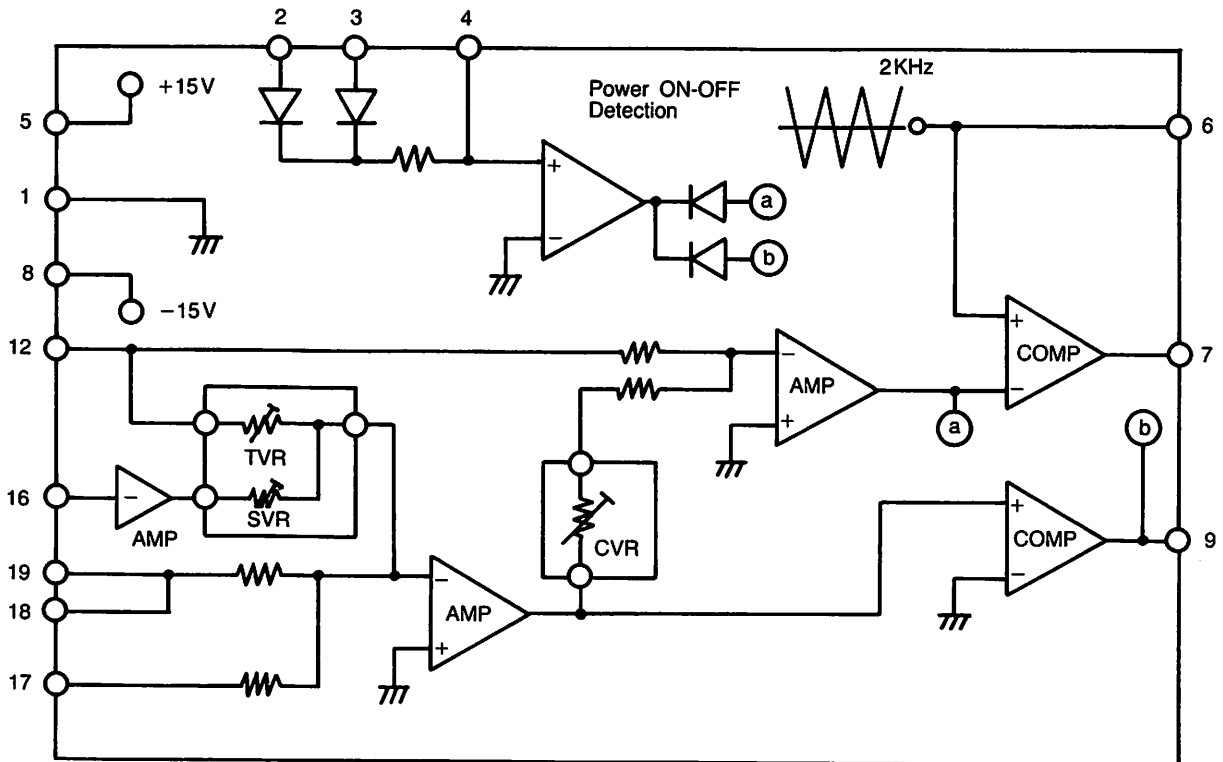




5 MOTOR INST (22831001)



6 MOTOR CONT (228312001)



# FRAME ASSEMBLY #2 REPLACEMENT

Refer to the motor disassembly diagram (Fig. 1).

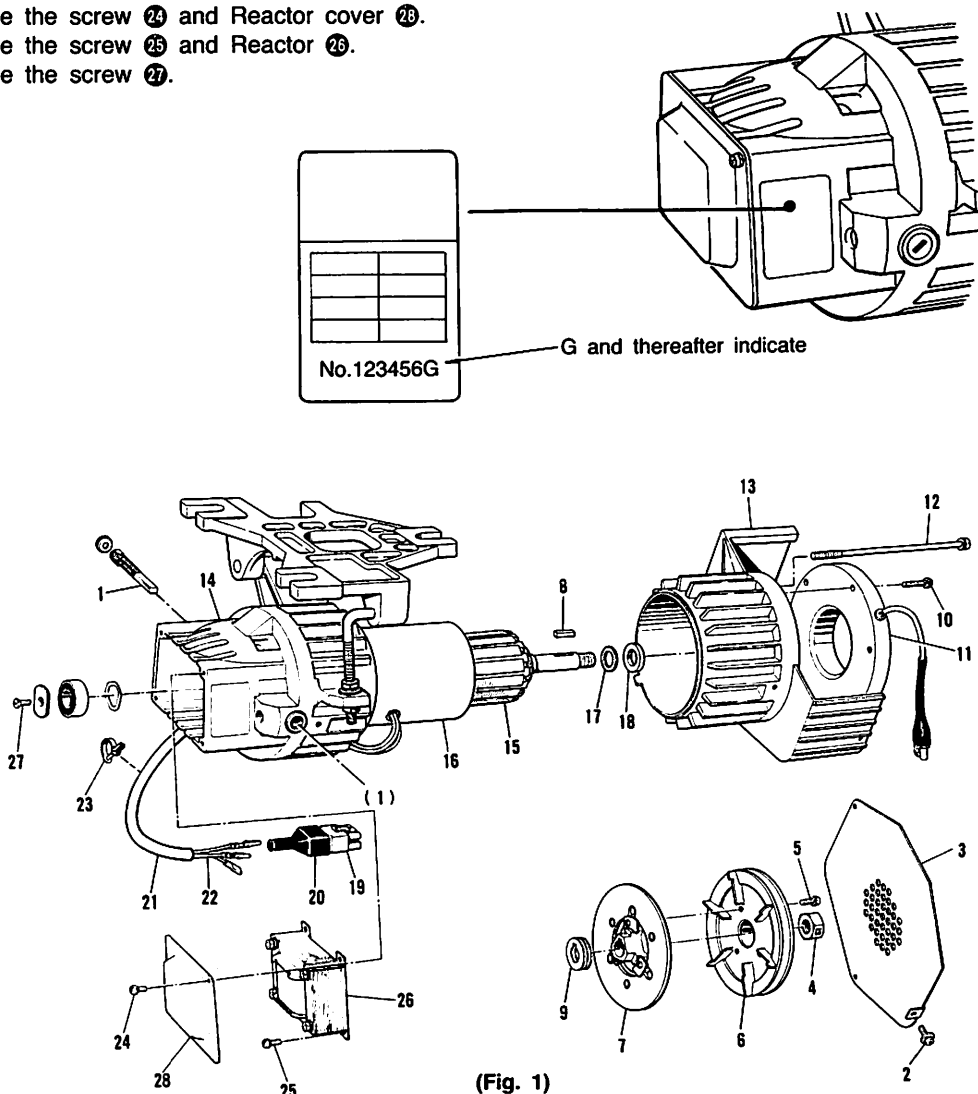
## 1 Disassembly

- (1) Remove the two MD carbon brushes ①.  
Note: The position of each carbon brush should be noted and remembered.
- (2) Take off the lead clamps ⑫ at two places from the installation plate.
- (3) Remove the screw ② and the belt cover.
- (4) Remove the nut ④ and the screw ⑤, and then remove the pulley ⑥.
- (5) Remove the brake armature assembly ⑦ from the rotor shaft, and then remove the woodruff key ⑧ and the washer ⑨.
- (6) Remove the screw ⑩ and the brake stator assembly ⑪.  
Note: If the stator is difficult to remove, strike it gently to loosen it for removal.
- (7) Remove the screw ⑫, and then separate bracket R ⑬ and bracket assembly L ⑭. A slight impact may help.
- (8) Take out the rotor ⑮ from the frame assembly ⑯. (Note)  
Because the rotor is held to the frame assembly ⑯ by magnetic force, the rotor should be grasped tightly and care should be taken so that the commutator part (see Fig. 3) of the rotor does not touch the magnet inside the frame.  
Be careful not to lose the motor shaft's spring washer ⑰ and collar ⑱.
- (9) Using the moxex pin remover (J5800-03), take out all pins from the 6-pin plug ⑲.
- (10) Pull out the plug cover ⑳ and the tube ㉑ from the cord assembly ㉒.
- (11) Cut at the crimped part of the two black cords, as close the end of the cord as possible, and then separate.
- (12) The frame assembly ⑯ can then be removed from bracket assembly L ⑭.  
A slight impact may be necessary to facilitate removal.

### (Note)

Perform steps 1-3 below before removing the rotor on motors with a serial number ending with any letter G-Z (see the motor name plate).

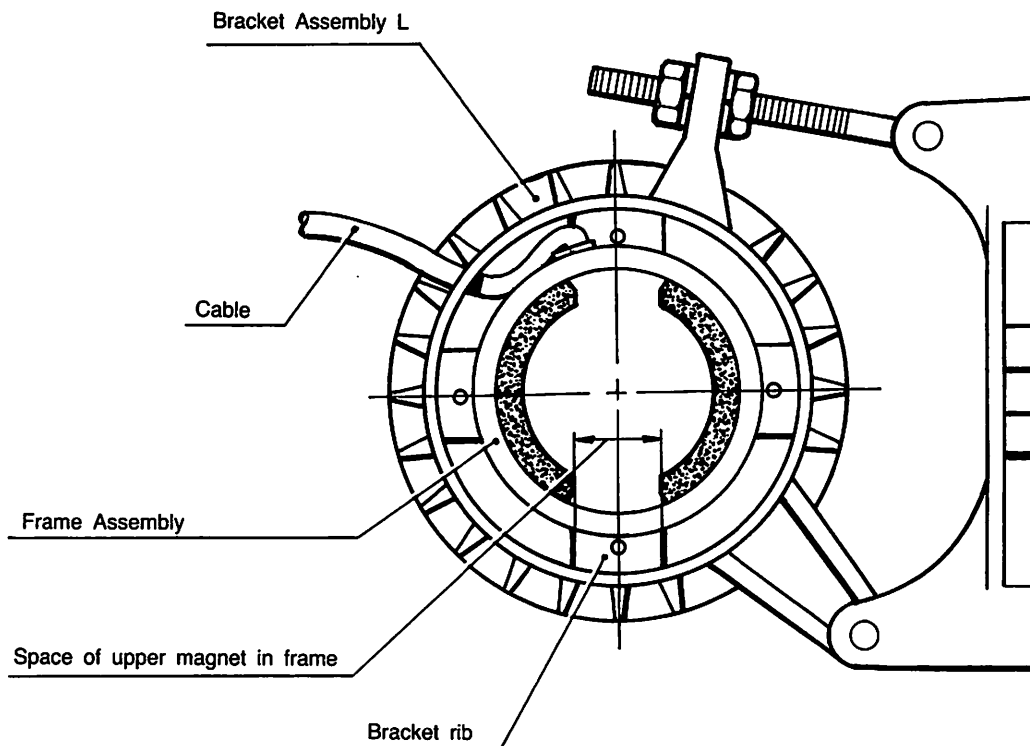
- (1) Remove the screw ㉓ and Reactor cover ㉔.
- (2) Remove the screw ㉕ and Reactor ㉖.
- (3) Remove the screw ㉗.



(Fig. 1)

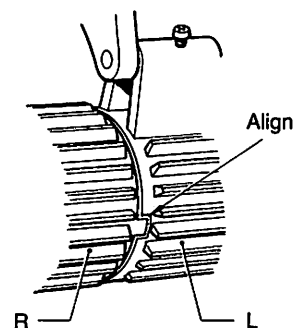
## 2 Assembly

- (1) Pass the cable of the new frame assembly through bracket assembly L.  
When doing so, note the following.
  - 1) Be careful that the cable is not caught in the frame.
  - 2) Be sure to align the bracket's rib with the space of the upper magnet in the frame.

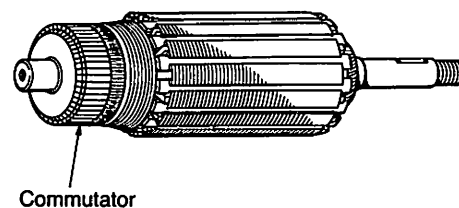


(Fig. 2)

- (2) Align the projection of bracket R with the groove of bracket L, and then try the insertion.  
Note that insertion cannot be completely in unless the rib within bracket R is aligned with the clearance of the upper magnet within the frame.  
For alignment, move the position of the frame assembly.



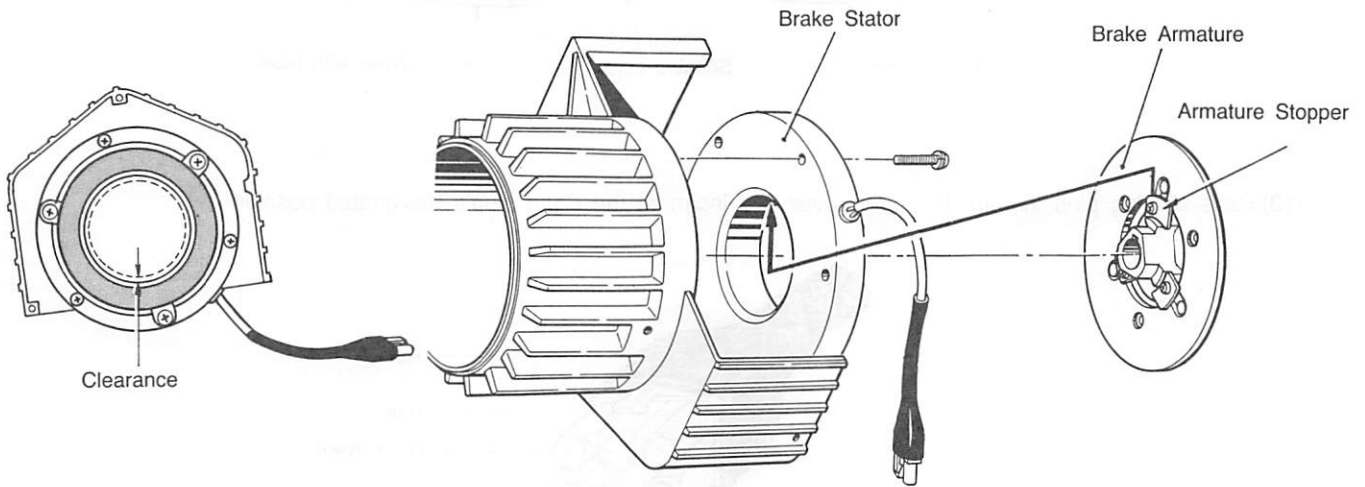
- (3) When the installation position of the frame assembly is adjusted, remove bracket R once again and push the rotor all the way into bracket L.  
At this time the rotor must be grasped tightly so that the commutator part of the rotor does not contact the magnet inside the frame.  
Be sure not to forget to check whether or not the spring washer is included.



- (4) Install bracket R so that it is positioned to bracket L as described in 2. above.  
When the position is correct, gently tap it in by using a wooden hammer.
- (5) Insert and tighten the four screws in the screw holes in bracket L.

(Fig. 3)

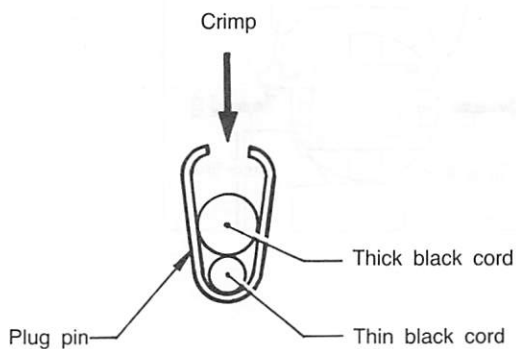
- (6) Temporarily secure the brake stator assembly to bracket R by using the screw.
- (7) Insert the washer and woodruff key to the rotor shaft, and then insert the brake armature assembly.
- (8) Make the positional alignment of the brake stator.



Adjust the position of the brake stator so that, as shown in the figure at the right, the clearance opens between the brake armature's armature stopper and the inner side of the brake stator when the brake armature is rotated. A noise will be heard if there is contact, so the position is OK if no noise is heard.

After the correct position has been determined, tighten the screw that was previously temporarily tightened. If the brake armature interferes, remove the brake armature after tightening to a certain extent, and then tighten further.

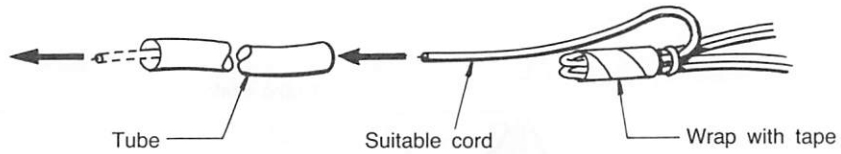
- (9) After installing the pulley and securing with the three screws, tighten the 14 lock nut to the rotor shaft.
- (10) Install the belt cover and tighten the screw.
- (11) Simultaneously crimp together, as described below, the black cord divided at the time of disassembly and the new frame's black cord.



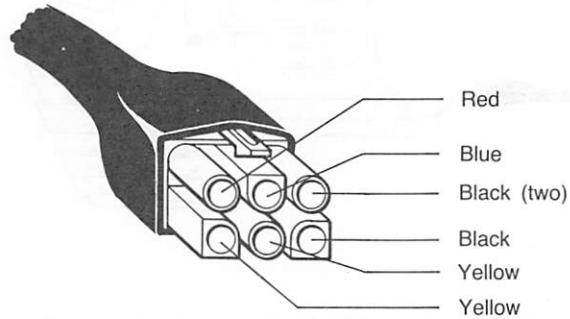
Plug pin = Part No. 217133-001  
 Pin remover = molex J5800-03  
 Crimper = JHTR 1031C

(12) Pass all through the new tube.

If, rather than a new tube, the plate tube used before is used as is, the following method is easy.

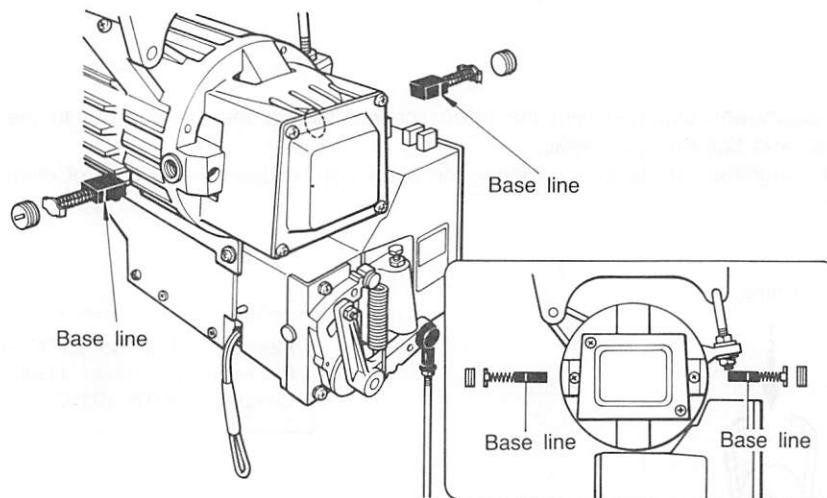


(13) Pass all plug pins through the plug cover and insert at the 6-pin plug's designated position.



(14) Secure the installation plate by the screw, and then affix two lead clamps to the holes at the upper part of the plate and secure the cable.

(15) Insert the carbon brushes at their designated positions and in the correct direction.



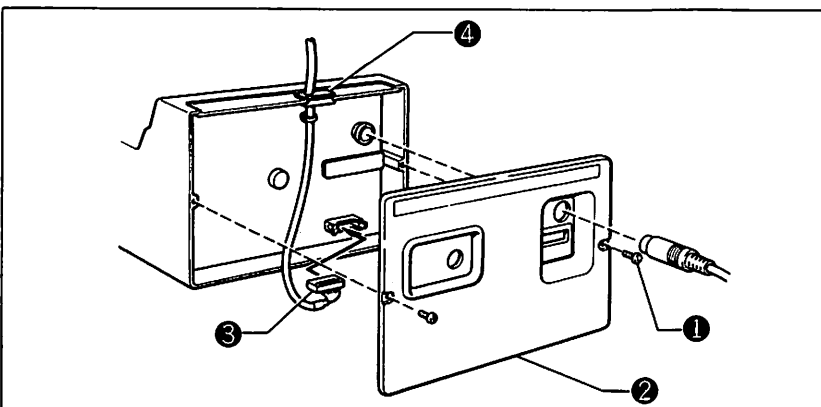
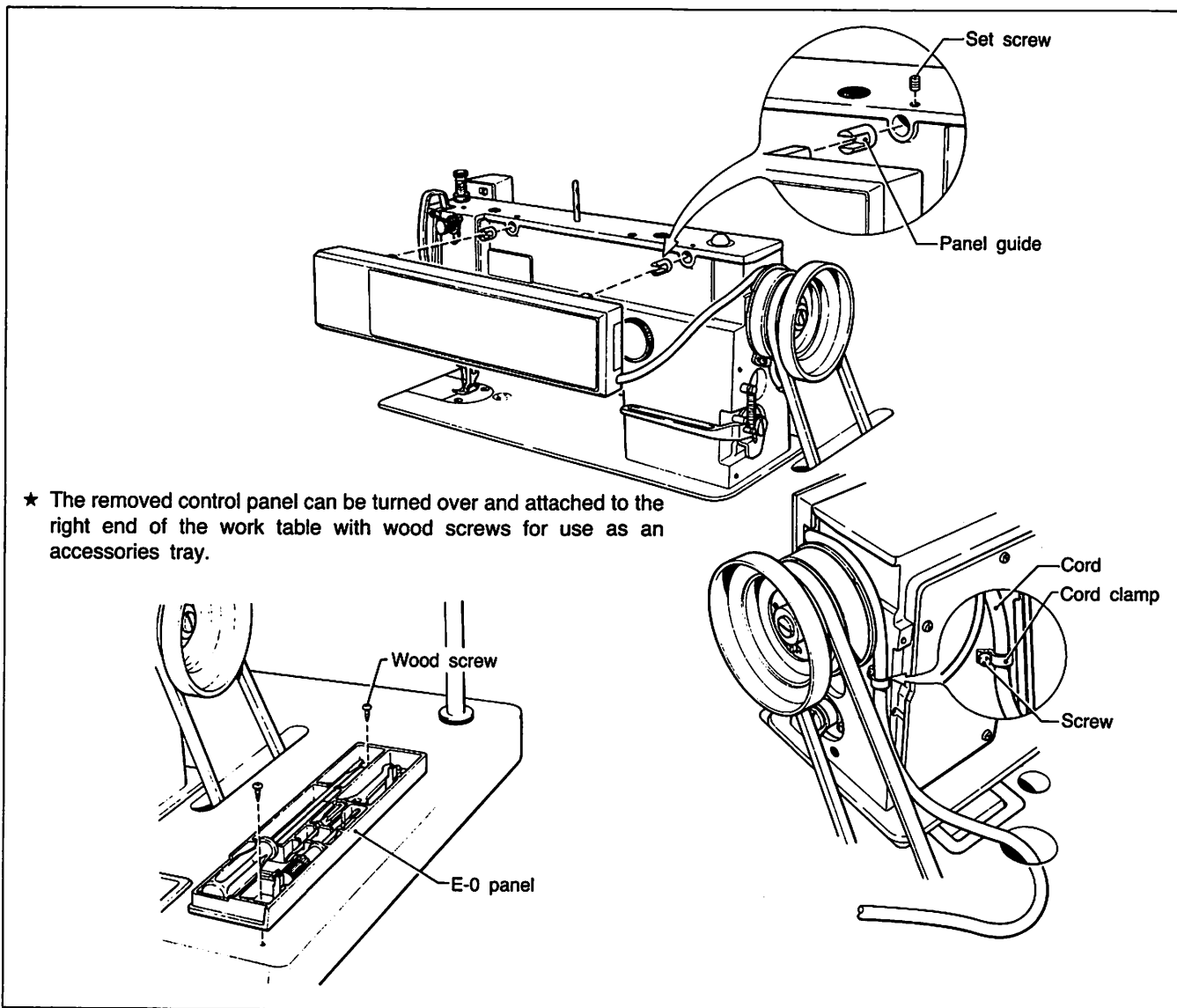
### ③ Megger test

After assembly is completed, check (by using a megger) to be sure that there is 100 mega-ohms or more.

# INSTALLATION OF OPTIONS

## 1 Operation panels Models DB2-B737

- ★ Remove the front panel (E-0) from the machine, and then install the new optional operation panel (E-20/40/100).
- ★ Remove the control box cover and connect the connector.



### 2 Connecting the cord

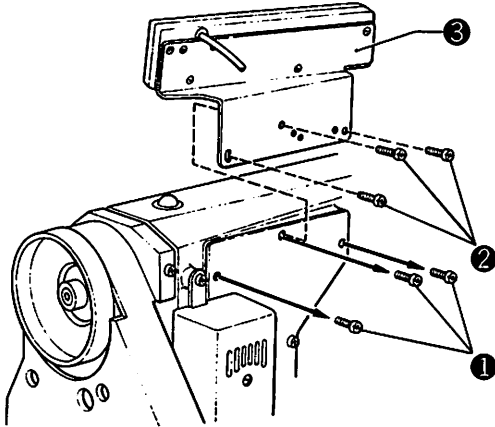
1. Remove screw ①, and remove face plate ②.
2. Connect operation panel connector ③ to the circuit board.
3. Fit the rubber cushion ④ over the cord, and fit the cord in the control box, being careful not to damage the cord.

\* When removing face plate ②, unplug the synchronizer.

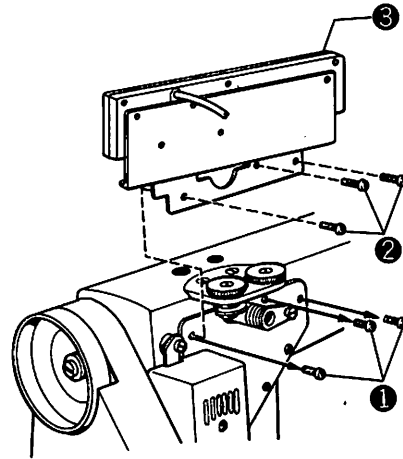
**■ Installation of operation panel bracket**

1. Remove the three screws ❶ in the back of the arm bed.
2. Of the six long screws, use the long screws ❷ that are the same diameter as screws ❶.
3. Mount operation panel bracket ❸ on the back of the arm bed with screws ❷.

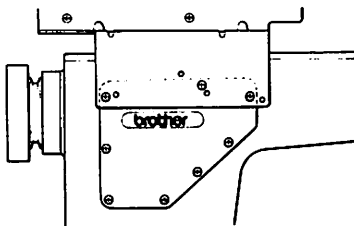
**Models DB2-B748**



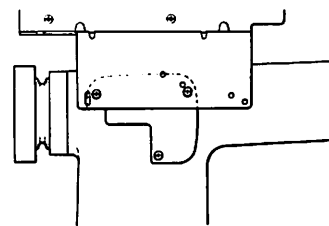
**Models DB2-B793-015  
DB2-B795**



**Models DB2-B791, B793**



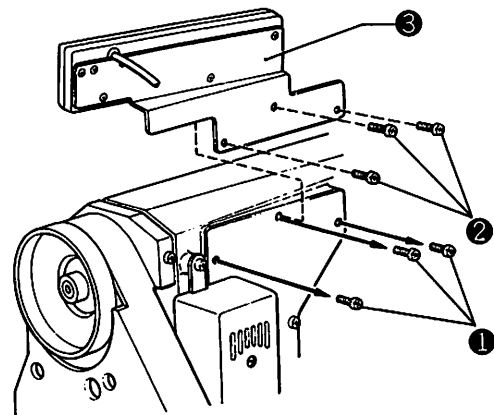
**Models DB2-B798**



**■ Installation of operation panel bracket**

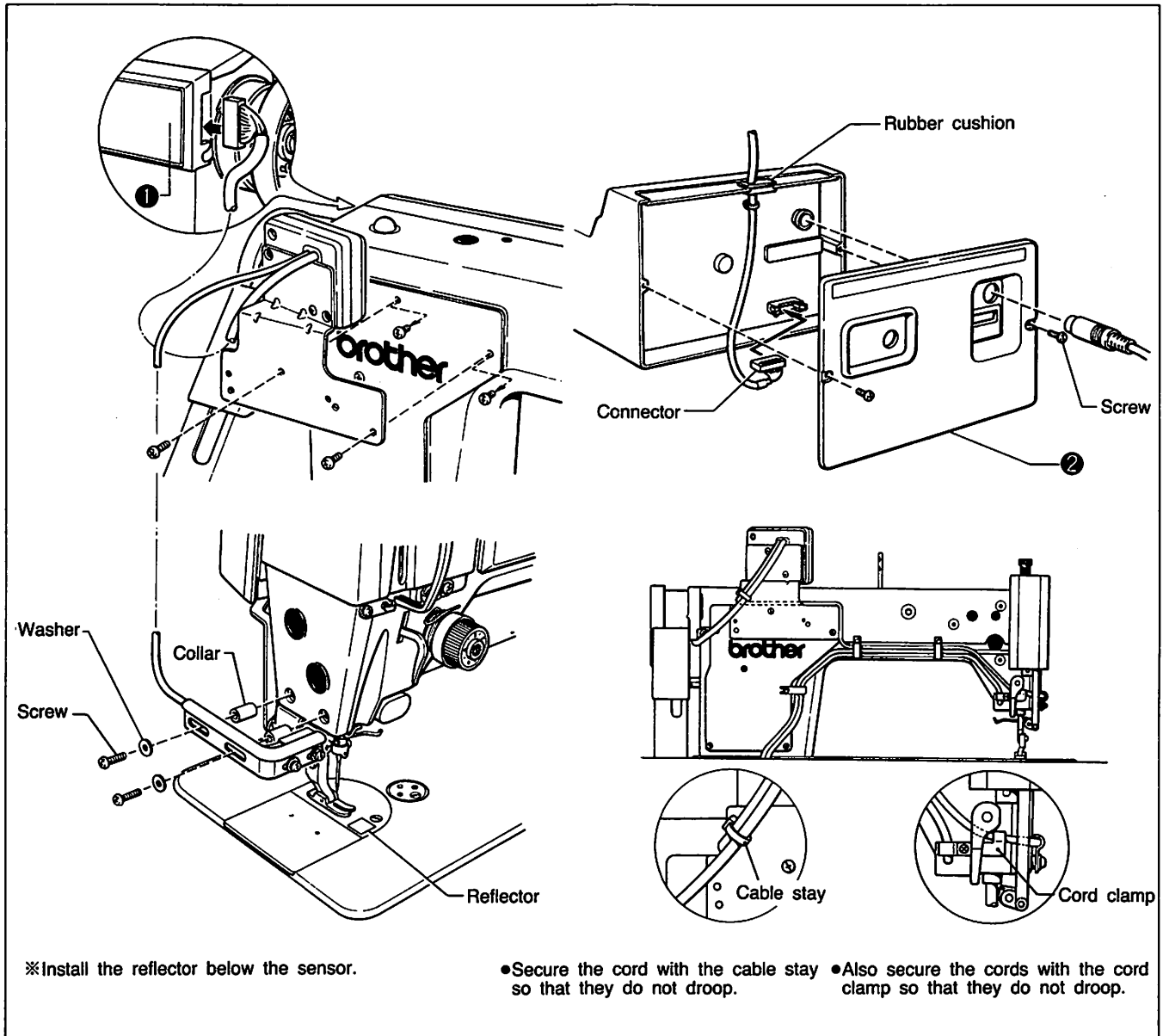
1. Remove the three screws ❶ in the back of the arm bed.
2. Use the three long screws ❷.
3. Mount operation panel bracket ❸ on the back of the arm bed with screws ❷.

**Models  
LT2-B842, LT2-B845  
LT2-B847, LT2-B848  
LT2-B872, LT2-B875**



## 2 Material edge sensor Models DB2-B737

- Be sure to turn the power switch off before installing the material edge sensor.
- ★ When installing sensor II, connect the sensor to the connector on the right side of the operation panel ①.
- ★ When installing sensor I, remove the control box cover ②, and connect the connector.



## Models DB2-B748

- ★ When installing sensor II on the operation panel, refer to models DB2-B791.

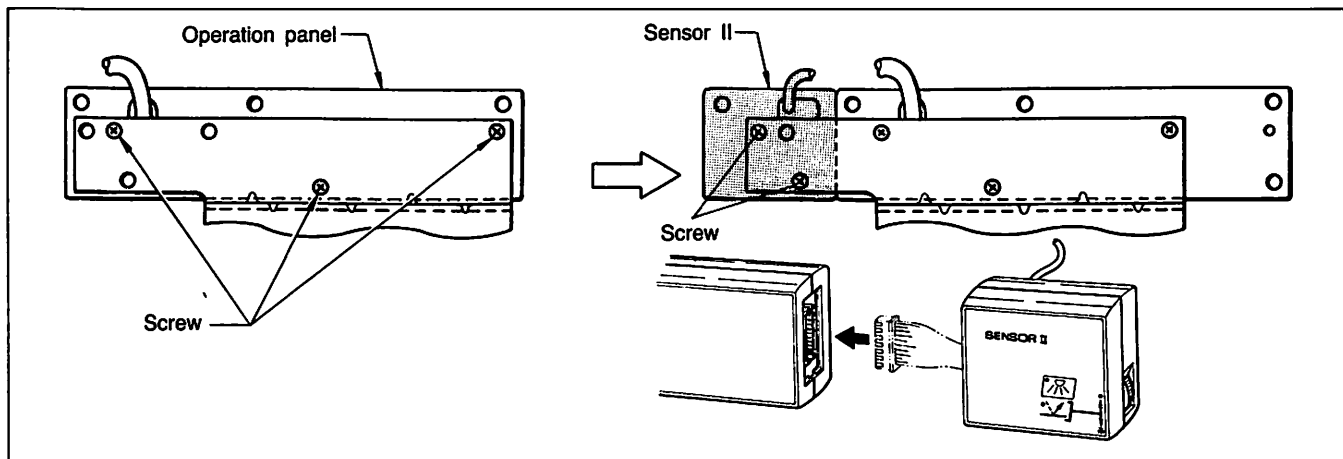


## Models DB2-B791

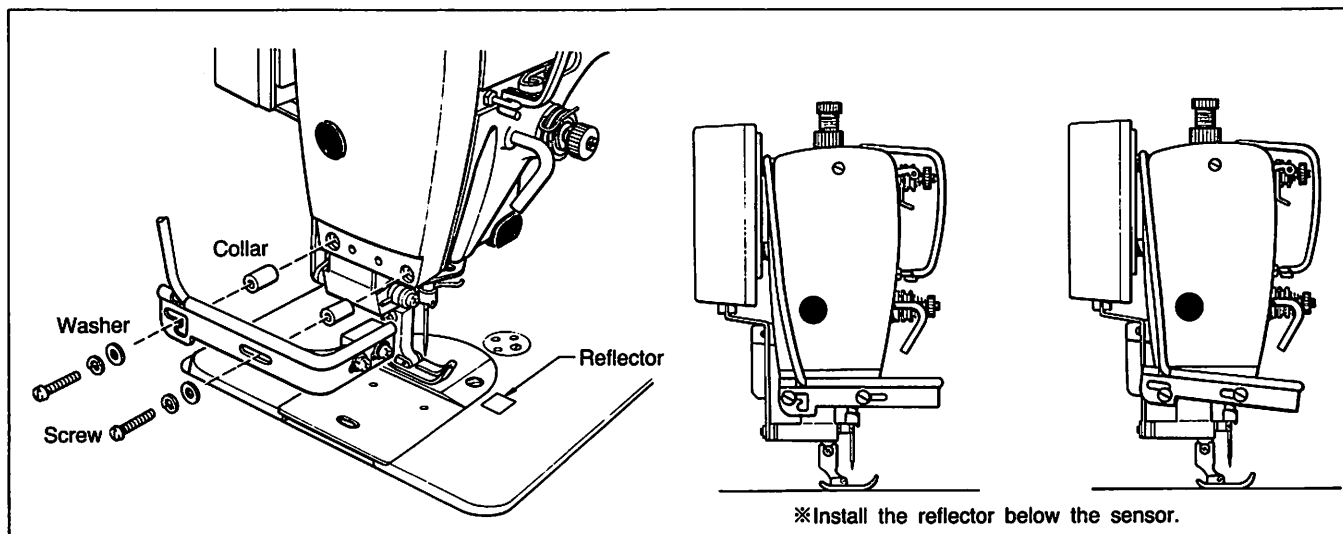
○ Be sure to turn the power switch off before installing the material edge sensor.

### ■ To install Sensor II

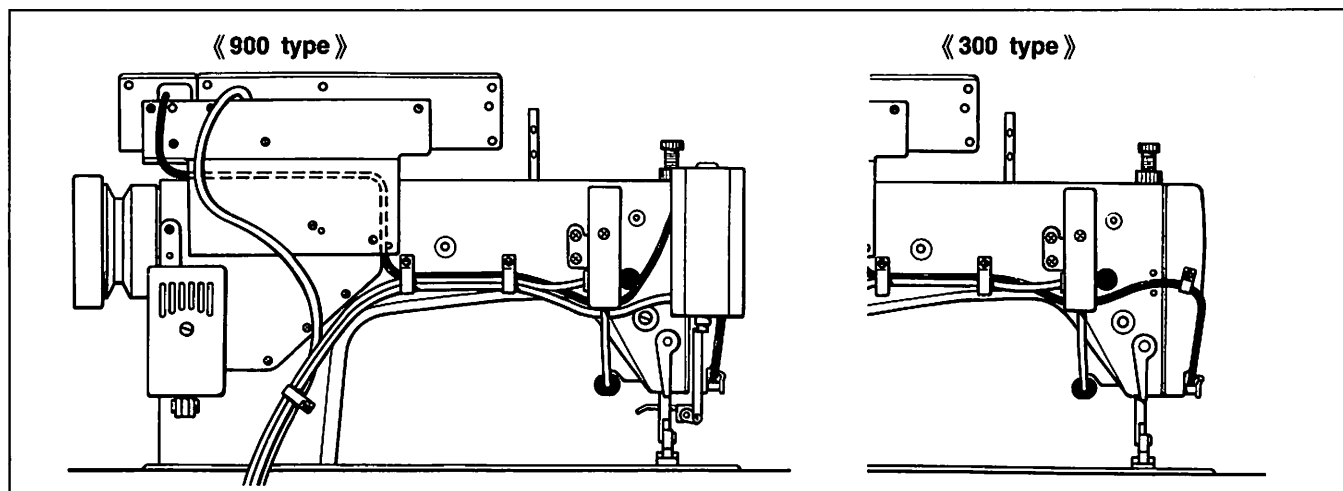
1. Shift the position of the operation panel as shown in the figure below.
2. Remove the rubber cap on the side of the operation panel, and connect the sensor II connector.
3. Secure sensor II with two screws, being careful not to pinch the flat cable.



### ■ Material edge sensor



### ■ Connecting the power cord

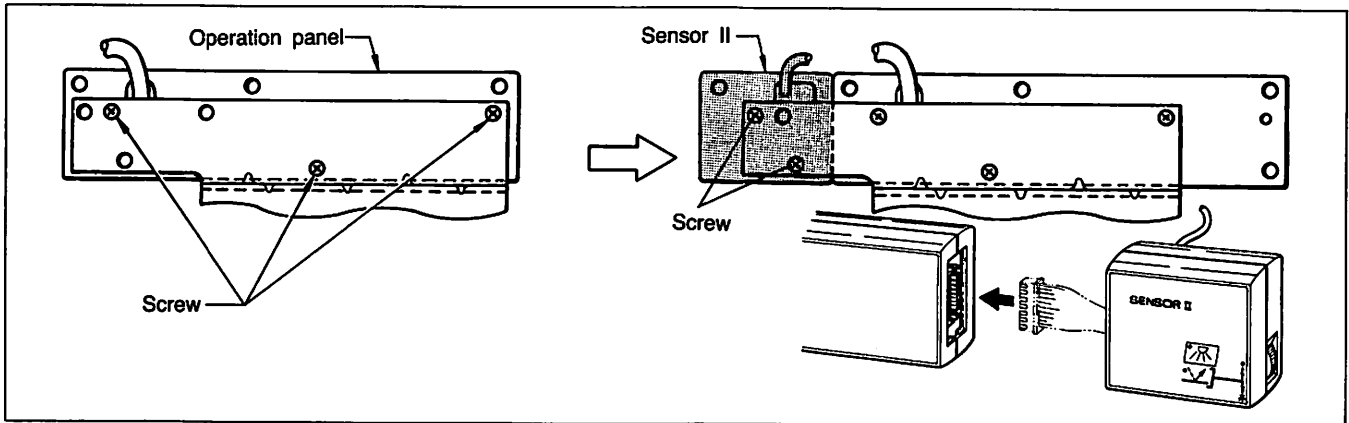


## Models DB2-B793, DB2-B795

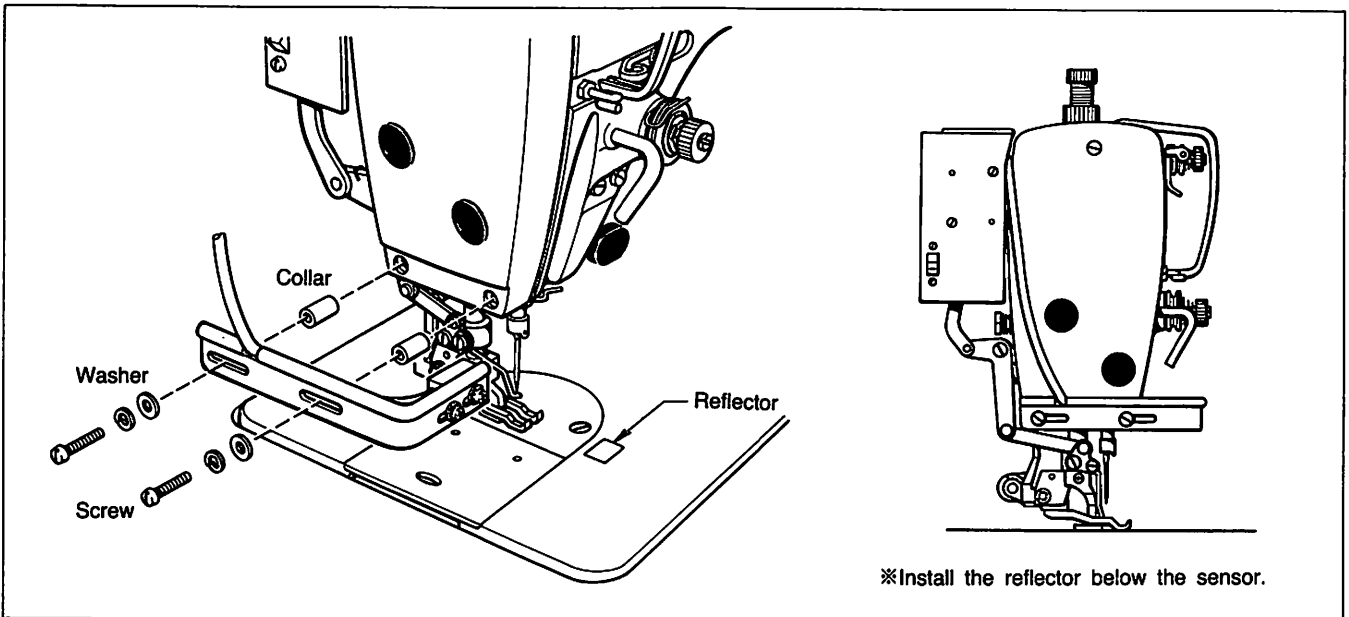
- Be sure turn the power switch off before installing the material edge sensor.

### ☑ To install Sensor II

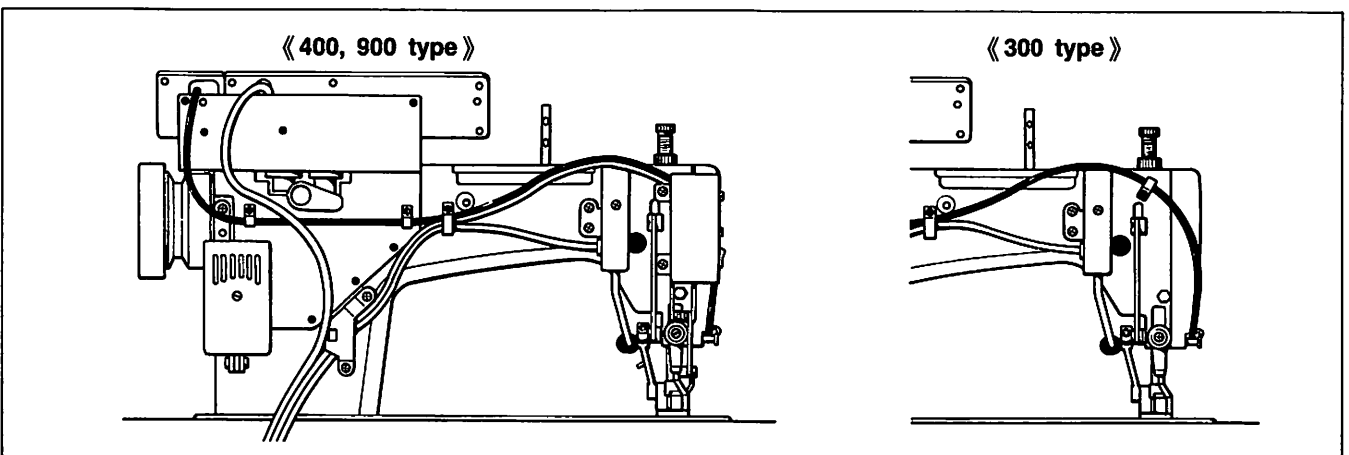
1. Shift the position of the operation panel as shown in the figure below.
2. Remove the rubber cap on the side of the operation panel, and connect the sensor II connector.
3. Secure sensor II with two screws, being careful not to pinch the flat cable.



### ☑ Material edge sensor



### ☑ Connecting the power cord

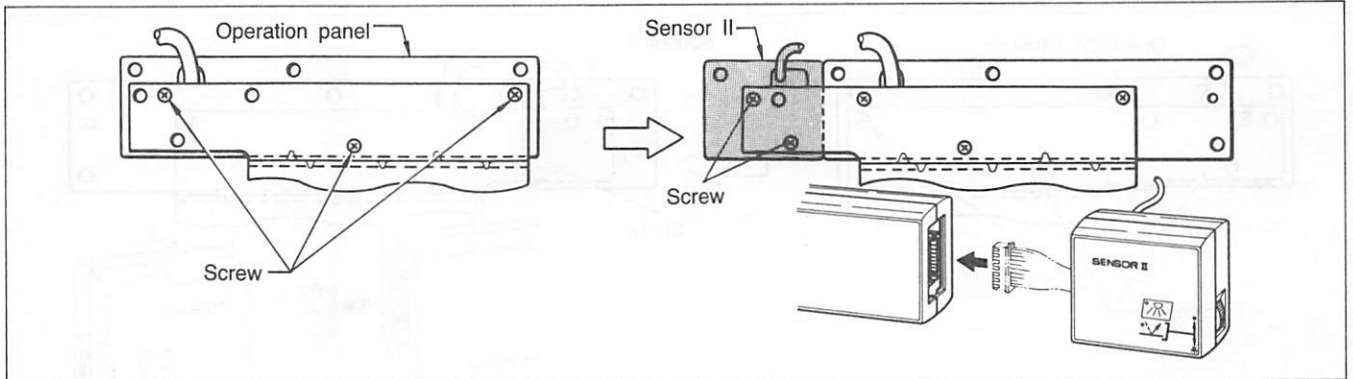


## Models DB2-B798

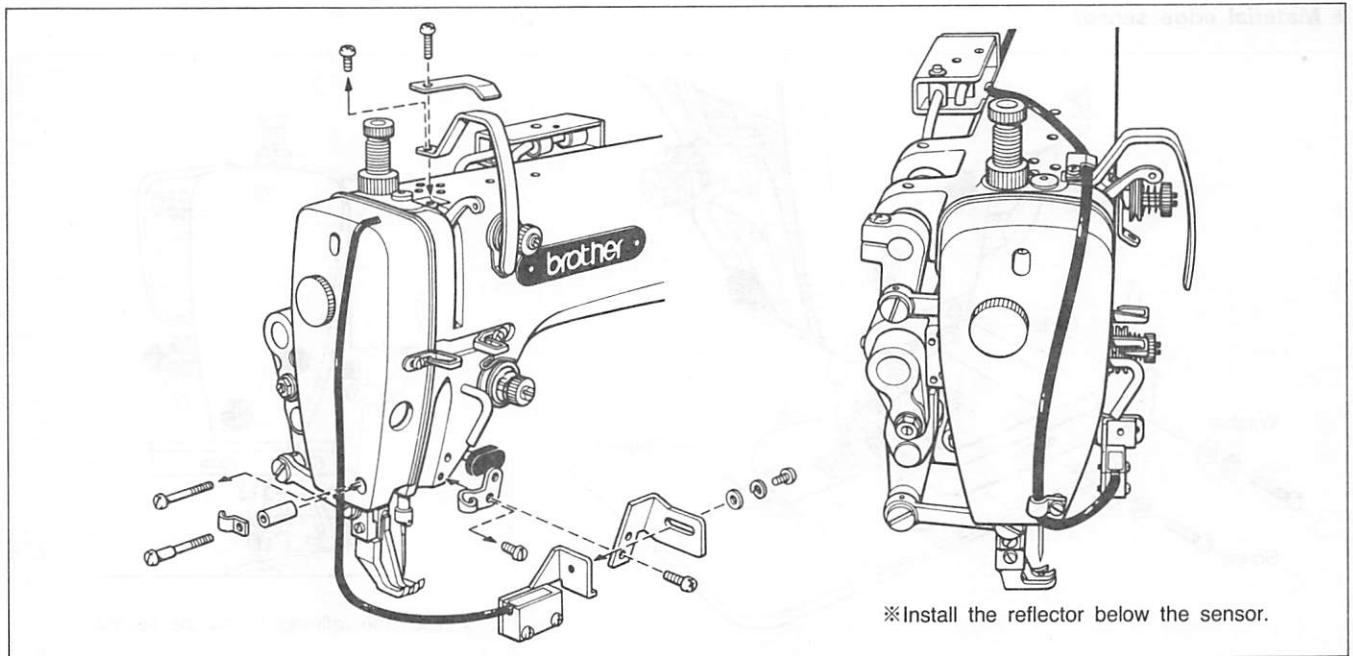
- Be sure turn the power switch off before installing the material edge sensor.

### ☒ To install Sensor II

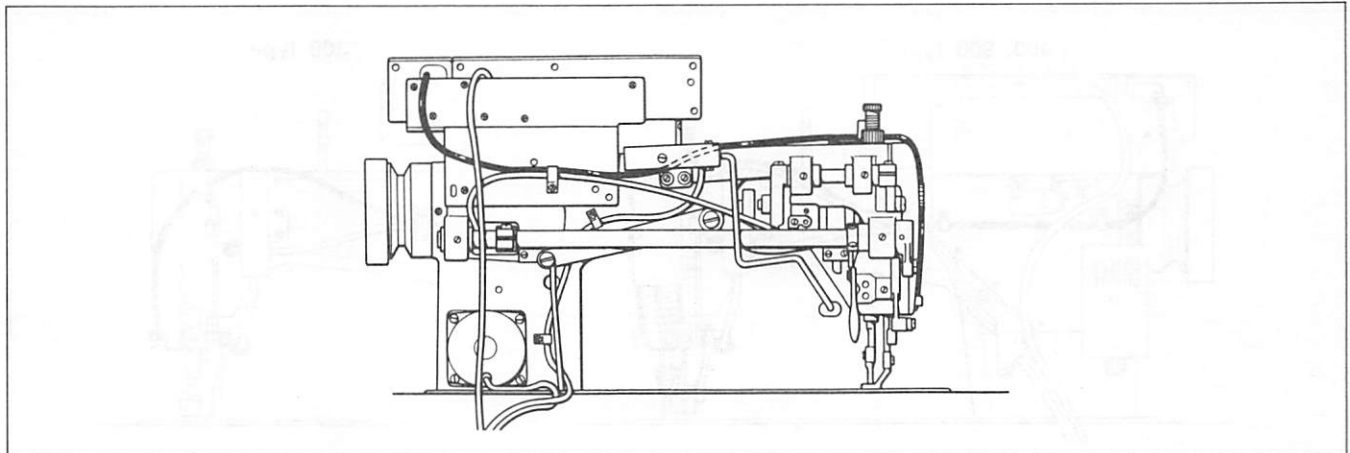
1. Shift the position of the operation panel as shown in the figure below.
2. Remove the rubber cap on the side of the operation panel, and connect the sensor II connector.
3. Secure sensor II with two screws, being careful not to pinch the flat cable.



### ☒ Material edge sensor



### ☒ Connecting the power cord

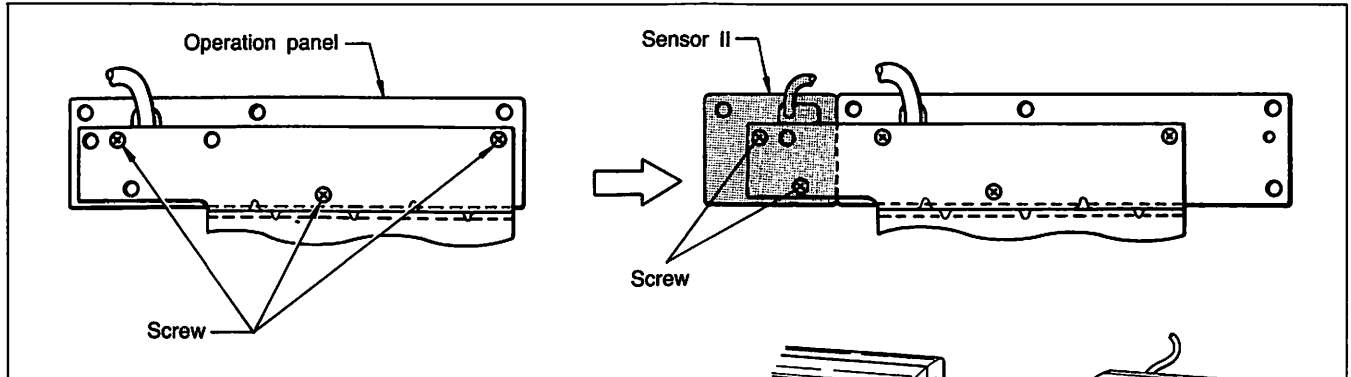


## Models LT2-B842, LT2-B845, LT2-B847, LT2-B848, LT2-B872, LT2-B875

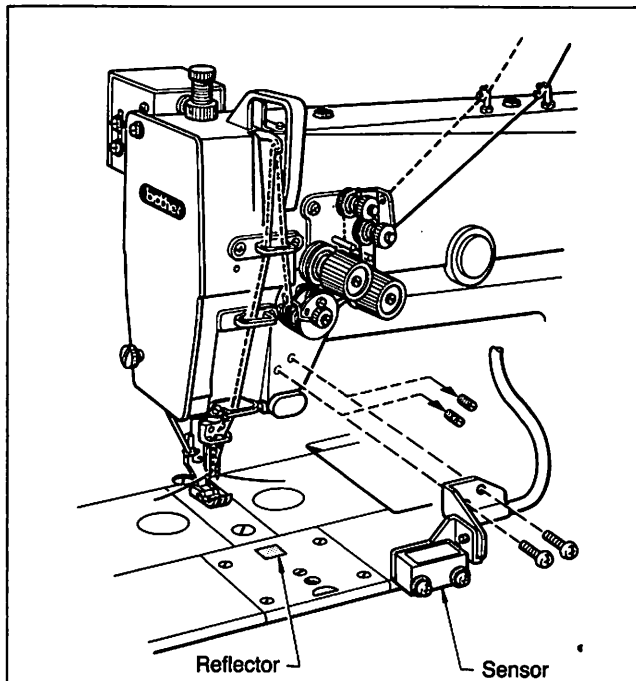
- Be sure turn the power switch off before installing the material edge sensor.

### ■ To install Sensor II

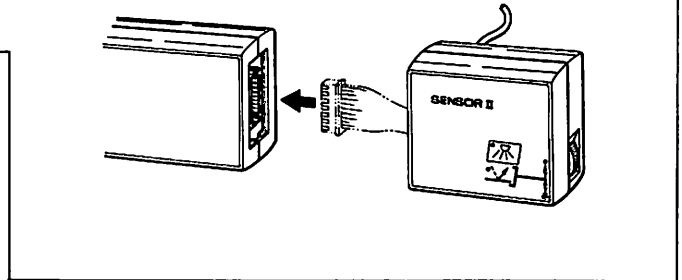
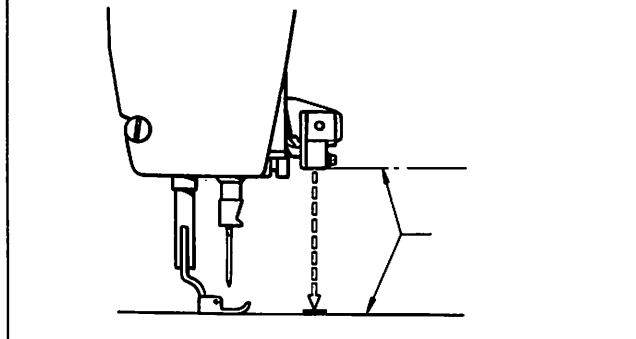
1. Shift the position of the operation panel as shown in the figure below.
2. Remove the rubber cap on the side of the operation panel, and connect the sensor II connector.
3. Secure sensor II with two screws, being careful not to pinch the flat cable.



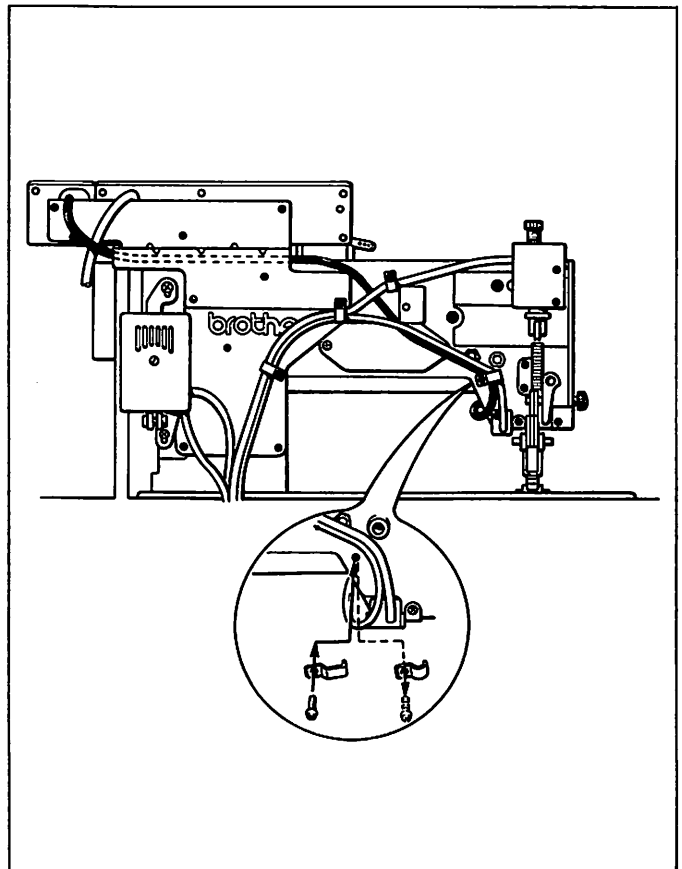
### ■ Material edge sensor



※ Install the reflector below the sensor.



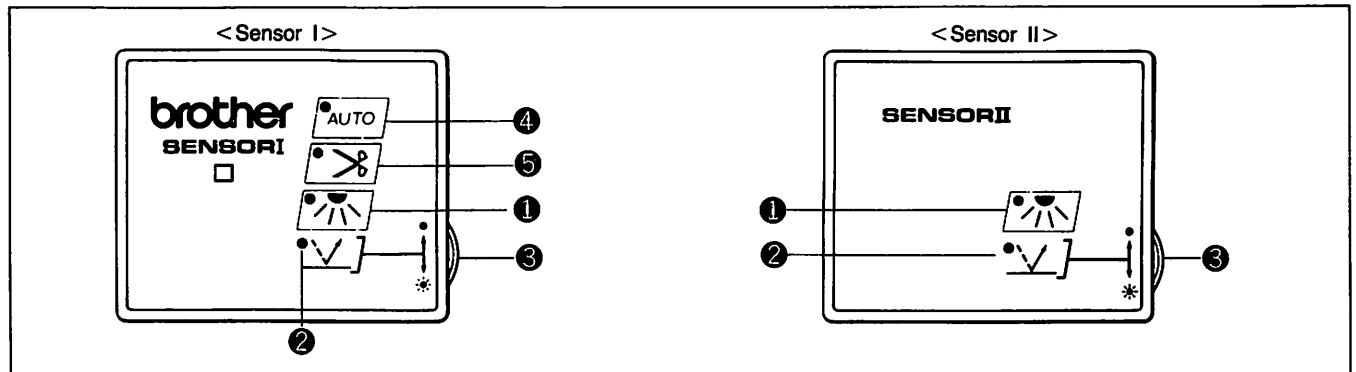
### ■ Connecting the power cord



# USING THE MATERIAL EDGE SENSOR

- ★ The material edge sensor can be used to automatically stop the sewing machine when the material edge is reached.
- ★ The material edge sensor operates in conjunction with operation panels E-20/40/100, and cannot be used alone.
- ★ To adjust the material edge stop position with sensor I, change the mounting position of the sensor.
- ★ To adjust the material edge stop position with sensor II, change the mounting position of the sensor, or change the number of stitches setting shown on the operation panel.

## 1 Part names and functions



### 1 Sensor key



• Press to light the indicator. Material edge detection is active while the indicator is on.

### 2 Sensor sensitivity indicator



• The indicator is out while material is under the sensor, and lights when there is no material under the sensor.

### 3 Sensitivity control

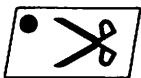
• Used to adjust sensor sensitivity.

### 4 AUTO key



• Press to light the indicator. While the indicator is on, simply press the treadle once to sew automatically to the material edge.

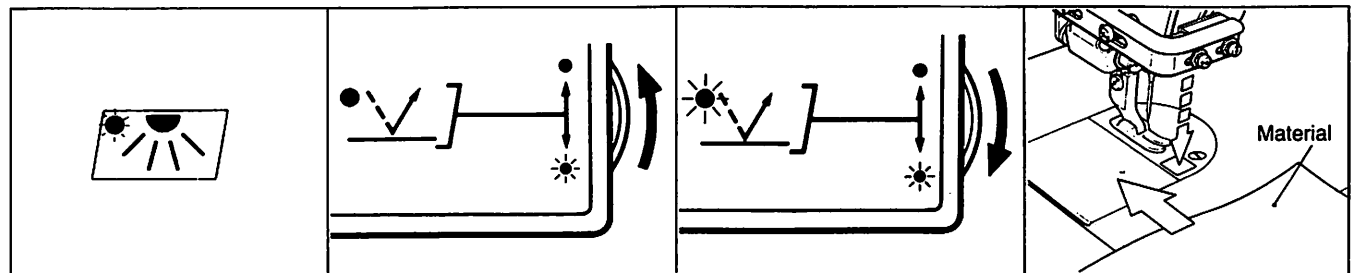
### 5 Thread trimmer key



• Press to light the indicator. Thread trimming will be performed automatically at the material edge while the indicator is on.

## 2 Adjusting the material edge sensor

- 1 • Press the sensor key.
- 2 • Turn the sensitivity control up.
- 3 • Slowly turn the control back down.
- 4 • Insert a piece of material under the sensor.



• The indicator will light.

• The indicator will go out.

• Stop where the indicator lights.

• Make sure the indicator goes out.

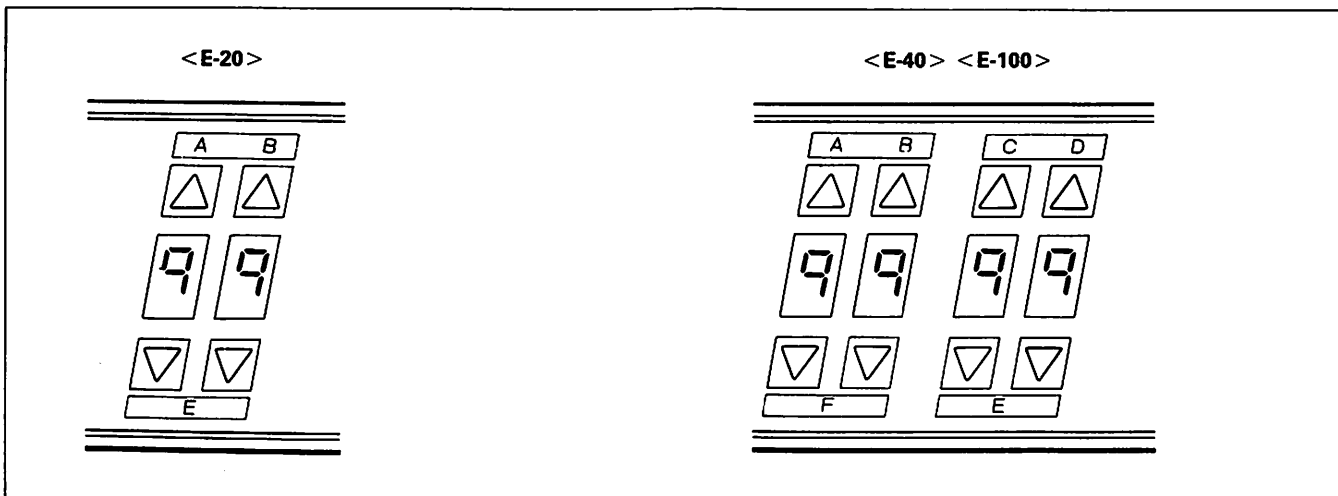
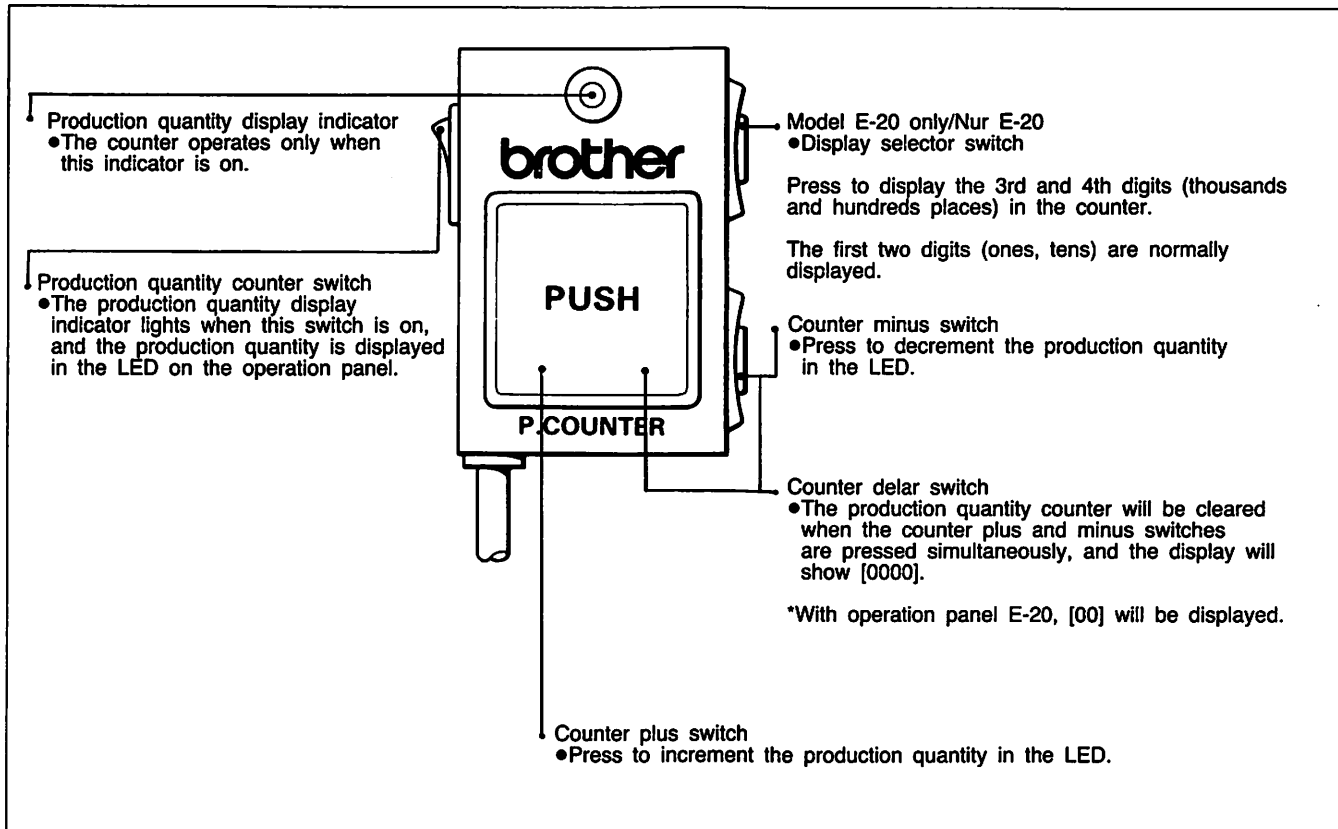
\*1) To cancel the material edge sensor, press the sensor key 1 again so the indicator goes out.

\*2) If the sensitivity control is turned too far in step 3 above, the material edge sensor will not function properly.

# USING THE PRODUCTION QUANTITY COUNTER

- ★ The number of completed work pieces can be displayed on the stitch number display on the operation panel.
- ★ The production quantity counter operates in conjunction with operation panels E-20/40/100, and cannot be used alone.

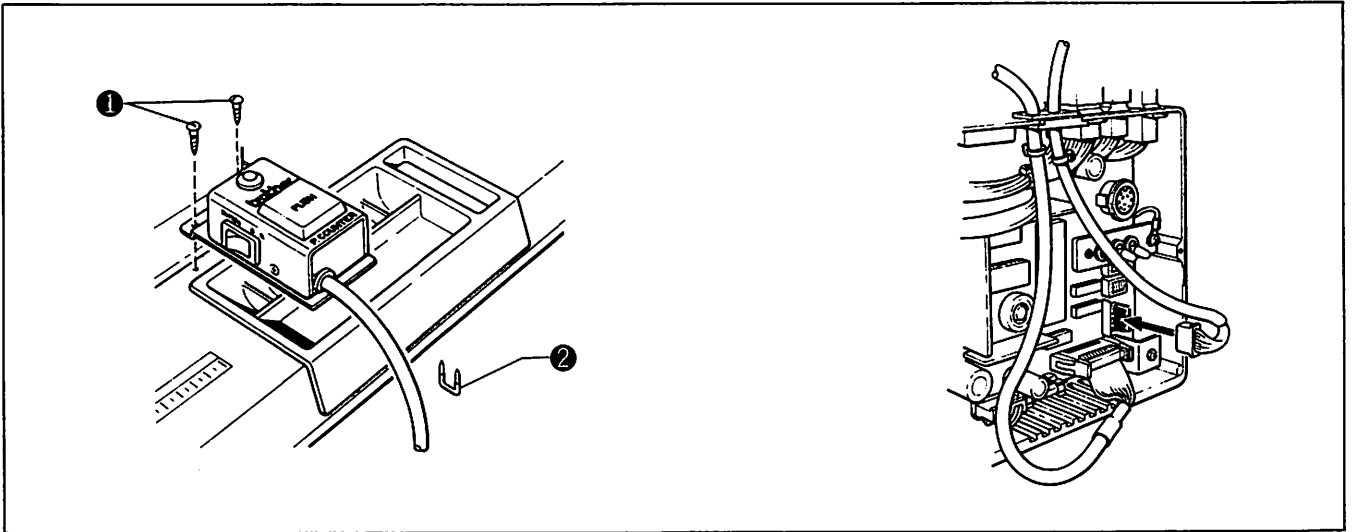
## 1 Part names and functions



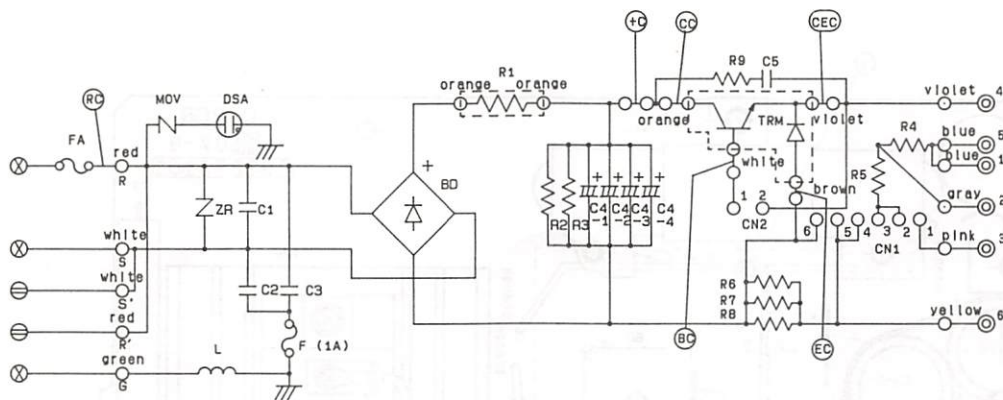
- \*1) The same display is used to separately display the first two and second two digits (1s, 10s and 100s, 1000s) on the E-20 panel. The 100s and 1000s places are displayed when the selector switch is pressed. The production quantity is displayed in four digits, e.g. [9999], on the E-40/100 displays.
- \*2) The production quantity is displayed so long as the production quantity indicator is on. Note that start and end backtick will not be displayed at this time.

## 2 Production quantity counter

- ★ The production quantity counter operates in conjunction with operation panels E-20/40/100, and cannot be used alone.
- ★ Mount the production quantity counter to the table with wood screws ①.
- ★ Secure the production quantity counter cord to the underside of the table with a staple ②.



# D printed-circuit board 1-110V assembly



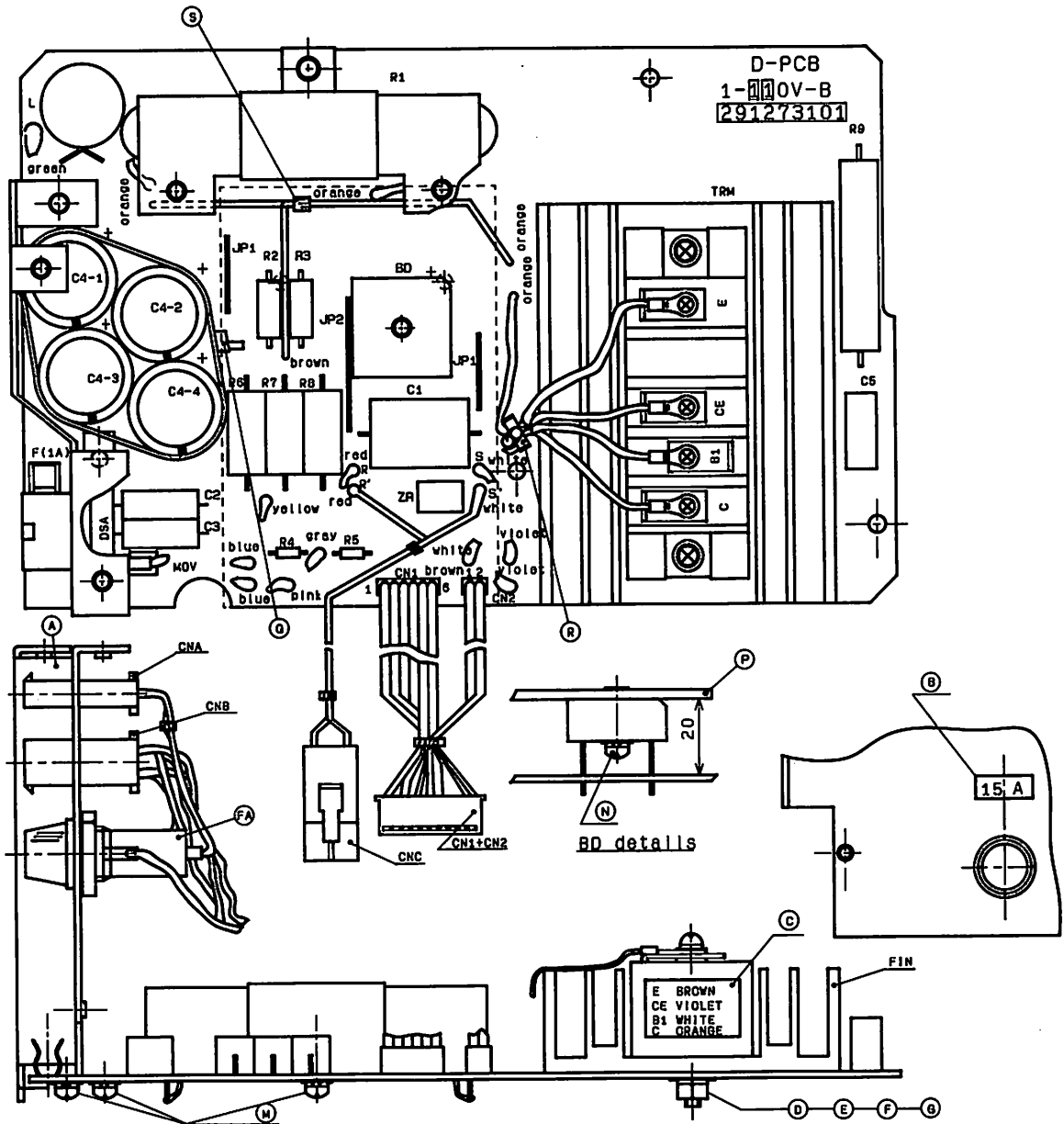
Symbol	Code	Name	Qty	Note
C1	228372001	MTB-2G-105K	1	400V, 1uF
C2, C3	228373001	MTB-2G-222K	2	400V, 2200pF
C5	228356001	MDD-2J-104K	1	630V, 0.1uF
C4-1, -2	233641001	HPR2D6B1M	4	200V, 680uF
C4-3, -4				
R1	228375001	MFS40AR2K	1	40W, 0.2
R6, 7, 8	228368001	MSS05NR1K	3	5W, 0.1
R9	228366001	MSS10N5R6K	1	10W, 5.6
TRM	233643001	SITRMID130F-050	1	450V, 30A
BD	224119000	SIDS15VB40	1	400V, 15A
R2, R3	234373001	ERC-1GJ473	2	1W, 47K
R4	090393320	ERD-50TJ393	1	0.5W, 39K
R5	090224320	ERD-50TJ224	1	0.5W, 220K
L	228358001	SF-T10-50M	1	3A
F	228359001	Fuse Holder S-N5051	2	
ZR	233645001	ENC271D-10A	1	270V
MOV	232382001	NV620D10	1	620V
DSA	232384001	DSA362MA	1	
FIN	233637001	27CU07B	1	
RC	228384001	RC code	1	
+C	233649001	+ *	1	
CC	233650001	C *	1	
CEC	233651001	CE *	1	
BC	233652001	B *	1	
EC	233653001	E *	1	
S	218859001	Band M150	4	
Q	233655001	Band M270	1	
R	227189001	Fastener 5.2L	1	
FA	225433001	Fuse Holder #3	1	
	218469001	Fuse 15A	1	

Symbol	Code	Name	Qty	Note
A	233636001	Connector Base -4	1	
B	224090001	Label 15A	1	
D	062501660	Screw 5X16	2	
E	025050370	Washer 5	2	
F	028050280	Spring Washer 2-5	2	
G	021500260	Nut 2-5	2	
N	224120001	Set screw 4X160B	1	
C	233688001	Wire Label	1	
M	216872001	Set Screw 4X80B	3	
CNA	230862001	Power Connector Assem.	1	
CNB	228376001	Motor Connector Assem.	1	
CNC	228296001	Trans Connector Assem.	1	
CN1+CN2	228383001	FIB Connector Assem.	1	
JP1	228371001	Jumper Wire 0.8X30	2	
JP2	228379001	Jumper Wire 0.8X55	1	
P	233639001	FIN 70X110	1	

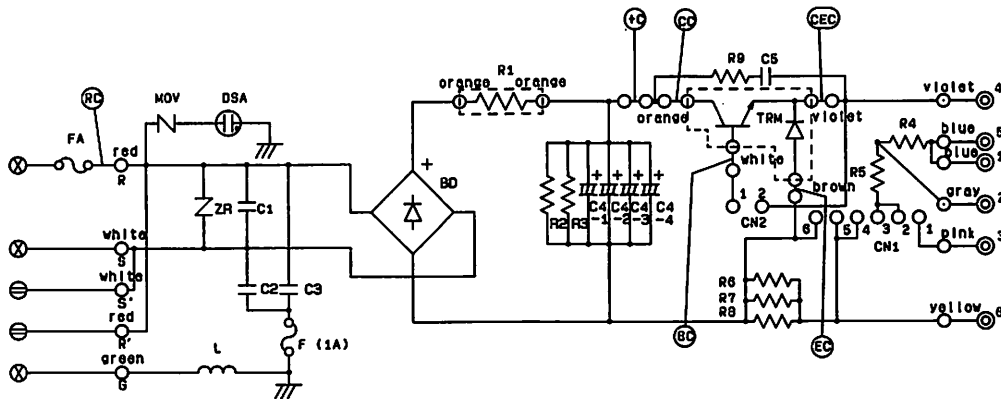


MD-802, 803 D-PCB1-110V-B 291273101 1 Phase 110V

NOTE: This D-PCB assembly is interchangeable for MD-802.



# D printed-circuit board 1-240V assembly

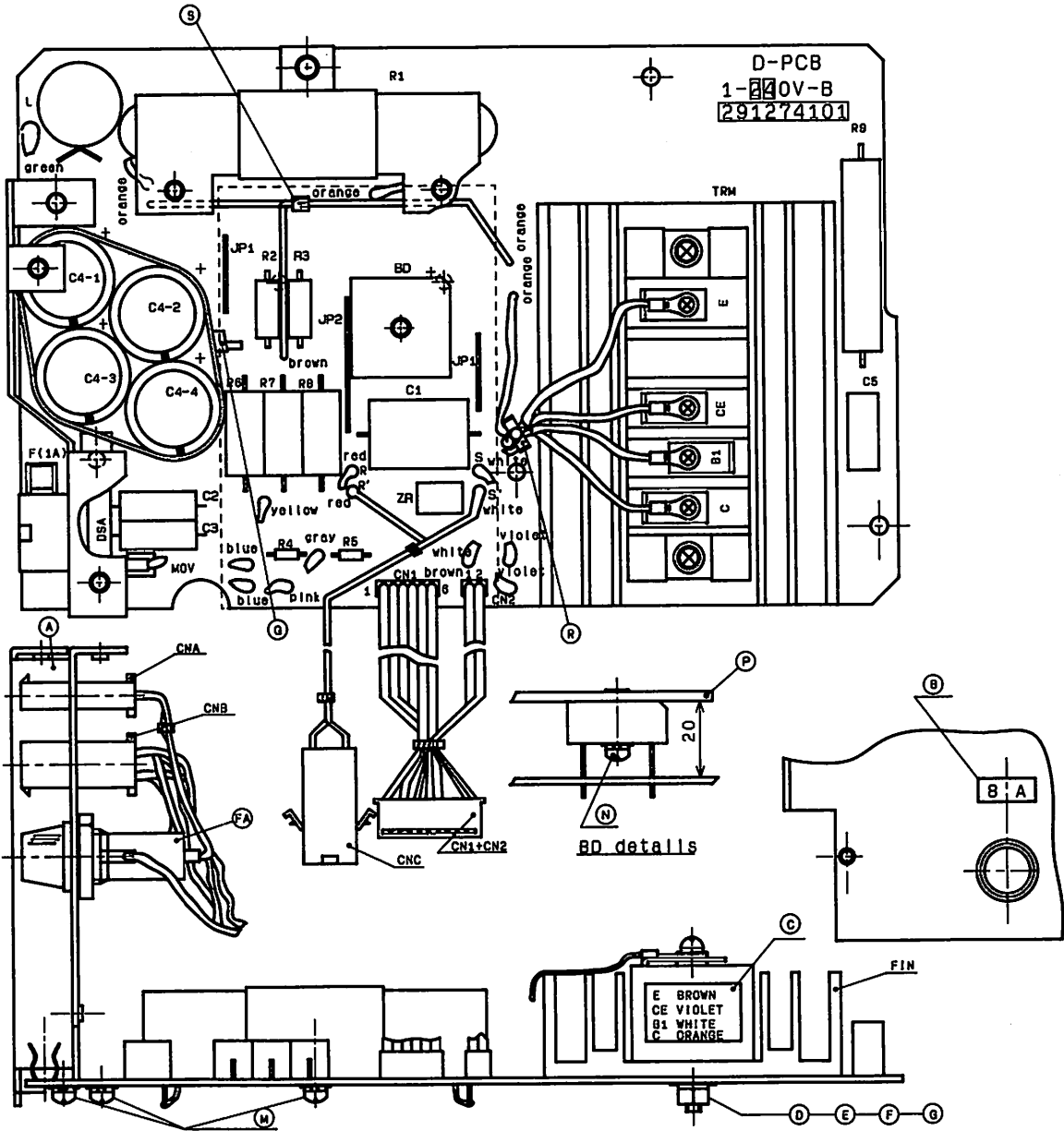


Symbol	Code	Name	Qty	Note
C1	229143001	MTB-2J-105K	1	630V, 1UF
C2, C3	229357001	MDD-2J-223K	2	630V, 2200PF
C5	229356001	MDD-2J-104K	1	630V, 0.1UF
C4-1, -2	233640001	HPR2V221M	4	450V, 220UF
R1	229140001	MFS40AR4K	1	40W, 0.4
R6, 7, 8	229368001	MS905NR1K	3	5W, 0.1
R9	229368001	MS910NR6K	1	10W, 5.6
TRM	233643001	51TRM1D130F-050	1	450V, 30A
BD	229142001	S1DS15V860	1	800V, 15A
R2, R3	234372001	ERC-1GJ224	2	1W, 220K
R4	080393320	ERD-50TJ393	1	0.5W, 39K
R5	080224320	ERD-50TJ224	1	0.5W, 220K
L	229358001	SF-T10-50M	1	3A
F	229359001	Fuse Holder S-N5051	2	
ZR	232380001	ENC621D-10A	1	620V
MOV	232382001	NV620D10	1	620V
DSA	232384001	DSA362MA	1	
FIN	233637001	27CU07B	1	
RC	229384001	RC code	1	
+C	233648001	+ *	1	
CC	233650001	C *	1	
CEC	233651001	CE *	1	
BC	233652001	B *	1	
EC	233653001	E *	1	
S	218859001	Band M150	4	
Q	233655001	Band M270	1	
R	227189001	Fastener 5.2L	1	
FA	225433001	Fuse Holder #3	1	
	219225000	Fuse 8A	1	

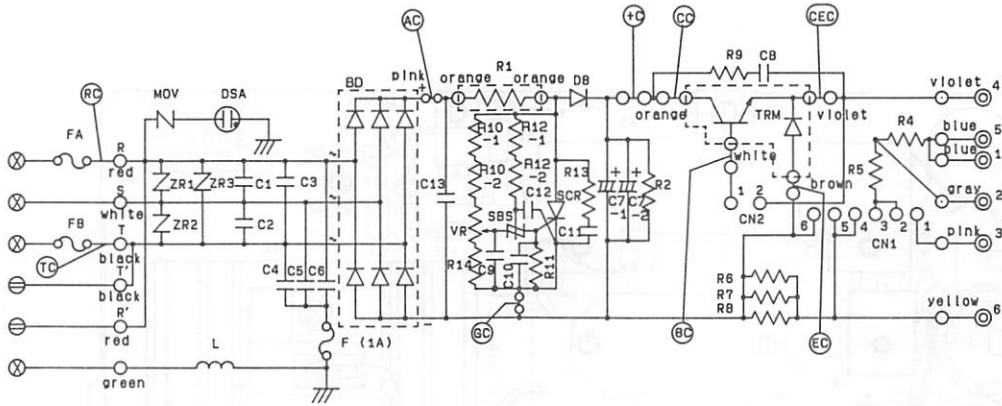
Symbol	Code	Name	Qty	Note
A	233636001	Connector Base -4	1	
B	233638001	Label 8A	1	
D	082501660	Screw 5X16	2	
E	026050370	Washer 5	2	
F	028050280	Spring Washer 2-5	2	
G	021500280	Nut 2-5	2	
N	224120001	Set screw 4X16DB	1	
C	233688001	Wire Label	1	
M	216872001	Set Screw 4X8DB	3	
CNA	229145001	Power Connector Assem.	1	
CNB	229376001	Motor Connector Assem.	1	
CNC	229148001	Trans Connector Assem.	1	
CN1+CN2	229383001	FIB Connector Assem.	1	
JP1	229371001	Jumper Wire 0.8X30	2	
JP2	229379001	Jumper Wire 0.8X55	1	
P	233639001	FIN 70X110	1	

MD-802, 803 D-PCB1-240V-B 291274101 1 Phase 240V

NOTE: This D-PCB assembly is interchangeable for MD-802.



# D printed-circuit board 3-240V assembly

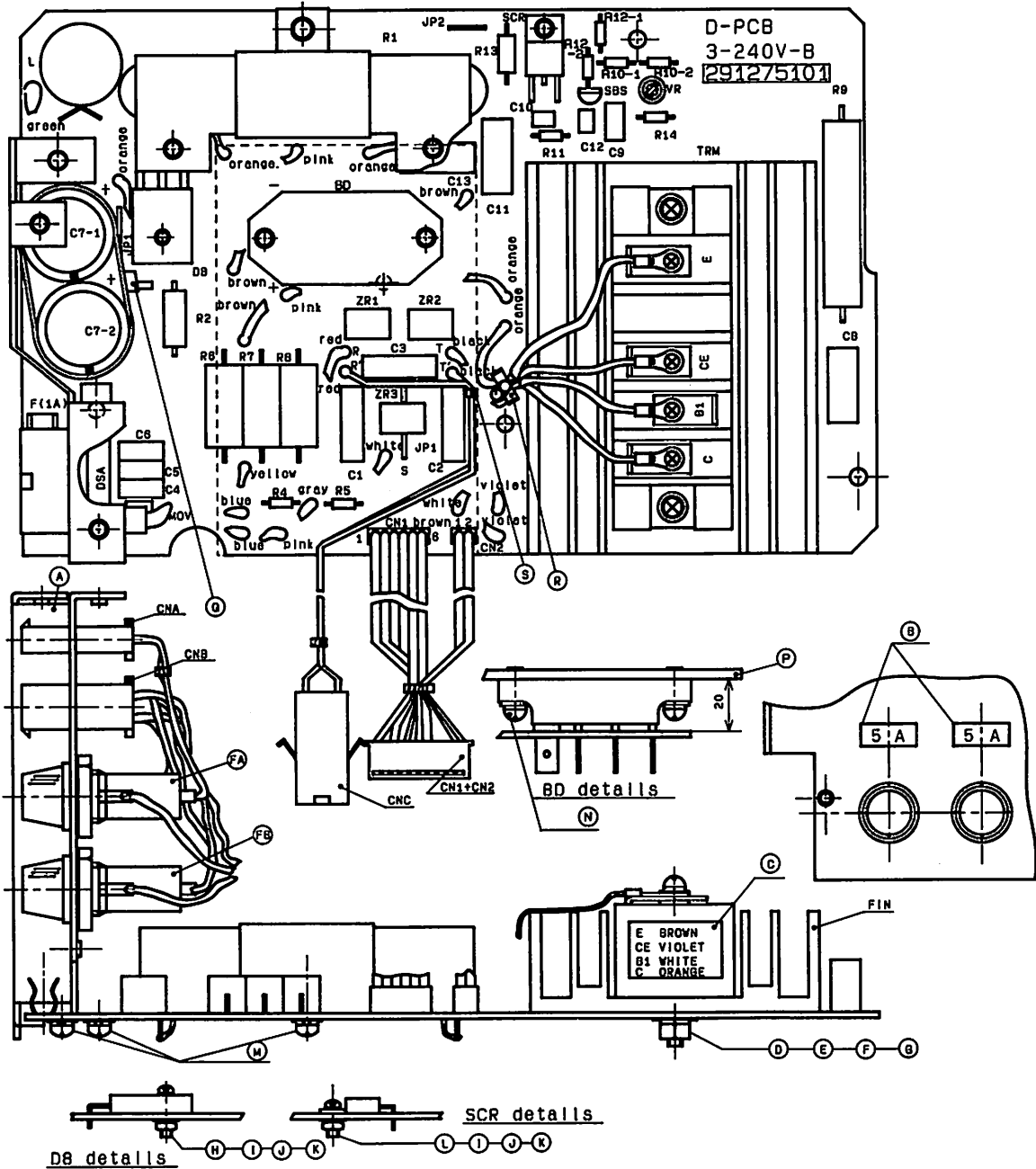


Symbol	Code	Name	Qty	Note
C1, C2, C3, C8	228356001	MDD-2J-104K	6	630V, 0.1uF
C11, C13				
C4, C5, C6	228357001	MDD-2J-223K	3	630V, 0.022uF
C9	Y54740040	ECG-V1H474JZ	1	50V, 0.47uF
C12	Y51040040	ECG-V1H104JZ	1	50V, 0.1uF
C10	Y54730040	ECG-V1H473JZ	1	50V, 0.047uF
C7-1, -2	233640001	HPR2W221M	2	450V, 220uF
R1	228363001	MFS40A020K	1	40W, 2
R9	228366001	MSS10N5R6K	1	10W, 5.6
R6, R7, R8	228368001	MSS05NR1K	3	5W, 0.1
TRM	233643001	SITRMID130F-050	1	450V, 30A
BD	234369001	SIDDF20DB	1	800V 20A
VR	229148001	CVR-1RLB502RJ-6P	1	5K
SCR	228615001	SCRRC6AM-12	1	600V, 6A
SBS	229027000	BS08A	1	BV
DB	229144001	SIDS12KC40	1	400V, 12A
R2	234372001	ERC-1GJ224	1	1W, 220K
R4	090393320	ERD-50TJ393	1	0.5W, 39K
R5	090224320	ERD-50TJ224	1	0.5W, 220K
R13	234374001	ERC-1GJ330	1	1W, 33
R10-1, -2	090244320	ERD-50TJ244	4	0.5W, 240K
R12-1, -2				
R14	090822120	ERD-25TJ822	1	0.25W, 8.2K
R11	090102120	ERD-25TJ102	1	0.25W, 1K
L	228358001	SF-T10-50M	1	3A, 110uH
F	228359001	Fuse Holder S-N5051	2	
ZR1, ZR2, ZR3	232380001	ENC621D-10A	3	620V
MOV	232382001	NV620D10	1	620V
DSA	232384001	DSA362MA	1	
FIN	233637001	27CU07B	1	
TC	228385001	T code	1	
+C	233649001	+ *	1	
CC	233650001	C *	1	
CEC	233651001	CE *	1	
BC	233652001	B *	1	
EC	233653001	E *	1	
RC	228384001	R *	1	
AC	233654001	A *	1	
GC	234368001	G *	1	
S	218859001	Band M150	4	
Q	233655001	Band M270	1	
R	227189001	Fastener 5.2L	1	
FA, FB	224087001	Fuse Holder #2	2	
	215822000	Fuse 5A	2	

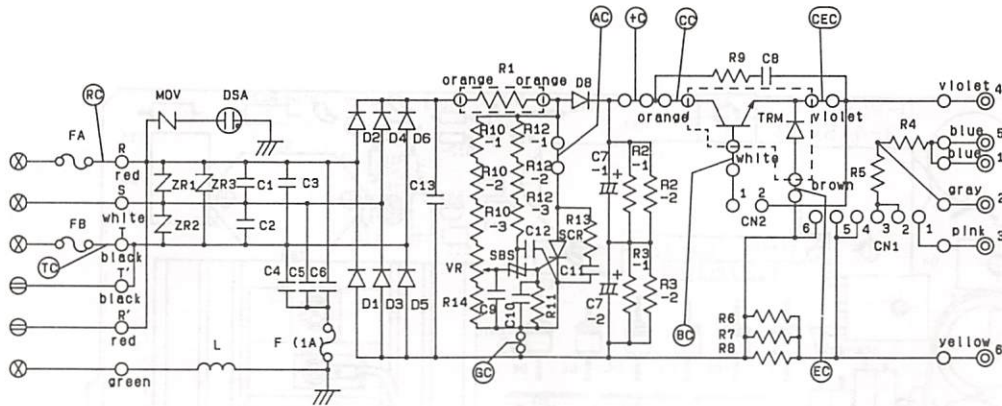
Symbol	Code	Name	Qty	Note
A	233635001	Connector Base -3	1	
B	224089001	Label 5A	2	
D	062501660	Screw 5X16	2	
E	025050370	Washer 5	2	
F	028050280	Spring Washer 2-5	2	
G	021500260	Nut 2-5	2	
H	062301260	Screw 3X12	1	
I	025030270	Washer 3	2	
J	028030280	Spring washer 2-3	2	
K	021300260	Nut 2-3	2	
L	062300860	Screw 3X8	1	
M	216872001	Set Screw 4X808	3	
CNA	228386001	Power Connector Assem.	1	
CNB	228376001	Motor Connector Assem.	1	
CNC	228387001	Trans Connector Assem.	1	
CN1+CN2	228383001	FIB Connector Assem.	1	
JP1	228371001	Jumper Wire 0.8X30	2	
JP2	228620001	Jumper Wire 0.8X15	1	
C	233688001	Wire Label	1	
N	217083001	Set Screw 4X12D	2	
P	233639001	FIN 70X110	1	

MD-812, 813 D-PCB3-240V-B 291275101 3 Phase 220~240V

NOTE: This D-PCB assembly is interchangeable for MD-812.



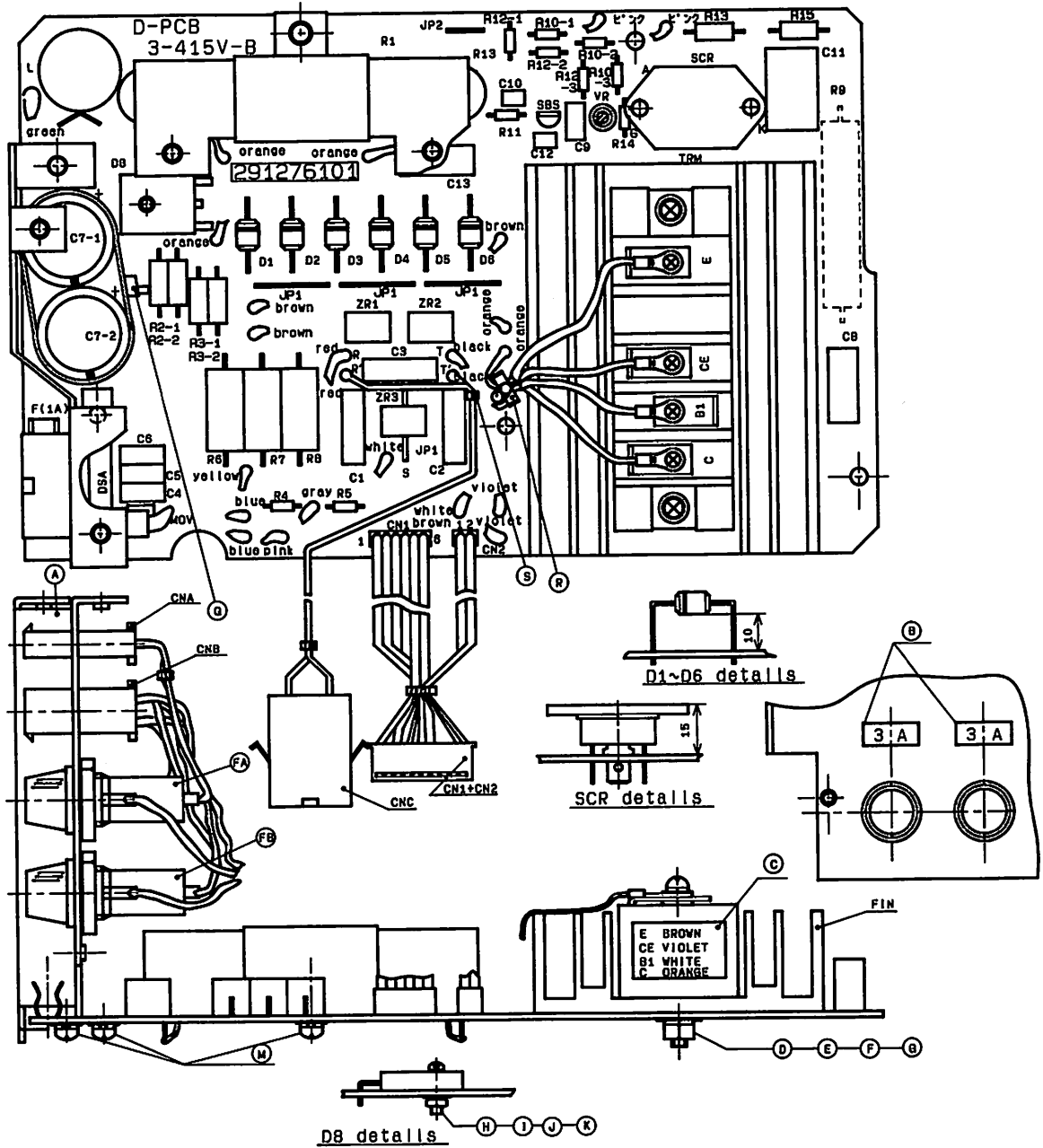
# D printed-circuit board 3-415V assembly



Symbol	Code	Name	Qty	Note	Symbol	Code	Name	Qty	Note
C1, C2, C3, C8	229149001	MDD-3A-104K	6	1000V, 0.1uF	A	233635001	Connector Base -3	1	
C11, C13					B	229160001	Label 3A	2	
C4, C5, C6	229178001	MDD-3A-103K	3	1000V, 0.01uF	D	062501660	Screw 5X16	2	
C9	Y54740040	ECQ-V1H474JZ	1	50V, 0.47uF	E	025050370	Washer 5	2	
C12	Y51040040	ECQ-V1H104JZ	1	50V, 0.1uF	F	028050280	Spring Washer 2-5	2	
C10	Y54730040	ECQ-V1H473JZ	1	50V, 0.047uF	G	021500260	Nut 2-5	2	
C7-1, -2	233640001	HPR2W221M	2	450V, 220uF	H	062301260	Screw 3X12	1	
R1	229152001	MFS40A040K	1	40W, 4	I	025030270	Washer 3	1	
R9	229154001	MSS15N100K	1	10W, 10	J	028030280	Spring washer 2-3	1	
R6, R7, R8	228368001	MSS05NR1K	3	5W, 0.1	K	021300260	Nut 2-3	1	
TRM	233644001	SITRMIDI30F-100	1	1000V, 30A	C	233688001	wire Label	1	
D1-D6	229150001	SIDERCO1-10	6	1000V, 1.5A	M	216872001	Set Screw 4X8DB	3	
VR	229148001	CVR-1RLB502RJ-6P	1	5K	CNA	229171001	Power Connector Assem.	1	
SCR	233642001	SCRSG16AA80	1	800V, 16A	CNB	229137001	Motor Connector Assem.	1	
SBS	229027000	BS08A	1	8V	CNC	229161001	Trans Connector Assem.	1	
DB	229157001	SIDD10V100	1	1000V, 10A	CN1+CN2	228383001	FIB Connector Assem.	1	
R3-1, -2	234372001	ERC-1GJ224	4	1W, 220K	JP1	228371001	Jumper Wire 0.8X30	4	
R4	090393320	ERD-50TJ393	1	0.5W, 39K	JP2	228620001	Jumper Wire 0.8X15	1	
R5	090274320	ERD-50TJ274	1	0.5W, 270K					
R13, R15	234375001	ERC-1GJ180	1	1W, 18					
R10-1, -2, -3	090334320	ERD-50TJ334	6	0.5W, 330K					
R12-1, -2, -3									
R14	090822120	ERD-25TJ822	1	0.25W, 8.2K					
R11	090102120	ERD-25TJ102	1	0.25W, 1K					
L	228358001	SF-T10-50M	1	3A, 110uH					
F	228359001	Fuse Holder S-N5051	2						
ZR1, ZR2, ZR3	232381001	ENC112D	3	1100V					
MOV	232383001	NV112D	1	1100V					
DSA	232384001	DSA362MA	1						
FIN	233637001	27Cu078	1						
TC	228385001	T code	1						
+C	233649001	+ *	1						
CC	233650001	C *	1						
CEC	233651001	CE *	1						
BC	233652001	B *	1						
EC	233653001	E *	1						
RC	228384001	R *	1						
AC	233654001	A *	1						
GC	234368001	G *	1						
S	218859001	Band M150	4						
Q	233655001	Band M270	1						
R	227189001	Fastener 5.2L	1						
FA, FB	224087001	Fuse Holder #2	2						
	215769001	Fuse 3A	2						

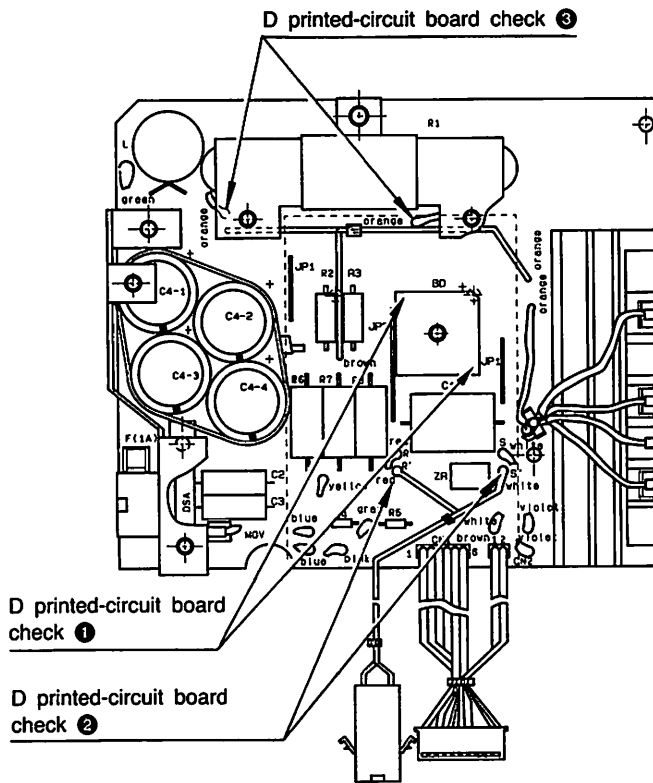
MD-812, 813 D-PCB3-415V-B 291276101 3 Phase 380~415V

NOTE: This D-PCB assembly is interchangeable for MD-812.



## B Type D printed-circuit board

D printed-circuit board 1-110V assembly  
1-240V assembly



### D printed-circuit board check ①

BD ⊖ - ⊖ both directions: must not be 0Ω

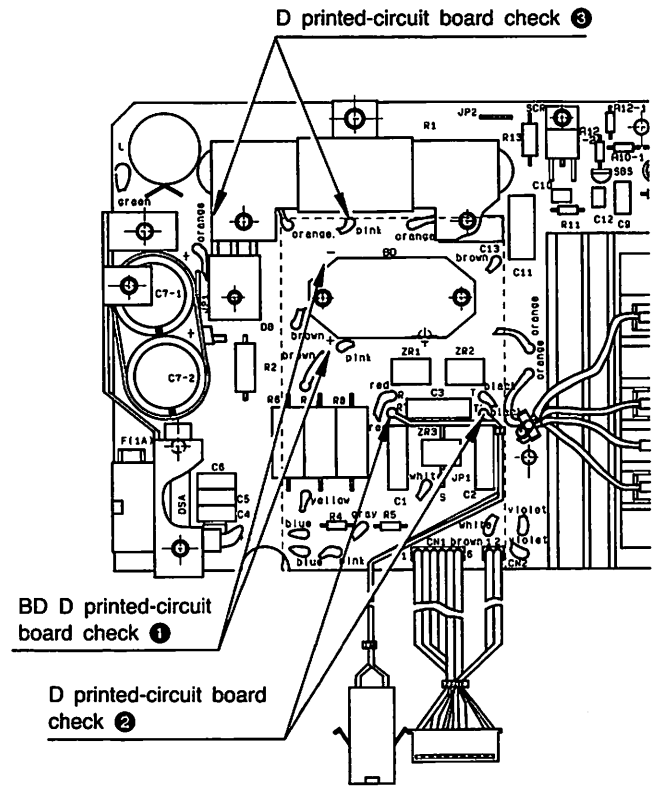
### D printed-circuit board check ②

Is solder of connector lead wiring OK?

### D printed-circuit board check ③

Between orange wires: must be 0-5Ω

D printed-circuit board 3-240V assembly  
3-415V assembly



### D printed-circuit board check ①

BD ⊖ - ⊕ and ⊖ - ⊖ both directions: must not be 0Ω

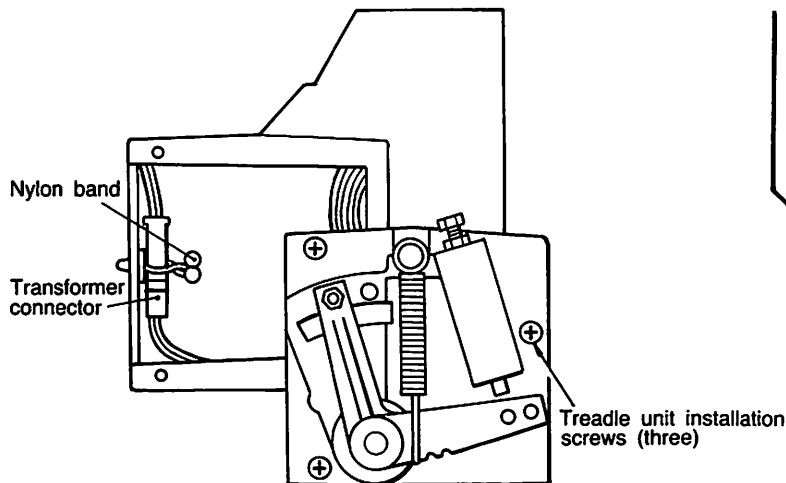
### D printed-circuit board check ②

Is solder of connector lead wiring OK?

### D printed-circuit board check ③

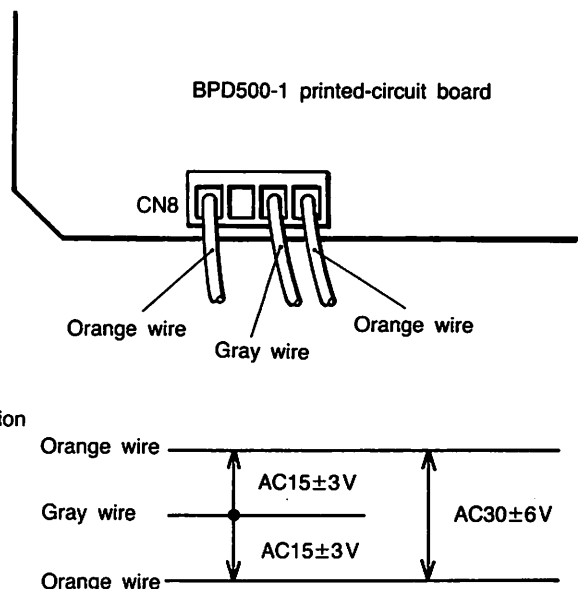
Between orange wires: must be 0-5Ω

Transformer primary voltage: OK #3-8



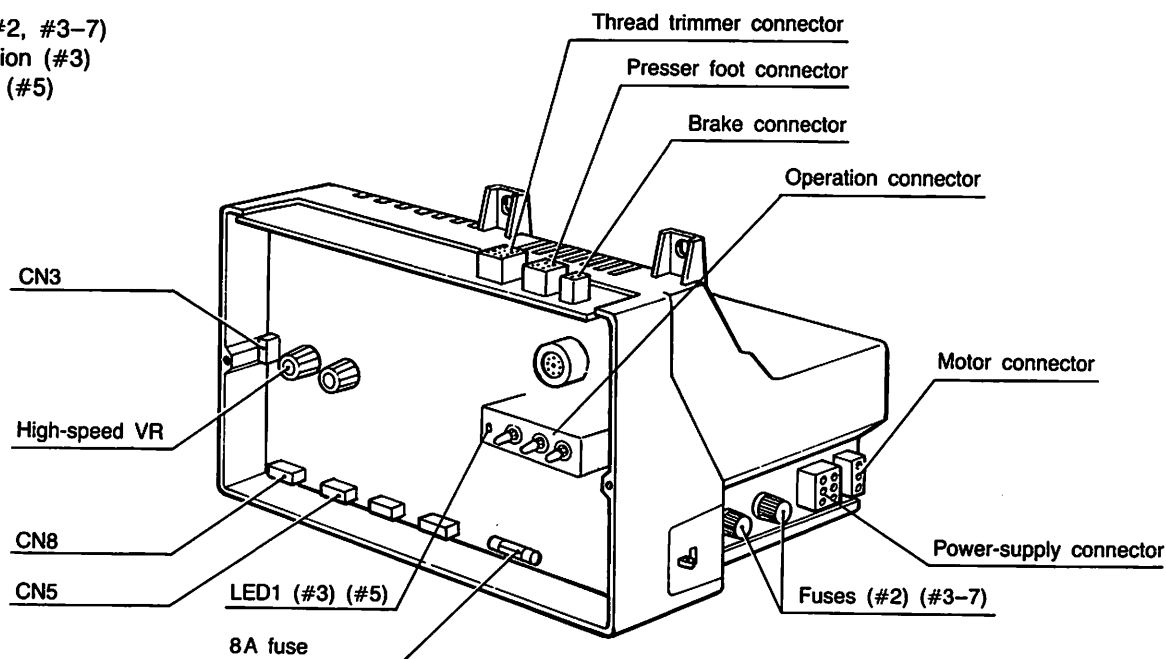
- (1) Remove the three treadle unit installation screws.
- (2) Disconnect the transformer connector from the nylon band.
- (3) Check the AC voltage of the transformer connector.

CN8 voltage: OK #4

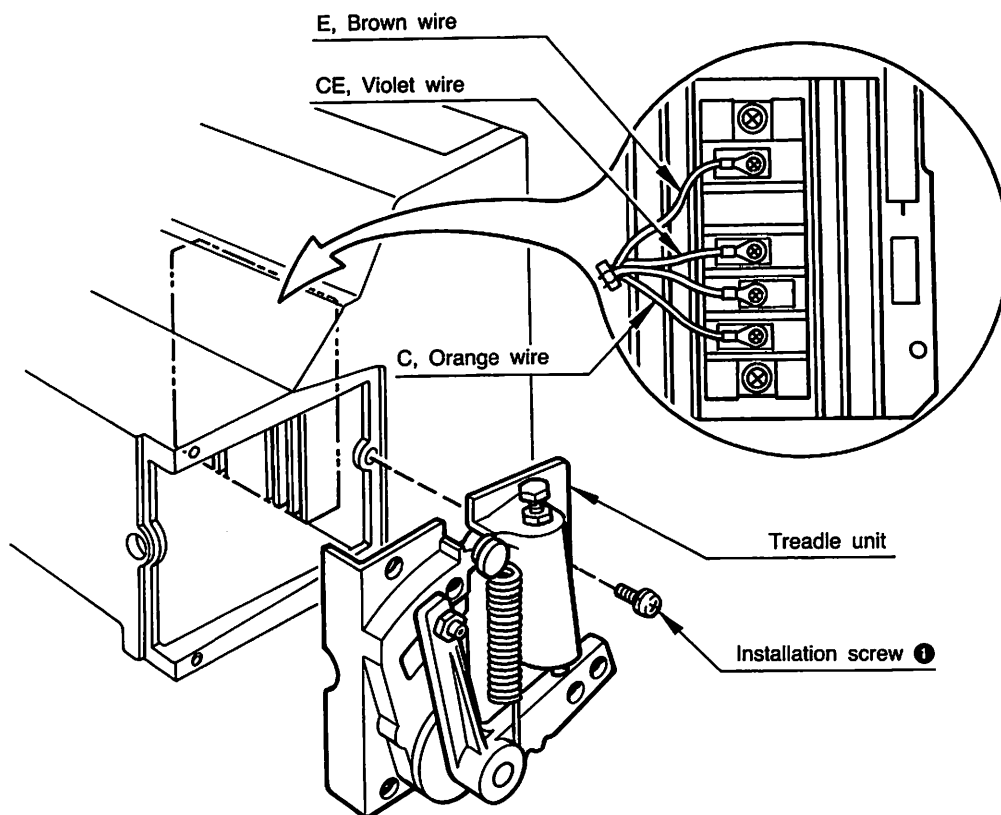




Fuse failure (#2, #3-7)  
 LED 1 illumination (#3)  
 LED 1 flashing (#5)



PTR, D: OK #1



**TRM check methods**

1. Remove the three treadle unit installation screws ①.
2. Set the tester to the X 1Ω range (0ohm adjustment).
3. PTR continuity test  
 Between TRM C (orange wire) and CE (violet wire)  
 Should not be 0ohms in both directions.
4. D continuity test  
 Between CE (orange wire) and E (brown wire)  
 Should not be 0ohms in both directions

**Note:**

If the TRM is damaged, replace the frame assembly of the motor used as a set with the control box. (The motor torque becomes weak and all rotation becomes higher.)